

Penetrant Classification System

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

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

<b>Each Shift</b> Water Wash Pressure and Temperature	<b>Monthly</b> Penetrant Water Content (method a only) Emulsifier Water Content (lipophilic only) Emulsifier Removability
<b>Daily</b> Penetrant Contamination Dry Developer Contamination Developer Contamination (form b & c) System Performance Black Light: Intensity, Reflectors & Filters Examination Area Cleanliness	<b>Quarterly</b> Penetrant Brightness Calibrate Drying Oven
<b>Weekly</b> Emulsifier (hydrophilic) Concentration Water Content (Water Based Penetrant) Aqueous Developer Concentration (b & c) Visible & Black Light Integrity	<b>Semi-Annually</b> Calibrate Light Meter Water Pressure Gage Calibration Water Temperature Gage Calibration
	<b>As Required</b> 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



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

www.sherwininc.com

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
<b>FLUORESCENT PENETRANT</b> 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
<b>FLUORESCENT PENETRANT</b> 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
<b>FLUORESCENT PENETRANT</b> 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
<b>EMULSIFIERS</b>				
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
<b>DEVELOPERS</b>				
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	
D-113G.1	form b	water-soluble	dip tank	nonhazardous, economical developer for testing large number of parts
<b>CLEANERS / REMOVERS</b>				
DR-60*	Class 2	hydrocarbon based		excellent solvent action pre-cleaner and remover
DR-62*	Class 2	hydrocarbon/acetone based	use with all visible or fluorescent penetrant	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
<b>VISIBLE DYE PENETRANT</b>				
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 BY-LUX*	Method A & C N/A	easily water washable visible and fluorescent	rough castings	easy wash-off for use on heavily textured parts
			second look with black light	no second application when closer look needed
<b>HIGH TEMPERATURE SYSTEM</b>				
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)
<b>MAGNETIC PARTICLE</b>	<b>SAE/AMS CLASSIFICATION</b>			
Black Oxide* CP-1* CP-2* Glo-Netic* GW-1 MPF WSC	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

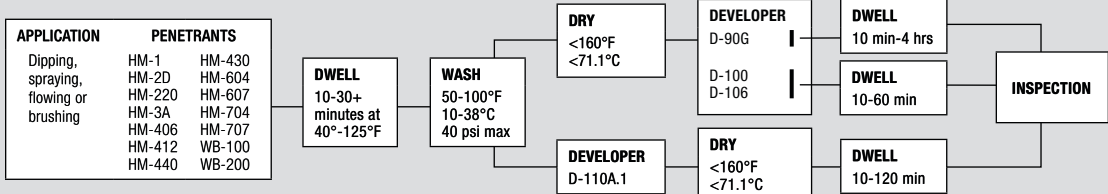
Turbomeca

TVA

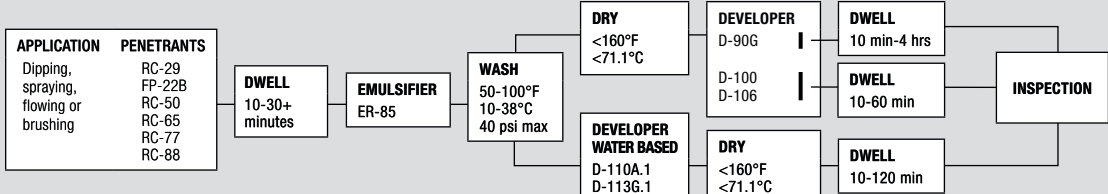
## SHERWIN GUIDE TO PENETRANT PROCESSES

### TYPE I – FLUORESCENT PENETRANTS

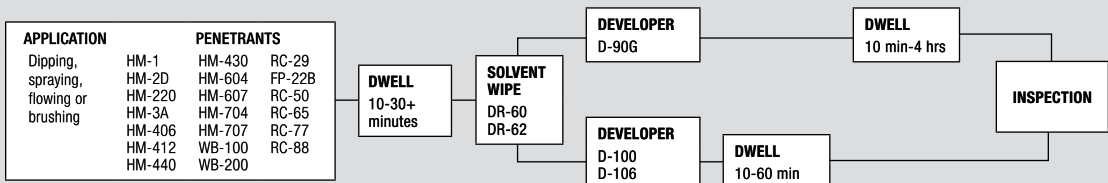
#### Method A – Water Washable



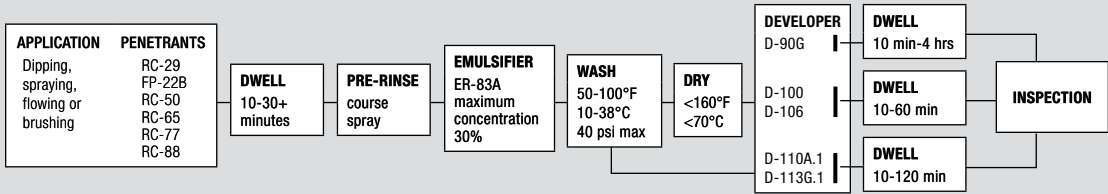
#### Method B – Post-Emulsifiable, Lipophilic



#### Method C – Solvent Removal

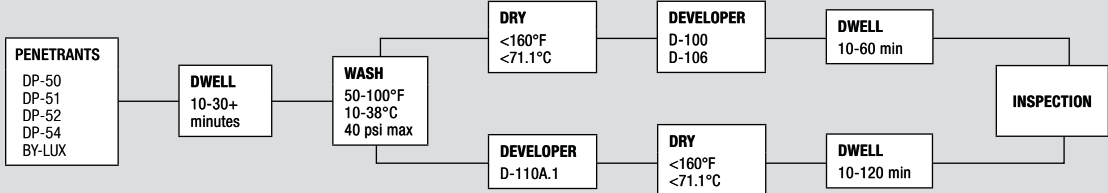


#### Method D – Post-Emulsifiable, Hydrophilic

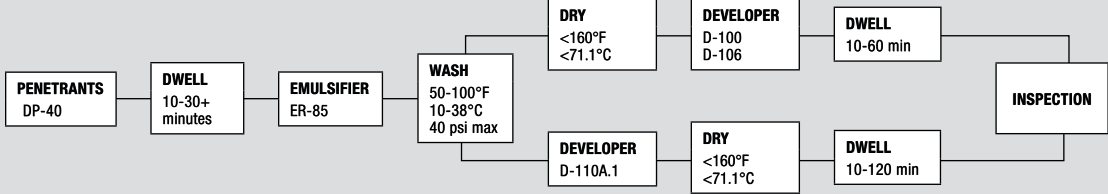


### TYPE II – VISIBLE PENETRANTS

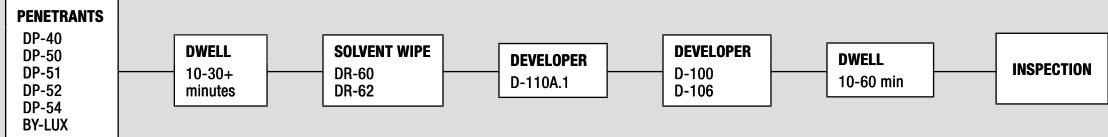
#### Method A – Water Washable



#### Method B – Post-Emulsifiable, Lipophilic



#### Method C – Solvent Removal



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

