



57640 North Eleventh Street
Calumet, MI 49913
Ph. (906) 337-3018
Fax (906) 337-2930
rel@relinc.com
www.relinc.com

REL TAM Panel - Twin (Part Number: 250-00103)



Certification

REL certifies that REL TAM Panels are Hexavalent Chromium free.

Compliances met by REL TAM Panel plating: RoHS, REACH, WEEE, ELV, and Proposition 65.

Pratt & Whitney Approved TAM 146040-1 (Mirror/Polished Finish).

REL, Inc. is an officially approved P&W Source Manufacturer. REL, Inc. certifies that the Fluorescent Penetrant Inspection REL TAM Panel meets the requirements as stated in **TAM 146040-1, ASTM E1417, MIL-STD-6866, TO 33B-1-1, NAVAIR 01-1A-16-1, TM 1-1500-335-23, Rolls-Royce, and GE Aviation Process Specification P3TF47**. The REL TAM Panel has been manufactured and tested in accordance with the REL, Inc. procedure RWI-1105.

REL TAM Panel and Documentation includes:

1. REL Tam Panel in Tool Control System
2. Panel Certificate of Conformance (Sealed) **this document*
3. Penetrant System Monitoring Panel Documentation
 - a. Serialized crack size certification document, including
 - b. 1:1 Picture

REL TAM Panel Cleaning Procedure:

1. Ultrasonically clean in 98% methanol for 15 minutes,
 - a. Alternate Cleaning Methods:
 - i. Ultrasonically clean in Acetone
 - ii. Ultrasonically clean in Isopropyl Alcohol
 - iii. Ultrasonically clean in Aqueous Alkaline Solutions
2. 15 minutes air dry,
3. Verify cleanliness:
 - a. Use a LED UV-A lamp Certified to ASTM E3022. (See illustrations on 'ASTM E3022 Certified Inspection Lamps'. REL, Inc. document included for lamps approved for this purpose.)
 - b. Inspect REL TAM Panel (5 places) at the intensity level of 3000 microwatts per centimeter squared to verify no residual fluorescent penetrant exists on the surface.

NOTE: Do NOT use Oxidizing Chemicals to Clean panel

REL TAM Panel storage:

1. Store in dry packaging, or
2. Store in Acetone

REL TAM Panel Serial Numbers: 290665-103_A & 290665-103_B

Date of Certification: November 3, 2025

Certified by: *RJB*
Inspector

REL TAM Panel Processing Procedure:

Type 1 (Fluorescent Dye), Method D (Post-Emulsifiable, Hydrophilic), Form a (Dry Powder), Level 4 (Ultra-high sensitivity)

1. Clean panel to specified "REL TAM Panel Cleaning Procedure"
2. Apply Fluorescent Penetrant by brush
 - a. Magnaflux Zyglo ZL-37 Level 4, Post-Emulsifiable, Fluorescent Penetrant
3. Penetrant Dwell: 20 minutes @ ambient temperature (50-90°F)
4. Penetrant Rinse: 1 minute wash/rinse 90°F @ 20psi, 18" from part
5. Dip application Emulsifier/Remover:
 - a. Magnaflux Zyglo ZR-10E Hydrophilic Emulsifier (Maximum 20% solution)
6. Emulsifier Dwell: 1 minute in 20% ZR-10E Emulsifier solution
7. Emulsifier Wash/Rinse: 1 minute wash/rinse 90°F @ 20psi, 18" from part
8. Oven Dry: Dry for 5 minutes @ 60°C (140°F)
9. Apply Dry Developer:
 - a. Place panel in Developer Chamber
 - b. Magnaflux Zyglo ZP-4D Dry Powder Developer (formerly ZP-4B)
 - c. Agitate air in chamber to ensure complete coverage
10. Developer Dwell: 10 minutes
11. Remove excess Developer
 - a. Air spray @ 5psi
12. Inspect, Measure, & Document Panel
 - a. Pratt & Whitney TAM146040
 - b. ASTM E1417

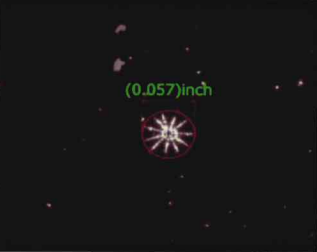
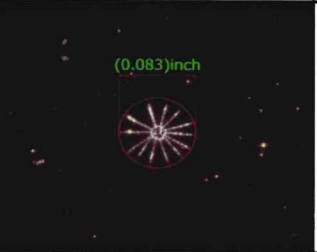
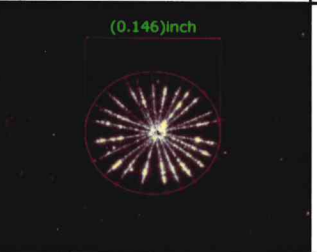
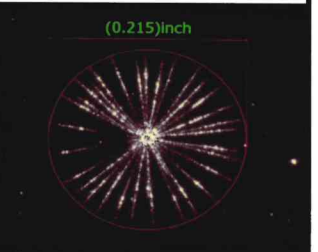
Process Instrumentation:

1. UV-7300, Nomad-DER (Diode Emission Recorder)
Certified REL UV-A & White Light Meter (SN: 290576-02)
2. Traceable® Mini Alarm Timer / Stopwatch Model 5020,90225-38
NIST traceable timer (SN: 26.552025) *NIST traceable reference# 900492398
3. Ashcroft 20W905PH 02B XC4 90#
NIST traceable Pressure gauge (SN: E726152)
4. Fluke 52 II Thermocouple Thermometer
Certified Temperature gauge (SN: 53470980MV) *Certified by REL Inc.
5. Atago PR-32 Palette Digital Refractometer
Refractometer (Emulsifier) (SN: B01309)
6. Carbolite AX-30 Laboratory Oven
SN: 21-400479
7. Keyence IM-8010
Serial #: IC0Q000134
8. UV-2000, C4 Magnum LED UV-A Inspection Lamps



Penetrant System Monitoring Panel Documentation

SN# 290665-103_A

Crack Position	A	B	C	D	E
Photo of Defect Magnification Factor: 1 : 3.5					
Measured Size (Inch)	0.028	0.057	0.083	0.146	0.215
Specification (Inch)	0.015 - 0.031	0.046 - 0.062	0.075 - 0.093	0.125 - 0.171	0.180 - 0.250
Measured Size (mm)	0.71	1.45	2.11	3.71	5.46
Specification (mm)	0.38 - 0.79	1.17 - 1.57	1.91 - 2.36	3.18 - 4.34	4.57 - 6.35

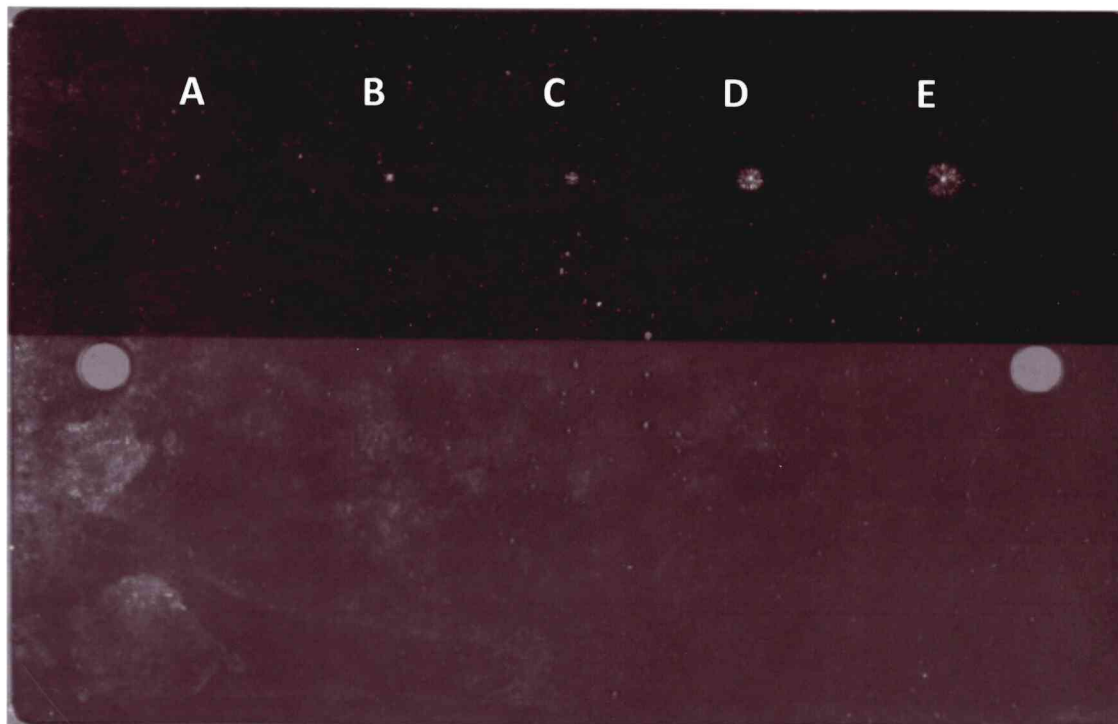
Crack Depth	.0025" ± .0001"	63 µm ± 2.5µm
-------------	-----------------	---------------

This panel has been tested to conform to all requirements of:
TAM146040-1

Measured with Keyence IM
8010
Calibration No. RM4133305C

Inspector: BDJ
Date of Certification: 06/26/25

This panel does not contain hexavalent chromium.

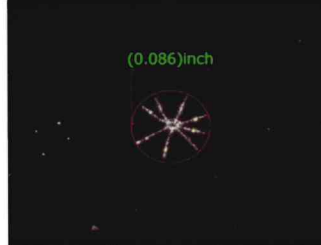
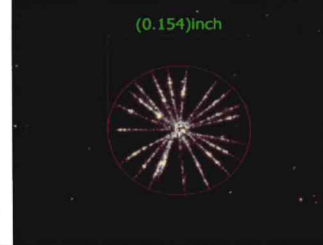
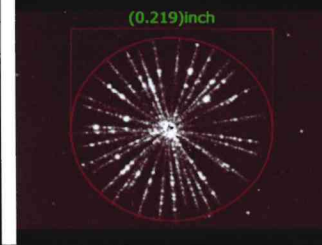


This photo is actual size. (1:1)



Penetrant System Monitoring Panel Documentation

SN# 290665-103_B

Crack Position	A	B	C	D	E
Photo of Defect Magnification Factor: 1 : 3.5					
Measured Size (Inch)	0.028	0.058	0.086	0.154	0.219
Specification (Inch)	0.015 - 0.031	0.046 - 0.062	0.075 - 0.093	0.125 - 0.171	0.180 - 0.250
Measured Size (mm)	0.71	1.47	2.18	3.91	5.56
Specification (mm)	0.38 - 0.79	1.17 - 1.57	1.91 - 2.36	3.18 - 4.34	4.57 - 6.35

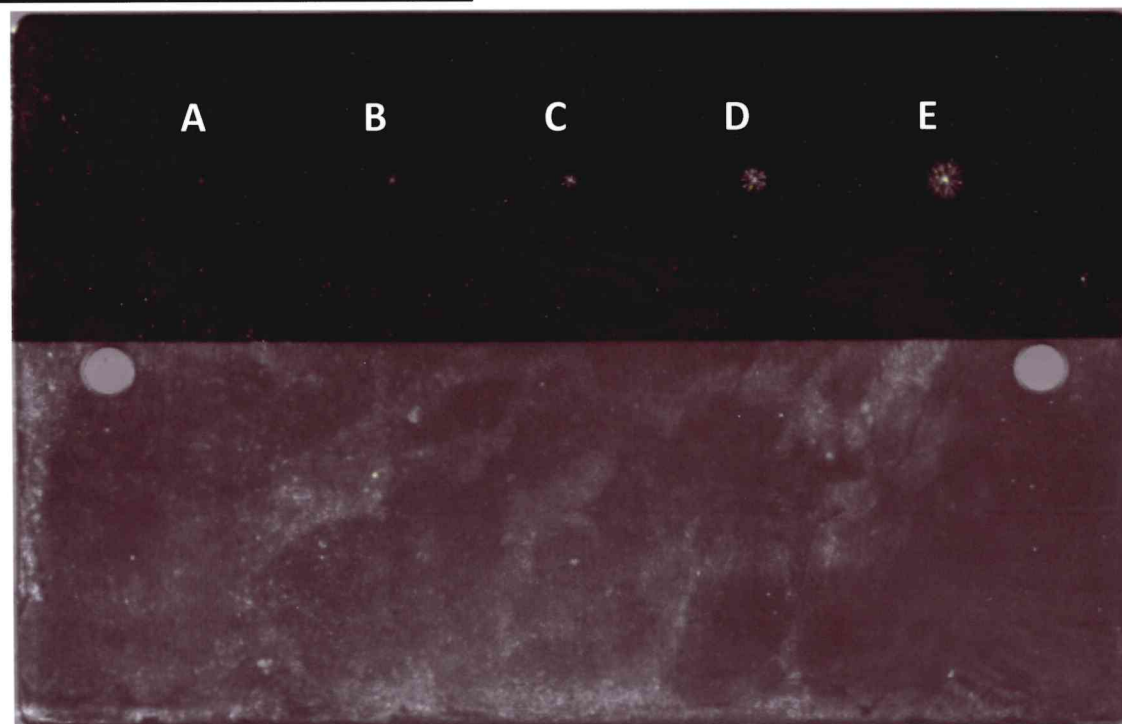
Crack Depth	.0025" ± .0001"	63 µm ± 2.5µm
-------------	-----------------	---------------

This panel has been tested to conform to all requirements of:
TAM146040-1

Inspector: BDJ
Date of Certification: 06/26/25

Measured with Keyence IM
8010
Calibration No. RM4133305C

This panel does not contain
hexavalent chromium.



This photo is actual size. (1:1)