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

REL TAM Panel - Single
(Part Number: 250-00104)

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
        NOTE: Do NOT use Oxidizing Chemicals to Clean panel
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.

REL TAM Panel storage:

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

REL TAM Panel Serial Number: 290714-036

Date of Certification: June 16, 2026

Certified by: RWB
Inspector

REL TAM Panel Processing Procedure:

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

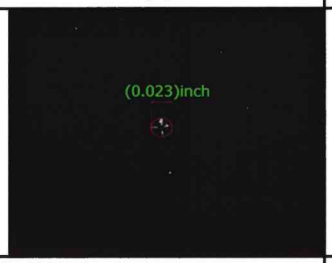
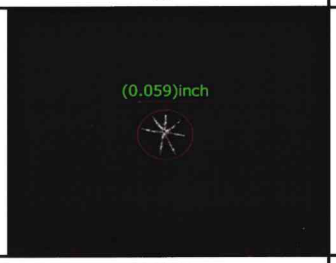
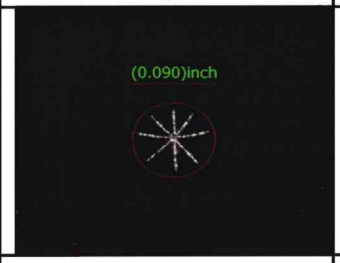
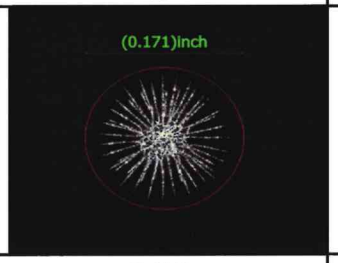
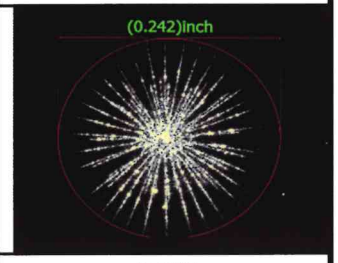
1. Clean panel to specified "REL TAM Panel Cleaning Procedure"
2. Apply Fluorescent Penetrant by brush
    a. Magnaflux Zyglo ZL-37 Level 4, Post-Emulsifiable, Fluorescent Penetrant
3. Penetrant Dwell: 20 minutes @ ambient temperature (50-90°F)
4. Penetrant Rinse: 1 minute wash/rinse 90°F @ 20psi, 18" 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
13. Lab environmental conditions
    a. Temperature 77 F
    b. Humidity 39%

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

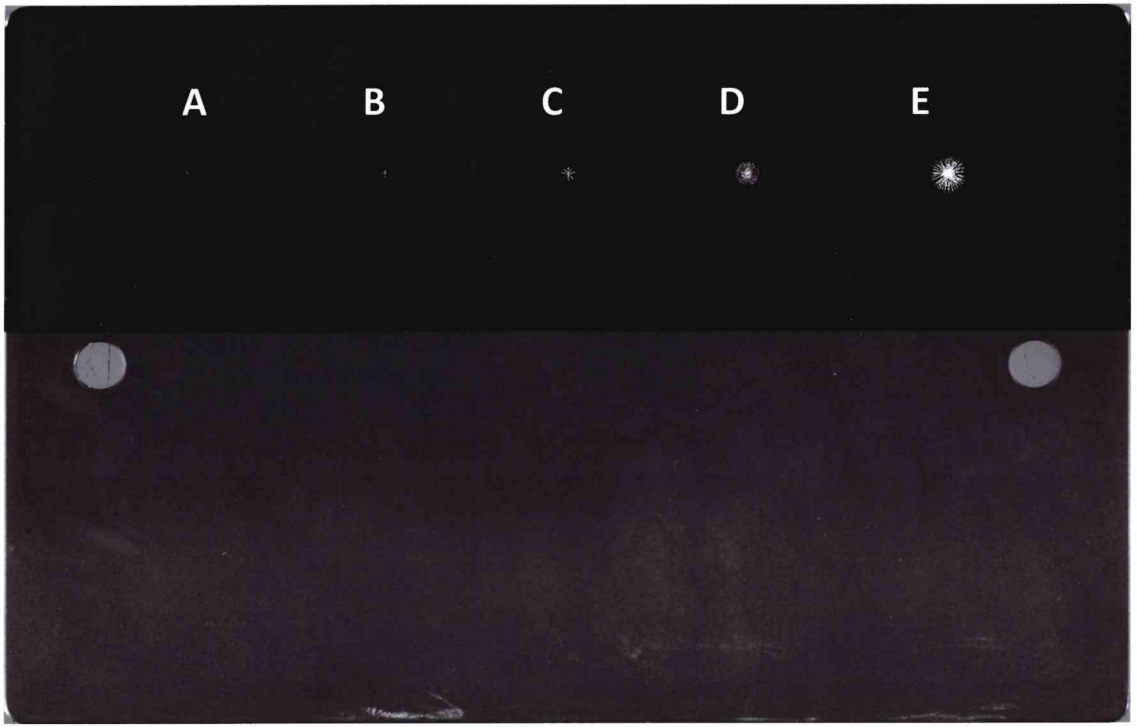
Penetrant System Monitoring Panel Documentation

SN# 290714-036

Crack Position	A	B	C	D	E
Photo of Defect Magnification Factor: 1 : 3.5					
Measured Size (Inch)	**0.023**	**0.059**	**0.090**	**0.171**	**0.242**
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)	**0.58**	**1.50**	**2.29**	**4.34**	**6.15**
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: RWB

Date of Certification: 6/16/26

This panel does not contain hexavalent chromium.

This photo is actual size. (1:1)