

ACIS Verification Summary Report

Specification:	AXAF Observatory to Science Instrument ICD (IF1-20)
Requirement Number/Title:	3.3.1.1.1.2.7 ACIS Support Structure/DPA/DEA Thermal Interfaces (VRSD 3.3.1.1.1.2.7-1)

Requirement Statement: The DEA and DPA shall have an emittance of ≥ 0.8 on all sides, except the + X sides.

Verification Method: I.R. Reflectance Measurement and NASA pub.

Procedure Number: Ref. : NASA Reference Publication 1121, April 1984

Configuration: A sample aluminum panel painted with black Aeroglaze Z306 (formerly Chemglaze Z306) paint was subjected to an IR reflectance measurement on 9/10/96 by Matthew Smith of MIT CSR at the Lincoln Labs.

Cycle Time: N.A.

Verification Discussion/Results:

All sides of the DEA and DPA, except their +X sides, are painted with Aeroglaze Z306 paint. The IR reflectance of a sample panel was measured as 0.09. (Reflectance plus emittance = 1.0) This value yields a normal emittance of 0.91. NASA conversion tables for normal vs. hemispherical emittance convert this to 0.86, in excess of the minimum requirement of 0.8.

$$\frac{\text{Emittance}_H}{\text{Emittance}_N} = 0.94 \text{ for } E_N = 0.91$$

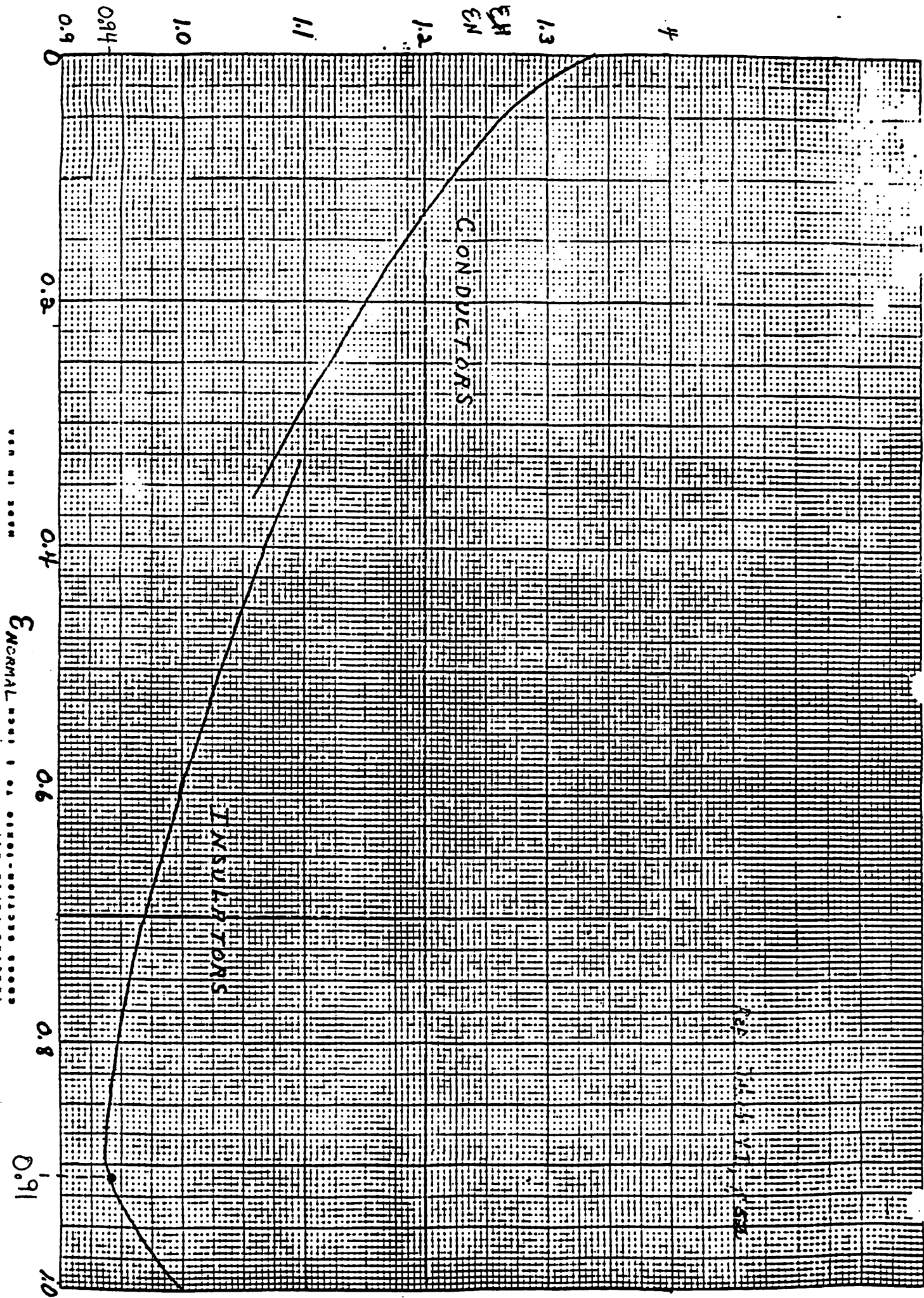
$$(0.94)(0.91) = 0.86$$

NASA Pub. 1121 lists the emittance as $0.91 = E_N$, identical to the MIT measurement.

Ellen M. Ser
ACIS Cognizant Engineer

5/13/97
Date

Ratio of (Hemispherical Emittance to Normal Emittance) to Normal Emittance



BLACK COATINGS

	$\bar{\alpha}_s$	$\bar{\epsilon}_n$
Anodize Black	0.88	0.88
Carbon Black Paint NS-7	0.96	0.88
Catalac Black Paint	0.96	0.88
Chemglaze Black Paint Z306	0.96	0.91
Delrin Black Plastic	0.96	0.87
Ebanol C Black	0.97	0.73
Ebanol C Black-384 ESH* UV	0.97	0.75
GSFC Black Silicate MS-94	0.96	0.89
GSFC Black Paint 313-1	0.96	0.86
Hughson Black Paint H322	0.96	0.86
Hughson Black Paint L-300	0.95	0.84
Martin Black Paint N-150-1	0.94	0.94
Martin Black Velvet Paint	0.91	0.94
3M Black Velvet Paint	0.97	0.91
Paladin Black Lacquer	0.95	0.75
Parsons Black Paint	0.98	0.91
Polyethylene Black Plastic	0.93	0.92
Pyramil Black on Beryllium Copper	0.92	0.72
Tedlar Black Plastic	0.94	0.90
Velestat Black Plastic	0.96	0.85

$e_h = .855$

*ESH = equivalent Sun hours of ultraviolet radiation.

Reference: NASA Reference Publication 1121, April 1984,
 "Solar Absorptance and Thermal Emittance of Some
 Common Spacecraft Thermal-Control Coatings", by
 John H. Henninger.