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AN ANALYSIS OF THE HEATING AND DENSIFICATION PROCESS DURING ROTATIONAL MOLDING OF A THERMOPLASTIC POWDER IN A UNIAXIALLY ROTATING CYLINDRICAL CAVITY

by Floyd S. Ribe

Dissertation submitted to the Faculty of the Graduate School of the New Jersey Institute of Technology in partial fulfillment of the requirements for the degree of Doctor of Engineering Science 1985

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FLOYD S. RIBE

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APPROVAL SHEET

Title of Thesis: AN ANALYSIS OF THE HEATING AND DENSIFICATION PROCESS DURING ROTATIONAL MOLDING OF A THERMOPLASTIC POWDER IN A UNIAXIALLY ROTATING CYLINDRICAL CAVITY

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ABSTRACT

Title of Thesis: AN ANALYSIS OF THE HEATING AND DENSIFICATION PROCESS DURING ROTATIONAL MOLDING OF A THERMOPLASTIC POWDER IN A UNIAXIALLY ROTATING CYLINDICAL CAVITY

Floyd Steven Ribe, Doctor of Engineering Science, 1985 Thesis directed by: Dr. Richard C. Progelhof Professor of Mechanical Engineering

This dissertation presents the results of an experimental and theoretical investigation of the heating and densification portion of the rotational molding process in a uniaxial, cylindrical mold.

A thorough literature survey is included which reviewed past analysis of the rotational molding process and other areas that assisted in understanding of the process.

The results presented in this dissertation included an analysis of the densification process by use of Scanning Electronic Microscope (SEM) photography producing intermediate correlations between the physical properties of the densifying material and neck radius of adjacent coalescing spheres. In addition, a hybrid experimental procedure coupled with a small computer simulation was devised to determine the actual initial thermal conductivity and diffusivity of the powdered polymeric material.

Finally, a computer program was written to simulate the heating and densification process during the rotational molding process. Results showed good agreement with actual experimental findings.

ACKNOWLEDGMENTS

The author would like to express appreciation to Dr. R. C. Progelhof for his guidance and assistance throughout the preparation of this dissertation.

Also appreciated for their assistance are my many friends and co-workers at Picatinny Arsenal, Dover, NJ.

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I. INTRODUCTION

This dissertation presents the results of an experimental and theoretical investigation of a portion of the rotational molding process of a thermoplastic material in a cylindical mold. In rotational molding or rotomolding of thermoplastic powders, the process consists of the following steps:

- 1 Loading the mold with a fixed mass of resin
- 2 Simultaineously heating and melting the thermoplastic powder while the mold rotates
- 3 Cooling the mold
- 4 Unloading the mold

During loading, a premeasured mass of thermoplastic powder is placed in a two or three part split mold of which one section is bolted to a platform. The mold is closed and locked. The mold platform is bolted to an arm which moves the mold from station to station and biaxially rotates the mold at a predetermined rate. Rotational speed and directional speed ratios are adjusted by gearing.

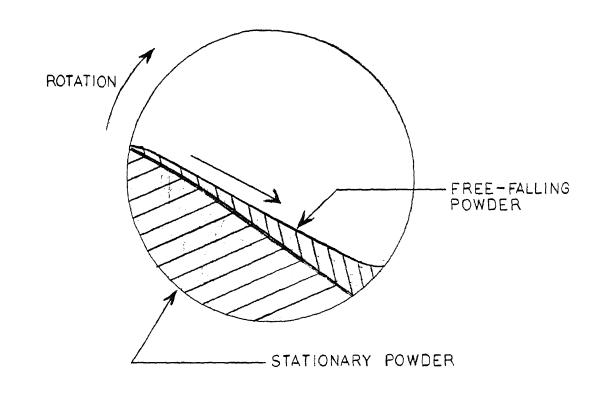
After loading, the arm moves the mold into an oven and the biaxially rotation is started. At this point the powdered material is still cool and due to gravity the powder forms a pool at the bottom of the mold. Figure 1 shows a typical pool flow of a uniaxial clockwise rotating mold and is the type used in this investigation to experimentally verify the theoretical analysis. As the mold rotates, friction causes the material to follow and remains stationary to the motion of the mold surface. When the powder particles reach a point where friction is overcome by gravity, the individual powder granules begin to free fall over the top surface of the following adjacent material of the stationary pool. The stationary and free fall zones are shown in Figure 1. Experiments have shown that the actual motion of the stationary and free falling powder is dependent upon particle geometry, air volume fraction and surface character of the powder.

This rotational process continues until the mold surface reaches a temperature that causes the material to begin to soften and adhere to the mold surface. This temperature is called the "stick temperature". With increasing mold temperature, more material adheres to the mold surface until the mold surface is covered. With a further increase in mold surface temperature, layers of powder will be built on the mold wall causing the pool to deplete. The material adhering to the surface of the mold is a porous powdered layer initially held together by point

2



TYPICAL POOL FLOW



contact of the individual powder particles.

During the period of time for which the particles are adhering to the wall of the mold, the material begins a densification process. During this process the material particles lose their individuality by joining themselves first at the contact points, then "melting" into a solid piece with minute air voids throughout the molten resin. The initial phase of this densification process is similar to the sintering, coalesence and fusion processes in the field of drop coalescense, paint technology, ceramics and glass.

When the heating process is completed, the mold is first air cooled allowing an even temperature distribution within the part and densification of the molded part to complete. Rapid cooing to room temperature is then usually accomplished by water spray on the exterior mold surface.

This investigation will analyze this rotational molding process excluding the cooling portion of the cycle. A literature survey will first be made to review past works. Finally two mathematical models will be developed to predict the material heating process which includes the time for complete densification.

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II. LITERATURE SURVEY

The literature available of the rotational molding process and the analysis thereof is very limited. Because of this, the literature survey will first examine the available published works on the subject and then at other related articles that also provide additional insight toward understanding the rotational molding process. These areas include a survey of articles concerning sintering which help describe the densification process in rotational molding, a survey of the thermal conductivity of porous material used to predict the thermal conductivity of powdered material similar to that encountered in the initial phase of the rotational molding system, and a rewiew of previously published works that analyzed the mass flow in a rotating cylinder.

Modeling of the Rotational Molding Process

One of the first to attempts to analytically model the rotational molding process was reported by Rao and Throne (31,32, and 14). They modeled the heat transfer to the mold and powder, the fluid flow of the powder, the sintering-melting and degradation during this process.

In their analysis, the authors' assume that an exponential internal mold surface temperature profile is resultant of a constant ambient oven temperature and 5

convective film coefficient . Assuming a polynomial temperature profile of the penetration thickness of the powdered material adjacent to the mold surface, they computed the amount of material adhering to the mold surface when the mold temperature reaches or exceeds the material stick temperature. By subtracting the predicted amount of powder that adhered to the mold surface, the new volume of the pool was determined. The analysis repeats until all material has left the pool.

Vanderbeck(30) modified Rao and Throne's models by improving some of the basic flow assumptions in the pool. As with Rao and Throne, Vanderbeck also assumes constant physical and thermal properties. Both authors disregard the fact of material that has traveled around the mold and has reentered the powdered pool and thus neglecting the insulating effect of the material adhering to the mold surface.

Throne(33) and Ahdout(34) modeled a rotational system which assumed the powdered material to be evenly distributed around the mold surface, neglecting the actual flow of the powder within the pool region and the mixing zone. Temperature dependent properties were calculated by using a linear interpolation between the known powdered state at the beginning and the final solid state at the end of the process. The Throne, Rao, Vanderbeck and Adhout models all simulate in a very rough manner, a portion of specific phases of the rotational molding process. However, a complete simulation with temperature dependent properties to predict pool depletion and total densification has yet to be accomplished.

Mass Flow

In the study of mass flow in a rotating cylinder, Lehmverg, Hehl and Schugerl(41) performed experiments using color tracers placed in the pool of powdered material of a rotating drum having transparent ends for visual observations. As the drum rotated, the position of the tracers were recorded. Their results showed an area where most of the material remained stationary relative to the wall during mold rotation and a thin layer of material on top of the stationary pool that mixed as it rolled down the incline of the surface of the material. These results as well as results reported in references 53 and 54, fully concur with the brief description of the typical mass flow in rotational molding made in the introduction.

Sintering

The sintering, coalescence and fusion of particles have been studied in the field of drop coalescence, paint technology, ceramics, glass and polymers. References

7

1-28,35,51,53,54, and 56 were reviewed with respect to the sintering process of polymers. The following is a brief summary of the major applicable works.

Frenkel(1) analyzed the phenomena of "Cold Welding" of two amorphous spheres. Based on thermodynamic relationships, a relationship to predict the neck radius, x, of two coalesing spheres (Figure 2), is given by:

$$x^2 = 3art/2\eta$$

where γ is the surface tension; η , is the Newtonian viscosity; a, is the radius of the sphere; and t is time.

To illustrate the application of Frenkel's equation for isothermal sintering for polyethylene, the properties of which are listed in Table 1, the following sintering equations are generated:

For 105 °C $\frac{x^2}{a} = 8.915 \times 10^{-6} \text{ t}$ where x and a are in cm. and t is seconds

For 150 °C
$$\frac{x^2}{a} = 6.549 \times 10^{-5} t$$

For 180 °C
$$\frac{x^2}{3} = 1.959 \times 10^{-4} t$$

The predicted results are plotted in Figure 3. Note the linear relationship between $\frac{\chi^2}{a}$ as a function of time that



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SINTERING OF TWO ADJACENT SPHERES

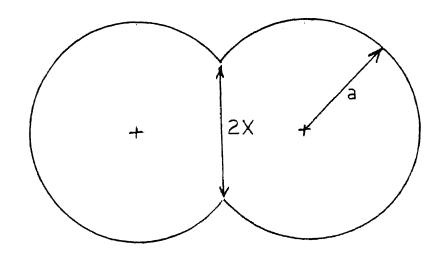


TABLE 1

PROPERTIES OF POLYETHYLENE

Surface Tension(18)

$$\gamma(T) = \gamma_0 - (\partial \gamma / \partial T) (T - T_0)$$

For Polyethylene

γ(Τ)	=	31	-	(0.058)(T-105)	Where	2:		
					tγ	ίs	in	dynes/cm
					T f	ĹS	in	degrees C.

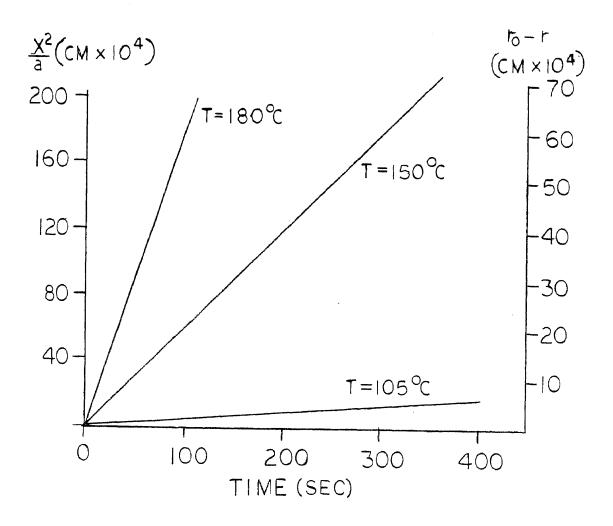
Viscosity(6)

$$\eta = \eta_0 \exp\left\{\frac{-E}{R} \frac{(T - T_0)}{(T) * (T_0)}\right\}$$

For Polyethylene

$$n = 5.22 \times 10^{6} \exp\left\{-19.583 + \frac{7402.5}{T}\right\}$$

Where: n is in Poise T is in degrees K



PLOTS OF FRENKEL'S EQUATIONS FOR POLYETHYLENE

Figure 3

11

intersects at the origin.

Frenkel also derived the theory of densification of glass for the second stage of sintering where the voids become individual bubbles that slowly reduce in diameter. The equation for the collapse of an individual bubble is given by:

$$r_o - r = \frac{\gamma}{2\pi} t \qquad (eq. 2)$$

where r_o is the original pore radius at time zero and r is the radius at time t. Using the polyethylene properties in Table 1, the collapse of the voids for the three temperatures used are as follows:

For 105 °C $r_{0} - r = 2.97 \times 10^{-6} t$ For 150 °C $r_{0} - r = 2.18 \times 10^{-5} t$ For 180 °C $r_{0} - r = 6.53 \times 10^{-4} t$

These equations are plotted in Figure 3.

Frenkel's equation(eq 1) was experimentally confirmed by Kuczynski(2) where glass beads were heated on top of a glass plate having the same composition as the beads. After heating, the samples were rapidly cooled and mounted in Bakelite. The dimensions were measured and plotted in



KUCZYNSKI'S RESULTS OF SINTERING GLASS SPHERES

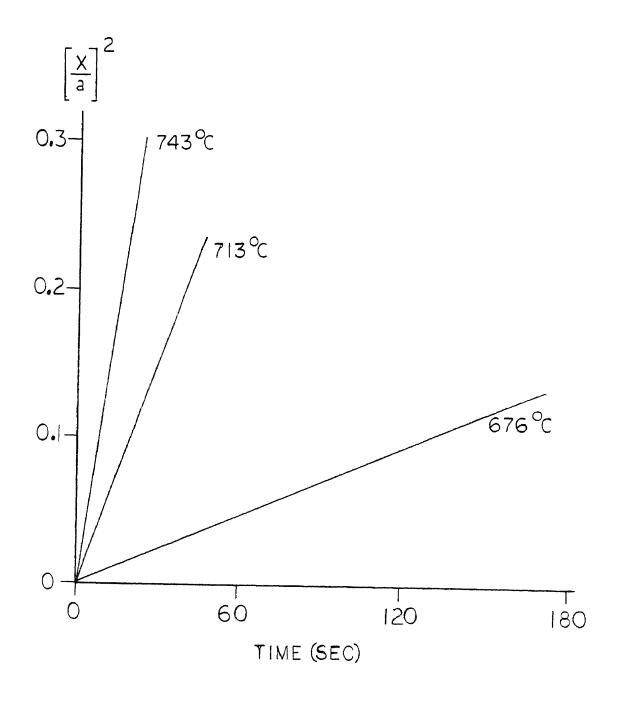


Figure 4. The experimental results confirmed the linear relationship of Frenkel's equation intersecting at the origin. Kuczynski along with Zaplatynskyj(13) confirmed Frenkel's colapsing theory, Equation 2, by heating capillary tubes and measuring the collapse of the internal diameter as a function of time.

Dillion, Matheson and Bradford(5) investigated the sintering of synthetic latex particles. Experimental results indicated that the coalescence process occurs by the same mechanism as was described by Frenkel equation.

Kuczynski, Neuville and Toner(3) performed the same type experiment as Kuczynski(2) using Poly(methy) Methacrylate (acrylic). Figure 5 presents the experimental results. They found for this polymer, Frenkel's equation(eq. 1) is inadequate. The following empirical equation was then correlated:

$$\begin{bmatrix} x^2 \\ a^{1.02} \end{bmatrix}^P = F(T) t \quad (Equation 3)$$

where F is a function of temperature only and P is the slope of the curve in Figure 5. Lontz(4) replots Figure 5 using $\frac{X}{a}$ for the Y axis (as opposed to $\frac{\chi^2}{a}$) versus time(Fig. 6). It is obvious from this graph that the y intersection of the linear curves tend to increase with temperature giving an indication of a time delay to the



NECK GROWTH OF PMMA SPHERES

$$\frac{x^2}{a}$$
 vs TIME

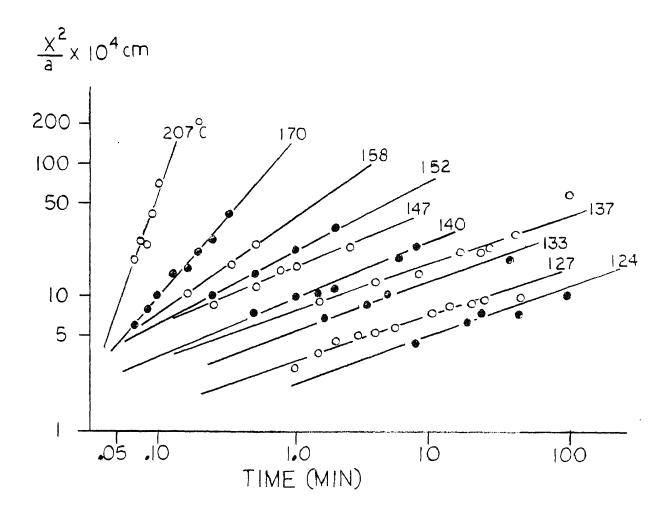
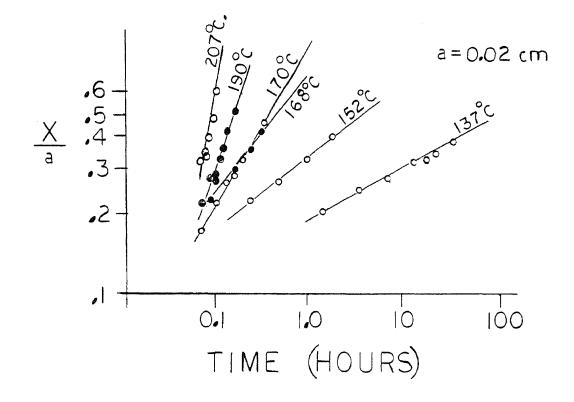


Figure 6

NECK GROWTH OF PMMA SPHERES

$$\frac{X}{a}$$
 vs TIME



sintering process. This is not unexpected due to the transient temperature response of the spheres.

Shonhorn, Frisch and Kwei(10), studying the kinetics of wetting of surfaces by polymer melts, showed that polymers at high temperatures exhibited a shifted Frenkel curve, as is evident in the Kuczynski, Neuville and Toner's plots(Figure 5).

Lontz(4) developed a model of sintering between two viscoelastic spheres yielding the equation:

$$\frac{\chi^2}{a} = \frac{3t}{2\eta} \frac{1}{1 - \exp(-t/\lambda)}$$
 (Equation 4)

where the second right hand term is a correction factor to the Frenkel equation to account for viscoelastic effects. The term, λ , is a relaxation time constant. The relaxation time constant is determined experimentally for each resin and temperature. Its significance can be better understood by examining the four element Maxwell-Voigt model(Figure 7) for a viscoelastic body.

The spring E_1 in Figure 7 act as the Hookean repsonse while the dashpot, η_3 , corresponds to the Newtonian fluid response. The spring, E_2 , and dashpot, η_2 , represent the

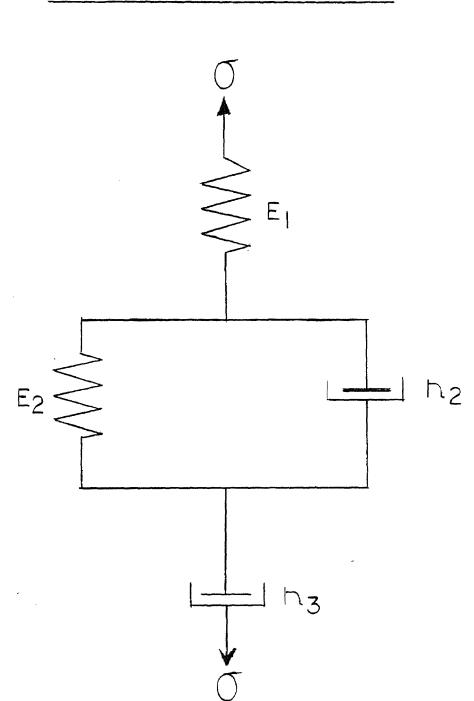


Figure 7

FOUR ELEMENT MAXWELL - VOIGHT MODEL

retarded elastic response of the polymer molecules. When the stress, σ , is applied, E_1 and η_3 react instantly while because of the physical arrangement, E_2 and η_2 have a delayed response. Together the system has a viscoelastic effect. The ratio of η_2 to E_2 is the relaxation time constant, λ , or:

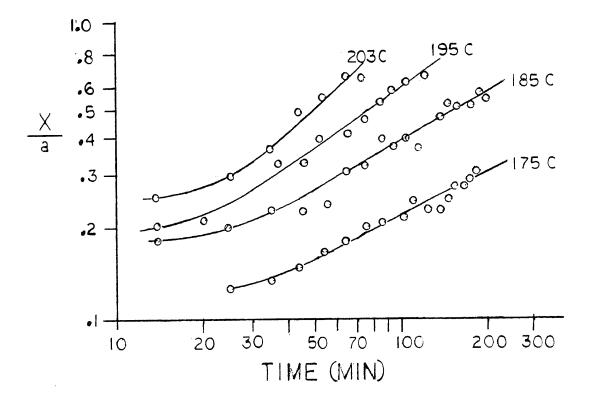
$$\lambda = \frac{\eta_2}{E_2}$$
 (Equation 5)

Narkis(8) also studied the sintering of closely packed Poly(methyl) Methacrylate spheres in a circulated air oven. Experimental results showing neck radius verus time for four temperatures are shown in Figure 8. The shapes of the curves were very similar to the theoretical curves given by Lontz's equation(Eq. 4)

An examination of these curves, show a non-linear portion is followed by a linear portion. The non-linear portion is due to the viscoelastic effect (E_2 and η_2 of our model) after which the relaxation term approaches unity reverting the Lontz equation to a shifted Frenkel equation (the linear portion). Note that the Kuczynski, Neuville and Toner(3) curves only showed the linear portion of the curves. They neglected to realize any relaxation effect but only stated that Frenkel's equation was inadequate. Also note, the viscoelastic effect is shortened as would be expected due to greater moleculer mobility as the sintering temperature is increasd.



SINTERING OF PMMA SPHERES BY NARKIS(8)



Steiner, Manson and Nippert(9), using the basic differential Frenkel equation, numerically integrated the equation using the exact value for the sin θ rather than Frenkel's assumption of sin $\theta = \theta$. (Only valid for small values of θ). Numerical results of $\frac{\chi^2}{a}$ versus time showed a better correlation to their experimental data for viscous sintering. A viscoelastic sintering equation which included a retardation time factor similar to that developed by Lontz was also derived.

Menges and associates(20) developed an isothermal growth correlation based on surface tension, neck curvatures and inner frictional forces. Theoretical results agreed with their experimental results.

Rosenzweig and Narkis(21) performed a study of dimensional changes of sintering particles. Based on the Frenkel's sintering model(Figure 9), the authors derived the following relationships of two sintering spheres:

$$x = (2az - z^2)^{0.5}$$
 (Eq 6)

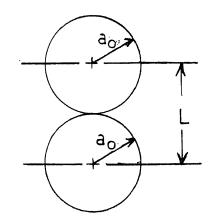
 $L = 2a - 2Z \qquad (Eq 7)$

$$4a^3 - 3Z^2a + Z^3 - 4a_0^3 = 0$$
 (Eq 8)

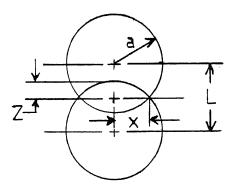
Figure 9

GEOMETRY OF TWO SINTERING SPHERES

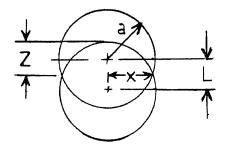
(FRENKEL'S MODEL)

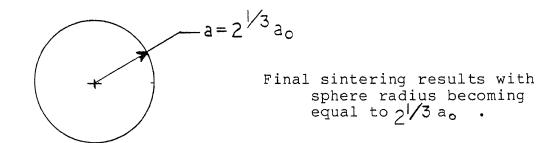


- Initially Two spheres with length L, between centers
 - ao = initial radius of
 two spheres



During sintering neck radius x, is formed as lenth L, decreases





where:	х	=	neck radius	
	a _O	=	original sphere radius	
	a	=	sphere radius during sintering	
	2*Z	=	penetration depth of two sintering	
	spheres			
	L	=	length between the centers of the	

two sintering spheres

These equations will be later used in this work to determine the density of the powdered material as a function of distance between centers of sintering spheres. The results were used to correlate the density of a group of spheres as a function of neck radius.

Thermal Conductivity

Progelhof, Throne, and Ruetsch(33) performed an in depth investigation of published articles studing the thermal conductivity of foamed, powdered or composite materials. In addition to the articles reviewed by Progelhof, Throne, and Ruetsch, references 34-46 were also reviewed. In most correlations evaluated, the values of k_c and k_d (where k_c = thermal conductivity of the continuous material and k_d = thermal conductivity of the discrete material) must be determined. In the case of rotomolding, until the material starts to stick to the mold, it is assumed that the polymeric material is the discrete phase that is surrounded by a continuous phase of air. Upon the commencement of the fusing process, the polymeric material is assumed to be the continous phase surrounding the discrete phase, air.

Figure 10 illustrates the Maxwell Model of thermal conductivity as reported by Progelhof, Throne and Ruetsch (35) of polyethylene and air. The top curve represents the predicted thermal conductivity with air as the discrete phase while the bottom curve represents polyethylene as the descrete phase. The dotted lines labled A', B' and C' represents possible routes where air originially the continuous phase changes over to the descrete phase as is expected to occur in the rotational molding process.

The original intent of this investigation was to use one of these equations to predict the thermal conductivity of the powdered material while in the pool. Using this value, new values as a function of temperature and neck growth would be estimated. However, in performing the thermal conductivity calculations, a great variance was found. Figure 11 shows six thermal conductivity estimate equations and the results using air as the discrete material and then as the continuous material. The results show a variance of two magnitudes. To avoid justifying one value over another, this investigation will use experimental data to determine the actual value. The experimental procedures are discussed latter.

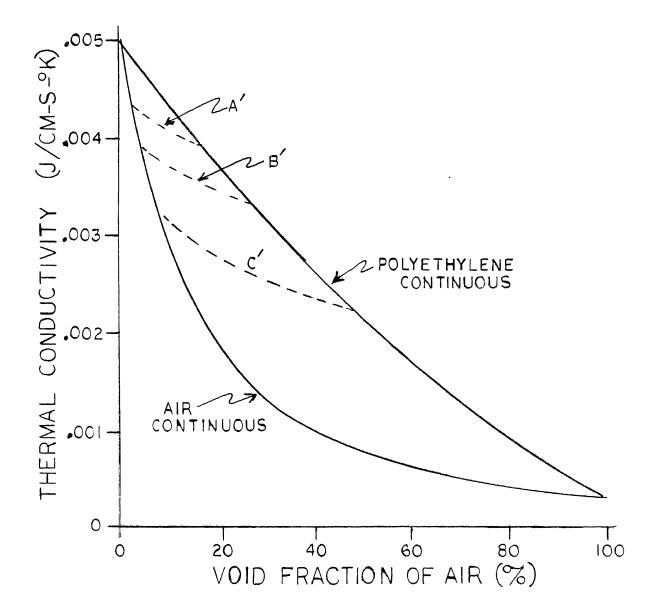


Figure 10

MAXWELL'S MODEL FOR THERMAL CONDUCTIVITY

Figure 11

COMPARISON OF VARIOUS

VARIOUS COMPOSITE THERMAL CONDUCTIVITY EQUATIONS

COMPUTED THERMAL CONDUCTIVITY (J/cm-sec-K)

Descrete Material	Polyethylene	Air
Continuous Material	Air	Polyethylene
Fraction of Continuous Material	0.58	0.42
EQUATION		
Yagi - Kunni	9.90 E-05	3.24 E-04
Maxwell	4.98 E-04	2.52 E-03
Lewis and Nielson	2.76 E-03	1.10 E-02
Russel	1.08 E-03	2.66 E-03
Geometric Mean	1.39 E-03	1.39 E-03
Series	2.96 E-03	2.96 E-03

Thermal Conductivity of Polyethylene = 4.93 E-03 J/cm-s-KThermal Conductivity of Air = 2.42 E-04

NOTE: Equations used in the computations of the thermal conductivity taken from Reference 35.

III. STATEMENT OF THE PROBLEM

All previously published investigations of rotational molding were based upon models that had limited restrictions. One assumed constant physical and thermal properties, while the other assumes the material already distributed around the mold. Investigations dealing with sintering(densification) of particles all involved an isothermal process. In rotomolding, the "sintering" process starts with polymer powder being placed in a mold at ambient temperature. The mold is then heated as it is rotated in an oven. As the temperature of the polymer reaches the stick temperature, it begins to adhere to the mold wall. This process is continued until all powder has adhered and then begins to densify.

This dissertation is an investigation of the rotational molding process. It includes an analysis of the material flow in the pool and an investigation of the heating and densification process. It does not include the cooling portion of the cycle. A theoretical simulation model of the rotational molding process was then derived to predict pool depletion and densification times using temperature and time dependent properties. In lieu of justifying the use of one of the many composite thermal conductivity equations (reviewed earlier) over another, an

experimental procedure was developed in conjuction with a small computer program for determining the actual powder thermal conductivity. In the conculsions, the theoretical results predicted by this new model are compared to the actual measured rotational molding pool depletion times and with the other previous simulation results. The densification times between the simulations developed are then compared with the earlier simulation results of Throne and Adhout.

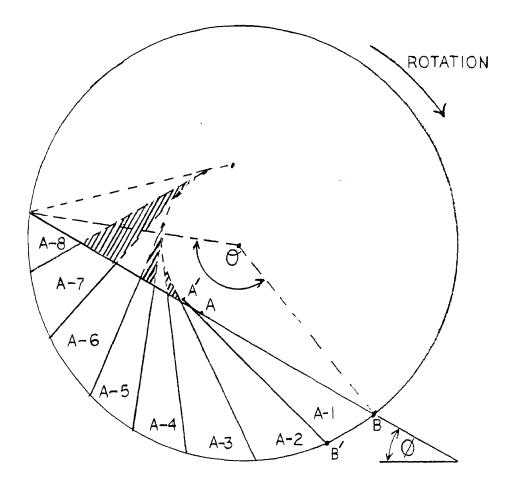
IV. MASS FLOW IN ROTATIONAL MOLDING

In order to properly simulate the rotational molding process, an understanding of the mass flow within the mold cavity during that process is essential. Consider a simple cylindical mold cavity as shown in Figure 12 rotating in a clockwise direction. The angle theta (Θ) is the included angle of the powdered material in the stationary zone of the pool. The angle phi (ϕ) is the angle that the stationary zone maintains as the mold rotates. This angle (ϕ) is a function of the material characteristics, the rotational speed, and the coefficient of friction of the mold surface. Based on Vanderbeck's experimental results, it has been shown that the angle (ϕ) remains constant during the depletion of the pool.

Consider a line segment A-B which begins at the center of the cord formed by the surface of the stationary pool of powdered material and ends at the mold surface. If the mold is rotated for a time interval(DT), the line segment is also rotated to the postion A'-B' shown in Figure 12. The area(volume) included by the two line segments and the mold surface is the amount of material that has entered the stationary pool leaving the free-falling zone during that time interval. This section is labled A-1.



ENTERING MASS FLOW IN ROTATIONAL MOLDING



Allowing the mold to rotate for another time increment will move Area A-1 to the location of Area A-2 as shown in Figure 12. Note that the shift of A-1 has caused a portion of the area to protude past the surface line B-C of the stationary region. This outside area represents the amount of material of Area A-1 that has left the stationary pool and reentered the free-falling region during that time increment.

Rotating the mold by another time increment will move Area A-2 to the position of A-3. Again, a portion of the area, in the movement from A-2 to A-3, has exited Area A-2 of the stationary pool region and reentered the free fall zone during that time increment.

Continuing the rotation of the mold will cause the Area A-3 to move to A-4, then to A-5 and so on to A-8. After A-8 all material in the area that started at A-1 has completely exited the stationary pool. The amount of material that exits the stationary pool at each time interval for each area is equal to the amount of area passing through the pool surface Line B-C during that time increment.

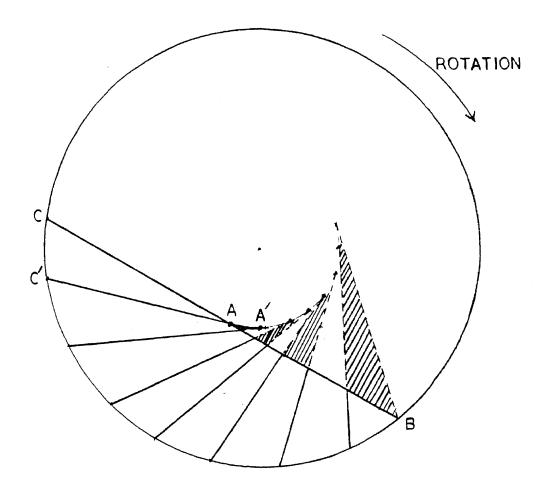
From the preceding analysis, it is evident that the time length that the material remains in the pool depends on its location or position while entering the pool. Material entering near the center surface of the pool (point A) remains in the pool for a short time duration while material entering near the mold surface remains longest in the pool.

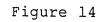
The total mass leaving at each time interval is the amount that passes through line segment B-C in Figure 13 to join the free-falling powder. Moving line segment C-A in the opposite direction of the rotation for one time interval of rotation results in the postioning of that line labled C'-A' in Figure 13. The area bounded by line segments C-A, C'-A' and the mold surface is the material exiting the stationary pool in the next time interval. Continuing back at one time increment movement intervals, the areas shown are the areas leaving in the succeding time intervals. Some areas have a portion of their areas above the pool surface line meaning that this portion of material has not yet entered the stationary pool. Notice that the area shown leaving the stationary pool in the Figure is the same amount of area that had entered in Figure 12.

Figure 14 combines Figures 12 and 13 into a complete illustration of the mass flow within the stationary pool zone . In this figure an arc time length of eight time increments(intervals) were used. It can be seen that the material entering in the center(area labled 1) remains in

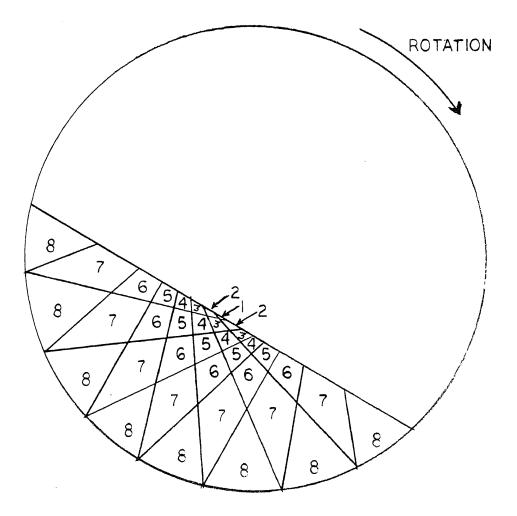


LEAVING MASS FLOW IN ROTATIONAL MOLDING





TOTAL MASS FLOW IN ROTATIONAL MOLDING



the pool for only one time increment while the areas labled 8 remain for all eight time increments. Those particles in between remain according to their relative position from the center.

It is assumed that after the material leaves the stationary pool, the material begins to fall down and mixes physically and thermally until it again rejoins the stationary pool and then repeats the cycle.

In addition to being rotated, the material is also being heated by the mold surface. When the mold reaches or exceeds the "stick temperature", the portion of material that is at or above that particular temperature will stick to mold wall, thus deminishing the amount of material in the pool. This process will continue until all material in the pool has left the pool by sticking to the mold surface.

V. ANALYSIS OF THE HEAT TRANSFER FOR SIMULATION ASSUMPTIONS

In the rotational molding process, the mass of material in the stationary pool is assumed to be heated by conduction from the mold surface. The time increment that an individual element is in contact with the mold surface is given by:

t(ms)= θ / ω (Eq. 9) where t(ms)= Contact time of an element with the mold surface. θ = angle theta(Figure 13) ω = angular velocity

Using typical values of an angle theta of 90 degrees, 7 RPM will result in a element contact time of 2.142 seconds.

During this contact time, the thermal penetration depth can be approximated by the results for a semi-infinite solid having a constant initial temperature and being subjected to sudden change in surface temperature:

$$T(x,t) = \operatorname{erf} \left\{ \frac{X}{2 * SQR(\alpha * t)} \right\} * (Ti-Ts) + Ts (Eq. 10)$$

where: T(x,t) = Temperature at time t, at a distance x from the surface Ti = Original Initial temperature of the

Ts = New surface temperature
x = distance from surface
α = thermal diffusivity
t = time

Rearranging the above equation and solving for the distance, x will result in the equation:

 $x = 2* SQR(\alpha *t)*erfc((T(x,t)-Ts)/(Ti-Ts))$ (Eq. 11) The penetration depth will be at the position where T(x,t) = Ti. The inverse error function has the numeric value of 3.60. The equation reduces to :

 $x = 7.2 * SQR(\alpha *t)$ (Eq. 12)

Using the numerical value of the thermal diffusivity of the High Density Polyethelyne powder as 1.7E-03 sq cm/sec, a contact time of 2.142 seconds will result in a penetration depth of 0.434 cm.

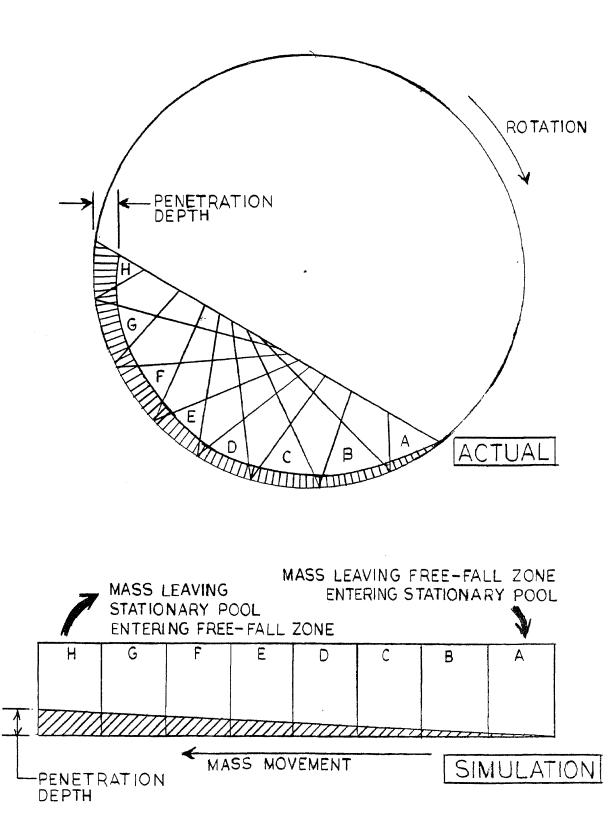
Since this penetration depth is very small compared to the depth of the pool, and that this penetration occurs only in the subareas adjacent to the mold surface, the computer simulation can use a rectangular system having the same number of columns as wedges in the actual system. This approximation will be in error when the pool is in the last phases of depletion. A comparison of the two systems is shown in Figure 15.

The rectangular system used in the computer simulation



COMPARISON BETWEEN THE ACTUAL ROTATIONAL MOLDING

AND THE COMPUTER SIMULATION MODEL



has a total area(or volume) equal to the area in the actual system and also a column width equal to the arc length of one wedge.

In this simulation, the material enters at position A in Figure 16 at a temperature equal to that of the free-falling powder region. The temperature profile for one time increment is then calculated. The material is then shifted over one position (labled B) simulating rotational movement and a new temperature profile is calculated for the next time interval using the old profile as its initial temperature.

This process is continued for all postions(columns A-H). After the last position (H), the material is assumed to leave the stationary pool and join the free-falling powder region. It is assumed in this phase of the model that all of the particles are thermally mixed. The average or equilibrium temperature of the powder in the free fall zone is computed by using a mass weighted average of the average temperature of the mass entering the free-falling region with the remaining material in this region, or:

$$\overline{T} = \frac{\overline{T_e * M_e + \overline{T_{FF}} * (M_{FF} - M_L)}{M_{FF}} \quad (Eq. 13)$$

where: \overline{T} = new ave temperature of free falling region.

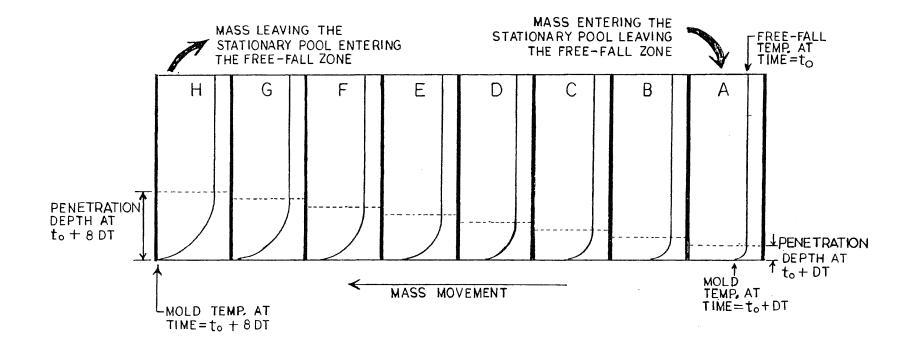


FIGURE 16

TEMPERATURE PROFILE DURING 8 TIME INTERVALS

:

- T_{FF} = previous average temperature of free falling region
- MFF = previous amount of mass in free falling region
- M_{L} = amount of mass leaving which is equal to the mass entering, Me .

Simplifing:

$$\overline{T} = \overline{Te} * \frac{Me}{M_{FF}} + T_{FF} * \left[I - \frac{Me}{M_{FF}} \right] \qquad (Eq. 14)$$

The average temperature of the mass entering the free falling region, $\overline{T_e}$, is determined by the same mass weighted formula using the temperatures and mass within the penetration depth and that outside the penetration depth.

After the free falling region, the mass now re-enters the stationary pool at the present mixed mean free-falling temperature and the heating cycle described earlier is repeated.

When the polymer powder in contact with the mold surface attains the stick temperature, material above this temperature will adhere to the mold wall causing the powdered pool to become smaller in size. The simulation will still use the same amount of wedges (columns), however, the time increment (interval) will become smaller to compensate for the smaller contact time.

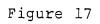
The cycle is repeated until all material has left the powdered pool and adheres to the mold.

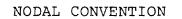
VI. THEORETICAL MODEL USING NODAL ANALYSIS

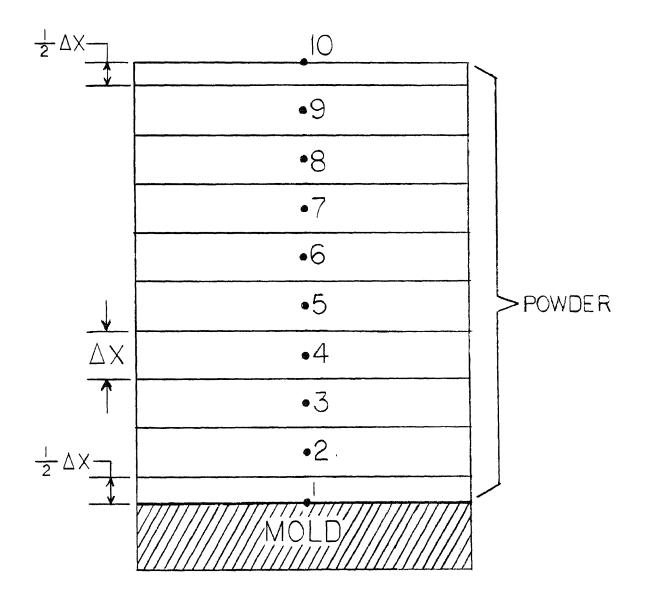
In the theoretical analysis presented in this dissertation, a numerical method will be used. The geometry of the specimen is subdivided into small but finite subvolumes of thickness of ΔX . For each subvolume there is located a center nodal point which has been assigned a reference number, Figure 17. Note that the exterior subvolumes has a thickness of 1/2 ΔX with its node located at the surface.

In this actual transient heat transfer process, the temperature profile within a subvolume varies with position and time. However for this simplified model it was assumed that the temperature of each subvolume can be denoted by a nodal "mixed mean" or "equilibration" temperature. Thus the temperature within a node is assumed to be only a function of time. The mixed mean or equilibration temperature of the element is defined as the temperature the element will attain if all the internal energy of the element was distributed evenly throughout that element.

The temperature of each subvolume is assumed to be represented by the temperature of the node. It is further assumed that the rate of energy transfer between adjacent nodal points is approximated by the steady-state conduction







equation using the nodal temperature values as the descriptive temperature between the nodes. Thus in this model, a discontinuous temperature profile is being used to approximate the actual temperature profile (Figure 18). It is obvious that as the subvolumes become smaller, the approximate temperature profile will approach the actual temperature profile.

Writing an energy balance on node i results in the following equation:

q(in) - q(out) + q(generated) = q(stored) (eq 15) Or:

 $\sum q_{i} + q(generated) = m_{i} C_{i} \frac{dT}{dt} \quad (eq 16)$ where: q_{i} = heat flow entering node i m_{i} = mass of subvolume i $\frac{dT}{dt}$ = the time derivative of temperature of
subvolume i

The initial temperatures of all nodes were constant room temperature and the mold surface was subjected to a changing temperature. Because the temperature change will only occur within the penetration depth, nodal equations must then be made to include this depth. Temperatures of nodal volumes outside the penitration depth will not change, thus performing computations of these nodes are needless and a waste of valuable computer time.

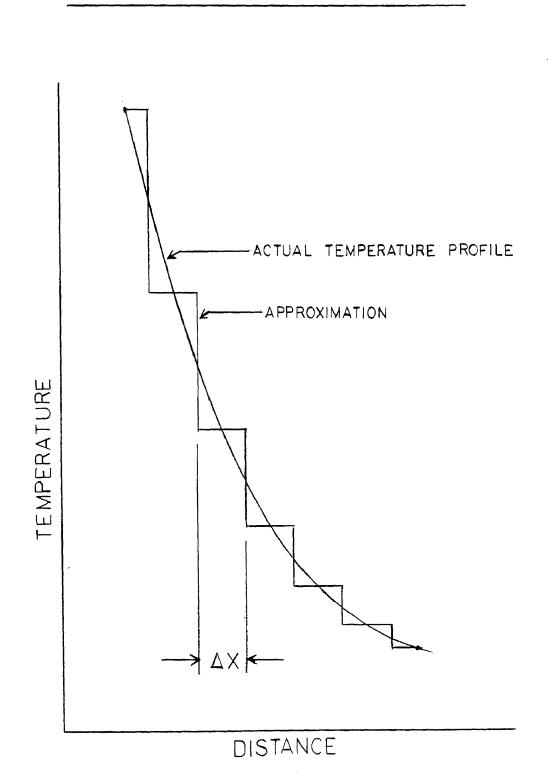


Figure 18

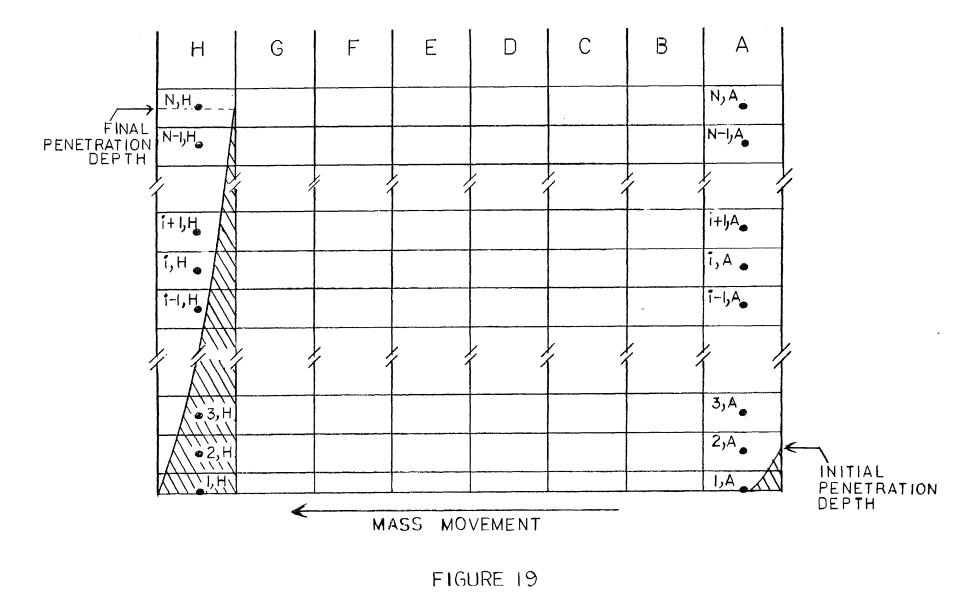
APPROXIMATION OF THE TEMPERATURE PROFILE

Figure 19 shows a typical stationary pool that is divided into eight wedges with each wedge divided into N nodal volumes. The nodal volumes have a fixed thickness such that the total distance extend slightly past the final penetration depth.

For this geometry, three types of nodal equations must be used. These equations are for: the surface nodes, the interior nodes and the final interior nodes outside the penetration depth.

The energy balance for the interior nodes of the column, Figure 19, is given by:

 $q(i-1:i) + q(i+1:i) = m_i C_L \frac{dT}{dt}$ (eg 17) where: q(i-1:i) = heat flow from node i-1 to node i $= k(i-1:i) \underline{A} (T_{i-1} - T_i) \quad (eq 18)$ k(i-1:i) = the average thermal conductivity between node i-1 and node i = 1/2 [k(i-1) + k(i)](eg 19) q(i+1:i) = heat flow from node i+1 to node i $= k(i+1:i) \underline{A}_{\Lambda X} (T_{i+1} - T_{\bar{i}}) \qquad (eq 20)$ k(i+1:i) = the average thermal conductivity between node i+l and node i = 1/2 [k(i+1) + k(i)] (eq 21) = the mass of node i m ; $= \rho A \Delta X$ (eq 22)



NODAL ASIGNMENTS FOR COMPUTER SIMULATION

which results in the relationship:

$$k(i-1;i) \frac{A}{\Delta X} (T_{i-1} - T_i) + k(i+1;i) \frac{A}{\Delta X} (T_{i+1} - T_i) = \rho A \Delta X C \frac{dT}{dt}$$
(eq 23)

In this slab geometry, the cross-sectional area A is constant. Solving for the time rate of change of temperature:

$$\frac{\mathrm{d}T}{\mathrm{d}t} = \frac{k(\mathbf{i}-\mathbf{1}:\mathbf{i})}{\rho C \Delta X^2} (\mathbf{T}_{\mathbf{i}-\mathbf{1}} - \mathbf{T}_{\mathbf{i}}) + \frac{k(\mathbf{i}+\mathbf{1}:\mathbf{i})}{\rho C \Delta X^2} (\mathbf{T}_{\mathbf{i}+\mathbf{1}} - \mathbf{T}_{\mathbf{i}})$$
(eq 24)

The surface node will be assigned the same temperature as the mold surface. Since the mold temperature changes as a function of time, then:

$$T(surface node) = T(mold) = T(t)$$
 (eq 25)

The last interior node, which being outside the penetration depth, is always at a temperature of the pool temperature for that particular wedge, or:

 $T_{j, \cap} = T(pool)_j$ (eq 26) Where: $T_{j, \cap} = temperature of node n in wedge j$ $T(pool)_j = pool temperature outside the penetration depth for wedge j$ $= \overline{T}$

There are three basic methods of approximating the time derivative, the Pure Explicit or Euler's Method, the Pure Implicit Method, and the Implicit Crank-Nicolison Method. Euler's Method estimates the temperature T' at the nodal point one time increment, $\Delta \Theta$, later by computing the time derivative of the present temperature T, multiplying it by the time increment between T and T', and then adding this to the present temperature T, or:

$$T' = T + \frac{dT}{dt} \bigg|_{t} \Delta \Theta$$
 (eq 27)

This is shown graphically in Figure 20.

The Pure Implicit Method estimates the future nodal temperature T' in a similar fashion as the Euler's Method. But instead of using the time derivative of the present temperature T, it uses the derivative of the future temperature T', or:

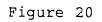
$$T' = T + \frac{dT}{dt} \Big|_{t'} \Delta \Theta \qquad (eq 28)$$

This is shown in Figure 21.

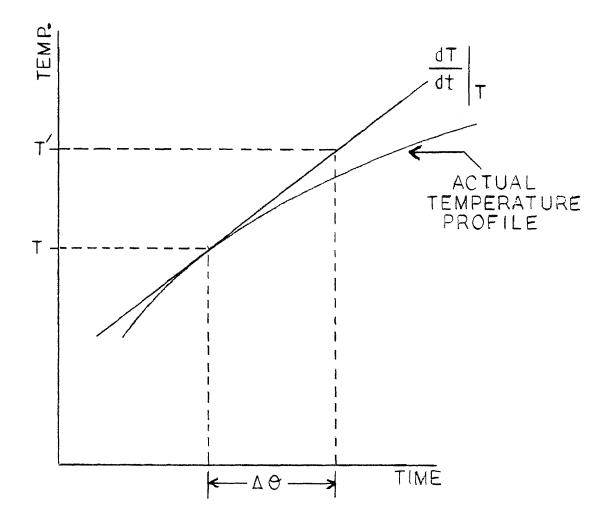
In the Implicit Crank-Nicolson Method, the arithmetic mean value of the derivatives at the beginning and at the end of the time interval is used to determine the future tmeperature. Or:

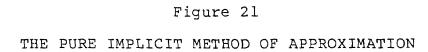
$$T' = T + \left[\frac{dT}{dt} \Big|_{t} + \frac{dT}{dt} \Big|_{t} \right] \Delta \Theta \quad (eq \ 29)$$

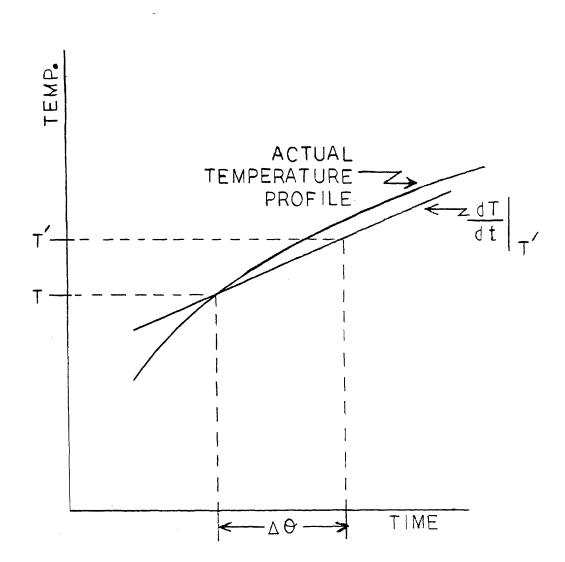
This is shown in Figure 22.

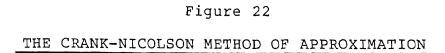


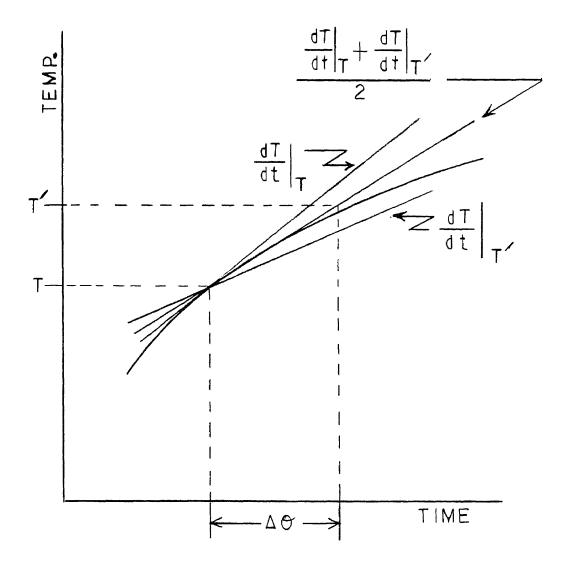
EULER'S METHOD OF APPROXIMATION











If the Pure Implicit or the Implicit Crank-Nicolson Method is used to approximate the time derivative, the result will be a set of N simultaneous equations with N unknowns. This would require the computer to solve a tri-diagonal matrix for each time increment for each column.

Euler's Method, however, results in a set of N equations with one unknown per nodal energy balance equation. Consequenty, the future temperature T' can be found directly by solving a simple algebraic equation. Therefore, in this dissertation, Euler's Method of approximation was used.

Substituting for the time derivative for an interior nodal equation results in:

$$\frac{\mathbf{T}_{\mathbf{i}}' - \mathbf{T}_{\mathbf{i}}}{\Delta \theta} = \frac{\mathbf{k}(\mathbf{i}-1:\mathbf{i})}{\rho C \Delta X^{2}} (\mathbf{T}_{\mathbf{i}-1} - \mathbf{T}_{\mathbf{i}}) + \frac{\mathbf{k}(\mathbf{i}+1:\mathbf{i})}{\rho C \Delta X^{2}} (\mathbf{T}_{\mathbf{i}+1} - \mathbf{T}_{\mathbf{i}}) \quad (eq 30)$$
Solving for the future temperature T':
$$\mathbf{T}_{\mathbf{i}}' = \mathbf{T}_{\mathbf{i}} \left(1 - \frac{\Delta \theta}{\rho C \Delta X^{2}} \{\mathbf{k}(\mathbf{i}-1:\mathbf{i}) + \mathbf{k}(\mathbf{i}+1:\mathbf{i})\}\right)$$

$$+ \frac{\Delta \theta}{\rho C \Delta X^{2}} \{\mathbf{k}(\mathbf{i}-1:\mathbf{i})\mathbf{T}_{\mathbf{i}-1} + \mathbf{k}(\mathbf{i}+1:\mathbf{i})\mathbf{T}_{\mathbf{i}+1}\} \quad (eq 31)$$

In the use of the Euler's Method of approximation, it must be noted that the equations become unstable when the expression $\frac{1-K\Delta\theta}{\rho C\Delta X^2}\Sigma k$ becomes negative (K is some constant).

Often the k's, K, ρ , C and $~\Delta X$ are predetermined. Therefore it is necessary to compute the value of $\Delta\theta~~$ such

that the value of the expression is greater than or equal to zero. Or:

$$\frac{1 - K\Delta \theta \Sigma k}{\rho C \Delta X^2} \ge 0.0 \qquad (eq 32)$$

Or:

$$\frac{K\Delta\Theta\Sigma k}{\rho C\Delta X^2} \leq 1.0 \tag{eq 33}$$

Solving for
$$\Delta \theta$$
:
 $\Delta \theta \leq \frac{\rho C \Delta X^2}{K \Sigma k}$ (eq 34)
Usually the maximum allowable value of will be used, or:
 $\Delta \theta_{MAX} = \frac{\rho C \Delta X^2}{K \Sigma k}$ (eq 35)

If the values of ρ , C, and k are not constant, the minimum values of ρ and C and the maximum value of k must be used to determine the stability constants.

Since the nodal thickness, ΔX in the simulation developed, becomes smaller as the material densifies, the maximum time increment ($\Delta \theta$) will be recalculated at each iteration assuring that all nodal equations remain stable.

The second simulation model developed includes the effect of convection heating by oven air. The exterior surface nodal equation of the mold is given by:

$$T_{eM}' = T_{eM} + \left[1 - \frac{2 \Delta \theta}{\rho_{M} C_{M} \Delta X_{M}} \left(\frac{k_{M}}{\Delta X_{M}} + H_{A} \right) \right] + \frac{2 \Delta \theta}{\rho_{M} C_{M} \Delta X_{M}} \left[\frac{k_{M}}{\Delta X_{M}} * T_{IM} + H_{A} * T_{OVEN} \right]$$
(eq 36)

T'eM = Future temperature of the external where: mold surface one time increment $(\Delta \theta)$ latter. = Present temperature of the external т_{еМ} mold surface. = Density of the mold material ρ_M К_М = Thermal Conductivity of mold material = Specific heat of mold material См ΔX_M = Mold thickness = Coefficient of Convection of the air HA in the oven Toven = Oven temperature = Temperature of mold's internal surface Т_{тм}

The maximum allowable time increment for this nodal equation is:

$$\Delta \theta_{MAX} = \frac{\rho_M C_M \Delta X_M}{2\left(\frac{K_M}{\Delta X_M} + H_A\right)}$$
 (eq 37)

The mold's internal surface nodal temperature equation is:

$$^{T}IM' = \begin{bmatrix} 1 - \frac{2 \Delta \theta k_{M}}{\rho_{M} C_{M} \Delta X_{M}^{2}} \end{bmatrix}^{T}IM + \frac{2 \Delta \theta K_{M}}{\rho_{M} C_{M} \Delta X_{M}^{2}} * T_{eM} \qquad (eq 38)$$

where: T' = Future temperature of the internal mold surface one time increment

($\Delta \theta$) later.

T = Present temperature of the internal mold surface.

The maximum allowable time increment for this nodal equation is:

$$\Delta \theta_{MAX} = \frac{\rho_M C_M \Delta X_M^2}{2 K_M} \qquad (eq 39)$$

When using more than one type of nodal equation, the minimum $\Delta \theta_{MAX}$ must be the largest time increment used in the numerical analysis. This will assure stability for all equations.

The temperature of the first node of the powdered material now becomes equal of ${\rm T}_{\rm TM}$.

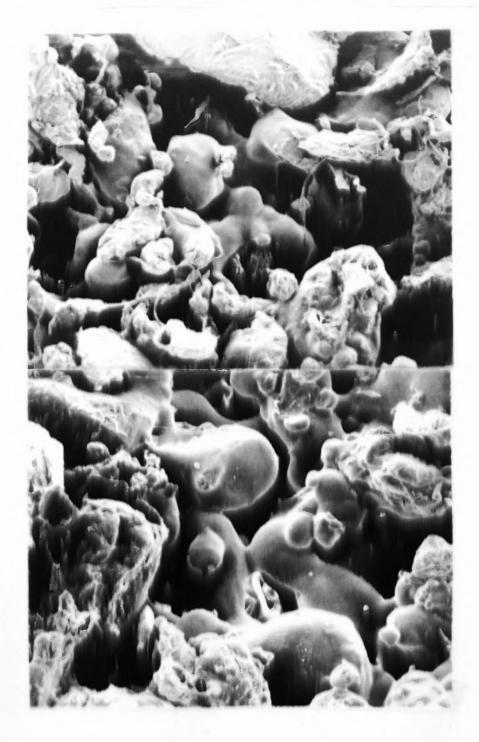
The equations developed in this chapter were used to predict the powder temperatures during the rotational molding process.

VII. INVESTIGATION INTO THE DENSIFICATION PROCESS

To accurately simulate the rotational molding process from powder rotation to the formation of molten mass, the powder densification process must be understood. Experimental studies were performed to determine the basic densification phenomena and the results were used to describe the densification in the simulation model.

Because the individual powder particles used in rotational molding have such irregular shape (see Figure 23), it becomes very difficult to obtain experimental observational data that can be used to describe the densification process . Thus, it becomes necessary to experiment with a much simpler particle geometry and then hypothesize how the process occurs with much more complex geometry. However, problems still occur in attempting to freeze the densification process at a particular time frame while the material is in an actual rotational mold. The solution was to model the rotational mold in an environment with a flat plate apparatus, Figure 24. The powdered material was heated through the base plate and at a particular instant of time the heating process was stopped by removing the plate from the heater and placing the plate on dry ice.

FIGURE 23



TYPICAL ROTATIONAL MOLDING MATERIAL DURING DENSIFICATION



FLAT PLATE APPARATUS USED IN DENSIFICATION STUDY

.

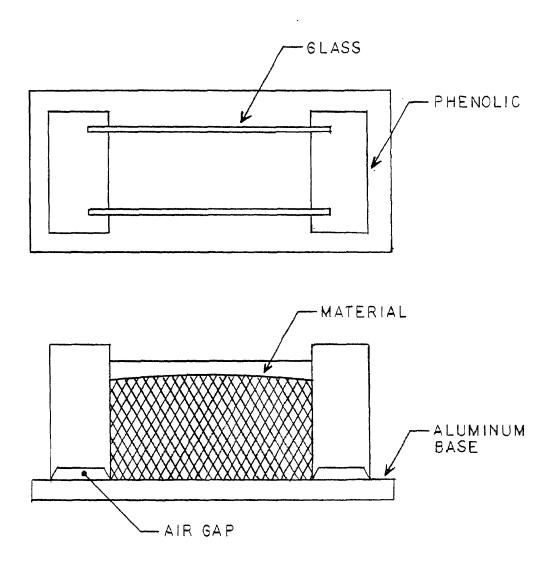
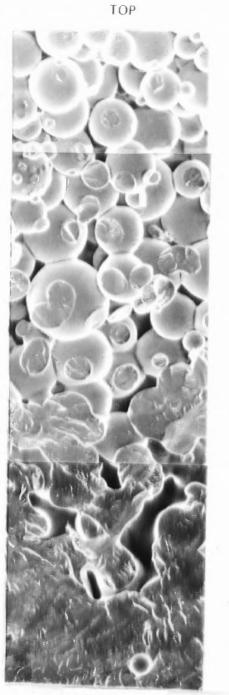


Figure 25 compares a photo of a rotational molded part of DuPont acrylic microspheres made in the uniaxial rotational mold in the NJIT laboratory and a photo of a part molded on the flat plate apparatus. Both molding processes were conducted under similar temperature time histories. (material data listed in Appendix C) Notice the similarities; both have a totaly densified region, a region with slight necking, and a region where spheres are attached but no appreciable or noticeable radius at the points of contact. Hence, the flat plate apparatus is a viable means of analyzing and understanding the densification process in rotational molding.

An analysis of the densification process was performed after a review of a flat plate experiment using significantly larger spheres illustrating a non-necking densification process. This experiment involved using one-eighth diameter High Density Polyethylene(HDPE) spheres (Appendix B for data) packed in a body centered cubic array using an apparatus shown in Figure 24. This apparatus was heated through its base, simulating the non-isothermal heating that occurs in the rotational molding process.

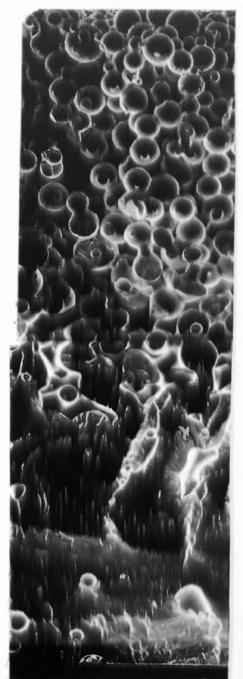
As energy was applied to the base plate , the lower portion of the bottom spheres became less viscous and was forced down by the weight of the spheres above. The less

COMPARISON BETWEEN ROTATIONAL MOLDING AND FLAT PLATE MOLDING OF ACRYLIC MICROSPHERES



HOT PLATE

TOP



HOT PLATE

FLAT PLATE MOLDED

ROTATIONAL MOLDED

viscous material flowed between the spheres, filling the voids(Figure 26a-c).

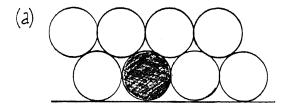
The upper portion of the bottom layer next became soft allowing the pressure of the harder spheres above to deform the lower level spheres(Figure 26d). The final shape of a bottom layer spheres appeared to be flat on the bottom due to the flat plate and dimpled on the top due to the more viscous upper level spheres. With continued heating of the plate, the interior spheres deformed next. As seen in the bottom layer analysis, the lower portion of the more viscous upper level its spherical shape while the lower layer was deformed (Figure 27-a).

As the upper portion of the interior sphere increases in temperature, the harder, more viscous next upper layer spheres deformed the interior sphere below(Fig. 27a-d). The final shape is spherical in the lower region and dimpled on top (Figure 27e). Duplication of the experiments using one-eighth diameter acrylic spheres produced the same results as those obtained with the HDPE spheres.

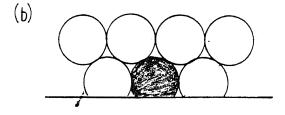
The experimental results indicated a different densification process that was described in the literature survey. Unlike sintering, the one-eighth diameter spheres

Figure 26

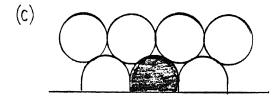
THE MELTING OF BOTTOM LAYER SPHERES



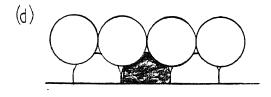
Original set-up



As heat in applied, the lower portion of the bottom spheres become less viscous (melts) and is forced down by the weight above.

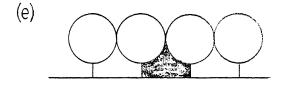


The displaced material begins to fill the voids



the upper portion of the bottom layer to become soft allowing the pressure of the more viscous, harder spheres to deform the lower level spheres.

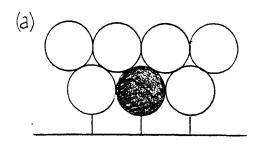
The heat continues and causes

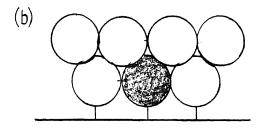


The final shape is flat on the bottom(caused by the plate) and dimpled on top (caused by the harder upper level spheres)

Figure 27

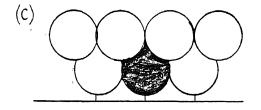
THE MELTING OF MIDDLE LAYER SPHERES

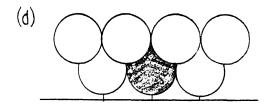


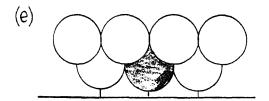


As was seen in the Bottom Layer Analysis, the lower portion of the middle layer retains its spherical shape during melting because it is more viscous(harder) than the layer below causing the lower level to be deformed by the spheres above it.

As the upper portion of the sphere increases in temperature, it allows the harder, more viscous upper layer spheresto deform it.







The final shape is spherical on the bottom and dimpled on top. showed no necking but rather filled the voids between the individual spheres by viscous flow.

The spheres used is this experiment were approximately one hundred times greater in size than normal rotational material. The only useful conclusions that were drawn from this study was that material flow caused by lower viscosity may also be a significant factor in the mechanism that occurs in the densification process of rotational molding.

The next set of experiments were performed with the DuPont acrylic microspheres using the Flat Plate apparatus. Because the size distribution of the microspheres was very close to that of a rotational molding grade polyethylene powder, the results obtained using the microspheres gave considerable insight into the actual densification mechanism.

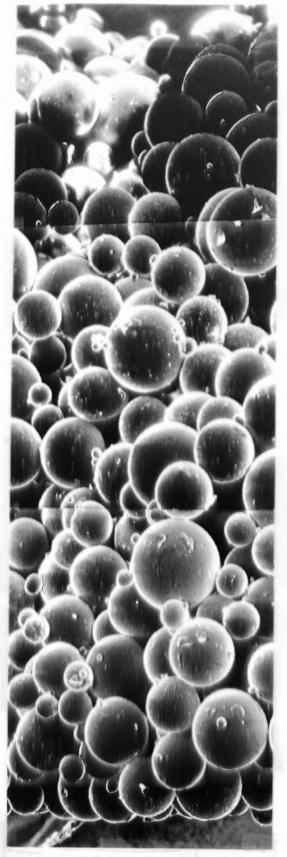
Several experiments were conducted terminating the densification process at different time intervals. The specimens were then mounted and photographed with a Scanning Electronic Microscope. The temperature - time profiles used in these experiments were identical to those used by Vanderbeck(30) in his experiments. A direct comparison between results of the computer simulation developed in a latter section in this dissertation using a model of the densification process observed here and the

actual experiments results of Vanderbeck.

Figure 28 shows the photographs of six simulated rotomolding experimental runs of the acrylic microspheres that were frozen at various time frames. Though difficult to see in the photographs, all the spheres have adhered together at the points of contact and the densification process was initiated.

As the temperature rises, the spheres nearer to the heat source began the necking process by sintering. With increasing time and mold temperature, neck radius of the spheres near the high temperature surface continue to increase. In addition, the necking process starts to occur with the interior spheres.

The latter photographs show that as the neck growth reaches a maximum of between 10% and 20%, there appears to be a dramatic change occuring. Necking is overcome by viscous flow from melting. This process continues until all the spheres have lost their individuality and have melted into one homogenous part. This drastic change is a characteristic of a material where by the temperature causes the material to flow faster than the slow viscous flow of the sintering process. This temperature at which material flow overcomes the sintering process will be referred to as the melt interface temperature (Tm).



HOT PLATE

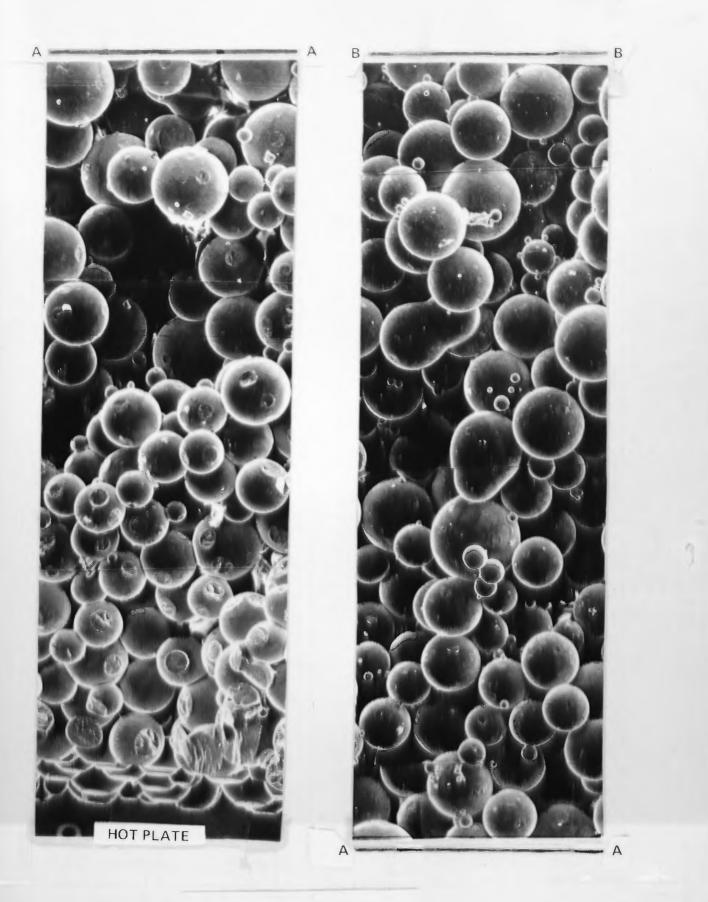
FIGURE 28

SCANNING ELECTRONIC MICROSCOPE PHOTOGRAPHS OF ACRYLIC MICROSPHERES FOR VARIOUS TIME INTERVALS

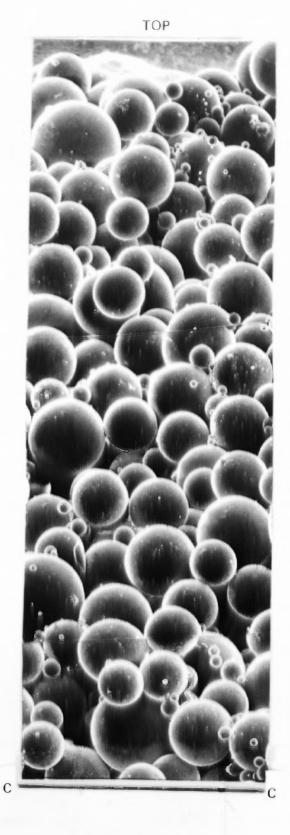
8 MINUTES



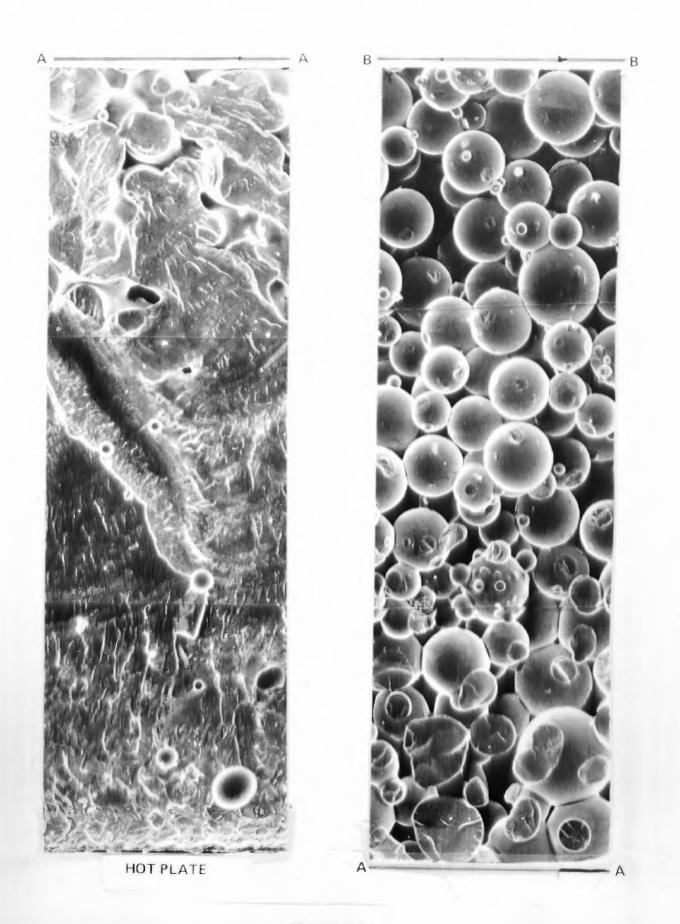
10 MINUTES



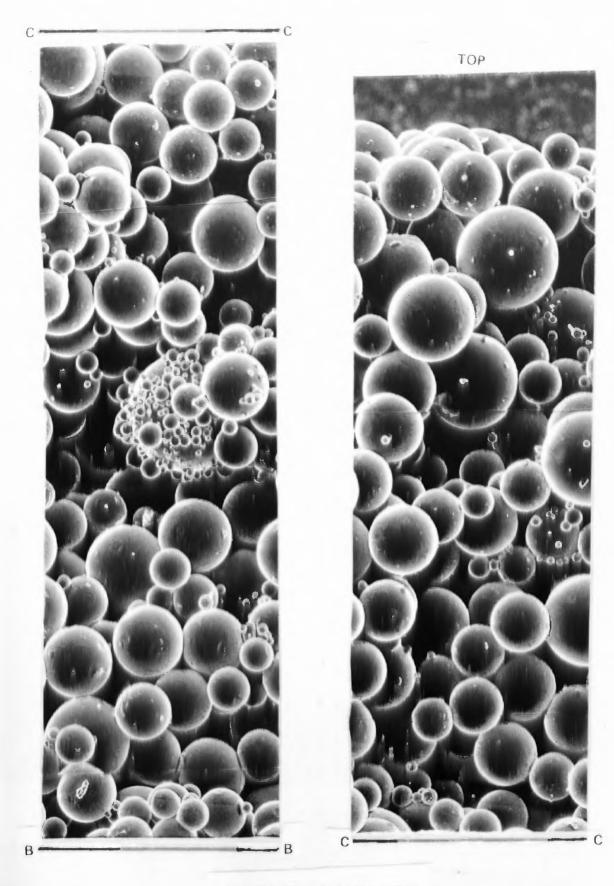
12 MINUTES



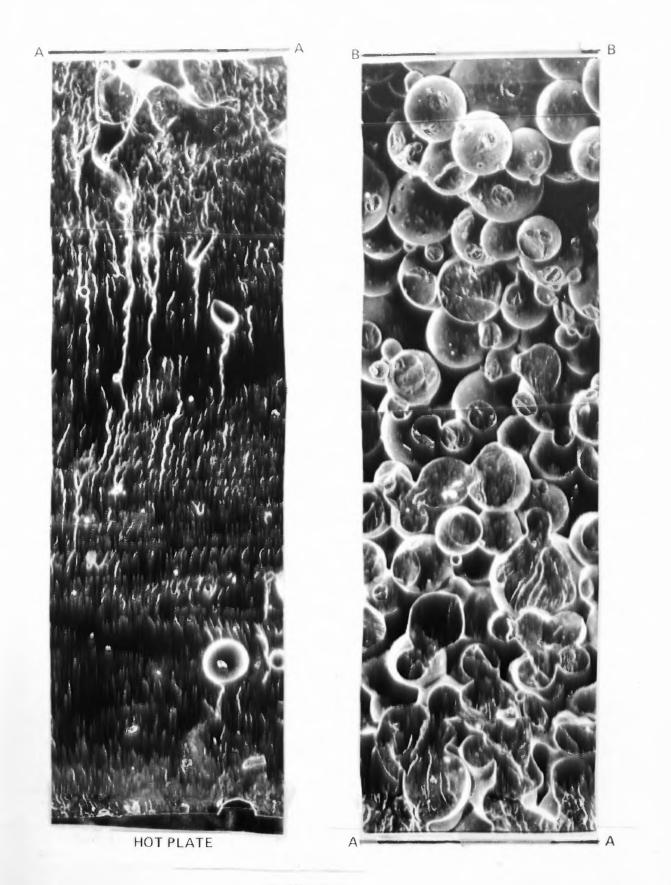
12 MINUTES (CONTINUED)



16 MINUTES

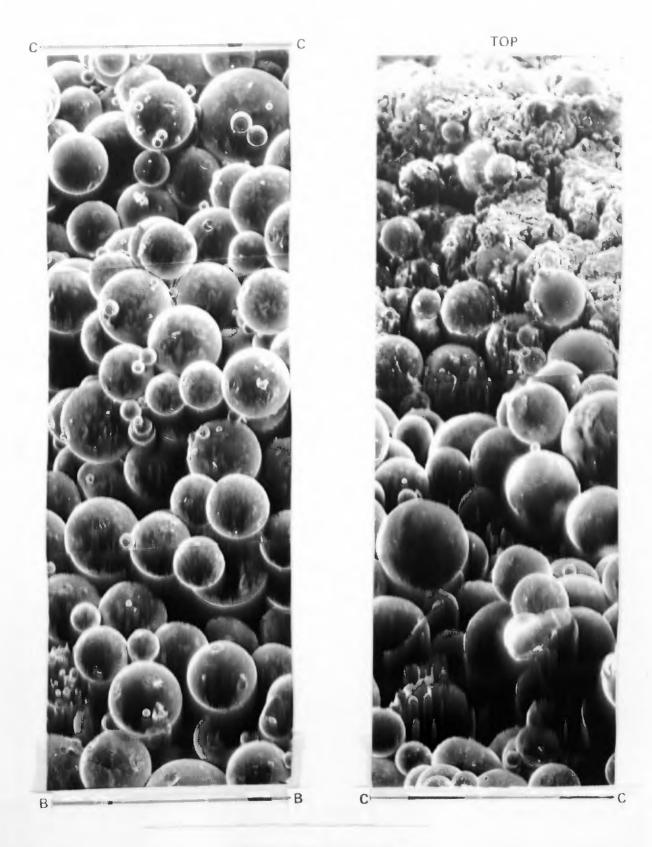


16 MINUTES (CONTINUED)

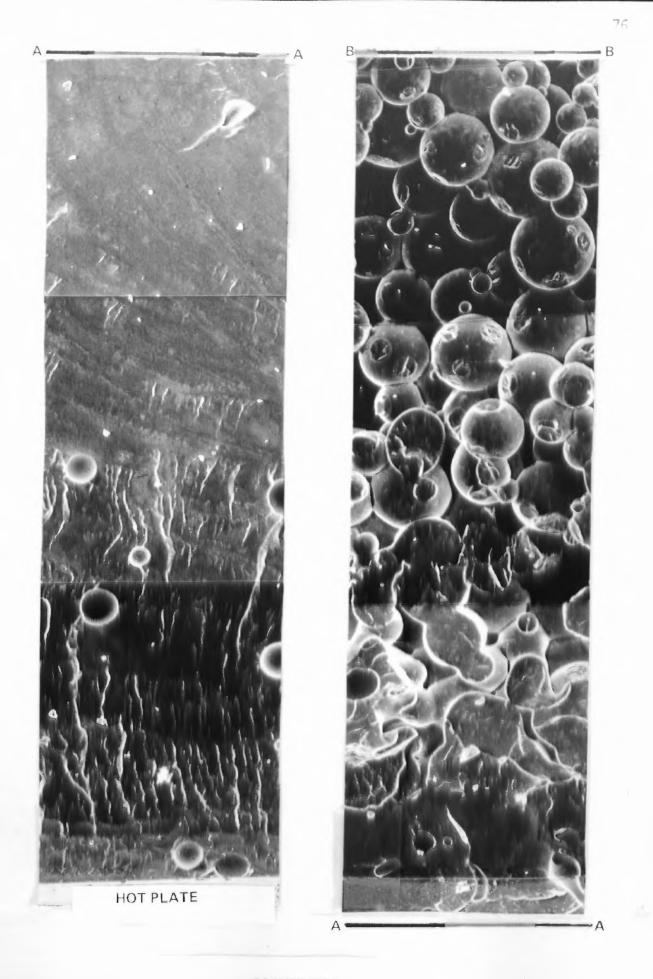


20 MINUTES

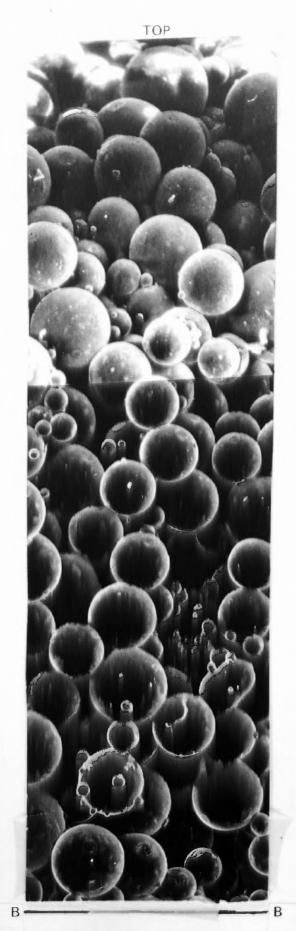
74



20 MINUTES (CONTINUED)



24 MINUTES



24 MINUTES (CONTINUED)

VIII. DETERMINATION OF THE PHYSICAL PROPERTIES

As discussed previously, the simulation model will use nodal analysis in which the average neck size for a representative particle will be computed at each node as a function of time. The value of the thermal conductivity of each nodal subvolume at any particular time will be a direct function of the neck size within the nodal volume at that instant of time. The equation used to estimate the instantaneous thermal conductivity showing the effect of necking due to sintering is:

$$K_{Ei} = K_{P} + \left[\frac{X_{i}}{a}\right]^{N} (K_{S} - K_{P}) \qquad (eq \ 40)$$

X; = neck radius of node i

a = original sphere radius

N = power law exponent (value = 1)

Even though the actual polyethylene powdered material is not spherical, the value of the original sphere radius, a, is the average sift size radius.

The thermal conductivity of the powdered material (K_P) was to be initially be determined using the equations

mentioned earlier in the literature survey for predicting the thermal conductivity of composite system. Figure 11 compared the results of using various composite material equations for determining thermal conductivity based on the material data in Appendix A. The calculated values of equivalent thermal conductivities (K_{E_1}) can be seen to vary greatly. Therefore it becomes necessary to experimentally determine, with use of a simple computer simulation, the actual thermal conductivity of the powder. The experiment and the subsequent determination of the powder thermal conductivity will be described in the next chapter.

The neck size for each node is calculated in the computer simulation by adding the calculated change in neck size during that time increment to the previous neck size of the node. Using Frenkel's Equation:

$$X = \left[\frac{3 a t \gamma}{2 \eta}\right]^{0.5} \qquad (eq 1)$$

and differentiating eq. 1 with respect to time will give the change of neck radius as a function of time, or:

$$\frac{\partial X}{\partial t} = \left[\frac{3 a \gamma}{8 \pi t}\right]^{0.5} \qquad (eq \ 41)$$

Converting the equation to a small finite change in time (Δt), the change in neck radius for a time Δt is :

$$\Delta X = \left[\frac{3 a r}{8 n t}\right]^{0.5} \Delta t \qquad (eq \ 42)$$

When the neck radius exceeds 50% of the sphere radius, Frenkel states that the collapse of the bubble formed is:

$$r_0 - r = \frac{\gamma}{2\pi} t \qquad (eq 2)$$

differenting with respect to time:

$$\frac{\partial \Gamma}{\partial t} = -\frac{\gamma}{2\pi} \qquad (eq \ 43)$$

for a small finite change in time:

$$\Delta r = -\frac{\gamma}{2\pi} \Delta t \qquad (eq 44)$$

since the negative change in bubble radius($\Delta \uparrow$) is equal to the increase of neck radius, the change in sphere radius above 50% necking is:

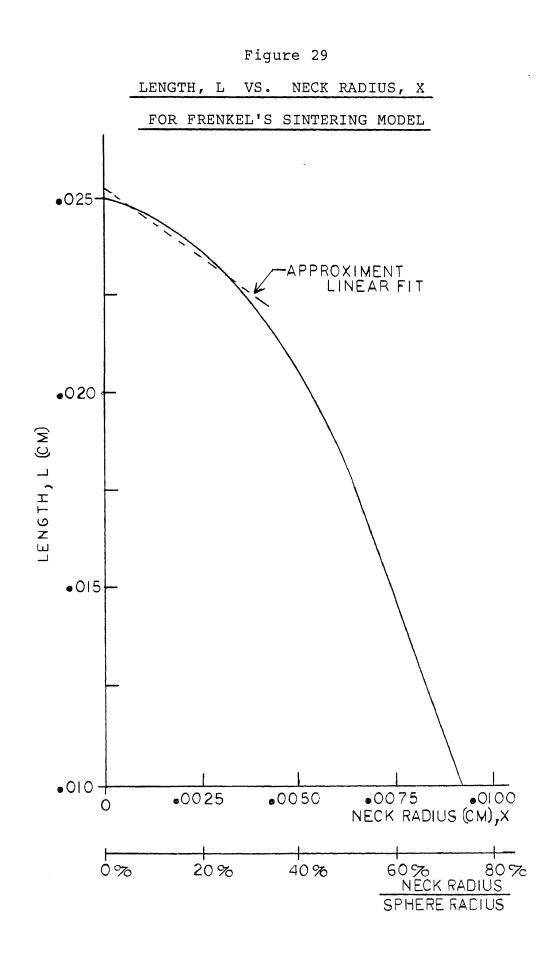
$$\Delta X = \frac{\gamma}{2\eta} \Delta t \qquad (eq 45)$$

As the temperature of a node exceeds the melt temperature, material flow overcomes necking in the densification process. Hence, the neck radius for that particular node instentaniously becomes equal to the radius of the spheres. In other words, the material has completely densified into a homogenious part for that nodal subvolume.

Density is computed in the similar manner as to that of thermal conductivity. The original powder density was found by experimentally by weighing a volume of the polyethylene material and comparing it to the same volume of water. The density measured for the polyethelyne powder is listed in Appendix A. The density at the complete melt is that of the solid polymer. Density and other physical data of the base resin was supplied by the manufacturer.

The intermediate density is a assumed to be linearly proportional to the distance between the centers of two sintering spheres as was shown in Figure 9. As length L decreases, the density increases proportionaly. Using Frenkel's model, the length L can be correlated to the neck radius, x, thus allowing a direct coorelation of density to neck radius. Figure 29 is a plot of length L vs neck radius using equations 6 through 8 and solving them simutaneously with a = 0.0125 cm. The curve between 0% and 40% neck radius/ sphere radius ratio can be approximated with a straight line fit with only a 2.5% variance. Therefore, it is possible to state that density is proportional to neck radius, or:

 $\rho_{Ei} = \rho_{P} + \frac{x_{i}}{a} (\rho_{s} - \rho_{p}) \qquad (eq \ 46)$ where: $\rho_{Ei} = Equivalent \ density \ at \ node \ i$ $\rho_{P} = initial \ powder \ density$ $\rho_{s} = density \ of \ solid \ polymer$ $x_{i} = neck \ radius \ at \ node \ i$ $a = sphere \ radius$



Because of the density change, the distance between nodes in the simulation also changes. The distance between node i and node i-l is one half the thickness of node i added to the half the thickness of node i-l. These distances are a function of their relative nodal densities. Therefore the nodal distance between node i and node i-l is proportional to the ratio of the original density to the new average density between node i and node i-l, or:

$$Dx_{i,i-1} = \frac{\rho_p}{(\rho_{E_i} + \rho_{E_i-1})^{*\frac{1}{2}}} * Dx$$
 (eq 47)

where: $Dx_{i,i-1} = Nodal distance between node i and$ node i-l $<math>\rho_p = Density of original powdered material$ $<math>\rho_{E_i} = Equivalent density at node i$ $\rho_{E_{i-1}} = Equivalent density at node i-l$ Dx = original nodal distance

Since specific heat is energy per amount of mass to raise the temperature of the mass one degree, the specific heat of the powder is assumed equal to that of the solid since the mass of air in the powder is neglible. Hence the specific heat remains constant in the simulation developed.

IX. DETERMINATION OF INITIAL THERMAL CONDUCTIVITY

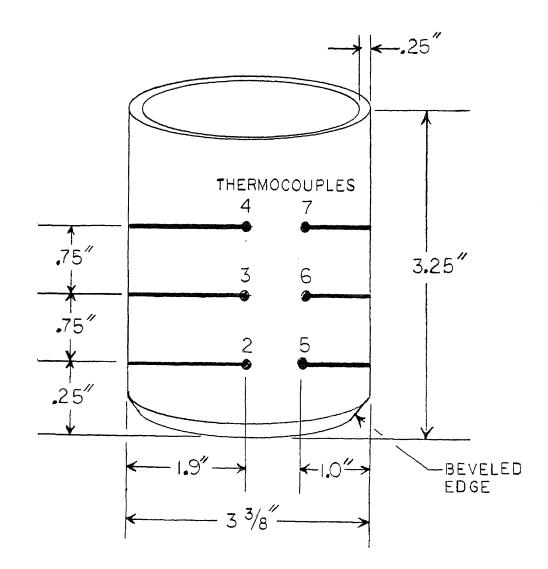
Since the consistency of the thermal conductivity equations of composite materials vary too greatly, it becomes necessary to determine the conductivity of the initial state of the polymeric powder by a combination of an experiment and a computer simulation. The experiment will entail heating the powder and measuring temperature-time histories at specific locations while the computer program will simulate the experiment in an attempt to duplicate the temperature - time histories and thus determining the thermal diffusivity which includes the thermal conductivity.

The experimental set-up used in shown in Figure 30. The apparatus consists of a cardboard tube 3.25 inches long, 3.375 inches inner diameter with a 0.25 inch wall thickness. The tube is beveled at the bottom to minimize heat transfer up the tube wall. Aluminum foil was then epoxied to the beveled edge, bottom of the tube, to contain the powdered material.

Six thermocouples were positioned as shown in Figure 30. To maintain their correct height level, sewing thread was positioned through the tube at the different levels.



THERMAL CONDUCTIVITY EXPERIMENTAL SET-UP



The thermocouple was then wrapped along the taught thread. The experimental proceedure used in these experiments were as follows:

1. The tube with the powdered material was placed on a hot plate and is heated slowly.

2. The temperature at each thermocouple location was then recorded every two minutes for seventy minutes.

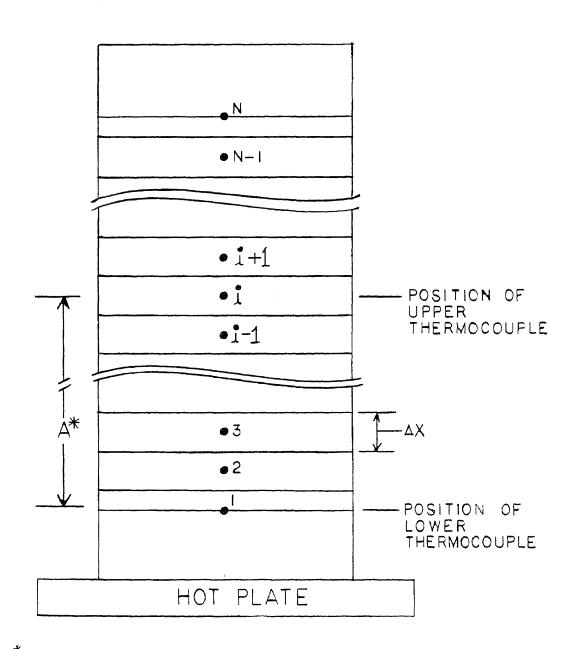
3. This data was then used in a computer simulation to determine the thermal conductivity of the powdered material.

Since the experiment was conducted with six thermocouples, the computer simulation can estimate six average thermal conductivities (actually diffusivity) for each experimental run. They are the diffusivities from position 2 to 3, 2 to 4, 3 to 4, 5 to 6, 5 to 7 and 6 to 7. Using two consecutive runs at the same heating rate, twelve estimates of the diffusivity were made.

The computer program used was a simple flat plate simulation having a nodal geometry as is shown in Figure 31. The simulation allowed input of an actual measured temperature - time history at node 1 and predicted the temperature - time history of one of the other two thermocouples located at node i in the simulation. In chosing the correct diffusivity in the simulation, the predicted temperature - time history duplicated the actual.



NODAL GEOMETRY



A* = DISTANCE BETWEEN THE TWO THERMOCOUPLES USED IN THE SIMULATION Six predictions of diffusivities per experimental run were obtained in using the simulation. They included predicted diffusivities between positions stated in the previous paragraph. The method of selecting the correct diffusivity was through trial and error. If the diffusivity used was too low, the predicted temperature time history was lower than the actual. If the diffusivity used was too high, the predicted history was higher.

The extra nodes from i+l to n were added to negate end effects. A technique to check that this assumption was valid was to perform the simulation with more nodes. If the predicted temperature time history at node i was unchanged then node i was uneffected by the end effects. In the actual experiment, end effects were negated by adding an additional quantity of powder, approximately one and a half inches above the last thermocouple.

There is essentially one nodal equation used in the flat plate simulation. For the internal nodes(node 2 to node n-1), the equation is:

$$T_{j}' = T_{j} * \left[1 - 2 \frac{DT * AL}{DX^{2}} \right] + \frac{DT * AL}{DX^{2}} * \left[T_{j-1} + T_{j+1} \right] \quad (eq. 48)$$

T_i = the present temperature of node j

$$T_{j-1}$$
 = the present temperature of node j-l
 T_{j+1} = the present temperature of node j+l
 DT = time increment
 AL = thermal diffusivity = $k/\rho C_p$
 k = thermal conductivity
 C_p = specific heat
 ρ = density

The last node n is assumed adiabatic. The equation for this node is the same as equation 41 except T_{n+1} will have the same value as T_{n-1} , or:

$$T_{n}' = T_{n} * \left[1 - 2 \frac{DT * AL}{DX^{2}} \right] + 2 \frac{DT * AL}{DX^{2}} * T_{n-1} \quad (Eq 49)$$

The computer simulation performs the following steps:

1 - Sets values for nodal distance(DX) and diffusivity(AL) and then determines the maximum time increment.

2 - Reduces the time increment to a division of a one minute interval so that temperatures will be calculated for each minute.

3 - Sets all nodes to the initial temperatures.

4 - Increments time by one time increment and sets node 1 to the temperature of the lower thermocouple at that time. 5 - Calculates the new nodal temperature for node 2 through node n.

6 - If the time is at a minute interval, then print the predicted temperature of the other thermocouple.

7 - Change the old nodal temperature values to the new predicted values.

8 - Go back to step 4 until the simulation is over.

To check the validity of this simulation, results of a trail simulation are compared to the Heisler Charts in Figure 32. Note the exact fit proving the simulation.

In the performance of this simulation, if the temperature time history of node i is identical to the experiment, the correct diffusivity must be ajusted accordingly and the simulation repeated. An example of the simulation - experiment matching for the Phillips Petroleum polyethylene(Appendix A) is shown in Figure 33.

Figure 34 shows the values of the diffusivity found with the corresponding thermal conductivity. This spread in values will be used in the rotational molding simulation to determine the effects in molding time. Appendix D lists the computer program used in this flat plate simulation.

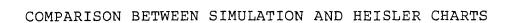


Figure 32

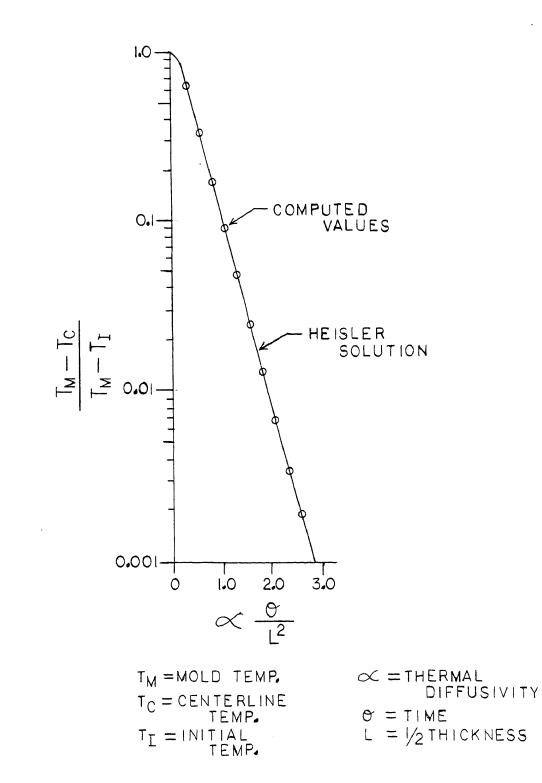


Figure 33

COMPARISON BETWEEN MEASURED AND COMPUTER

PREDICTED TEMPERATURES

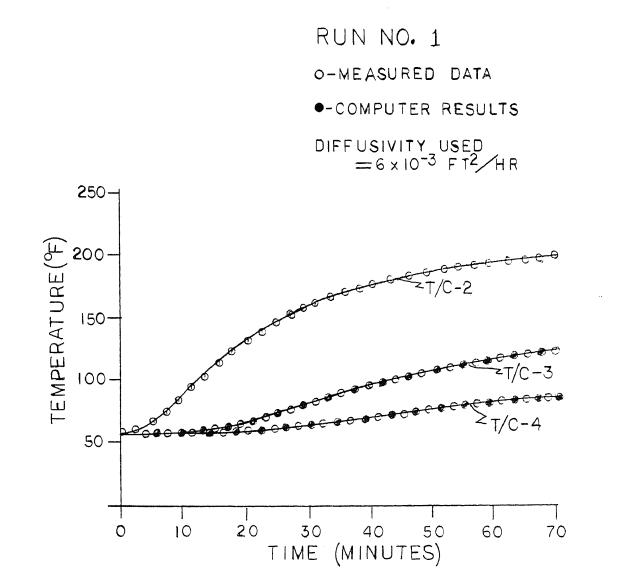


FIGURE 34

EXPERIMENTALLY AND COMPUTER SIMULATED DETERMINATION

OF THERMAL CONDUCTIVIT	TΥ	
------------------------	----	--

Run	Thermo- couples	Diffusivity		Thermal Conductivity	
No.		(Ft2/Hr)	(Cm2/sec)	(B/hr-ft-F)	(J/cm-s-K)
1	2 - 3	6.0E-03	1.55E-03	0.105	1.82E-03
	2 - 4	6.0E-03	1.55E-03	0.105	1.82E-03
	3 - 4	6.0E-03	1.55E-03	0.105	1.82E-03
	5 - 6	7.5E-03	1.94E-03	0.131	2.27E-03
	5 – 7	6.5E-03	1.68E-03	0.113	1.96E-03
	6 - 7	7.5E-03	1.94E-03	0.131	2.27E-03
2	2 - 3	6.0E-03	1.55E-03	0.105	1.82E-03
	2 - 4	6.0E-03	1.55E-03	0.105	1.82E-03
	3 - 4	6.0E-03	1.55E-03	0.105	1.82E-03
	5 - 6	5.0E-03	1.29E-03	0.087	1.51E-03
	5 - 7	7.0E-03	1.81E-03	0.122	2.11E-03
	6 - 7	9.5E-03	2.45E-03	0.160	2.77E-03

Average Thermal Conductivity = .155 B/Hr-ft-F Standard Deviation = 0.020 B/Hr-ft-F

NOTE: Thermal Conductivity calculated computed diffusivity using a density of 31.8 lb/ft3 and a specific heat of 0.55 B/lb-F (Appendix A).

X. THE COMPUTER SIMULATION FOR ROTATIONAL MOLDING

The rotational molding computer simulation (Appendix F) consists of the main program named ROTOTP, supported by the following subroutines: PRINT and CONST, and functions: VIS, SU, RHO, RADX, COND, and CP. The main program ROTOTP performs the simulation, PRINT is the printing routine and CONST computes the constants used in the nodal temperature equations. In addition CONST compute the neck growth for each node during every time increment. The functions VIS, SU, RHO, COND, and CP computes the viscosity, surface tension, density, thermal conductivity and specific heat respectively for each node. Function RADX computes the distance between adjacent nodes based on the density at those nodes.

The main program is divided into ten parts as is labeled in the program listing. Preceding Section I is a glossary of all variables used in the main programs. Section I initializes all the variables and sets all program flags. The variables include: the mold stick temperature(SS), the complete melt temperature(SM), the printing interval(PT), the number of wedges(NC), the material radius(RAD), the initial temperature(IT), the mold radius(RO), the radius from the center of the mold to the surface of the stationary pool material(RI), acceleration due to gravity(G), rotational speed of the mold(RPM), the angle of response(BA), and the coefficients used in the mold temperature-time history equation(A, B, and YY).

Section II performs initial computations using the initial values in Section I. They include computation of the pool angle theta(TH), cross-sectional area of stationary pool(AA), radial mold velocity(W), maximum penetration thickness(AD), maximum time increment(DT), the nodal distance(DX), and the number of nodes per column(N). This section then sets each node to the initial temperature and each nodal neck radius to zero. Then all major values are printed.

Section III begins the iteration process. The mold temperature(MT) based on time is determined. For each iteration the maximum time increment(DT) and time increment used(TS) is determined using the maximum diffusivity and the minimum nodal distance(all usually located at the surface node). Cross sectional areas(AT and AS), penetration thickness(AD) and free-fall time(TF) is also calculated for each iteration.

Section IV computes the nodal temperatures and nodal neck size at each nodal subvolume. The values Cl, C2, C3, DB, and DA in the temperature equation and the new neck size is determined in the subroutine CONST. The program

also checks each node to determine if its temperature is equal to or has exceeded the complete melt temperature(SM). When reached, the nodal neck radius becomes equal to the orginal radius of the material simulating full densification of the material.

Section V controls the printing of nodal temperatures and neck sizes. The printing time interval(PT) was selected in Section I. In addition, the temperature and neck size are printed at the point in time when there is no material remaining in the stationary pool and when all material has completely densified. At the end of the simulation, the neck size of each node location is printed showing the amount of neck growth that occured before complete melt had overcome the sintering process.

If mold sticking has not yet occured in the simulation, the program enters Section VI where it calculates the new free-fall section's average temperature for the next time interval. It calculates the temperature energy of the last column of the stationary pool that enters the free-fall zone during the next time interval and adds it to that remaining in the pool after a portion of it re-enters the stationary pool.

The program then rotates the stationary pool nodes

over one column distance simulating one time increment of travel. For example, the values of the nodes in the next to the last column move over to the last column. The nodal values in the second to the last column are shifted to the next to the last column and so on.

Next, the nodes in the first column are then initialized to the temperature of the material that had just exited from the free-fall zone and re-entered the stationary pool. The computer simulation then returns to Section IV and begins another iteration process for the next time interval.

If there is material sticking to the mold, the program by-passes Section VI and goes on to Section VII where it determines the amount of material in the last column that will stick to the mold wall and the amount that enters the free-fall zone during the next time interval.

This routine then sets up new nodal columns to simulate the stuck material. Since the time interval(TS) decreases as the cross-section of the stationary pool decreases, the simulation maintains, for each stuck column, its width(DC), position in the mold(PS), the number of nodes(N3), its height(H2), the distance between the last two nodes of the column(H3), and the nodal neck sizes (ANECK). It must be noted that the stuck height(H2) is very seldom an integer of the nodal distance(DX), therefore all nodal distances are the length DX except between the last two nodes which has a distance larger than DX making up the extra distance.

This section then calculates the energy of the material in the stationary pool column not sticking but entering the free-fall zone.

Section VIII simulates the rotation of the mold when sticking has occured. The stationary pool and then the stuck material is rotated one column width in the same manner described in the discussion of Section VI. The values of the stuck column's width(DC), number of nodes(N3), height(H2), and the distance between the last two nodes(H3) is also shifted along with the column. The position(PS) is updated to reflect its new position in the mold.

Section IX checks if the rotation causes any of the stuck material to re-enter the stationary pool. If no re-entering occurs, the computer simulation goes to Section X. If re-entering occurs, the simulation determines the portion of column width(EN) that re-enters the pool as well as the portion remaining outside(OT). The portion of the column remaining outside(OT) is combined to the adjacent column to make one equivalent column having a combined average nodal temperatures with a width equal to OT plus the width of the adjacent column.

The nodal temperatures and neck size of the stationary pool's first column is assigned the same values as the re-entering material(EN). Since the nodal distance of the last two nodes is usually larger than the normal nodal distance(DX), the last node is replaced by two nodes. The next to the last node will have the same neck size and temperature as the last node of the stuck material re-entering the pool. The remaining material is to be combined with the re-entering powder from the free fall zone to form an equivalent node. Additional nodal subvolumes are added representing the re-entering powder from the free fall zone adding an additional height equal to the penetration thickness.

If there is not enough mass in the stationary pool to allow adding the height of a penetration thickness, then fewer subvolumes are used having an equivalent cross sectional area equal to that of the remaining pool material. The last node will then be modeled as an adiabatic edge. The temperatures and neck radius nodal values of these added subvolumes are equal to that of the re-entering material from the free-fall zone.

Section X calculates the new angle theta(TH) based on the amount of material in the stationary pool zone. The program then returns to Section III and starts the iteration again for the next time increment.

When the amount of material in the stationary pool becomes zero, angle theta (TH) becomes zero. Therefore, the rotational simulation portion of this program is no longer needed making this simulation a simple onedimensional heat transfer simulation having the number of columns equal to that of the number of columns of stuck material. The simulation then consists of the iteration process in Sections III and IV until the temperature of the last nodes reaches or exceeeds the complete melt temperature(SM). At that point, the simulation calls SUBROUTINE PRINT and then terminates the simulation by printing the neck size of each node height level at the point when complete melt had overcome the sintering process.

XI. COMPUTER SIMULATION WITH OVEN CONVECTION

To simulate heating by oven convection in rotational molding, a few significant modifications were made to the original nodal model and to the computer program earlier developed (as listed in Appendix F.).

The original model assumed a temperature-time relationship which was described by a polynomial equation for the mold's internal surface, NODE 1, that is in direct contact with the powdered material. The temperature values of the other nodes are then calculated during each iteration based on the temperature time history of NODE 1.

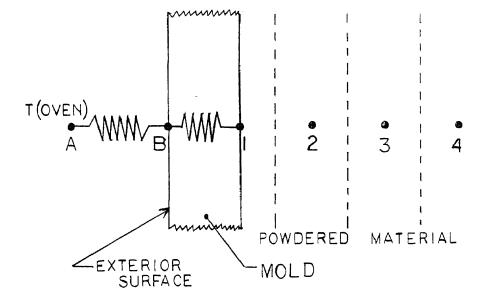
With oven convection, two additional nodes are used in the model accounting of the effect of the mold itself and the resistance between the heated air and the mold's surface. Figure 35 shows the position of these extra nodes. The node labled A in the figure represents the oven air and has a temperature value equal to the oven temperature, or:

$$T(A) = T(OVEN)$$

NODE B represents the exterior surface of the mold. Its nodal temperature equation (eq 36) is listed in Chapter VI. NODE 1 represents the interior surface of the mold having equation 38 as its nodal temperature equation. The



OVEN CONVECTION SURFACE NODAL CONVENTION



distance between NODE B and NODE 1 is equal to the thickness of the mold.

With the additional nodal equations, there are two additional stability equations, each having a maximum allowable time increment. The computer simulation calculates for each iteration the three maximum time increments and then allows the time increment used to be no greater than the minimum value of the three.

The future temperature values of NODE B and NODE1 as well as the remaining nodes are computed for each iteration using the nodal temperature equations developed. Appendix H is the listing of the Rotational Molding Simulation having oven convection.

XII. DISCUSSION OF RESULTS

Using the computer simulation program earlier developed, a number of runs were performed in order to predict pool depletion and total densification times with variations in temperature-time histories, rotational speeds, material amount, and thermal properties of the powdered material. The results of the rotomolding simulations as well as results of the Vanderbeck and Throne/Ahdout simulations are compared in Table 2 to the actual experimental results performed by Vanderbeck(30). The simulations reported in Table 2 used the polynominal temperature-time equations discussed earilier.

Section I of Table 2 compares each simulation at various power input levels having 50 grams of powdered material in the mold cavity. The different power inputs correspond to a particular mold temperature-time history as described by Vanderbeck(30). Results show a 40% to 55% error in the Vanderbeck simulation, a -3.6% to -10.2% error in the Throne/Ahdout simulation and a -2.1% to -11.1% error in the Rotational Mold Simulation developed here.

In Section II and III, the thermal diffusivity of the powder used in Section I was decreased by 20% and increased by 20% respectively. Simulations using the 500 watt and

TABLE 2

TIMES
DEPLETION
POOL

		1								 				-				 			_
DUT	ON 2 ERROR	Ŧ	0.7	-7.3	-10.2		-10.2	-5.2	-12.8	 -11.2	-10.5	7.8	-8.2	1	5 I	> C \	. 4.	45.1	48.1	49.4	47.I
THRONE/AHDOUT	SIMULATION PREDICTED ((SEC) E	071	310	278	246	, 1 F	246	363	239	246	246	246	246	t	8/7	8/7	278	737	647	146 146	040
	% ERROR	-	4 0- 1 1 1	-7.9	-11.1			0°0-	-12.4	-15.1	-16.7	-15.0	-16.0			10.1	-11.6	0	0°0	01	1
SIMULATION	PREDICTED (SEC)	175	312	276	244	947	247	372	240	235	229	227	222	c c		0 0 0 0 0 0	258	508	459	424	245
9	INEKMAL DIFFUSIVITY (CM2/SEC)	1. ZOF-03	1.70E-03	1.70E-03	1.70E-03	1 365-03	1.36E-03	 2.04E-03	2.04E-03	1.70E-03	1.70E-03	1.70E-03	1.70E-03	1 706-01	1.705-04	1.705-03	1.70E-03	 1.70E-03	1.70E-03	1.70E-03	1
k	1 ERROR	44	40	46	រ ព	1	1	 		42	4 10	R	27	Ç	Ì	5 60	28	 . 29	ы	5 F	-
	PREDICTED (292	470	439	411	1)	1	392	368	354	3 4 0	V C 9	104	388	373	 655	573	910 486	
	HCIUNL TIME (SEC)	TRT	335	300	274	TOT	274	383	274	277	275	267	268	CU1	100	100	292	508	437	246	1
-	۴ RI	4 796	4.796		4.796	702 V	4.796	4.796	4.796	4.796	4.796	4.796	4.796	70L V	704 1	4.796	4.796	1.361	•	1.561	•
	MAIEKIAL AMOUNT (GRMS)	0	20.0	50.0	50.0	C C V	20.01	50.0	50.0	50.0	0°05	50.0	50.0			20.02	50.0	84.5	ດ. 1989	0 4 0 0 4 0 0 4	1
-	RPM	~	~ ~	~	7	 7	~ ~	~	~	 10	ភ្	20	52	ç	, r		32	 ~	- 1		
	INPUT (WATTS)	005	600	700	800	ر د لا		500	800	800	800	008	800	001		2007	700	500	600	004	200
			I			Ť	11	III			١٧				5	>			17		

 For Temperature Equation Used: T = At + Bt² + IT

 Watts
 A
 B
 IT = 20 C
 F

 ----- ----- ----- ----- -----

 ----- ----- ----- ----- -----

 ----- 18.2
 -0.324
 -0.430

 500
 18.2
 -0.430
 -0.430

 700
 25.0
 -0.531
 -0.711

800 watt temperature-time histories resulted in the predicted pool depletion times shown for both the Throne/Ahdout and the Rotational Mold Simulations. For the 20% change, the Rotomolding Simulation showed a change between 0.8% and 1.6% while the Throne/Ahdout Flat Plate simulation resulted in a 1.6% to 3.3% change.

Section IV and V in Table 2 show the results of varying the rotational speed of the mold. The Vanderbeck simulation yielded a difference of 27% to 42% between the predicted and actual experimental results. Because the Throne/Ahdout simulation is a flat plate analysis with no rotational parameter, the pool depletion times are constant for power input reguardless of the actual rotational speed. The Throne/Ahdout simulation produced a 4.8% to 11.2% difference between actual and experimental results. The Rotational Mold Simulation had a 11.2% to 16.7% difference.

Note that the Rotational Mold Simulation developed here predicts a time difference of 10 seconds between the 10 RPM and 25 RPM pool depletion times of the 800 watt power input while the actual experimental difference was 9 seconds. For the 700 watt power input, the predicted and actual experimental time differences were identical with 10 seconds.

Section VI is the actual and predicted pool depletion

time results of a mold containing 84.5 grams of powder. The Throne/Ahdout has a difference ranging from 45.1% to 49.1%. The Rotomold Simulation produced a 0.0% to 7.1% difference.

Table 3 is a comparison of pool depletion and total densification times with the Rotomold and Throne/Ahdout simulation containing a 50 gram charge using oven convection coefficients in lieu of the polynomial temperature equations. Using a typical oven temperature of 371 degrees Centigrade, an aluminum mold thickness of 0.655 cm yielded results showing a close agreement between the two simulation for typical air convection coefficients.

The previous comparison of the 50 gram charge simulations show that the Rotomold Simulation developed here and the Throne/Ahdout Simulation will predict pool depletion and total densification times within a satisfactory tolerance. The Vanderbeck Simulation however, showed between 27% and 57% error. It also showed at those power inputs an insensitivity to changes in thermal conductivity.

It is confusing however, that for the 50 gram charge simulations, the Throne/Ahdout Simulation which is a flat plate simulation with no rotation or thermal mixing has as

TABLE 3

DEPLETION AND DENSIFICATION TIMES

Convection	Coefficient	Rib Simulati Depletion	-	Throne/A Simulation Depletion	
(B/Hr-Ft2-F)	(J/sec-cm2-K)	F	cation	<u>r</u>	cation
2	1.1356E-03	442	577	431	572
4	2.2712E-03	241	300	232	295
6	3.4068E-03	174	208	167	204
8	4.5424E-03	141	162	134	158
10	5.6780E-03	126	135	125	135

Material Stick Temperature (deg C) = 110 Material Melt Temperature (deg C) = 138 Oven Air Temperature (deg C) = 371.0Amount of material in mold (grams) = 50.0

Properties of Aluminum Mold

Thermal Conductivity (J/cm-sec-K) = 2.025Density (Kg/Cm3) = 2.707E-03Specific Heat (J/Kg-K) = 8.7085E-02Thermal Diffusivity (Cm2/sec) = 8.588 good as or even better results then the Rotational Mold Simulation developed. It would seem logical that the flat plate simulation temperature profile would show a maximum temperature at the mold's surface dropping rapidly to a minimun temperature at the inner surface. The difference between the minimum and maximum temperature would then increase with time causing a dramatic increase in predicted pool depletion and densification time for the powdered material. The flat plate simulation did not predict this. In fact, its predictions for the temperature profiles were very close to the Rotomold Simulation.

This seeming discrepency can be explained. In the Vanderbeck experiments, the pool depletion times for 500 through 800 watts are shown(Table 3) equivalent to an oven convection coefficient of approximently 1.137E-03 to 2.271E-03 J/Sec-cm2-K (2.0 to 4.0 B/hr-ft2-F). The ratio of the convection coefficient to the thermal conductivity of the powder divided by the thickness(h/(k/L)) determines the temperature profile. Krieth (55) states that if the ratio, h/(k/L) is less than 0.1 then the temperature throughout the material can be assumed constant for transcient thermal analysis. In other words, the heat input is so slow that it allows the material to distribute its internal energy evenly.

Pre-distributing 50 grams of powdered material around the mold will result in a material height of 0.4 cm, the ratio, h/(k/L) varies between 0.22 and 0.46. Although these values are not below 0.1, they are close enough to produce similar results. In addition, because these ratios are low, a 20% change in either direction of the thermal conductivity (as was reported in Section II and III of Table 2) would produce very little change in the pool depletion and total densification times.

With 80 grams of material charge, the material height (the value L) becomes 1.67 cm increasing the ratio four fold. Section VI of Table 2 shows the dramatic change in prediction times of the Throne/Ahdout simulation as compared to the actual results. The error now increases to a range of 45% to 49%.

By increasing the thermal conductivity, Table 4 shows again the limitation of the Throne/Ahdout simulation. Notice that as the conductivity, k, becomes smaller (making h/(k/l) larger), the deviation between the Rotational Molding Simulation and the Throne/Ahdout Simulation becomes extremely large.

Similar results are found if the value of the coefficient of convection becomes large as may occur in

TABLE 4

DEPLETION AND DENSIFICATION TIMES

AS A FUNCTION OF THERMAL CONDUCTIVITY

Thermal Conduc- tivity (J/Cm-sec-K)	Thermal Diffu - sivity (cm2/sec)	Ribe Simulat (sec) Depletion		Throne/A Simulat (sec Depletion	ion))
وي من حد غير ايه من عن عن جي بي غير عل			والدر الروان ويون ويوه والله		
1.99E-02	1.7E-02	95	84	116	113
1.99E-03	1.7E-03	126	126	135	135
1.99E-04	1.7E-04	154	245	200	258
1.99E-05	1.7E-05	215	873	418	919

Material Stick Temperature (deg C) = 110 Material Melt Temperature (deg C) = 138 Oven Air Temperature (deg C) = 371.0Amount of material in mold (grams) = 50.0Oven Convection Coefficient (J/cm2-sec-K) = 5.678E-03

Properties of Aluminum Mold

Thermal Conductivity (J/cm-sec-K) = 2.025Density (Kg/Cm3) = 2.707E-03Specific Heat (J/Kg-K) = 8.7085E-02Thermal Diffusivity (Cm2/sec) = 8.588 radiant and forced Fluid heating of the mold. Table 5 illustrates the effect of changing convection coefficients by factors of magnitude. Again, high errors (19% to 34%) occur in the prediction of the pool depletion and densification times.

In summary, the Throne/Ahdout Simulation is accurate only when using certain combinations of the simulation parameters, otherwize large errors will occur in pool depletion and total densification predictions. The Rotational Molding Simulation developed in this dissertation does predict accurate times for the pool depletion and densification as was verified by the experimental results of Van der Beck(30). It models closely the material flow, mold heating of the powdered material, rotation of the stationary pool and material melted to the mold wall, and the thermal and physical mixing during the free-fall zone.

TABLE 5

DEPLETION AND DENSIFICATION TIMES

AS A FUNCTION OF CONVECTION COEFFICIENT

Convection Coefficient (J/Cm2-S-K)	Depleti Ribe Sim.	on Time: T/A Sim.	s (sec) % Diff. 	Densifi Ribe Sim.	Cation T/A Sim.	Times % Diff.
3.407E-03	331	445	34	355	468	32
3.407E-02	122	151	24	137	178	30
3.407E-01	101	121	20	109	130	19
3.407	99	118	19	105	125	19

Material Stick Temperature (deg C) = 110 Material Melt Temperature (deg C) = 138 Oven Air Temperature (deg C) = 371.0Amount of material in mold (grams) = 80.0Thermal Diffusivity (Cm2/sec) = 1.7E-03

Properties of Aluminum Mold

Thermal Conductivity (J/cm-sec-K) = 2.025Density (Kg/Cm3) = 2.707E-03Specific Heat (J/Kg-K) = 8.7085E-02Thermal Diffusivity (Cm2/sec) = 8.588

NOTE: T/A = Throne/Adhout

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XIII. CONCLUSIONS AND REMARKS

This dissertation has presented an investigation of the densification process in rotational molding of a thermoplastic powder in a cylindrical cavity.

First, a thorough literature survey was performed to review past works of rotational molding analysis, as well as the study of sintering, the effects of temperature on viscosity and surface tension for polymeric material, a review of thermal conductivity equations of composite materials and a review of other areas that would assist in the analysis of the densification process in rotational molding.

Next, an in depth study of the mass flow in a rotating cylinder together with an analysis of the heat transfer during rotational molding were performed to attain the understanding necessary to model the densification process.

The densification process in rotational molding was then modeled mathematically using Nodal Analysis. Nodal temperature equations were derived for typical oven convection heating and a special case where the mold's temperature-time history is known. The special case was modeled to provide a comparison and validation of the

simulation developed with previous experimental research.

The research for this dissertation included an exhaustive investigation and analysis into the densification process (neck formation) by use of Scanning Electronic Microscope(SEM) photography. Because of the large depth-of-field of the SEM, photographs which were almost impossible to obtain before, allow the analysis to be performed. Based on this analysis, the intermediate physical property correlations needed in the nodal temperature equations were derived.

Lacking an agreement between results of published composite thermal conductivity equations, a hybrid experimental procedure coupled with a computer simulation was devised to determine the actual initial thermal conductivity of the powdered polymeric material.

Finally, a computer program was written to simulate the heating and densification during the rotational molding process. Results showed agreement with actual rotational molding experimental findings. In addition, results of other simulations were compared showing their shortcomings.

It is important to include in this summary a discussion of one logistical drawback in the use of this simulation; that being the amount of computer time required.

Because of the intricate modeling, the simulation will require from 800 to 6000 seconds of computer time. This equates to a maximum of \$650.00 per simulation when used on a Control Data Corp. mainframe system(CDC 6500).

If, because of cost, the use of the Rotational Molding Simulation becomes prohibitive, modifications to the Throne/Ahdout Simulation will improve its accuracy. A complete examination and modification to the Throne/Ahdout Simulation is beyond the scope of work for this dissertation. However let it be noted that the major modification would encompass a thermal mixing routine to simulate the free fall thermal/physical mixing zone for the powdered material that has a temperature below the stick temperature.

Since miminal computer cost was not an original requirement, this dissertation has performed and completed all its objectives. It has investigated the heating and densification portion of the rotational molding process. Included, was an analysis of the heat transfer, mass flow and neck formation colmenating into a valid and proven simulation.

APPENDIX	А
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NOMINAL PHYSICAL PROPERTIES OF MARLEX LX470 (POLYETHYLEN	NOMINAL	PHYSICAL	PROPERTIES	OF	MARLEX	LX470	(POLYETHYLENE
--	---------	----------	------------	----	--------	-------	---------------

PROPERTY ¹	ASTM	Metric Units	Value
Density	D1505	g/cm3	0.943
Melt Index	D1238	g/10 min	3.0
Flow Index, CIL, 190C 10.4 MPa2		g/10 min	3.0
Brittleness Temperature	D7 4 6	Deg. C	-118
Specific Heat @ 90C(ref 58)		cal/g-C	0.55
ROTATIONAL MOLDED PROPERTIES	3		
ESCR, Condition A, F50	D1693	h	200
Tensile Strength at Yield 2"(50.8 mm) per min.	D638 Type IV Spec	MPa	22.1
Elongation 2"(50.8 mm) per min.	D638 TYPE IV Spec	8	350
Flexural Modulus	D790	МРа	965
Impact ARM Standard ⁴ at -28.9 deg C		J	68

¹ Physical properties reported herein were determined on compression molded speciments prepared in accordance with Procedure C of ASTM D1928 (Ref 57).

- ² Data obtained using a gas extrusion plastometer based on design by Canadian Industries, Ltd., with a die having an orifice diameter of 0.49 mm and a land length of 4.48mm.
- ³Physical properties are based on parts molded at optimum conditions (Ref 57).

⁴ Ten pound dart with 0.5 inch point in center of 0.125 inch thick unsupported 3.5 inch diameter area.

APPENDIX A (continued)

Size	Inches	mm	Percent of material stopped by sieve
30 35 40 45 50 60 80 100 120 170 200 230 270 PAN	0.0197 0.0164 0.0138 0.0117 0.0088 0.0070 0.0059 0.0049 0.0035 0.0029 0.0025	0.420 0.350	0.0007 4.40 16.41 20.81 19.19 5.96 18.10 7.78 3.56 2.32 1.05 0.27 0.11 0.14

U. S. STANDARD SIEVE SIZE DISTRIBUTION OF MARLEX LX470

Measured Specific Gravity of Powder = 0.5096 Specific Gravity of Resin = 0.9430

Void Fraction of Air = 45.96%

APPENDIX B

PHYSICAL PLASTIC PROPERTIES OF ONE-EIGHT DIAMETER

SPHERES MADE OF POLYETHYLENE AND ACRYLIC

PROPERTY	UNITS	POLY- ETHYLENE	ACRYLIC
Impact Strength, Notched Izod	Ft-lb/in	1 - 10	0.4 - 0.6
Tensile Strength	PSI x 1000	2.5 - 5	7.9
Tensile Modulus	PSI x 1000	85 -160	350 - 450
Thermal Conductivity	Cal/cm2/sec/ C/cm x 10000	8	4 - 6
Specific Gravity		0.94 - 0.96	1.18 - 1.19
Elongation	<u>0</u> 0	5 - 10	2 - 10
Flexural Strength	PSI x 1000	2 - 3	14 - 16
Flexural Modulus	PSI x 1000	90 - 150	350 - 450

APPENDIX C

PHYSICAL PROPERTIES OF MICROSPHERES COMMERICALLY NAMED

"ELVACITE" ACRYLIC RESINS 2021 by DuPont

Density(resin) 1.196 Kg/M3 Glass Transition Temperature 100 Deg C Tukon Hardness, Knoop No. 20 Tensile Strength (23 Deg C., 50% RH) 106 MPa 15kPsi Elongation at Break (23 Deg C., 50% RH) 4%

U. S. STANDARD SIEVE SIZE DISTRIBUTION

Sieve Size	Inches	mm	Percent of material stopped by sieve
30 35	0.0232 0.0197	0.590 0.500	0.48 0.16
40	0.0164	0.420	0.18
45 50	0.0138 0.0117	0.350 0.297	0.27 3.26
60	0.0088	0.250	18.87
80 100	0.0070 0.0059	0.177 0.149	65.58 4.83
120	0.0049	0.125	3.28
170 200	0.0035 0.0029	0.088 0.074	1.92 0.92
230	0.0025	0.063	0.10
270 PAN	0.0021	0.055	0.08 0.07
FAN			
			100.00 %

Measured Specific Gravity of Powder = 0.730 Specific Gravity of Resin = 1.196 Void Fraction of Air = 38.96%

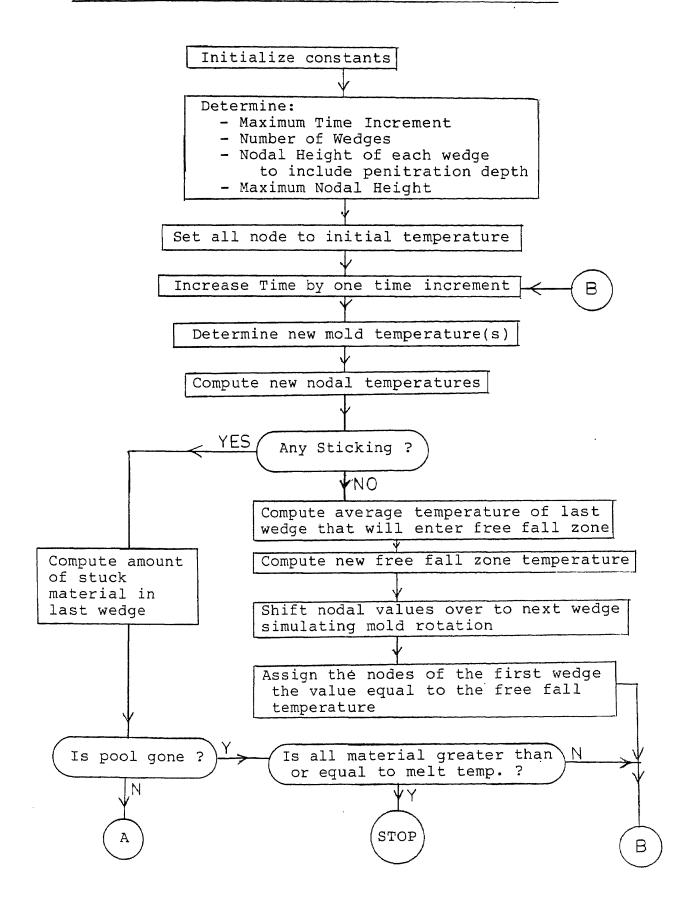
APPENDIX D

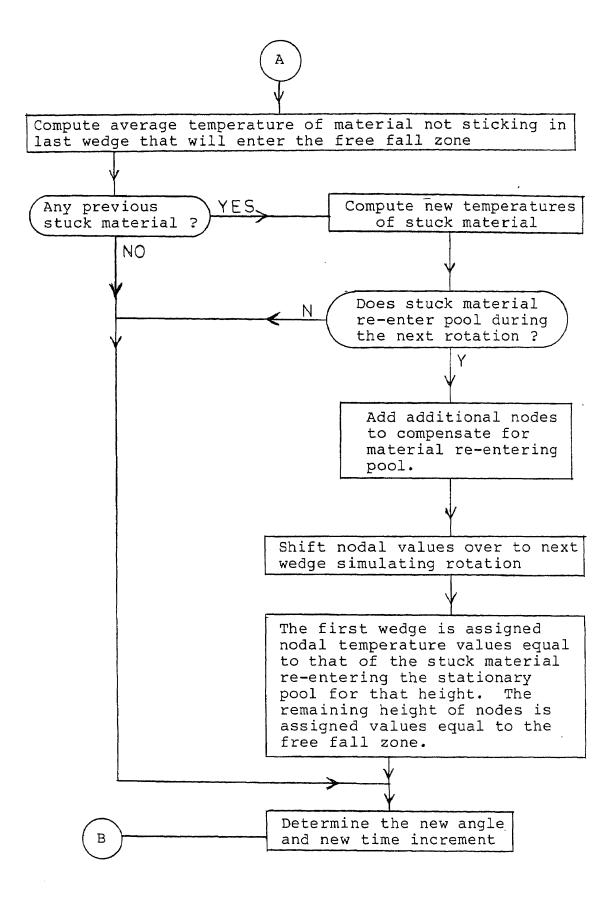
FLAT PLATE SIMULATION

```
90 REM SLAB TEMPERATURE TIME HISTORY SIMULATION
95 DIM T(30),TN(30),TT(15),TP(15)
97 OPEN1,4,2
100 AL=6.200E-03:REM FT2/HR
105 PRINT#1,"AL = ";AL
110 AL=AL*0.04 :REM IN2/SEC
120 DX=0.09375
                :N=17 :REM DX IN INCHES
125 TM=0.0 :NN=0
130 TS=DX©2/(2*AL)
140 M=INT(60/TS)+1
150 DT=60/M
160 FORJJ=1TO11:READ TT(JJ):NEXTJJ
170 FORJJ=1TO11: READ TP(JJ):NEXTJJ
180 FORI=1TON:T(I)=TP(1):NEXTI
200 TM=TM+DT:NN=NN+1
210 GOSUB 1000
220 T(N+1) = T(N-1)
230 FOR I=2TON
240 TN(I) = T(I) * (1-2*DT*AL/DX©2) + DT*AL/DX©2*(T(I-1)+T(I+1))
245 IFTN(I)<T(I)THEN STOP
250 NEXTI
260 FORI=2TON:T(I)=TN(I):NEXTI
265 PRINTTM;T(9)
270 IF INT(NN/M)=NN/M THEN PRINT#1,TM;TM/60,T(1),T(9),T(16)
280 IF TM/60>60 THEN PRINT#1:CLOSE1:STOP
290 GOTO200
1000 REM SUBROUTINE TO DETERMINE 1ST NODE TEMPERATURE
1010 FOR JJ=2T011
1020 IF(TM/60 <TT(JJ)) THEN 1030
1025 NEXTJJ
1030 \text{ RA}=(TM/60 -TT(JJ-1))/(TT(JJ)-TT(JJ-1))
1035 IFRA=OTHEN T(1)=TP(JJ-1):RETURN
1040 T(1) = TP(JJ-1) + RA^{*}(TP(JJ) - TP(JJ-1))
1050 RETURN
2000 DATA 0,2,5,10,15,20,30,40,50,60,100
2010 DATA 64,67,86,127,153,171,195,210,220,227,227
```

APPENDIX E

FLOW DIAGRAM FOR THE ROTATIONAL MOLDING SIMULATION





APPENDIX F

ROTATIONAL MOLDING SIMULATION

	PROGRAM R485 (INPUT, OUTPUT, TAPE5=INPUT, TAPE6=OUTPUT, TAPE8) DIMENSION IN(100), T(200, 100), DC(200), PS(200), N3(200), H3(200)
	<u> </u>
	COMMON SS, SM, AL, AM, DX, N, TM, AA, AT, AD, TH, DL, N2, CT, NC, N3, RAD, TS COMMON TAIR, 34T, MT
	INTEGER CT,KL
	REAL HoHSOHECK (2000000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
	DATA ANECK,BNECK/20000*0.0,100*0.0/
	GLOSSARY
	JLUJJART
	A COEFFIEIENT IN TEMPERATURE EQUATION
	AA TOTAL JROSS SECTIONAL POOL AREA (CH2)
	AD PENITRATION THICKNESS (CM)
	AL INITIAL THERMAL DIFFUSIVE TY (CM2/SEC)
;	AM THERMAL DIFFUSIVITY AT COMPLETE MELT (CM2/SEC)
	ANECK NESC RADIUS AT EACH NOCE (CM)
	ANEK NECK RADIJS OF EACH NODAL AREA AT THE TIME
	MELTING OVE RCOMES THE SINTERING PORCESS (CM)
;	ANK DUMMY VARIABLE = ANECK(1,1)
;	
ì	CROSS SECTIONAL FOOL AREA
;	AS TOTAL AREA ENCOMPANSING NCDAL ANALYSIS
	(HEIGHT OF NODES X TOTAL WIDTH)
	AT
;	AV DUMMY VARIABLE USED TO CETERMINE NEW ANGLE THETHAT
;	
,	THAT RE-ENTERS THE FOOL IN THE NEXT TIME INCREMENT. (
;	MATERIAL THAT REMAINS OUTSIDE THE POOL
;	DURING THE NEXT TIME INCREMENT (C+2)
;	B CDEFFICIENT IN TEMPERATURE EQUATION
,	BA ANGLE OF RESPONSE OF THE POOL (RAD)
	BB JUMMY VARIABLE USED IN TEMPERATURE EQUATION
;	BE DUMMY VARIABLE USEC SURFACE NOBAL NECK SIZE EQUATION
;	BNECK NEW COMPUTED NECK SIZE FROM SUBROUTINE (CM)
;	CC-H4LF-LENGTH-OF-POOL-CORO-(CM)
;	CT COUNTER USED TO COUNT THE NUMBER OF STUCK COLUMNS
;	CI CONSTANT USED IN TEMPERATURE EQUATIONS DETERMINED IN
, ,	SUBROUTINE CONST
· · · · · · · · · · · · · · · · · · ·	C2 CONSTANT USED IN NODAL TEMPERATURE EQUATIONS
, ;	C3 CONSTANT USED IN NODAL TEMPERATURE EQUATIONS
,	DA AVERAGE DIFFUSIVITY BETWEEN NODES I+1 AND NODE I (CM2/SEC) DB AVERAGE DIFFUSIVITY BETWEEN NODES I-1 AND NODE I (CM2/SEC)
, 	
,	DC ARC WIDTH OF STUCK NOTAL COLUMNS (RAD)
	DL ARC LENGTH PER TIME INCREMENT (RAD/SEC)
;	DT MAXIMUM TIME INCREMENT (SEC) DX DISTANCE BETWEEN NODES (CM)
, ;	
;	STATIONARY POOL (RADIANS)
, ;	FT-4VERAGE TEMPERATURE OF MATERIAL IN FREE FALL ZONE (C)
,	G ACCELLERATION DUE TO GRAVITY (CM/SEC2)
, }	HEIGHT OF STJCK MATERIAL LEAVING POOL (CM)
;	HT DUMMY VARIABLE USED IN COMPUTING POOL ANGLE THETHA
, 	HI HEIGHT OF STUCK MATERIAL LEAVING POOL DURING THE NEXT

-

......

}	H2 HEIGHT OF STUCK MATERIAL COLUMN OUTSIDE POOL
}	H3DI-STANSE-BETWEEN-LAST-TWO-NOBES-OF-EACH-COLUMN-OF
;	STUCK MATERIAL OUTSIDE POOL (CM)
ì	IFLAG FLAG SHOWING THAT NODAL HEIGHT HSD REACHED
	ITS-MAXIMUM-WHEN-≠-1
•	II COUNTING VARIABLE USED IN DC-LOOPS
;	
2	IREM FLAG SHOWING POCL MASS IS GONE WHEN = 0
	ITINITIAL'TEMPERATURE-OF_POOL_POWCER (C)
;	IZ JUMMY VARIABLE USED WITH THE PRINT SUERCUTINE
<u>}</u>	
;	J COUNTING VARIABLE USED IN DO-LOOPS
)	JI GOUNTING VARIABLE USED IN DO-LOOPS
2	JJ COUNTING VARIABLE USED IN DO-LOOPS
;	JJI COUNTINS VARIABLE USED IN DO-LOOPS
)	JK DUMMY VARIABLE
;	JL =LAG
	JTVAL DUMMY VARIABLE
<u>}</u>	
	KK FLAG VARIABLE
;	KL JUMMY VARIABLE
	K4 DUMMY VARIABLE
}	
, }	LT DUMMY VARIABLE MCROSS SECTIONAL-OFMASSLEAVING-POCLAND-STUCK-TC-WALL
	MT MOLD TEMPERATURE (C)
, ;	
3	NC NUMBER OF POOL GOLUMNS OF NODES
<u></u>	
C	NMAX MAXIMUM NODE HEIGHT BASED ON VOLUME OF POOL (CM)
Ğ	
C	NNTP DUMMY VARIABLE WHICH EQUALS N6+N4+1
Ğ	N2-GOLUMN HUMBER OF STUCK MATERIAL
C	N3 NUMBER OF NODES IN STUCK COLUMN MINUS 2
с	
Ċ	N4 DJMMY VARIABLE
č	
C	OT PORTION OF RE-ENTERING STUCK COLUMN NOT ENTERING POOL (RAD)
Ğ	
Č	PT PRINTING INTERVAL (SEC)
c	
C	RAD INITIAL RADIUS OF MATERIAL (CM)
c -	
C	RI RADIUS FROM MOLD CENTER TO SURFACE OF STATIONARY POOL (CM)
-C	RM DUMMY VARIABLE
С	<pre>ro inner radius of mcld (CM)</pre>
·e	
C	R2 DJMMY VARIABLE
	SH COMPLETE MELT TEMPERATURE (DEG C)
С	SR RATIO OF FREE-FALL TIME TO TIME INTERVAL TS
-C	
C	S1 DUMMY VARIABLE USED IN WEDGE AREA EQUATION
-6	
C	T NODAL TEMPERATURE
	TF-FALL TIME-IN-FREE FALL ZONE (SEC)

	TH ANGLE (THETHA) FROM GENTIR OF MOLD TO JUNCTION OF
	TH ANGLE (THETHA) FROM GENTIR OF MOLD TO JUNCTION OF POOL SURFACE AND MOLD (RAD)
<u> </u>	TH TINE
C	TN NEW COMPUTED NODAL TEMPERATURE (C)
<u>c</u>	TP COMBINED NODAL TEMPERATURE USED IN DETERMINING
č	A VERAGE TEMFERATURE (C)
c	TS TIME INTERVAL USED (SEC)
С	TW CONTACT TIME OF MATERIAL TO WALL IN POOL REGION (SEC)
C	W ROTATIONAL SPEED OF MOLD (RAD/SEC)
С	X5 POSITION OF LEADING AREA OF STUCK MATERIAL (RAD)
	YY CUNSTANT IN TEMPERATURE EQUATION
C	
C +	**** SECTION I *****
C	
	EN=0.0 IREM=1
·····	
	NEC=1
	PT=30.0
	TM=0.0
	NC=8
	RAD=0.0125
	RI=1.360 E
••••••••••••••••••••••••••••••••••••••	20=6.6675
	RPM=10.0
	BA=53
-	SS=110.0
	SM=139.0 IT=20.0
	A=22.0
	B = -0.430
	YY=20.0
	G=980.0
۴ ۲	***** SECTION II *****
<u> </u>	
	RA=RI/RO
	29 FH= (3.14159/2.0-AT4 + (RA/ (-RA*RA+1.0)**0.5))*2
C C	DETERMINE AREA IN STATIONARY POOL
	AL=COND(0)/(CP(0)*RHO(0))
	A M=COND(RAD)/(CP(RAD)*RHO(RAD))
	W=0.10472*RPM
	TS=TW/NC ITM=0
	ITMX=1
С	DETERMINE MAXIMUM PENITRATION DISTANCE
	AD=7.2*(AL *TW) **0.5
C	DETERMINE MAXIMUM TIME INCREMENT
С	DETERMINE NODAL DISTANCE

DETERMINE NODAL DISTANCE DX= (DT*2*AM)**0.5------

C

IF(AM.LT.AL) DX=(DT*2*AL)**0.5

DETERMINE NUMBER OF NODES PER COLUMN

	-N= (INT (40/ DX)+1)+2	
	NNAX=N+1	
	NAA=NTI N2=NC+2	
	CT=N2-1	
<u>6</u>	SET INITIAL TEMPERATURE AND NECK RADIUS	
Ŭ	DO 125 I=1,NC	
	00 126 J=1,NNAX	
	$T(I \cdot J) = I T$	
	ANECK (1, J) = 0 + 0	
125	SONTINUE	
	CONTINUE	
	BA=0.0174533*3A	
· · · · · · · · · · · · · · · · · · ·	WRITE(6,15)	
10	FORMAT(1H1,29HROTATIONAL MOLDING SIMULATOR)	
	WRITE(6;11) RI, RO, N.A.B. EX, SS, A. SM, AM, RPM	
11	the second from the second of the second	JS(
	L3M)= +F10.3+ /+ 6X+21HINTIAL NO. OF NOCES= +I3+/+	
h	26X,19HCJEF. A OF TEMP EQ=,F10.3,/,6X,20HCOEF. 3 OF TEMP EQ= ,F10	
	5, /, 6X, 20 HNODE THICKNESS(CM) = , F10, 4, /, 6X, 38HSTICK TEMP(C) AND D	
S.	+USIVITY(CM2/S)= ,F10.3,3X,E10.3,/,6X,46HCOMPLETE MELT TEMP(C) AN DIFFUSIVITY(3M2/S)= ,F1(.3,3X,E10.3,/,6X,6HRPM= ,F10.3)	
C	DTELOSIVIL4(245/2)- *LI(*240X4E10*24/404404K+L- *LI(*2)	·.
Č	SCOTION III	
	-TW=TH/W	
	CC=2*RO*SIN(T+1/2)	
	ANK=ANE3K(1,1)	
	IF (CT.GT.N2) ANK=ANECK(CT,1)	5
	AM=COND(ANK)/(RHO(ANK)*CP(ANK))	-
	BE=RADX(ANK)	
	-RECHECK-MAXIMJ M-TIME-INCREMENT EACH ITERATION	
	DT=(BE+DX) ++2/(2.0+AM)	
	-IF (AM.LT.AL) - DT= (8=* 0x) ** 2/(2.0*AL)-	
	TM=TM-TS	
	IF ((IREM. EG. U) . JR . (ITM. GT. 0)) 60 10 109	
	TS=TW/NC	
	-FTL=FS	
	ITMX=1	
	-EF+FTL.GT.DT+ TTL=>T	
	IF(TTL.GT.TS1) TTL=TS1	
	IF(ITL,EQ, TS)-G3T0-189	
	ITMX=INT(TS/TTL)+1	
	-TS=ITL/IIMX	
109	IF(IREM.EQ.0) TS=DT	
	OL=W*IS*RO	
	IF(TM.EQ.0.0) WRITE(6,20)DT,TS,OL	
	FORMAT(1H +/+ 5X+23+MAX TIME INCREMENTS(S) = + F10+5+/+6X+21 HTIME	1 NC-
	LREMENT USED= ,F10.5,/,6X,18HARC/TIME INC(CM)= ,F10.5)	
	-TM=TM+TS	
	IF(IPEM.EQ.0) GOTO 540	
	NMAX= INT (AA/(NG*DL*DX)) + 1	
	AD=7.2*(AL *TW) **0.5	
	-TF= (1 + 33 33 * 6 6 / (6 * 6 9 5 (8 A))) * * 9 * 5	
	SR=TF/TS	
	-IF(SR.LT.1.0)-S7.±1.0	
C	DETERMINE AREA OF EACH WEDGE	
	51=R0*SIN(TH/2.0)	

OGRA	М	R485

	$-\frac{52=80 \times C_3 \times (1+72 \times 0) \times FAN(W \times 15/2 \times 0)}{52}$
	AT=0.5*(S1+52)*(S1-S2)*SIN(W*TS)+0.5*RC*RO*(W*TS-SIN(W*TS))
	IF(AS.GT.AT) AS=AT
	N=NMAX
54	C CONTINUE
	00 550 I=1,NG
	$T(I_{1}N+1) = T(I_{1}N-1)$
	$\frac{1}{1} = \frac{1}{1} = \frac{1}{1} = \frac{1}{1} = \frac{1}{1}$
55	a continue
	CONTINUE
	NNAX = N + 1
	N6=INT(40/0X)+I
0	
a¥	**** SECTION IV ****
2	
3	COMPUTE NODAL TEMPERATURES AND NECK RADIUS
58	C MT=A*TM/60.0+3*(TM/60.0) **2+YY
	DO 620 I=1,NC
)	NODAL TEMPERATURE EQUATIONS FOR STATIONARY POOL
	$\frac{T(1,1)=4T}{TN(1)} = 4T$
	CALL CONST (C1, C2, C3, C8, DA, MT, MT, ANECK(I, 1), ANECK(I, 2),
	1 BNECK(1))
	ANECK(I, 1) = BNECK(1)
	DO 630 J=2,N
	- CALL CONST (C1, C2, C3, CB, DA, T(I, J), T(I, J-1), T(I, J+1), ANECK (I, J),
	1 ANECK(I,J+1), BNECK(J))
	TN(J)=T(I,J)+(1-TS/C3+(DB/C1-+DA/C2))+TS/C3+(DB/C1+T(I,J-1)+
	1DA/C2*T(I,J+1))
63	CONTINUE
	DO 640 JJ=1.N
	T(I,JJ)=TN(JJ)
	IF((JJ.EQ.NEC).AND.(TN(JJ).GT.SM)) ANEK(NEC)=BNECK(JJ)
	TF((JJ.EQ.NEC).AND.(TN(JJ).GT.SM)) NEC=NEC+1
	IF(TN(JJ),GT.SM) BNECK(JJ)=RAD ANECK(I,JJ)=BNECK(JJ)
64	C CONTINUE
	CONTINUE
	TE(CT.IT.N2) 50 TO 890
<u></u>	NODAL TEMPERATURE EQUATIONS FOR STUCK MATERIAL
	DO 880 T = N2 CT
	CALL CONST(C1, C2, C3, DB, DA, MT, MT, MT, ANECK (1, 1), ANECK (1, 2),
	1 BNECK(1))
-	ANECK(I, 1) = 3NECK(1)
	IF(N3(I).EQ.1) GO TO 780
	D0 770 J=2.JTVAL
	CALL CONST (C1, C2, C3, DB, DA, T(I, J), T(I, J), T(I, J), ANECK(I, J),
	1 ANECK(I, J+1), BNECK(J))
	1DA/C2 *T(I, J+1))
	CONTINUE

<u>788 J=N3(I)+1</u> CALL CONST(C1,C2,C3,DB,DA,T(I,J),T(I,J-1),T(I,J)	+1) . ANECK (T) .
1 ANECK(I,J+1), BNECK(J)	
BB = TS / C3 + (DB / C1 + T (I, J-1) + DA / (H3 (I) + C2 / DX) + T (I, J+1)	+1))
820 CONTINUE	
J=N3(I)+2	anting ang ang ang ang ang ang ang ang ang a
CALL CONST (C1, C2, C3, DB, DA, T(I, J), T(I, J-1), T(I, J), ANECK (I, J),
BB=08*TS/(H3(I)*(C3/DX)**2*(H3(I)~DX/2))	
TN{J}=T{I}}*{1=88}+88*T-{IJ=1}	
DO 870 JJ=1, J	
IF((JJ.EQ.NEC).AND.(TN(JJ).GT.SM)) ANEK(NEC)=BNE	
IF((JJ.EQ.NEC).AND. (TN(JJ).GT.SM)) NEC=NEC+1	annen annen annen an star annen san annen an star annen an san annen an san annen an san an san an san an san
IF(TN(JJ).GT.SM) BNECK(JJ)=RAD ANECK(I,JJ)=BNECK(JJ)	
375 CONTINUE	
	and and the second s
C	
890 CONTINUE	an a
IF ((T(NC,N). JE.SS). AND. (IREM.EQ. 1). AND. (N.EQ. NMA	XI) GO TO 891
	and a standard standard and a standard standard a standard standard standard standard and an a standard standar
IF(TM.LT.LK*PT) GOTO 892	
	· · · ·
C **** SECTION V *****	
C PRINT ROUTINE	۲۰۰۰ - میکنان این این این این این این این این این
C PRINT RJUTINE	
801 13-0	
$T_{3} = 1$	
	an an ann a suadhachan a bann ann an 2 an ann ann a suadhachan air an
CALL PRINT (ANECK, 12, 13)	
IF(I(NC, N) .GT. SM) 501029	ngana sa manjung na saman nanakarat Malana saka sati sa sa sa sa sakarika ka manakan saka na s
IF((T(NC,N).LT.SS).OR.(IREM.EQ.0)) GOTO 892	
IF (N.L.T. NMAX) GO TOB92	a ang a sa saga ang ang ang ang ang ang ang ang ang
WRITE(6, 30)TM	
	+5+6+=-+++++++++++++++++++++++++++++++++
IREM=0	
AT = 0, 0	
AA = 0 . 0 	
GOTO 892	
29 CONTINUE	
. #RITE(6, 31)	1996 - 1997 y 1 y 1 10 A To and Star I for any second of Tab. 21 1 10 1 10 1 10 1 10 10 10 10 10 10 10
31 FORMAT(1X, ///, 5X, 29H NECK RADIUS AT COMPLETE ME	LT ,/,10X,
1 4HNCDE, 6X, SHRADIUS	-
00 33 J=1,N	
WRITE (6, 32) J, ANEK(J)	
32 FORMAT(10X,15,5X,F10.6)	
37 CONTINUE	
STOP	
ITM=ITM+1	

	<u>IF((IREM.EC.0).)R.(ITM.LT.ITMX)) GD TO 1000</u> ITM=0
C	
∂* -	**** SECTION VE *****
C	
C	
C	CALCULATE MIX MEAN TEMPEFATURE WHEN NO MATERIAL HAS STUCK
ա 	9 TP=0.0
110	- 00 1110 I=2, N
	$TP = TP + T(NC_{\bullet}I)$
-111	CONTINUE
	TP = (TP + 4T/2) / (N - 0.5)
	DO 1140 III=2, NC
	DO 1142 J=1, NNAX
	$\frac{T(I,J)=T(I-1,J)}{ANECK(I,J)=ANECK(I-1,J)}$
-++-6-	ANEUR (1, J)=ANEUR (1-1, J) 2 CONTINUE
	C CONTINUE
	-00 - 1150 - I = 1, NNAX
115	GONTINUE
·····	IT=((SR-1)+IT+FT)/SR
	TM=TM+TS
C	
	**** SECTION VII *****
<u>c</u>	DETERMINE THE AMOUNT OF STICK AND NEW ANGLE
C	
	DO 1220 I=2, N IF(T(NC,I).LE.SS) GO TO 1221
-122	CONTINUE
122	
	1 CONTINUE
	1 CONTINUE - RA=(SS-F(NC,I-1))/(F(NC,I)-T(NC,I-1))
	- RA=(SS-F(NC,I-1))/(T(NC,I)-T(NC,I-1)) H=(RA+(I-2))*DX DO-1250-IF= 2,N
*** *	- RA=(SS=F(NC,I=1))/(T(NC,I)=T(NC,I=1)) H=(RA+(I=2))*3X DO-1250-IF= 2,N IF(T(NC-1,II).LE.SS) G0 T0 1251
-1-25	RA=(SS-F(NC,I-1))/(T(NC,I)-T(NC,I-1)) H=(RA+(I-2))*0X DO-1250-IF= 2,N IF(T(NC-1,II).LE.SS) GO TO 1251 C- CONTINUE 1 CONTINUE
-1-25	RA=(SS-F(NC,I-1))/(T(NC,I)-T(NC,I-1)) H=(RA+(I-2))*0X DO-1250-IF= 2,N IF(T(NC-1,II).LE.SS) GO TO 1251 C- CONTINUE 1 CONTINUE
125	- Ra=(SS-F(NC, I-1))/(T(NC, I) - T(NC, I-1)) H= (RA+(I-2))*0X - 00-1250-IF=2,N IF(T(NC-1, II).LE.SS) GO TO 1251 - CONTINUE 1 CONTINUE RB=(SS=T(NC, II - 1))/(T(NC, II) - T(NC, II - 1)) H1=(RB+(TI-2))*0Y
125	- Ra=(SS=F(NC, I=1))/(F(NC, I)=F(NC, I=1)) H= (RA+(I=2))*0X - 00-1250-IF=2,N IF(T(NC-1, II).LE.SS) GO TO 1251 - CONTINUE 1 CONTINUE RB=(SS=F(NC, II=1))/(F(NC, II)=F(NC, II=1)) H1=(RB+(II=2))*0X - IF(INT(H/DX)=1.LT.0) GO TO 1109
-125 125	- Ra=(SS-F(NC, I-1))/(T(NC, I)-T(NC, I-1)) H= (RA+(I-2))*0X - 00-1250-IF=2;N IF(T(NC-1, II).LE.SS) GO TO 1251 - CONTINUE 1 CONTINUE RB=(SS-T(NC, II-1))/(T(NC, II)-T(NC, II-1)) H1=(RB+(II-2))*DX - IF(INT(H/DX)-1.LT.0) GO TO 1109 CT=CI+1
-125 125	- Ra=(SS-F(NC, I-1))/(F(NC, I)-F(NC, I-1)) H= (RA+(I-2))*0X - 00-1250-IF=2,N IF(T(NC-1, II).LE.SS) GO TO 1251 - CONTINUE 1 CONTINUE RB=(SS=F(NC, II -1))/(F(NC, II)-F(NC, II-1)) H1=(RB+(II-2))*DX . IF(INT(H/DX)-1.LT.0) GO TO 1109 CT=CT+1 - DC(N2-1)=N*TS-
-125 125	
-125 125	- Ra=(SS-F(NC, I-1))/(F(NC, I)-F(NC, I-1)) H= (RA+(I-2))*0X - 00-1250-IF=2,N IF(T(NC-1, II).LE.SS) GO TO 1251 - CONTINUE 1 CONTINUE RB=(SS=F(NC, II -1))/(F(NC, II)-F(NC, II-1)) H1=(RB+(II-2))*DX . IF(INT(H/DX)-1.LT.0) GO TO 1109 CT=CT+1 - DC(N2-1)=N*TS-
-125 125	<pre>?A=(SS-F(NC, I-1))/(F(NC, I)-F(NC, I-1)) H=(RA+(I-2))*DX OO-1250-IF=2,N IF(T(NC-1, II).LE.SS) GO TO 1251 CONTINUE CONTINUE RB=(SS-F(NC, II-1))/(F(NC, II)-F(NC, II-1)) H1=(RB+(II-2))*DX IF(INT(H/DX)-1.LT.0) GO TO 1109 CT=CT+1 OC(N2-1)=H*TS PS(N2-1)=TH/2.0 N3(N2-1)=INT(H/DX)-1 H3(N2-1)=H-DX*N3(N2-1) H2(N2-1)=H</pre>
-125 125	<pre>?A=(SS-F(NC, I-1))/(F(NC, I)-T(NC, I-1)) H= (RA + (I - 2))*0X OO-1250-IF=2;N IF (T(NC-1, II).LE.SS) GO TO 1251 CONTINUE CONTINUE RB=(SS-T(NC, II - 1))/(T(NC, II)-T(NC, II-1)) H1=(R8+(II-2))*DX IF (INT(H/DX)-1.LT.0) GO TO 1109 CT=CT+1 OC(N2-1)=H*TS PS(N2-1)=TH/2.0 N3(N2-1)=INT(H/0X)-1 H3(N2-1)=H-DX*N3(N2-1) H2(N2-1)=H JTVAL=N3(N2-1)+1</pre>
1-2 5 125	<pre>?A=(SS-F(NC, I-1))/(F(NC, I)-F(NC, I-1)) H=(RA+(I-2))*0X OO-1250-IF=2,N IF(T(NC-1, II).LE.SS) GO TO 1251 CONTINUE ?CONTINUE RB=(SS-F(NC, II -1))/(F(NC, II)-F(NC, II-1)) H1=(R8+(II-2))*0X .IF(INT(H/DX)-1.LT.0) GO TO 1109 CT=CI+1 OC(N2-1)=W*TS PS(N2-1)=TH/2.0 N3(N2-1)=INT(H/DX)+1 H3(N2-1)=H-DX*N3(N2-1) H2(N2-1)=H JTVAL=N3(N2-1)+1 OO 1350 J=1, JTVAL</pre>
-125 125	<pre>?A=(SS-F(NC, I-1))/(F(NC, I)-T(NC, I-1)) H= (RA + (I - 2))*0X OO-1250-IF=2;N IF (T(NC-1, II).LE.SS) GO TO 1251 CONTINUE CONTINUE RB=(SS-T(NC, II - 1))/(T(NC, II)-T(NC, II-1)) H1=(R8+(II-2))*DX IF (INT(H/DX)-1.LT.0) GO TO 1109 CT=CT+1 OC(N2-1)=H*TS PS(N2-1)=TH/2.0 N3(N2-1)=INT(H/0X)-1 H3(N2-1)=H-DX*N3(N2-1) H2(N2-1)=H JTVAL=N3(N2-1)+1</pre>

	CONTINUE	
	T(N2-1,N3(N2-1)+2)=SS	
	-ANECK(N2-1; +3(N2-1)+2)=ANECK(NC; N3(N2-1)+2)	
С		
<u>c</u>	COMPUTE MIX TEMPERATURE OF MATERIAL NOT STICK H	NG-BUT-
č	ENTERING FREE-FALL ZONE	
<u>ē</u>		and a second
•	TP=0.0	
	<u>00 1380 J=1,N</u>	an a
	TP = TP + T(NC, J)	
	CONTINUE	
1201	K=RA-0.5	
	<u>IF(K.GE.0.0)</u> <u>TP=(TP-T(NC,I)*K)/(N-I-K+1)</u> IF(K.LT.0.0) TP=(TP-T(NC,I-1)*K)/(N-I-K+1)	
		an a
	FT = ((AS - M) *TP + (AT - AS) *IT)/(AT - M)	
c c	OTATE POWDER	
	DO 1440 III=2.NC	
	I=NC+III+2	and and an an an and an an an and an an an an an and an and an and an
	1445 J=1, NNAX	
	-F(I,J)=F(I-1,J)	nan an
	ANECK(I, J) = ANECK(I-1, J)	
	-GONTINUE	an a
1440	CONTINUE	
	IF(CT.LT.N2) 50 TO 1900	•
e		
C **	*** SECTION VIII *****	<u>+</u> -
e		
С	STUCK MATL SHIFT	
	-D0 1476 JJI=N2, CT	
	JI=CT-JJI+N2	
	-DC (JI)=36 (JI-1)	
	PS(JI) = S(JI - 1) + W * TS	
	-N3(JI)=N3(JI-1)	
	$H_3(JI) = H_3(JI - 1)$	
	H2(JI)=H2(JI-1)	and a second strange and the second
	N3TEMP=N3(JI)+2	
	-00-1530-J=1, V3TEMP	
	T(JI, J) = T(JI - 1, J)	
	- ANECK(JI,J)=ANECK(JI-1,J)	
	CONTINUE	
	- CONTINUE	
	X5=6.28318-TH/2	
	-EN=0.0	
	KL=0	
C	-IF(PS(CT)+LT+X5)-GD-TO-1900	
	*** SECTION IX ****	
C	STUCK MATERIAL RE-ENTERING PCCL ROUTINE	
	DO 1570 JI=N2,CT	
	IF (PS (JI). GE. X5) - GO - TO - 1575	and and a second s
	CONTINUE	
	CONTINUE	

RAM	R485	74/325 OPT=3, ROUND= A/ S/ M/-D, -DS FTN 5.1+691 132
		IF (OT.LT.W*TS)-50 FO-1610
		PS(JI)=X5
		-DC+JI)=91
		GO TO 1770
	1612	-IF (0T.LT.0.0) - 0F=0C(JI)
		IF(OT.LT.0.0) KL=1
		K K = 0
		JL=0
		JK=N3 (JI -1)+1
	1651	-IF(JK.LE.N3(JI)+1) GO TO 1650
		JK=JK-1
		XX=1
		GO TO 1650
	1660	CONTINUE
		IF((H3(JI).GE, 1.5*3X).ANC.KK.EQ.1) JL=1
		IFIJL.EQ.11 JK=JK+1
		00 1670 I=2, JK
		- T(JI=1,[}={OT*T(JI,I}+nC(JI=1)*T(JI=1,I)}/{OT+DC(JI=1)}
		ANECK(JI-1,I) = (0T*ANECK(JI,I)+DC(JI-1)*ANECK(JI-1,I))/(DT+
		DC(JI-II)
		CONTINUE
		JK=JK+1
		A3=DC(JI-1)*(H3(JI-1)-DX/2)
		A4=0T+(H3(JI)-DX/2)
		IF (JL.EQ. 1) A4=0T* (H3(JI)-1.5*DX)
		IF(JL.EQ.1)
		IF (JL.EQ.1) ANECK(JI,JK) = ANECK(JI,N3(JI)+2)
		-IF ((JL.EQ. 0) . 4 ND. (KK.EQ. 1))- 43= DC(JI-1)*DX
		T(JI-1,JK) = (T(JI,JK) * A4 + T(JI-1,JK) * A3) / (A3+A4)
		ANECK(JI-1, JK) = (ANECK(JI, JK) * A4+ANECK(JI-1, JK) * A3)/(A3+A4)
		DC(JI-1) = DC(JI-1) + 0T
		IF(KL.NE.1) 30 TO 1750
		PS(JI-1) = PS(JI)
		JI=JI=1
		GO TO 1550
	+75+	PStJI=1 /= x5
		CONTINUE
	<u></u> (f U	T(1,1)=4T
		N4=N3(JI)+1
		TF (H3 (JI); GE =1:5*DX) N4 =N4+1
		$\frac{1}{10} = 1 + 1 = 1 + 1 = 1 + 1 = 1 = 1 = 1 = 1$
		$\frac{1}{1(j) = 1(j)}$
		ANECK(1, J) = ANECK(JI, J)
	-++ }-+-	CONTINUE
		RM = H2 (JI) - (N4 - 0.5) * 0X
		$\frac{11}{16} (RM_{*}LE_{*}0_{*}0) = 60 - 10 - 1840$
	-	N4=N4+1
		-T t1,N4)= (RM* T(JI, N3 (JI)+2)+(DX-RM)*IF)/DX
		ANECK(1, N4) = ANECK(JI, N3(JI)+2)
	-++++-	CONTINJE
	1941 1941	IF(IFLAS.EG.1) SOTO 1870
		IF (IF LAS . EG. 1) SUIJ 10/0 IF (N6+N4 . LE. N) GO TO 1870
		NNTP=N6+N4+1
		NN(/=NO+N4+1 -NNAX=N+1
		DO 1860 I=2,NC
		DO 1862 J=NNAX; NNTP

	- T(I,J)=T(I,N+1) ANECK(I,J)=0.0
	- CONTINJE
\$2	CONTINUE
	N=N6+N4
£	CONTINUE
C	
	N N A X = N+1
	K4=N4+1
1900	CONTINUE
	-DO -1985-II= 4, NVAX
Robert Course State	T(1,II)=IT
5.	-ANECK (1, II)=0.0
	CONTINUE
	IT=((SR-1)*IT*FT)/SR
	AA=AA-M - 22=R0
	AR=4A
	AR=4A -IF((CT.LT.N2).02.(EN.LE.C.0)) GO TO 1950
Solution and the second s	AA = AA + DL + H2(JI)
2	
	R2=R0-B3
	-AR=AA-B3*R2*T4
	CONTINUE
 c	
C	
1	*** SECTION X ****
. C	
6	FIND NEW ANGLE THETHA (TH)
C	
	HT=TH
с с С	-t+=0.8
	AV = (HT + LT)/2.0
	-IF (HT .EQ.LT) -50 TO 2070
	RM=AV-SIN(AV)-2*AR/R2**2
	-IF(QM**2.0.LT.0.0000001)- G0-T0-2070
	IF (RM.GT.).) GO TO 2060
	t t=AV
	GO TO 2010
2005	
40.30	30 TO 2010
2375	
	<u>- GD TO 1333</u> ENO
•	
i	
	· · ·

	D, DB=-TB/-SB/-St/-ER/-ID/-PMD/-S
DIMENSION T(200,100),N3(200)	
	AT, AD, TH, DL, N2, CT, NC, N3, RAD, TS
COMMON TAIR, BMT, MT	
INTEGER CT	
BB=TH *57 • 2 9578	
IF (K. EQ. 1) SOT023	<mark></mark>
WRITE (6, 20) TM, AA, AT, AD, BB, DL, N	
29 FORMAT(//,	X,28HORIGINAL PENITRATION DEPTH=
3= ,F10.5,/,6X,24HNJ. OF WEDGES	
WRITE (6, 10) - TAIR, BMT, MT	
10 FORMAT(6X, 24HTEMP. OF AIR (DEG.	• C) = $,F10.3,/,6X,$
1 44HTEMP. OF MOLD+S EXTERNAL SU	
	IOR SURFACE (DEG. C) = $,F10.3,/,$
WRITE(6,21)	
21 FORMAT(6X,30HTEMPERATURE HIST	URY OF POWDER)
23 IF (K. EQ. 1) WRITE (5,24) 24 FORMAT(//,12H NECK RADIUS)	
ICOL=15	۰۰ سر ۲۰۰۰ می از می می از می
IREP=((NC-1)/ICOL)+1	ż
IREM=NC-(IREP-1)*ICOL	
00 100 KK=1,IREP	
IF(KK.EQ.IREP) ICOL=IREM	
KJ = (KK-1) * ICOL + 1	
KJ1=KJ+(ICOL=1)	
IF (KK.EQ.IREP) KJ1=KJ+IREM-1	
WRITE(6,108)(J,J=KJ,KJ1) 108 FORMAT(1X,6HAREA ,15(I3,5X))	
00'104 J=1,N	
TEIN ON WATTEIS 1021 1. (TIT.	J),I=KJ,KJ1)
IF (K. EQ. 1) WRITE (6, 103) J, (T(I).	J);I=KJ;KJ1)
102 FORMAT(1X,I3,3X,15(F7.3,1X))	
103 FORMAT(1X, I3, 3X, 15(F7.5, 1X))	
104 CONTINUE 	
105 FORMAT(1X,//)	
-103 CONTINUE	
97 CONTINUE	
IF(CT.LT.N2) - ZETURY	
ICOL=15	
98 FORMAT(1X,//, 31H TEMPERATURE (OF STUCK MATERIAL ./)
99 FORMAT(//, 30H NECK RADIUS OF ST	
IREP=INT((CT-(N2))/ICOL)+1	
IREM=CT-N2+1-(IREP-1)*ICOL	
$K_{J} = (KK - I) + TCOI + N2$	
IF (KK.EQ.IREP) ICOL=IREM	
KJ1=KJ+(ICCL-1) IF(KK.EQ.IREP) KJ1= KJ+IREM=1	

	NTN=N3(KJ)+2
	00 203 II=KJ, KJ1
	-NTMP=N3(II)+2
	IF(NTMP.EQ.NTN) GO TO 203
	- IDIFF=NT N-NTYP
	00 202 LL=1.IJIFF
Laffrancesar for the non-setting against	-
	CONTINUE
	CONTINUE
	IF(K.EQ. 0) WRITE(6,102)J,(T(I,J),I=KJ,KJ1)
<u>200</u> 30(
500	
	-SUBROUTINE CONST(G1, C2+C3+D8+DA, T1+T2+T3+ANB+ANA+BNK)
_	DIMENSION N3(200)
C	
C	
C	
	COMMON SS, SM, AL, AM, DX, N, 1M, AA, AT, AD, TH, DL, NZ, CT, NC, N3, RAD, IS
	- A1=0.5+(AHB+ANA)
	C1=RADX(ANE)*DX
	C3=RADX(A1)*DX DELB=(3.)*SU(T1)*RAD/(8.6*VIS(T1)*(T M+ 8.5*TS)))**8.5*TS
	IF(ANB/RAD.GE.0.5) DELB=0.5*SU(T1)*TS/(VIS(T1))
	DA = COND(ANA)/(RHO(A1) + CP(A1))
	IF (BNK.G T.RAD) BNK=RAD
	- IF (DELB. GT. D. B) - RETURN
	WRITE(6,10)TM, ANB, ANA, BNK, RAD, TS, SU(T1), VIS(T1), DELB
	FORMAT(1X,10(E10.5,1X))
	RETURN
	EN D

CIION CONC 74/825 OPT=J,ROUND= A/ S/ M/-D,-DS FTN 5.1+601 I36 BMG/-OT,APG=-COMMON/-FIXED,CS= USER/-FIXED,DB=-TB/-SB/-SL/ ER/-ID/-PMD/

.

	FUNCTION COND(Y)
	DIMENSION N3(200)
	CONDUCTIVITY FUNCTION (JCULE/(CM-SEC-DEG K))
	C1 = THERMAL CONDUCTIVITY AT TEMPERATURE SS C2 = THERMAL CONDUCTIVITY AT TEMPERATURE SM
	02 - THERME CONDUCTIVITY AT TEMERATORE SH
	COMMON SS, SY, AL, AM, DX, N, TM, AA, AT, AD, TH, DL, N2, CT, NC, N3, RAC, TS
	C1=1.99E-03
	C2=4.9325E-03 X=Y/RAD
	TF 1X.GT. 0.03 30TO 10
	COND=C1
4	GO TO 1 LE IF(X.GT.1.0) GOTO 20
	COND=C1+X*(C2-C1)
	GO TO 1
2	20 COND=C2
	1 CONTINUE RETURN
	END
···	FUNCTION RHO(Y)
6	DIMENSION N3 (200)
C	DENSITY FUNCTION (KG/CM**3)
0	
с с —	R1=DENSITY AT SS R2=DENSITY AT SM
Č	
	COMMON-SS, SM, AL, AM, DX, N, TM, AA, AT, AD, TH, DL, N2, CT, NC, N3, RAC, TS
	R1=5.0937E-04
	R2=8.8058E-04 X=Y/RAD
	TF (X.GT.0.01 50TO 10
	RH0=R1
	GO TO 1 13 IF(X.GT. 1.0) GOTO 20
	RH0=R1+tR2=21) *X
	GO TO 1
	23 RHO=R2 1 CONTINUE
	RETURN
	END

	FUNCTION CP(X)
C	
-6	SPECIFIC-HEAT- (JOULE/(KG-DEG-K))
C	CP=2302.7
	RETURN
	END
	FUNCTION RADX(Y)
	DIMENSION N3 (200)
	COMMON SS SM & L & AM & DX & N & TM & AA & AT & AD & TH & DL & N2 & CT & NC & N3 & RAD & TS
C	
- C	THIS FUNCTION DETERMINES THE RATIO USED TO CALCULATE DX AS A
C	OF MOLD TEMP
	X=Y/RAD
	IF (X.GT. 0.6) 30TO 10 RADX=1.0
	GO TO 1
10	IF(X.GT.1.G) GOTO 20
	-RADX=RH0 (0.0)/RH0 (Y)
	GO TO 1
	-RADX=RHO(B.B)/RHO(RAD)
1	CONTINUE
	RETURN
	END
····	FUNCTION SU(T)
С	
<u> </u>	SURF4CE-TENSION FUNCTION-(BYNES/CH)
C	
	SU=31.0-0.058*(T-105) RETURN
	FUNCTION VIS(T)
C	· ·
- <u>C</u>	VISCOSITY FUNCTION (FOISE)
<u> </u>	
	VIS=5.22E06*EXP(-19.583 + 7402.5/(T+273)) RETURN
	END

<pre> 5.900 5.9005315311334 1V17Y(CM2/5)- 20.000</pre>	668 5.531 531 531 531 531 531 531 531 531 531 531 531 531 531 531 531 531 530 0200 20.0000 20.0000 20.000 20.000 20.0000 20.0000 20.0000 20.0000	110.000 .170E-02 .243E-02					20.000 20.	20.000	20.000 20.	20.000	Z0.000 Z0.	000 20.000 20.	0.000 20.	0.000 20.000 20.	20.000 20.000 20.000	n a chuir a chuir a chuir an a' chuir an tarta a chuir an tarta an tarta an tarta an tarta an tarta an tarta a	• 10000	10000.	10000 *	.0000	.0000.	.00001	· 10000 · 10000			
	13 668 13 668 13 668 12 12 12 12 11 26 12 12 13 12 14 12 15 12 16 12 17 12 16 12 17 12 16 14 17 12 17 12 16 14 17 12 16 14 17 12 16 14 17 12 17 12 17 12 17 12 17 12 17 12 17 12 17 12 17 12 17 14 17 14 17 14 17 14 17 14 17 14 17 14 17 14 17 14 17 14 17 14 17 14 17 <td>CM2</td> <td></td> <td>.3592 28014</td> <td></td> <td>50.000</td> <td>20.000</td> <td>20.000</td> <td>20.000</td> <td>20.000</td> <td>20.000</td> <td>20.</td> <td>000</td> <td>S S S</td> <td>°</td> <td>n</td> <td>10000</td> <td></td> <td>•</td> <td></td> <td>10000.</td> <td>10000</td> <td>•</td> <td></td> <td>• •</td> <td>•</td>	CM2		.3592 28014		50.000	20.000	20.000	20.000	20.000	20.000	20.	000	S S S	°	n	10000		•		10000.	10000	•		• •	•
	D D <td>8 5 5 HO</td> <td>•19 •18</td> <td>H.</td> <td>ONO</td> <td>40</td> <td>u ini r</td> <td>JN</td> <td>N 8</td> <td>v N</td> <td>1 N</td> <td>20.</td> <td>- 0 - 0 - 0</td> <td>20.</td> <td>20.</td> <td></td> <td>• į</td> <td>• •</td> <td>1</td> <td>•</td> <td>•</td> <td>•</td> <td>•</td> <td>• •</td> <td>• •</td> <td></td>	8 5 5 HO	•19 •18	H.	ONO	40	u ini r	JN	N 8	v N	1 N	20.	- 0 - 0 - 0	20.	20.		• į	• •	1	•	•	•	•	• •	• •	

APPENDIX G

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SAMPLE SIMULATION OUTPUT

	SEC) = Total Are		11.92	7				
	WEDGE ARE		.0527					
	CRIGINAL	PENITRAT	ION DEPT	'H=	.4293			
	ANGLE (DEG	;)= 8	8.005					
	ARC_LENGT	H/TINE I	NCREMENT	. 1.2	28014			
	NO. OF WE	DGES IN	P00L =	8				
	TEMPERATU	-		UNER				
AREA	1	2	3	4	. 5	4	7.	8
1		32.667	32.667	32.667	32.667		32.667	
2		29.238		29.899	30.084	30.221		30.414
3		27.153	27.527		28.076		28.417	
Ĩ.	26.494	26.405	26. 576	26.727			27.140	
5	26.494	26.405	26.316	26.318	26.341		26.427	
6	26.494	26.405	26.316	26.228	26.171	26.131		26.092
7	26.494	26.405	26.316	26.228	26.140	26.063		25.937
8	26.494	26.405	26.316	26.228	26-140	26-052		25.889
9	26.494	26.405	26.316	26.228	26.140	26.052	25.964	
10	26.494	26.405	26.316	26.228				23.077
n	26.494	26.405	26.316	26.228	26.140	26.052	25.964	
12		26.405		26.228				25.877
13		26.405		26.228			25.964	
NECK	RADIUS							
AREA		2	3			6	7	
L	.00000	.00000		.00000	.00000	.00001	.00001	
2	• 00000	.00000	.00000	.00000	.00000	.00000		• 00001
3	• 00000	.00000	.00000	.00000	.00000	.00000	.00000	
4	.00000		.00000		.00000			
5	.00000	.00000	.00000	.00000	.00000	.00000	- 00000	
<u> </u>	.00000	00000		00000	00000_		00000	
7	.00000	.00000	.00000	.00000	.00000	.00000	•00000	
8.				.00000			.00000	the second s
9	.00000	.00000	.00000	.00000	.00000	.00000	.00000	
.10 	.00000	.00000	.00000	.00000		.00000		
12	.00000	-00000	.00000	.00000	.00000			
4	. 00000	,00000	.00000	.00000	.00000	.00000	.00000	

contraction contracts

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	T1NE	(SEC)=			_				
		TOTAL ARE WEDGE ARE		11.92 2.0527	.7				سامريها والمسترية المسارية والمسارية والمنافعة سامعتها والمقربية والمشاري المالي والمالي والمار والمراجع والمراجع
		ORIGINAL			Ha	.4293			
•		ANGLEIDEG		8.005	11 -			Ne e of	со во на конструктира и на село село село на на селото на конструктира на волица на ракото сполозиото на селото на на
~		ARC LENGT			= <u>1.2</u>	8014			
		NO. OF WE	DGES IN	POOL -	8				
•		TEMPERATU	RE HISTO	RY OF PO	WDER	· · · · · · · · · · · · · · · · · · ·			
	AREA	_	. 2	3		5	6		. 8
	1	45.067	45.067	45.067				45.067	
•	2	40.381	41.072	41.550	41.847	42.066	42.228	42.356	42.457
	3	37.871	38.642	39.080	39.449	39.726	39.950	40.131	40.260
	4 .	37.871	37.767	37.968	38.146	38.329		36+634	38.759
	5	37.871	37.767	37.663	37.666	37.692	37.741	37.795	37.851
	6 .	37.871	37.767	37.663	37.559			37.416	
	7		37.767		37.559	37.455		37.284	
<u>'-</u>	8							-37-252	
*	9		37.767					37.247	
	10.		37.767						
	11		37.767					37.247	
	12								
	13	710017		31.005	378337		314371	310241	J 1 6 L 7 7
	NECK	RADIUS			• •				
·	AREA		,	2	*	a.		7	•
t	1	.00000	.00000	.00000	.00000	.00000	.00001	.00001	.00001
	2		.00000	.00000	.00000	.00000	+00001		• 00001
	3	.00000	.00000	.00000	.00000	.00000	.00000	.00001	.00001
	4	.00000	.00000	.00000	.00000	.00000	+00000-		
'	5	.00000	.00000	.00000	.00000	.00000	.00000	.00001	.00001
•			.00000						+00001
	7	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00001
	8	.00000	• • • • • •	.00000	•00000		.00000		
	0	.00000		.00000	.00000	.00000	.00000	.00000	.00001
	7				.00000				• 00001
	10	• 00000	•00000	.00000					
	10 11 12	.00000	.00000 .00000	.00000	.00000	.00000	.00000	.00000	.00001

		90.100										
	TOTAL ARE		11.92 .0527	27	• • • • •	· · · · · · · · · · · · · · · · · · ·						
	ORIGINAL			Ha	.4293							
	ANGLEIDEG		8.005		• • • • • • • • •							
	ARC LENGT	H/TIME I	NCREMENT	a1.2	8014							
	NO. OF WE	DGES IN	POOL =	6								
	TEMPERATU	RE HISTO	RY OF PO	WDEP	· · · · · · · · · · · · · · · · · · ·			• • • • • • • •				
AREA	1				5		7					
1	57.095	57.095	57.095	57.095	57.095	57.095	57.095	57.095		tar data da constante consequenças por p	the other of the formation of the second	• President and the first first second se
2	52.369	53.067	53.549				_ 54,363_					
3	49.839			51.431			52.120					
4				50.116.	50.301		_ 50.609				to be testing to be the same same a super-	
5		49.734		49.631	49.658		49.762					
6		49.734									and and the second s	
7			49.629	49.524			49.245					
<u> </u>							49.213					
10	49.839			49.524			49.208					
11		49.734					49.208					
12												- Terrardo en esta des atolegidas e da la compactante de presentação da primeira de primeira da compacta da com
13							49.208					The share of the shaft of the transmission of the second second sector of the s
						1. m				d 		
	RADIUS									A CONTRACTOR OF	The second s	and the second
AREA_			3	4	- 5	6						
1	.00000	.00000	.00000	.00000	.00001	.00001		.00001				
2	.00000	.00000	• 00 0 00	.00000	.00001	.00001	.00001	.00001				· · · · · · · · · · · · · · · · · · ·
4	.00000		.00000								•	
	.00000	.00000	.00000	.00000	.00000	.00001	.00001	.00001				
6	.00000	.00000	.00000	.00000	.00000	.00001	.00001		والمعاهد ولوجود فعاهمه فالما	linkyrka fansky i kark kiter	erande i je e	i nama na ana ing
7	.00000	.00000	.00000	.00000	.00000	.00001	.00001	.00001				
8	.00000	.00000	.00000	.00000	.00000							
9	.00000	.00000	.00000	.00000	.00000	.00001	.00001	.00001				
10	.00000		.00000	00000								Na sa kana na kana na kana na kana na kana ka
11 12	.00000	.00000	.00000	.00000	.00000	.00001	-	.00001				
16					.00000	00001_	00001	00001				

a and a second and an an an an an and a second a second a second and an an an and a second and a second and a s

T1ME	(SEC)= 3								
	TOTAL ARI		11.92	27					
	WEDGE ARI		.0527						
	ORIGINAL			rH=	• 4293			n a standard and a standard and a standard and a standard and and and and and a standard as the standard and a	
	ANGLE(DEC		8.005						
	ARC_LENG				8014				
	ND. DF WI	DAF2 TH	PUUL =	8					
	TENPERATI	RE HISTO	RY OF PO	DADEK					
AREA		2	3		5	6	7		
1	68.962	68.962	68.962	68.962	68.962	68.962	68.962	66.962	* and 1.00 million
2	64.314	65.000	65.475	65.770	65.987		66.276		
3		62.590			63.667	63.890	64.070	64.218	
5		61.722		62.098	62.280	62.440	62.583	62.708	
5		61.722		61.621	61+647	61.695	61.749		
6		61.722			61.449			61.355	
7							61.241		
				61.515			_61.209_		
9 10				61.515		61.308		61.103	
11		61.722			61.412			61.101	• · · •
12							61.205		
13							61.205		
				~~~~~					
				<b></b>					
NECK	RADIUS								
AREA	-	2		4	5	6	7		
1	.00000			.00001	.00001		.00001		
2.	.00000	.00000	.00000	.00001	.00001	.00001		.00001	mir a .
3	.00000	.00000	.00000	.00000	.00001	.00001	.00001	.00001	
<b>4</b>	.00000		.00000	.00000	.00001				
5	.00000		.00000	.00000	.00001	.00001	.00001		
<u> </u>				00000_	00001_	00001_	00001		
7		.00000	.00000	•00000	.00001	.00001			
5			.00000	.00000 .00000	.00001	.00001	.00001	.00001	
10	.00000			.00000	.00001	.00001			
11	.00000				.00001		.00001		
12	.00000		.00000	.00000	.00001		.00001		
13	.00000		.00000		.00001		.00001		
								·	

		ANGLE (DEG	A(C2) = A= 2 PENITRAT D= 8 H/TIME I	0527 ION DEPT 6.005 NCREMENT	(H=	8014				
	~	TEMPERATU	RE HISTO	RY OF PO	WDER					
	AREA	1. <b>1</b>		.3	. 4	5	6		8	
•	1	80,461	80,461	80.461				80.461		
	2	75.913	76.584	77.049	77.338	77.550	77.709	77.833	77.932	
	3	73.477	74.226	74.651	75.010	75.280	75.498	75.674	75,819	
		73.477	73.376	73.571	73.744.	73.922	74.079	74.219	74.341	
	5	73.477	73.376	73,275	73.277	73.303	73.350	73.403	73,458	
-	6		73.376	73.275	73.173	73.108			73,017	ւ Հերբերի հետ երել է հետ երել հետ առաջանի հետ առաջան պատասխել է դարից է մարինել է է հայտեստելանը երկարանը արենք է է
	7	73.477	73.376	73.275	73.173	73.07Z	72.984	72.906	72.838	ι
	9	73.477	73.376	73.275	73.173	73.072	72,971	72.870	72.770	,
	10		73.376	73.275	73.173	73.072	72.971	72.870	72.769	
	11							72.870		
	. 12									
·. 	13	73.477	73.376	73.275	73,173	73.072	72.971	72.870	72.769	
							• •••• • ••	No. 5 - 10		
	MECK	RADIUS	<b>x x</b> + + +							
		1	2	3		5	6			
	ĩ	.00000			.00001	.00001	.00001	.00001	.00001	
	ź	.00000		.00001	.00001					
	3	.00000	.00000	.00000	.00001	.00001	.00001	.00001	.00001	
	4	.00000	.00000	.00000	.00001		.00001	.00001	00001	
	5	.00000	.00000	.00000	.00001	.00001	.00001	.00001	.00001	
· _	6	.00000	00000		00001_		00001	00001	.00001_	
	7	.00000	.00000		.00001	.00001	.00001		.00001	
	8.	. 00000	.00000	00000	.00001		.00001			
	9	.00000	.00000		.00001	.00001	.00001	.00001	• 00 0 0 1	
	10	+00000			+00001		+00001	.00001	.00001	
	11	.00000			.00001	.00001	.00001	•00001	.00001	
• _	12	.00000		.00000						
	13	.00000	.00000	• 00 0 00	.00001	.00001	.00001	.00001	.00001	

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1

	TIME	(SEC)= :	180.200							
		TOTAL AR		11.92	7					
		WEDGE AR		2.0527	• • • • • • • • • • • • •		• • • • • • • • • • • • • • • • •			
		ORIGINAL			rul a	6203				
		ANGLE(DE		10N DEF1	174					
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•	. ANEA 1			· • · · · · · ·						
	1		91.795		91.795				91.795	
.,	<u>_</u>						_ 69.106		49, 324	
•	3		85.703	86.119	86.469	86.733	86.946	87.11B		
•	<b>1</b>	84.971.		85.063	85.232			85.696		
·	5	84.971	84.872	84.773	84.776	84.801	84.847	84.899		
·	. D.	84+971		84.773	84.674.		. 84.566			
·	7	84.971	84.872	84.773	84.674	84.576	84.489	84.413	- 84o.347	
•		84.971	84.872	84.773	84.674	84.576			84,292	
•	9	84.971	84.872	84.773	84.674	84.576	84.477	84.378	84.280	
	10.			84.773	84.674	. 84. 576			84.279	
•	11	64.971	84.872	84.773	84.674	84.576	84.477	84.378	84.279	
	12	84.971	84.872	84.773	.84.674	84.576		84.378	84,279	
	13	84.971	84.872	84.773	84.674	84,576	84.477	84.378	84.279	
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3		96.817		97.566			98.199				:			
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3	106.417	107.213	107.697	108.083	108.382	108.629	108-835	109.013						 	
4	106.417	106.387	106.626	106.829	107.037	107.229	-107-406	107.571			-				
5	106.417	106.387	106.344	106.374	106.433	106.517	106.611	106.714							
6	106.417	106.387	106.344	106.278	106.247	106.240	106.256	106.290	•						
7	106.417	106.387	106.344	106.278	106.214	106.166	106.134	106.120							
	_106.417	106.387.	106.344	106-278	-106-214	106.155	106.105	106.068						 	
9	106.417	106.387	106.344	106.278	106,214	106.155	106.101	106.057							
10	106.417	106.387	106.344	106+278	106.214	106.155	106.101	-106.055					• • • • • • • • • • • • • • • • • • •	 	•••••
11	100.417	106 307	100.344	100.278	106.214	106.155	106.101	106.055							
12 13	106 417	100+387	100+344	100.278	106.214	-100.155	- 106+101	-106.055						 	
13	100.411	1004301	100.399	TAD* 518	100.514	100+132	109-101	106.055							
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AREA 1 2	10 113,555 110.824	11 113.555 111.503	12 113.555 112.037	13 113.555 112.434	14 113.555 112.797	15 113.555 113.061	16 113.555 113.239	17 113.555 113.349	10 113.555 113.412	19 113.555 113.449	20 113.555 113.474	21			
AREA 1 2	10 113,555 110.824	11 113.555 111.503	12 113.555 112.037	13 113.555 112.434	14 113.555 112.797	15 113.555 113.061	16 113.555 113.239	17 113.555 113.349	10 113.555 113.412	19 113.555 113.449	20 113.555 113.474	21 113.555 113.495			
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AREA 1 2 NECK AREA 1 2 3 4 5 6 7 8 9 10	10 113.555 110.824 <b>RAD IUS</b> 1 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	11 113.555 111.503 2 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	12 113,555 112,037 3 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	13 113.555 112.434 4 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	14 113.555 112.797 5 .00002 .00001 .00001 .00001 .00001 .00001 .00001	15 113.555 113.061 6 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	16 113.555 113.239 7 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	17 113.555 113.349 8 00003 00002 00002 00002 00002 00002 00002 00002 00002 00002 00002	10 113.555 113.412	19 113.555 113.449	20 113.555 113.474	21 113.555 113.495			
AREA 1 2 MECK AREA 1 2 3 4 5 6 7 8 9 10 11	10 113.555 110.824 RADIUS 1 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	11 113.555 111.503 2 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	12 113,555 112,037 3 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	13 113.555 112.434 4 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	14 113.555 112.797 5 .00002 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	15 113.555 113.061 6 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	16 113.555 113.239 7 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	17 113.555 113.349 8 00003 00002 00002 00002 00002 00002 00002 00002 00002 00002 00002	10 113.555 113.412	19 113.555 113.449	20 113.555 113.474	21 113.555 113.495			
ARE A 1 2 MECK AREA 1 2 3 4 5 6 7 8 9 10 11 12	10 113.555 110.824 <b>RAD IUS</b> 1 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	11 113.555 111.503 2 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	12 113,555 112,037 3 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	13 113.555 112.434 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	14 113.555 112.797 5 .00002 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	15 113.555 113.061 6 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	16 113.555 113.239 7 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	17 113.555 113.349 8 .00003 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	10 113.555 113.412	19 113.555 113.449	20 113.555 113.474	21 113.555 113.495			
ARE A 1 2 MECK AREA 1 2 3 4 5 6 7 8 9 10 11 12	10 113.555 110.824 <b>RAD IUS</b> 1 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	11 113.555 111.503 2 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	12 113,555 112,037 3 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	13 113.555 112.434 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	14 113.555 112.797 5 .00002 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	15 113.555 113.061 6 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	16 113.555 113.239 7 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	17 113.555 113.349 8 .00003 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	18 113.555 113.412	10 113.555 113.440	20 113.555 113.474	21 113.555 113.495			
ARE A 1 2 MECK AREA 1 2 3 4 5 6 7 8 9 10 11 12	10 113.555 110.824 <b>RAD IUS</b> 1 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	11 113.555 111.503 2 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	12 113,555 112,037 3 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	13 113.555 112.434 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	14 113.555 112.797 5 .00002 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	15 113.555 113.061 6 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	16 113.555 113.239 7 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	17 113.555 113.349 8 .00003 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	18 113.555 113.412	10 113.555 113.440	20 113.555 113.474	21 113.555 113.495			
ARE A 1 2 MECK AREA 1 2 3 4 5 6 7 8 9 10 11 12	10 113.555 110.824 <b>RAD IUS</b> 1 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	11 113.555 111.503 2 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	12 113,555 112,037 3 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	13 113.555 112.434 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	14 113.555 112.797 5 .00002 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	15 113.555 113.061 6 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	16 113.555 113.239 7 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	17 113.555 113.349 8 .00003 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	18 113.555 113.412	10 113.555 113.440	20 113.555 113.474	21 113.555 113.495			
AREA 1 2 MECK AREA 1 2 3 4 5 6 7 8 9 10 11 12 13	10 113.555 110.824 RADIUS 1 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000	11 113.555 111.503 2 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	12 113,555 112,037 3 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	13 113.555 112.434 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	14 113.555 112.797 5 .00002 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	15 113.555 113.061 6 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	16 113.555 113.239 7 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	17 113.555 113.349 8 .00003 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	18 113.555 113.412	10 113.555 113.440	20 113.555 113.474	21 113.555 113.495			
AREA 1 2 MECK AREA 1 2 3 4 5 6 7 8 9 10 11 12 13 NECK	10 113.555 110.824 RAD IUS 1 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .000000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .00000000	11 113.555 111.503 2 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .000001 .000000 .0000000000	12 113.555 112.037 3 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	13 113.555 112.434 4 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	14 113.555 112.797 5 .00002 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	15 113.555 113.061 6 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	16 113.555 113.239 7 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	17 113.555 113.349 8 .00003 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	18 113.555 113.412	10 113.555 113.440	20 113.555 113.474	21 113.555 113.495			
AREA 1 2 MECK AREA 1 2 3 4 5 6 7 8 9 10 11 12 13 NECK AREA	10 113.555 110.824 RAD IUS 1 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .000000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .000000 .000000 .000000 .000000 .000000 .000000 .000000 .00000000	11 113.555 111.503 2 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .000001 .000000 .0000000000	12 113.555 112.037 3 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	13 113.555 112.434 4 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .000001 .000000000 .0000000000	14 113.555 112.797 5 .00002 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	15 113.555 113.061 6 .90002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .0002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .0002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	16 113.555 113.239 7 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .0002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002 .0002	17 113.555 113.349 8 00003 00002 00002 00002 00002 00002 00002 00002 00002 00002 00002 00002 00002 00002 00002 00002	18 113.555 113.412	19 113.555 113.449	20 113.555 113.474	21 113.555 113.495			
AREA 1 2 MECK AREA 1 2 3 4 5 6 7 8 9 10 11 12 13 NECK	10 113.555 110.824 RAD IUS 1 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .000000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 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.00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .000001 .000000 .0000000000	12 113.555 112.037 3 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	13 113.555 112.434 4 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .000001 .000000000 .0000000000	14 113.555 112.797 5 .00002 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001 .00001	15 113.555 113.061 6 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .0002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	16 113.555 113.239 7 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 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.0002 .0002 .0002	17 113.555 113.349 8 .00003 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002 .00002	18 113.555 113.412	19 113.555 113.449	20 113.555 113.474	21 113.555 113.495			

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TIME	TOTAL AR	EA(CZ)=	3.20												
	WEDGE AF		.3601							~					
			TION DEPT	TH-	.3136			,							
	ANGLE (DE		46-973												
			INCREMENT	T= .	68328										
		EDGES IN		8											
		LOOLO IN	TWWE -				the group of the state		and the second second second second						
	TEMPERAT	URE HIST	ARY OF PO	TWDER											
AREA	1	2	3	4	5	6	7	8							
1	124.018	124-018	124.018	124.018	124-018	-	•	-					•		
Z			122.063												
. 3	120.216	120.244	120.290	120.289	120.317	120.340	120.374	120.354							
4	118.702	118.741	118.799	118.768	118,797	118.799	118.813	118.758							
5			117.579												
6	116.587	116.426	116.274	116.052	115.886	115.730	115.633	115.525							-
7	114.870	114.420	114.183	114.018	113.000	113.778	113.720	113.679							
8	111.016	111.359	111.526	111.685	111,708	111.760	111.013	111.874							
. 9	109,433	109.648	109.828	110.040	.110.153	110.278	110.386	110.495							
10	109.287	109.302	109.334	109.406	109.462	109.538	109.614	109.696							
11	109.287	109.283	109.275	109.276	109.279	109.295	109.320	109.355							
12	109.207	109.283	109.274	109.264	109.253	109.245	109.243	109.249							
13	109.287	109.283	109.274	109.264	109.251	109-239	109.231	109.226							
14	109.287	109.283	109.274	109,264	109.251	109.239	109.229	109.223							
. 15	109.287	109.283	109.274	109.264	109.251	109.239	109.229	109.222							
16	109.287	109.283	109.274	109.264	109+251	109.239	109.229	109.222							
17	1094287		109.274	109.264	109.251	109.239	109+229	109.222							
		a 1 a 1	109.274	109.264	109.251			-							
TEMPE	ERATURE O	FSTUCK	109.274 NATERIAL	109.264	109.251			-							
TEMP E	ERATURE 0	F STUCK	109.274 NATERIAL 12 124.018	109.264 13 124.018	109.251	15	16	17		19	20	21	22	23	
TEMP E	10 124.018 122.109	F STUCK	109.274 ATERIAL 12 124.018 122.052	109.264 13 124.018 122.059	109.251 14 124.018 122.037	15 124.018 122.028	16 124.018 122.020	17 124.018 122.020	18 124-018 121-008	19 124.018 121.087	20 124.010	21	22	23 124.011	124.018
TEMPE AREA 1 2 3	10 124.010 122.109 120.352	F STUCK 11 124.010 122.089 120.303	109.274 AATERIAL 12 124.018 122.052 120.213	109,264 13 124,018 122,059 120,219	109.251 14 124.018 122.037	15 124.018 122.028	16 124.016 122.020	17 124.018 122.020	18 124.018 121.998	19 124.018 121.987	20 124.010 121.976	21 124.01 121.968	22 124.018 121.969	23 124.010 121.950	124.018
TEMPE AREA 1 2 3	PATURE 0 124.016 122.109 120.352 118.725	F STUCK 11 124.016 122.069 120.303 118.595	109.274 ATERIAL 12 124.018 122.052 120.213 116.434	109.264 13 124.018 122.059 120.219 18.432	109.251 14 124.018 122.037 120.174 118.368	15 124.010 122.020 120.154 118.338	16 124.018 122.020 120.135 118.308	17 124.018 122.020 120.134	18 124.018 121.998 120.093	19 124.018 121.987 120.074	20 124.01 121.976 120.054	21 124.014 121.969 120.040	22 124.018 121.969 120.045	23 124.010 121.950 120.013	124.018
TEMPE AREA 1 2 3	RATURE 0 124.010 122.109 120.352 118.725 117.133	F STUCK 11 124.010 122.089 120.303 118.595 116.886	109.274 ATERIAL 12 124.018 122.052 120.213 118.434 116.665	109,264 13 124,018 122,059 120,219 118,432 116,659	109.251 14 124.018 122.037 120.174 118.368	15 124.010 122.028 120.154 116.338	16 124.016 122.020 120.135 116.308	17 124.018 122.020 120.134 116.304	18 124.018 121.998 120.093 116.261	19 124.018 121.987 120.074 118.236	20 124.010 121.976 120.054 118.217	21 124.010 121.969 120.040 118.204	22 124.018 121.969 120.045 118.217	23 124,010 121,950 120,013 116,163	124.018 121.941 119.998 118.170
TEMPE AREA 1 2 3	RATURE 0 124.010 122.109 120.352 118.725 117.133	F STUCK 11 124.010 122.089 120.303 118.595 116.886 115.073	109.274 ATERIAL 12 124.018 122.052 120.213 116.434 116.665 114.844	109,264 13 124,018 122,059 120,219 118,432 116,659	109.251 14 124.018 122.037 120.174 118.368 116.593	15 124.018 122.028 120.154 118.338 116.564	16 124.016 122.020 120.135 118.308 116.533	17 124.018 122.020 120.134 116.304 116.533	18 124.018 121.998 120.093 118.261 116.519	19 124.018 121.987 120.074 118.238 116.504	20 124.014 121.976 120.054 118.217 116.492	21 124.014 121.968 120.040 118.204 116.491	22 124.018 121.969 120.045 118.217 116.516	23 124.010 121.950 120.013 118.183 116.495	124.018 121.941 119.998 118.170 116.487
TEMPE AREA 1 2 3	PATURE 0 124.016 122.109 120.352 118.725 117.133 113.416 113.607 111.921	F STUCK 11 124.018 122.089 120.303 118.595 116.595 116.595 115.073 113.268 111.699	109.274 ATERIAL 12 124.018 122.052 120.213 116.434 116.665 114.854 113.105 111.660	109.264 13 124.018 122.059 120.219 116.659 114.653 113.154 111.777	109.251 14 124.018 122.037 120.174 118.368 116.593 114.815 113.176 111.882	15 124.010 122.028 120.154 118.338 116.356 114.808 113.219 111.998	16. 124.018 122.020 120.135 118.308 116.533 115.798 113.259 112.117	17 124.018 122.020 120.134 116.304 116.533 114.819 113.329	18 124.018 121.998 120.093 118.261 116.519 114.873 113.468	19 124.018 121.987 120.074 118.238 116.504 114.682 113.513	20 124.014 121.976 120.054 118.217 116.492 114.894 113.559	21 124.014 121.968 120.040 118.204 116.491 114.916 113.615	22 124.018 121.969 120.045 118.217 116.516 114.968 113.697	23 124.010 121.950 120.013 116.103 116.495 114.973 113.739	124.018 121.941 119.998 118.170 116.487 114.990 113.791
TEMPE AREA 1 2 3	PATURE 0 124.016 122.109 120.352 118.725 117.133 113.416 113.607 111.921	F STUCK 11 124.018 122.089 120.303 118.595 116.595 116.595 115.073 113.268 111.699	109.274 ATERIAL 12 124.018 122.052 120.213 116.434 116.665 114.854 113.105 111.660	109.264 13 124.018 122.059 120.219 116.659 114.653 113.154 111.777	109.251 14 124.018 122.037 120.174 118.368 116.593 114.815 113.176 111.882	15 124.010 122.028 120.154 118.338 116.356 114.808 113.219 111.998	16. 124.018 122.020 120.135 118.308 116.533 115.798 113.259 112.117	17 124.018 122.020 120.134 116.304 116.533 114.819 113.329	18 124.018 121.998 120.093 118.261 116.519 114.873 113.468	19 124.018 121.987 120.074 118.238 116.504 114.682 113.513	20 124.014 121.976 120.054 118.217 116.492 114.894 113.559	21 124.014 121.968 120.040 118.204 116.491 114.916 113.615	22 124.018 121.969 120.045 118.217 116.516 114.968 113.697	23 124.010 121.950 120.013 116.103 116.495 114.973 113.739	124.018 121.941 119.998 118.170 116.487 114.990 113.791
TENPE AREA 1 2 3 4 5 6 7 8 9	RATURE 0 124.010 122.109 120.352 118.725 117.133 119.416 113.607 111.921 110.197 25	F STUCK 11 124.010 122.089 120.303 118.595 116.886 115.073 113.268 111.699 110.453 26	109.274 ATERIAL 12 124.018 122.052 120.213 116.434 116.665 114.854 113.105 111.660 110.715 27	109,264 13 124,018 122,059 120,219 118,432 116,659 14,453 113,154 111,777 110,945 28	109.251 14 124.018 122.037 120.174 118.368 116.593 114.815 113.176 111.882 111.153 29	15 124.018 122.028 120.154 118.338 116.364 114.808 113.219 111.998 111.373 30	16 124.016 122.020 120.135 116.533 116.798 113.259 112.117 111.612 31	17 124.018 122.020 120.134 116.304 116.533 114.819 113.329 112.258 111.852 32	18 124.018 121.998 120.093 118.261 116.519 114.873 113.468 111.400 0.000 33	19 124.018 121.987 120.074 118.238 116.504 114.882 113.513 111.552 0.000 34	20 124.014 121.976 120.054 118.217 116.492 114.894 113.559 111.706 0.000 25	21 124.010 121.968 120.040 118.204 116.491 114.916 113.615 111.859 0.000	22 124.018 121.969 120.045 118.217 116.516 114.968 113.697 112.009 0.000	23 124.014 121.950 120.013 116.495 116.495 114.973 113.739 112.136 0.000	124.018 121.941 119.998 118.170 116.487 114.990 113.791 112.305 0.000
TEMP E 	ERATURE 0 124.010 122.109 120.352 118.725 117.133 113.416 113.607 111.921 110.197 25 124.010	F STUCK 11 124.010 122.089 120.303 118.595 116.886 115.073 113.268 113.268 111.699 110.453 26 124.010	109.274 ATERIAL 12 124.018 122.052 120.213 118.434 116.665 114.864 113.105 111.600 110.715 27	109.264 13 124.018 122.059 120.219 118.432 116.659 114.453 113.154 111.777 110.945 28 124.018	109.251 14 124.018 122.037 120.174 118.368 116.593 113.176 113.862 111.153 29 124.018	15 124.018 122.028 120.154 118.338 116.564 114.808 113.219 111.998 111.373 30 -24.018	16 124.016 122.020 120.135 116.305 116.533 115.795 113.259 112.117 111.612 31	17 124.018 122.020 120.134 116.304 116.533 114.819 113.329 112.258 111.852 32 32	18 124.018 121.998 120.093 118.261 116.519 114.873 113.468 111.400 0.000 23 124.018	19 124.018 121.987 120.074 118.238 116.504 114.882 113.513 111.552 0.000 34 124.018	20 124.014 121.976 120.054 118.217 116.492 114.894 113.559 111.706 0.000 35 126.648	21 124.014 121.968 120.040 118.204 116.491 114.916 113.615 111.859 0.000 36	22 124.018 121.969 120.045 118.217 116.516 113.697 112.009 0.000 37 124.018	23 124,014 121,950 120,013 116,183 116,495 113,739 113,739 112,136 0,000 38	124.018 121.941 119.998 118.170 116.487 114.990 113.791 112.305 0.000 39
TEMP E 	PATURE 0 124.016 122.109 120.352 117.133 113.416 113.607 111.921 110.197 25 124.010 121.93	F STUCK 11 124.016 122.089 120.303 118.595 116.595 115.073 113.268 111.699 110.453 26 -124.014	109.274 ATERIAL 12 124.018 122.052 120.213 116.434 116.665 114.854 113.105 111.660 110.715 27 -124.018 121.927	13 124.018 122.059 120.219 118.432 116.659 113.154 113.154 111.777 110.945 28 124.018 121.914	109.251 14 124.018 122.037 120.174 118.368 116.593 114.815 113.176 111.882 111.153 29 124.4018 121.908	15 124.010 122.028 120.154 118.338 116.564 114.808 113.219 111.998 111.998 111.373 30 -524.018	16. 124.016 122.020 120.135 116.533 114.748 113.259 112.117 111.612 31 124.016	17 124.018 122.020 120.134 116.304 116.533 114.819 113.329 113.329 112.258 111.852 32 134.016	18 124.018 121.998 120.093 116.519 114.873 113.468 111.400 0.000 33 .124.018	19 124.018 121.987 120.074 118.238 116.504 114.682 113.513 111.552 0.000 34 124.018	20 124.014 121.976 120.054 118.217 116.492 114.894 113.559 111.706 0.000 35 124.048	21 124.014 121.968 120.040 118.204 116.491 114.916 113.615 111.859 0.000 36 -144.018	22 124.018 121.969 120.045 118.217 116.516 114.968 113.697 0.000 37 124.018	23 124.010 121.950 120.013 116.183 116.495 114.973 113.739 112.136 0.000 38 124.009	124.018 121.941 119.998 118.170 116.487 114.990 113.791 112.305 0.000 39 124.015
TEMP E 	RATURE 0 124.010 122.109 120.352 118.725 117.133 115.414 113.607 111.921 110.197 25 124.010 121.933 119.987	F STUCK 11 124.010 122.089 120.303 118.595 116.886 115.073 113.268 111.699 110.453 26 124.010 1321.929 119.974	109.274 ATERIAL 12 124.018 122.052 120.213 118.434 116.665 114.854 113.105 111.660 110.715 27 -424.018 121.927 119.980	109.264 13 124.018 122.059 120.219 116.659 114.853 113.154 111.777 110.945 28 124.018 124.018 124.018	109.251 14 124.018 122.037 120.174 118.368 116.593 114.815 113.176 111.882 111.153 29 124.018 129.953	15 124.010 122.028 120.154 118.338 116.564 114.808 113.219 111.998 111.373 30 	16 124.018 122.020 120.135 118.308 116.533 114.798 113.259 112.117 111.612 31 124.018 124.018	17 124.018 122.020 120.134 116.304 116.353 114.819 113.329 112.258 111.852 32 .324.018 119.923	18 124.018 121.998 120.093 118.261 116.519 114.673 113.468 111.400 0.000 23 .224.018 421.893	19 124.018 121.987 120.074 118.238 116.504 114.822 113.513 111.552 0.000 34 124.018 34 34 34 34 34 34 34 34 34 34 34 34 34	20 124.014 121.976 120.054 118.217 116.492 114.894 113.559 111.706 0.000 35 124.648 124.648	21 124.014 121.969 120.040 118.204 116.491 114.916 113.615 111.859 0.000 36 -14.018	22 124.018 121.949 120.045 118.217 116.516 114.968 113.697 112.009 0.000 37 124.018 112.475	23 124+010 121.950 120.013 116.183 116.495 114.973 113.739 112.136 0,000 38 124.003 124.003	124.018 121.941 110.998 118.170 116.487 114.990 113.791 112.305 0.000 39 124.018 122.018
TEMP E 	RATURE 0 124.010 122.109 120.352 118.725 117.133 115.416 113.607 111.921 110.197 25 124.010 121.935 119.95 110.16	F STUCK 11 124.010 122.089 120.303 118.595 116.886 115.073 113.268 111.699 110.453 26 -124.010 124.010 124.010 10.453 26 -124.010 10.453 26 -124.010 10.453 26 -124.010 10.453 26 -124.010 10.453 26 -124.010 10.453 26 -124.010 10.453 26 -124.010 10.453 26 -124.010 10.453 26 -124.010 10.453 26 -124.010 10.453 26 -124.010 10.453 26 -124.010 10.453 26 -124.010 10.453 26 -124.010 10.453 26 -124.010 10.453 26 -124.010 10.453 26 -124.010 -124.010 10.453 26 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.010 -124.0100 -124.0100 -124.0100 -124.0100 -124.0100 -124.01000 -124.00	109.274 ATERIAL 12 124.018 122.052 120.213 118.434 116.665 114.864 113.105 111.660 110.715 27 -124.018 121.927 119.980 118.169	109.264 13 124.018 122.059 120.219 118.432 113.154 113.154 111.777 110.945 28 124.018 121.914 119.960 118.152	109.251 14 124.018 122.037 120.174 118.368 113.176 111.882 111.153 29 -124.018 124.018 119.953 116.151	15 124.010 122.028 120.154 118.338 116.564 114.808 113.219 111.998 111.998 111.998 111.998 111.998 111.9994 119.941 118.143	16 124.016 122.020 120.135 116.308 116.533 116.798 113.259 113.259 113.259 113.259 113.259 113.259 114.612 31 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.019 116.137	17 124.018 122.020 120.134 116.304 116.533 114.819 113.329 112.258 111.852 32 ,334.018 119.923 116.138	18 124.018 121.998 120.093 116.261 116.519 114.873 113.468 111.400 0.000 33 124.018 124.018 124.018 124.018 119.938	19 124.018 121.987 120.074 118.238 116.504 114.682 113.513 111.552 0.000 34 124.018 MOM.488 119.932 118.167	20 124.014 121.976 120.054 118.217 116.492 114.894 113.559 111.706 0.000 35 124.048 124485 119.930 118.175	21 124.014 121.969 120.040 118.204 116.491 114.916 113.615 111.859 0.000 36 -4.4.018 2024.018 2024.018	22 124.018 121.969 120.045 118.217 116.516 114.968 113.697 112.009 0.000 37 124.018 121.421 119.912	23 124.014 121.950 120.013 116.183 116.495 114.973 113.739 112.136 0.000 38 124.029 124.029 124.029	124.018 121.941 119.998 118.170 116.487 114.990 113.791 112.305 0.000 39 124.015 119.879 119.879
TEMP E 	RATURE 0 124.018 122.109 120.352 118.725 117.133 113.416 113.607 111.921 110.197 25 124.010 121.935 119.985 116.477	F STUCK 11 124.016 122.089 120.303 118.595 116.886 113.268 111.699 110.453 26 -124.010 132.929 119.974 216.478 216.478	109.274 ATERIAL 12 124.018 122.052 120.213 118.434 116.665 113.105 111.660 113.105 111.600 110.715 27 -424.018 121.927 119.980 118.165	109.264 124.018 124.018 122.059 118.432 116.659 113.154 111.777 110.945 28 124.018 121.914 119.960 116.152 116.509	109.251 14 124.018 122.037 120.174 118.368 116.593 113.176 113.82 111.153 24.018 121.908 119.953 116.525	15 124.010 122.028 120.154 118.338 116.56 113.219 111.998 111.998 111.373 30 324.018 (9.81.900 119.941 119.941 116.532	16 124.016 122.020 120.135 116.533 116.733 114.74 113.259 112.117 11.612 31 124.016 124.016 124.016 124.030 116.137 116.540	17 124.018 122.020 120.134 116.304 116.533 114.819 113.329 112.258 112.258 112.258 112.258 112.258 112.258 112.258 112.258 112.258 112.258 112.258 113.556	18 124.018 121.998 120.093 118.261 116.519 113.468 111.400 0.000 33 124.018 124.018 124.018 119.938 116.604	19 124.018 121.987 120.074 118.238 116.504 114.882 113.513 111.552 0.000 34 124.018 124.018 124.018 124.018 124.018 124.018	20 124.014 121.976 120.054 118.217 116.492 114.894 113.559 111.706 0.000 35 124.048 124.048 124.048 119.930 118.175	21 124.010 121.968 120.040 118.204 118.204 113.615 111.859 0.000 36 -124.018 297.680 119.924 118.180	22 124.018 121.969 120.045 118.217 116.516 114.968 113.697 112.009 0.000 37 124.018 121.431 119.912 118.181	23 124.014 121.950 120.013 116.4953 116.4953 116.4953 113.739 112.136 0.000 38 124.009 124.009 124.009 124.009 124.009 124.009 119.868 118.156	124.018 121.941 119.998 116.170 116.487 114.990 113.791 112.305 0.000 39 *124.018 *131.850 119.879 118.180
TEMP E 	RATURE 0 124.010 122.109 120.352 118.725 117.133 115.416 113.607 111.921 110.197 124.016 121.933 119.987 116.165 116.477 115.002	F STUCK 11 124.010 122.089 120.303 118.595 116.886 115.073 113.268 111.699 110.453 26 124.010 124.010 124.010 125.024 115.034	109.274 ATERIAL 12 124.018 122.052 120.213 118.434 116.665 114.866 113.105 11.660 110.715 27 -424.018 121.927 119.980 116.169 116.511 115.093	109.264 124.018 122.059 120.219 118.432 113.154 113.154 113.777 110.945 28 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059	109.251 14. 124.018 122.037 120.174 118.368 116.593 114.815 113.176 111.852 111.1853 29 -124.018 119.953 116.525 115.156 114.151	15 124.010 122.028 120.154 118.338 116.564 113.219 111.998 111.978 30 .24.018 129.941 116.532 115.108	16 124.016 122.020 120.135 116.303 116.533 114.790 113.259 113.259 113.259 113.259 114.612 31 124.018 124.018 124.018 114.930 116.540 115.221	17 124.018 122.020 120.134 116.533 114.533 114.533 114.533 114.533 114.533 114.533 114.535 119.923 119.923 110.138 116.556 115.261	18 124.018 121.998 120.093 116.261 116.519 113.468 111.400 0.000 23 124.018 124.018 124.018 124.018 119.938 116.604 115.332	19 124.018 121.987 120.074 118.238 116.504 114.882 113.513 111.552 0.000 34 124.018 124.018 129.932 118.167 116.620 115.369	20 124.014 121.976 120.054 118.217 116.492 114.894 113.559 111.706 0.000 35 124.648 12468 12468 12468 12468 119.930 118.175 116.645 115.419	21 124.014 121.969 120.040 118.204 116.491 114.916 113.615 111.859 0.000 36 	22 124.018 121.949 120.045 118.217 116.516 114.968 113.697 112.009 0.000 37 124.018 124.433 119.912 118.181 116.666 115.518	23 124.010 121.950 120.013 118.183 116.495 114.973 113.739 112.136 0.000 38 124.009 124.009 124.009 124.009 124.009 124.009 119.068 116.156	124.018 121.941 110.998 118.170 116.487 114.990 113.791 112.305 0.000 39 124.018 19.879 118.180 116.180 115.627
TEMP E 	RATURE 0 124.010 122.109 120.352 118.725 117.133 115.416 113.607 111.921 110.197 124.016 121.933 119.987 116.165 116.477 115.002	F STUCK 11 124.010 122.089 120.303 118.595 116.886 115.073 113.268 111.699 110.453 26 124.010 124.010 124.010 125.024 115.034	109.274 ATERIAL 12 124.018 122.052 120.213 118.434 116.665 114.866 113.105 11.660 110.715 27 -424.018 121.927 119.980 116.169 116.511 115.093	109.264 124.018 122.059 120.219 118.432 113.154 113.154 113.777 110.945 28 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059 125.059	109.251 14. 124.018 122.037 120.174 118.368 116.593 114.815 113.176 111.852 111.1853 29 -124.018 119.953 116.525 115.156 114.151	15 124.010 122.028 120.154 118.338 116.564 113.219 111.978 30 .24.018 129.941 110.143 116.532 115.108	16 124.016 122.020 120.135 116.303 116.533 114.790 113.259 113.259 113.259 113.259 114.612 31 124.018 124.018 124.018 114.930 116.540 115.221	17 124.018 122.020 120.134 116.533 114.533 114.533 114.533 114.533 114.533 114.533 114.535 119.923 119.923 110.138 116.556 115.261	18 124.018 121.998 120.093 116.261 116.519 113.468 111.400 0.000 23 124.018 124.018 124.018 124.018 119.938 116.604 115.332	19 124.018 121.987 120.074 118.238 116.504 114.882 113.513 111.552 0.000 34 124.018 124.018 129.932 118.167 116.620 115.369	20 124.014 121.976 120.054 118.217 116.492 114.894 113.559 111.706 0.000 35 124.648 12468 12468 12468 12468 119.930 118.175 116.645 115.419	21 124.014 121.969 120.040 118.204 116.491 114.916 113.615 111.859 0.000 36 	22 124.018 121.949 120.045 118.217 116.516 114.968 113.697 112.009 0.000 37 124.018 124.433 119.912 118.181 116.666 115.518	23 124.010 121.950 120.013 118.183 116.495 114.973 113.739 112.136 0.000 38 124.009 124.009 124.009 124.009 124.009 124.009 119.068 116.156	124.018 121.941 110.998 118.170 116.487 114.990 113.791 112.305 0.000 39 124.018 19.879 118.180 116.180 115.627
TEMP E 	RATURE 0 124.010 122.109 120.352 118.725 117.133 115.416 113.607 111.921 110.197 25 124.010 121.935 116.473 116.473 115.003 113.843 40	F STUCK 11 124.010 122.089 120.303 118.595 116.886 115.073 113.268 113.268 114.699 10.453 26 -124.010 1.521.925 119.974 218.153 216.478 215.034 215.034	109.274 ATERIAL 12 124.018 122.052 120.213 118.434 116.665 113.105 111.660 110.715 27 -424.018 121.927 119.980 118.169 115.093 113.998 113.998	109.264 124.018 124.018 122.059 118.432 116.659 113.154 111.777 110.945 28 124.018 121.914 119.950 116.152 116.509 115.115 114.050 12.920 43	14 14 124.018 122.037 120.174 118.368 116.593 113.176 111.153 29 -24.018 121.153 29 -24.018 121.908 116.525 115.156 114.105 113.054 44	15 124.010 122.028 120.154 118.338 116.564 113.219 111.998 111.998 111.998 111.998 111.998 110.143 116.532 115.188 114.166 113.182 45	16 124.016 122.020 120.135 116.303 116.790 113.259 113.259 112.117 11.612 31 124.018 124.018 124.018 124.018 124.018 13.13 14.540 115.221 114.229 113.315 46	17 124.018 122.020 120.134 116.304 116.533 114.819 113.329 112.258 111.852 32 734.016 119.923 118.138 116.556 115.261 114.299 113.452 47	18 124.018 121.998 120.093 116.261 116.519 113.468 113.468 113.468 113.468 113.468 113.468 113.468 113.468 113.468 113.468 114.893 114.393 114.393 113.584 48	19 124.018 121.987 120.074 118.238 116.504 114.682 113.513 111.552 0.000 34 124.018 1025.682 118.167 116.620 115.369 114.456	20 124.014 121.976 120.054 118.217 116.492 114.894 113.559 111.706 0.000 35 124.048 124.048 124.048 124.048 124.048 124.048 118.175 116.645 115.419 114.534 114.534	21 124.010 121.968 120.040 118.204 116.491 114.916 113.615 111.859 0.000 36 -4.4.018 119.924 119.924 119.924 119.924 115.467 114.615 113.997 51	22 124.018 121.949 120.045 118.217 116.516 114.968 113.697 112.009 0.000 37 124.018 124.433 119.912 118.181 116.666 115.518	23 124.010 121.950 120.013 118.183 116.495 114.973 113.739 112.136 0.000 38 124.009 124.009 124.009 124.009 124.009 124.009 119.068 116.156	124.018 121.941 129.998 118.170 116.487 114.990 113.791 112.305 0.000 39 *124.015 *131.350 119.879 118.180 116.726
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TEMPE 	RATURE 0 124.016 122.109 120.352 117.133 113.607 111.921 110.197 25 124.010 121.998 116.165 116.477 112.485 40 124.011 121.660	F STUCK 11 124.010 122.089 120.303 118.595 116.595 116.595 116.595 116.473 26 -124.014 113.260 112.647 215.034 113.647 41 124.014 124.014 124.014	109.274 ATERIAL 12 124.018 122.052 120.213 116.434 116.665 114.854 113.105 111.660 110.715 27 -124.018 121.927 119.980 118.169 116.511 115.093 113.998 112.814 42 124.018 121.884	109.264 124.018 124.018 122.059 120.219 116.659 114.653 113.154 110.945 28 124.018 121.914 119.960 116.152 116.509 115.115 114.050 112.920 43 124.018 121.898	109.251 14 124.018 122.037 120.174 118.368 116.593 114.815 113.176 111.852 111.153 29 -124.018 121.908 119.953 116.525 115.156 114.105 113.054 44 121.908	15 124.010 122.028 120.154 118.338 116.564 114.808 113.219 111.998 111.978 111.978 114.978 116.532 115.188 114.166 113.182 45 124.018 121.929	16 124.018 122.020 120.135 118.308 116.533 115.798 113.259 112.117 114.612 31 124.018 121.0930 118.137 116.540 115.221 114.229 113.315 46 124.018 121.033	17 124.018 122.020 120.134 116.533 114.819 113.329 112.258 111.852 32 ,334.018 119.923 118.138 116.556 115.261 114.299 113.452 47 124.018 121.946	18 124.018 121.998 120.093 116.201 116.519 114.673 113.468 111.400 0.000 33 124.018 124.018 119.938 118.166 116.604 115.332 114.393 113.584 48 124.018	19 124.018 121.987 120.074 118.238 116.504 114.682 113.513 111.552 0.000 34 124.018 129.932 118.167 116.620 115.369 114.456 113.695 49 124.018	20 124.014 121.976 120.054 118.217 116.492 114.894 113.559 114.706 0.000 35 124.048 119.930 118.175 116.645 115.419 114.534 113.835 50 124.018	21 124.014 121.969 120.040 118.204 116.491 114.916 113.615 111.859 0.000 36 -144.018 119.924 118.180 110.666 115.467 114.615 113.697 51 124.018	22 124.018 121.949 120.045 118.217 116.516 114.968 113.697 112.009 0.000 37 124.018 124.433 119.912 118.181 116.666 115.518	23 124.010 121.950 120.013 118.183 116.495 114.973 113.739 112.136 0.000 38 124.009 124.009 124.009 124.009 124.009 124.009 119.068 116.156	124.018 121.941 110.998 118.170 116.487 114.990 113.791 112.305 0.000 39 124.018 19.879 118.180 116.180 115.627
TENPE AREA 1 2 3 4 5 6 7 8 9 AREA 7 8 9 4 5 6 7 8 9 4 5 6 7 8 9 7 8 9 9 7 8 9 9 7 8 9 9 7 8 9 9 7 8 9 9 7 8 9 9 7 8 9 9 7 8 9 9 7 8 9 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 9 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 8 8 8 8 8 8 8 8 8 8 8 8	ERATURE 0 124.010 122.109 120.352 113.412 113.607 111.921 110.197 25 124.010 116.472 116.472 116.472 116.472 116.472 115.000 113.842 112.482 40 124.011 124.011 119.90	F STUCK 11 124.010 122.089 120.303 118.595 116.886 115.073 113.268 111.699 124.010 122.087 110.453 26 124.010 115.034 215.034 215.034 215.034 212.647 41 212.873 110.925	109.274 ATERIAL 12 124.018 122.052 120.213 116.434 116.665 114.660 110.715 27 424.018 121.928 118.169 116.511 115.093 113.998 122.814 42 124.018 121.884 129.938	109.264 124.018 122.059 120.219 116.659 116.659 114.853 113.154 111.777 110.945 28 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018 124.018	109.251 14 124.018 122.037 120.174 118.368 116.593 114.815 113.176 111.882 111.153 29 -124.018 124.018 114.105 115.158 114.105 113.054 44 124.018 112.908	15 124.010 122.028 120.154 118.338 116.564 114.808 113.219 111.998 111.373 30 	16 124.018 122.020 120.135 118.308 116.533 114.798 113.259 112.117 111.612 31 124.018 124.018 124.018 115.221 116.540 115.221 114.229 113.315 46 124.018 121.033 120.020	17 124.018 122.020 120.134 116.353 114.819 113.329 112.258 111.852 32 324.018 119.923 118.138 116.556 115.261 114.299 113.452 47 124.018 120.946	18 124.018 121.998 120.093 116.261 116.519 114.673 113.468 111.400 0.000 23 .24.018 421.893 119.938 118.166 116.604 115.332 113.584 48 124.018 124.018 121.959	19 124.018 121.987 120.074 118.238 116.504 114.882 113.513 111.552 0.000 34 124.018 34 34 119.932 118.167 116.620 115.369 114.456 113.695 49 124.018 124.018	20 124.014 121.976 120.054 118.217 116.492 114.894 113.559 111.706 0.000 35 124.645 124.645 115.419 116.645 115.419 114.534 113.835 50 124.018 124.018	21 124.014 121.969 120.040 118.204 116.491 114.916 113.615 111.859 0.000 36 -14.018 19.924 118.467 114.615 113.997 51 124.018 122.017	22 124.018 121.969 120.045 118.217 116.516 114.968 113.697 112.009 0.000 37 124.018 121.433 119.912 118.181 116.686 115.518 114.708 114.193	23 124.010 121.950 120.013 118.183 116.495 114.973 113.739 112.136 0.000 38 124.009 124.009 124.009 124.009 124.009 124.009 119.068 116.156	124.018 121.941 119.998 118.170 116.487 114.990 113.791 112.305 0.000 39 *124.018*** *11.1850 119.879 118.180 116.726 115.627 114.999 114.594
TEMPE AREA 1 2 3 4 5 6 7 8 9 AREA 1 1 1 1 1 1 1 1 1 1 1 1 1	RATURE 0 124.010 122.109 120.352 118.725 117.133 113.607 111.921 110.197 25 124.010 121.035 116.477 115.007 116.477 115.007 113.847 112.486 40 124.01 121.867 119.98 118.725 112.487 119.987 116.165 116.477 115.007 118.725 118.725 118.725 118.725 118.725 118.725 124.010 118.725 118.725 124.010 118.725 118.725 124.010 124.010 124.010 125.007 118.725 118.725 124.010 124.010 124.010 125.007 124.010 125.007 125.007 125.007 124.010 125.007 125.007 125.007 124.010 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 125.007 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9       -00000       -00000       -00001       -00001       -00001       -00001         11       -00000       -00000       -00001       -00001       -00001       -00001         12       -00000       -00000       -00001       -00001       -00001       -00001         13       -00000       -00000       -00001       -00001       -00001       -00001         14       -00000       -00000       -00001       -00001       -00001       -00001         15       -00000       -00000       -00001       -00001       -00001       -00001         15       -00000       -00000       -00001       -00001       -00001       -00001         16       -00000       -00000       -00001       -00001       -00001       -00001         16       -00000       -00000       -00001       -00001       -00001       -00001       -00001         17       -00000       -00000       -00000       -00001       -00001       -00001       -00001       -00001         18       -00000       -00000       -00000       -00001       -00001       -00001       -00001       -00001       -00001       -00001       -00001	9 -00000 .00000 .00000 .00001 .00001 .00001 .00001 .00001 1 00000 .00000 .00000 .00001 .00001 .00001 .00001 2 00000 .00000 .00000 .00001 .00001 .00001 .00001 3 00000 .00000 .00000 .00001 .00001 .00001 .00001 4 00001 .00000 .00000 .00001 .00001 .00001 .00001 5 00000 .00000 .00000 .00000 .00001 .00001 .00001 .00001 5 00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .00000 .	6										the second second	·····				
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16       .00000       .00000       .00001       .00001       .00001       .00001         17       .00000       .00000       .00001       .00001       .00001       .00001         17       .00000       .00000       .00001       .00001       .00001       .00001         17       .00000       .00000       .00001       .00001       .00001       .00001         10       11       12       13       14       15       16       17       18       19       20       21       22       23       24         1       .00050       .00040       .00040       .00041       .00041       .00042       .00042       .00042       .00042       .00042       .00042       .00042       .00042       .00042       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       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17       .00000       .00000       .00001       .00001       .00001       .00001         MECK       RAD IUS_DF_STUCK_MATERIAL       .00001       .00001       .00001       .00001       .00001       .00001         AREA       10       11       12       13       14       15       16       17       18       19       20       21       22       23       24         2       .00030       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00017       .00027 <td>7       .00000       .00000       .00001       .00001       .00001       .00001         60000       .00000       .00001       .00001       .00001       .00001       .00001         CK       RAD IUS DF STUCK MATERIAL       13       14       15       16       17       18       19       20       21       22       23       24         A       10       11       12       13       14       15       16       17       18       19       20       21       22       23       24         A       00040       .00040       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00</td> <td>16</td> <td>.00000</td> <td>.00000</td> <td>.00000</td> <td>.00001</td> <td>• 0D001</td> <td>-00001</td> <td>-00001</td> <td>. 00001</td> <td></td> <td>·</td> <td></td> <td></td> <td></td> <td></td> <td></td>	7       .00000       .00000       .00001       .00001       .00001       .00001         60000       .00000       .00001       .00001       .00001       .00001       .00001         CK       RAD IUS DF STUCK MATERIAL       13       14       15       16       17       18       19       20       21       22       23       24         A       10       11       12       13       14       15       16       17       18       19       20       21       22       23       24         A       00040       .00040       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00	16	.00000	.00000	.00000	.00001	• 0D001	-00001	-00001	. 00001		·					
MECK. RADIUS_OF_STUCK_MATERIAL         AREA       10       11       12       13       14       15       16       17       18       19       20       21       22       23       24         1       .00040       .00040       .00040       .00040       .00041       .00041       .00041       .00041       .00042       .00042       .00042       .00042       .00042       .00042       .00042       .00042       .00042       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00027       .00027       .00027       .00027       .00027       .00027       .00027       .00027       .00027	CX. RAD IUS_DF_STUCK_MATERIAL         EA       10       11       12       13       14       15       16       17       18       19       20       21       22       23       24         1       .00050       .00040       .00040       .00040       .00040       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00027       .00027       .00027       .00027       .00027       .00027       .00027       .00025       .00025       .00025       .00025       .00025       .00025       .00025       .00025       .00025       .00025       .00022       .00022       .00023 <td< td=""><td></td><td></td><td></td><td>.00000</td><td>-00001_</td><td>- 00001</td><td>- 00001</td><td>- 00001</td><td>400001</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>				.00000	-00001_	- 00001	- 00001	- 00001	400001							
AREA       10       11       12       13       14       15       16       17       18       19       20       21       22       23       24         1       .00050       .00040       .00040       .00040       .00040       .00041       .00041       .00041       .00041       .00041       .00042       .00042       .00042       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00027       .00027       .00027       .00027       .00027       .00027       .00027       .00027       .00027       .00027       .00027       .00023       .00013       .00013       .00013       .00013       .00013       .00013       .00014       .00014       .00014	EA       10       11       12       13       14       15       16       17       18       19       20       21       22       23       24         1       .00050       .00040       .00040       .00040       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00013       .00013       .00013       .00013       .00013       .00013       .00013       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00013       .00013       .00013       .00013       .00013       .00014       <																L
AREA       10       11       12       13       14       15       16       17       18       19       20       21       22       23       24         1       .00050       .00040       .00040       .00040       .00040       .00041       .00041       .00041       .00042       .00042       .00042       .00042       .00042       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00040       .00012       .00027       .00027       .00027       .00027       .00027       .00027       .00027       .00027       .00027       .00023       .00013       .00013       .00013       .00013       .00014	EA       10       11       12       13       14       15       16       17       18       19       20       21       22       23       24         1       .00050       .00040       .00040       .00040       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00041       .00013       .00013       .00013       .00013       .00013       .00013       .00013       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00013       .00013       .00013       .00013       .00013       .00014       <									· · · · · · · · · · ·		• • • • • • • • • • • • • • • • • • •					
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1       .00012       .00013       .00013       .00013       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00043       .00043       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00043       .00043       .00043       .00043       .00043       .00044	1       .00012       .00013       .00013       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00014       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00004       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00043       .00043       .00043       .00043       .00043       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00043       .00043       .00043       .00043       .00043       .00043       .00043	-	• 00013			.00013	.00013	.00013	.00014	.00014	.00014	.00014	.00014	.00015	.00015	.00015	.00015
0       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00004       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       000	00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       00002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       000002       00004       00044       00044       00044       00044       00044       00044       00044       00042       00042       00042       00042       00042       00042       00042       00042       00042       00042       00042       00042       00042       00043       00043       00043       00043       00043       00043       00043       00043       000043       00043       00043					.00013		-+00013-			+00014-			+00014		.00015	
AREA       25       26       27       28       29       30       31       32       33       34       35       36       37       38       39         2       .00042       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00044       .00044       .00044       .00044       .00044       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045	4       00002       00002       00002       00002       00003       00003       000000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.00000       0.000000       0.000000       0.000000	0		<u> </u>	• 00 00 Z	.00002	.0000Z	•0000Z	.00003	.00003	•00003	<b>AAAA</b> 3	00000	~~~~			
1       .00042       .00043       .00043       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00016       .00016       .00016	1       .00042       .00043       .00043       .00043       .00044       .00044       .00044       .00044       .00044       .00044       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00045       .00016	0		00003	~~ ~ ~ ~				. 00003	****	0.0000	0.0000.0	0.00000	0.00000	0.00000	0.00000	0.00000
2 .00042 .00043 .00043 .00043 .00043 .00044 .00044 .00044 .00044 .00044 .00045 .00045 .00045 .00045 3 .00040 .00041 .00041 .00041 .00041 .00042 .00042 .00042 .00044 .00044 .00044 .00044 .00044 .00045 .00045 4 .00028 .00028 .00028 .00028 .00029 .00029 .00029 .00030 .00031 .00031 .00033 .00043 .00043 .00045 5 .00016 .00016 .00017 .00017 .00017 .00017 .00018 .00018 .00018 .00018 .00019 .00019 .00019 .00019 .00019 .00019 6 .00015 .00016 .00016 .00016 .00016 .00017 .00017 .00017 .00017 .00017 .00018 .00018 .00018 .00018 .00018 .00019 .00019 .00019 .00019 .00019 .00019 .00019 .00019 .00019 .00019 .00019 .00017 .00017 .00017 .00017 .00017 .00017 .00017 .00017 .00017 .00017 .00018 .00006 .00006 .00006 .00006 .00006 .00006 .00006 .00006 .00006 .00006 .00006 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .0	1       100043       100043       100043       100043       100044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00044       00043       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045       00045 <t< td=""><td></td><td>+0000Z</td><td></td><td>.00002</td><td></td><td></td><td></td><td></td><td> + 44443</td><td>V+ VUUVV-</td><td></td><td></td><td></td><td></td><td></td><td>20</td></t<>		+0000Z		.00002					+ 44443	V+ VUUVV-						20
3       .00040       .00041       .00041       .00043       .00043       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00044       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00043       .00013       .00013       .00014       .00014       .00014       .00014	00040       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041 <td< td=""><td>AREA</td><td></td><td>-•00002 26</td><td><b></b></td><td>20</td><td>£7</td><td>30</td><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td><td>38</td><td></td></td<>	AREA		-•00002 26	<b></b>	20	£7	30	31	32	33	34	35	36	37	38	
3       00040       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       000011       00011       00	3       00040       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       00041       000	AREA	.00042	+00002. 26 +00043						32 	33 +00044-	34	35 	36 	37		
5       .00016       .00017       .00017       .00017       .00017       .00017       .00018       .00018       .00011       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019       .00019	0.0016       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0017       0.0018       0.0018       0.0018       0.0019       0.0019       0.0019       0.0019       0.0019       0.0018       0.0006       0.0006       0.0006       0.0006       0.0006       0.0006       0.0006       0.0006       0.0006       0.0006       0.0006       0.0006       0.0006       0.0006       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007       0.0007	AREA 1 2	+00042	+00002 26 +00043 +00042	.00043	.00043	.00043	.00044			33 	34 	35 	36 	37 	.00045	.00045
6 .00015 .00016 .00016 .00016 .00017 .00017 .00017 .00018 .00018 .00018 .00018 .00019 .00019 .00019 .00019 7 .00015 .00016 .00016 .00016 .00005 .00006 .00006 .00006 .00006 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .000	6 .00015 .00016 .00016 .00016 .00017 .00017 .00017 .00018 .00018 .00018 .00018 .00019 .00019 .00019 .00019 7 .00015 .00016 .00016 .00016 .00005 .00006 .00006 .00006 .00006 .00007 .00007 .00007 .00007 .00007 8 .00004 .00005 .00005 .00005 .00005 .00005 .00006 .00006 .00006 .00006 .00006 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .	AREA 1 2	• 00042 • 00042 • 00040	•00002 26 •00043 •00042 •00041	.00043 .00042 .00041	.00043 .00042 .00041	.00043 .00043 .00041	• 00044 • 00043 • 00042	.00044 .00043		33 	34 .00044 .00044 .00042	35 	36 .00045 .00044 .00043	37 • 00045 • 00044 • 00043	.00045 .00045 .00043	.00045
5       .00015       .00016       .00016       .00017       .00017       .00017       .00017       .00018       .00018       .00018       .00018       .00018       .00018       .00018       .00018       .00018       .00018       .00018       .00018       .00018       .00018       .00018       .00017       .00017       .00017       .00017       .00017       .00017       .00018       .00018       .00018       .00017       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007	00015       00016       00016       00017       00017       00017       00017       00018       00018       00018       00018       00019       00019         00015       00016       00016       00005       00006       00006       00006       00006       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       00007       0	AREA 1 2 3 4	• 00042 • 00042 • 00040 • 00028	.00002 26 .00043 .00042 .00041 .00028	.00043 .00042 .00041 .00028	.00043 .00042 .00041 .00028	.00043 .00043 .00041 .00029	+00044 +00043 +00042 +00029	.00044 .00043 .00042 .00029	32 • 00044 • 00042 • 00042 • 00030	33 	34 .00044 .00044 .00042 .00031	35 	36 .00045 .00044 00043 .00033	37 • 00045 • 00044 • 00043 • 00036	00045 00045 00043 00042	.00045 .00043
8       .00004       .00005       .00005       .00005       .00005       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .000047       .00047	8 .00004 .00005 .00005 .00005 .00005 .00005 .00005 .00006 .00006 .00005 .00005 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007 .00007	AREA 2 3 4 5	• 00042 • 00042 • 00040 • 00028 • 00016	.00002 26 .00043 .00042 .00041 .00028 .00016	.00043 .00042 .00041 .00028 .00017	.00043 .00042 .00041 .00028 .00017	.00043 .00043 .00041 .00029 .00017	.00044 .00043 .00042 .00029 .00017	.00044 .00043 .00042 .00029 .00017	.00044 .00044 .00042 .00030 .00016	33 •00044 •00044 •00042 •00031 •00018	34 .00044 .00044 .00042 .00031 .00018	35 .00044 .00044 .00043 .00031 .00031	36 .00045 .00044 .00043 .00033 .00019	37 .00045 .00044 .00043 .00036 .00019	.00045 .00045 .00043 .00042 .00019	.00045 .00043 .00042 .00019
0       000003       000003       000003       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000006       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007       000007	6       .00004       .00005       .00005       .00005       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00006       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007       .00007	AREA 1 2 3 4 5 6	• 00042 • 00042 • 00040 • 00028 • 00016 • 00015	.00002 26 .00043 .00042 .00041 .00028 .00016	.00043 .00042 .00041 .00028 .00017 .00016	.00043 .00042 .00041 .00028 .00017 .00016	.00043 .00043 .00041 .00029 .00017 .00016	.00044 .00043 .00042 .00029 .00017 .00017	31 •00044 •00043 •00042 •00029 •00017 •00017	32 • 00044 • 00042 • 00030 • 00018 • 00017	33 .00044 .00044 .00042 .00031 .00018 .00017	34 .00044 .00044 .00042 .00031 .00018 .00017	35 .00044 .00043 .00031 .00018 .00018	36 .00045 .00044 .00043 .00033 .00019 .00018	37 .00045 .00044 .00043 .00036 .00019 .00018	• 00045 • 00045 • 00043 • 00042 • 00019	.00045 .00043 .00042 .00019
1       .00046       .00046       .00047       .00047       .00047       .00048       .00048       .00049         2       .00045       .00046       .00046       .00047       .00047       .00047       .00048       .00048       .00049         3       .00043       .00040       .00033       .00034       .00034       .00035       .00035       .00035         4       .00042       .00041       .00032       .00033       .00033       .00034       .00034       .00035       .00035         5       .00019       .00020       .00020       .00020       .00021       .00021       .00021       .00022       .00022	1       .00046       .00046       .00047       .00047       .00047       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00047       .00047       .00047       .00047       .00047       .00047       .00047       .00047       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00048       .00035       .00035       .00035       .00035       .00035       .00034       .00034       .00034       .00034       .00034       .00034       .00034       .00034       .00034	AREA 1 2 3 4 5 6 7	.00042 .00042 .00040 .00028 .00016 .00015 .00015	.00002 26 .00043 .00042 .00041 .00028 .00016 .00016 .00016	.00043 .00042 .00041 .00028 .00017 .00016 .00016	.00043 .00042 .00041 .00028 .00017 .00016 .00016	.00043 .00043 .00041 .00029 .00017 .00016 .00005	.00044 .00043 .00042 .00029 .00017 .00017	31 •00044 •00043 •00042 •00029 •00017 •00017 •00005	52 00044 00044 00042 00030 00018 00017 00006	33 .00044 .00042 .00031 .00018 .00017 .00006	34 .00044 .00044 .00042 .00031 .00018 .00017 .00006	35 .00044 .00043 .00031 .00018 .00018 .00007	36 .00045 .00044 .00043 .00033 .00019 .00018 .00007	37 • 00045 • 00044 • 00043 • 00036 • 00019 • 00018 • 00018	• 00045 • 00045 • 00043 • 00042 • 00019 • 00019	.00045 .00043 .00042 .00019 .00019
2 .00045 .00045 .00046 .00046 .00046 .00047 .00047 .00047 .00048 .00048 .00048 .00048 3 .00043 .00042 .00040 .00033 .00033 .00034 .00034 .00034 .00035 .00035 .00035 .00035 4 .00042 .00041 .00039 .00032 .00032 .00033 .00033 .00033 .00033 .00035 .00035 .00035 5 .00019 .00020 .00020 .00020 .00020 .00021 .00021 .00021 .00022 .00022 .00032	2 .00045 .00045 .00046 .00046 .00047 .00047 .00047 .00048 .00048 .00048 .00049 3 .00043 .00042 .00040 .00033 .00033 .00034 .00034 .00034 .00034 .00035 .00035 .00035 4 .00042 .00041 .00039 .00032 .00032 .00033 .00033 .00033 .00033 .00034 .00035 .00035 5 .00019 .00020 .00020 .00020 .00020 .00021 .00021 .00021 .00022 .00022 .00022 .00022	AREA 1 2 3 4 5 6 7 8	00042 00042 00040 00028 00016 00015 00015 00015	.00002 26 .00043 .00042 .00041 .00028 .00016 .00016 .00016 .00015	.00043 .00042 .00041 .00028 .00017 .00016 .00016 .00015	.00043 .00042 .00041 .00028 .00017 .00016 .00016 .00005	.00063 .00043 .00041 .00029 .00017 .00016 .00005	-00044 -00043 -00043 -00029 -00017 -00017 -000017 -00006 -00005	51 00044 00043 00042 00029 00017 00017 00017 00005 00006	32 00044 00044 00042 00030 00018 00018 00017 00006 00006	33 .00044 .00042 .00031 .00018 .00017 .00006 .00006	34 .00044 .00042 .00031 .00018 .00017 .00006 .00006	35 .00044 .00043 .00031 .00018 .00018 .00007 .00006	36 .00045 .00044 .00043 .00033 .00019 .00018 .00007 .00007	37 .00045 .00044 .00043 .00036 .00019 .00018 .00007 .00007	.00045 .00045 .00043 .00042 .00019 .00019 .00007	.00045 .00043 .00042 .00019 .00019 .00008
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4 .00042 .00041 .00039 .00032 .00032 .00033 .00033 .00033 .00034 .00034 .00034 .00033 5 .00019 .00020 .00020 .00020 .00020 .00021 .00021 .00021 .00021 .00022 .00022 .00022	4 .00042 .00041 .00039 .00032 .00032 .00033 .00033 .00033 .00034 .00034 .00033 5 .00019 .00020 .00020 .00020 .00020 .00021 .00021 .00021 .00022 .00022 .00022	AREA 2 3 4 5 6 7 8 AREA 1	.00042 .00042 .00040 .00028 .00016 .00015 .00015 .00004 40 .00046	.00002 26 .00043 .00042 .00041 .00028 .00016 .00016 .00016 .00005 41 .00046	.00043 .00042 .00041 .00028 .00017 .00016 .00016 .00005 42 .00046	.00043 .00042 .00041 .00028 .00017 .00016 .00016 .00005 43 .00047	-00043 -00043 -00041 -00029 -00017 -00016 -00005 44 -00047	-00044 -00043 -00042 -00029 -00017 -00017 -00005 -00005 -55 -00047	51 00044 00043 00042 00029 00017 00005 00006 46 000047	52 00044 00044 00042 00030 00018 00017 00006 47 00047	33 • 00044 • 00044 • 00042 • 00031 • 00018 • 00017 • 00006 • 00006 • 88 • 00048	34 .00044 .00044 .00042 .00031 .00018 .00017 .00006 .00006 .99 .00048	35 .00044 .00044 .00043 .00031 .00018 .00018 .00007 .00006 .00046	36 .00043 .00043 .00033 .00019 .00018 .00007 .00007 .00007	37 .00045 .00044 .00043 .00036 .00019 .00018 .00007 .00007	.00045 .00045 .00043 .00042 .00019 .00019 .00007	.00045 .00043 .00042 .00019 .00019 .00008
5 .00019 .00020 .0200.020 .0200.020 .0200.021 .00021 .00021 .0000.020 .02000.0200.02	5 .00019 .00020 .00020 .00020 .00020 .00021 .00021 .00021 .00022 .00022 .00022 .00022	AREA 1 2 3 4 5 6 7 8 AREA 1 2	.00042 .00042 .00040 .00028 .00016 .00015 .00015 .00004 40 .00046 .00045	.00002 26 .00043 .00042 .00041 .00028 .00016 .00016 .00015 .00005 41 .00046 .00045	.00043 .00042 .00041 .00028 .00017 .00016 .00016 .0005 42 .00046 .00046	.00043 .00042 .00041 .00028 .00017 .00016 .00016 .00005 43 .00047 .00046	-00043 .00043 .00041 .00029 .00017 .00016 .00005 .00005 .44 .00047 .00046	-00044 -00043 -00042 -00029 -00017 -00017 -00005 -00005 -5 -00047 -00047	51 00044 00043 00042 00029 00017 00005 00006 46 000047 000047	52 • 00044 • 00044 • 00042 • 00030 • 00018 • 00017 • 00006 • 00006 • 47 • 00047 • 00047	33 .00044 .00042 .00031 .00018 .00017 .00006 .00006 48 .00048 .00048	34 • 00044 • 00044 • 00042 • 00031 • 00018 • 00017 • 00006 • 00006 • 00006 • 9 • 00048 • 00048 • 00047	35 .00044 .00043 .00031 .00018 .00018 .00018 .00007 .00006 .50 .00048	36 .00043 .00043 .00033 .00019 .00018 .00007 .00007 .00007 .00007 .00007 .000049 .00049	37 .00045 .00044 .00043 .00036 .00019 .00018 .00007 .00007	.00045 .00045 .00043 .00042 .00019 .00019 .00007	.00045 .00043 .00042 .00019 .00019 .00008
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TIME	(SEC)= TOTAL AR	EA (C2) =		09		•								·· · · · · · · · · · · · · · · · · · ·		
	WEDGE AR Original		.0294 TION DEP	TH=	.2050						· · · · · ·					• ••••••••••••••••••••••••••••••••••••
	ANGLE (DE		20.060 INCREMEN	T	29180											
			POOL =		4.7.4.9 V	• *		**************************************					·			
	TENPERAT	URE HTST	ORY OF P	OVOFR												
AREA	1	2	. 3		5											
1			126.195							1	nanglar en en ar	· · · · ·	a.	پېښو د اورومونونه	·· 1	·
3			121.986							,						
<u>+</u>	120.209	120.209	120.209	120.245	120.245	120.247	120.247	120.246								
<b>5</b> 6			118.709 117.482													
ž			116.536										and the set further being a set of		The front other contact and	
B	115.811	115.637	115.483	115.365	115.234	114.785	114.703	114.630								
10	113+274	113.222	113.181 110.666	113.019	113,006	112.704	112.709	112.708								
11	109.999	110.039	110.092	110.136	110.182	110.158	110.216	110.266		· · · • • • • •		·····				
	and a state of the											_				
TEMPE	RATURE OF	STUCK	MATERIAL							1 1993 I <b>4</b> Fm						
AREA	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1			126.195													
2			124.008													
4			120.286												122.126	
5															.118.755.	
6			117.435													
<u>7</u> 8			114.502												115.736	
9	112.710	112.721	112.727	112.739	112.755	112.761	112.755	112.766	112.775	112.783	112.794	112.800	112.803	112.821	112.846.	
10 11			111.259													
AREA	25	26	27	28	29	30	31	32	33	34	35	36	37	38	_111.370_ 39	
_1			126.195													
2			124.067												124.072	
Ĩ.	120.356	120.367	120.373	120.357	120,371	120.354	120.358	120.340	120.338	120.348	120.328	120.332	120.340	120.321	120.331	
5															118.645	
7	115-702	115.726	117.202	115.689	115.683	115.655	115.655	115.635	115.625	115.633	115.615	115.626	115.641	115.628	117.091	
8	114.208	114.286	114.290	114.278	114.285	114.274	114.285	114,281	114,283	114.301	114.301	114.324	114.352	114.357	114.392	
9															113.307_	
10 11	111.485	111.107	111.272	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	112.313	
AREA	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	
1	126.195	126.195	126.195	126.195	126.195	126.195	126.195	126.195	126.195	126.195	126.195	126.195	126.195	126.195	126,195	۲ <u>۱</u>
2	124.065	124.062	124.060	124+053	129.037	124+038	122-030	127+027	129.021	124.013	123.995	123.997	124.002	123,995	123.997	,
	120.312	120.303	120.302	120.283	120.237	120.239	120-221	120.208	120.174	120.158	120.092	120.067	120.083	120.071	120-079	
5	118.623	118.607	118.600	118.579	118.512	118.516	118.498	118.484	118.448	118.434	118.361	118.344	118.369	118.360	118.375	
6	117.071	117.053	117.042	117.025	115.52A	115-547	115-547	115.544	115-899	116.892	116.823	115-820	116:857	116.857	116.883	
<b>/</b>		*** 108	114.402	114.412	114.349	114.382	114.396	114.413	114.427	114.450	114.434	114.478	114.551	114.580	114.636	
							112.542	113.582	113.641	113.681	113.713	113.789	113.884	113.928	114.000	٠

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AREA	10	.11 .	MATERIAL	13	14		16		18	19	20	21	22		24
1	.00051														-24
	00050														
3	.00049	.00049	.00049								.00050				
<u>.</u> .	• 00036				.00036	00036								+00050	.00050
5	• 00035			.00035	.00035	.00035					. 00034	.00030	+ UUU3 f		
5	• 00023		.00023	+ 00023		.00023				.00033		.00030	+ 00025	.00025	.00025
7	• 00022			.00023				- 00023	.00023		+ 00023			+ 000Z4	
				+00011					+00012	- 00012				+00024	.00024
9	.00011			.00011	.00012	.00012	.00012	.00012	.00012		.00012				00013
10.	.00001				.00001	.00001	00001				.00002		.00012	.00012	.00013
11	.00001		.00001	.00001	.00001	.00001	.00001	+00001	.00001		00002		• 0000 Z.		.00002
AREA	. 25		27	28	29	30				34	35	.00002	• 00 00 Z	• 00002	.00002
1	• 00053	.00053	.00053	.00053	.00054	.00054			.00054	00.088					39
2	.00052	.00052							.00053	.00054	.00055	+00055	.00055	.00055	.00055
3	+00050	.00051	.00051	.00051	.00051	.00051	.00051	00051	.00052			00054			
4	.00037		. 00038			00038	- 0003A	-00035	.00020	.00032	• 00052	.00052	.00052	• 00052	.00052
5	• 00025	.00026			.00026	.00026	.00034	- RAA24	.00026					-+00040	
	-00024	. 00025	.00025				.00025	-00020	00020	+VUU27	.00027	.00027	.00027	.00027	.00027
7	• 00024				.00014	.00014	.00014	.00014	+00014					+ 00026	
6	.00013	.00013	.00013	.00013			.00014	100014	+00014	.00014	.00014	.00015	.00015	.00015	。00015
9	.00013	.00013	.00013	.00013	.00013	. 00012	. 00014		.00014		-+00014			-00014	
10	.00002		. 00002				+00014	+00013	.00014	+10001	.00014	.00014	.00014	.00014	+00004
11			0.00000	0.00000	0.00003										
AREA	40	41	43	43	44	0.00000	0.00000	0.00000	0.00000	D • 00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	.00055	.00055	.00055	· • • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·	92		<b></b>		49					54
	.00054			• 00 055		-00056	•00056	+00056	.00056	•00056	+00057	.00057	.00057	.00057	.00058
3	.00052			.00055			00055_						.00056	+00056	.00057
-			.00053	,00053	.00053	#VVV72		•00072	.00050	+00050	•00048	.00043	.00043	.00043	.00044
													.00042		.00042
2	.00027	.00027	.00028	.00028	.00028	.00028	.00025	.00028		.00028	• 00029	.00029	.00029	.00029	.00030
· • •			• 00027		.00027	-00027			. 00028		.00028		+ 00029	.00029	.00029
	.00015	.00015	.00016	.00016	.00016			.00016	.00016	.00016	.00017	.00017	.00017	.00017	-00017
B	. 00015		00015_					.00016	.00016	.00016	.00016		. 00017	-00017	- 00017
10	.00004	.00004	.00004	.00005	.00005	-00005	.00005	* +00005			- 00004	00004	00004	00004	
								. 00005			.00005	.00006		.00006	- 00006
AREA	55 .00058	56	57	58	27	UV .	01	0Z	63	64	65	66	67	68	60
2	.00057	.00058	. 00056		+00058	+00058								00060	-00060
	".00044		.00057	.00057	.00058	.00058	.00058		.00058	.00056	.00058	00059	00059	+00059	.00059
3	+00042	.00044		.00044	+00044			-00045		.00045	.00045	.00046	.00046	.00046	
5	.00030	.00042	•00042 •00030		.00043		.00043	•00043	.00043	•0004z	.00041	.00037	.00037	.00033	.00033
, , , , , , , , , , , , , , , , , , ,	.00029	.00029	.00030	# 00.030					.00031	.00031	.00031	.00032	.00032	.00032	.00032
7	.00018	.00017	.00018	.00029		.00029	.00028	+00019	.00019	.00020	•00020	.00020	• 00020	.00020	-00021
,	.00017	.00017	.00017			00018_			.00019			.00019		+ 00020	.00020
0	.00006		+ 00 007	.00018	.00018	.00018	.00018	.00018	.00018						
<u> </u>	.00006								00008	~~~~~	~~~~				
10 Area	70	*00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
ARCA	.00060	. <b>I A</b>	. 16	19	e e <b>f Y</b> e goerne	<b>I. 7</b>	/ 9	[ ]							
1		.00060	.00061	.00050		.00050	.00050								
<u> </u>	.00057		.00055	. 00049											
3	• 00046	.00046	.00047	.00047		.00047	.00047								
· <u>}</u>			.00034	.00034		.00035	00035								
5	.00033	.00033	.00033	.00033	.00033	.00034	.00034	.00034			_				
6	.00021	,00021	.00021	.00021		400022				a company and an and a second second					
7	.00020	.00020	.00020	.00021		+00021	.00021	.00022							· · · · · · · · · · · · · · · · · · ·
8	.00009	+00009	.00010	.00010			.00010	.00011							
0	.00009	.00009	.00009	.00010	00010	.00010	.00010		the second that have been as the second s	And the second sec				<ul> <li>1.1. The second sec second second sec</li></ul>	

	(SEC) - 300.008 YOTAL AREA(C2) - 0.000	i i i i i i i i i i i i i i i i i i i							
	NEDGE AREA- 0.0000			÷ •					
	ORIGINAL PENITRATION DEPTH Angle(Deg)= 0.000	- ,2050							
	ARC LENGTH/TINE INCREMENT=	1.57144			and a second	and a second second second second second			
	NO. OF WEDGES IN POOL -								
ABCA	TEMPERATURE HISTORY OF POW 1 2 3	0ER 5 6	7						nonegales and beauty the starts of a start success and
AREA 1	134.228 134.228 134.228 1								
2	132.091 132.091 132.091 1				<ul> <li>The second s</li></ul>				
3	130.056 130.057 130.057 1:								
4	128.205 128.206 128.206 1								
2	126.586 126.587 126.588 12								
7	125.179 125.180 125.181 12 124.021 124.022 124.023 12								
8	123.099 123.100 123.101 12				· · · · · · · · · · · · · · · · · · ·				
	122.438 122.439 122.440 12								
10	122.033 122.034 122.035 12								
11	121.898 121.899 121.900 12	21.902 121.900 121.	819 121.818	121.815					
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	n anna ann ann an Bhann Air an Airtean ann Bhann an Airtean an Airtean an Airtean an Airtean Airtean an Airtean			······	******				
TENPE	RATURE DF STUCK MATERIAL	· · · · · · · · · · · · · · · · · · ·	ي الد المعاد المسال		The second s				-
1054	10 11 10 1		• •			••			• •
AREA	10 11 12 1 134.228 134.228 134.228 13								
2	131.957_131.955_131.959_13								
3	129.786 129.780 129.788 12								
· · •	127.790 127.782 127.793 12								
5	126.018 126.007 126.021 12	26.022 126.042 126.	066 126.228	126.229 126.29	126.311 126.33	9 126.380	126.440	26.454	26.528
6	124.445 124.430 124.449 12								
7	123.110 123.091 123.113 12								
	121.994 121.971 121.997 12								
9 10	121.126 121.097 121.127 12 120.496 120.461 120.495 12								
ĩi	119.755 119.696 119.745 11								
AREA					34 35				
1	134.228 134.228 134.228 13								
	132.090.132.095 132.103.13								
3									
5	128.201 128.217 128.240 12 126.548 126.570 126.602 12								
6	125.136 125.165 125.206 12	25.219 125.246 125.	267 125, 293	125.299 125.331	125.369 125.37	1.25.398-	125.438.1	25.4381	25.506
7	123.972 124.007 124.053 12	24.070 124.085 124.	111 124.143	124.149 124.188	124.234 124.24	7 124.269	124.318 1	24.317 1	24.400
	123.043 123.086 123.141 12								
9	122.374 122.425 122.491 12								
10 11	121.960 121.620 121.723 12 121.810 0.000 0.000	U'QUU U'UUU U' TFIDT TETOIAQ TETO	000 07000 000 07000	0.000 0.000		0,000			0.000
AREA	40 41 42 4	44	\$6	47	49			53	54
1	134.228 134.228 134.228 13	4.228 134.228 134.	228 134.228	134.228 134.228	134.228 134.220	134.228	134.228 1	34.228 1	34.228
2	132.162 132.166 132.173 13								32.280
3	130.197 130.205 130.218 13								
. 4	128.424.128.441 128.471 12								28.190
5	126.847 126.869 126.906 12								
6	125.513 125.540 125.584 12								
7	124.408 124.441 124.492 12							-	
	123.561 123.600 123.659 12	<u></u>	030 <u>.173</u> 0843	_123+842-124+038		(- <u>144+201</u> -		, <del>C9+389</del> ]	
0	122.966 123.011 123.079 12		341 194 844	199 367 188			100	~~ ~ ~ ~	AJ BAJ

	AREA	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	
	1	134.228	134.228	134.228	134-228	134.228	134.228	134.278	134.228	134.228	134.228	124.228	124.328	134 398	134 338	134.228	
	2	132.285	132.266	132.295	132.303	132.313	132.316	132.327	132.336	112.310	1 22. 244	122.342	122.344	122 240	123 283	132.389	
	3	130.410	130.417	130.431	130.446	130. 467	130.676	130.495	130.514	130.519	130.530	130.544	120.871	130 574	130 407	132.304	
	4	128,761	128.770	128.792	128.815	128.846	128-856	128.888	128.914	128-921	128.937	128.058	128.084	128 008	120 020	129.052	
7.	. 5	127.319	127.332	127.362	127.393	127.434	127.448	127-491	127.525	127.436	127.857	127.886	197.426	127.420	127 446	127.720	
,	6	126.125	126.141	126.180	126.219	126.269	126-286	126-338	126.364	124-377	124.404	126.442	176.409	124 811	134 676	126.617	
	7	125.168	125.188	125.236	125.283	125.363	125-364	125.428	125.461	125.477	125.510	125.555	125.610	125.661	126.721	125.772	
	8	124.475	124.499	124.558	124.613	124.683	124.707	124.782	174.824	124.842	124.880	124.034	125.010	125.026	128.121	125.180	
	9	124.043	124-070	123.727	123.809	123.911	123.947	124-061	124.125	124.151	124.205	124.284	124.207	174.434	124.848	124.652	
	10	123.877	123.910	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
	AREA	70	71	72					.77							41000	
	1	134.228	134.228	134.228													
	2		132.396														
	3		130.641													,	
			129.083														
	5	127.750	127.763	127.795	127.962	128.060	128.104	128.135	128,185								
	6	126.654	126.671	126.714	126.933	127.058	127.118	127.151	127.214								
	7	125.817	125,838	125.891	126.164	126.318	126.384	126.430	126.505								
	. 8	. 125.234	125.258	125.322	125.653	125.838	125.913	125.967	126.054		and the state of the second second						
	9		124.759														
•	MECK	RADIUS															
	AREA	1	2	2	· · · ·	5	A		• • • • • • • • • • • • • • • • • • • •		· ···· ··· · · · · · ·					-	
	1	-		. 00.092	.00093	-	-00093	. 00093									
	2	.00091		.00091			.00091	.00091									N. Market and P. Sandara and Sandara
	3	.00087					.00087										
	6	.00072				.00073	.00073	.00073	.00073						·		
	5	.00070					.00070	.00070									
••	6	.00057				.00057	.00057	.00057	.00057							·	
	Ī	.00055	.00055	.00055	.00056	.00056											
	8	.00043	.00043	.00043	.00044	.00044	.00044	.00044	.00044								
	9	.00042	DOD42	+00042		.00043	.00043	00043							_		
	10	.00031	.00032	.00032	.00032	.0003Z	.00032	.00032	.00032								
	11	.00031		.00031	.00031	.00032	.00032	.00032	.00032								

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AREA	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	· ·
1	.00093														.00095	
2	.00091				.00092	.00092	.00092	.00092	.00092	.00092					.00093	
3	.00087			.00088	.00088	.00088	.00088	1.11 a 00088	.00088	.00088					.00089	
4	• 00073				.00073	.00073	.00074	.00074								
5	•00070	•00070	• 00 0 7 0	.00070	.00071				+00069					.00074	.00075	
6	.00057	.000 57	.00057	.00057				.00058					NOND1		.00061	-
7	.00055	.00055	. 00056					- 00054				.00058	.00059	.00059	.00059	
8	•00043	.00043	.00044		.00044	.00044	.00044	.00044							+00057	
9												.00045		.00045	.00045	
10	.00031		.00032									00044	.00044		.00045	
11		.00031				.00032	•00032	+00032	.00032	.00033	- 00033	. 00022	00033	~~~~	<b>AAAAA</b>	
REA	25	26	27			- 40003T	. • UUU3Z			.00032			. 00033		+00033	
1	.00095	-		28	29	30	21	32	33	34	35	36	37	38	30	
ź					.00095	.00095		.00096		.00096	.00096	.00096	.00096	.00096	.00096	
2	• 00093	.00093			• 00094		•00094	.00094	.00094	. 00095	.00095	.00095	.00095		.00095	• • -
····· 2 ····· ·				.00090	.00090	.00090		.00090	.00090	.00091			.00091		.00091	
7	.00075	.00075	- · ·	.00075	• 00075	.00075	•00076	.00076	.00076	.00077	.00077				• 00079	
2	.00061	.00061	.00061		.00062	.00062	. 00062	.00062	.00062	.00062						
6	.00059	.00059	.00059		.00060	.00060	•00060	.00060	.00060	.00060	.00060		• 00061			
7	.00057	<u>•</u> 00057	o0055	.00055	.00047	.00047		.00048	.00048			.0004		+00001	.00061	
8	.00045	.00045	.00046		.00046	.00046			.00046	.00047	.00047					
9	.00045	.00045	. 00045	.00045	.00045	.00045		-00046	-00046	.00046	00041	*****	.00047	.00047	.00048	
10	.00034	- 00034	- 00034	. 00034	.00026	00026										
11	.00033	0.00000	0.00000	0.00000	0.00000	0.00000	00000	0 00000	+ 00037	+00035	.00035	+00035	.00035	.00035	.00036	
REA	40	41	42	43	44	45	46			0.00000	0.00000	0.00000	• 00035	0.00000.	0.00000	
1																
2	.00095	.00095	.00096	.00096									52 •00099	. 00099		
2						*****	<b></b>	4 UU U V O	* 000AD		.00097	_ 00007	- 00007	64407	00000	
d	.00079						TANNAT.	00041		.00089	.00087				00082	
т к		.00081	.00085		.00089	*00000	.00085	400088	-00086	~000AA			. 00070	00070	<b>AAAA</b> A	
4		.00063	.00064		00064.			.00064	-00064	-00066	- 00065	- 00068	- 00.06 8		.00066	
7	.00061	.00061	.00062		+ UVUQZ	-UUUOZ-		+0006Z	- DD063	-00063	- 00063	- 0004 3	00063	00043	.00064	
(	• 00049	.00049	.00049	+ 00049			<b>~ 00050</b>	. +00050		.00050	.00050		.00051	.00051		
0	.00048	.00048	.00048	.00048	+00040	+00049	+00049	• 00 04 9	•00049	.00049	.00049	.00050	.00050	-00050	.00050	
<u>, Y</u>	00030_	00037_		.00037	.00037	00037	.00037	-00038	- 00038	-00038	. 0002 R	00038	00020	00000	00000	
10		.00036	.00036		.00037	.00037	•00037	• UU 0 3 7	.00037	.00038	.00038	.00038	.00038	.00038	.00039	
REA	55	56	57		. <b>27</b>				53.	54	65	**	A7	4.9	40	
1		.00099	.00099	.00100	.00100	.00100	.00101	.00101	-00101	.00101		00101		00100	AA4 AA	
Z			• 00 0 9 8	.00098					- 00044		-00099	-00100	-00100	-00100	.00102	
3		.00083	.00083	.00083				# UUU04		_ [][] [] [] [] []	- 00084			~~~~	<b>**</b> **	
<u>+</u>				.08000			.00080	-00080	-00080	- 00 08 0	. 00070	00078	00075	~~~~		
5		.00066		• • • • • • • •	• UUUO (	• • • • • • • • • • • • • • • • • • • •	.00007	.00067	.00067	-00067	- 00068	. 00048	. 0004.0	00040	00010	
<b>6</b>			.00065						+00074		.00055	.00055	-00055	- 00056	. 00056	
7		.00052	.00052	• • • • • •	+ 4 4 4 9 2	.00072			. 000 9 4	-00053	- 00083	00084	AAAEL	~~~=/		
8	.00051	A 000 51	+00051	.00051	.00051		.00052	AU0052	-00052	- 00 05 7	- 00052		00.08.3	00049	000/0	
9	.00039	.00039	.00039													
10	.00039	.00039	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	- 00072	• 000 92	•00042 0•00000	
REA	70	71	72	73	74	75	76	77		and the set of the Manual			MAMMMUL	*********	u.uu000	
1	.00102	.00102	.00103	.00092		D0092_										
2	.00098	.00096	.00096	.00090	.00090	-00000	.00090	. 00.000								
3	.00086		. 00086	.00086			-00040	. 00047								
4	.00071	.00071	.0007Z	.00072	.00072				· · · · · · · · · · · · · · · · · · ·	a kolman i sa garagangangang						
	.00069	.00069					•00072							•		-
			00069_	00070_	_00070		.00070									
Ð	.00056	.00056	.00056	.00057	.00057	.00057	•00057	• 00 0 5 7								
.7 .	.00055	. 00055	.00055	.00055	00056		.00056									
8	- 00043	.00043	.00043	.00044	.00044	.00044	.00045	.00045								~~~~
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TINE	TOTAL AR	(EA=	0.0000		2050								ta:		
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			INCREMEN	ľ=	42824										
	NO. OF W	EDGES IN	I POOL -	8											
					· · · · ·										
AREA			ORY OF P		-		-	-							
AREA		2	3		5										
1	143 343	744.744	144.199	144.199	144.144	144.199	144.199	144.199							
2	162.271	142 271	143.243	163 979	1130273	143.418	. 144.200	1934200	• • • • • • • •						····· ···· -
Ĩ.	141.374	141.374	141.375	141.376	141.278	1420313	1464317	1420313							
			140.641												
. 6.			139.714												
7			139.093												
A	136-965	136.965	-136.965	136.968	136.968	136.800	114.800	134.890							
9	135.594	135.594	135.594	135.50A	135,507	135.414	125.834	128_828					······		
10	134.833	134.834	134.834	134.834	134.83A	136.792	134,703	134.702							
11	134.591	134.591	134.591	134-594	134, 594	134.552	134.552	126_552		· ••••••					
						····									
					** · · · ~.						·····				
TEMPE	RATURE OF	STUCK	MATERIAL												
AREA	10	11	12	19	14	• • • • • • • • • • • • • •	14		10	10	•••				
48CA		11	12	13	14	15	16	17	18	19	20	21	22	23	24
 3	144,199	163 163	-1999-144-	-T### TAA	143 140	144+144	194+-144-	-1444144	-144-144	-194-199	-144-199	-144-199	144+199	144.199	144.141
Z			143.164												
3			142.075												
1			141.185												
2.	190.210	140.204	140.213	190.213	.140.232	140.322	. 140. 298.	-140+204	.140.5/9	140.541	-140.035	-140+672	-140+740	-140-764-	-140.000
9			139.449												
<b>(</b>	134 800	134 948	136.904	134 403	130,990	128 040	138 448	138 644	-13/+083-	136 018	<u>13/+/8U</u> 134 000	-13/+8/3	136 320	126 268	138.98(
9		133.414	133.446	122.448	122.800	133.600	134.280	134.201	134 881	1 32 807	124.704	134.883	130.320	128 124	130+/30
10			132.470												
	131.403														
AREA	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
1			144.199												
•	143 803							_199.144	144.199	100.199					
2	1930201	143.246	143.274	143.233	143.235	143.239	143.269	143.270	143.238	143.269	143.270	143.273	143.248	143.247	143.255
	142.306	143.246	143.274	143.233	143.235	143.239 142.373	143.269	143.270	143.238	143.269	143.270	143.273	143.248	143-247	142.384
	142.306	143.246 142.377 141.386	143.274 142.293 141.489	143.233 142.355 141.393	143.235 142.359 141.397	143.239 142.373 141.411	143.269 142.296 141.495	143.270 142.299 141.498	143.238 142.362 141.431	143.269 142.312 141.511	143.270 142.314 141.515	143.273 142.320 141.523	143.248 142.375 141.477	143.247 142.373 141.473	142.384
3	142.306 141.500 140.472	143.246 142.377 141.386 140.656	143.274 142.293 141.489 140.541	143.233 142.355 141.393 140.654	143.235 142.359 141.397 140.661	143.239 142.373 141.411 140.686	143.269 142.296 141.495 140.598	143.270 142.299 141.498 140.603	143.238 142.362 141.431 140.700	143.269 142.312 141.511 140.655	143.270 142.314 141.515 140.660	143.273 142.320 141.523 140.671	143.248 142.375 141.477 140.753	143.247 142.373 141.473 160.749	142.384 141.504 140.788
3	142.306 141.500 140.472 139.800	143.246 142.377 141.386 140.656 139.737	143.274 142.293 141.489 140.541 139.866	143.233 142.355 141.393 140.654 139.812	143.235 142.359 141.397 140.661 139.618	143.239 142.373 141.411 140.686 139.844	143.269 142.296 141.495 140.598 139.929	143.270 142.299 141.498 140.603 139.935	143.238 142.362 141.431 140.700 139.912	143.269 142.312 141.511 .140.655 139.995	143.270 142.314 141.515 140.660 140.002	143.273 142.320 141.523 140.671 140.015	143.248 142.375 141.477 140.753 140.007	143.247 142.373 141.473 140.749 140.002	142.384 141.504 140.788 140.068
3 4 5 6 7	142.306 141.500 140.472 139.800 138.965	143.246 142.377 141.386 140.656 139.737 139.122	143.274 142.293 141.489 140.541 139.866 139.124	143.233 142.355 141.393 140.654 139.812 139.201	143.235 142.359 141.397 140.661 139.818 139.208	143.239 142.373 141.411 140.686 139.844 139.241	143.269 142.296 141.495 140.598 139.929 139.239	143.270 142.299 141.498 140.603 139.935 139.246	143.238 142.362 141.431 140.700 139.912 139.318	143.269 142.312 141.511 140.655 139.995 139.343	143.270 142.314 141.515 140.660 140.002 139.351	143.273 142.320 141.523 140.671 140.015 139.366	143.248 142.375 141.477 140.753 140.007 139.431	143.247 142.373 141.473 140.749 140.002 139.425	142.384 141.504 140.788 140.068
3 4 5 6 7 8	142.306 141.500 140.472 139.800 138.965 136.850	143.246 142.377 141.386 140.656 139.737 139.122 137.028	143.274 142.293 141.489 140.541 139.866 139.124 137.124	143.233 142.355 141.393 140.654 139.812 139.201 137.202	143.235 142.359 141.397 140.661 139.618 139.208 137.210	143.239 142.373 141.411 140.686 139.844 189.241 137.258	143.269 142.296 141.495 140.598 139.929 139.239 137.321	143.270 142.299 141.498 140.603 139.935 139.246 137.331	143.238 142.362 141.431 140.700 139.912 139.318 137.416	143.269 142.312 141.511 140.655 139.995 139.343 137.502	143.270 142.314 141.515 140.660 140.002 139.351 137.515	143.273 142.320 141.523 140.671 140.015 139.366 137.537	143.248 142.375 141.477 140.753 140.007 139.431 137.620	143.247 142.373 141.473 140.749 140.002 139.425 137.612	142.384 141.504 140.788 140.068 139.506 137.759
3 4 5 6 7 8 9	142.306 141.500 140.472 139.800 138.965 136.850 135.484	143.246 142.377 141.386 140.656 139.737 139.122 137.028 135.690	143.274 142.293 141.489 140.541 139.866 139.124 137.124 135.784	143.233 142.355 141.393 140.654 139.812 139.201 137.202 135.864	143.235 142.359 141.397 140.661 139.616 139.208 137.210 135.876	143.239 142.373 141.411 140.686 139.844 139.241 137.258 135.936	143.269 142.296 141.495 140.598 139.929 139.239 137.321 136.000	143.270 142.299 141.498 140.603 139.935 139.246 137.331 136.013	143.238 142.362 141.431 140.700 139.912 139.318 137.416 136.114	143.269 142.312 141.511 140.655 139.995 139.343 137.502 136.214	143.270 142.314 141.515 140.660 140.002 139.351 137.515 136.231	143.273 142.320 141.523 140.671 140.015 139.366 137.537 136.259	143.248 142.375 141.477 140.753 140.007 139.431 137.620 136.362	143.247 142.373 141.473 140.749 140.002 139.425 137.612 136.352	142.384 141.504 140.788 140.068 139.506 137.759 136.519
3 5 6 7 8 9 10	142.306 141.500 140.472 139.800 138.965 136.850 135.484 134.728	143.246 142.377 141.386 140.656 139.737 139.122 137.028 135.690 134.269	143.274 142.293 141.489 140.541 139.866 139.124 137.124 135.784 134.400	143.233 142.355 141.393 140.654 139.812 139.201 137.202 135.864 134.479	143.235 142.359 141.397 140.661 139.816 139.208 137.210 135.876 134.513	143.239 142.373 141.411 140.686 139.844 139.241 137.258 135.936 134.607	143.269 142.296 141.495 140.598 139.929 139.239 137.321 136.000 134.679	143.270 142.299 141.498 140.603 139.935 139.246 137.331 136.013 134.698	143.238 142.362 141.431 140.700 139.912 139.318 137.416 136.114 134.824	143.269 142.312 141.511 140.655 139.995 139.343 137.502 136.214 134.952	143.270 142.314 141.515 140.660 140.002 139.351 137.515 136.231 134.984	143.273 142.320 141.523 140.671 140.015 139.366 137.537 136.259 135.026	143.248 142.375 141.477 140.753 140.007 139.431 137.620 136.362 135.164	143.247 142.373 141.473 140.749 140.002 139.425 137.612 136.352 135.148	142.384 141.504 140.788 140.068 139.506 137.759 136.515 135.383
3 6 7 8 9 10 11	142.306 141.500 140.472 139.800 138.965 136.850 135.484 134.728 134.461	143.246 142.377 141.386 140.656 139.737 139.122 137.028 135.690 134.269 0.000	143.274 142.293 141.489 140.541 139.866 139.124 137.124 135.784 134.400 0.000	143.233 142.355 141.393 140.654 139.812 139.201 137.202 135.864 134.479 0.000	143.235 142.359 141.397 140.661 139.816 139.208 137.210 135.876 134.513 0.000	143.239 142.373 141.411 140.686 139.844 139.241 137.258 135.936 134.607 000	143.269 142.296 141.495 140.598 139.929 139.239 137.321 136.000 134.679 0.000	143.270 142.299 141.498 140.603 139.935 139.246 137.331 136.013 134.698 0.000	143.238 142.362 141.431 140.700 139.912 139.318 137.416 136.114 134.824 0.000	143.269 142.312 141.511 140.655 139.943 137.502 136.214 134.952 0.000	143.270 142.314 141.515 140.660 140.002 139.351 137.515 136.231 134.984 0.000	143.273 142.320 141.523 140.671 140.015 139.366 137.537 136.259 135.026 0.000	143.248 142.375 141.477 140.753 140.007 139.431 137.620 136.362 135.164 0.000	143.247 142.373 141.473 140.749 140.002 139.425 137.612 136.352 135.148 0.000	142.384 141.504 140.788 140.068 139.506 137.759 136.515 135.383 0.000
3 5 6 7 8 9 10	142.306 141.500 140.472 139.800 138.965 136.850 135.484 134.728 134.461 40	143.246 142.377 141.386 140.656 139.737 139.122 137.028 135.690 134.269 0.000 41	143.274 142.293 141.489 140.541 139.866 139.124 137.124 135.784 134.400 0.000 42	143.233 142.355 141.393 140.654 139.812 139.201 137.202 135.864 134.479 0.000 43	143.235 142.359 141.397 140.661 139.818 139.208 137.210 135.876 134.513 0.000 44	143.239 142.373 141.411 140.686 139.844 139.241 137.258 135.936 135.936 134.607 	143.269 142.296 141.495 140.598 139.929 139.239 137.321 136.000 134.679 0.000 46	143.270 142.290 141.498 140.603 139.935 139.246 137.331 136.013 134.698 0.000 47	143.238 .142.362 141.431 140.700 139.912 .139.318 137.416 136.114 134.824 0.000 48	143.269 142.312 141.511 140.655 139.995 139.343 137.502 136.214 134.952 0.000 49	143.270 142.314 141.515 140.660 140.002 139.351 137.515 136.231 134.984 	143.273 .142.320 141.523 .140.671 140.015 .139.366 137.537 .136.259 .135.026 .0.000 .51	143.248 142.375 141.477 140.753 140.007 139.431 137.620 136.362 135.164 0.000 52	143.247 142.373 141.473 140.749 140.002 139.425 137.612 136.352 135.148 0.000 53	142.384 141.504 140.788 140.068 139.506 137.759 136.515 135.383 0.000 54
3 6 7 8 9 10 11	142.306 141.500 140.472 139.800 136.965 136.850 135.484 134.728 134.461 40 144.199	143.246 142.377 141.386 140.656 139.737 139.122 137.028 135.690 134.269 0.000 61 144.199	143.274 142.293 141.489 140.541 139.866 139.124 137.124 135.784 134.400 0.000 42 144.199	143.233 142.355 141.393 140.654 139.812 139.201 137.202 135.864 134.479 0.000 43 144.199	143.235 142.359 141.397 140.661 139.818 139.208 137.210 135.876 135.876 134.513 0.000 44 144.199	143.239 142.373 141.411 140.686 139.844 139.241 137.258 135.936 134.607 -0.000 45 144.199	143.269 142.296 141.495 140.598 139.929 139.239 137.321 136.000 134.679 0.000 46	143,270 142,299 141,498 140,603 139,935 139,246 137,331 136,013 134,698 0,000 47 144,199	143.238 142.362 141.431 140.700 139.318 137.416 136.114 134.824 0.000 48	143.269 142.312 141.511 140.655 139.995 139.343 137.502 136.214 134.952 0.000 49 144.199	143.270 142.314 141.515 140.660 140.002 139.351 137.515 136.231 134.984 0.000 50	143.273 142.320 141.523 140.671 140.015 139.366 137.537 136.259 135.026 0.000 51	143.248 142.375 141.477 140.753 140.007 139.431 137.620 136.362 135.164 0.007 52 144.199	143.247 142.373 141.473 140.749 140.002 139.425 137.612 136.352 135.148 0.000 53 144.199	142.384 141.504 140.788 140.068 139.506 137.759 135.383 -0.000 54 144.199
3 6 7 8 9 10 11	142.306 141.500 140.472 139.800 138.965 136.850 135.484 134.728 134.461 40 143.256	143.246 142.377 141.386 140.656 139.737 139.122 137.028 135.690 134.269 0.000 41 144.199 143.281	143.274 142.293 141.489 140.541 139.866 139.124 137.124 135.784 134.400 0.000 42 144.199 143.270	143.233 142.355 141.393 140.654 139.812 139.201 137.202 135.864 134.479 0.000 43 144.199 143.271	143.235 142.359 141.397 140.661 139.818 139.208 137.210 135.876 134.513 0.000 44 144.199 143.305	143.239 142.373 141.411 140.686 139.844 139.241 137.258 135.936 134.607 -0.000 45 144.199 143.308	143.269 142.296 141.495 140.598 139.929 139.239 137.321 136.000 134.679 0.000 46 144.199 143.308	143,270 142,299 141,498 140,603 139,935 139,246 137,331 136,013 134,698 0,000 47 144,199 143,304	143.238 142.362 141.431 140.700 139.318 137.416 136.114 134.824 0.000 48 144.199 143.324	143.269 142.312 141.511 140.655 139.995 139.343 137.502 136.214 134.952 0.000 49 144.199 143.298	143.270 142.314 141.515 140.660 140.002 139.351 137.515 136.231 134.984 0.000 50 144.199 143.325	143.273 142.320 141.523 140.671 140.015 139.366 137.537 136.259 135.026 0.000 51 144.199 143.330	143.248 142.375 141.477 140.753 140.007 139.431 137.620 136.362 135.164 0.00 52 144.199 143.328	143.247 142.373 141.473 140.749 140.002 139.425 137.612 136.352 135.148 0.000 53 146.199 143.331	142.384 141.504 140.788 140.068 139.506 137.759 136.515 135.383 
3 6 7 8 9 10 11	142.306 141.500 140.472 139.800 138.965 136.850 135.484 134.728 134.461 40 144.199 143.256 142.385	143.246 142.377 141.386 140.656 139.737 139.122 137.028 135.690 134.269 0.000 41 144.199 143.261 142.359	143.274 142.293 141.489 140.541 139.866 139.124 137.124 135.784 134.400 0.000 42 144.199 143.270 142.406	143.233 142.355 141.393 140.654 139.812 139.201 137.202 135.864 134.479 0.000 43 144.199 143.271 142.408	143.235 142.359 141.397 140.661 139.818 139.208 137.210 135.876 134.513 0.000 44 144.199 143.305 142.423	143,239 142,373 141,411 140,686 139,844 139,241 137,258 135,936 134,607 -0.000 45 144,199 144,199 143,308 142,429	143.269 142.296 141.495 140.598 139.929 139.239 137.321 136.000 134.679 0.000 46 144.199 143.308 142.429	143,270 142,299 141,498 140,603 139,935 139,246 137,331 136,013 134,698 0,000 47 144,199 143,304 142,463	143.238 142.362 141.431 140.700 139.318 137.416 136.114 134.824 0.000 48 144.199 143.324 142.426	143.269 142.312 141.511 140.655 139.995 139.343 137.502 136.214 134.952 0.000 49 144.199 143.298 142.471	143.270 142.314 141.515 140.660 140.002 139.351 137.515 136.231 134.984 0.000 50 144.199 143.325 142.458	143.273 142.320 141.523 140.671 139.366 137.537 136.259 135.026 0.000 51 144.199 143.330	143.248 142.375 141.477 140.753 140.007 139.431 137.620 136.362 135.164 0.000 52 144.199 143.328 142.509	143.247 142.373 141.473 140.749 140.002 139.425 137.612 136.352 135.148 0.000 53 144.199 143.331 142.502	142.384 141.504 140.788 140.66 139.506 137.759 136.515 135.383 -0.000 54 144.199 143.339 142.502
3 6 7 8 9 10 11	142.306 141.500 140.472 139.800 136.850 135.484 134.728 134.461 40 144.199 143.256 142.385 141.507	143.246 142.377 141.386 140.656 139.737 139.122 137.028 135.690 134.269 0.000 41 144.199 143.281 142.359	143.274 142.293 141.489 140.541 139.866 139.124 137.124 135.784 134.400 0.000 42 144.199 143.270 142.406 141.552	143.233 142.355 141.393 140.654 139.812 139.201 137.202 135.864 134.479 0.000 43 144.199 143.271 142.408 141.556	143.235 142.359 141.397 140.661 139.616 139.208 137.210 135.876 134.513 0.000 44 144.199 143.305 142.423 141.652	143.239 142.373 141.411 140.686 139.241 137.258 135.936 134.607 -0.000 45 144.199 143.308 142.429 141.659	143.269 142.296 141.495 140.598 139.239 137.321 136.000 134.679 0.000 46 144.199 143.308 142.429 141.659	143,270 142,299 141,498 140,603 139,246 139,246 137,331 136,013 134,698 0,000 47 144,199 143,304 142,263 141,585	143.238 142.362 141.431 140.700 139.318 137.416 136.114 134.624 0.000 48 144.199 143.324 142.675	143.269 142.312 141.511 140.655 139.343 137.502 136.214 134.952 0.000 49 144.199 143.298 142.471 141.603	143.270 142.314 141.515 140.660 140.002 139.351 137.515 136.231 134.984 	143.273 142.320 141.523 140.671 140.015 139.366 137.537 136.259 135.026 0.000 51 144.199 143.330 142.472 141.718	143.248 142.375 141.477 140.753 140.007 139.431 137.620 136.362 135.164 0.000 52 144.199 143.328 142.509 141.695	143.247 142.373 141.473 140.749 140.002 139.425 137.612 136.352 135.148 0.000 53 144.199 143.331 142.502 141.718	142.384 141.504 140.788 140.068 139.506 137.759 136.515 135.383 -0.000 54 144.199 143.339 142.502
3 6 7 8 9 10 11	142.306 141.500 140.472 139.800 138.965 135.484 134.728 134.461 40 144.199 143.256 142.385 141.507 140.791	143.246 142.377 141.386 140.656 139.737 139.122 137.028 135.690 134.269 0.000 41 144.199 143.281 142.359 141.569	143.274 142.293 141.489 140.541 139.866 139.124 137.124 135.784 134.400 0.000 42 144.199 143.270 143.270 142.406 141.552 140.844	143.233 142.355 141.393 140.654 139.812 137.202 135.864 134.479 0.000 43 144.199 143.271 142.408 141.556 140.849	143.235 142.359 141.397 140.661 139.618 139.208 137.210 135.876 134.513 0.000 44 144.199 143.305 142.423 141.652 140.909	143.239 142.373 141.411 140.686 139.844 139.241 137.258 134.607 -0.000 45 144.199 143.308 142.429 141.659	143.269 142.296 141.499 140.598 139.229 137.321 136.000 134.679 0.000 46 144.199 143.308 142.429 141.659 140.773	143,270 142,299 141,498 140,603 139,935 139,246 137,331 136,013 134,698 0,000 47 144,199 143,304 142,463 141,585 140,903	143.238 142.362 141.431 140.700 139.912 139.318 137.416 134.624 0.0000 48 144.199 143.324 143.324 141.675 140.638	143.269 142.312 141.511 140.655 139.995 139.343 137.502 136.214 134.952 0.000 49 144.199 143.298 142.471 141.603	143.270 142.314 141.515 140.660 140.002 139.351 137.515 136.231 134.984 -0.000 50 144.199 143.325 142.458 141.698	143.273 142.320 141.523 140.671 140.015 139.366 137.537 136.259 135.026 0.000 51 144.109 143.330 142.472 141.718	143.248 142.375 141.477 140.753 140.007 139.431 137.620 136.362 135.164 0.000 52 144.199 143.328 142.509 141.695 141.695	143.247 142.373 141.473 140.749 140.002 139.425 137.612 135.148 0.000 53 144.199 143.331 142.502 141.718 140.988	142.384 141.504 140.788 140.068 139.506 137.759 135.383 0.000 54 144.199 143.339 141.725 141.725
3 6 7 8 9 10 11	142.306 141.500 140.472 139.800 138.965 136.850 135.484 134.728 134.461 40 144.199 143.256 142.385 141.507 140.791 140.072	143.246 142.377 141.386 140.656 139.737 139.122 137.028 135.690 134.269 0.000 41 145.199 143.281 142.359 141.569 140.774	143.274 142.293 141.489 140.541 139.866 139.124 135.784 134.400 0.0000 42 144.199 143.270 142.406 141.552 140.844 140.154	143.233 142.355 141.393 140.654 139.812 139.201 137.202 135.864 134.479 0.000 43 144.199 143.271 142.408 141.556 140.849 140.159	143.235 142.359 141.397 140.661 139.818 139.208 137.210 135.876 134.513 0.000 44 144.199 143.305 142.423 141.652 140.909 140.909	143.239 142.373 141.411 140.686 139.844 139.241 137.258 135.936 134.607 134.607 144.199 143.308 142.429 141.659 140.029	143.269 142.296 141.499 140.598 139.929 139.239 137.321 136.000 134.679 0.000 46 144.199 143.308 142.429 141.659 140.773 140.773	143,270 142,299 141,498 140,603 139,935 139,246 137,331 136,013 134,698 0,000 47 144,199 143,304 142,463 141,585 140,903 140,028	143.238 142.362 141.431 140.700 139.912 139.318 137.416 136.114 134.824 0.000 48 144.199 143.324 142.426 141.675 140.838 140.240	143.269 142.312 141.511 140.655 139.995 139.343 137.502 136.214 134.952 0.000 49 144.199 143.298 142.471 141.603 140.929 140.170	143.270 142.314 141.515 140.660 140.002 139.351 137.515 136.231 134.984 	143,273 142,320 141,523 140,671 140,015 139,366 137,537 136,259 135,026 0,000 51 144,199 143,330 142,472 141,718 140,932	143.248 142.375 140.753 140.007 139.431 137.620 136.362 135.164 0.000 52 144.199 143.328 142.509 141.695 141.030 140.288	143.247 142.373 141.473 140.749 140.002 139.425 137.612 136.352 135.148 0.000 53 144.199 143.331 142.502 141.718 140.988	142.384 141.504 140.788 140.068 139.506 137.759 135.383 0.000 54 143.339 142.502 141.725 141.021
3 6 7 8 9 10 11	142.306 141.500 140.472 139.800 135.485 136.850 135.484 134.728 134.461 40 143.256 142.385 141.507 140.772 140.072 139.510	143.246 142.377 141.386 140.656 139.737 139.122 137.028 135.690 134.269 0.000 41 144.199 143.281 142.359 141.569 140.774 140.138	143.274142.293141.489140.541139.866139.124137.124135.784135.784134.4000.00042144.199143.270142.406141.552140.844140.154139.606	143.233 142.355 141.393 140.654 139.812 139.201 137.202 135.864 134.479 0.000 43 144.199 143.271 142.408 141.556 140.849 140.849 140.849	143.235 142.359 141.397 140.661 139.818 139.208 137.210 135.876 134.513 0.000 44 144.199 143.305 142.423 141.652 140.909 140.009	143.239 142.373 141.411 140.686 139.844 139.241 137.258 135.936 134.607 -0.000 45 144.199 143.308 142.429 141.659 140.023 139.478	143.269 142.296 141.495 140.598 139.929 139.239 137.321 136.000 134.679 0.000 46 144.199 143.308 142.429 141.659 140.773 140.170 139.293	143,270 142,299 141,498 140,603 139,935 139,246 137,331 136,013 134,698 0,000 47 144,199 143,304 142,463 141,585 140,903 140,028	143.238 142.362 141.431 140.700 139.318 137.416 136.114 134.624 0.000 48 144.199 143.324 143.324 141.675 140.838 140.240 139.557	143.269 142.312 141.511 140.655 139.995 139.343 137.502 136.214 134.952 0.000 49 144.199 143.298 142.471 141.603 140.929 140.170	143.270 142.314 141.515 140.660 140.002 139.351 137.515 136.231 134.984 0.000 50 144.199 143.325 142.458 141.698 140.944 140.339	143.273 142.320 141.523 140.671 140.015 139.366 137.537 136.259 135.026 0.000 51 144.199 143.330 142.472 141.718 140.932 149.622	143.248 $142.375$ $140.753$ $140.007$ $139.431$ $137.620$ $136.362$ $135.164$ $0.0007$ $52$ $144.199$ $143.328$ $142.509$ $141.695$ $141.030$ $149.288$ $139.801$	143.247 142.373 141.473 140.749 140.002 139.425 137.612 136.352 135.148 0.000 53 144.199 143.331 142.502 141.718 140.988 140.357 139.744	142.384 141.504 140.788 140.068 139.506 137.759 136.515 135.383 0.000 54 143.339 142.502 141.725 141.021 140.353
3 6 7 8 9 10 11 AREA 2 3 4 5 6 7 8	142.306 141.500 140.472 139.800 138.965 136.850 135.484 134.728 134.461 40 144.199 143.256 142.385 141.507 140.791 140.072 139.510 137.766	143.246 142.377 141.386 140.656 139.737 139.122 137.028 135.690 134.269 0.000 41 143.281 143.281 142.359 141.569 141.569 140.774 140.774 140.138 139.542	143.274 142.293 141.489 140.541 139.866 139.124 135.784 134.400 0.00 42 144.199 143.270 142.406 141.552 140.844 140.154 139.606 137.928	143.233 142.355 141.393 140.654 139.812 137.202 135.864 134.479 0.000 43 144.199 143.271 142.408 141.556 140.849 139.613 137.939	143.235 142.359 141.397 140.661 139.818 139.208 137.210 135.876 134.513 0.000 44 144.199 143.305 142.423 141.652 140.909 139.462 138.677	143.239 142.373 141.411 140.686 139.844 139.241 137.258 135.936 134.607 -0.000 45 144.199 143.308 142.429 141.659 140.029 140.029 139.478	143.269 142.296 141.495 140.598 139.929 139.239 137.321 136.000 134.679 0.000 46 144.199 143.308 142.429 141.659 140.773 140.170 139.293 138.827	143,270 142,299 141,498 140,603 139,935 139,246 137,331 136,013 134,698 0,000 47 144,199 143,304 142,463 141,585 140,903 140,028 139,498 136,646	143.238 142.362 141.431 140.700 139.318 137.416 136.114 134.824 0.000 48 144.199 143.324 142.426 141.675 140.838 140.240 139.557 139.113	143.269 142.312 141.511 140.655 139.995 139.343 137.502 136.214 134.952 0.000 49 144.199 143.298 142.471 141.603 140.929 140.170 139.649 139.127	143.270 142.314 141.515 140.660 140.002 139.351 137.515 136.231 134.984 0.000 50 144.199 143.325 142.458 141.698 140.339 139.540 139.135	143.273 142.320 141.523 140.671 140.015 139.366 137.537 136.259 135.026 0.000 51 144.199 143.330 142.472 141.718 140.932 140.342 139.622	143.248 142.375 141.477 140.753 140.007 139.431 137.620 136.362 135.164 0.000 52 144.199 143.328 142.509 141.695 141.695 141.695 141.695 141.695 141.801 139.234	143.247 142.373 141.473 140.749 140.002 139.425 137.612 136.352 135.148 0.000 53 144.199 143.331 142.502 141.718 140.988 140.357 139.744	142.384 141.504 140.788 140.768 137.759 136.515 135.383 
3 6 7 8 9 10 11	142.306 141.500 140.472 139.800 138.965 136.850 135.484 134.728 134.461 40 144.199 143.256 142.385 141.507 140.791 140.072 139.510 137.766	143.246 142.377 141.386 140.656 139.737 139.122 137.028 135.690 134.269 0.000 41 143.281 143.281 142.359 141.569 141.569 140.774 140.774 140.138 139.542	143.274 142.293 141.489 140.541 139.866 139.124 135.784 135.784 134.400 0.000 42 144.199 143.270 142.406 141.552 140.844 140.154 139.606 137.928 136.730	143.233 142.355 141.393 140.654 139.812 137.202 135.864 134.479 0.000 43 144.199 143.271 142.408 141.556 140.849 140.159 139.613 137.939 136.745	143.235 142.359 141.397 140.661 139.818 139.208 137.210 135.876 134.513 0.000 44 144.199 143.305 142.423 141.652 140.909 139.462 138.677	143.239 142.373 141.411 140.686 139.844 139.241 137.258 135.936 134.607 -0.000 45 144.199 143.308 142.429 143.308 142.429 140.023 139.478 138.698	143.269 142.296 141.499 140.598 139.929 139.239 137.321 136.000 134.679 0.000 46 144.199 143.308 142.429 141.659 140.773 140.170 139.293 138.827 137.219	143,270 142,299 141,498 140,603 139,935 139,246 137,331 136,013 134,698 0,000 47 144,199 143,304 142,463 141,585 140,903 140,028 139,498 136,848 137,376	143.238 142.362 141.431 140.700 139.912 139.318 137.416 136.114 0.000 48 144.199 143.324 141.675 140.838 140.240 139.557 139.113 137.764	143.269 142.312 141.511 140.655 139.995 139.343 137.502 136.214 134.952 0.000 49 143.296 142.471 141.603 140.929 140.170 139.643	143.270 142.314 141.515 140.660 140.002 139.351 136.231 134.984 0.000 50 144.199 143.325 142.458 140.339 140.339 139.540 139.135	143.273 142.320 141.523 140.671 139.366 137.537 136.259 135.026 0.000 51 144.109 143.330 142.472 140.932 140.932 140.342 139.622 139.622	143.246 $142.375$ $140.753$ $140.007$ $139.431$ $137.620$ $136.362$ $135.164$ $0.000$ $52$ $144.199$ $143.328$ $142.509$ $141.695$ $141.030$ $140.288$ $139.801$ $139.234$ $138.731$	143.247 142.373 141.473 140.749 140.002 139.425 137.612 135.148 0.000 53 144.199 143.331 142.502 141.718 140.988 140.357 139.744 139.210 138.916	142.384 141.504 140.788 140.68 137.759 136.515 135.383 -0.000 54 144.199 142.502 141.725 141.021 140.353 139.3777 139.355

	REA		56	57	58	59		61	62	63	64	65	: 66	67	68.	69
	1	144.199	144.199	144.199	144.199	144.199	144.199	144.199	144.199	144.199	144.199	144.199	144.199	144.199	144.199	144,199
	2	143.327	143.340	143.368	143.379	143.383	143.385	143.394	143.396	143.390	143.398	143.394	143.405	163.408	143.420	143.426
	3	142,526	142.511	142.583	142.586	142.612	142.616	142.618	142.621	142.624	142.615	142.640	142.640	142.640	142.677	142.693
	- 4	141.698	141.744	141.852	141.882	141.898	141.685	141.901	141.910	141.894	141.919	141.915	141.951	141.962	142.005	142.027
	5	141.062	141.011	141.223	141.236	141.244	141.251	141.249	141.254	141.263	141.258	141.307	141.327	141.334	161.617	141.453
	6	140.304	140.417	140.659	140.702	140.655	140.615	140.650	140.680	140.667	140.712	140.731	140.802	140.825	140.920	140.962
	7	139.876	139.784	140.212	140.085	140.078	140.097	140.145	140.178	140.200	140.226	140.299	140.368	140.391	140.527	140. 583
	8	139.255	139.459	139. 529	139.568	139.602	139.613	139.730	139.797	139.815	139.879	139.947	140.055	160.091	140.246	140.311
	9	139.119	139.051	138.317	138.566	138.881	138.981	139.220	139.332	139-381	1 39- 470	139,579	139.728	139.776	139.981	140.064
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	REA		71	72	73	74	75	76	77							
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	2	.01250				.01250		.01250							•	
	3	.01250	.01250	.01250	.01250	.01250	.01250	.01250	.01250							
	4	.01250		. 01250	.01250	.01250		01250	.01250							and the second
	5	.01250	.01250	.01250	.01250	.01250	.01250	.01250	•01250							
	6	.01250	.01250	.01250	.01250	.01250	.01250		. 01250						-	
	7	.01250	.01250	.01250	.01250	.01250	.01250	.01250	.01250							
		.00093		.00093	.00094		.00094	.00094	.00094				·····			
	9	.00092	.00092	.00092	• 00 09 Z	.00092	•0009Z	• 00092	.00092							
	10	.00080		.00080	.00080				.00080		• • • • • • • • • • • • • • • • • • •			-		
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AREA	RADIUS D	11	12	13	14	15	16	17	18	19	20	21	22	23	24 •01250
1	.01250	.01250	.01250	.01250	.01250	,01250	.01250	.01250	.01250	.01 250	-01250	-01750	- 01 250	-01250	-01250
2		~~~			401270				-01250		<b>N13E</b> A	A1 1 2 4	A1 38A		
3	WALJU			40122U	*01730		01250	-01250	-01250	. 01 240	. 01 280		01 288	61380	A1 48 A
2				******	. AVICIV			.01750	-01250	. 01 250	.01250		.01250	-01250	.01250
5	• 01250	•01250		.01250			• • • • • • • • •		-01230	-01250	- 01 240		A1 78A	A1 3 # A	AT
7		.01250			.01250			.01250.	.01250				. 01 250	.01250	A01250
Å			.00106	.00100											
9	.00090	.00090	.00090			00003	E 2000.		.00094			.00094	- 00095	- 00005	
10		.00078		.00078		+ + + + + + + + + + + + + + + + + + + +	00007I	PUDUAT	-00092	_ 00092	. 00002		<u> </u>	~~~~	
11		.00077			.00077	- 00077	00000U	00080.		.00080		• 00081			+00082
AREA	2.5			28				800017	* 000 LA	* \ U U U #	• 00080	•00080	.00080	.00081	
1			.01250		.01250	.01280		32		. 34			37	_ 38	
2		-01250	.01250	.01250	.01250	-01250	• 01 2 50	01250	.01250	.01250	+01250	.01250	.01250	.01250	•01250
3	.01250	.01250	.01250	.01250	.01250	-01250	.01250	AULC2U	<u>AU1270</u>		01250	.01250	.01250	.01250	•01250 •01250
4	.01250	.01250	.01250	.01250	.01250	.01250	-01250	-01250	.01250	-01250	.01250	.01250	.01250	• 01 2 5 0	.01250
5	.01250	.01250	- 01 250	.01250	.01250		- 01 280	01 360		<u> </u>				.01250	.01250
6	• 01250	.01250	- 01 250	.01250	.01250	01280	01250	.01250	+01200	+01220	101250	.01250	.01250	.01250	•01250
7	.01250	-01250	.01250	-01250	.01250		01 250	,01250					- 01250	.01250	•01250 •01250
8	.00095	.00096	. 00096	-00096	.00004	-00094	.00007	.00097	•01270	+01250	.01250	.01250	.01250	.01250	•01250
9	.00094	.00094	.00094	.00094	.00008			.00095			00097		.00098	.00098	.00098
. 10															
11	.00081	0.00000	0.00000	0.00000	0.00000	0.00000	D-00000	0.00000	0.00000			+ <u>D</u> DD84			
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2	.01250	01250	01250	.01250	-01250	-01250	-01250	.01250	-01250	-01250	01250	01250	01250	• 01 2 50	•01250
3	+ 0123U	•UL270	*01230	.01250	•01230	.01230	-01250	-01250	-01250	-01250	.01250	. 61 260	01 280	A1 38A	A1 38A
4	AVICZU .	TANT COU				A01250	.01250	-01250	-01250	- 01 250	- 01250	. 01 280	01 760	01 9 K A	A1 38 A -
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7		* AT 5 3 0	• VI 230	• 01 2 3 0	#U123U	-01230	.01750		. 01250	. 61 256	01 7 E A	A1 38A	A1 38 A	A . A	
9		A MMM Y D		V UUUAA	AU1/30	-01250	-01250	. 01 250	01250	01 280	A1 38A	A1 98A	A3 38A		
			• • • • • • • • •	<b>.</b>	400057						01780	A19EA	01 3 <b>5</b> 6		
AREA	<u></u>	56	57									01250_	.01250	.01250	.01250
ARCA 1	.01250			58	59	60	61	62	63	64	65	66	67	68	69
2	01250	01280	01250	01 280		ANTCOM.			+01220				.01250	.01250	.01250
	. 01250	-012KA	. 61 250	.01986	. 01 380	.01250	+01220	.01250	.01230	.01230	+01220	.01250	.01250	.01250	+01250
· · · · · · · · · · · · · · · · · · ·	.01250	.01250	. 01 2 50	-01250	. 01 240		- 401474	- 01250 .	""""""""""""""""""""""""""""""""""""""	- •ULZ50 .		01250 .			01250
	.01250	01250	.01250			-01250		• V1 27U	AU1270	+V1270	+ 41230	+01250	.01250	.01250	.01250 .01250
	# UI Z 2 U		* UI 2 7 U	.01220	•U1230	-01/30		- 01 250	. 01250	<b>NI 98</b> 0	- <b>N13EA</b>			** * * *	
7		AULZ 3U	AUL 2 70		AU1 7 70.			- 01 280		<b>N1 76</b>	A1 36 A	<b>**</b> ***	** * * *		
8	. UI L J U		8 UI C 2 U			AU1270	_ (11 / 74)	- 01250	. 01250	<b>N1 36A</b>	<b>0172</b> 0	~	~ ~ ~ ~ ~		
9								01790	.01250		. 61280	A1 36A	01 184		****
10	.01250	.01250	0,00000				0.00000	0.00000	0.00000	0.00000	0-00000	<b></b>	<u>0.00000</u>	00000	
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5	•01250	.01250	.01250	.01250	.01250	.01230	-01250	- 01 250							
<b>6</b> .	•01250	•01250	•01250	.01250	+01250	01250		. 01250							
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AREA	TENPERATI	2 Z	3 IKT UF PL	4		• • • • • • • • • • • • • • • • • • • •	7		anna na ar a						
1					145.288			145.288							
2	144.339	144.323	144.323	144.324	144.323	144.336	144.336	144.344	•						
3	143.410	143.428	143.428	143.429	143.429	.143.401	143.401								
4	142.557	142.512	142.512	142.513	142.512	142.549	142.548	142.569	•						
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TENP F	RATURE OF	STUCK N	ATERTAL												
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AREA							16								
1	145,288	145.288	145.288	145.288	145.288	145.288	145.288	145.288	145.288	145.288	145,288	145.28	8 145.28	8 145.28	8 145.288
-	145.288	145.288	145.288	145.288	145.288	145.288	145.288 144.271	145.288	145.288	145.288	145.286	145.28	B 145.28 2 144.31	8 145.28 1 144.32	8 145.288
1	145.288 144.256 143.237	145.288 144.253 143.230	145.288 144.255 143.235	145.288 144.255 143.235	145.288 144.248 143.261	145.288 144.266 143.261	145.288 144.271 143.329	145.288 144.271 143.329	145.288 144.302 143.294	145.288 144.278 143.340	145,286	145.28	B 145.28 2 144.31 2 143.38	8 145.28 1 144.32 7 143.37	8 145.288 6 144.330 1 143.398
1	145.288 144.256 143.237 142.324	145.288 144.253 143.230 142.314	145.288 144.255 143.235 142.321	145.288 144.255 143.235 142.321	145.288 144.248 143.261 142.311	145.288 144.266 143.261 142.355	145.288 144.271 143.329 142.327	145.288 144.271 143.329 142.328	145.288 144.302 143.294 142.433	145.288 144.278 143.340 142.377	145.286 _144.306 143.310 _142.453	145.28 144.30 143.33 142.47	B 145.28 2 144.31 2 143.38 142.49	8 145.28 1 144.32 7 143.37 1 142.53	8 145.288 6 144.330 1 143.398 1 142.529
1 2 3 4 5 6	145.288 144.256 143.237 142.324 141.441 140.683	145.288 144.253 143.230 142.314 141.428 140.667	145.288 144.255 143.235 142.321 141.437 140.679	145.288 144.255 143.235 142.321 141.437 140.679	145.288 144.248 143.261 142.311 141.475 140.685	145.288 144.266 143.261 142.355 141.490 140.742	145.288 144.271 143.329 142.327 141.529 140.611	145.288 144.271 143.329 142.328 141.530 140.611	145.288 144.302 143.294 142.433 141.511 140.793	145.288 144.278 143.340 142.377 141.588 140.750	145.286 -144.306 143.310 -142.453 141.559 -140.849	145.28 144.30 143.33 142.47 141.61 140.900	B 145.28 P 144.31 2 143.38 L 142.49 L 141.640 140.900	8 145.28 1 144.32 7 143.37 1 142.53 6 141.63 1 140.95	8 145.288 6 144.330 1 143.398 1 142.529 1 141.689 2 140.967
1 2 3 4 5 6 7	145.208 144.256 143.237 142.324 141.441 140.683 139.985	145.288 144.253 143.230 142.314 141.428 140.667 139.966	145.288 144.255 143.235 142.321 141.437 140.679 139.979	145.288 144.255 143.235 142.321 141.437 140.679 139.980	145.288 144.248 143.261 142.311 141.475 140.685 140.013	145.288 144.266 143.261 142.355 141.490 140.752 140.059	145.288 144.271 143.329 142.327 141.529 140.611 139.947	145.288 144.271 143.329 142.328 141.530 140.611 139.948	145.288 144.302 143.294 142.433 141.511 140.793 140.036	145.288 144.278 143.340 142.377 141.588 <u>140.750</u> 140.108	145.286 -144.306 143.310 -142.453 141.559 -140.849 140.126	145.28 144.30 143.33 142.47 141.61 140.900 140.21	B 145.28 P 144.31 2 143.38 L 143.38 L 142.49 L 141.64 0 140.90 3 140.06	8 145.28 1 144.32 7 143.37 1.142.53 6 141.63 1.40.95 1 140.07	$\begin{array}{c} 8 & 145.288 \\ 6 & 144.330 \\ 1 & 143.398 \\ 1 & 142.529 \\ 1 & 142.529 \\ 1 & 141.689 \\ 2 & 140.967 \\ 0 & 140.244 \end{array}$
1 2 3 4 5 6 7 8	145.288 144.256 143.237 142.324 141.441 140.683 139.985 137.851	145.288 144.253 143.230 142.314 141.428 140.667 139.966 137.821	145.288 144.255 143.235 142.321 141.437 140.679 139.979 137.843	145.288 144.255 143.235 142.321 141.437 140.679 139.980 137.844	145.288 144.248 143.261 142.311 141.475 140.685 140.013 137.889	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973	145.288 144.271 143.329 142.327 141.529 140.611 139.947 139.252	145.288 144.271 143.329 142.328 141.530 140.611 139.948 139.252	145.288 144.302 143.294 142.433 141.511 140.793 140.036 139.466	145.288 144.278 143.340 142.377 141.588 150.750 140.108 139.486	145,286 144,306 143,310 142,453 141,559 140,849 140,126 139,573) 145.28 144.309 143.333 142.471 141.611 140.900 140.212 139.670	8 145.28 9 144.31 2 143.38 1 142.49 1 141.644 1 140.90 3 140.061 1 19.49	8 145.28 1 144.32 7 143.37 1 142.53 6 141.63 1 140.95 1 140.07 5 139.54	8 145.288 6 144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.698
1 2 3 4 5 6 7 8 9	145.268 144.256 143.237 142.324 141.441 140.683 139.985 137.851 136.154 134.934	145.288 144.253 143.230 142.314 141.428 140.667 139.966 137.821 136.113 134.882	145.288 144.255 143.235 142.321 141.437 140.679 139.979 137.843 136.143 134.919	145.288 144.255 143.235 142.321 141.437 140.679 139.980 137.844 136.144 134.920	145.288 144.248 143.261 142.311 141.475 140.685 140.013 137.889 136.205 134.990	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122	145.288 144.271 143.329 142.327 141.529 140.611 139.947 139.252 137.360 136.071	145.288 144.271 143.329 142.328 141.530 140.611 139.948 139.252 137.361 136.073	145.288 144.302 143.294 142.433 141.511 140.793 140.036 139.466 137.682 136.463	145.288 144.278 143.340 142.377 141.588 140.750 140.108 139.485 137.755 136.551	145.286 144.306 143.310 142.453 141.559 140.849 140.126 139.573 137.868 136.699) 145.28 144.30 143.33 143.33 142.47 141.61 140.90 140.21 139.67 138.036 136.916	8 145.28 2 144.31 2 143.38 1 142.49 1 141.64 1 140.90 3 140.06 1 39.49 1 38.666 1 37.441	8 145.28 1 144.32 7 143.37 1 142.53 6 141.63 1 140.95 1 140.07 5 139.54 1 138.91 1 137.51	8 145.288 6 144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.698 1 139.204 5 137.993
1 2 3 4 5 6 7 8 9	145.268 144.256 143.237 142.324 141.441 140.683 139.985 137.851 136.154 134.934	145.288 144.253 143.230 142.314 141.428 140.667 139.966 137.821 136.113 134.882	145.288 144.255 143.235 142.321 141.437 140.679 139.979 137.843 136.143 134.919	145.288 144.255 143.235 142.321 141.437 140.679 139.980 137.844 136.144 134.920	145.288 144.248 143.261 142.311 141.475 140.685 140.013 137.889 136.205 134.990	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122	145.288 144.271 143.329 142.327 141.529 140.611 139.947 139.252 137.360 136.071	145.288 144.271 143.329 142.328 141.530 140.611 139.948 139.252 137.361 136.073	145.288 144.302 143.294 142.433 141.511 140.793 140.036 139.466 137.682 136.463	145.288 144.278 143.340 142.377 141.588 140.750 140.108 139.485 137.755 136.551	145.286 144.306 143.310 142.453 141.559 140.849 140.126 139.573 137.868 136.699) 145.28 144.30 143.33 143.33 142.47 141.61 140.90 140.21 139.67 138.036 136.916	8 145.28 2 144.31 2 143.38 1 142.49 1 141.64 1 140.90 3 140.06 1 39.49 1 38.666 1 37.441	8 145.28 1 144.32 7 143.37 1 142.53 6 141.63 1 140.95 1 140.07 5 139.54 1 138.91 1 137.51	8 145.288 6.144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.698 1 139.204 5 137.993
1 2 3 4 5 6 7 8 9	145.268 144.256 143.237 142.324 141.441 140.683 139.985 137.851 136.154 134.934 133.545 25	145.288 144.253 143.230 142.314 141.428 140.667 139.966 137.821 136.113 134.882 133.450 26	145.288 144.255 143.235 142.321 141.437 140.679 137.843 136.143 136.143 134.919 133.513 27	145.288 144.255 143.235 142.321 141.437 140.679 139.980 137.844 136.144 134.920 133.516 28	145.288 144.248 143.261 142.311 141.475 140.685 140.013 137.889 136.205 134.990 133.616 29	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122 133.823 30	145.288 144.271 143.329 142.327 141.529 140.611 139.947 139.252 137.360 136.071 135.105 31	145.288 144.271 143.329 142.328 141.530 140.611 139.948 139.948 139.252 137.361 136.073 135.108 32	145.288 144.302 143.294 142.433 141.511 140.793 140.036 139.466 137.682 136.463 135.622	145.288 144.278 143.340 142.377 141.588 140.750 140.108 139.486 137.753 136.551 135.740 34	145.286 -144.304 143.310 -142.453 141.559 140.849 140.126 -139.573 137.868 136.699 135.946	145.28(144.30(143.33) 143.33(142.47) 141.611 140.90(140.212 139.67(138.036 136.916 136.253 36	B 145.28 144.31 2 143.38 142.49 141.64 140.90 140.90 139.49 138.868 137.44 136.770 37	$\begin{array}{c} 8 & 145.28 \\ 1 & 144.32 \\ 7 & 143.37 \\ 1 & 142.53 \\ 6 & 141.63 \\ 1 & 140.95 \\ 1 & 140.95 \\ 1 & 139.54 \\ 1 & 137.51 \\ 1 & 136.87 \\ 38. \end{array}$	8 145.288 6.144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.204 5 137.993 4 137.489
1 2 3 4 5 6 7 8 9 10	145.288 144.256 143.237 142.324 141.441 140.683 139.985 137.851 136.154 134.934 133.545 23 145.288	145.208 144.253 143.230 142.314 141.420 140.667 137.821 136.113 136.113 134.882 133.450 26 145.208	145.288 144.255 143.235 142.321 141.437 140.679 137.843 136.143 136.143 134.919 133.513 27 145.288	145.288 144.255 142.325 142.321 141.437 140.679 139.980 137.844 136.144 134.920 133.516 28 145.288	145.288 144.248 143.261 142.311 141.475 140.685 140.685 134.013 137.889 136.205 134.990 133.616 29	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122 133.823 30	145.288 144.271 143.329 142.327 141.529 140.611 139.947 139.252 137.360 136.071 135.105 145.288	145.288 144.271 143.329 142.328 141.530 140.611 139.948 139.252 137.361 136.073 135.108 32	145.288 144.302 143.294 142.433 141.511 140.793 140.036 137.682 136.463 135.622 145.288	145.288 144.278 143.340 142.377 141.588 140.750 140.108 139.486 137.753 136.551 135.740 34	145.288 144.304 143.310 142.453 141.559 140.126 139.573 137.868 136.699 135.946 35.46 145.288	145.28 144.303 143.33 142.47 141.61 140.900 140.21 139.670 136.916 136.253 36 145.288	B 145.28 144.31 2 143.38 142.49 144.40.90 140.90 140.90 139.49 130.45 137.441 136.770 37. 145.288	8 145.28 1 144.32 7 143.37 1 142.53 6 141.63 1 140.95 1 140.07 5 139.54 1 137.51 3 136.67 38 145.288	8 145.288 6 144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.698 1 139.204 5 137.993 4 137.489 3 145.288
1 2 3 4 5 6 7 8 9 10	145.268 144.256 143.237 142.324 141.441 140.683 139.985 137.851 136.154 133.545 23 145.288 145.288	145.208 144.253 143.230 142.314 141.420 140.667 139.966 137.821 136.113 136.802 133.450 26 145.208 144.336	145.288 144.255 143.235 142.321 141.437 140.679 137.843 136.143 136.143 134.919 133.513 _27 145.288 144.346	145.288 144.255 143.235 142.321 141.437 139.980 137.844 136.144 134.920 133.516 28 145.288	145.288 144.248 143.261 142.311 141.475 140.685 140.013 137.889 136.205 134.990 133.616 29 145.288 144.346	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122 133.823 30 145.288	145.288 144.271 143.329 142.327 141.529 140.611 139.047 139.252 137.360 136.071 135.105 31 145.288 144.359	145.288 144.271 143.329 142.326 141.530 140.611 139.948 139.252 137.361 136.073 135.100 32 145.280 144.365	145.288 144.302 143.294 142.433 141.511 140.793 140.036 139.466 137.682 135.622 33 145.288 145.288 144.364	145.288 144.278 143.340 142.377 141.588 140.750 140.108 139.486 137.755 136.551 135.740 34 145.288	145.288 144.304 143.310 143.410 141.559 140.126 139.573 137.868 135.946 	145.28(144.30(143.33) 143.33) 143.33(142.47) 141.611 140.212 139.670 136.036 136.253 36 145.288 144.371	B 145.28 144.31 2 143.38 142.49 142.49 144.64 140.06 139.49 138.86 137.45 136.770 37 145.288 144.382	8 145.28 1 144.32 7 143.37 1.142.53 1.42.53 1.40.95 1.40.95 1.30.54 1.37.51 1.36.87 38 145.288 145.288	8 145.288 6 144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.698 1 139.204 5 137.993 4 137.489 39 8 145.288
1 2 3 4 5 6 7 8 9 10	145.268 144.256 143.237 142.324 141.441 140.683 139.985 137.851 136.154 134.934 133.545 25 145.288 145.288	145.208 144.253 143.230 142.314 141.420 140.667 137.021 136.113 134.082 133.450 26 145.208 145.208 145.208 145.208	145.288 144.255 143.235 142.321 141.437 140.679 137.843 136.143 134.919 133.513 27 145.288 144.346 143.425	145.288 144.255 143.235 142.321 141.437 139.980 137.844 136.144 134.920 133.516 28 145.288 145.288 145.434	145.288 144.248 143.261 142.311 141.475 140.685 140.013 137.889 136.205 134.990 133.616 29 145.288 144.346 143.446	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122 133.823 30 145.288 144.354	145.288 144.271 143.329 142.327 141.529 140.611 139.947 139.252 137.360 136.071 135.105 31 145.288 145.288	145.288 144.271 143.329 142.328 141.530 140.611 139.948 139.252 137.361 136.073 135.108 32 145.288 145.288 143.444	145.268 144.302 143.294 142.433 141.511 140.793 140.036 139.466 137.682 136.463 135.622 33 145.286 144.364	145.288 144.278 143.340 142.377 141.588 150.750 140.108 139.486 137.753 136.551 135.740 34 145.288 145.288 145.288	145.288 -144.304 143.310 -142.453 141.559 140.126 -139.573 137.868 -136.699 135.946 -35 -145.288 145.288 145.288 -145.288	145.28(144.30(143.33) 143.33(142.47) 141.611 140.212 139.670 136.036 136.036 136.233 36 145.288 145.288	B 145.28 144.31 2 143.38 142.49 140.00 140.00 139.49 138.86 137.49 138.86 137.49 145.288 145.288 143.499	8 145.28 1 144.32 7 143.37 1.142.53 6 141.63 1.40.95. 1 140.95. 1 140.95. 1 30.91 1 30.91 1 30.91 1 33.91 1 35.288 1 45.288 1 44.381 1 43.502	8 145.288 6 144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.698 1 139.204 5 137.993 4 137.489 39 3 145.288 144.387 143.517
1 2 3 4 5 6 7 8 9 10	145.288 144.256 143.237 142.324 141.441 140.683 139.985 137.851 136.154 134.934 133.545 23 145.288 145.288 145.288 145.288 145.288 143.407 142.525 141.732	145.208 144.253 143.230 142.314 141.428 140.667 139.966 137.821 136.113 134.882 133.450 26 145.208 145.208 145.208 145.2558 141.791	145.208 144.255 143.235 142.321 141.437 140.679 137.643 136.143 136.143 134.919 133.513 27 145.288 144.346 143.425 142.590 141.795	145.288 144.255 142.321 141.437 140.679 139.980 137.844 136.144 136.144 134.920 133.516 20 145.288 145.288 144.344 143.443 142.587 141.833	145.288 144.248 143.261 142.311 141.475 140.685 140.685 137.889 136.205 134.990 133.616 29 145.288 144.346 143.446 142.591 141.839	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122 133.823 30 145.288 145.288 145.288 145.288 145.288	145.288 144.271 143.329 142.327 141.529 140.611 139.947 139.252 137.360 136.071 135.105 31 145.288 144.359 143.452 142.632	145.288 144.271 143.329 142.328 141.530 140.611 139.948 139.252 137.361 136.073 135.108 32 145.288 144.365 144.365 143.444 142.649.	145.288 144.302 143.294 142.433 141.511 140.793 140.036 139.466 137.682 136.463 135.622 33 145.288 145.288 145.288 145.288 145.288 144.364 143.467 142.650 141.892	145.288 144.278 143.340 142.377 141.588 140.750 140.108 139.486 137.753 136.551 135.740 34 145.288 145.288 145.663 141.931	145.288 -144.306 143.310 -142.453 141.559 140.126 139.573 137.868 135.946 -35 -145.288 146.26 146.2	145.28(144.30(143.33(142.47(141.61) 140.212 139.670 136.916 136.253 36 145.288 145.288 145.286 145.2675 142.675	B 145.28 144.31 2 143.38 142.49 141.64 140.90 139.49 139.49 139.49 136.77 37.44 136.77 37.44 145.288 145.288 144.382 143.499 142.697	8 145.20 1 144.32 7 143.37 1.42.53 5 141.63 1.40.95 1.40.95 1.40.07 5 139.54 1.37.51 9 136.87 36 145.200 145.200 145.200 145.200 145.200 145.200 145.200 145.200	$\begin{array}{c} 8 & 145.288\\ 6 & 144.330\\ 1 & 143.398\\ 1 & 142.529\\ 1 & 141.689\\ 2 & 140.967\\ 0 & 140.244\\ 9 & 139.698\\ 1 & 139.204\\ 5 & 137.993\\ 4 & 137.489\\ 39\\ 8 & 145.288\\ 1 & 144.387\\ 2 & 143.517\\ 1 & 142.710\\ 1 & 14.972\\ \end{array}$
1 2 3 4 5 6 7 8 9 10 11 4 REA 1 2 3 4 5 6	145.268 144.256 143.237 142.324 141.441 140.683 139.985 137.851 136.154 134.934 133.545 .25 145.288 144.332 143.407 142.525 141.732 140.955	145.208 144.253 143.230 142.314 141.420 140.667 137.021 136.113 136.082 133.450 26 145.200 144.336 143.426 143.426 143.426 141.791 141.061	145.288 144.255 143.235 142.321 141.437 140.679 139.979 137.843 136.143 136.143 134.919 133.513 27 145.288 144.346 143.425 142.590 141.795 141.117	145.288 144.255 142.321 141.437 140.679 139.980 137.844 136.144 136.144 134.920 133.516 28 145.288 145.288 145.288 145.288 145.833 141.833	145.288 144.248 143.261 142.311 141.475 140.685 140.013 137.889 136.205 134.990 133.616 29 145.288 144.346 143.446 143.446 141.839 141.130	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122 133.823 30 145.288 143.445 142.617 141.842 141.172	145.288 144.271 143.329 142.327 141.529 140.611 139.047 139.252 137.36.071 135.105 31 145.288 145.288 143.452 143.452 141.857 141.196	145.288 .144.271 143.329 .142.328 .141.530 .140.611 .139.252 137.361 .136.073 .135.108 .32 .143.288 .143.444 .143.649 .141.847 .141.847	145.268 144.302 143.294 142.433 141.511 140.036 137.662 135.622 135.463 135.286 144.364 143.467 142.650 141.892 141.237	145.288 144.278 143.340 142.377 141.588 140.750 140.108 139.486 137.753 136.551 135.740 34 145.288 145.288 145.288 145.288 145.288 145.288 145.288 145.288 145.288 145.288 145.288	145.288 144.304 143.310 143.310 141.559 140.126 139.573 137.868 135.946 35.946 35. 145.2888 145.288 145.288 145.288 145.288 145.288 145.288 145.288	145.28(144.30) 143.33; 142.47] 141.611 140.90(140.212 139.67(138.036 136.916 136.253 36 145.288 145.288 144.371 143.495 142.675 141.927	B 145.28 144.31 2 143.38 142.49 141.64 140.06 139.49 138.49 138.49 137.451 136.770 37 145.288 144.382 143.499 142.697 141.929	8 145.28 1 144.32 7 143.37 1 142.53 6 141.63 1 140.95 1 140.97 1 130.91 1 30.91 1 36.87 38 1 45.288 1 44.381 1 43.502 1 42.694 1 41.948	8 145.288 6 144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.698 1 139.204 5 137.993 4 137.489 39 3 145.288 144.387 142.710 141.972 141.303
1 2 3 4 5 6 7 8 9 10 11 AREA 1 2 3 4 5 6 7	145.268 144.256 143.237 142.324 141.441 140.683 139.985 137.851 136.154 133.545 23 145.288 145.288 144.934 143.407 142.525 141.732 140.325	145.288 144.253 143.230 142.314 141.428 141.428 139.966 137.821 136.113 136.812 133.450 26 145.288 145.288 144.336 143.426 142.558 141.791 141.061 140.465	145.288 144.255 143.235 142.321 141.437 130.979 137.843 136.143 134.919 133.513 27 145.288 144.346 143.425 142.590 141.795 141.117 140.488	145.288 144.255 143.235 142.321 141.437 139.980 137.844 136.144 28 135.288 145.288 145.288 145.288 144.354 143.443 142.587 141.833 141.833	145.288 144.248 143.261 142.311 141.475 140.685 140.013 137.889 136.205 134.990 133.616 29 145.288 144.346 142.591 141.839 141.839	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122 133.823 30 145.288 143.445 142.617 141.842 141.842 141.842 141.872 140.570	145.288 144.271 143.329 142.327 141.529 140.611 139.047 139.252 137.360 136.071 135.105 31 145.288 144.359 143.452 142.632 141.857 141.196	145.288 144.271 143.329 142.328 141.530 140.611 139.948 139.252 137.361 136.073 135.108 32 145.288 143.444 142.649 141.847 "141.218	145.288 144.302 143.294 142.433 141.511 -140.793 140.036 139.466 137.682 -33 145.286 144.364 143.467 142.650 141.892 -141.237 140.654	145.288 144.278 143.340 142.377 141.588 140.750 140.108 139.486 137.755 135.740 34 145.2888 145.2888 145.2888 145.2888 145.2888 145.2888 145.2888 145.	145.288 144.304 143.310 143.310 141.559 140.126 139.573 137.868 135.946 .136.699 135.946 .136.499 145.288 145.288 145.288 145.288 141.938 141.733 140.642	145.28(144.30) 143.33; 142.47] 141.611 140.212 139.670 136.036 136.253 36 145.288 145.288 145.288 144.371 143.495 142.675 141.927 141.246	B 145.28 144.31 2 143.38 142.49 141.64 140.06 130.69 137.65 136.770 37 145.288 144.382 143.499 142.697 141.929 141.929	$\begin{array}{c} 8 & 145.28\\ 1 & 144.32\\ 7 & 143.37\\ 1.142.53\\ 6 & 141.63\\ 1.40.95\\ 1 & 140.07\\ 1.39.54\\ 1 & 138.91\\ 1.37.51\\ 1.37.51\\ 1.36.87\\ 38\\ 145.28\\ 144.381\\ 143.502\\ 142.694\\ 141.948\\ 141.258\\ 140.655\\ \end{array}$	8 145.288 6 144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.698 1 139.204 5 137.993 4 137.489 39 8 145.288
1 2 3 4 5 6 7 8 9 10 11 4 REA 1 2 3 4 5 6	145.268 144.256 143.237 142.324 141.441 140.683 139.985 137.851 136.154 134.934 133.545 23 145.288 145.288 145.288 145.288 145.288 144.732 140.955 140.325 139.722 138.856	145.208 144.253 143.230 142.314 141.428 140.667 139.966 137.821 136.113 134.882 133.450 26 145.208 145	145.288 144.255 143.235 142.321 141.437 140.679 139.979 137.843 136.143 134.919 133.513 27 145.288 144.346 143.425 142.590 141.795 141.117 140.488 139.958	145.288 144.255 142.321 141.437 140.679 139.980 137.844 136.144 134.920 133.516 28 145.2885 145.2888 145.2888 145.2888 145.2886145.2888 145.2888 145.	145.288 144.248 143.261 142.311 141.475 140.685 140.685 137.889 90 133.616 29 145.288 144.346 143.446 142.591 141.839 141.130 140.550 140.038 139.662	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122 133.823 30 145.288 145.288 145.286	145.288 144.271 143.329 142.327 141.529 140.611 139.947 139.252 137.360 136.071 135.105 145.288 145.28	145.288 .144.271 143.329 142.328 141.530 .140.611 139.948 139.252 137.361 136.073 135.108 32 145.288 144.365 143.444 142.649 141.218 140.591 140.591 140.142	145.268 144.302 143.294 142.433 141.511 140.793 140.036 137.602 136.463 135.622 33 145.286 144.364 143.467 142.650 141.892 141.237 140.654 139.500	145.288 144.278 143.340 142.377 141.588 140.750 140.108 139.486 137.753 136.551 135.740 34 145.288 144.367 143.486 142.663 141.931 141.229 140.630 140.021 139.558	145.288 144.304 143.310 142.453 141.559 140.126 139.573 137.868 136.699 135.966 136.699 135.966 145.288 145.288 145.288 145.288 145.288 145.288 145.288 145.288 145.288 145.288 145.288 145.288 146.699 147.208 141.233 140.642 140.036 139.577	145.28 144.30 143.33 142.47 141.61 140.90 140.21 139.670 136.916 136.253 36 145.288 144.371 143.495 142.675 141.927 141.927 141.927 140.605 140.064 139.593	B 145.28 144.31 2 143.38 142.49 144.90 140.90 140.90 139.49 136.770 37. 145.288 143.499 145.287 141.929 141.929 141.929 140.629 139.707	8 145.20 1 144.32 7 143.37 1.42.53 6 141.63 140.95 1 140.07 5 139.54 1 35.67 36 145.200 145.200 145.200 145.200 144.301 143.502 142.694 141.948 141.95 140.655 140.109	8 145.288 6 144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.698 1 139.698 1 139.698 1 139.698 1 137.489 3 137.489 3 145.288 1 44.387 1 43.517 1 43.517 1 43.517 1 43.517 1 43.517 1 43.517 1 44.303 1 40.730 1 40.250 1 39.903
1 2 3 4 5 6 7 8 9 10 11 AREA 1 2 3 4 5 6 7 8	145.208 144.256 143.237 142.324 141.441 140.683 139.985 137.851 136.154 134.934 133.545 25 145.2888 145.2888 145.2888 145.2888 145.2888 145.2888 145.2888 145.2888 145.2888 14	145.208 144.253 143.230 142.314 141.420 140.467 137.821 136.113 134.802 133.450 26 145.208 145.208 145.208 145.208 145.208 145.208 145.450 141.061 141.061 141.061 140.465 139.927 139.532	145.288 144.255 143.235 142.321 141.437 140.679 130.979 137.843 136.143 134.919 133.513 27 145.288 144.346 143.425 142.590 141.795 141.117 140.488 139.998 137.647	145.288 144.255 142.321 141.437 140.679 139.980 137.844 136.144 134.920 133.516 28 145.288 145.288 145.443 142.587 141.833 140.541 140.027 139.649 137.763	145.288 144.248 143.261 142.311 141.475 140.685 140.013 137.889 136.295 134.990 133.616 29 145.288 144.346 143.446 143.446 141.130 140.550 140.038 139.662 137.807	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122 133.823 30 145.288 144.354 143.445 142.617 141.842 141.172 140.970 140.091 139.7040	145.288 144.271 143.329 142.327 141.529 140.611 139.947 139.252 137.360 136.071 135.105 31 145.288 144.359 143.452 143.452 141.196 140.593 140.122 139.743 138.022	145.288 144.271 143.329 142.328 141.530 140.611 139.948 139.252 137.361 136.073 135.100 32.288 143.444 142.649 141.218 140.591 140.142 139.754 138.053	145.288 144.302 143.294 142.433 141.511 140.793 140.036 137.682 136.463 135.622 135.286 144.364 143.467 142.650 141.892 141.237 140.654 140.029 139.500 138.600	145.288 144.278 143.340 142.377 141.588 140.750 140.108 139.486 137.753 136.551 135.740 34 145.2888 145.2888 145.2888 145.2888 145.2888 145.2888 145.2888 145.2888 145	145.288 144.304 143.310 142.453 141.559 140.126 139.573 137.868 136.699 135.946 135.946 145.288 145.288 145.288 145.288 145.288 145.288 145.288 145.288 145.288 145.288 145.288 145.288 146.699 135.946 139.577 138.947	145.28(144.30) 143.33(142.47) 141.611 140.90(140.212 139.670(138.036 136.916 136.253 36 145.288 145.288 144.371 143.495 141.927 141.246 140.605 140.064 139.593	B 145.28 144.31 2 143.38 142.49 141.64 140.00 140.00 139.49 138.66 137.441 136.770 37. 145.288 144.382 143.499 142.697 141.929 141.267 140.629 140.129 139.705	8 145.20 1 144.32 7 143.37 1 42.53 6 141.63 1 40.95 1 140.07 5 139.54 1 37.51 1 37.51 1 36.87 38 1 45.288 1 45.288 1 44.694 1 41.948 1 41.948 1 40.655 1 40.109 1 39.697 1 39.921	8 145.288 6 144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.698 1 139.698 1 139.204 5 137.489 39 3 145.288 144.387 143.517 142.710 141.972 141.303 140.730 140.250 139.903 139.550
1 2 3 4 5 6 7 8 9 10 11 AREA 1 2 3 4 5 6 7 8 9 9 10 11	145.268 144.256 143.237 142.324 141.441 140.683 139.985 137.851 136.154 134.934 133.545 25 145.288 145.288 145.288 145.288 144.732 142.525 147.732 140.325 139.722 138.856 138.550 137.662	145.208 144.253 143.230 142.314 141.420 130.667 137.821 136.113 134.882 133.450 26 145.208 145.208 145.208 145.208 145.208 145.208 145.42 143.420 143.420 141.061 140.465 139.927 139.532 137.459 0.000	$145.288\\144.255\\143.235\\142.321\\141.437\\140.679\\139.979\\137.843\\136.143\\136.143\\134.919\\133.513\\27\\145.288\\144.346\\143.425\\142.590\\141.795\\141.117\\140.488\\139.998\\139.594\\137.647\\0.000$	145.288 144.255 142.321 141.437 140.679 139.980 137.844 136.144 134.920 133.516 28 145.288 144.344 143.443 142.587 141.833 141.123 140.541 140.027 137.649 137.763 0.000	145.288 144.248 143.261 142.311 141.475 140.685 140.013 137.889 136.205 134.990 133.616 29 145.288 144.346 143.446 143.446 144.550 141.839 141.130 140.550 140.038 139.662 137.807 0.000	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122 133.823 30 145.288 145.288 145.288 145.288 145.288 145.45 142.617 140.570 140.091 139.7040 0.000	145.288 144.271 143.329 142.327 141.529 140.611 139.047 139.252 137.360 136.071 135.105 31 145.288 144.359 143.452 143.452 141.857 141.196 140.593 140.122 139.743 136.022 0.000	145.288 144.271 143.329 142.328 141.530 140.611 139.948 139.252 137.361 136.073 135.100 32. 145.288 143.444 142.649 141.847 141.847 141.847 140.591 140.142 139.754 138.053 0.000	145.268 144.302 143.294 142.433 141.511 140.793 140.036 137.662 135.622 135.622 135.286 144.364 143.467 142.650 141.892 141.237 140.654 140.029 139.500 0.000	145.288 144.278 143.340 142.377 141.588 140.108 139.486 137.753 136.551 135.740 34 145.288 145.289 145.280 145.289 145.28	145.288 144.304 143.310 143.310 141.559 140.126 139.573 137.868 136.699 135.946 35.946 35.946 145.288 146.699 135.947 0.000	145.28(144.30) 143.33; 142.47] 141.611 140.90(140.212 139.67(138.036 136.253 36 145.288 144.371 143.495 141.927 141.246 140.605 140.064 139.593 139.041 0.000	B 145.28 144.31 2 143.38 142.49 141.64 140.06 139.49 139.49 136.770 37 145.288 144.382 143.499 142.697 141.929 141.267 140.629 140.129 139.700 0.000	8 145.28 1 144.32 7 143.37 1 142.53 6 141.63 1 140.95 1 140.95 1 140.07 5 139.54 1 130.51 1 36.87 38 1 45.288 1 44.381 1 43.502 1 42.694 1 41.948 1 41.948 1 41.948 1 40.655 1 40.109 1 39.697 1 39.211 0.000	8 145.288 6 144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.698 1 139.204 5 137.993 4 137.489 39 39 145.288 144.387 142.710 141.972 141.303 140.730 140.250 139.953 0.000
1 2 3 4 5 6 7 8 9 10 11 AREA 1 2 3 4 5 6 7 8 9 9 0 11 AREA	145.268 144.256 143.237 142.324 141.441 140.683 139.985 137.851 136.154 134.934 133.545 23 145.288 145.288 145.288 145.288 145.288 144.732 140.325 139.722 138.856 138.550 137.662	145.288 144.253 143.230 142.314 141.428 140.667 139.966 137.621 136.113 134.882 133.450 26 145.2888 145.2888 145.2888 145.2888 145.2886145.2888 145.2	145.288 144.255 143.235 142.321 141.437 140.679 139.643 136.143 136.143 134.919 133.513 27 145.288 144.346 143.425 142.590 141.795 141.117 140.488 139.998 139.594 137.647 0.000	145.288 144.255 142.321 141.437 140.679 139.980 137.844 136.144 136.144 133.516 28 145.288 145.288 145.288 145.288 145.288 145.288 141.833 141.123 140.541 140.649 137.649 137.649	145.288 144.248 143.261 142.311 141.475 140.685 134.990 133.616 29 145.288 144.346 143.446 142.591 141.839 141.130 140.550 140.038 139.662 137.807 0.000	145.288 144.266 143.261 142.355 141.490 140.5792 136.314 135.122 133.823 30 145.288 144.354 145.451 142.617 141.842 141.172 140.570 140.591	145.288 144.271 143.329 142.327 141.529 140.611 139.947 139.252 137.360 136.071 135.105 31 145.288 144.359 143.452 142.632 141.106 140.593 140.593 140.522 139.743 136.022 0.000	145.288 144.271 143.329 142.328 141.530 140.611 139.948 139.252 137.361 136.073 135.108 32 145.288 144.365 145.288 144.365 145.288 144.365 145.288 144.365 145.288 144.365 145.288 144.365 145.2888 145.2888 145.2888 145.2888 145.2888 145.2888 145.2888 1	145.288 144.302 143.294 142.433 141.511 140.793 140.036 139.466 137.682 135.622 33 145.288 144.364 143.467 142.650 141.892 141.237 140.654 140.029 139.500 138.600 0.000 48	145.288 144.278 143.340 142.377 141.588 140.108 139.486 137.753 136.551 135.740 34 145.288 145.285 145.288 145.285 146.205 146.205 146.205 146.205 146.205 146.205 147.255 148.915 0.000 49	145.288 -144.306 143.310 142.453 141.559 140.126 139.573 137.868 135.946 	145.28 144.30 143.33 142.47 141.61 140.212 139.67 138.036 136.23 36 145.2888 145.288 145.288 145.2888 145.2888 145.2888 14	B 145.28 2 144.31 2 143.38 1 142.49 1 140.90 3 140.06 1 39.69 1 39.69 1 39.69 1 39.69 1 39.69 1 39.69 1 39.70 145.288 145.288 144.382 143.499 141.267 141.267 141.267 140.629 139.707 139.260 0.000 52	8 145.20 1 144.32 7 143.37 5 141.63 1 40.95 1 140.95 1 130.54 1 130.54 1 130.54 1 137.51 1 36.67 38 1 45.288 1 45.288 1 44.381 1 43.502 1 42.59 1 40.655 1 40.655 1 40.655 1 40.69 1 39.697 1 39.697 1 39.61 0.000 5 3	8 145.288 6 144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.204 5 137.489 39 8 145.288 144.387 142.710 141.972 141.303 140.730 140.250 139.903 139.550 0.000 54
1 2 3 4 5 6 7 8 9 10 11 A REA 5 6 7 8 9 10 11 A REA 1	145.268 144.256 143.237 142.324 141.441 140.683 139.985 137.851 136.154 134.934 133.545 25 145.288 145.288 145.288 140.955 140.955 140.955 140.955 139.722 138.856 138.550 137.662	145.208 144.253 143.230 142.314 141.428 140.667 139.966 137.821 136.113 134.882 133.450 26 145.208 141.791 141.061 140.465 139.927 139.532 137.459 0.000 41	145.288 144.255 143.235 142.321 141.437 140.679 139.979 137.843 136.143 134.919 133.513 27 145.288 144.346 143.425 142.590 141.795 141.117 140.488 139.998 137.647 0.000 42 145.288	145.288 144.255 142.321 141.437 140.679 139.980 133.516 28 145.288 145.288 144.344 143.443 142.587 141.833 141.123 141.123 140.027 139.649 137.763 0.000 43	145.288 144.248 143.261 142.311 141.475 140.685 140.685 137.889 136.205 134.990 133.616 29 145.288 144.346 142.591 141.839 141.130 140.550 140.038 137.807 0,000 45.288	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122 133.823 30 145.2888 145.288 145.288 145.288 145.288 145.288 145.288 145.288	145.288 144.271 143.329 142.327 141.529 140.611 139.947 139.252 137.360 136.071 135.105 31 145.288 145.288 143.452 141.857 141.196 140.593 140.122 139.743 138.022 0.000 445.288	145.288 144.271 143.329 142.328 141.530 140.611 139.948 139.252 137.361 136.073 135.108 32 145.288 144.365 143.444 142.649 141.218 140.591 140.591 140.142 139.754 138.053 0.000 47 145.288	145.268 144.302 143.294 142.433 141.511 140.793 140.036 137.662 136.463 135.622 33 145.286 144.364 143.467 142.650 141.892 141.237 140.654 140.029 138.600 0.000 138.600 0.000	145.288 144.278 143.340 142.377 141.588 140.750 140.108 139.486 137.753 136.551 135.740 34 145.288 145.288 141.931 141.229 140.630 140.021 139.558 138.915 0.000 49 145.288	145.288 144.304 143.310 142.453 141.559 140.126 139.573 137.868 136.699 135.946 145.288 145.288 145.288 141.233 140.642 141.233 140.642 141.233 140.642 141.233 140.642 138.947 0.000 50 145.288	145.28(144.30) 143.33(142.47) 141.611 140.900 140.212 139.670 136.916 136.253 36 145.288 145.288 145.288 141.927 141.246 140.605 140.064 139.593 139.041 0.000 51	B 145.28 144.31 2 143.38 142.49 144.90 140.90 139.49 139.49 136.770 37.451 145.288 144.382 143.499 142.697 141.929 141.929 141.929 140.129 139.260 0.000 145.288	8 145.20 1 144.32 7 143.37 1.42.53 6 141.63 1.40.95 1.40.95 1.30.54 1.37.51 3.36.67 3.4 145.200 145.200 145.200 141.259 140.655 140.109 139.211 0.000 53 145.200	8 145.288 6 144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.698 1 139.698 1 139.698 1 139.698 1 137.993 4 137.489 3 145.288 1 44.387 1 43.517 1 42.710 1 41.303 1 40.730 1 40.250 1 39.550 0.000 54 1 45.288
1 2 3 4 5 6 7 8 9 10 11 AREA 1 2 3 4 5 6 7 8 9 9 0 11 AREA	145,268 144,256 143,237 142,324 141,441 140,683 139,985 137,851 136,154 136,154 134,934 133,545 23 145,268 144,332 143,407 142,525 141,732 140,955 140,325 139,722 138,856 138,550 137,662 40 145,288 144,368	145.288 144.253 143.230 142.314 141.428 141.428 139.966 137.821 136.113 134.882 133.450 26 145.288 141.791 141.061 140.465 139.927 139.532 137.459 0.000 41 145.288 144.375	145.288 144.255 143.235 143.321 141.437 140.679 139.979 137.843 136.143 134.919 133.513 27 145.288 144.346 143.425 142.590 141.795 141.117 140.488 139.998 139.594 137.647 0.000 42 145.288 144.392	145.288 144.255 143.235 142.321 141.437 140.679 139.980 137.844 136.144 136.144 133.516 28 145.288 145.288 145.288 141.833 140.541 140.027 139.649 137.763 0.000 43 145.288 144.397 143.551	145.288 144.248 143.261 142.311 141.475 140.685 134.990 133.616 29 145.288 144.346 142.591 141.839 141.839 141.839 141.839 140.038 139.662 137.807 0,000 45 145.288 144.22 145.608	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122 133.823 30 145.288 145.288 145.288 145.288 145.288 145.288 143.445 142.617 141.842 141.172 140.570 140.091 139.709 137.940 0.000 45 145.2888 145.2888 145.2888 145.2888 145.2888 145.2888 145.2888 145.2888 145.2888 145.28888 145.28888 145.2	145.288 144.271 143.329 142.327 141.529 140.611 139.947 139.252 137.360 136.071 135.105 31 145.288 145.288 144.359 143.459 143.459 143.459 140.122 139.743 138.022 0.000 46 145.288 144.548	145.288 144.271 143.329 142.328 141.530 140.611 139.948 139.252 137.361 136.073 135.108 32 145.288 144.365 143.44.365 143.44.365 140.591 140.142 139.754 138.053 0.000 47 145.288 144.438 143.634	145.288 144.302 143.294 142.433 141.511 140.793 140.036 139.466 137.682 135.622 33 145.288 144.364 143.464 143.467 142.650 141.892 141.237 140.654 140.029 139.500 138.600 0.000 48 145.288 145.288	145.288 144.278 143.340 142.377 141.588 140.108 139.486 137.753 136.551 135.740 34 145.288 145.288 141.931 141.229 140.021 139.558 138.915 0.000 49 145.288 144.479 143.709	145.288 144.306 143.310 142.453 141.559 140.126 139.573 137.868 136.699 135.946 35.946 35.946 35.946 145.288 141.233 140.642 140.036 139.577 138.947 0.000 50 145.288 144.516 143.772	145.28(144.30) 143.33(142.47] 141.61 140.212 139.670 138.036 136.916 136.253 36 145.288 144.371 143.495 142.675 141.927 141.246 140.605 140.064 139.041 0.000 51 145.288 144.532	B 145.28 2 144.31 2 143.38 142.49 141.64 140.061 139.49 138.866 137.451 136.770 145.288 144.382 143.499 142.697 141.267 140.629 139.260 0.000 52 145.288 144.543 143.639	$\begin{array}{c} 8 & 145.26\\ 1 & 144.32\\ 7 & 143.37\\ 1 & 142.53\\ 6 & 141.63\\ 1 & 140.95\\ 1 & 140.95\\ 1 & 137.51\\$	8 145.288 6 144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.698 1 137.489 39 39 1 45.288 144.387 142.710 141.972 141.303 140.730 140.250 139.550 0.000 54 145.288 144.557 143.860
1 2 3 4 5 6 7 8 9 10 11 A REA 5 6 7 8 9 10 11 A REA 1	145.208 144.256 143.237 142.324 141.441 140.683 137.851 136.154 134.934 133.545 23 145.288 145.288 145.288 144.332 140.325 139.722 138.856 138.550 137.662 40 145.288 144.36 135.550	145.208 144.253 143.230 142.314 141.428 140.667 139.966 137.621 136.113 134.802 133.450 26 145.208 145.208 141.791 141.061 140.465 139.927 139.532 137.459 0.000 41 145.208 144.395 143.519	$145.288\\144.255\\143.235\\142.321\\141.437\\140.679\\139.979\\137.843\\136.143\\136.143\\134.919\\133.513\\27\\145.288\\144.346\\143.425\\142.590\\141.795\\142.590\\141.795\\142.590\\141.117\\140.488\\139.998\\139.594\\137.647\\0.000\\42\\145.288\\144.392\\145.288\\144.392\\143.522\\142.735\\$	145.288 144.255 142.321 141.437 140.679 139.980 137.844 136.144 134.920 133.516 28 145.288 145.288 145.288 141.123 140.541 140.541 140.649 137.649 137.630 0.000 43 145.288 144.397 143.551	145.288 144.248 143.261 142.311 141.475 140.685 134.990 133.616 29 145.288 144.346 143.446 142.591 141.839 141.130 140.550 140.559 141.839 141.130 140.554 143.466 145.288 139.662 137.807 0.000	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122 133.823 30 145.288 144.354 142.617 141.842 141.172 140.570 140.591 140.591 140.591 145.288 144.431 143.602 145.288	145.288 144.271 143.329 142.327 141.529 140.611 139.947 139.252 137.360 136.071 135.105 141.35.10 145.288 144.359 143.452 142.632 141.196 140.593 140.593 140.522 0.000 46 145.288 144.434 143.599	145.288 144.271 143.329 142.328 141.530 140.611 139.948 139.252 137.361 136.073 135.108 32 145.288 144.365 143.444 142.886 145.2888 145.288 145.288 145.288 145.288 145.288 145.288 145.288	145.288 144.302 143.294 142.433 141.511 140.793 140.036 139.466 137.682 135.622 33 145.288 144.364 143.467 142.650 141.892 141.237 140.634 140.029 139.500 138.600 0.000 45.288 14	145.288 144.278 143.340 142.377 141.588 140.108 139.486 137.753 136.551 135.740 34 145.288 145.288 145.288 145.288 141.931 141.229 140.633 141.931 141.229 140.63 145.289 145.288 138.915 0.000 49 145.288 144.478 143.79 143.79 143.588 138.915 0.000 49 145.288 144.478 143.79 143.801	145.288 -144.306 143.310 142.453 141.559 140.126 139.573 137.868 136.699 135.946 	145.28 144.30 143.33 142.47 141.61 140.21 139.67 138.036 136.23 36 145.288 144.371 143.495 142.675 141.226 140.605 140.605 140.605 140.605 140.605 140.605 140.605 143.528 145.2888 145.288 145.288 145.2888 145.2888 145.	B 145.28 2 144.31 2 143.38 1 142.49 1 140.90 3 140.064 1 39.69 3 139.69 3 139.69 3 139.69 1 39.69 1 39.69 1 39.69 1 39.69 1 39.69 1 45.288 1 44.382 1 43.499 1 41.267 1 49.629 1	8 145.20 1 144.32 7 143.37 1 142.53 6 141.63 1 140.95 1 130.54 1 140.07 5 130.54 1 137.51 9 136.67 38 145.288 145.288 144.381 143.502 142.694 141.948 141.948 141.948 141.948 141.948 143.502 145.288 145.28	$\begin{array}{c} 8 & 145.288\\ 6 & 144.30\\ 1 & 143.398\\ 1 & 142.529\\ 1 & 142.529\\ 1 & 140.967\\ 0 & 140.244\\ 9 & 139.698\\ 1 & 139.204\\ 5 & 137.489\\ 39\\ 1 & 137.489\\ 39\\ 1 & 137.489\\ 39\\ 1 & 137.489\\ 39\\ 1 & 137.489\\ 1 & 137.489\\ 1 & 137.489\\ 39\\ 1 & 137.489\\ 39\\ 1 & 137.489\\ 39\\ 39\\ 1 & 137.489\\ 39\\ 39\\ 39\\ 39\\ 39\\ 39\\ 39\\ 39\\ 39\\ 3$
1 2 3 4 5 6 7 8 9 10 11 A REA 5 6 7 8 9 10 11 A REA 1	145.268 144.256 143.237 142.324 141.441 140.683 139.985 137.851 136.154 134.934 133.545 145.288 144.332 140.955 147.625 136.550 137.662 40 145.288 144.360 143.519 142.713 141.976	145.288 144.253 143.230 142.314 141.428 140.667 139.966 137.821 136.113 134.882 133.450 26 145.288 141.791 141.061 140.465 139.927 139.532 137.459 0.000 145.288 144.395 143.519 143.519	$145.288\\144.255\\143.235\\142.321\\141.437\\140.679\\139.979\\137.843\\136.143\\136.143\\134.919\\133.513\\27\\145.288\\144.346\\143.425\\142.590\\141.795\\141.117\\140.488\\139.998\\139.594\\137.647\\0.000\\42\\145.288\\144.392\\145.288\\144.392\\145.288\\144.392\\145.288\\144.392\\145.288\\142.735\\$	145.288 144.255 142.321 141.437 140.679 139.980 137.844 136.144 136.144 133.516 28 145.288 145.288 144.344 143.443 142.587 141.833 140.541 140.027 137.63 0.000 43 145.288 144.397 143.551 142.749	145.288 144.248 143.261 142.311 141.475 140.685 140.685 137.889 136.205 134.990 133.616 29 145.288 144.3466 143.446 142.591 141.839 141.130 140.550 140.558 137.807 0.000 45.288 144.422 143.608 145.288 144.2836 142.836	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122 133.823 30 145.288 144.354 143.445 142.617 141.842 141.172 140.570 139.709 137.940 0.000 455 145.288 144.431 143.602 142.861 143.862 144.854 143.862 143.865 145.865 145.865 145.865 145.865 145.865 145.865 145.8	145.288 144.271 143.329 142.327 141.529 140.611 139.947 139.252 137.360 136.071 135.105 145.288 144.359 143.452 142.632 141.857 141.196 140.593 140.593 140.528 143.622 0.000 46 145.288 144.434 143.599 142.870 142.870	145.288 144.271 143.329 142.328 141.530 140.611 139.948 139.252 137.361 136.073 135.108 32 145.288 144.365 145.288 141.847 "141.218 140.591 140.591 140.592 145.288 144.365 0.000 47 145.288 144.438 143.634 142.886 142.243	145.288 144.302 143.294 142.433 141.511 140.793 140.036 139.466 137.682 136.463 135.622 33 145.288 144.364 143.467 142.650 141.892 141.892 141.895 144.65 145.288 145.	145.288 144.278 143.3400 142.377 141.588 140.108 139.486 137.753 136.551 135.740 34 145.288 145.288 145.663 141.931 141.225 140.630 140.021 139.558 138.915 0.000 49 143.288 144.479 143.288 144.479 143.288	145.288 144.306 143.310 142.453 141.559 140.126 139.573 137.868 136.699 135.966 136.699 135.966 145.288 145.288 145.288 141.233 140.642 140.036 141.233 140.642 140.036 141.233 140.642 140.036 141.233 140.642 143.490 00 00 145.288 144.516 143.772 143.772 143.772 143.525	145.28(144.30(143.33(142.47) 141.611 140.90(140.212 139.67(138.036 136.253 36 145.288 145.288 145.288 145.2675 141.927 141.246 140.605 140.064 139.593 139.041 0.000 51 145.288 144.532 143.810 143.816 142.597	B 145.28 2 144.31 2 143.38 1 142.49 1 141.64 1 140.90 3 140.05 1 39.49 1 39.49 1 39.49 1 39.49 1 39.49 1 45.288 1 44.382 1 43.499 1 42.697 1 41.257 1 40.629 1 49.25 1 43.83 1 43.83	8 145.20 1 144.32 7 143.37 1.42.53 6 141.63 1.40.95 1.40.95 1.40.07 5 139.54 1.37.51 9 136.87 145.200 145.200 145.200 141.048 141.048 141.048 141.048 141.05 140.655 140.109 139.211 0.000 145.200 145.200 145.200 145.200	8 145.288 6 144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.698 1 139.698 1 137.689 39 3 145.288 144.387 143.517 142.710 141.972 141.303 140.730 140.250 139.550 0.000 54 143.288 144.557 143.860 143.239 142.695
1 2 3 4 5 6 7 8 9 10 11 A REA 5 6 7 8 9 10 11 A REA 1	145.268 144.256 143.237 142.324 141.4611 140.683 139.985 137.8511 136.154 134.934 133.545 25 145.288 143.407 142.525 140.955140.955140.955140.955137.662 137.662 145.2888144.360 143.519 142.7133 141.976 141.976	145.288 144.253 143.230 142.314 141.428 141.428 130.966 137.821 136.113 134.882 133.450 26 145.288 141.791 141.061 140.465 139.927 139.927 139.532 137.459 0.000 41 145.288 144.395 143.519 142.735 141.987	145.288 144.255 143.235 142.321 141.437 140.679 139.979 137.843 136.143 134.919 133.513 27 145.288 144.346 143.425 142.590 141.795 141.117 140.488 139.998 137.647 0.000 42 145.288 144.392 143.552 142.735 142.052 141.384	145.288 144.255 142.321 141.437 140.679 139.980 137.844 136.144 134.920 133.516 28 145.288 145.288 145.288 145.288 141.123 141.833 141.123 140.541 140.0547 137.763 0.000 43 145.288 144.397 143.551 142.749 142.053 141.403	$\begin{array}{c} 1+5.288\\ 1+3.261\\ 1+2.311\\ 1+2.311\\ 1+1.475\\ 1+0.685\\ 1+0.013\\ 137.889\\ 136.29\\ 135.286\\ 1+3.489\\ 145.286\\ 1+3.446\\ 1+3.446\\ 1+3.446\\ 1+3.446\\ 1+2.591\\ 1+1.891\\ 1+1.801\\ 1+0.038\\ 139.662\\ 137.807\\ 0.000\\ 1+5.288\\ 139.662\\ 137.807\\ 0.000\\ 1+5.288\\ 1+4.422\\ 1+3.608\\ 1+4.2836\\ 1+2.866\\ 1+2.866\\ 1+2.866\\ 1+2.866\\ 1+2.866\\ 1+2.866\\ 1+2.866\\ $	145.288 144.266 143.261 142.355 141.490 140.742 140.059 137.973 136.314 135.122 133.823 30 145.288 144.354 143.445 142.617 140.970 140.970 137.970 147.288 145.288 145.288 145.288 144.431 143.602 142.861 142.861 142.861 142.861 145.288	145.288 144.271 143.329 142.327 141.529 140.611 139.947 139.252 137.360 136.071 135.105 145.284 145.284 145.284 145.284 145.284 140.593 140.122 0.000 45.288 143.599 142.672 143.599 142.672	145.288 144.271 143.329 142.328 141.530 140.611 139.948 139.252 137.361 136.073 135.108 35.108 145.288 143.444 142.649 141.218 140.591 140.591 140.591 140.591 140.591 140.592 145.288 143.634 142.886 142.885	145.268 144.302 143.294 142.433 141.511 140.793 140.036 137.662 136.463 135.622 135.622 145.286 144.364 143.467 142.650 141.892 141.237 140.654 143.267 138.600 0.000 45.268 145.268 145.268 145.268 145.268 145.268 145.268 145.268 145.268 145.268 145.277 143.699	145.288 144.278 143.340 142.377 141.588 140.750 140.108 139.486 137.753 136.551 135.740 34 145.288 145.288 145.367 143.486 142.663 141.229 140.630 140.021 139.558 138.915 0.000 49 145.288 144.479 143.709 143.709 143.709 143.709 143.74	145.288 144.304 143.310 142.453 141.559 140.126 139.573 137.868 136.699 135.946 145.288 145.288 145.288 145.288 141.233 140.642 141.233 140.642 141.233 140.642 141.233 140.642 141.233 140.642 141.233 140.642 141.233 140.642 141.233 140.642 141.233 140.642 141.233 140.642 141.233 140.642 141.233 140.642 141.236 141.237 140.642 141.236 140.642 141.236 140.642 141.236 140.642 141.236 140.642 141.236 140.642 141.236 140.642 141.236 140.642 141.236 140.642 141.236 140.642 141.236 140.642 141.236 140.642 141.236 140.642 141.236 140.642 141.236 140.642 141.236 140.642 141.236 140.642 141.236 140.642 141.236 140.642 141.236 145.266 144.256 144.256 144.256 142.666 144.256 142.666 144.256 143.676 145.266 144.256 145.266 145	145.28(144.30) 143.33(142.47) 141.611 140.90(140.212 139.67(136.916 136.916 136.253 36 145.288 144.371 143.495 141.927 141.246 140.064 139.593 140.064 139.041 0.000 51 145.288 145.532 143.810 143.168 142.597	B 145.28 144.31 2 143.38 142.49 144.90 140.90 140.90 139.49 130.45 136.770 37. 145.288 144.382 143.499 142.67 140.629 140.229 139.260 0.000 52. 143.288 143.839 143.839 143.201 142.653 142.653	8 145.20 1 144.32 7 143.37 1.42.53 6 141.63 1 40.95 1 140.07 5 139.54 1 30.54 1 37.51 1 36.67 38 1 45.200 1 45.200 1 45.200 1 45.200 1 40.655 1 40.109 1 39.521 0.000 53 1 45.200 1 45.2	8 145.288 6 144.330 1 143.398 1 142.529 1 141.689 2 140.967 0 140.244 9 139.698 1 139.698 1 139.698 1 139.204 5 137.489 3 145.288 1 44.387 1 43.517 1 42.710 1 41.303 1 40.730 1 39.955 0.000 54 1 43.288 1 44.557 1 43.860 1 43.239 1 42.695 1 42.242
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2	144.356	144.567	144.566	144.576	144.587	144.590	144.603	144.610	144.612	144.618	144.625	144.637	144.640	144.657	144.66
3														144.061	
4	143.238	143.270	143.268	143.295	143.327	143.337	143.375	143.395	143,401	143.419	143.441	143.474	143.485	143.534	143.55
5														143.082	
6	142.243	142.289	142.286	142.329	142.382	142.397	142.457	142.489	142.499	142.527	142.563	142.615	142.632	142.710	142.74
7	141.908	141.917	141.932	141,979	142.041	142-061	142.130	142.166	142.179	142,210	142.253	142.313	142.331	142.422	142.46
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7	142.502	142.514	142.567	142.839	142.962	142,998	143.027	143.068							
8	142.312	142.325	142.383	142,687	142.825	142.865	142.897	142.942							
9	142,145	142.161	142.231	142.592	142.752	142.798	142.835	142.886				4			
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10		• • • • • • • • • • • • • • • • • • • •			.00085	.00085		00086	- 00084		. 00087	00007	00007	~~~~	
. 11	0008:	1	.00083	. 00083	.00083	00083	.00085	-00085	- 00085	-00085	. 00086	.00086	00007	00000	00000
ARE	~ ~ ~	£ U	<u> </u>	20	64	50	41	42	11	34	36	34		3.4	
1		01250	. 01 2 50	.01250	01250	-01250	- 01250	-01 280	01780	01 280	01 35 0	A1 98A		38	
Z	.01250	.01250	.01250	.01250	-01250	-01250	.01280	. 01 250	01280	+01230-					
. 3	.0125	+01250	.01250	.01250	.01250	.01280	.01280	-01250	101230	+41220	*****	•01520	• 01 230	•01250	+01250
- 4	.01250	.01250	01250	.01250	-01250	.01280	. 01 980	A1 2 = A	A13=A	01 250		+01250	+01250		+01250
5	. 01250	.01250	.01 250	.01280	.012#0	.01984	.01380	+ UI 29U	• 01270	.01220	+01250	.01250	.01250	•01250	.01250
, K		• 01250	. 61 3 84	01.280		~~ #UICJU	A14220	+V1230			+ 01 250		• 01250-		01250
7			01230	01220	+01290	.01230	•01250	.01250	.01250	.01250	+01250	+01250	•01250	•01250	•01250
8		01230	+-01230					+01250	+01250					_ <u>+01250</u> _	-+01250
-		.01250	•01250	.01250	.01250	.01250	+01250	.01250	•01250	.01250	.01250	.01250	•01250	.01250	.01250
<u> </u>			+01220	•01250	.01250	01250				.01250	aa 01250		- +01250	-+01250	
10	.01250	.00088	+ 00 088	.00089	.00089	.00089	· • • • • • • • • • • • • • • • • • • •		-01250	.01250	.01250	-01250	- 03 250	. 01 250	- 01250
. 11	• 00088	0.00000	0.00000	0.00000	0.00000	.0.00000	0.00000	.0.00000	0.00000	0.0000.	0.00000	0.00000	0.00000-	0.00000	0.00000
ARE	A 40	41	42	43	44	45	46	47	48	40	50	51	52	42	56
1		.01250	.01250						01250	- 01 250	-01250	-01250	- 01 250	-01250	.01250
2	• 01 5 2 0	•01220	.01250	•01250	•01250	+01250	.01250	.01250	.01250	-01250	-01250	-01250	-01250	- 01 2 50	. 61250
3	01250	01250	.01250	.01250	.01250	-01250	-01250	-01250	.01250	.01250	.01250	-01250	.01250	01250	01250
4	.01250	.01250	.01250	.01250	.01250	-01250	-01250	-01250	-01250	-01 250	- 01250	01280	01280	01260	
5	.01250	. 01250	. 01 2 50	-01250	-01250	-01250	-01250	.01280	.01280	01 980	01280	01250	+ 41230	• • • • • • • •	•01220
6	.01250	.01250	- 01 2 50	-01250	-01250	-01250	-01280	. 01 250	01280	01 280	01280.	01250	+01230	-+ 91270-	+-01220
7		-01250	- 01 250	- 01 250	.01250	.01250	A1 28A	01 280	A1280	01250	01250	01250	.01200	• 01250	.01250
8	.01250	.01250	.01250	- 01 250	.01250	.01250	01280	01250			-+01230		+01230	-+41230_	-+01250.
, , , , , , , , , , , , , , , , , , ,	01250	-01250	. 01 250	.01250	.01250	.01250	+01230	01230	.01290	-01270	.01250	.01250	.01250	• 01 2 50	•01250
10	-01250	.01250	- 01 250	-01250	. 01 280	01250	01250				+01230.	- •01250	+01250		-+01250
ARE	A 55	56	57	59	#012JV	101290	41	* VI 290	.01250	-01270	.01250	.01250	.01250	.01250	•01250
1			01 250	01 250	01250	01280	01260	01 250	01250	64					- 69
	.01250	•01250	.01250	01250	01250	01250	-01250	+01250	+01250	.01250	.01250	.01250	.01250	.01250	•01250
		01980	AU1280		UC_U	A1 9 2 4	+01630		+01230-				-01250	01250	01250_
2	+ UI 2 7 U	• 01250	+ VI 27U	+ 01 220	+ 41230	+01670	• 01220	• 01 2 3 0	+01220	.01250	.01250	.01250	.01250	.01250	.01250
2.	•UI230	. 01250	+ UL 2 7 0	•01250			01250	+01250	.01250				+01250	-+01250	-+01250_
?	.01250	.01250	• 01 2 50	+01250	.01250	.01250	+01250	.01250	.01250	-01250	.01250	.01250	.01250	.01250	.01250
					-01250	-01250	-01250	_ 01 280	.01980	A1 38A	A1 38 A	A1 38A	01 98 0	A1 8 PA	** * * *
1		• • • • • • • • • •	• • • • • • • • • •	• U1 2 7 U	• 41234	-01230	-01250	- 01 280		A1 98 A	A1 48 A	A 4 4 8 A	~ * ~ ~ ~		
7			e UI 2 2 U	9 UI 2 3 U	.01230	-01230	-01230	-01230	-01250	- 01 250	01280	013E0	01 3E 0	A1 A#A	
10	• V1220		0+00000	0.00000	.0.00000	0.0000	0.00000	0.00000	0.00000	0.00000-	0.00000	0.00000	0.00000.0	0.00000	.00000
	N 70	(1	12	73	/4	75	76	77							
1	. 01250		+01250	.01250	.01250	.01250	01250.								
2	.01250	.01250	.01250	.01250	.01250	.01250	.01250	.01250							and an end of the second second
3	01250	01250	-01250	01250		-01250	-01250	.01250							
•	•01230	.01230	.01250	.01250	-01250	-01250	-01250	- 01 250							
. 5		· 01250	• 01 2 50		.01250	.01250	.01280	- 01 250							
6	• 01230	+01250	.01250	.01250	-01250	-01250	.01250	01280				· · · · · · · · · · · · · · · · · · ·	• • • • • • • • • • • • •	· · · ••• · · · · · · · · · · · · · · ·	
7															

and the second secon

NE		COMPLETE HELT	
	NODE	RADIUS	
	1	.001145	
	2	.001219	
		.001216	
	3		
	9	+001104	
	5	.001108	
	6		
	7	.001007	
	Å	.000902	
· · · · · · · · · · · · · · · · · · ·	α	.000900	
	10		
	11	.000856	a second seco

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ROTATIONAL MOLDING SIMULATION

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WITH OVEN CONVECTION HEATING

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	WITH OVEN CONVECTION HEATING
	PROGRAM RH485(INPUT, OUTPUT, TAPES=INPUT, TAPE6=OLTPUT, TAPE8) DIMENSION TN (100), T (200, 100), DC (200), PS (200), N3 (200), H3 (200)
	C ,H2(203), AVECK(203, 100), SNECK(100), ANEK(100)
	COMMON SS, SM, A L, A M, DX, N, TM, AA, A T, AD, TH, DL, N2, CT, NC, N3, RAD, TS
	COMMON TAIR, BHT, MT
	INTEGER CT.KL
	DATA ANECK, 3NECK/20000*0.0,100*0.0/
C C	GLOSSARY
-C C	AA TOTAL CROSS SECTIONAL POOL AREA (CM2)
.	ACNST DUMMY VARIABLE
С	ACONST DJMMY VARIABLE
-6	AD PENITRATION THICKNESS (CH)
C	AH CONVECTION COEFFICIENT OF OVEN AIR (J/CH2-SEC-K)
- <u>C</u>	AL-INITIAL POWDER THERMAL DIFFUSIVITY (CM2/SEC)
C	ALCP SPECIFIC HEAT OF ALUMINUM MOLE (J/KG-C)
C	ALDIFF THERMAL DIFFUSIVITY OF ALUMINUM MCLC (CM2/SEC) ALK THERMAL CONDUCTIVITY OF MOLD (J/CM-SEC-K)
с -с	ALK THERMAL CONDUCTIVITY OF MULD (J/CM-SEC-K)
C	AM THERMAL DIFFUSIVITY AT COMPLETE MELT (C12/SEC)
-č-	ANECK
č	ANEK NECK RADIJS OF EACH NODAL AREA AT THE TIME
- C	
C	ANK DUMMY VARIABLE = ANECK(1,1)
£	
C	DROSS SECTIONAL POOL AREA
.	AS TOTAL AREA ENCOMPANSING NODAL ANALYSIS
-C	(HEIGHT OF NCDES X TOTAL WIDTH)
- 0 -	AT- 3 ROSS SECTIONAL A REA OF ONE WEDGE (CM 2)
-	ATEST DUMMY VARIABLE
÷C	AV JUMMY VARIABLE USED TO DETERMINE NEW ANGLE THETHA A3 CROSS SECTIONAL AREA OF STUCK COLUMN OF MATERIAL THAT
- <u>c</u> -	THAT RE-ENTERS THE POOL IN THE NEXT TIME INCREMENT (
č	A4 THE GROSS SECTIONAL AREA OF THE STUCK COLUMN OF
	MATERIAL THAT REMAINS OUTSIDE THE POOL
С	DURING THE NEXT TIME INCREMENT (C12)
6	
C	BB JUMMY VARIABLE USED IN TEMPERATURE EQUATION
·6 ·	BE DUMMY VARIABLE USED - SURFACE NODAL NECK SIZE EQUATION
C	BMT EXTERIOR TEMP OF MCLD (DEG C)
5	BMIN EXTERIOR TEMP OF MOLD DURING
	THE NEXT TIME INCREMENT (DEG C)
C	CC HALF LENGTH OF POOL CORD (CM)
<u>c</u>	CT - SOUNTER USED TO COUNT THE NUMBER OF STUCK COLUMNS
č	CI CONSTANT USED IN TEMPERATURE EQUATIONS CETERMINED IN
	SUBROUTINE CONST
С	CZ DONSTANT USED IN NODAL TEMPERATURE EQUATIONS
C	C3
С	DA AVERAGE DIFFUSIVITY BETWEEN NODES I+1 AND NODE I (CM2/SEC)
0	DB -4-VERAGE DIFFUSIVITY BETHEEN NODES I-1 AND NODE I -1CH2/SECI
0 0	DC ARC WIDTH OF STUCK NODAL COLUMNS (RAD)
	DL-ARC-LENGTH DER-TIME INCREMENT (RAD/SEC)

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74/825 OPT=0, ROUNC= 4/ S/ M/-D, -DS FTN 5.1+601 163

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<u>C</u>	DT
C	DX JISTANCE BETWEEN NODES (CM)
e	
C	EN PORTION OF COLUMN ARC WIDTH RE-ENTERING THE
-C	
C	FT AVERAGE TEMPERATURE OF MATERIAL IN FREE FALL ZONE (C)
-6	G ACCELLERATION DUE TO GRAVITY (CH/SEC2)
C	H HEIGHT OF STUCK MATERIAL LEAVING POOL (CM)
-C	HT DUMMY VARIABLE USEE IN COMPUTING POOL ANGLE THETHA
C	H1 HEIGHT OF STUCK MATERIAL LEAVING POOL DURING THE NEXT
-6	
C	H2 HEIGHT OF STUCK MATERIAL COLUMN OUTSIDE POOL
-8	
C	STJCK MATERIAL OUTSIDE POOL (CM)
6	I-COUNTING VARIABLE-USED IN CO-LOOPS
С С	IFLAS FLAS SHOWING THAT NODAL HEIGHT HSD REACHED
с С	II COUNTING VARIABLE USED IN DO-LOOPS
C	IREM FLAG SHOWING POOL MASS IS GONE WHEN = 0
- <u>č</u>	
č	ITM COUNTER
-	
Ċ	12 DUMMY VARIABLE US (D WITH THE PRINT SUBROUTINE
-	
Ĉ	J COUNTING VARIABLE USED IN EO-LOOPS
—ē—	
Č	JJ COUNTING VARIABLE USED IN DO-LCOPS
-6	
C	JK DUMMY VARIABLE
€	
C	JTVAL DUMMY VARIABLE
	
C	KK FLAG VARIABLE
. 6	KLDUMMY VARIABLE
C	K4 DUMMY VARIABLE
	LK COUNTING INTEGER-USED WITH-PRINT SUBR CUTINE-
C	LT DUMMY VARIABLE
0 0	MT INTERIOR MOLD SURFACE TEMP (DEG C) MIN_INTERIOR_MOLD_SURFACE_TEMP_ONE_TIME_INGREMENT
C	
	LATTER (DEG C) NNUMBER OF NODES IN EACH STATIONARY-POOL COLUMN
	NC NUMBER OF POOL COLUMNS OF NODES NEC- COUNTINS-VARIABLE
Ĵ	NMAX MAXIMUM NODE HEIGHT BASED ON VOLUME OF POOL (CM)
	NNAX EQUALS N+1
Č	NNTP DUMMY VARIABLE WHICH EQUALS N6+N4+1
	N2 COLUMN NUMBER OF STUCK MATERIAL
Č	N3 NUMBER OF NODES IN STUCK COLUMN MINUS 2
	N3 TEMP - DUMMY - VARIABLE
C	N4 DJMMY VARTABIE
<u>C</u>	NE NUMBER OF NODES IN PENITRATION THICKNESS
C	OT PORTION OF RE-ENTERING STUCK COLUMN NOT ENTERING POOL (RAD
C -	PS -POSITION OF A PARTICULAR STUCK COLUMN IN MOLD (RAD)
	PT PRINTING INTERVAL (SEC)
ç	

	D INITIAL RADIUS OF MATERIAL (CM)
RB	
RM	
	INNER RADIUS OF MCLO (CM)
	M ROTATIONAL SPEED OF MOLD (RPM)
-	
	DJMMY VARIABLE
SM	
÷.	RATIO JE FREE-FALL TIME TO TIME INTERVAL TS
S5	
	JUMMY VARIABLE USED IN WEDGE AREA EQUATION
S2	
	NO DAL TEMPERATURE
	IR TEMPERATURE OF OVEN AIR (DEG C)
TF	FALL TIME IN FREE FALL ZONE (SEC)
T۲	ANGLE (THETHA) FROM CENTER OF MOLD TO JUNCTION OF
	POOL SURFACE AND HOLD (RAD)
T٢	1 TIME
	P COMBINED NODAL TEMPERATURE USED IN DETERMINING
	A VERAGE TEMPERATURE (C)
	S TIME INTERVAL USED (SEC)
	ST DUMMY VARIABLE
	IL DUMMY VARIABLE
	+CONTACT-TIME OF MATERIAL-TO-WALL-IN POOL REGION (SEC)
W	
	5 POSITION OF LEADING AREA OF STUCK MATERIAL (RAD)
EN= 0	SECTION I *****
EN=0	SECTION I *****
EN=0 IREM LK=0	SECTION I ***** • 0- = 1
EN=0 IREM LK=0 NEC=	SECTION I *****
EN=0 IREM LK=0 NEC= IFLA	SECTION I **** .0- =1 1 5=0
EN=0 IREM LK=0 NEC= IFLA PT=3	SECTION I **** -0- =1 1 3=0 0.0
EN=0 IREM LK=0 NEC= IFLA PT=3 TM=0	SECTION I **** .0- =1 1 5=0
EN=0 IREM LK=0 NEC= IFLA PT=3 TM=0 NC=8	SECTION I ***** -0
EN= 0 IREM LK= 0 NEC= IFLA PT= 3 TM= 0 NC= 8	SECTION I ***** •0 =1 1 3=0 0 •0 •0 •0 •0
EN=0 IREM LK=0 NEC= IFLA PT=3 TM=0 NC=8 RI=1	SECTION I ***** •0
EN=0 IREM NEC= IFLA PT=3 TM=0 NC=8 RI=1 RI=1	SECTION I ***** -0- =1 1 3=0 0.0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -
EN=0 IREM LK=0 NEC= IFLA PT=3 TM=0 NC=8 RAD= RI=1 RO=6 RPM=	SECTION I ***** =1 1 3=0 0.0 0.0 •0 •0 •0 •0 •0 •0 •0 •0 •0 •0 •0 •0 •0
EN=0 IREM LK=0 NEC= IFLA PT=3 TM=0 NC=8 RAD= RI=1 RO=6 RPM=	SECTION I ***** -0- =1 1 3=0 0.0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -
EN=0 IREM LK=0 NEC= IFLA PT=3 TM=0 NC=8 RAD= RI=1 RO=6 RPM=	SECTION I ***** =1 i 5=0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0
EN=0 IREM NEC= IFLA PT=3 TM=0 NC=8 RI=1 RI=1 RI=1 SA=5 SS=1	SECTION I ***** • 0 = 1 1 5=0 0 • 0 • 0 • 0 • 0 • 0 • 0 • 0
EN= 0 IREM LK= 0 NEC= IFLA PT= 3 TM= 0 NC= 8 RI= 1 RD= RI= 1 SM= 1	SECTION I ***** -0- =1 1 5=0 0.0 -0 0.0 -0 0.0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -
EN=0 IREM LK=0 NEC= IFLA PT=3 TM=0 NC=8 RI=1 RO=6 RPM= SA=5 SS=1 SM=1 IT=2	SECTION I ***** -0
EN=0 IREM IREM NEC= IFLA PT=3 TM=0 NC=8 RD= RI=1 RI=1 SM=1 SM=1 IT=2 DX40	SECTION I ***** 0 =1 1 3=0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0
EN=0 IREM IREM NEC= IFLA PT=3 TM=0 NC=8 RD= RI=1 RI=1 SM=1 IT=2 DXH0 ALRH	SECTION I ***** .0 =1 1 5=0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0
EN=0 IREM IREM NEC= IFLA PT=3 TM=0 NC=8 RI=1 RI=1 RO=6 RPM= SA=5 SS=1 IT=2 DXM0 ALRH ALCP	SECTION I ***** •0 =1 1
EN=0 IREM IREM NEC= IFLA PT=3 TM=0 NC=8 RI=1 RI=1 RI=1 SM=1 IT=2 DXM0 ALRH ALCP ALK=	SECTION I ***** .0 =1 1 3=0 0.0 .0 .0 .0 .0 .0 .0 .0 .0
EN= 0 IREM IREM NEC= IFLA PT= 3 TM= 0 NC= 8 RI= 1 RO= 6 RPM= SA= 5 SS= 1 SM= 1 IT= 2 DXMO ALRH ALCP ALK=	SEGFION I ***** •0 • •1 • 5=0 • 0.0 • •0 </td
EN= 0 IREM IREM NEC= PT= 3 TM= 0 NC= 8 RD= RI=1 RO= 6 RPM= SS=1 SM=1 IT= 2 DXM0 ALRH ALCP ALCP ALS TAIR	SECTION I ***** .0 1 5=0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 10.0 3 10.0 3 10.0 2.0 2.0 2.025 3 3 3 2.025 3 3 .
EN=0 IREM IREM NEC= IFLA PT=3 TM=0 NC=8 RI=1 RI=1 RI=1 SM=1 IT=2 DXM0 ALRH ALCP ALK= IAIR NI=1	SECTION I ****** :0
EN=0 IREM IREM NEC= IFLA PT=3 TM=0 NC=8 RI=1 RO=6 RI=1 SM=1 IT=2 DX-MO ALRH ALCP ALF=I BMT=	SECTION I ****** :0
EN= 0 IREM IREM NEC= IFLA PT= 3 TM= 0 NC= 8 RI= 1 RO= 8 RI= 1 RO= 5 SM= 1 IT= 2 DXMO ALRH ALCP ALCP ALF= IALDI	SEGTION I ***** =1 1 5=0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0
EN=0 IREM IREM NEC= IFLA PT=3 TM=0 NC=8 RI=1 RO=6 RI=1 SM=1 IT=2 DX-MO ALRH ALCP ALF=I BMT=	SEGTION I ***** -0

C	** SECTION-II*****
	RA=RI/R9
220	TH= (3.14159/2.0-ATAN (RA/(-RA*RA+1.0)**0.5))*2
	DETERMINE AREA IN STATIONARY POOL
	AA=0.5*R0*R0*(TH-SIN(TH))
	AL=COND(0)/(C) (0) *RH0(0)
	AM=COND(RAD)/(CP(RAD)*RHO(RAD))
	H=0.18472*RPH
	TW=TH/W
	ITM=0
	ITHX=1
	ACNST=2/(DXMOLD*ALRHO*ALCP)*(AH+ALK/DXMOLD)
	TS1=1 /ACNST
	TM = TM + TS
	-DETERMINE -MAXIMUM PENITRATION-DISTANCE
	AD=7.2*(AL *TW) **0.5
	DETERMINE MAXIMUM TIME-INCREMENT
	DT=TW/NC
	DETERMINE NODAL DISTANCE
	DX= (DT*2*AM) ** 0.5
	-IF(AM.LT.AL) -DX=(DT*2*AL)**0.5
	DETERMINE NUMBER OF NODES PER COLUMN
	-N = (INT(AD/DX) + 1) + 2
	NNA X= N+1
	-N2=NC+2
	CT=N2-1
	SET INITIAL TEMPERATURE-AND NECK RADIUS
	DO 125 I=1,NC
	T(I,J)=IT
	- ANECK (I, J) =0.0
	CONTINUE
	-CONTINUE
-	BA= 0.0174533*BA
	WRITE (6, 10)
16	FORMAT(1H1,29HRD TATIONAL MCLDING SIMULATOR)
	WRITE (6, 12) TAIR, AH, DXHOLD, ALDIFF
12	FORMAT(1X, //, $6X$, 24HTEMP. OF AIR (DEG. C) = , F10.3./, $6X$,
	133HGONVEGTION-COEF (J/CK2-SEG-K) = +E10.3./.6X.
	222HMOLD THICKNESS (CM) = $,F10.5,/,6X,$
	3-27HMGLD -DIFFUSIVITY -{CM2/S}
	WRITE(6,11)RI,RO,N.DX,SS,AL,SM,AM,RPM
	-FORMAT(6X+25HPOHDER-HEIGHT RADIUS(CH)=-+F10.3+/+6X+17HHOLD RADIU
	1CM) = ,F1C. 3,/,6X,21HINTIAL NO. OF NODES= ,I3,/,
··· · · · · · · · · · · · · · · · · ·	36X + 20 HN OJE-THICKNESS (CM)= -+ F1C+ 4+/+ 6X+38HSTICK-TEMP(C) - AND -DI
	41STVTTVICM2/SN ETA Z ZV. ETA Z. / GV. LGHCOMPLETE MELT TEMP(C) AN
	501FFUSIVI FY(042/S)= -,F-1 (-3,3X,E 10-3,7,6X,6HRPM= -,F10-3)
U	
(;¥.¥	***SEGTION-III. ** ***
C	
1900	· TW=TH/W
	GG=2*RO*SIN(TH/2)
· · · ·	-ANK=ANESK(1,1)
	IF (CT.GT.N2) ANK = ANECK (CT, 1)
	IF (CT.GT.N2) ANK = ANECK(CT.1) -AM=GOND{ANK}/{RHO}ANK}*CF(ANK))

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	3E=RADX(ANK)
С	RECHECK MAXIMUM TIME INCREMENT EACH ITERATION
	DT= (BE+DX) ++2/ (2.0+AM)
	IF(AM.LT.AL) DT=(BE*DX)**2/(2.0*AL)
	IF((IREM.EQ.0).OR.(ITM.GT.0)) GOTO 109
	TS=TW/NJ
108	TTL=TS
	ITMX=1
	IF(TTL.GT.DT) TTL=DT
	-IF(TTL.3T.TS1) TTL=TS1
	IF(TTL.EQ.TS) GOTO 109
	ITMX=INT(TS/TTL)+1
	TS=TTL/ITMX
109	IF (IREM.EQ.0) TS=DT
	DL=W*TS*R0
	-IF(TM.EQ.0.0) WRITE(6,20) DI, TS, DL
2.9	FORMAT(1H ,/.6X, 23HMAX TIME INCREMENTS(S) = , F10.5, /.6X, 21HTIME INC
	1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 =
	TM=TM+TS
	IFTIREM.EQ.01 GOTO 540
	NMAX = INT (AA/(NG*DL*DX)) + 1
	AD=7.2*(4L *TW) ** 0.5
	TF=(1.3333*CC/(G*COS(BA)))**0.5
	SR=TF/TS
_	IF(SR.LT.1.0) SR=1.0
	DETERMINE AREA OF EACH WEDGE
	S1=R0*SIN(TH/2.0)
	-S2=R0+C0S(TH/2.0)+TAN(+TS/2.0)
	AT=0.5*(S1+S2)*(S1-S2)*SIN(W*TS)+0.5*P0*R0*(W*TS-SIN(W*TS))
	AS=(N=0.5)*DX*DL
	IF (AS.GT.AT) AS=AT
+	IF (N.LT. NMAX) G0 T3-560
•	N=NMAX
	IFLAG≈1
-540	CONTINUE
	00 550 I=1,NC
	T(I, N+1) = T(I, N-1)
	CONTINUE
562	CONTINUE
	N NA X= N+1
	-N6= INT (4)/ DX)+ 1
С	
- <u>L</u>	*** SECTION IV ****
C	
e	
С	
c c	OMPUTE EXTERIOR AND INTERIOR MOLD SURFACE TEMPERATURES
•	
	CONTINUE
	ACONST=2*TS/(3XMOLB*ALRHO*ALCP)
590	BMTN=BMT*(1.0-ACONST*(AH+ALK/DXMOLD))+
	1 ACONST* (AH* TAIR+ALK *MT/CXMOLD)
	MTN=MT*(1.J-ACONST*ALK/DXHCLD)+ACONST*ALK*BMT/DXMOLD
· · · · · · · · · · · · · · · · · · ·	-00-620 I=1.NC
	n kan manangan sa kan sa sa kan manan sa
. 2	

	T(I,1) = MT
	CALL CONST (C1, C2, C3, DB, DA, MT, MT, MT, ANECK (I, 1), ANECK(I, 2),
	ANECK $(I, 1) = BNECK(1)$
	D0 638 J=2,N
	CALL CONST (C1, C2, C3, DB, DA, T(I, J), T(I, J-1), T(I, +1), ANECK (I, J),
	1 ANECK(I, J+1), BNECK(J))
	TN(J)=T(I,J)*(1-TS/C3*(DB/C1 +DA/C2))+TS/C3*(D9/C1*T(I,J-1)+
	10A/C2*T(I,J+1)
	630 CONTINUE
	T(I,JJ) = TN(JJ)
	IF((JJ.EQ.NEC).AND.(TN(JJ),GT.SM)) NEC=NEC+1
	ANECK (I+JJ)=BNECK (JJ)
	642-CONTINUE-
	625 CONTINUE
•	
	NODAL TEMPERATURE EQUATIONS FOR STUCK MATERIAL
•	
	T(I,1)=MT
	CALL-GONST-(31, C2, G3, OB, D4, MT, MT, MT, ANECK(I, 1), ANECK(I, 2),
	1 BNECK(1))
	TE(N3(T), EQ, 0) = 30 TO(820)
	JTVAL=N3(I)
	CALL CONST (G1, G2, G3, DB, DA, T(I,J), T(I,J-1), T(I,J+1), ANECK(I,J),
	<u></u>
	779 CONTINUE
	78 <u>- J=N3{-I}+1</u>
	CALL CONST (C1, C2, C3, CB, DA, T(T, J), T(T, J-1), T(T, J+1), ANECK(T, J),
	BB=TS/C3*(DB/C1*T(I,J-1)+DA/(H3(I)*C2/DX)*T(I,J+1))
	S21 CONTINUE
	CALL CONST (C1, C2, C3, DB, DA, T(I, J), T(I, J-1), T(I, J), ANECK (I, J),
	BB=DB*TS/(H3(I)*(C3/DX)**2*(H3(I)+0X/2))
	IN(J) = I(I, J) * (I - BB) + BB * T (I, J - 1)
	DO 870 JJ=1, J -T{-T,JJ}=T+{{J}}-
-	IF((JJ,EQ,NEC),AND,(TN(JJ),GT,SM)) ANEK(NEC) = BNECK(JJ)
	$\frac{1}{1} \left\{ \left\{ J_{J} = E_{Q} + NE_{Q} + AND_{Q} + TN \left\{ J_{Q} + G + S + Y \right\} \right\} - NE_{Q} + E_{Q} + 2 - C_{Q} + C_{Q} $
	IF(TN(JJ).GT.SM) = BNECK(JJ) = RAB
	-ANECK (I, JJ)=3NECK(JJ)
	37° CONTINUE
	88 CONTINUE
- •	898 CONTINUE

T=MTN -{{T{NC}}N}=5E=SS}=ANB={-IREM=EQ=1}=AND={N=EQ=NMAX}}=60-T0-891
CITING N) - SF - SS - AND - (IRFM - FR - +) - AND - (N - FR - NMAY) - CR - TO - 201
(T(NC,N).GE, SM) GOTO 8 1
SECTION V ****
INT ROUTINE
ALL PRINT (T, LK, I3)
2=0
LL PRINT (ANECK, 12, 13)
(T(NC, N) GT. SM) GOTO29
-t(T(N);N);LT.;S;);OR;(IREM:EQ:0)) GOTO 892
(N.LT.NMAX) GOTOB92
DRMAT(1H ,///,5X,34HMASS COMPLETELY GONE - TIME(SEC)= ,F10.3)
E M=0 = 0.0
≠U•U =[]•]
(=1K=1
DTO 892
INTINUE
RITE (6, 31)
RMA T(1X, ////, 5X, 29H NECK RADIUS AT COMPLETE HELT
4HNODE, 5X, 6HRADIUS)
)
RITE(6, 32) J, ANEK(J)
RMAT(10X,15,5X,F10.6)
DNTINUE
10P
DNTINUE
M=ITM+1
((IREM.EQ. 0) . OR. (ITM. L1. ITMX)) TM=TM+TS
-((IREM.EQ.0).3R.(ITM.L].ITMX)) GO TO 1000
J COLTAN AI
LOULATE MIX MEAN TEMPERATURE WHEN NO MATERIAL HAS STUCK
LOULATE MER MEAN TEM ERATORE WIEN TO MATERIAL MADE OF THE
P=0.0
- 3.0 - 1110 · I=2,N
P=TP+T(NC.I)
NFINE
P = (TP + MT/2) / (N - 0.5)
'= (AS*TP+(AT-AS)*IT)/AT
) 1146 TTT=2.NC
) 1146 TTT=2.NC
= (AS*TP+(AT-AS)*IT)/AT) 1140 III=2, NC NC-III+2)0 1142 J=1, NNAX T,J)=T(I-1,J)

1 RH485

	ANECK(I, J)=ANECK(I-1, J)
1142	CONTINUE
-1140	CONTINUE
	DO 1150 I=1, NNAX
	
	ANECK (1, I)=0.0
	CONTINUE
	IT=((SR-1)*IT+FT)/SR
وربي بريدين ب متحدثات	-TM=TM+TS
	GO TO 580
	CONTINUE
C	
-	***
C	DETERMINE THE AMOUNT OF STICK ANE NEW ANGLE
- <u>C</u>	
	DO 1220 I=2,N
	-IF (T(NC) I) .LE.SS) -60 -T0 -1221
1220	CONTINUE
	CONTINUE
	RA = (SS - T(NC, I - 1)) / (T(NC, I) - T(NC, I - 1))
	H= (RA+ (I-2+)*)X
	DO 1250 II=2,N
	-IF-(F(NC-1, II). LE.SS) -60 -10-1251
	CONTINUE
4.251	CONTINUE
1295	
	RB = (SS-T(NC, II-1))/(T(NC, II)-T(NC, II-1))
	+1=(RB+(II-2))*
	IF (INT (H/DX) -1.LT.C) GO TO 1109
	-C-T=CT+1
	DC(N2-1)=W*T3
	PS(N2-1)=TH/2.0
~	N3(N2-1) = INT(H/DX) - 1
	-H3 (N2-1) =H-DX N3 (N2-1)
	H2(N2-1)=H
-	DO 1350 J=1, JTVAL
	-T(N2-1, J)=T(NC, J)
	ANECK(N2-1,J) = ANECK(NC,J)
	-CONTINUE
1395	CONTINUE
	T (N2-1,N3 (N2-1)+2)=SS ANECK (N2-1,N3(N2-1)+2)=ANECK (NC,N3(N2-1)+2)
C	
C	COMPUTE MIX-TEMPERATURE OF MATERIAL NOT STICKING BUT
C	ENTERING FREE-FALL ZONE
	TP=0.0
· · · · · · · · · · · · · · · · · · ·	1P=0.0 -90-1-380 J=1,N
	TP = TP + T(NC + I)
139	-CONTINUE
	-IF (K. 6E, 0. 0) - TP=(TP-T(N(,I)*K)/(N-I-K+1)-
	IF(K.LT. J. 0) TP = (TP - T(NC, I-1) *K) / (N-I-K+1)
	M=H*DL
	FT = ((AS - M) * TP + (AT - AS) * IT) / (AT - '4)
• •	
C >	OTATE PONDER
	DO 1440 III=2, NC
	-I=+C-III+2

M RH495

	DO 1445 J=1, NVAX
	T(I,J)=T(I-1,J)
	ANECK(I, J) = ANECK(I-I, J)
	CONTINUE
<u> </u>	CONTINUE
	K4=1
	IF(CT.LT.N2) 50 TO 1900
С	i
-c-**	*** SECTION VIII *****
С	·
C	STUCK MAIL SHIFT
	D0 1470 JJI=N2,CT
and the second se	
	DC(JI)=DC(JI-1)
	N3(JI) = N3(JI - 1)
	H3 (JI)=H3 (JI-1)
	$H_2(JI) = H_2(JI - 1)$
	N3TEMP=N3(JI)+2
	DO 1530 J=1, N3TEMP
	T(JI, J)=T(JI=1, J)
	ANECK(JI,J)=ANECK(JI-1,J)
	CONTINUE
	×5=6.28318-TH/2
	EN=0.0
and an	
	IF(PS(CT).LT.X5) GO TO 1900
	*** SECTION IX *****
	STUCK MATERIAL RE-ENTERING POOL ROUTINE
C	
1	- 00-1570-JI=N2,CT
	IF(PS(JI).GE.X5) GJ TO 1575
	CONTINUE
1575	CONTINUE
	-EN=PS (JI) - X5
	OT=DC(JI)-EN
	-IF (OT-LT-W*FS)
	PS(JI)=K5
	-DC+JI+=>T
	GO TO 1770
	<u>IF (07.LT.0.0) OT=BC(JI)</u>
	$TE(OT_{i} T_{i},0,0)$ $K_{i}=1$
	1K = N3(17 - 1) + 1
	-IF(JK-1E-N3(JI)+1) 60-10 1660
	5x-5x-1 ***=1
4660	GO TO 1550 - CONTINUE
100.	IF((H3(JI).GE.1.5*DX).ANC.KK.EQ.1) JL=1
	IF ((HS(JI) BE 1.5+JX) AND
······	D0 1676 I=2, JK
	T(JI=1,I)=(0T*T(JI,I)+DC(JI=1)*T(JI=1,I))/(0T+DC(JI-1))

	ANECK(JI-1,I)=(OT*ANECK(JI,I)+DC(JI-1)*ANECK(JI-1,I))/(OT+
10/0	CONTINUE
	A3=DC(JI-1)*(H3(JI-1)-DX/2)
	A4=0T*(H3(JI)-DX/2)
	IF(JL.EQ.1) 44=0T*(H3(JI)-1.5*DX)
	$IF(JL \cdot EQ \cdot 1) \qquad T(JI, JK) = T(JI, N3(JI) + 2)$
	IF (JL.EQ.1) ANESK(JI, JK) = ANECK(JI, N3(JI)+2)
	IF((JL.EQ.0).AND.(KK.EQ.1)) A3=DC(JI-1)*DX
	T(JI=1, JK)=(T(JI, JK)*A4+T(JI=1, JK)*A3)/(A3+A4)
	ANECK(JI-1,JK)=(ANECK(JI,JK)*A4+ANECK(JI-1,JK)*A3)/(A3+A4)
ومايومورومين ويهورها مواقعوني	DC(JI=1)=DC(JI=1)+0T
	IF(KL.NE.1) 50 TO 1760
	PS(JI-1)=PS(JI)
	JI=JI-1
	60 T0 -1550
	PS (JI-1) = X5
	CONTINJE
117U	T(1,1)=MT
	N4=N3 (JI) +1
	$IF(H3(JI) \cdot GE \cdot 1 \cdot 5 \times DX) = N4 = N4 + 1$
	111111111111111111111111111111111111
	T(1,J)=T(JI,J)
	ANECK(1, J)=ANECK(JI, J)
1810	CONTINUE
	RM=H2(JI)=(N4+3.5)+DX
	IF(RM.LE.0.0) GO TO 1840
	N4=N4+1
	T(1,N4) = (RM*T(JI,N3(JI) + 2) + (DX-RM) + IT) / DX
	ANECK (1, N4) = A NECK(JI, M3 (JI)+2)
	CONTINJE
•	IF (IFLAG.EQ.1) 6019-1879
	IF (N6+N4.LE.N) 50 TO 1870
÷	NNTP=N6+N4+1
-	NNA X= N+1
	-D0-1860 -I=2, NC
	DO 1862 J=NNAX, NNTP
	-T (I,J)=T (I,N+1)
	ANECK(I, J)=0.0
	CONTINJE
1860	CONTINJE
	N=N6+N4
1.97	CONTINJE
1010	
0	NNA X= N+1
	CONTINUE
T 2 0 "	-00-1935 -II=K4+ NAAX
	T(1,II)=IT
1905	CONTINJE
	IT=((SR-1)*IT+FT)/SR-
	$\Delta \Delta = \Delta \Delta - M$
	-R2=R 0
	AR=AA
	-IF ((CT.LT.N2).02. (EN.LE.E.0)) - 60 - TO - 1950

;RAM RH485

	AA=AA+DL+H2(JI)
	BB=(H1+H2(JI))/2
	R2=R0=88
	AR=AA-B3*R2*T4
1050	CONTINJE
	CONTINE
C	
C	
C **	*** SECTION X *****
e	
Č	FIND NEW ANGLE THETHA (TH)
<u>C</u>	TIAD KEN AGOLI FALTGA (FAR)
С	· · · · · · · · · · · · · · · · · · ·
	LT=0.0
	AV=(HT+LT)/2.0
	IF (HT.EQ.LT) 50 TO 2070
	-RM=AV-SIN(AV)-2*AR/R2**2
	IF (RM**2.0.LT.0.000001) GO TO 2079
	IF(RM.GT.0.0) GO TO 2060
	LT=AV
المراجع	-G0 TO 2010
2060	HT=AV
	<u>GO TO 2010</u>
2070	
	<u>-TM=TM+TS</u>
	SO TO 1000
	-END
. • -	
•	
-	
an a	

	SUBROUTINE PRINT(T,LK,K) DIMENSION T(200,100),N3(200)
	COMMON SSISHIALIAMADXANI THAAAATAATAABATHADLANZICTINGAN3AADATS
	COMMON TAIR, BMT, MT
	REAL MT
	INTEGER CT
	BB=TH*57.29578
	-IF-(K-EQ.1)-601023
	WRITE (6,20)TM, AA, AT, AD, BB, DL, NC
	$-FORMAT(//,11H-T1ME(SEC)=,F10.3,/,6X,16HT0TAL_AREA(C2)=,F10.3,$
	L/,6X,12HWEDGE AREA= ,F10.4,/,6X,28HORIGINAL PENITRATION DEPTH= ,
	2F10.47/96X912HAUGLE (DEG) = -,F10.3,/,6X,27HARC_LENGTH/TIHE_INCREMENT
	3 = ,F10.5, /,6X, 24HND. OF WEDGES IN POOL = ,13, /)
	WRITE(6,10) -TAIR-BMT, MT
	FORMAT(6X,24HTEMP. OF AIR (DEG. C) = ,F10.3,/,6X, 1 44HTEMP. OF MOLD+S EXTEINAL SURFACE (DEG. C) = ,F10.3,
	2 /,6X,44HTEMP. OF MOLD+S INTERIOR SURFACE (DEG. C) = ,F19.3, ///)
	WRITE (5, 21)
	FORMAT(6X,304TEMPERATURE HISTORY OF POWDER)
	-EF-(K-EQ.1) WRITE(6,24)
	FORMAT(//, 12H NECK RADIUS)
	IREP=((NC-1)/ICOL)+1
	IREM=NC-(IREP-1) * ICOL
	00 100 KK=1, IREP
	IF(KK-EQ.IREP) ICOL=IREM
	KJ=(KK-1) * ICOL +1
	-KJ1=KJ+(ICOL-1)
-	IF(KK.EQ.IREP) KJ1=KJ+IREM-1
	-WRITE (6, 108) (J, J=KJ, KJ1)
	FORMAT(1X,5HAREA ,15(13,5X))
	IF (K. EQ. 0) WRITE (6, 1 02) J, (T(I, J), I=KJ, KJ1)
	-IF(K.EQ.1)-W2ITE(S,103)J,(T(I,J),E=KJ,KJ1)
	FORMAT(1X,I3,3X,15(F7.3,1X))
	FORMAT(1 X, I3, 3X, 15(F 7.5, 1X))
104	CONTINUE
	-WRITE (6, 105)
105	FORMAT(1X,//)
	CONTINUE
	IF (CT-LT-N2) -ZETURN
	$\frac{1}{1} \frac{1}{1} \frac{1}$
ЧP	FORMAT(1X,//, 31H TEMPERATURE OF STUCK MATERIAL ,/)
	-IF-(+, EQ. 1) HRITE(6, 99)
9 a	FORMAT(//, 30H NECK RADIUS OF STUCK MATERIAL)
	IREP=INT ((CT-(N2 -)) /ICOL)+1
	IREM=CT-N2+1-(IREP-1)*ICCL
	-00-200 KK=1,I2E
	KJ=(KK-1) * ICAL +N2
	IF(KK.EQ.IREP) ICOL=IREM
	KJ1=KJ+(ICCL-1)
	-IF (KK.Eg.IREP) - KJ1= - KJ+IREM-1

	74/825 OPT=0, ROUNC= A/ S/ M/-D, -DS FTN 5.1+601 174
	WRITE (6, 108) (J, J=KJ, KJ1)
	NTN=N3{KJ}+2
	DO 204 J=1,NTN
	$DO 203 II = KJ_{\bullet}KJ1$
	NTMP=N3(II)+2
	IF (NTMP. EQ.NTN) GO TO 203 IDIFF=NTN=NTMP
	DO = 202 LL = 1, IDIFF
	T(11, NTMP+LL)=0.0
	CONTINUE
	CONTINUE
	IF (K.EQ. 0) WRITE (6, 102) J, (T(I,J), I=KJ, KJ1)
	IF(K.EQ. 1) WRITE(6,103) J, (T(I,J),I=KJ,KJ1)
	CONTINUE
	CONTINUE
	RETURN
	EN1)
	SUBROUTINE CONSTICT, C2, C3, OB, DA, T1, T2, T3, ANB, ANA, BNK)
	DIMENSION N3(200)
	DISCRIPTION ROLLEY.
C	
- <u>c</u>	
	COMMON SS, SM, AL, AM, DX, N, TM, AA, AT, AD, TH, DL, N2, GT, NC, N3, RAD, TS
	A1=0.5*(ANB*ANA)
	C1=RADX(ANB)*PX
	S2=RADX(ANA)*DX
	C3=RADX(A1)*DX DELB={3.0*SU{T1}*RAD/(8.0*VIS(T1)*(TM+0.5*TS))**0.5*TS
· •	IF(ANB/RAD.SE. 0.5) DELB=0.5*SU(T1)*TS/(VIS(T1))
~	-DB=COND(ANB)/[RH0(A1)*CP(A1)]
	DA=COND(ANA)/(RHO(A1)*CP(A1))
	-BNK=ANB+DELB
-	IF (BNK.GT.RAD) BNK=RAD
	IF (DELB. GT. 0. 0) RETURN
	WRITE(6,10)TM,AN3,ANA,BNK,RAD,TS,SU(T1),VIS(T1),DELB
15	FOR MAT(1X, 10 (E10.5, 1X))
	RETURN
	END
Maria	
Mirow - a antosrandaga alga una a	

:ON RHO 74/825 OPT=0, ROUNC= A/ S/ M/-D,-DS FTN 5.1+601 175 ;/=OT,ARG==COMMON/=FIXED,CS= USER/=FIXED,DB==I8/=SB/=SL/ ER/=ID/=PMD/

การสีมันสมารณสารแรกได้การเป็นการสารการการการการสารสมารณสมมณฑิตรีสีมีพิติสีมีสีมีสมมณฑิตรีสารสีมารสมารณสารการสาร

	FUNCTION RHO(Y)
e	DIMENSION N3(200)
С	DENSITY FUNCTION ((G/CM**3)
с С	R1=DENSITY AT SS
c – –	R2=DENSITY AT S4
C	
	X=Y/RAD -
	10 IF(X.GT.1.0) GOTO 20
	RH0=R 1+(2 2-21) *X
	GO TO 1 28 RH0=R2
	1 CONTINUE
	END
	FUNCTION COND(Y) DIMENSION N3(200)
	DIMENSION N3(200) CONDUCTIVITY FUNCTION (JCULE/(CM-SEC-DEG K)) C1 = THERMAL CONDUCTIVITY AT TEMPERATURE SS
с С	DIMENSION N3(200) CONDUCTIVITY FUNCTION (J(ULE/(CM-SEC-DEG K))
- C	DIMENSION N3(200) CONDUCTIVITY FUNCTION (J(ULE/(CM-SEC-DEG K)) C1 = THERMAL CONDUCTIVITY AT TEMPERATURE SS C2 = THERMAL CONDUCTIVITY AT TEMPERATURE SM COMMON SS, SM, AL, AM, DX, N, 1M, AA, AT, AD, TH, DL, N2, CT, NC, N3, RAD, TS C1=1,99E-03
с С	DIMENSION N3(200) CONDUCTIVITY FUNCTION (J(ULE/(CM-SEC-DEG K)) C1 = THERMAL CONDUCTIVITY AT TEMPERATURE SS C2 = THERMAL CONDUCTIVITY AT TEMPERATURE SM COMMON SS, SM, AL, AM, DX, N, 1M, AA, AT, AD, TH, DL, N2, CT, NC, N3, RAD, TS C1=1.99E-03 C2=4, 9325E-03
с С	DIMENSION N3(200) CONDUCTIVITY FUNCTION (J(ULE/(CM-SEC-DEG K)) C1 = THERMAL CONDUCTIVITY AT TEMPERATURE SS C2 = THERMAL CONDUCTIVITY AT TEMPERATURE SM COMMON SS, SM, AL, AM, DX, N, 1M, AA, AT, AD, TH, DL, N2, CT, NC, N3, RAD, TS C1=1,99E-03
с С	DIMENSION N3(200) CONDUCTIVITY FUNCTION (J(ULE/(CM-SEC-DEG K)) C1 = THERMAL CONDUCTIVITY AT TEMPERATURE SS C2 = THERMAL CONDUCTIVITY AT TEMPERATURE SM C0MMON SS, SM, AL, AM, DX, N, 1M, AA, AT, AD, TH, DL, N2, CT, NC, N3, RAD, TS C1=1.99E-03 C2=4.9325E-03 X=Y/RAD IF(X.GT. 0.0) 50TO 10 COND=C1
с С	DIMENSION N3(200) CONDUCTIVITY FUNCTION (J(ULE/(CM-SEC-DEG K)) C1 = THERMAL CONDUCTIVITY AT TEMPERATURE SS C2 = THERMAL CONDUCTIVITY AT TEMPERATURE SM COMMON SS, SM, AL, AM, DX, N, 1M, AA, AT, AD, TH, DL, N2, CT, NC, N3, RAD, TS C1=1.99E-03 C2=4.9325E-03 X=Y/RAD IF(X.GT, 0.0) SOTO 10 COND=C1 GO TO 1
с С	DIMENSION N3(200) CONDUCTIVITY FUNCTION (J(ULE/(CM-SEC-DEG K)) C1 = THERMAL CONDUCTIVITY AT TEMPERATURE SS C2 = THERMAL CONDUCTIVITY AT TEMPERATURE SM C0MMON SS, SM, AL, AM, DX, N, 1M, AA, AT, AD, TH, DL, N2, CT, NC, N3, RAD, TS C1=1.99E-03 C2=4.9325E-03 X=Y/RAD IF(X.GT. 0.0) 50TO 10 COND=C1
с С	DIMENSION N3(200) CONDUCTIVITY FUNCTION (J(ULE/(CM-SEC-DEG K)) C1 = THERMAL CONDUCTIVITY AT TEMPERATURE SS C2 = THERMAL CONDUCTIVITY AT TEMPERATURE SM COMMON SS, SM, AL, AM, DX, N, TM, AA, AT, AD, TH, DL, N2, CT, NC, N3, RAD, TS C1=1.99E-03 C2=4.9325E-03 X=Y/RAD IF(X.GT.0.0) SOTO 10 COND=C1 GO TO 1 10 IF(X.GT.1.0) SOTO 20 COND=C1+X*(C2-C1) GO TO 1
с С	DIMENSION N3(200) CONDUCTIVITY FUNCTION (J(ULE/(CM-SEC-DEG K)) C1 = THERMAL CONDUCTIVITY AT TEMPERATURE SS C2 = THERMAL CONDUCTIVITY AT TEMPERATURE SM COMMON SS, SM, AL, AM, DX, N, 1M, A4, AT, AD, TH, DL, N2, CT, NC, N3, RAD, TS C1=1.99E-03 C2=4.9325E-03 X=Y/RAD IF(X.GT.0.0) SOTO 10 COND=C1 GO TO 1 10 IF(X.GT.1.0) SOTO 20 COND=C1+X*(C2-C1) GO TO 1 20 COND=C2
	DIMENSION N3(200) CONDUCTIVITY FUNCTION (J(ULE/(CM-SEC-DEG K)) C1 = THERMAL CONDUCTIVITY AT TEMPERATURE SS C2 = THERMAL CONDUCTIVITY AT TEMPERATURE SM COMMON SS, SM, AL, AM, DX,N, TM, A4, AT, AD, TH, DL, N2, CT, NC, N3, RAD, TS C1=1, 99E-03 C2=4, 9325E-03 X=Y/RAD IF(X.GT, 0.0) SOTO 10 COND=C1 GO TO 1 10 IF(X.GT.1.0) SOTO 20 COND=C1+X*(C2-C1) GO TO 1 20 COND=C2 1 CONTINUE
	DIMENSION N3(200) CONDUCTIVITY FUNCTION (J(ULE/(CM-SEC-DEG K)) C1 = THERMAL CONDUCTIVITY AT TEMPERATURE SS C2 = THERMAL CONDUCTIVITY AT TEMPERATURE SM COMMON SS, SM, AL, AM, DX, N, 1M, A4, AT, AD, TH, DL, N2, CT, NC, N3, RAD, TS C1=1.99E-03 C2=4.9325E-03 X=Y/RAD IF(X.GT.0.0) SOTO 10 COND=C1 GO TO 1 10 IF(X.GT.1.0) SOTO 20 COND=C1+X*(C2-C1) GO TO 1 20 COND=C2
	DIMENSION N3(200) CONDUCTIVITY FUNCTION (J(ULE/(CM-SEC-DEG K)) C1 = THERMAL CONDUCTIVITY AT TEMPERATURE SS C2 = THERMAL CONDUCTIVITY AT TEMPERATURE SM COMMON SS, SM, AL, AM, DX, N, 1M, AA, AT, AD, TH, DL, N2, CT, NC, N3, RAD, TS C1=1, 99E-03 C2=4, 9325E-03 X=Y/RAD IF(X.GT, 0.0) SOTO 10 COND=C1 G0 TO 1 1) IF(X.GT.1.0) SOTO 20 COND=C1+X*(C2-C1) SO TO 1 20 COND=C2 1 CONTINUE RETURN
	DIMENSION N3(200) CONDUCTIVITY FUNCTION (J(ULE/(CM-SEC-DEG K)) C1 = THERMAL CONDUCTIVITY AT TEMPERATURE SS C2 = THERMAL CONDUCTIVITY AT TEMPERATURE SM COMMON SS, SM, AL, AM, DX, N, 1M, AA, AT, AD, TH, DL, N2, CT, NC, N3, RAD, TS C1=1, 99E-03 C2=4, 9325E-03 X=Y/RAD IF(X.GT, 0.0) SOTO 10 COND=C1 G0 TO 1 1) IF(X.GT.1.0) SOTO 20 COND=C1+X*(C2-C1) SO TO 1 20 COND=C2 1 CONTINUE RETURN

FUNCTION RADX 74/825 OPT=0,ROUNC= A/ S/ M/-D,-DS FTN 5.1+601 176 -LONG/-OT,ARG=-COMMON/-FIXED,CS= USER/-FIXED,DB=-TB/-SB/-SL/ ER/-ID/-PMD/ N5.

	FUNCTION RADX { Y }
	DIMENSION N3(200)
С	
<u>-</u>	
С	OF MOLE TEMP
	X=Y/RAD
	RADX=1.0
1	LC IF (X.GT. 1. 0) GOTO 20
	20 RADX=RH0(0.0)/RH0(RAD) 1 CONTINUE
	END
-	
	FUNCTION CP(X)
С	
C	
C	
	CP=2302.7
	RETURN
	END
≁	
	FUNCTION SU(T)
⁻ C	
С	
	RETURN
	ENO
C	
G	AT 2002111 - ANOLION - ALATZEN
-	
	RETURN
	END
_	

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