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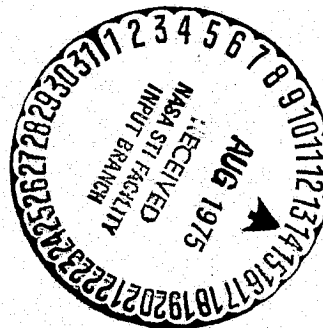
(NASA-CR-141919) SKYIAB MISSIONS SL/1, 2,
 3, 4 PHOTOGRAPHIC PROCESSING CONTROL PLAN
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SKYLAB MISSIONS SL/1,2,3,4

PHOTOGRAPHIC PROCESSING CONTROL PLAN

INTRODUCTION:

This document defines the control parameters to be used by the Photographic Technology Division for the processing of films flown on Skylab Missions SL/1, 2, 3, and 4. It defines the sensitometric exposure and processing conditions PTD plans to use, describes the procedures necessary for general film certification, and will serve as a vehicle for denoting and solving any problem areas or conflicts which may occur prior to the mission. This document will be updated whenever new information is obtained.

REFERENCES

1. Technicolor Technical Note, TN 72-12, "Film Handling Procedures for Skylab S-056 Experiment", dated September 1972.
2. Technicolor Technical Note, TN 73-1, "Duplication Trial of SO-212 Film for Skylab S-056 Experiment", dated January 1973.
3. Technicolor Technical Note, TN 73-2, "Radiation Effects on Skylab Films, Interim Report", dated February 1973.
4. Technicolor Technical Report, TR 72-4, "Protective Overcoating of Films", dated June 1972.
5. NASA/PTD Document, J112-202, "S-190 A and B, and S-191 Film Handling Procedures", dated November 1972, Revision A, dated December 1972.
6. Technicolor Technical Report, TR 73-1, "Evaluation of Anomalies Observed on Film from S-190A Flight System Calibration Tests", dated January 1973.
7. NASA/PTD Document, J112-204, "S-056 Film Handling Procedures", dated March 1973.

LIST OF ABBREVIATIONS

ASA	American Standards Association
ATM	Apollo Telescope Module
BE	Black and white Exterior Film -EK Type 2403
BH	Black and white High Speed film -EK Type 3401
BV	Black and white Very High Speed film -EK Type 2485
BW	Black and White Low Speed Film -EK Type 3414
CI	Color Interior Film -EK Type SO-168 (320 ASA)
CL	Color Low Light Film -EK Type SO-168 (160 ASA)
CT	Color Film -EK Type SO-242
CX	Color Exterior Film -EK Type SO-368
cm	centimeter
D-log E	relation of density to logarithm of exposure
°F.	degrees Fahrenheit
°K.	degrees Kelvin
fpm	feet per minute
in.	inch(es)
IR	Color Infrared Film -EK Type 3443
log E	logarithm of exposure
MPL	Motion Picture Laboratory
mm	millimeter
NASA	National Aeronautics and Space Administration
ND	neutral density
nm	nanometer
pH	the negative logarithm of the hydrogen ion concentration expressed in moles per liter
PI	Principal Investigator(s)
PPL	Precision Processing Laboratory
PSO	Photo Science Office
PTD	Photographic Technology Division
QC	Quality Control
RH	Relative humidity
SL	Still Laboratory
SL/--	Skylab/one, two, three, or four
T	number of tanks
TBD	To Be Determined
UA	Black and White ultraviolet sensitive film -EK Type 103a0
UV	Ultraviolet

1.0 FILM/PROCESS/SENSITOMETRY CONFIGURATIONS

PCD	FILM DESIGNATION	FILM TYPE	FILM NUMBER	EMULSION NUMBER	SIZE	PROCESSOR	CHEMISTRY	FILTRATION	EXPOSURE TIME (sec)	NOTES
A	CI	SO-168	012-01		16mm	RAM	ME-4	5500°K	1/100	320 ASA
B	CI	SO-168	12-1		35mm	Houston	ME-4	5500°K	1/100	320 ASA
C	CL	SO-168	12-1		35mm	Houston	ME-4	5500°K	1/100	160 ASA (T025)
D	CX	SO-368	018-32G		16mm	Hi-Speed	ME-2A	5500°K	1/50	
E	CX	SO-368	18-811		35mm	Hi-Speed	ME-2A	5500°K	1/50	
F	CX	SO-368	18-81		70mm	Hi-Speed	ME-2A	5500°K	1/50	
G	SO-356	SO-356	16-4		70mm	Houston	ME-4	5500°K	1/5	
H	CT	SO-242	36-12		5 in.	VMT 1811	EA-5	5500°K	1/5	
I	2443	2443	116-20		70mm	VMT 1811	EA-5	5500°K+Wr12	1/50	
J	IR	3443	009-01		16mm	RAM	ME-4	2850°K+.3ND	1/100	
K	IR	3443	11		5 in.	VMT 1811	EA-5	5500°K + Wr12	1/50	
L	SO-022	SO-022	1-1		70mm	Fultron	MX-819	5500°K + Wr25	1/5	
M	SO-212	SO-212	4-1		35mm	Hi-Speed	D-19	5500°K	1/50	
N	BE	2403	52-20		35mm	Hi-Speed	D-19	5500°K	1/100	
O	2424	2424	43-1		70mm	Hi-Speed	D-19	5500°K + 89B	1/50	
P	BV	2485	108-05		16mm	Hi-Speed	D-19	5500°K +1.0 ND	1/100	
Q	BV	2485	108-5		35mm	Hi-Speed	D-19	5500°K + 1.0 ND	1/100	T025
R	BV	2485	108-5		35mm	Hi-Speed	D-19	5500°K + 1.0ND	1/100	S063
S	2474	2474	149-02		16mm	Houston 16	D-19	5500°K	1/100	
T	BH	3401	384-04		16mm	Houston 16	D-19	5500°K	1/50	
U	BW	3414	21-8/2		5 in.	Fultron	MX-819	5500°K + Wr12	1/10	
V	UA	103aO	162794		16mm	Hi-Speed	D-19B	3000°K +2650A Inconel Tablet	2	

2.0 FILM CERTIFICATION PROCEDURES

- 2.1 The sensitometric characteristics of each film type and emulsion are established by exposure on the I-B sensitometer and are controlled by processing as determined for the respective films. The condition for sensitometric exposure of each film type is specified as to:
 - a. Color temperature
 - b. Filtration, as prescribed by the film application.
 - c. Exposure needed to place the resulting density exposure relationship in a desired position on the D-log E curve.
- 2.2 After the processing machine has met Quality Control chemical and sensitometric standards, five sensitometric strips of the film to be certified are processed. The densitometric values of these processed exposure wedges are averaged and the result is plotted to represent the certification data for subsequent sensitometric control for that particular film type. In general, a number of curves using various time/temperature/chemistry configurations are obtained using the above described method. The Photo Science Office reviews these curves with the Principal Investigator and jointly arrive at the optimum D-log E curve to satisfy the requirements of the experiment.
- 2.3 One roll of each film type is visually inspected in white light to check for dirt, scratches, coating imperfections, etc.
- 2.4 After the inspection is completed, the inspected roll is visibly marked and retained intact until after processing of the mission film.
- 2.5 Additional tests are conducted by the Photo Science Office as required by the Principal Investigator. These may include tests to determine latent image and radiation effects, resolution, granularity, etc.

3.0 DISCUSSION

3.1 PCD-H, SO-242-36-12, 5 inch

The control curve supplied is for a different emulsion batch than the one designated for flight. Tests are presently being conducted on the flight emulsion. A new D-log E curve will be supplied upon completion of the tests.

3.2 PCD-M, SO-212-4-1, 35mm

Tests are still being conducted by the PTD in conjunction with the PI. A final curve will be supplied upon completion of all testing.

3.3 PCD-N, 2403-52-20, 35mm; PCD-Q, 2485-108-5, 35mm

The curves included in this document have not yet been approved by the PI. Resolution tests are being conducted to assist in the determination of the final curve.

3.4 PCD-V, 103aO - 162794, 16mm

Testing in D-19 and D-19B chemistries has been completed. The final D-log E curve will be supplied after approval by the PI.