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CONTROLLED BIAXIAL STRAIN-RATE TEST RESULTS FROM UNIRRADIATED 20% CW 316 STAINLESS STEEL CLADDING AT CONSTANT TEMPERATURE

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N. S. Cannon

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CONTROLLED BIAXIAL STRAIN-RATE TEST RESULTS FROM UNIRRADIATED 20% CW 316 SS CLADDING AT CONSTANT TEMPERATURE

By

N. S. Cannon

Constant temperature controlled biaxial strain-rate (CBSR) tests were performed on unirradiated 20% CW 316 stainless steel reactor cladding. Tests were made at hoop strain-rates of 1.2×10^{-5}/s, 1.2×10^{-4}/s, 6×10^{-4}/s, and 1.2×10^{-3}/s. For each of these strain rates, tests were performed at 425°C, 540°C, and 650°C. The data from these tests are examined and compared with previously reported tensile data. A simple relationship between tensile and CBSR tests is developed, allowing easy correlation of the CBSR results.

TRANSIENT PARAMETERS:

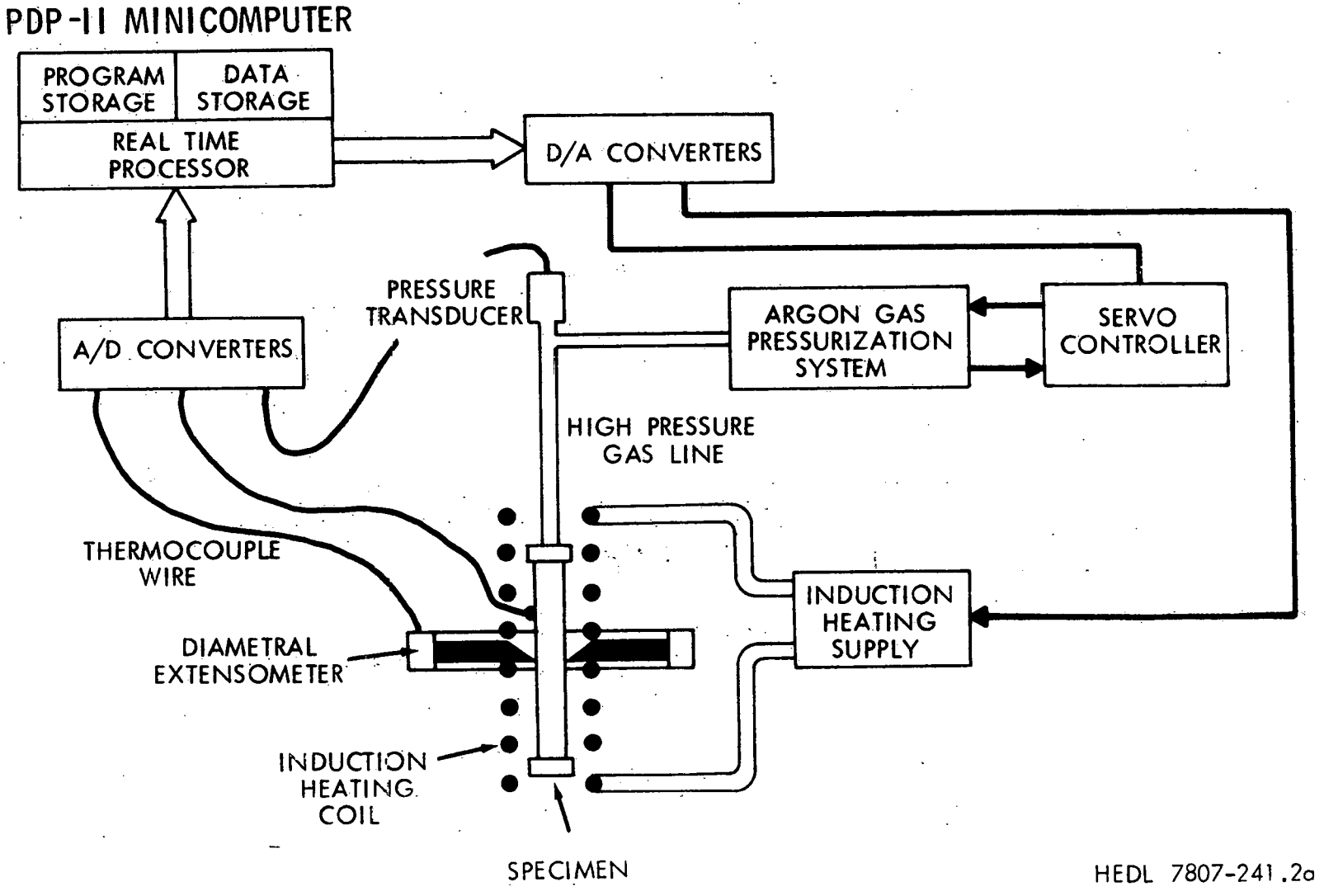
1) HEATING RATE
2) MECHANICAL STRAIN RATE

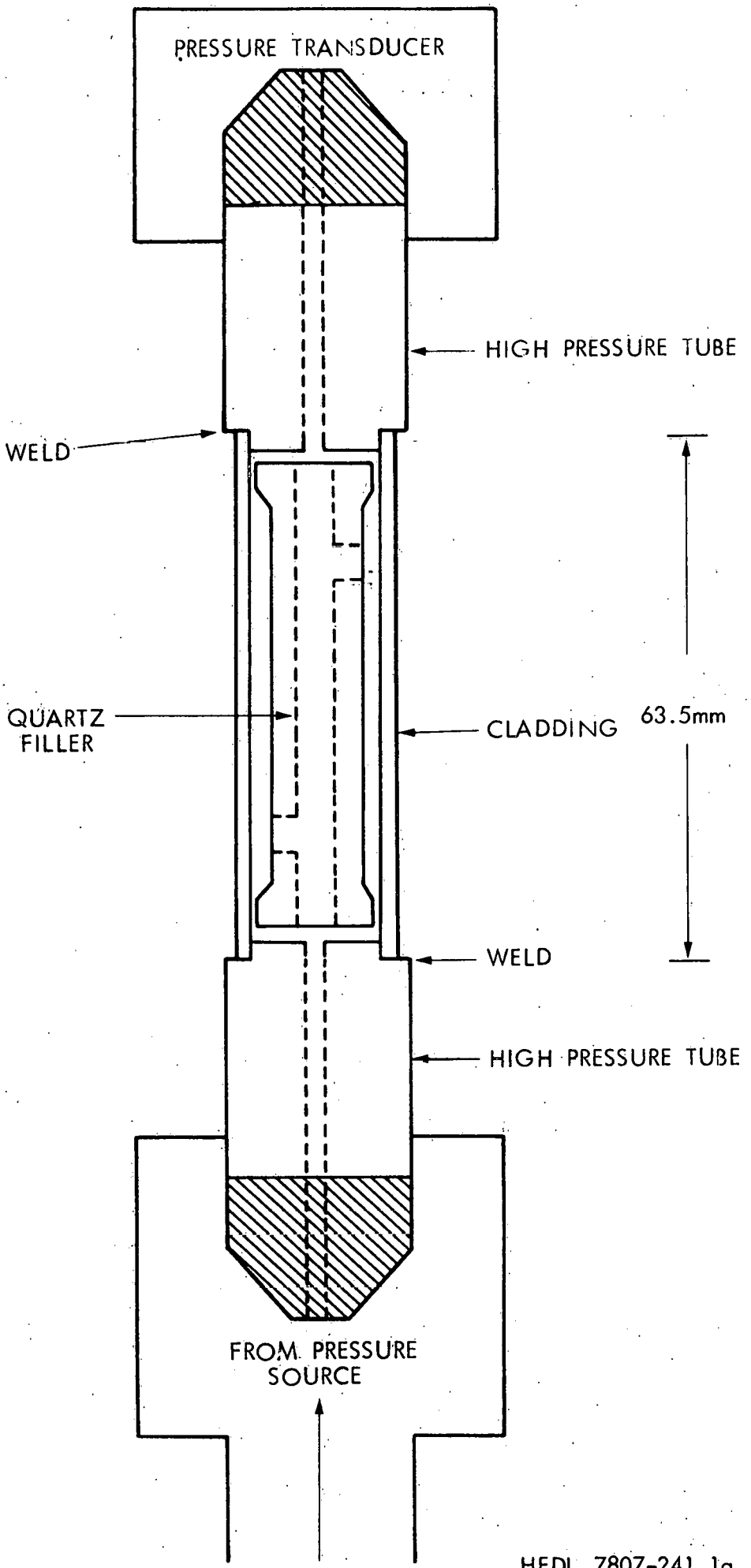
TESTS AT HEDL DESIGNED TO INVESTIGATE EACH PARAMETER SEPARATELY

TEST TYPE	TEMPERATURE	PRESSURE
CONSTANT PRESSURE TEST (FCTT)	UNIFORM HEATING RATE	CONSTANT
CONTROLLED BIAXIAL STRAIN RATE	CONSTANT	PRODUCES CONSTANT STRAIN RATE

HEDL 7810-086.3

SCHEMATIC OF PROGRAMMABLE FUEL CLAD TESTING SYSTEM





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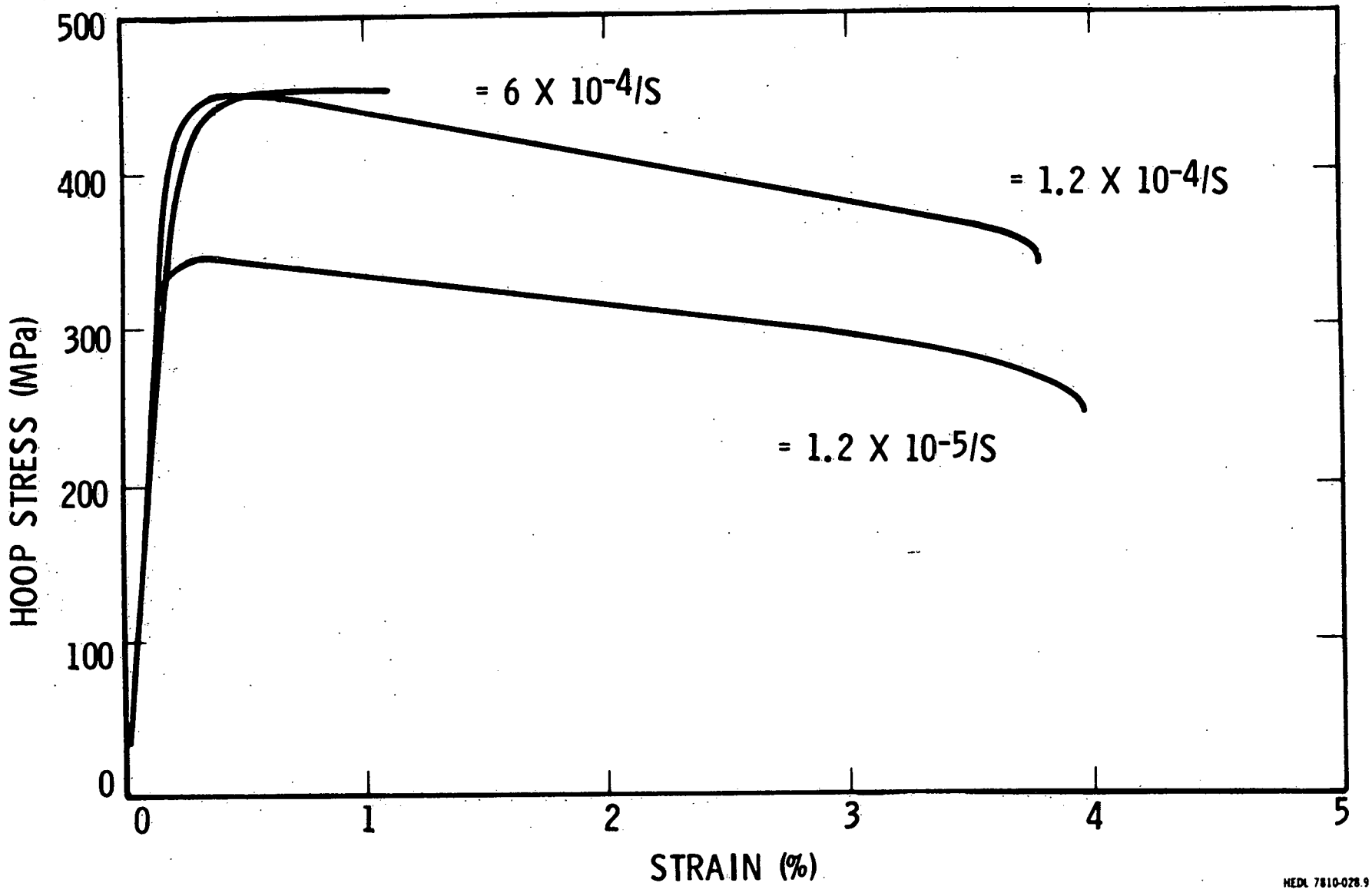
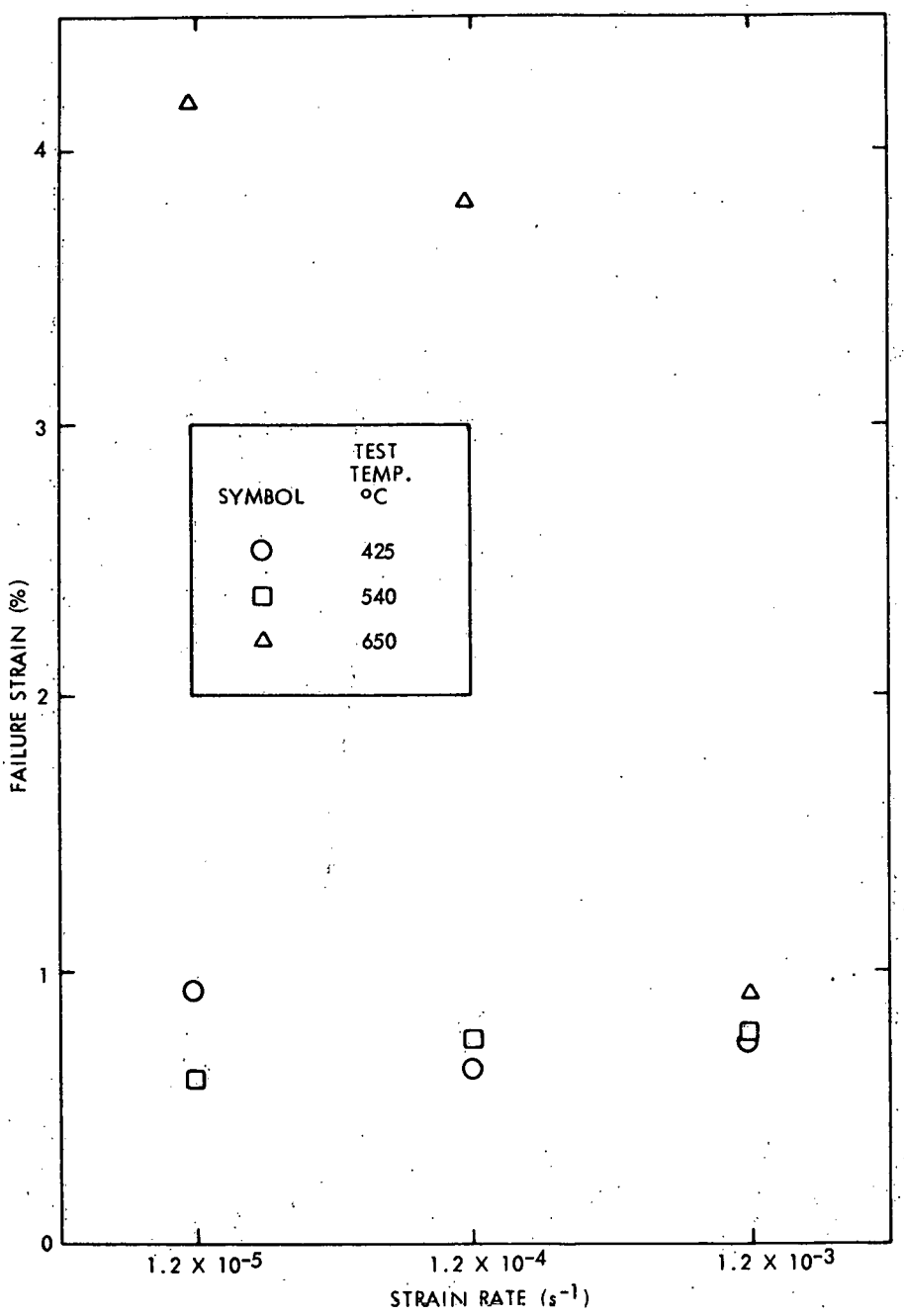
BIAXIAL STRESS-STRAIN CURVE





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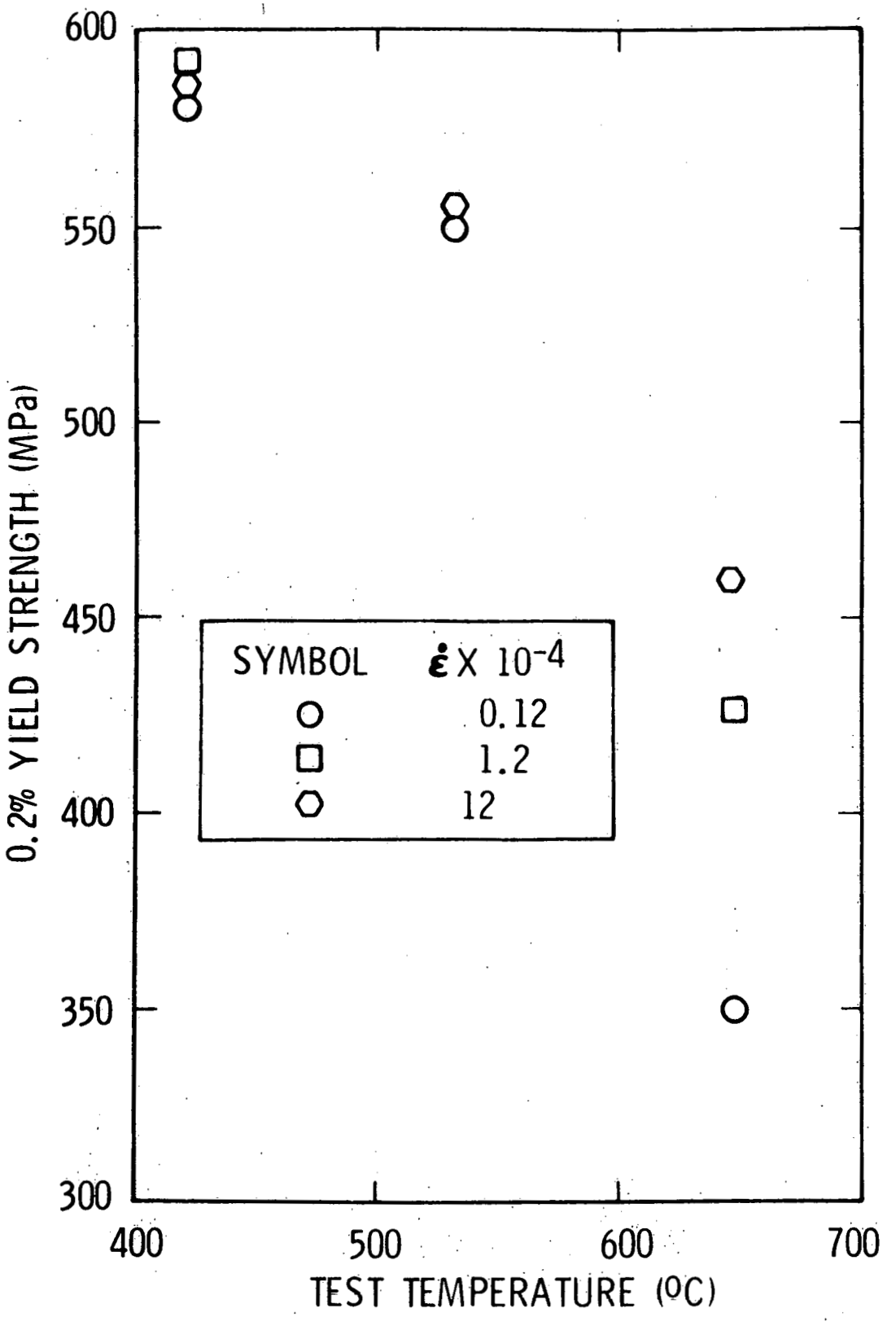
YIELD STRENGTH DEPENDENCE ON TEST TEMPERATURE



HEDL 7810-028.3

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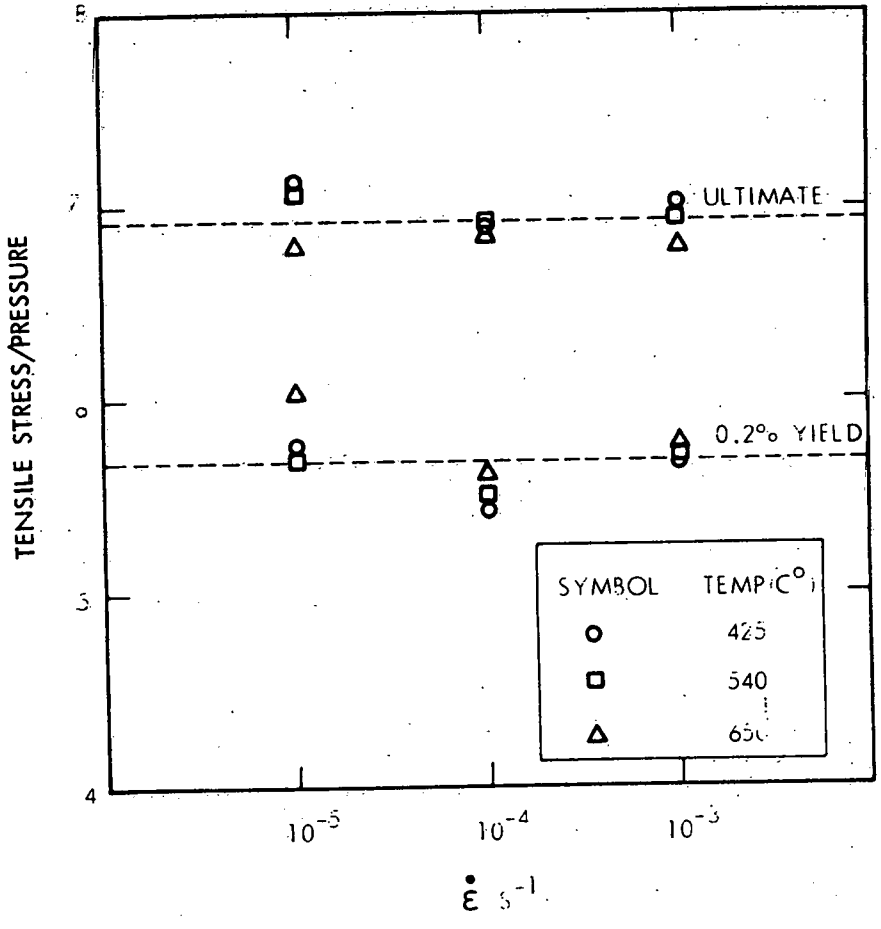
COMPARISON OF BIAXIAL AND TENSILE RESULTS



HEDL7810-086.1

CONCLUSIONS:

CBSR DATA BASE ON UNIRRADIATED CLADDING ESTABLISHED

TENSILE/PRESSURE RATIOS ALLOW EASY CORRELATION OF CBSR RESULTS USING EXISTING TENSILE CORRELATIONS