

SHERWIN
INCORPORATED

Callington

**DUBL-
CHEK**
PENETRANT
PROCESS

PENETRANT MATERIALS GUIDE



Penetrant Products

- Fluorescent - Water Washable
- Fluorescent - Non Water Washable
- Visible - Water Washable
- Visible - Non Water Washable
- Developer
- Emulsifier

Magnetic Particle Products

- Fluorescent
- Visible
- Visible & Fluorescent
- Dusting Powder

Test Panels

- PSM-5
- Twin KDS Panel
- Wash Test Panel
- Twin Nickel Chrom Panels
- Cracked Aluminium Blocks

Laboratory Services

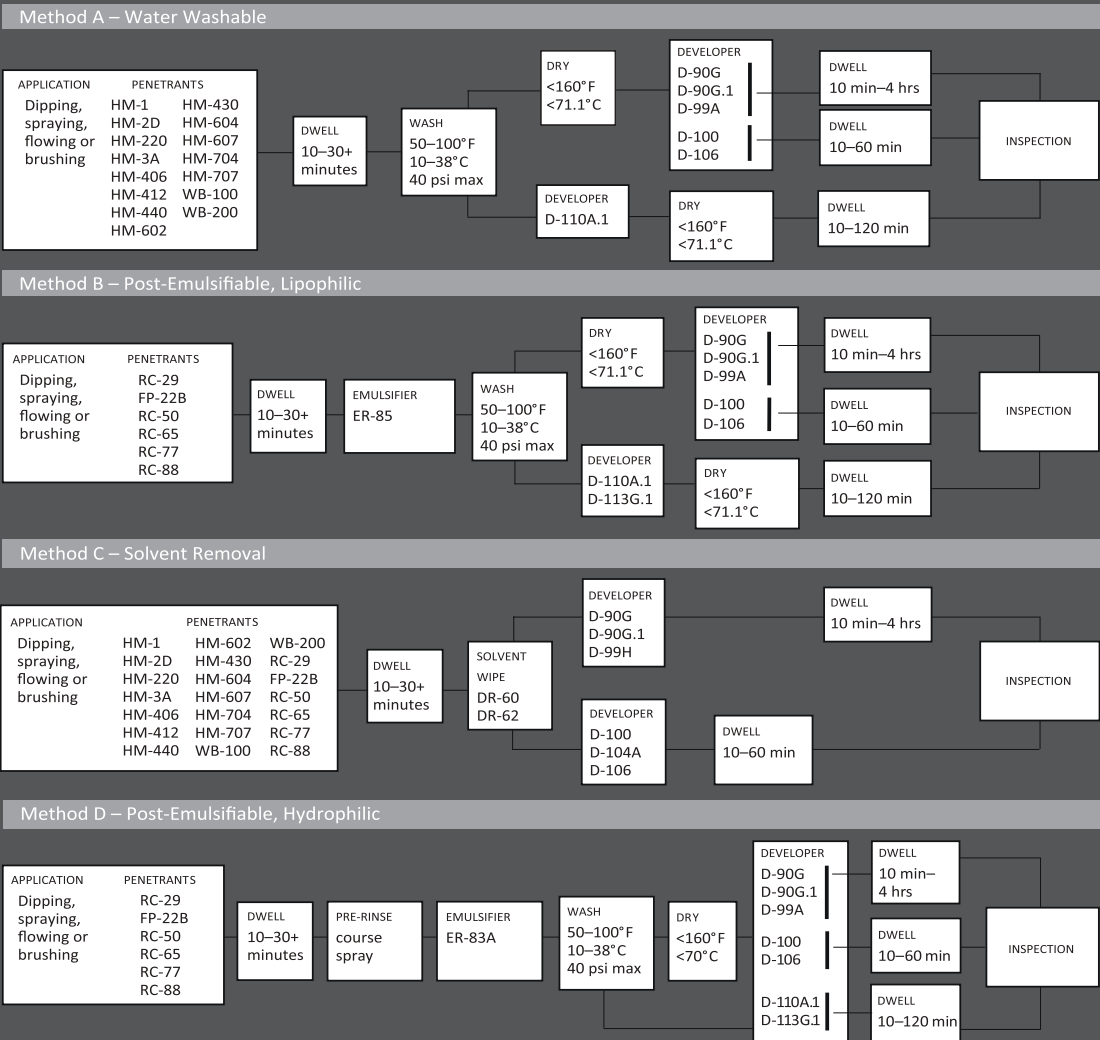
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|------------------------------|--------------------------|
| • Penetrant | • Emulsifier |
| • Fluorescent Brightness | • Removability |
| • Water Content | • Water Content |
| • Removability | • Magnetic Particle |
| • Sensitivity | • Viscosity |
| • Viscosity | • Background Fluorescent |
| • Water Tolerance | |
| • Contamination / Separation | |
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PRODUCTS		CLASSIFICATION TO AMS-2644	AVAILABLE IN AEROSOL	BIODEGRADABLE	DESCRIPTION	
	FLUORESCENT PENETRANT Water-washable (Method A & C)					
	TRI-A	N/A			surfactant-based	
	HM-1	Level 1/2			low sensitivity	
	HM-2D	Level 1			low sensitivity	
	HM-220	Level 1		X	low sensitivity	
	HM-3A	Level 2			medium sensitivity	
	HM-406	Level 2	X		medium sensitivity	
	HM-412	Level 2			high level 2 sensitivity	
	HM-440	Level 2		X	medium sensitivity	
	HM-602	Level 2		X	medium sensitivity	
	HM-430	Level 3			high sensitivity	
	HM-604	Level 3	X	X	high sensitivity	
	HM-607	Level 3		X	high sensitivity	
	HM-704	Level 4		X	ultra-high sensitivity	
	HM-707	Level 4		X	ultra-high sensitivity	
	FLUORESCENT PENETRANT Post-Emulsifiable (Method B, C & D)					
	RC-29	Level 1			low sensitivity	
	FP-22B	Level 2			medium sensitivity	
	RC-50	Level 2			medium sensitivity	
	RC-65	Level 3	X		high sensitivity	
	RC-77	Level 4	X		ultra-high sensitivity	
	RC-88	Level 4			ultra-high sensitivity	
	FLUORESCENT PENETRANT Water-based (Method A & C)					
	I-319 Water-based	N/A		X		
	WB-100 Water-based	Level 1		X	low sensitivity	
	WB-200 Water-based	Level 2		X	medium sensitivity	
	EMULSIFIERS					
	ER-83A	Method D		X	hydrophilic	
	ER-85	Method B			lipophilic	
	DEVELOPERS					
	D-90G					
	D-90G.1	form a			dry powder	
	D-90H					
	D-100	form d & e	X		nonaqueous alcohol	
	D-106	form d & e	X		nonaqueous acetone	
	D-110A.1	form c			water-suspendible	
	D-113G.1	form b			water-soluble	
	CLEANERS / REMOVERS					
	DR-60	Class 2	X		hydrocarbon based	
	DR-62	Class 2	X		hydrocarbon based	
	DR-64	Class 2	X		hydrocarbon based	
	LA-1 Cleaner	N/A			hot tank - alkaline	
	VISIBLE DYE PENETRANT					
	DP-40	Method B & C & D	X		P.E. type	
	DP-50	Method A & C	X		water washable	
	DP-51	Method A & C	X		water washable	
	DP-52	N/A			water washable	
	DP-54	Method A & C		X	easily water washable	
	BY-LUX	N/A	X		visible and fluorescent	
	HIGH TEMPERATURE SYSTEM					
	KO-17 Penetrant	Method A & C	X	X	high temp. visible dye	
	KO-19 Remover	Class 2	X		high temp. remover	
	D-350 Developer	form d & e	X		high temp. developer	

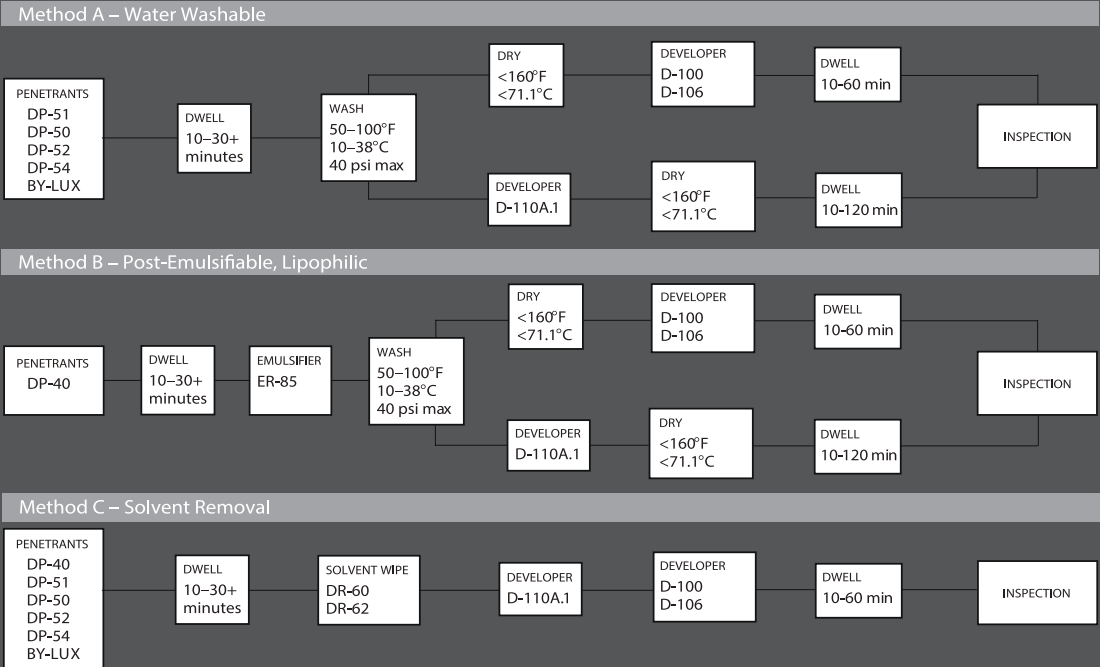
TYPICAL APPLICATION	SPECIAL FEATURES	APPROVALS & SPECIFICATIONS
ceramic, plastic, and porous parts	crack detection without staining or use of developer	SHERWIN penetrant materials are listed in the Qualified Product List (QPL) of MIL-I-25135E and AMS-2644-1 <i>NOTE: Some specialty products do not meet requirements and are only used for special inspections.</i> Rolls-Royce Pratt & Whitney General Electric Sneema DMC Aerospatiale Turbomeca FIAT Aviazone Augusta MTU Garrett EMS Allison Douglas DMS Airbus Industry Boeing BAC 5423 Sikorsky Aircraft Lockheed General Dynamics Northrop ASME Code Sec V RDT-F3-6T AMS/SAE 2647 AMS-3155 AMS-3156 AMS-3157 Embraer Bombardier
non-ferrous metal casting	excellent washability, low penetrant consumption due to low viscosity, excellent electrostatic spray capability flash point over 200 degrees F	
welds, castings forging and extrusions of automotive and aerospace, ferrous and non-ferrous, air frame and turbine engine components		
turbine engine components including turbine blades and critical welds, castings, forging and extrusions	resists over-washing, low background and excellent electrostatic spray capability flash point over 200 degrees F	
welds, castings, forging in automotive, airframe and turbine engine	low penetrant consumption due to low viscosity, excellent electrostatic spray capability, superior heat resistance, fully approved and proven over two decades flash point over 200 degrees F	
critical turbine engine components, e.g. turbine blades, turbine engine rotating parts, discs, fan-blades		
liquid oxygen applications	water-base, LOX compatible	
castings, forging in automotive airframe and turbine engine	first approved water-based fluorescent penetrants biodegradable, resists over-washing, non-flammable	
use with P.E. penetrants and DP-40	qualified to 30% max. concentration – high tolerance to contamination	
use with P.E. penetrants and DP-40	slow diffusion with lower risk of over-emulsification	
dust chamber – hand application, or powder bulb	stabilizes and enhances brilliance to indications	
aerosol, sprayer aerosol, sprayer	refined white particles give thin, more uniform layer refined white particles, dries fast into uniform layer nonhazardous, economical developer for testing large number of parts	
dip tank dip tank		
use with all visible or fluorescent	excellent solvent action- pre-cleaner and remover more volatile than DR-60, excellent pre-cleaner	
dilution, spray or immersion	non-corrosive, non-toxic, sodium-free	
welding, castings, forging and extrusions of both ferrous and non-ferrous components and some plastics and ceramics	sharp indications through high color content resist over-washing, high color content flash point over 200 degrees	
rough castings	easy wash-off for use on heavily textured parts	
second look with black light	no second application when closer look needed	
welding, castings, forging at high temperature	inspection on hot surfaces, no need to cool down parts reducing processing time and inspection costs dwell up to 350 degrees	

SHERWIN GUIDE TO PENETRANT PROCESSES

TYPE I-FLUORESCENT PENETRANTS



TYPE II-VISIBLE PENETRANTS



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 (non-flammable) 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

EACH SHIFT

Water Wash Pressure and Temperature

DAILY

Penetrant Contamination

Dry Developer Condition

Developer Contamination (form b & c)

System Performance

Black Light: Intensity, Reflectors & Filters

Examination Area Cleanliness

WEEKLY

Emulsifier (hydrophilic) Concentration

Penetrant Sensitivity*

Water Content (water based)

Aqueous Developer Concentration (b & c)

Visible & Black Light Integrity

MONTHLY

Penetrant Water Content (method a only)

Penetrant Removability* (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

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

* These tests may be combined and performed during the "system performance" test in accordance with 7.8.4.