MAGNAFLUX

PRODUCT DATA SHEET

DEVELOPERS SKD-S2 ZP-4B ZP-9F ZP-5B ZP-14A

General Description

Product	Description	Composition	Special benefits
SKD-S2	Ready-to-use suspension of white developing particles in a fast-drying solvent. Produces an opaque white coating, which provides an excellent contrasting background for penetrant indications.	A blend of inert inorganic particles suspended in an isopropanol and acetone mix. Low in sulphur and halogens. Contains no chlorinated hydrocarbons.	• Excellent contrast with red penetrants • Maximum sensitivity • Quick drying
ZP-4B	Free-flowing, white fluffy powder supplied ready to use. Forms a thin film over the surface of the component to enhance defect indications.	A mixture of inert developing powders.	• Gives bright indications
ZP-5B	Powder concentrate for mixing with water. When dry, it forms a uniform white coating which enhances fluorescent indications; at higher concentrations, it forms a more opaque white coating, making a good contrasting background.	A blend of inert mineral pigments, surface active agents and corrosion inhibitors.	• Gives bright indications • Good colour contrast with red penetrants
ZP-9F	Ready-to-use suspension of white developing particles in a fast-drying solvent. Produces a light white coating which provides an excellent contrasting background for penetrant indications.	A blend of inert inorganic particles suspended in an isopropanol and acetone mix. Low in sulphur and halogens. Contains no chlorinated hydrocarbons.	• Quick drying • Maximum sensitivity • Easily removed with water
ZP-14A	White free-flowing powder which dissolves in water to form a clear, colourless biodegradable developer solution. When dry, it produces a uniform white porous coating.	A blend of organic salts, surface active agents and corrosion inhibitors.	• Chromate and nitrite free • Easily removed with water

Typical Properties (not a specification)

Property	SKD-S2	ZP-4B	ZP-5B	ZP-9F	ZP-14A
Colour	White suspension	White powder	White powder	White suspension	White powder
Flash point	-6°C (bulk product) -40°C (aerosol)	N/A	N/A	-40°C (aerosol)	N/A
Density	0.88 g/cm^3	0.25 g/cm^3	0.6 g/cm^3	0.83 g/cm^3	0.6 g/cm^3
Sulphur content	< 300 ppm	< 200 ppm	< 1000 ppm	< 300 ppm	< 1000 ppm
Chloride content	< 300 ppm	< 350 ppm	N/A	< 300 ppm	N/A
Halogen content	N/A	N/A	< 1000 ppm	N/A	< 1000 ppm
Corrosion	Meets AMS 2644	Meets AMS 2644	Meets AMS 2644	Meets AMS 2644	Meets AMS 2644
AMS 2644 class	Form d - Type 1 Form e - Type 2	N/A	Form c - Type 1 and 2	Form d - Type 1 Form e - Type 2	Form b - Type 1
Storage temperature	10°C - 30°C	10°C - 30°C	10°C - 30°C	10°C - 30°C	10°C - 30°C
Usage temperature	< 50°C	N/A	N/A	< 50°C	N/A

Like all Magnaflux materials, our developers are closely controlled to ensure batch-to-batch consistency, optimum process control and inspection reliability.

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General Method of Use

Before using any developer, ensure the test surface is clean, free from excess penetrant, and dry. Residue from water-based penetrants can be removed with a water spray; solvent-based penetrants by wiping with a solvent cleaner.

With **Spotcheck** penetrants, cracks will appear as red lines and porosity as spots. If you see a general reddish colour or pink film, that means the penetrant was not completely removed.

With **Zyglo penetrants**, indications will fluoresce bright yellow/green under UV light (we recommend Magnaflux black lights ZB-100F or ZB-100-LED). If you see a general greenish film, that means the penetrant was not completely removed.

SKD-S2 and ZP-9F

Use as soon as possible after mixing; if left to stand, the developer particles will settle out of suspension. The mixture must be continually agitated during use to ensure uniformity of mix.

- **Apply by spraying only** (dipping or brushing will cause excessive solvent action) by aerosol or conventional spray gun.
- **Spray in thin even layers which just wet the surface.** Too wet a spray will cause excessive bleeding and running of indications; too dry a spray will result in slow indication development, as well as possible loss in overall sensitivity.
- After inspection, developer residue can be removed by wiping with a cloth, or by a water and detergent wash.

ZP-4B

- **Apply** by dusting, powder puffer, powder storm or electrostatic spray.
- **Allow a development time** of at least 10 minutes before inspecting under UV(A) light.
- After inspection, developer residue can be removed by wiping with a cloth, or by a water and detergent wash.

ZP-5B and ZP-14A

- **Apply by immersion dip, spray or flow on** techniques (see below) for just long enough to completely cover the part.
- **Dry the part thoroughly**. For best results, use forced warm air drying at around 60 ºC. Remove from the dryer as soon as the developer is dry or it could bake on and be difficult to remove.
- Allow a minimum of **10 minutes development time** before inspecting the component.
- After inspection, **wash off the developer** film with a water spray and, if necessary, a brush.

Spray or flow-on application

Avoid foaming as foam bubbles in the developer film can cause voids in the dried coating.

Immersion dip application

Make up a developer bath:

- Ensure that the developer tank and the part to be tested are **clean**. Excess penetrant will contaminate the bath and shorten its life.
- **Fill the tank** with the appropriate amount of water (see below) that is no hotter than 50 °C. We recommend using soft water or de-ionised water where possible.*
- Wearing a suitable filter face mask, **slowly add the required amount of powder** (see table below) while agitating the water.
- **Continue mixing** until the powder is fully dispersed.
- **With ZP-5B, the bath will need agitating** throughout the development process, to keep the powder particles in suspension. ZP-14A baths need no further agitation.
- Don't leave the component in the bath for too long - this will reduce the sensitivity of the process by removing penetrant from shallow discontinuities.

We recommend the following concentrations for the make-up of your developer bath:

	ZP-5B	ZP-14A
Penetrant type	**Concentration per litre of water**	
Spotcheck	180 g	N/A
Zyglo	60 g	120 g - 200 g

* ZP-14A baths may show traces of fluffy sediment in hard water. This will not interfere with the developer or its removability.

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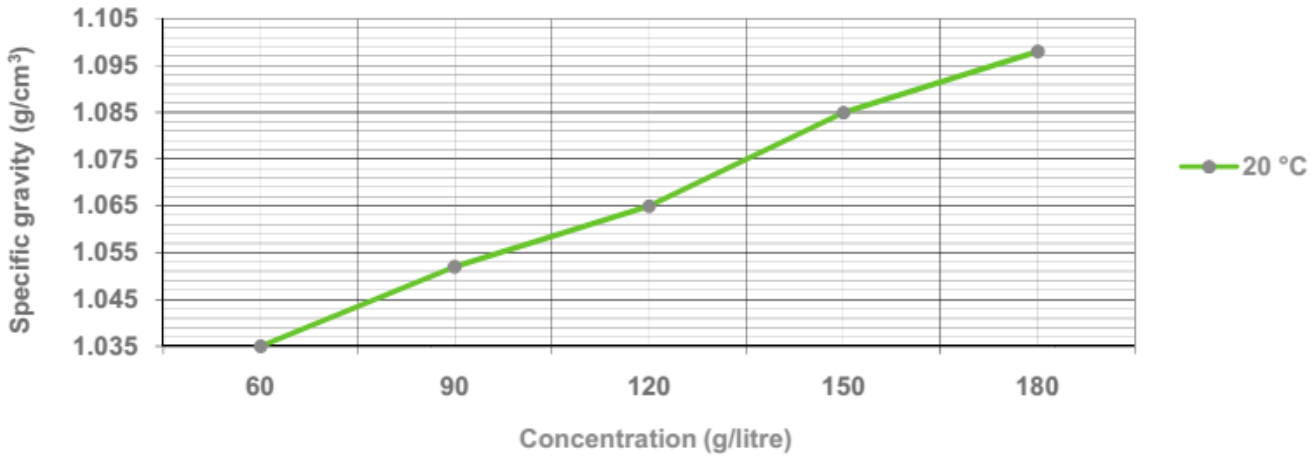
The concentration should be monitored on a regular basis to maintain the correct working strength is maintained. To do this, take a known volume of the bath, evaporate off the water and weigh the residue. The concentration can be calculated as follows:

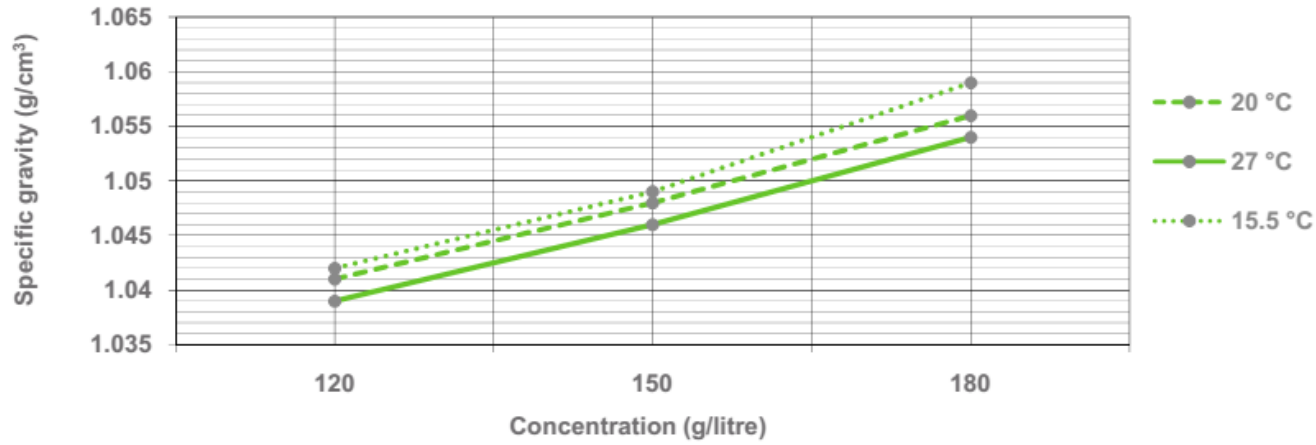
For a 50 ml sample volume: **Weight of residue (g) x 20 = Concentration (g per litre)**

A less accurate method is to measure the specific gravity of the bath and cross-reference with the graphs below.

Graph of ZP-5B Bath specific gravity versus concentration at 20 °C



Graph of ZP-14A Bath specific gravity versus concentration at various temperatures



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Recommended Products

Product type	Product Name(s)
Cleaner/remover	SKC-S
Water-washable penetrants	Zyglo: ZL-15B, ZL-19, ZL-60C, ZL-60D, ZL-67B, ZL-56 • Autoglo AL-4B • Spotcheck: SKL-WP2, SKL-LT
Post-emulsifiable penetrants	Zyglo: ZL-2C, ZL-27A, ZL-37 • Spotcheck: SKL-SP2, SKL-LT

Specification Compliance

Specification	SKD-S2	ZP-4B	ZP-5B	ZP-9F	ZP-14A
AMS2644F	✓	✓	✓	✓	✓
ASME B & PV Code, Sec V	✓	✓	✓	✓	✓
ASTM E165/E165M	✓	✓	✓	✓	✓
ASTM E1417/E1417M	✓	✓	✓	✓	✓
EN ISO 3452-1	✓				
EN ISO 3452-2	✓				
MIL-STD-2132D	✓	✓	✓	✓	✓
MIL-STD-271F	✓	✓	✓	✓	✓
Pratt & Whitney PMC		4356-4		4357-2	
Propan-2-ol content = 10.8%				✓	
Rolls Royce RRP 58003 (CSS 232)		✓		✓	
SAFRAN Pr 5000/In 5000	✓	✓		✓	

Availability

	SKD-S2	ZP-4B	ZP-5B	ZP-9F	ZP-14A
Unit	Part numbers (if applicable)				
10 x 400ml aerosol	008A007	N/A	N/A	008A010	N/A
4 x 5 litres	005C014	N/A	N/A	N/A	N/A
1 Kg pack	N/A	055C022	N/A	N/A	N/A
5 Kg pack	N/A	055C023	005C002	N/A	005C010

Health and Safety

Read the relevant Safety Data Sheet for this product before use. Safety Data Sheets are available on request from your Magnaflux distributor or via the Magnaflux website: **www.eu.magnaflux.com**

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