



Penetrant Professor Approved

Product Data Sheet
VP-31A
Visible Penetrant



Met-L-Chek manufactures a complete line of penetrants used in the fluorescent (Type 1) and visible (Type 2) dye penetrant inspection process. All Met-L-Chek penetrants are qualified to AMS-2644 and are sold under the Met-L-Chek® and Pen-Chek® trademarks.

VP-31A is a visible (Type 2), post emulsifiable (Method B) and solvent removable (Method C) inspection penetrant. It is designed for use in general metalworking, welding, nuclear and automotive applications for surface flaw and through leak detection. VP-31A is used with E-50 emulsifier for Method B processing which renders the penetrant water washable. Visible penetrants are not rated by sensitivity levels per AMS-2644 but are considered approximate to level 1 fluorescent penetrants. 50µ discontinuities are readily detected and under controlled conditions 30µ size defects may be highlighted by visible penetrants. ISO-3452 does rate visible penetrants by sensitivity level with #2 being the most sensitive. VP-31A is a level 2 per this specifications requirements.

VP-31A is listed on the Qualified Products List for AMS-2644. It meets the requirements of ASME Boiler and Pressure Vessel Code Section V, ASTM E-165, ASTM E-1417, and ISO- 3452 for penetrant inspection materials. It is low in Sulfur, Chlorine, Fluorine and other Halogens, making it safe for use on Titanium and high Nickel alloys found in aerospace, medical and nuclear components.

Guide to METHOD "B" (lipophilic) processing per ASTM E-1417

Guide to METHOD "C" wipe off processing per ASTM E-1417

- 1. Part must be clean, dry and at a temperature of 4.4°-52°C (40°- 125°F) before penetrant is applied.
2. Apply VP-31A penetrant using spray, immersion, or wipe on.
3. Wait a minimum of 10 minutes; 20 minutes if temperature is 4.4°-10°C (40-50°F).
4. Spray on E-50 emulsifier, or flow on; drain time < 2 minutes.
5. Wash part; water temperature 10°-38°C (50°-100 °F). Water pressure < 275kPa (< 40 psi). Distance >30cm (>12 inches). Wash time- only long enough to remove surface color .
6\*. Dry part.
7. Apply non-aqueous developer, D-70, form "f", by spraying.
7A\*. If water based developer form D-78B, "c" is used, it is applied by immersion or spray, prior to step 6 drying.
8. Wait a minimum of 10 minutes before inspection. Maximum time is 1 hour for form "f" (non-aqueous), maximum 2 hours for form "c" (aqueous). If times are exceeded, clean part and reprocess. Use illumination of >1100 lux/m² (>100 foot candles) to inspect.

- 1. Part must be clean, dry and at a temperature of 4.4°-52°C (40°- 125°F) before penetrant is applied.
2. Apply VP-31A using spray, immersion, or wipe on.
3. Wait a minimum of 10 minutes; 20 minutes if temperature is 4.4°-10°C (40-50°F).
4. Moisten cloth with remover E-59, E-59A, R-503 or R-504 and wipe penetrant from surface. Do not spray remover on surface to remove penetrant, as sensitivity will be impaired.
5. Apply nonaqueous developer D-70, by spraying.
6. Wait a minimum of 10 minutes before inspection.
7. Use lighting of 1100 lux/m2 (100 footcandles) minimum.

Through Leak Method

For through leak testing the penetrant is applied to one side of the component and then developer is applied to the opposite side. Thickness of the component will effect the dwell time which may range from 10 minutes to 2 hours.





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### Typical Physical Properties

Form: red liquid  
 Density: 880 g/L  
 Flash Point: > 93.3°C (> 200°F)  
 Viscosity: 6.2 mm<sup>2</sup>/s  
 Water Tolerance: > 5%  
 Corrosion of aluminum: none  
 Corrosion of carbon steel: none  
 Corrosion of magnesium: none  
 Corrosion of stainless steel: none  
 Corrosion of titanium: none  
 Chloride content: < 100 ppm (< 0.01%)  
 Fluoride content: < 50 ppm (< 0.005%)  
 Sulfur content: < 150 ppm (< 0.015%)  
 Mercury: none  
 VOC's: 0 g/L  
 Ozone layer depleting substances: none  
 PCB's: none

### Specifications

ISO 3452  
 PMUC  
 AMS 2644  
 ASTM E-165  
 ASTM E-1417  
 MIL-STD-271  
 MIL-STD-2132  
 RCC-M rev 2000  
 Dassault IQ-1-0-1-20  
 ASME B&PV Code Section V  
 NAVSEA-T9074-AS-GIB-010/271

### Product Availability

12 x 400mL(16oz) vol. aerosol net wt 310g (10.9oz)  
 6 x 1 pint (0.4L) can with dauber  
 1 gallon (3.7L) metal can  
 5 gallon (18.9L) metal pail  
 55 gallon (208L) metal drum

### NSN #'s

5 gallon 6850-01-264-8677



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