Penetrant Classification System

Penetrants:	Type I	Fluorescent
	Type II	Visible (Red)
Removal Method:	Method A	Water Removable
	Method B	Lipophilic Emulsifier (oil base)
	Method C	Solvent Wipe
	Method D	Hydrophilic Emulsifier (water base)
Removers:	Class (1)	Halogenated (nonflammable)
	Class (2)	Nonhalogenated (flammable)
Developers:	Form a	Dry Powder
	Form b	Water Soluble
	Form c	Water Suspendable
	Form d	Nonaqueous
	Form e	Nonaqueous
Fluorescent Sensitivity:	Level 1/2	Ultra Low
	Level 1	Low
	Level 2	Medium
	Level 3	High
	Level 4	Ultra High

Frequency of In-Use Penetrant Tests – ASTM E-1417

Each Shift
Water Wash Pressure and Temperature

Daily
Penetrant Contamination
Dry Developer Contamination
Developer Contamination (form b & c)
System Performance
Black Light: Intensity, Reflectors & Filters
Examination Area Cleanliness

Weekly
Emulsifier (hydrophilic) Concentration
Water Content (Water Based Penetrant)
Aqueous Developer Concentration (b & c)
Visible & Black Light Integrity

Monthly
Penetrant Water Content (method a only)
Emulsifier Water Content (lipophilic only)
Emulsifier Removability

Quarterly
Penetrant Brightness
Calibrate Drying Oven

Semi-Annually
Calibrate Light Meter
Water Pressure Gage Calibration
Water Temperature Gage Calibration

As Required
Penetrant Removability (method a only)
Penetrant Sensitivity

Note: Table as it appears is not a complete summary of the required in-use material tests.

Sherwin Incorporated Basic Shelf Life Statement

Shelf life on Sherwin products, starts from ship date.

Aerosol: The shelf life for aerosol cans is three years from the ship date.

Bulk: The shelf life for penetrants, emulsifiers, cleaners/removers and magnetic particle fluids, packed in original sealed containers of, 55 gallon drums, 5 gallon pails, and 1 gallon cans, is five years from the ship date. Products to be used after this date, or in opened containers, may be sent in for testing to ASTM E 1417 or ASTM E 1444, to verify continued product integrity and acceptability for use.

Bulk Powders: The shelf life for dry powder developer (form a) is indefinite, as long as there is no noticeable degradation or contamination. The shelf life for aqueous suspendable developer (form c), water soluble developer (form b), and powdered wetting agents for magnetic particle inspection in unopened containers, is one year.

See complete Shelf Life Statement on our website: www.sherwininc.com

SHERWIN INCORPORATED
DUBL-CHEK PENETRANT PROCESS

5530 Borwick Avenue • South Gate, CA 90280
Phone: (562) 861-6324 • Fax: (562) 923-8370
Email: sherwin@sherwininc.com • www.sherwininc.com

SHERWIN INCORPORATED

Materials Guide

SHERWIN INCORPORATED

Sherwin Incorporated provides a full line of products and related services, including:

✓ Penetrant Products
Visible & Fluorescent
Cleaners & Removers
Emulsifiers
Developers

✓ Specialized Penetrants
High Temperature
Water Based
Food Grade - NSF Approved

✓ Magnetic Particle Products
White Contrast Paints
Visible & Fluorescent Particles

✓ Test Panels
PSM-5 // TAM 146040 Certified
PSM-5 // Sherwin Certified
Twin KDS Panels
Twin Nickel Chrome Panels
Wash Test Panels, 1 and 2
Cracked Aluminum Blocks
Panel Recertification
Photo and Sizing of Indications

✓ Laboratory Services
In-Use Penetrant Testing
In-Use Mag Particle Testing
Custom Products

✓ Penetrant Inspection Accessories

Sherwin Incorporated has 2 locations in the U.S. to serve your penetrant needs:
Sherwin products are available worldwide - see website for details.

Manufacturing and Laboratory Facility
Sherwin Incorporated - California
5530 Borwick Avenue
South Gate, CA 90280
Phone: (562) 861-6324
Fax: (562) 923-8370
Email: sherwin@sherwininc.com

Distribution Facility
Sherwin Incorporated - Kentucky
1615 Distribution Drive
Burlington, KY 41005
Phone: (859) 525-6881
Fax: (859) 525-6887
Email: sherwinky@aol.com

www.sherwininc.com

PRODUCTS ★available in aerosol	CLASSIFICATION TO AMS-2644	DESCRIPTION	TYPICAL APPLICATION	SPECIAL FEATURES
FLUORESCENT PENETRANT Water-washable (Method A & C)				
TRI-A	N/A	surfactant-based	ceramic, plastic and porous parts	crack detection without staining or use of developer
HM-1 HM-2D HM-220	Level 1/2 Level 1 Level 1	low sensitivity low sensitivity low sensitivity	non-ferrous metal castings	excellent washability, low penetrant consumption due to low viscosity, excellent electrostatic capability, flash point over 200°F
HM-3A HM-406★ HM-412 HM-440 HM-440.NY	Level 2 Level 2 Level 2 Level 2 N/A	medium sensitivity medium sensitivity high level 2 sensitivity medium sensitivity surfactant-based	welds, castings, forgings and extrusions of automotive and aerospace, ferrous and non-ferrous, airframes and turbine engine components	HM-220: surfactant based HM-440: surfactant based pre-inspection, before HM-440 final inspection, contains no yellow dye
HM-430 HM-604 HM-607 HM-704 HM-707	Level 3 Level 3 Level 3 Level 4 Level 4	high sensitivity high sensitivity high level 3 sensitivity ultra-high sensitivity highest level 4 sensitivity	turbine engine components including turbine blades and critical welds, castings, forgings and extrusions	resists over-washing, low background and excellent electrostatic spray capability flash point over 200°F HM-604: surfactant based HM-607: surfactant based HM-704: surfactant based HM-707: surfactant based
FLUORESCENT PENETRANT Post-emulsifiable (Method B, C & D)				
RC-29 FP-22B RC-50	Level 1 Level 2 Level 2	low sensitivity medium sensitivity medium sensitivity	welds, castings, forgings in automotive, airframes and turbine engines	low penetrant consumption due to low viscosity, excellent electrostatic spray capability, superior heat resistance, fully approved and proven over three decades, flash point over 200°F
RC-65★ RC-77★ RC-88	Level 3 Level 4 Level 4	high sensitivity ultra-high sensitivity ultra-high sensitivity	critical turbine engine components, e.g. turbine blades, turbine engine rotating parts, discs	*RC-88: contains no petroleum solvent*
FLUORESCENT PENETRANT Water-based (Method A & C)				
I-319	N/A	LOX Compatible	liquid oxygen applications	water-base, LOX compatible, Level 1 equivalent
WB-100 WB-200	Level 1 Level 2	low sensitivity medium sensitivity	used in castings, forgings, in automotive, airframes and turbine engines	first approved water-based fluorescent penetrants, resists over-washing, non-flammable, available in ready to use form, also available in concentrate
EMULSIFIERS				
ER-83A	Method D	hydrophilic	use with P.E. penetrants and DP-40	qualified to 30% max. concentration – high tolerance to contamination
ER-83A-1	N/A	hydrophilic	use with P.E. penetrants and DP-40	contains no dye
ER-83C	Method D	hydrophilic	use with P.E. penetrants and DP-40	qualified to 30% max. concentration – high tolerance to contamination
ER-85	Method B	lipophilic	use with P.E. penetrants and DP-40	slow diffusion with lower risk of over-emulsification
ER-85-1	N/A	lipophilic	use with P.E. penetrants and DP-40	contains no dye
DEVELOPERS				
D-90G	form a	dry powder	dust chamber – hand application, or powder bulb	stabilizes and enhances brilliance to indications
D-100★	form d & e	nonaqueous alcohol	aerosol, sprayer	refined white particles give thin, more uniform layer, alcohol based
D-106★	form d & e	nonaqueous acetone	aerosol, sprayer	refined white particles, dries fast into uniform layer, acetone based
D-110A.1	form c	water-suspendible	dip tank	nonhazardous, economical developer for testing large number of parts
D-113G.1	form b	water-soluble	dip tank	
CLEANERS / REMOVERS				
DR-60★	Class 2	hydrocarbon based	use with all visible or fluorescent penetrant	excellent solvent action pre-cleaner and remover
DR-62★	Class 2	hydrocarbon/acetone based		excellent solvent action pre-cleaner and remover, faster drying than DR-60
DR-63	Class 2	isopropyl alcohol based		excellent solvent action pre-cleaner and remover
DR-64	Class 2	acetone based		formulated VOC exempt solvent
LA-1	N/A	hot tank - alkaline cleaner	use diluted, spray or immersion	safe on all metals, leaves no residue, penetrant compatible
VISIBLE DYE PENETRANT				
DP-40★ DP-50★ DP-51★ DP-52	Method B & C & D Method A & C Method A & C N/A	P.E. type water washable water washable water washable	welds, castings, forgings and extrusions of both ferrous and non-ferrous components and some plastics and ceramics	sharp indications through high color content, resists over-washing, flash point over 200°F
DP-54	Method A & C	easily water washable	rough castings	easy wash-off for use on heavily textured parts
BY-LUX★	N/A	visible and fluorescent	second look with black light	no second application when closer look needed
HIGH TEMPERATURE SYSTEM				
KO-17★ Penetrant KO-19★ Remover D-350★ Developer	Method A & C Class 2 form d & e	high temp. visible dye high temp. remover high temp. developer	welds, castings, forgings at high temperature	KO-17: surfactant based inspection on hot surfaces, no need to cool down parts, reducing processing time and inspection costs (tested up to 350°F)
MAGNETIC PARTICLE	**SAE/AMS CLASSIFICATION**			
Black Oxide★ CP-1★ CP-2★ Glo-Netic★ GW-1 MPF W5C	AMS 3041, 3042, 3043 N/A Meets ISO 9934 AMS 3044, 3045, 3046 AMS 3044 AMS 2641 AS 4792	black mag particles peelable contrast paint contrast paint premixed fluorescent particles in petroleum carrier powder concentrate mag particle fluid for wet method mag particle inspection powder water additive	welds, castings and forgings - used under visible light high contrast background for interpreting mag particle indications high contrast background for interpreting mag particle indications widely used for manufacturing and maintenance inspection mix with oil or water to find microscopic cracks in ferrous metals use with both fluorescent and non-fluorescent magnetic particles disperse and suspend mag particles, both fluorescent and non-fluorescent	high particle concentration provides heavier indication buildup for easy detection enhances the visibility of black or red-brown mag particles under white light enhances the visibility of black or red-brown mag particles under white light highly sensitive for inspecting critical parts. Indications are bright, precise, and easier to read – used on ferrous metal highly sensitive for magnetic inspection of critical parts, low background no odor, no fluorescence, clear liquid, non-flammable flashpoint above 200°F no petroleum solvents for disposal, contains surface wetting agents, corrosion inhibitors and anti-foaming agents

APPROVALS & SPECIFICATIONS

SHERWIN penetrant materials are listed in the Qualified Product List (QPL) of MIL-I-25135E and AMS-2644.

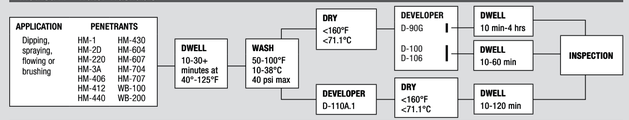
*NOTE: Some **specialty** products do not meet QPL requirements and are only used for special applications.*

AMS/SAE 2647
AMS-3155
AMS-3156
AMS-3157
ASME BPVC Sec V
Aerospatiale
AIRBUS
Allison
Augusta
Boeing
Bombardier
Douglas DMS
Embraer
FIAT Aviazone
Garrett EMS
General Dynamics
General Electric
Lockheed
MTU
Northrop
Pratt & Whitney
RDT-F3-6T
Rolls-Royce
Sikorsky Aircraft
Snecma DMC
Turbomeca
TVA

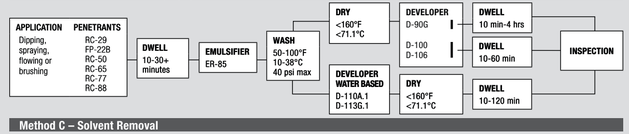
SHERWIN GUIDE TO PENETRANT PROCESSES

TYPE I – FLUORESCENT PENETRANTS

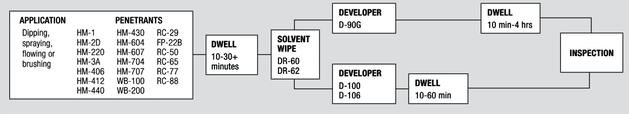
Method A – Water Washable



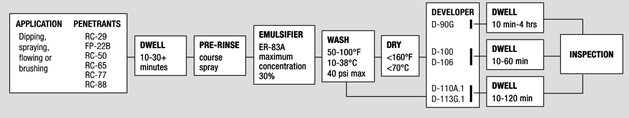
Method B – Post-Emulsifiable, Lipophilic



Method C – Solvent Removal

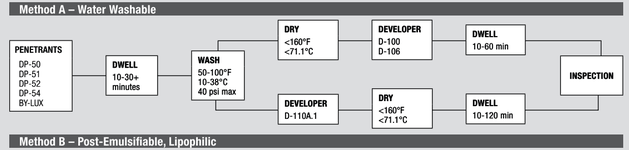


Method D – Post-Emulsifiable, Hydrophilic

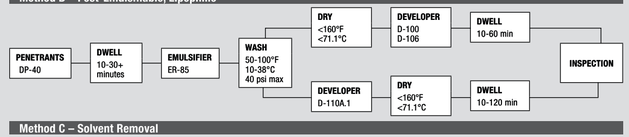


TYPE II – VISIBLE PENETRANTS

Method A – Water Washable



Method B – Post-Emulsifiable, Lipophilic



Method C – Solvent Removal

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