DZERO ENGINEERING NOTE

3740.000-EN-32

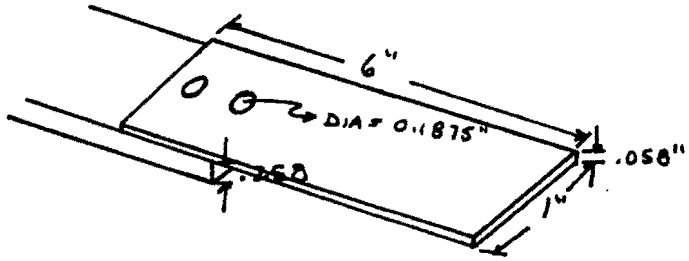
12-7-85

G. STEPANEK

SPOT WELD TEST PULL

BACKGROUND: THE D-ZERO CRYOSTATS WILL CONTAIN A NUMBER OF DETECTOR MODULES. EACH MODULE WILL BE MADE UP OF PLATES SEPERATED BY G-10. TO HOLD THE PLATES TOGETHER A STAINLESS STEEL SKIN HAS BEEN PROPOSED TO COVER A WHOLE MODULE. BY A SERIES OF CALCULATIONS IT WAS NOTED THAT THE THIN SKINS WOULD BUCKLE UNDER THE FORCE. TO PREVENT THE BUCKLING IT WAS PROPOSED TO SPOT WELD THE SKINS TO SOME OF THE INTERNAL PLATES, THEREFORE GIVING THE SKINS GREATLY INCREASED STRENGTH. THIS PAPER GIVES THE RESULTS OF THE TEST ON THE PROPOSED SPOT WELDS.

WELD DIMENSIONS



AREA/WELD= 0.0276 SQ IN

TEST RESULTS

1) YEILD POINT- 2750 LBS BROKE- 3930 LBS

2) YEILD POINT- 2700 LBS

3) YEILD POINT- 2700 LBS

4) YEILD POINT- 2720 LBS

TO DETRMINE THE STRESS AT THE YIELD POINT: AVG YEILD= 2717.5 LBS

STRESS= LOAD/AREA

STRESS= 2717.5 LBS/ 2* 0.0276 SQ IN

STRESS= 49230 PSI

TO DETERMINE THE ULTIMATE STRESS USE TEST 1):

STRESS= 3930 LBS/ 2* 0.0276 SQ IN

STRESS= 71196 PSI

AS A COMPARISON TO ACTUAL TESTS ON STAINLESS STEEL:

ACTUAL ULTIMATE= 75-85K TEST RESULTS= 71.2K

ACTUAL YIELD = 35K TEST RESULTS= 49.2K

THE RESULTS WILL VARY SLIGHTLY DUE TO THE METHOD OF TESTING. THE ACTUAL TESTS WERE DONE WITH TENSILE BARS, OUR TESTS WERE DONE SOMEWHERE BETWEEN THE TENSILE AND SHEAR RANGE.

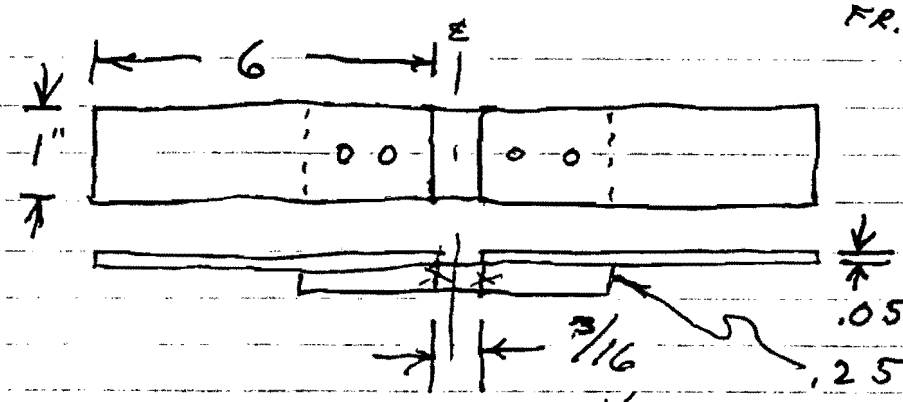
CONCLUSION: FROM THE TESTS IT CAN BE SEEN THAT THE STAINLESS STEEL SPOT WELDS BEHAVE VERY PREDICTABLY, AND VERY CLOSE TO WHAT IS EXPECTED FROM STAINLESS STEEL.

A POSSIBLE EXPLANATION TO THE DECREASED ULTIMATE, AND INCREASED YEILD STRENGTH COULD BE THE INCREASED GRAIN SIZE DUE TO THE MELTING, AND RE-SOLIDIFICATION OF THE STAINLESS STEEL.

Student's Name E. K. Date 11-27-55

Subject SPOT WELDED ST. ST. SAMPLES Instructor's Name JAY H.

FR. → KURT KREMPETZ
X4657



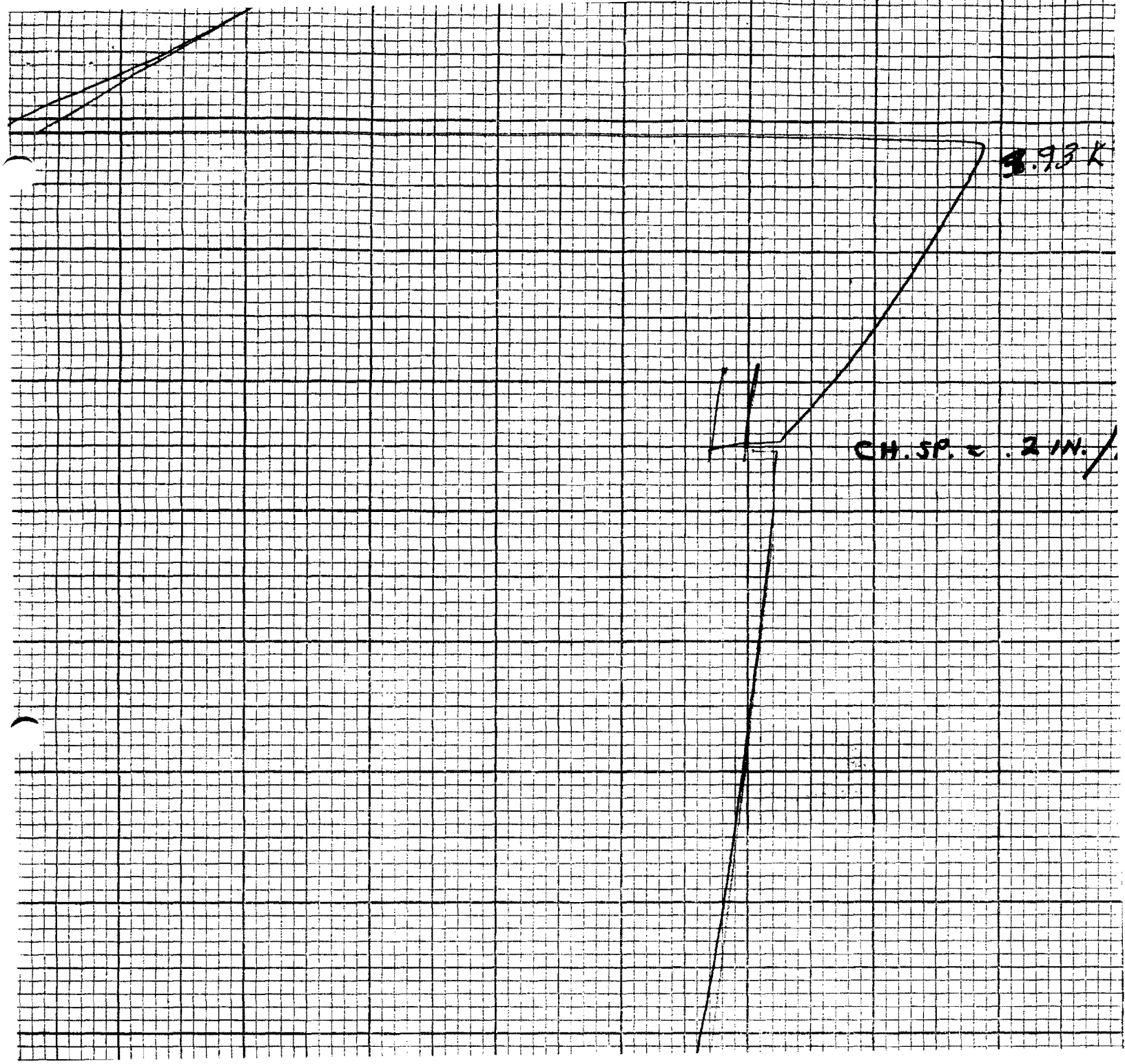
SPOT WELDS ≈ 1" APART

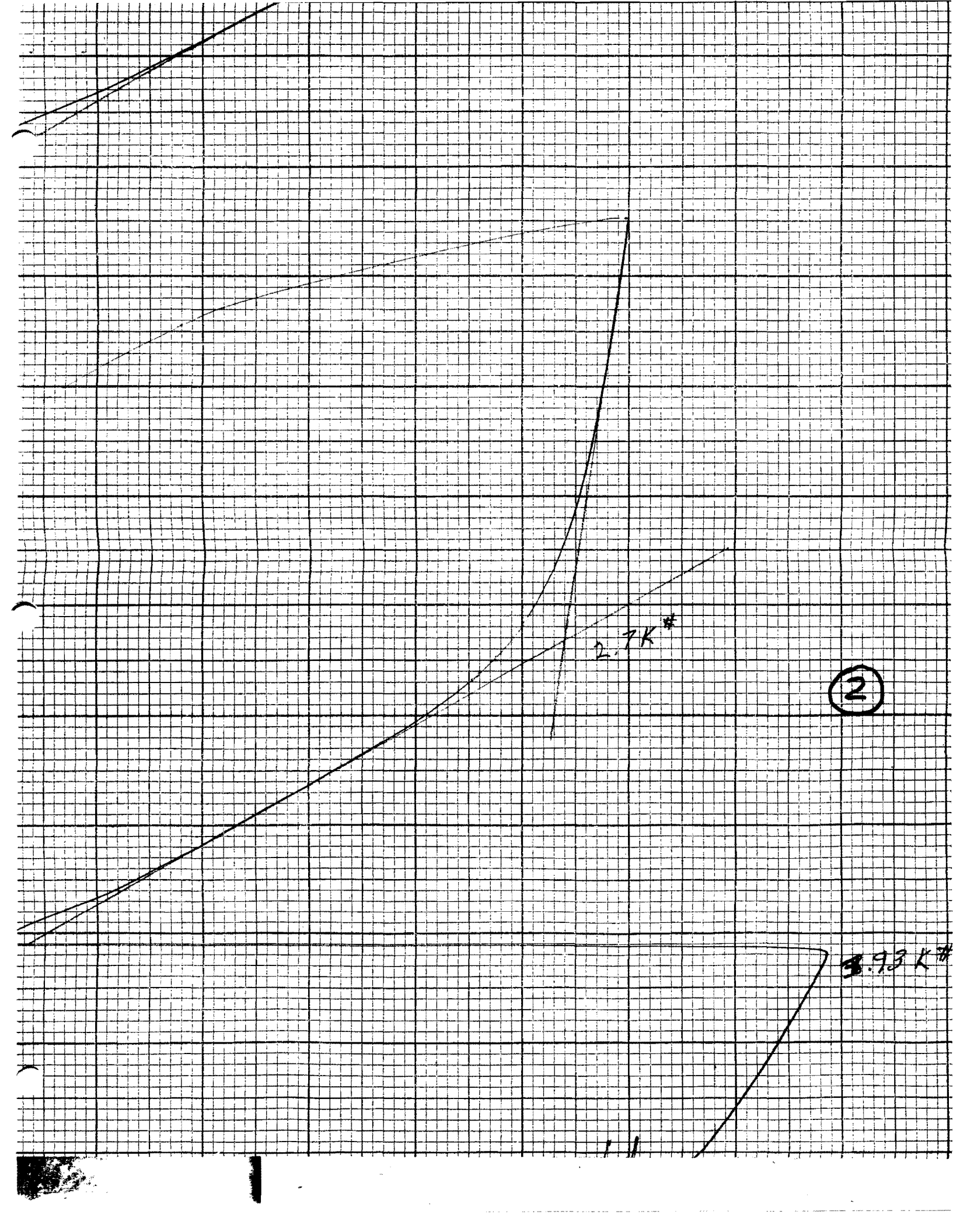
① YIELD PT. = 2,750 # BROKE @ 3,930 #

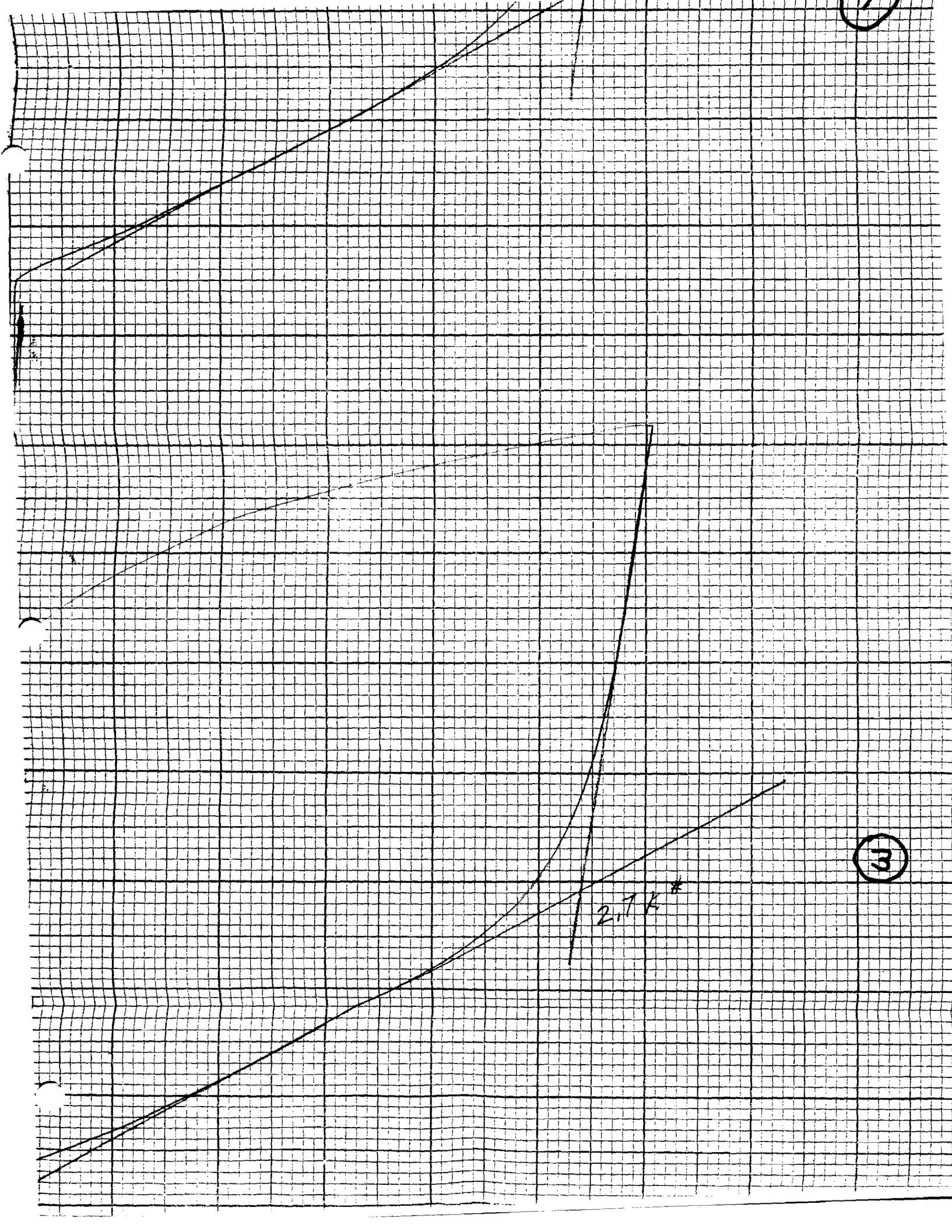
② " " = 2,700 #

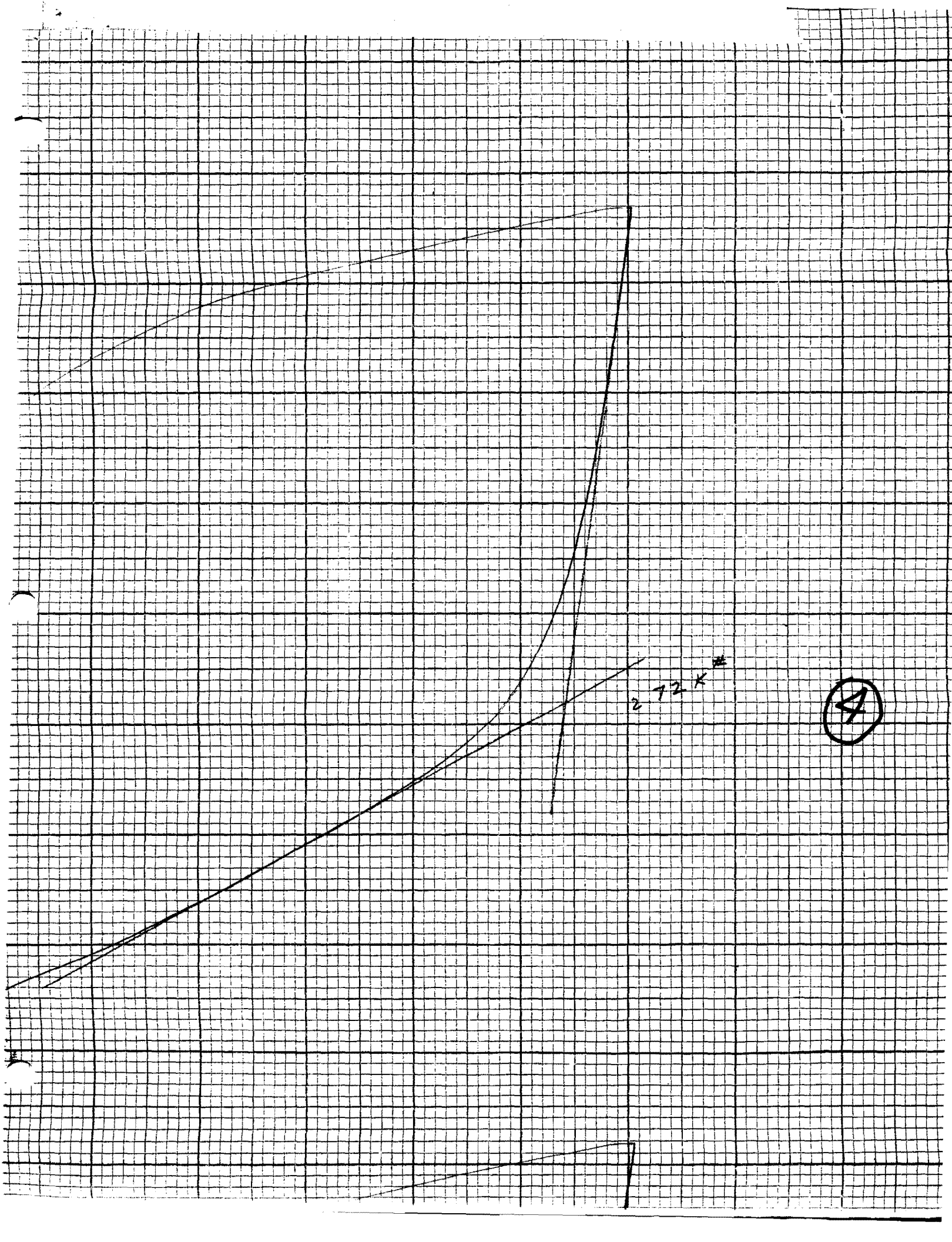
③ " " = 2,700 # MEAN = 2717.5 #

④ " " = 2,720 # S.DEV. = 23.6


9.93 K
CH. SP. = .2 MV.


2.7K*
(2)
3.93K*


2.1 K#


272 K
4