



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: 290711-078

Date of Certification: October 17, 2025

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

## Process Instrumentation:

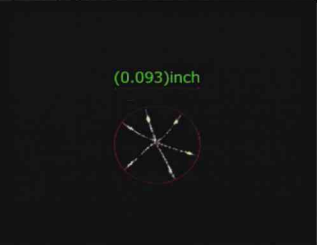
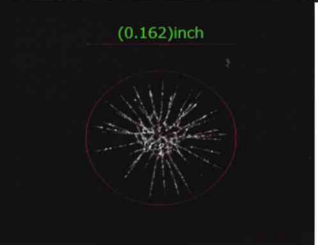
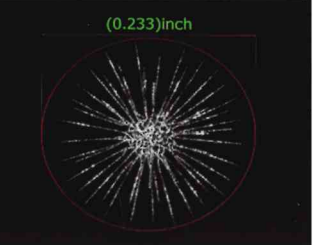
1. UV-7300, Nomad-DER (Diode Emission Recorder)  
Certified REL UV-A & White Light Meter (SN: 290576-02)
2. Traceable® Mini Alarm Timer / Stopwatch Model 5020,90225-38  
NIST traceable timer (SN: 26.552025) \*NIST traceable reference# 900492398
3. Ashcroft 20W905PH 02B XC4 90#  
NIST traceable Pressure 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# 290711-078

| Crack Position                                      | A                                                                                 | B                                                                                  | C                                                                                   | D                                                                                   | E                                                                                   |
|-----------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Photo of Defect<br>Magnification Factor:<br>1 : 3.5 |  |  |  |  |  |
| Measured Size (Inch)                                | 0.030                                                                             | 0.062                                                                              | 0.093                                                                               | 0.162                                                                               | 0.233                                                                               |
| 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)                                  | 0.76                                                                              | 1.57                                                                               | 2.36                                                                                | 4.11                                                                                | 5.92                                                                                |
| 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 |
|-------------|-----------------|---------------|

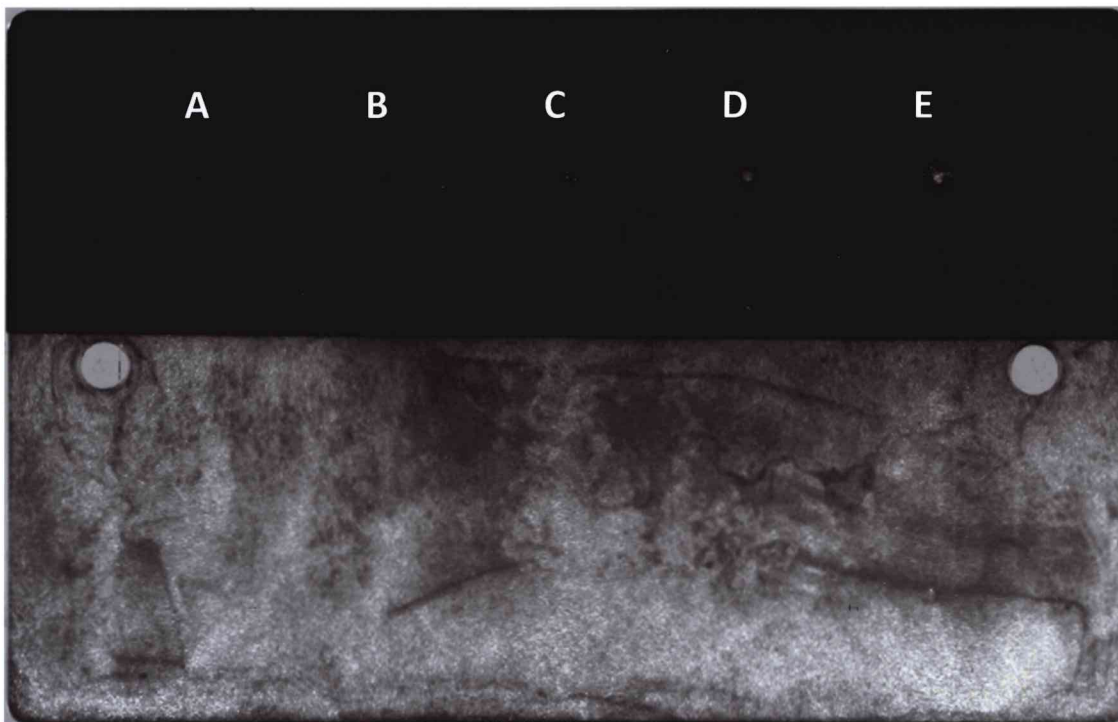
This panel has been tested to conform to all requirements of:  
TAM146040-1

Measured with Keyence IM  
8010  
Calibration No. RM4133305C

Inspector: RWB

Date of Certification: 10/17/25

This panel does not contain  
hexavalent chromium.



This photo is actual size. (1:1)