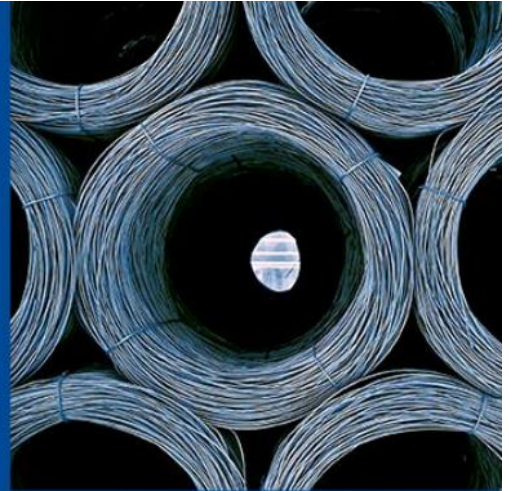


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Inspection Solutions



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# ARDROX<sup>®</sup> 8506

## HIGH-SENSITIVITY FLUORESCENT MAGNETIC INK

### Description

Ardrox<sup>®</sup> 8506 is a ready-to-use fluorescent ink ideal for the inspection of ferromagnetic materials, structures and components by the magnetic particle inspection method.

Ardrox<sup>®</sup> 8506 consist of finely-divided fluorescent magnetic particles, dispersed in a hydrocarbon carrier fluid which will fluoresce brilliant yellow/green under ultraviolet radiation with a predominant wavelength of 365 nanometer.

The particles have been selected for their high magnetic response, low coercivity (to avoid coagulation) and prolonged operational life.

Ardrox<sup>®</sup> 8506 use a hydrocarbon carrier fluid corresponding to the AMS 2641, Type 1 Magnetic Particle Inspection Vehicle with a flash point exceeding 93°C / 200°F.

Ardrox<sup>®</sup> 8506 is available as bulk material and as aerosol.

### Conformances

- ✓ ASME Boiler & Vessel Code Section V, Article 7
- ✓ ASTM E-1444
- ✓ CEN ISO 9934-2
- ✓ Rolls Royce CSS231 & RRP 580004 (approval)
- ✓ SAE AMS 3045/3046 & 2641 Type 1
- ✓ Safran IN-5300

Ask your Chemetall representative for a complete list of approvals

### 1 Physical and chemical properties

Property	Typical Value	Unit	Test Method
Appearance	Suspension of brown powder	-	-
Particle size (mean)	4-5	µm	-
Settlement	0.1 - 0.3	%	AMS 3045
Flash point	>93 / >200	°C / °F	ASTM D93
Density	0.81 at 20°C / 68°F	g/cm <sup>3</sup>	volumetric

These are typical values only and do not constitute a specification.

### 2 Application

Ardrox<sup>®</sup> 8506 is used as supplied without any dilution.

The surface of the component to be inspected should be cleaned prior to testing as any contamination on the component can mask any indication and contaminate the magnetic particle ink. Surface temperature should be between 0 and 75°C (30-165°F).

Before use, Ardrox<sup>®</sup> 8506 must be agitated/shaken to ensure that the magnetic particles are maintained in suspension.

The ink can be applied by spray, flow-on or when residual magnetic field method is used by immersion. When the continuous magnetization method is used, the application of ink must be stopped before the magnetizing current is switched off to enable the particles to migrate to the area of flux leakage.

Indications appear brilliant yellow-green when viewed under UVA (black) light of peak wavelength of 365 nm. The component surfaces should be inspected under UVA (black) light of minimum output of 1,000  $\mu\text{W}/\text{cm}^2$  and peak wavelength of 365 nm. The ambient light should also be less than 10 lux.

Note: Specification may vary. Check concentration and UVA/ambient light as per the applicable specification.

### **3 Effects on materials**

When Ardrox<sup>®</sup> 8506 is used in the prescribed manner, no significant corrosion will occur on ferrous materials. Equipment/tanks should be constructed of stainless steel.

### **4 Storage**

Store in a cool place, protected from freezing conditions. Shelf life is 36 months.

### **5 Labor and environmental protection**

Before operating the process described it is important that this complete document, together with any relevant Safety Data Sheets, be read and understood.

All local and national regulations on the transport, storage, use and waste treatment of chemicals in concentrated or diluted form and as working solutions must be obeyed.

### **6 General information**

Chemetall supplies a wide range of chemical products and associated equipment for cleaning, descaling, paint and carbon removal, metal working and protection and non-destructive testing. Sales Executives are available to advice on specific problems and applications.

The above details have been compiled to the best of our knowledge on the basis of tests and research work and with regard to the current state of our practical experience. This technical product information is non-binding. No liabilities or guarantees deriving from or in connection with this leaflet can be imputed to us. Statements relating to possible uses of the product do not constitute a guarantee that such uses are appropriate in a particular user's case or that such uses do not infringe the patents or proprietary rights of any third party. The reproduction of any or all of the information contained in this leaflet is expressly forbidden without Chemetall's prior written consent.

# Ardrox® – Corrosion Protection

High-performance corrosion protection of airframe structures and components



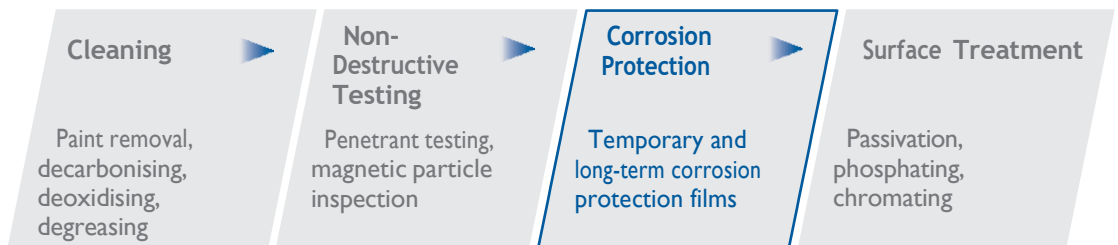
## Benefits:

- + Complete product portfolio with all major approvals
- + Easy application and comprehensive equipment range
- + Excellent corrosion protection properties
- + Outstanding water-displacing properties
- + Products with lubricating properties available
- + Local service and support

## Applications:



















- + Ardrox® AV: corrosion inhibiting compounds for aircraft structures
- + Ardrox® 3 series: temporary and long-term protection of components

Chemetall provides an extensive product portfolio for surface treatment. A comprehensive range of equipment for these applications and the reliable service of local Chemetall experts complete the product portfolio.



# Ardrox® - Corrosion Protection

Chemetall's proven, high-performance Ardrox® and Ardrox® AV specialty chemicals have been specifically developed for the aerospace industry and meet the demanding requirements of national and international industry, aviation and military quality standards which include e.g. Airbus Industrie, Boeing, German Army, SNECMA, MIL, MTU, AMS, STM, SNCF, EDF, GEC Alstom and others.

Product	Appearance	Properties	Packaging
<b>Corrosion Inhibiting Compounds for Aircraft Structures</b>			
Ardrox® AV 8 Super penetrating, water-displacing. Also as first component prior to Ardrox® AV 100D	liquid	Film thickness = 8 µm; transparent, light brown; protection time > 36 months Salt spray test > 300 h (Fe), > 1500 h (Al)	
Ardrox® AV 15 Super penetrating, water-displacing	liquid	Film thickness = 15 µm; transparent, light brown; protection time > 36 months Salt spray test > 500 h (Fe), > 2000 h (Al)	
Ardrox® AV 25 Penetrating, water-displacing, for moveable parts	liquid	Film thickness = 25 µm; transparent; soft, lubricating; protection time > 36 months Salt spray test > 500 h (Fe), > 4000 h (Al)	
Ardrox® AV 30 Penetrating, water-displacing	liquid	Film thickness = 30 µm; transparent, light brown; protection time > 36 months Salt spray test > 500 h (Fe), > 2000 h (Al)	
Ardrox® AV 40 Heat-resistant	liquid	Film thickness = 40 µm; transparent, colourless; protection time > 24 months Salt spray test > 240 h (Fe)	
Ardrox® AV 100 D 2-component, long-term corrosion protection. Requires pre-treatment with Ardrox® AV 8!	thixotropic	Film thickness = 100 µm; transparent, beige; protection time > 36 months Salt spray test > 500 h (Fe), > 2500 h (Al)	
<b>Temporary and Long-Term Corrosion Protection</b>			
Ardrox® 3140	pasty	Film thickness = 75 µm; hard, dry; protection time > 36 months Salt spray test > 750 h; long-term protection	
Ardrox® 396/1E8	liquid	Film thickness = 5 µm (oily); protection time > 12 months Salt spray test > 48 h; medium protection time	
Ardrox® 396/1 M	liquid	Film thickness approx 5 µm; protection time = 6 months; Salt spray test > 4 h, PMUC-approved	
Ardrox® 3965	liquid	Film thickness = 5 µm; protection time = 6 months Salt spray test > 4 h; temporary protection, NATO Code C-634	
Ardrox® 3966	liquid	Film thickness < 1 - 2 µm; protection time = 3 months Salt spray test < 4 h; temporary protection	
Ardrox® 3968 Water-displacing	liquid	Film thickness < 2 µm; protection time = 6 months Salt spray test > 4 h	
<b>Lubricants and Corrosion Protection</b>			
Ardrox® 397/1 HP Corrosion protection and lubricant	liquid	Film thickness = approx. 5 µm; Salt spray test > 48 h	
Ardrox® 398A Corrosion protection and lubricant	liquid	Film thickness = 10 µm Salt spray test = 72 h, NATO Code S-758	
<b>Corrosion Inhibitors</b>			
Ardrox® 3702 Corrosion protection concentrate	liquid	Spray: 2 - 4 %; Immersion: 1 - 10 %, Temp.: RT - 80 °C, Suitable for Fe, Al; not suitable for Mg	
Ardrox® 3705 Corrosion protection concentrate (approved by Pratt & Whitney)	liquid	Spray, immersion: 1 - 2 %, Temp.: RT - 65 °C, Suitable for steel	
<b>Corrosion Protection Removers</b>			
Ardrox® AV 980 pH-neutral, biodegradable remover	slightly thixotropic	Film thickness = 30 - 150 µm; transparent, colourless; application time = 1 - 15 min. Attention: not suitable for use on acrylic materials	
Ardrox® White Spirit	liquid	Spray, immersion, brush; transparent, colourless Attention: not suitable for use on rubbers	

Salt spray test = on steel XC 18S (if not specified otherwise)

 Aerosol  Bulk  Wipes

# ARDROX<sup>®</sup> 8505

## HIGH-SENSITIVITY FLUORESCENT MAGNETIC POWDER

### 1 Description

Ardrox<sup>®</sup> 8505 consists of finely divided fluorescent magnetic particles which will fluoresce brilliant yellow-green under ultraviolet radiation with a predominant wavelength of 365 nanometers. The particles have been selected for their high magnetic response, low coercivity (to avoid coagulation) and prolonged operational life.

Ardrox<sup>®</sup> 8505 is used for the high-sensitivity detection of surface or near surface defects in ferro-magnetic materials.

Ardrox<sup>®</sup> 8505 is also available as a bulk or aerosol ready-to-use dispersion in a high flash point carrier oil under the product name Ardrex<sup>®</sup> 8506.

#### Conformances

- ✓ ASME Boiler & Vessel Code Section V, Article 7
- ✓ CEN ISO EN ISO 9934-2
- ✓ Rolls Royce RRP 580004-MILC104 (approval)
- ✓ SAE AMS 3044
- ✓ SAFRAN IN-5300

Ask your Chemetall representative for a complete list of approvals

### 2 Physical and chemical properties

Property	Typical Value	Unit	Test Method
Appearance	Brown powder	-	-
Density	Approx.. 0.7 at 20 °C / 68 °F	g/ml	Volumetric
Particle size	Approx. 4	µm	-

These are typical values only and do not constitute a specification.

### 3 Preparation

Ardrox<sup>®</sup> 8505 is used by mixing directly with a suitable carrier fluid, such as the high flash point and odorless carrier oil Ardrex<sup>®</sup> Base Oil HF.

Ardrox<sup>®</sup> 8505 is added at concentrations between 0,8 g/L and 1,2 g/L, which will give approximate settlement volumes of between 0,15% and 0,30%.

### 4 Method of use

Heavy deposits of grease, rust, scale, and paint should be removed prior to use. Any contamination on the component can mask indications and contaminate the magnetic particle ink.

Components are magnetized using the appropriate technique and the Ardrox<sup>®</sup> 8505 ink is applied during magnetization. Application of the ink should cease before the magnetization source is switched off to enable the particles to migrate to the area of flux leakage. Application of the prepared Ardrox<sup>®</sup> 8505 may be by spray, flow-on or immersion.

The component surfaces should be inspected under UVA of minimum output of 1000  $\mu\text{W}/\text{cm}^2$  and peak wavelength of 365 nanometers. The ambient light should also be less than 20 lux.

Specification may vary. Check concentration and UVA/ambient light as per the applicable specification.

## **5 Effects on materials**

When Ardrox<sup>®</sup> 8505 used in the prescribed manner, no significant corrosion will occur on ferrous materials. Equipment/tanks should be constructed of stainless steel.

## **6 Storage**

Store in a cool place, with protection from freezing conditions. Shelf life of Ardrox 8505<sup>®</sup> is 36 months.

## **7 Labor and environmental protection**

Before operating the process described it is important that this complete document, together with any relevant Safety Data sheets, be read and understood.

All local and national regulations on the transport, storage, use and waste treatment of chemicals in concentrated or diluted form and as working solutions must be obeyed.

## **8 General Information**

Chemetall supplies a wide range of chemical products and associated equipment for cleaning, descaling, paint and carbon removal, metal working and protection and non-destructive testing. Sales Executives are available to advice on specific problems and applications.

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# ARDROX<sup>®</sup> 8901 W

## WHITE CONTRAST PAINTS

### 1 Description

Ardrox<sup>®</sup> 8901W is a quick drying white paint which is designed specifically for the use in the color contrast method of magnetic particle inspection. It provides a dense white background against which black or red indications of defects can be seen readily. Ardrox<sup>®</sup> 8901W is ideal for use with either oil based or water based magnetic inks.

Ardrox<sup>®</sup> 8901W is available as aerosol cans. It offers optimal performances when used together with the color contrast magnetic inks Ardrox<sup>®</sup> 800/3 or 8032.

#### Conformances

- ✓ ASME Boiler & Vessel Code Section V, Article 7
  - ✓ CEN ISO EN ISO 9934-2
  - ✓ Rolls Royce OMat 264 (approval)
- Ask your Chemetall representative for a complete list of approvals

### 2 Physical and chemical properties

Property	Typical Value	Unit	Test Method
Appearance	white dispersion	-	-
Flash point	-18 / -0.4	°C / °F	ASTM D93
Density	0.96 at 20°C / 68°F	g/cm <sup>3</sup> / °C / °F	volumetric

These are typical values only and do not constitute a specification.

### 3 Application

Ardrox<sup>®</sup> 8901W can be applied to the area to be inspected by spraying.

It is essential that aerosols are shaken before use. Surface temperature should be between 0 and 50°C (30-120°F).

Ardrox<sup>®</sup> 8901W is applied to dark colored ferromagnetic surfaces and allowed to dry before applying the magnetic particles. This ensures a good color contrast between the white paint and the red or black particles making it much easier for the inspector to identify and interpret the indications.

Ardrox<sup>®</sup> 8901W is used extensively in conjunction with Ardrox<sup>®</sup> 800/3 or 8032 ink in aerosols particularly for the in-situ inspection of welded fabrications or structures, pressure vessels and pipelines.

Ardrox<sup>®</sup> 8901W can then be left on the surface or removed with an appropriate Ardrox<sup>®</sup> solvent cleaner, for instance Ardrox<sup>®</sup> 5319.

#### **4 Effects on material**

When Ardrox<sup>®</sup> 8901W is used in the prescribed manner, no significant corrosion will occur on ferrous materials.

#### **5 Storage**

Store in a cool place, with protection from freezing conditions. Shelf life of Ardrox<sup>®</sup> 8901W is 24 months.

#### **6 Labor and environmental protection**

Before operating the process described it is important that this complete document, together with any relevant Safety Data sheets, be read and understood.

All local and national regulations on the transport, storage, use and waste treatment of chemicals in concentrated or diluted form and as working solutions must be obeyed.

#### **7 General Information**

Chemetall supplies a wide range of chemical products and associated equipment for cleaning, descaling, paint and carbon removal, metal working and protection and non-destructive testing. Sales Executives are available to advice on specific problems and applications.

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# ARDROX<sup>®</sup> 9D1B

Non-Aqueous Liquid Developers

## 1. DESCRIPTION

ARDROX 9D1B is a liquid suspension of an inert white powder in a quick drying solvent with low sulphur, halogen and alkali metal content.

Ardrox 9D1B is used as a developer in penetrant testing of forged parts, welds, cast and drop forged parts. The thin translucent layer provided by Ardrex 9D1B will make it especially suited for fluorescent penetrant testing applications.

### CONFORMANCES:

- |                             |                         |
|-----------------------------|-------------------------|
| ✓ ASME Boiler & Vessel Code | Section V, Article 6    |
| ✓ EN ISO 3452-2             | Form d & e              |
| ✓ Pratt & Whitney           | FPM PMC 4357 (Approval) |
| ✓ Rolls Royce               | RRP 58003 (Approval)    |
| ✓ SAE                       | QPL-AMS 2644 (Approval) |
| ✓ SAFRAN                    | IN-5000 (Approval)      |

Ask your Chemetall representative for a complete list of approvals.

## 2. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTY	ARDROX 9D1B	UNIT
Appearance	White solid particle in a clear liquid	
Density	0.88	g/ml @ 20°C / 68°F
Flash Point	-18 / 0	°C / °F

These are typical values only and do not constitute a specification.

## 3. METHOD OF USE

### 3.1 Pre-Cleaning, Penetrant & Excess Penetrant Removal

Clean part with e.g. Ardrex 9PR5, 9PR50 or 9PR88 before applying the Ardrex penetrant. Apply cleaner to the part and wipe clean with cloth. Surface must be free of grease, oil and dirt. Allow part to dry before applying penetrant.

Apply a thin even film of Ardrox penetrant to cover the test area and allow penetration as per the required time (typically 10-30 minutes).

Remove excess surface penetrant with clean cloths, pre-moistened with cleaner. Removal can also be affected by rinsing with water (over 5°C / 41°F). Do not flush surface with cleaner as sensitivity will be impaired. Repeat procedure until surface penetrant has been removed. Thoroughly dry the component surface before developer application.

### 3.2 Developing

Ardrox 9D1B is a solid suspension of solid particles which settle-out on standing; therefore, aerosols and bulk containers must be shaken thoroughly before and during use. Spray thin, even developer film over the area to be inspected (spraying distance 30 cm / 1 ft.). Surface temperature should be between -10° and 50°C (15°-120°F). Ardrox 9D1B must be applied by a light even spray (immersion or brushing will cause a loss of process sensitivity). When Ardrox 9D1B is used as part of a fluorescent penetrant process, it should be applied by successive spraying until a translucent layer is achieved.

Allow 10 – 30 minutes developing time before evaluation.

### 3.3 Inspection

For color contrast processes, inspection should be carried out in diffused white light of at least 500 lux (approx. 46 ft.cdl) and in the case of a fluorescent penetrant processes under UVA of 365 nm peak wavelength, typical output of 1200 µwatts/cm<sup>2</sup> at 38 cm from the component.

**NOTE:** The procedure above is a recommendation only; where relevant, the process specifications of the approving authorities must be followed.

## 4. EFFECTS ON MATERIALS

When Ardrox 9D1B is used in the prescribed manner, no significant corrosion is likely to occur on commonly used constructional metals. Ardrox 9D1B may cause swelling of some rubbers and plastics, the product should be tested for compatibility before application.

## 5. LABOR AND ENVIRONMENTAL PROTECTION

Before operating the process described it is important that this complete document, together with any relevant Safety Data sheets, be read and understood.

All local and national regulations on the transport, storage, use and waste treatment of chemicals in concentrated or diluted form and as working solutions must be obeyed.

## 6. GENERAL INFORMATION

Chemetall supplies a wide range of chemical products and associated equipment for cleaning, descaling, paint and carbon removal, metal working and protection. Sales Executives are available to advice on specific problems and applications.

## 7. SAFETY AND HANDLING

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

### KEEP OUT OF REACH OF CHILDREN

## 8. STORAGE

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

Store in a cool place, with protection from freezing conditions. Shelf life is 36 months.

## 9. DISPOSAL

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> 9D1B & NQ1

## NON-AQUEOUS LIQUID DEVELOPERS

### PRIMARY APPLICATION

ARDROX<sup>®</sup> 9D1B and NQ1 are liquid suspensions of an inert white powder in a quick drying solvent with low sulphur, halogen and alkali metal content.

Ardrox<sup>®</sup> 9D1B and NQ1 are used as developers in penetrant testing of forged parts, welds, cast and drop forged parts. ARDROX<sup>®</sup> NQ1 offers best results with both color contrast and fluorescent penetrants while the thin, translucent layer provided by Ardrex<sup>®</sup> 9D1B will make it especially suited for fluorescent penetrant testing applications.

Ardrox<sup>®</sup> 9D1B and NQ1 are available as bulk material and as aerosol. They are typically used in a penetrant system with Ardrex<sup>®</sup> penetrants and removers.

#### Conformances

- ✓ ASME Boiler & Vessel Code Section V, Article 6
- ✓ EN ISO 3452-2 Form d & e
- ✓ Pratt & Whitney FPM PMC 4357 (approval, Ardrex<sup>®</sup> 9D1B)
- ✓ Rolls Royce RRP 58003 (approval)
- ✓ SAE QPL-AMS 2644 (approval)
- ✓ SAFRAN IN-5000 (approval)

Ask your Chemetall representative for a complete list of approvals

### CHEMICAL CHARACTERISTICS

Property	Ardrox <sup>®</sup> 9D1B	Ardrox <sup>®</sup> NQ1	Unit
Appearance	White solid particle in a clear liquid		-
Density	0.88	0.88	g/ml @ 20°C / 68°F
Flash point	-18 / 0	16 / 61	°C / °F

These are typical values only and do not constitute a specification.

### APPLICATION PROCEDURE

## **Pre-cleaning, penetrant & excess penetrant removal**

Clean part with e.g. Ardrox<sup>®</sup> 9PR5, 9PR50 or 9PR88 before applying the Ardrox<sup>®</sup> penetrant. Apply cleaner to the part and wipe clean with cloth. Surface has to be free of grease, oil and dirt. Allow part to dry before applying penetrant.

Apply a thin even film of Ardrox<sup>®</sup> penetrant to cover the test area and allow penetration as per the required time (typically 10-30 minutes).

Remove excess surface penetrant with clean cloths, pre-moistened with cleaner. Removal can also be affected by rinsing with water (over 5°C / 41°F). Do not flush surface with cleaner as sensitivity will be impaired. Repeat procedure until surface penetrant has been removed. Thoroughly dry the component surface before developer application.

## **Developing**

Ardrox<sup>®</sup> 9D1B and NQ1 are liquid suspensions of solid particles which settle-out on standing; therefore, aerosols and bulk containers must be shaken thoroughly before and during use.

## **Inspection**

For color contrast processes, inspection should be carried out in diffused white light of at least 500 lux (approx. 46 ft.cdl) and in the case of a fluorescent penetrant processes under UVA of 365 nm peak wavelength, typical output of 1200 µwatts/cm<sup>2</sup> at 38 cm from the component.

Note: the procedure above is a recommendation only; where relevant, the process specifications of the approving authorities must be followed.

## **SOLUTION CONTROL**

When Ardrox<sup>®</sup> 9D1B and NQ1 are used in the prescribed manner, no significant corrosion is likely to occur on commonly used constructional metals. Ardrox<sup>®</sup> 9D1B and NQ1 may cause swelling of some rubbers and plastics, the product should be tested for compatibility before application

## **NOTES ON USE** (See Safety Data Sheet)

## **SAFETY AND HANDLING**

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

## **KEEP OUT OF REACH OF CHILDREN**

## STORAGE

Store in a cool place, with protection from freezing conditions is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

## SHELF LIFE

Shelf life is 36 months

## DISPOSAL

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.



# ARDROX<sup>®</sup> 9D4A

Dry Powder Developer

## PRIMARY APPLICATION

ARDROX 9D4A is a Form a, dry powder, developer. It is a homogeneous blend of synthetic white powders of very small particle sizes. It does not contain any mined materials. The product has very low impurity levels.

Ardrox 9D4A dry powder developer is used to develop any approved fluorescent penetrant. This developer does not have any significant effect on any common materials of construction and is completely safe to use on all metals, plastics, and rubbers when used in the prescribed manner.

### APPROVAL & CONFORMANCES:

- |                             |                      |
|-----------------------------|----------------------|
| ✓ ASME Boiler & Vessel Code | Section V, Article 6 |
| ✓ NAVSEA                    | 250-1500-1           |
| ✓ SAE                       | AMS 2644             |
| ✓ ASTM                      | E-165                |
| ✓ Pratt & Whitney           | PMC 4356             |
| ✓ Boeing                    | BAC 5433             |

Ask your Chemetall representative for a complete list of approvals.

## CHEMICAL CHARACTERISTICS

PROPERTY	TYPICAL VALUE	UNIT	TEST METHOD
Appearance	Deep red liquid	-	-
Density	187	g/l	-
Particle size	Submicron to 20 microns		-
Sulphur Content	<500	ppm	-
Chloride Content	<500	ppm	-
Fluoride Content	<50	ppm	-
Sodium Content	<100	ppm	-

## APPLICATION PROCEDURE

After properly cleaning the component to be inspected, applying the penetrant, processing and drying the component, apply Ardrox 9D4A via a Dust Storm Cabinet, Electrostatic Spray Gun, Sufflator, or Flock Gun.

Ardrox 9D4A dry powder developer is used as supplied. After application of the developer the components must be left in contact with the powder for a minimum period of 10 minutes before inspecting under UVA (365 nm) illumination in a darkened area.

For optimum results on very fine defects, allow Ardrox 9D4A to develop for 30 minutes.

## EFFECTS ON MATERIALS

Ardrox 9D4A has no effect on most common materials of construction. It is safe to use on steel, aluminum, brass, bronze, copper, magnesium, cadmium plate and titanium.

## NOTES ON USE (See Safety Data Sheet)

## SAFETY AND HANDLING

Prior to handling and use of any of the materials referenced in this document, the Material Safety Data Sheets should be read and understood by all personnel in contact with these materials.

## KEEP OUT OF REACH OF CHILDREN

## STORAGE

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Material Safety Data Sheets. All containers should be tightly closed when not in use.

## SHELF LIFE

The shelf life for Ardrox 9D4A is 3 years.

## DISPOSAL

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> 9PR50

Solvent Remover

## 1. DESCRIPTION

ARDROX 9PR50 is a non-chlorinated, volatile solvent which is used for the removal of surface excess penetrant in the solvent removal process or wipe-off technique. Ardrex 9PR50 has a low sulfur and halogen content.

Ardrex 9PR50 is ideal for the removal of oil, grease and other organic contamination as a pre-cleaning of surfaces before the application of a penetrant or a magnetic ink.

Ardrex 9PR50 is typically used in a penetrant system together with the Ardrex penetrants and developers.

### CONFORMANCES:

- ✓ EN ISO 3452-2
  - ✓ SAE
  - ✓ ASME Boiler & Vessel Code
- Method C, class 2  
QPL-AMS 2644 (Approval)  
Section V, Article 6
- Ask your Chemetall representative for a complete list of approvals.

## 2. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTY	UNIT	ARDROX 9PR50
Appearance	-	Clear, colorless liquid
Density	g/ml @ 20°C / 68°F	0.75
Flash Point	°C / °F	38 / 100

These are typical values only and do not constitute a specification.

## 3. METHOD OF USE

### 3.1 As a Pre-Cleaning Solvent

Ardrex 9PR50 should be sprayed directly onto the contamination to be removed. The surface may then require wiping or flushing with the solvent cleaner depending upon the level of contamination to be removed. For best results, the surface should be given a final wipe over with a clean cloth or tissue dampened with Ardrex 9PR50.

### 3.2 For the Removal of Excess Penetrant

When Ardrox 9PR50 is used to remove excess penetrant at the end of the penetrant contact time, it is applied to the tested surface using the wipe-off technique. The bulk of the surface excess penetrant is wiped away by using clean, dry absorbent cloth or paper; then Ardrox 9PR50 is applied to a similar cloth or paper and the tested surface is wiped again until a satisfactory level of background is achieved.

Never apply solvent penetrant removers by direct spray on or immersion of the tested surface for the removal of the excess penetrant as this will lead to a loss in sensitivity of the process.

Surface temperature should be between -10° and 50°C (15°-120°F).

An Ardrox developer can then be applied to the dry surface. For Ardrox color contrast processes, inspection should be carried out in diffused white light of at least 500 lux (approx. 46 ft.cdl) and in the case of Ardrox fluorescent penetrant processes under UVA of 365 nm peak wavelength, typical output of 1200 μwatts/cm<sup>2</sup> at 38 cm from the component.

**NOTE:** The procedure above is a recommendation only; where relevant, the process specifications of the approving authorities must be followed.

## 4. EFFECTS ON MATERIALS

When Ardrox 9PR50 is used in the prescribed manner, no significant corrosion is likely to occur on commonly used constructional metals.

Ardrox 9PR50 may cause swelling of some rubbers and plastics. If Ardrox 9PR50 is to be used on synthetic surfaces, including painted surfaces, the product should be tested for compatibility before application.

## 5. LABOR AND ENVIRONMENTAL PROTECTION

Before operating the process described it is important that this complete document, together with any relevant Safety Data sheets, be read and understood.

All local and national regulations on the transport, storage, use and waste treatment of chemicals in concentrated or diluted form and as working solutions must be obeyed.

## 6. GENERAL INFORMATION

Chemetall supplies a wide range of chemical products and associated equipment for cleaning, descaling, paint and carbon removal, metal working and protection. Sales Executives are available to advice on specific problems and applications.

## 7. SAFETY AND HANDLING

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

## **KEEP OUT OF REACH OF CHILDREN**

### **8. STORAGE**

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

Store in a cool place, with protection from freezing conditions. Shelf life is 36 months.

### **9. DISPOSAL**

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> 906

**Water Washable Visible Penetrant**

## PRIMARY APPLICATION

ARDROX 906 is a water washable color contrast penetrant, widely used in many industries for the detection of indications which are open to the surface of non-porous parts. Ardrex 906 is dark red in color, allowing easy control and monitoring of the washing process.

Ardrex 906 is a high-sensitivity, low- viscosity liquid with excellent surface wetting properties to ensure optimum coverage of the part. It is used in conjunction with developers and a penetrant remover, which can be water or a suitable organic solvent, as a part of the inspection technique.

Defects such as cracks, laps, cold shuts, porosity, bursts, casting and welding discontinuities can be detected using the appropriate process. Ardrex 906 has been formulated to ensure the product has improved resistance to over-washing where removal by water spray is the preferred method.

Ardrex 906 is designed to be used with a non-aqueous developer such as Ardrex 9D1B or Ardrex NQ1.

### APPROVAL & CONFORMANCES:

- ✓ ASME Boiler & Vessel Code                      Section V, Article 6
  - ✓ NAVSEA    250-1500-1
  - ✓ SAE    AMS 2644
- Ask your Chemetall representative for a complete list of approvals.

## CHEMICAL CHARACTERISTICS

PROPERTY	TYPICAL VALUE	UNIT	TEST METHOD
Appearance	Deep red liquid	-	-
Density	0.926	g/ml at 68°F	-
Flash Point	>200	°F	ASTM D 113
Sulphur Content	<1000	ppm	-
Chloride Content	<1000	ppm	-

## APPLICATION PROCEDURE

Ardrox 906 may be applied by aerosol, brush, tank immersion, conventional or electrostatic spray. The following typical process sequence illustrates the recommended method of use.

### PRECLEAN/DRY

Completely remove all surface contamination (rust, paint residues, greases, scale, etc.). After cleaning, make sure that the component is completely dry and cool, ≤120°F (49°C), before applying the penetrant. Ardrox 9PR50 solvent-based products may be used as oil and grease cleaners/removers.

### PENETRANT APPLICATION

Apply penetrant to the surface and leave on for a suitable dwell period. If the contact period exceeds 120minutes, the penetrant should be reapplied to the surface.

### AMS 2644, METHOD A, PENETRANT REMOVAL: WATER WASH

Water washes in accordance with the relevant specification or Code.

Use either one or a combination of manual spray or automatic spray tank rinses. To accelerate drying time, use wash water at upper limit temperatures.

### AMS 2644, METHOD C, PENETRANT REMOVAL: WIPE OFF

Wipe excess penetrant from surface with a clean cloth. Moisten a clean cloth with Ardrox 9PR50 or Ardrox PR1 and wipe surface free of penetrant residue. To maintain sensitivity, do not flood surface with cleaner/remover.

### OVEN DRY, AIR RECIRCULATING

Maximum oven temperature: 160°F (71°C).

Use the minimum time necessary to thoroughly dry the components. Use clean, filtered, low-pressure compressed air to remove pockets of water before oven drying. If a drying oven is not available, accelerate drying time by blowing warm air across the part.

### APPLY DEVELOPER

Apply non-aqueous developers Ardrox 9D1B or NQ1 by spray. Allow 10-30 minutes developing time before evaluation.

### INSPECTION

Components should be inspected under bright light (e.g. 100 ft. candle). A pinkish developer film indicates incomplete surface penetrant removal. Severe penetrant residue will mask fine indications.



## **NOTES ON USE** (See Safety Data Sheet)

Ardrox 906 is non-corrosive, safe to use on all metal alloys and meets AMS 2644 corrosion requirements. Ardrox 906 will stain or soften some plastics, rubbers or ceramics; where appropriate, perform a compatibility test.

## **SAFETY AND HANDLING**

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

## **KEEP OUT OF REACH OF CHILDREN**

## **STORAGE**

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

## **SHELF LIFE**

The shelf life for Ardrox 906 is 3 years.

## **DISPOSAL**

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> 970P25E

Water-Washable Fluorescent Penetrant

## 1. DESCRIPTION

Ardrox 970P25E is a biodegradable water washable fluorescent penetrant with a sensitivity level 3. It consists of a mixture of biodegradable nonionic surfactants and fluorescent dyes without any mineral oil or hydrocarbon. The product gives crisp indications with exceptionally low levels of background and has excellent heat and UV fade characteristics.

Ardrox 970P25E can be used for metals and ceramics which are not strongly porous, during production and maintenance works.

Ardrox 970P25E is usually used in conjunction with the Ardrex 9D4A or 9D1B developer and the Ardrex surface technologies. It is also approved to the AMS 2644 as Method C, solvent removable penetrants.

### APPROVALS:

- |                              |                                    |
|------------------------------|------------------------------------|
| ✓ SAE                        | AMS 2644                           |
| ✓ ASME                       | Boiler & Vessel Code (Conformance) |
| ✓ Rolls Royce                | CSS232                             |
| ✓ International Aero Engines | V2500                              |
| ✓ Pratt & Whitney            | PMC 4350-6                         |
| ✓ Rollys Royce               | CSS 232 & OMat 632J                |
| ✓ SAFRAN Group               | IN-5000                            |

Ask your Chemetall representative for a complete list of approvals.

## 2. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTY	ARDROX 970P25E
Appearance	Fluorescent yellow liquid
Density in g/ml at 20 °C / 68 °F	Approx. 0.98
Flash Point	> 93 °C / 200 °F

These are typical values only and do not constitute a specification.

## 3. METHOD OF USE

Ardrox 970P25E may be applied by brushing, tank immersion or by electrostatic or conventional spraying. The following typical process sequence illustrates the recommended method of use for general industrial applications. However, where relevant, the process specifications of the approving authorities must be followed.

### 1. Pre-Cleaning

All surface contamination such as rust, paint residues, grease, scale etc. must be completely removed. Ensure that the component is completely dry and not too hot or cold (10°-50°C / 50°-122°F).

### 2. Penetrant Application

Apply penetrant to the surface and leave for a suitable dwell period. Allow components to drain as necessary. The combined application and drainage period should be at least 10 minutes. If the drain time exceeds 1 hour, the penetrant should be re-applied to the surface.

### 3. Cleaning

Penetrant removal by water washing: 15° – 35°C (59° – 95°F) for 30 seconds up to 2 minutes at 0.8–1.7 bar (10-25 psi).

Use one or a combination of the following methods:

- a) air agitated water rinse tank
- b) spray rinse tank
- c) manual spray rinse

The times given are a rough guide only. Practical trials should be carried out to find the optimum.

### 4. Drying

Dry in air recirculating oven at 50–60°C (122–140°F), typically for 10 minutes. Longer times may be required for larger components. To assist drying, clean, filtered, low pressure, compressed air (1.7 bar/25 psi maximum) can be used prior to oven drying. Use the minimum oven time required to obtain thoroughly dry components.

### 5. Development

Apply developer Ardrox 9D4A or Ardrox 9D1B.

**Contact Time:** Ardrox 9D4A: 10-30 min.

**Contact Time:** Ardrox 9D1B: maximum 5–10 min.

### 6. Inspection

When applicable, low pressure, clean filtered air at 0.3 bar/5 psi (maximum) should be used to remove excess powder prior to inspection under black (UV) light, (1000 µW/cm<sup>2</sup> minimum) in a darkened area.

## 4. EFFECTS ON MATERIALS

When Ardrox 970P25E is used in the prescribed manner, no significant corrosion is likely to occur on commonly used constructional metals.

The product may stain or soften some plastics and rubbers and, where appropriate, a compatibility test should be carried out.

## 5. LABOR AND ENVIRONMENTAL PROTECTION

Before operating the process described it is important that this complete document, together with any relevant Safety Data sheets, be read and understood.

All local and national regulations on the transport, storage, use and waste treatment of chemicals in concentrated or diluted form and as working solutions must be obeyed.

## 6. GENERAL INFORMATION

Chemetall supplies a wide range of chemical products and associated equipment for cleaning, descaling, paint and carbon removal, metal working and protection. Sales Executives are available to advice on specific problems and applications.

## 7. SAFETY AND HANDLING

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

## KEEP OUT OF REACH OF CHILDREN

## 8. STORAGE

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

Store Ardrex 970P25E in tightly closed container, cool, dry and away from sources of heat and avoid direct exposure to sunlight. Shelf-life is 36 months.

## 9. DISPOSAL

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, provincial and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> 8032

**Color Contrast Magnetic Ink**

## PRIMARY APPLICATION

ARDROX 8032 is a ready-to-use color contrast magnetic ink ideal for the inspection of ferromagnetic materials, structures and components by the magnetic particle inspection method. A typical application is the inspection of welds, pressure vessels and pipeline in the oil, gas and petrochemical industries as well as power plants.

Ardrox 8032 consist of very finely divided black magnetic particles suspended in high flash point, dearomatized, odorless petroleum distillate designed to provide good particle mobility. The particles have been selected for their high magnetic response, low coercivity and prolonged operational life.

Ardrox 8032 and Base Oil HF use a hydrocarbon corresponding to the AMS 2641, Type 1 Magnetic Particle Inspection Vehicle with a flash point exceeding 93°C / 200°F.

Ardrox 8032 is available as bulk material and as aerosol. It offers optimal performances when used together with the Ardrex 8901W or 8903W contrast paint.

### Conformances

- ✓ ASME Boiler & Vessel Code, Section V, Article 7
- ✓ CEN ISO 9934-2
- ✓ SAE AMS 3041/3043 & 2641 Type 1

Ask your Chemetall representative for a complete list of approvals.

## CHEMICAL CHARACTERISTICS

Property	Typical Value	Unit	Test Method
Appearance	suspension of black powder	-	-
Settlement	1.5 – 2.4	%	AMS 3041
Flash point	>93 / >200	°C / °F	ASTM D93
Particle size	0.5 - 4 / mean 1,5	µm	-
Viscosity	<3.0 at 40°C / 104°F	mm <sup>2</sup> /s	-

These are typical values only and do not constitute a specification.

## APPLICATION PROCEDURE

Aerosol cans and bulk containers must be shaken thoroughly before and during use in order to homogenize the powder concentration.

### Method of Use

Surface temperature should be between -20° and 75°C (-4° to 165°F).

Components are magnetized and Ardrox 8032 is applied to the test area, normally by spraying immediately prior to and during magnetization. Application of Ardrox 8032 should cease before the magnetization is switched off. Defects will show up as well defined black indications and inspection should take place in good white light of at least 500 Lux (refer to the controlling specification for levels of ambient light acceptable for inspection).

### White Contrast Paint

It is not practical to use Ardrox 8032 on dark substrates as it would be difficult for the inspector to identify indications against the dark background. Therefore, the white contrast paint Ardrox 8901W or 8903W is frequently used to provide a contrasting background against the black indications (alternatively, fluorescent fluids such as the Ardrox 8 series inks may be used if a UV light is available). Ardrox 8901W or 8903W can then be left on the surface or removed with an appropriate Ardrox solvent cleaner for instance Ardrox 5319.

## EFFECT ON MATERIALS

When Ardrox 8032 is used in the prescribed manner, no significant corrosion will occur on ferrous materials. Equipment/tanks should be constructed of stainless steel.

## LABOR AND ENVIRONMENTAL PROTECTION

Before operating the process described it is important that this complete document, together with any relevant Safety Data sheets, be read and understood.

All local and national regulations on the transport, storage, use and waste treatment of chemicals in concentrated or diluted form and as working solutions must be obeyed.

## GENERAL INFORMATION

Chemetall supplies a wide range of chemical products and associated equipment for cleaning, descaling, paint and carbon removal, metal working and protection and non-destructive testing. Sales Executives are available to advice on specific problems and applications.

## NOTES ON USE (See Safety Data Sheet)

## **SAFETY AND HANDLING**

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

## **KEEP OUT OF REACH OF CHILDREN**

## **STORAGE**

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

Store in a cool place, with protection from freezing conditions.

## **SHELF LIFE**

The shelf life for Ardrex 8032 is 36 months.

## **DISPOSAL**

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> 8505

High-Sensitivity Fluorescent Magnetic Powder

## 1. DESCRIPTION

ARDROX 8505 consists of finely divided fluorescent magnetic particles which will fluoresce brilliant yellow-green under ultraviolet radiation with a predominant wavelength of 365 nanometers. The particles have been selected for their high magnetic response, low coercivity (to avoid coagulation) and prolonged operational life.

Ardrox 8505 is used for the high-sensitivity detection of surface or near surface defects in ferro-magnetic materials.

Ardrox 8505 is also available as a bulk or aerosol ready-to-use dispersion in a high flash point carrier oil under the product name Ardrex 8506.

### CONFORMANCES:

- ✓ ASME Boiler & Vessel Code Section V, Article 7
- ✓ CEN ISO EN ISO 9934-2
- ✓ Rolls Royce RRP 580004-MILC104 (Approval)
- ✓ SAE AMS 3044
- ✓ SAFRAN IN-5300

Ask your Chemetall representative for a complete list of approvals.

## 2. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTY	TYPICAL VALUE	UNIT	TEST METHOD
Appearance	Brown powder	-	-
Density	Approx.. 0.7 at 20 °C / 68 °F	g/ml	Volumetric
Particle Size	Approx. 4	µm	-

These are typical values only and do not constitute a specification.

## 3. PREPARATION

Ardrox 8505 is used by mixing directly with a suitable carrier fluid, such as the high flash point and odorless carrier oil Ardrex Base Oil HF.

Ardrox 8505 is added at concentrations between 0,8 g/L and 1,2 g/L, which will give approximate settlement volumes of between 0,15% and 0,30%.

## 4. METHOD OF USE

Heavy deposits of grease, rust, scale, and paint should be removed prior to use. Any contamination on the component can mask indications and contaminate the magnetic particle ink.



Components are magnetized using the appropriate technique and the Ardrox 8505 ink is applied during magnetization. Application of the ink should cease before the magnetization source is switched off to enable the particles to migrate to the area of flux leakage. Application of the prepared Ardrox 8505 may be by spray, flow-on or immersion.

The component surfaces should be inspected under UVA of minimum output of 1000  $\mu\text{W}/\text{cm}^2$  and peak wavelength of 365 nanometers. The ambient light should also be less than 20 lux.

Specification may vary. Check concentration and UVA/ambient light as per the applicable specification.

## **5. EFFECTS ON MATERIALS**

When Ardrox 8505 used in the prescribed manner, no significant corrosion will occur on ferrous materials. Equipment/tanks should be constructed of stainless steel.

## **6. LABOR AND ENVIRONMENTAL PROTECTION**

Before operating the process described it is important that this complete document, together with any relevant Safety Data sheets, be read and understood.

All local and national regulations on the transport, storage, use and waste treatment of chemicals in concentrated or diluted form and as working solutions must be obeyed.

## **7. GENERAL INFORMATION**

Chemetall supplies a wide range of chemical products and associated equipment for cleaning, descaling, paint and carbon removal, metal working and protection and non-destructive testing. Sales Executives are available to advice on specific problems and applications.

## **8. SAFETY AND HANDLING**

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

## **KEEP OUT OF REACH OF CHILDREN**

## **9. STORAGE**

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

Store in a cool place, with protection from freezing conditions. Shelf life of Ardrox 8505 is 36 months.

## 10. DISPOSAL

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> 8506

Fluorescent Magnetic Particle Fluid, Aerosol

## PRIMARY APPLICATION

ARDROX 8506 Fluorescent Magnetic Particle Fluid consists of finely-divided fluorescent magnetic particles, dispersed in a hydrocarbon carrier fluid. It will fluoresce brilliant yellow/green under ultraviolet radiation with a predominant wavelength of 365 nanometers. Ardrex 8506 meets the requirements of AMS 3046.

Ardrox 8506 uses a hydrocarbon corresponding to AMS 2641, Type 1 Magnetic Particle Inspection Fluid with a Flash Point exceeding 93°C (method ASTM D 93).

The particles have been selected for their high magnetic response, low coercivity (to avoid coagulation), and prolonged operational life.

## CHEMICAL CHARACTERISTICS

Appearance ..... Suspension of brown powder

Mean Particle Size..... 4 – 5 microns

Settlement ..... 0.1 – 0.3%

Density at 20°C ..... Approximately 0.8 g/cm<sup>3</sup>

Flash Point (Active Substance)..... >93°C (Method ASTM D 93)

## APPLICATION PROCEDURE

The surface of the components to be inspected should be cleaned prior to testing as any contamination on the component can mask any indications.

Components are magnetized using the appropriate technique, and the Ardrex 8506 is applied during magnetization. Application of the spray should cease before the magnetizing source is switched off to enable the particles to migrate to the area of flux leakage.

The component surface should be inspected under UVA at a minimum output of 1,000 μwatts per cm<sup>2</sup> and a peak wavelength of 365 nanometers. The ambient light should also be less than 2 foot candles, though individual specifications may vary.

## NOTES ON USE (See Safety Data Sheet)

## **SAFETY AND HANDLING**

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

## **KEEP OUT OF REACH OF CHILDREN**

## **STORAGE**

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

## **SHELF LIFE**

The shelf life for Ardrex 8506 is 3 years.

## **DISPOSAL**

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> 8901W

## White Contrast Paints

### 1. DESCRIPTION

ARDROX 8901W is a quick drying white paint which is designed specifically for the use in the color contrast method of magnetic particle inspection. It provides a dense white background against which black or red indications of defects can be seen readily. Ardrex 8901W is ideal for use with either oil based or water based magnetic inks.

Ardrox 8901W is available as aerosol cans. It offers optimal performances when used together with the color contrast magnetic inks Ardrex 800/3 or 8032.

#### CONFORMANCES:

- ✓ ASME Boiler & Vessel Code Section V, Article 7
  - ✓ CEN ISO EN ISO 9934-2
  - ✓ Rolls Royce OMat 264 (Approval)
- Ask your Chemetall representative for a complete list of approvals.

### 2. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTY	TYPICAL VALUE	UNIT	TEST METHOD
Appearance	white dispersion	-	-
Flash Point	-18 / -0.4	°C / °F	ASTM D93
Density	0.96 at 20°C / 68°F	g/cm <sup>3</sup> / °C / °F	volumetric

These are typical values only and do not constitute a specification.

### 3. APPLICATION

Ardrox 8901W can be applied to the area to be inspected by spraying.

It is essential that aerosols are shaken before use. Surface temperature should be between 0° and 50°C (30°-120°F).

Ardrox 8901W is applied to dark colored ferromagnetic surfaces and allowed to dry before applying the magnetic particles. This ensures a good color contrast between the white paint and the red or black particles making it much easier for the inspector to identify and interpret the indications.

Ardrox 8901W is used extensively in conjunction with Ardrox 800/3 or 8032 ink in aerosols particularly for the in-situ inspection of welded fabrications or structures, pressure vessels and pipelines.

Ardrox 8901W can then be left on the surface or removed with an appropriate Ardrox solvent cleaner, for instance Ardrox 5319.

## **4. EFFECTS ON MATERIALS**

When Ardrox 8901W is used in the prescribed manner, no significant corrosion will occur on ferrous materials.

## **5. LABOR AND ENVIRONMENTAL PROTECTION**

Before operating the process described it is important that this complete document, together with any relevant Safety Data sheets, be read and understood.

All local and national regulations on the transport, storage, use and waste treatment of chemicals in concentrated or diluted form and as working solutions must be obeyed.

## **6. GENERAL INFORMATION**

Chemetall supplies a wide range of chemical products and associated equipment for cleaning, descaling, paint and carbon removal, metal working and protection and non-destructive testing. Sales Executives are available to advice on specific problems and applications.

## **7. SAFETY AND HANDLING**

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

## **KEEP OUT OF REACH OF CHILDREN**

## **8. STORAGE**

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

Store in a cool place, with protection from freezing conditions. Shelf life of Ardrox 8901W is 24 months.

## 9. DISPOSAL

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> 9702

## Water-Washable Fluorescent Penetrant

### 1. DESCRIPTION

ARDROX 9702 is a water washable fluorescent penetrant. The product gives crisp indications with exceptionally low levels of background and has excellent heat and UV fade characteristics. It is ideal for electrostatic application.

Ardrox 9702 can be used for metals and ceramics which are not strongly porous, during production and maintenance works. It is appropriate for various applications such as aerospace and other high specification industries thanks to a large number of approvals and conformances.

Ardrox 9702 is usually used in conjunction with the Ardrex 9D4A or 9D1B developer and the Ardrex surface technologies. Ardrex 9702 is also approved to the AMS 2644 as Method C, solvent removable penetrants.

#### CONFORMANCES:

- ✓ SAE
- ✓ CFM International
- ✓ GE Commercial Engines
- ✓ Pratt & Whitney
- ✓ Rolls Royce
- ✓ SAFRAN

AMS 2644

Ask your Chemetall representative for a complete list of approvals.

### 2. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTY	ARDROX 9702
Appearance	Clear, yellowish – greenish liquids
Density in g/ml at 20°C / 68°F	Approx. 0.87
Flash Point	More than 100 °C / 212 °F
Sensitivity Level	1

These are typical values only and do not constitute a specification.



### 3. METHOD OF USE

Ardrox 9702 may be applied by brushing, tank immersion or by electrostatic or conventional spraying. The following typical process sequence illustrates the recommended method of use for general industrial applications. However, where relevant, the process specifications of the approving authorities must be followed.

#### 1. Pre-Cleaning

All surface contamination such as rust, paint residues, grease, scale etc. must be completely removed. Ensure that the component is completely dry and not too hot or cold (10°-50°C / 50°-122°F).

#### 2. Penetrant Application

Apply penetrant to the surface and leave for a suitable dwell period. Allow components to drain as necessary. The combined application and drainage period should be at least 10 minutes. If the drain time exceeds 1 hour, the penetrant should be re-applied to the surface.

#### 3. Cleaning

Penetrant removal by water washing: 15°–35°C (59°–95°F) for 30 seconds up to 2 minutes at 0.8-1.7 bar (10-25 psi). In the case of rough surfaces or if products for higher sensitivity levels – e.g. Ardrox 9705 - are used, it may be necessary to clean with warm water at this point. Relevant trials should be carried out prior to application.

Use one or a combination of the following methods:

- a) air agitated water rinse tank
- b) spray rinse tank
- c) manual spray rinse

The times given are a rough guide only. Practical trials should be carried out to find the optimum.

#### 4. Drying

Dry in air recirculating oven at 50–60°C (122–140°F), typically for 10 minutes. Longer times may be required for larger components. To assist drying, either clean, filtered, low pressure, compressed air (1.7 bar/25 psi maximum) can be used prior to oven drying. Use the minimum oven time required to obtain thoroughly dry components.

#### 5. Development

Apply developer Ardrox 9D4A or Ardrox 9D1B.

#### Contact Time:

Ardrox 9D4A: 10-30 min.

Ardrox 9D1B: maximum 5–10 min.

#### 6. Inspection

When applicable, low pressure, clean filtered air at 0.3 bar/5 psi (maximum) should be used to remove excess powder prior to inspection under black (UV) light, (1000 µW/cm<sup>2</sup> minimum) in a darkened area.

## 4. EFFECTS ON MATERIALS

When Ardrex 9702 is used in the prescribed manner, no significant corrosion is likely to occur on commonly used constructional metals.

The product may stain or soften some plastics and rubbers and, where appropriate, a compatibility test should be carried out.

## 5. LABOR AND ENVIRONMENTAL PROTECTION

Before operating the process described it is important that this complete document, together with any relevant Safety Data sheets, be read and understood.

All local and national regulations on the transport, storage, use and waste treatment of chemicals in concentrated or diluted form and as working solutions must be obeyed.

## 6. GENERAL INFORMATION

Chemetall supplies a wide range of chemical products and associated equipment for cleaning, descaling, paint and carbon removal, metal working and protection and non-destructive testing. Sales Executives are available to advise on specific problems and applications.

## 7. SAFETY AND HANDLING

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

## KEEP OUT OF REACH OF CHILDREN

## 8. STORAGE

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

Store Ardrex 9702 at temperatures between +10°C and +40°C (50°-104°F), in a dry place, away from oxidizing chemicals and from sources of heat. Avoid direct exposure to sunlight. Shelf-life is 36 months.

## 9. DISPOSAL

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> 9703

## Water-Washable Fluorescent Penetrant

### 1. DESCRIPTION

ARDROX 9703 is a water washable fluorescent penetrant. The product gives crisp indications with exceptionally low levels of background and has excellent heat and UV fade characteristics. It is ideal for electrostatic application.

Ardrox 9703 can be used for metals and ceramics which are not strongly porous, during production and maintenance works. It is appropriate for various applications such as aerospace and other high specification industries thanks to a large number of approvals and conformances.

Ardrox 9703 is usually used in conjunction with the Ardrex 9D4A or 9D1B developer and the Ardrex surface technologies. Ardrex 9703 is also approved to the AMS 2644 as Method C, solvent removable penetrants.

#### CONFORMANCES:

✓ SAE	AMS 2644
✓ CFM International	CFM56 SPM
✓ GE Commercial Engines	GE Commercial Engines SPM
✓ Pratt & Whitney	PMC 4350-6
✓ Rolls Royce	OMat 653L
✓ SAFRAN	IN-5000

Ask your Chemetall representative for a complete list of approvals.

### 2. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTY	ARDROX 9703
Appearance	Clear, yellowish – greenish liquids
Density in g/ml at 20°C / 68°F	Approx. 0.89
Flash Point	More than 100 °C / 212 °F
Sensitivity Level	2

These are typical values only and do not constitute a specification.

### 3. METHOD OF USE

Ardrox 9703 may be applied by brushing, tank immersion or by electrostatic or conventional spraying. The following typical process sequence illustrates the recommended method of use for general industrial applications. However, where relevant, the process specifications of the approving authorities must be followed.

#### 1. Pre-Cleaning

All surface contamination such as rust, paint residues, grease, scale etc. must be completely removed. Ensure that the component is completely dry and not too hot or cold (10°-50°C / 50°-122°F).

#### 2. Penetrant Application

Apply penetrant to the surface and leave for a suitable dwell period. Allow components to drain as necessary. The combined application and drainage period should be at least 10 minutes. If the drain time exceeds 1 hour, the penetrant should be re-applied to the surface.

#### 3. Cleaning

Penetrant removal by water washing: 15°–35°C (59°–95°F) for 30 seconds up to 2 minutes at 0.8-1.7 bar (10-25 psi). In the case of rough surfaces or if products for higher sensitivity levels – e.g. Ardrox 9705 - are used, it may be necessary to clean with warm water at this point. Relevant trials should be carried out prior to application.

Use one or a combination of the following methods:

- a) air agitated water rinse tank
- b) spray rinse tank
- c) manual spray rinse

The times given are a rough guide only. Practical trials should be carried out to find the optimum.

#### 4. Drying

Dry in air recirculating oven at 50–60°C (122–140°F), typically for 10 minutes. Longer times may be required for larger components. To assist drying, either clean, filtered, low pressure, compressed air (1.7 bar/25 psi maximum) can be used prior to oven drying. Use the minimum oven time required to obtain thoroughly dry components.

#### 5. Development

Apply developer Ardrox 9D4A or Ardrox 9D1B.

#### Contact Time:

Ardrox 9D4A: 10-30 min.

Ardrox 9D1B: maximum 5–10 min.

#### 6. Inspection

When applicable, low pressure, clean filtered air at 0.3 bar/5 psi (maximum) should be used to remove excess powder prior to inspection under black (UV) light, (1000 µW/cm<sup>2</sup> minimum) in a darkened area.

## 4. EFFECTS ON MATERIALS

When Ardrex 9703 is used in the prescribed manner, no significant corrosion is likely to occur on commonly used constructional metals.

The product may stain or soften some plastics and rubbers and, where appropriate, a compatibility test should be carried out.

## 5. LABOR AND ENVIRONMENTAL PROTECTION

Before operating the process described it is important that this complete document, together with any relevant Safety Data sheets, be read and understood.

All local and national regulations on the transport, storage, use and waste treatment of chemicals in concentrated or diluted form and as working solutions must be obeyed.

## 6. GENERAL INFORMATION

Chemetall supplies a wide range of chemical products and associated equipment for cleaning, descaling, paint and carbon removal, metal working and protection and non-destructive testing. Sales Executives are available to advise on specific problems and applications.

## 7. SAFETY AND HANDLING

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

## KEEP OUT OF REACH OF CHILDREN

## 8. STORAGE

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

Store Ardrex 9703 at temperatures between +10°C and +40°C (50°-104°F), in a dry place, away from oxidizing chemicals and from sources of heat. Avoid direct exposure to sunlight. Shelf-life is 36 months.

## 9. DISPOSAL

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> 9704

Water-Washable Fluorescent Penetrant

## 1. DESCRIPTION

ARDROX 9704 is a water washable fluorescent penetrant. The product gives crisp indications with exceptionally low levels of background and has excellent heat and UV fade characteristics. It is ideal for electrostatic application.

Ardrox 9704 can be used for metals and ceramics which are not strongly porous, during production and maintenance works. It is appropriate for various applications such as aerospace and other high specification industries thanks to a large number of approvals and conformances.

Ardrox 9704 is usually used in conjunction with the Ardrex 9D4A or 9D1B developer and the Ardrex surface technologies. Ardrex 9704 is also approved to the AMS 2644 as Method C, solvent removable penetrants.

### CONFORMANCES:

- |                         |                           |
|-------------------------|---------------------------|
| ✓ SAE                   | AMS 2644                  |
| ✓ CFM International     | CFM56 SPM                 |
| ✓ GE Commercial Engines | GE Commercial Engines SPM |
| ✓ Pratt & Whitney       | PMC 4350-6                |
| ✓ Rolls Royce           | OMat 653L                 |
| ✓ SAFRAN                | IN-5000                   |

Ask your Chemetall representative for a complete list of approvals.

## 2. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTY	ARDROX 9704
Appearance	Clear, yellowish – greenish liquids
Density in g/ml at 20°C / 68°F	Approx. 0.87
Flash Point	More than 100 °C / 212 °F
Sensitivity Level	2

These are typical values only and do not constitute a specification.



### 3. METHOD OF USE

Ardrox 9704 may be applied by brushing, tank immersion or by electrostatic or conventional spraying. The following typical process sequence illustrates the recommended method of use for general industrial applications. However, where relevant, the process specifications of the approving authorities must be followed.

#### 1. Pre-Cleaning

All surface contamination such as rust, paint residues, grease, scale etc. must be completely removed. Ensure that the component is completely dry and not too hot or cold (10°-50°C / 50°-122°F).

#### 2. Penetrant Application

Apply penetrant to the surface and leave for a suitable dwell period. Allow components to drain as necessary. The combined application and drainage period should be at least 10 minutes. If the drain time exceeds 1 hour, the penetrant should be re-applied to the surface.

#### 3. Cleaning

Penetrant removal by water washing: 15°–35°C (59°–95°F) for 30 seconds up to 2 minutes at 0.8-1.7 bar (10-25 psi). In the case of rough surfaces or if products for higher sensitivity levels – e.g. Ardrox 9705 - are used, it may be necessary to clean with warm water at this point. Relevant trials should be carried out prior to application.

Use one or a combination of the following methods:

- a) air agitated water rinse tank
- b) spray rinse tank
- c) manual spray rinse

The times given are a rough guide only. Practical trials should be carried out to find the optimum.

#### 4. Drying

Dry in air recirculating oven at 50–60°C (122–140°F), typically for 10 minutes. Longer times may be required for larger components. To assist drying, either clean, filtered, low pressure, compressed air (1.7 bar/25 psi maximum) can be used prior to oven drying. Use the minimum oven time required to obtain thoroughly dry components.

#### 5. Development

Apply developer Ardrox 9D4A or Ardrox 9D1B.

#### Contact Time:

Ardrox 9D4A: 10-30 min.

Ardrox 9D1B: maximum 5–10 min.

#### 6. Inspection

When applicable, low pressure, clean filtered air at 0.3 bar/5 psi (maximum) should be used to remove excess powder prior to inspection under black (UV) light, (1000 µW/cm<sup>2</sup> minimum) in a darkened area.

## 4. EFFECTS ON MATERIALS

When Ardrox 9704 is used in the prescribed manner, no significant corrosion is likely to occur on commonly used constructional metals.

The product may stain or soften some plastics and rubbers and, where appropriate, a compatibility test should be carried out.

## 5. LABOR AND ENVIRONMENTAL PROTECTION

Before operating the process described it is important that this complete document, together with any relevant Safety Data sheets, be read and understood.

All local and national regulations on the transport, storage, use and waste treatment of chemicals in concentrated or diluted form and as working solutions must be obeyed.

## 6. GENERAL INFORMATION

Chemetall supplies a wide range of chemical products and associated equipment for cleaning, descaling, paint and carbon removal, metal working and protection and non-destructive testing. Sales Executives are available to advise on specific problems and applications.

## 7. SAFETY AND HANDLING

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

## KEEP OUT OF REACH OF CHILDREN

## 8. STORAGE

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

Store Ardrox 9704 at temperatures between +10°C and +40°C (50°-104°F), in a dry place, away from oxidizing chemicals and from sources of heat. Avoid direct exposure to sunlight. Shelf-life is 36 months.

## 9. DISPOSAL

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> 9812, 9813 & 9814

## FLUORESCENT POST-EMULSIFIABLE PENETRANTS

### PRIMARY APPLICATION

ARDROX<sup>®</sup> 9812, 9813 and 9814 are fluorescent penetrants, to be used with a separate emulsifier. These products give crisp indications with exceptionally low levels of background fluorescence and have excellent heat and UV fade characteristics. They are ideal for electrostatic application.

They are normally used in conjunction with Ardrox<sup>®</sup> 9881 hydrophilic emulsifier (maximum concentration 10% v/v) and with the Ardrox<sup>®</sup> 9D4A or 9D1B developer and the Ardrox surface technologies.

Ardrox<sup>®</sup> 9812, 9813 and 9814 are also approved to the AMS 2644 as Method C, solvent removable penetrants.

They are available as bulk material or as aerosol spray cans on special order.

#### Conformances

- |                         |                           |
|-------------------------|---------------------------|
| ✓ SAE                   | AMS 2644                  |
| ✓ Pratt & Whitney       | PMC 4352, 4353 & 4354     |
| ✓ Rolls Royce           | CSS 232 & OMat            |
| ✓ SAFRAN                | IN-5000                   |
| ✓ GE Commercial Engines | GE Commercial Engines SPM |

Ask your Chemetall representative for a complete list of approvals

### CHEMICAL CHARACTERISTICS

Property	Ardrox <sup>®</sup> 9812	Ardrox <sup>®</sup> 9813	Ardrox <sup>®</sup> 9814
Appearance	Clear, bright, highly fluorescent, yellow liquids		
Density in g/ml at 20°C / 68°F	Approx. 0.90		
Flash point	100°C / 212°F (Pensky Martens closed cup)		
Sensitivity level	2	3	4

These are typical values only and do not constitute a specification.

### APPLICATION PROCEDURE

Ardrox<sup>®</sup> 9812, 9813 and 9814 may be applied by brushing, tank immersion or by electrostatic spraying. The following typical process sequence illustrates the recommended method of use for general industrial

applications. However, where relevant, the process specifications of the approving authorities must be followed.

### **Pre-Cleaning**

All surfacecontamination such as rust, paint residues, grease, scale etc. must be completely removed. Ensure that the component is completely dry and not too hot or cold (10-50°C / 50-122°F).

### **Penetrant Application**

Apply penetrant to the surface and leave for a suitable dwell period. Allow components to drain as necessary. The combined application and drainage period should be at least 10 minutes. If the drain time exceeds 1 hour, the penetrant should be re-applied to the surface.

### **Remove excess penetrant**

Penetrant removal by water washing: 15–35°C (59–95°F) for approx. 1 min. at 1.4-1.7 bar (20-25 psi). Remove excess penetrant by one or a combination of the following methods:

- a) air agitated water rinse tank
- b) spray rinsing
- a) manual spray rinse
- d) wipe with a clean lint-free tissue, dampened in Ardrex® solvent remover

The times given are a rough guide only. Practical trials should be carried out to find the optimum.

### **Emulsify**

Immerse in Ardrex® 9881 at maximum 10% v/v in water at ambient temperature for 30–90 seconds. Slight agitation of components is recommended to free any trapped air. Drain for 30 seconds over the remover tank.

### **Rinse with water**

Conditions as for 3.3. It is recommended that this rinse stage be kept separate from the pre-rinse to facilitate effluent treatment.

### **Drying**

Dry in air recirculating oven at 50–60°C (122–140°F), for 15 minutes maximum. Longer times may be required for larger components. To assist drying, either clean, filtered, low pressure, compressed air (1.7 bar/25 psi maximum) or a hot water dip (80–90°C / 176–194 °F maximum for up to 20 seconds) can be used prior to oven drying. Use the minimum oven time required to obtain thoroughly dry components.

### **Development**

Apply developer Ardrex® 9D4A or Ardrex® 9D1B and allow 10 – 30 minutes developing time before evaluation.

**Inspection**

When applicable, low pressure, clean filtered air at 0.3 bar/5 psi (maximum) should be used to remove excess powder prior to inspection under black (UV) light, (1000  $\mu\text{W}/\text{cm}^2$  minimum) in a darkened area.

**SOLUTIONS CONTROL**

When Ardrox® 9812, 9813 and 9814 are used in the prescribed manner, no significant corrosion is likely to occur on commonly used constructional metals.

These products may stain or soften some plastics and rubbers and, where appropriate, a compatibility test should be carried out.

**NOTES ON USE** (See Safety Data Sheet)**SAFETY AND HANDLING**

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

**KEEP OUT OF REACH OF CHILDREN****STORAGE**

Store Ardrox® 9812, 9813 and 9814 at temperatures between +10 °C and +40°C (50-104 °F), in a dry place, away from oxidizing chemicals and from sources of heat. Avoid direct exposure to sunlight. All containers should be tightly closed when not in use.

**SHELF LIFE**

Shelf-life of Ardrox® 9812, 9813 and 9814 is 36 months.

## **DISPOSAL**

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> 9813

## Fluorescent Post-Emulsifiable Penetrant

### 1. DESCRIPTION

ARDROX 9813 is a fluorescent penetrant, to be used with a separate emulsifier. The product gives crisp indications with exceptionally low levels of background fluorescence and has excellent heat and UV fade characteristics. It is ideal for electrostatic application.

It is normally used in conjunction with Ardrox 9881 hydrophilic emulsifier (maximum concentration 10% v/v) and with the Ardrox 9D4A or 9D1B developer and the Ardrox surface technologies.

Ardrox 9813 is also approved to the AMS 2644 as Method C, solvent removable penetrants.

#### CONFORMANCES:

✓ SAE	AMS 2644
✓ Pratt & Whitney	PMC 4352, 4353 & 4353
✓ Rolls Royce	CSS 232 & OMat
✓ SAFRAN	IN-5000
✓ GE Commercial Engines	GE Commercial Engines SPM

Ask your Chemetall representative for a complete list of approvals.

### 2. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTY	ARDROX 9813
Appearance	Clear, bright, highly fluorescent, yellow liquids
Density in g/ml at 20°C / 68°F	Approx. 0.90
Flash Point	100°C / 212°F (Pensky Martens closed cup)
Sensitivity Level	3

These are typical values only and do not constitute a specification.

### 3. METHOD OF USE

Ardrox 9813 may be applied by brushing, tank immersion or by electrostatic spraying. The following typical process sequence illustrates the recommended method of use for general industrial applications. However, where relevant, the process specifications of the approving authorities must be followed.



## 1. Pre-Cleaning

All surface contamination such as rust, paint residues, grease, scale etc. must be completely removed. Ensure that the component is completely dry and not too hot or cold (10°-50°C / 50°-122°F).

## 2. Penetrant Application

Apply penetrant to the surface and leave for a suitable dwell period. Allow components to drain as necessary. The combined application and drainage period should be at least 10 minutes. If the drain time exceeds 1 hour, the penetrant should be re-applied to the surface.

## 3. Remove excess penetrant

Penetrant removal by water washing: 15–35°C (59–95°F) for approx. 1 min. at 1.4-1.7 bar (20-25 psi). Remove excess penetrant by one or a combination of the following methods:

- a) air agitated water rinse tank
- b) spray rinsing
- c) manual spray rinse
- d) wipe with a clean lint-free tissue, dampened in Ardrex solvent remover

The times given are a rough guide only. Practical trials should be carried out to find the optimum.

## 4. Emulsify

Immerse in Ardrex 9881 at maximum 10% v/v in water at ambient temperature for 30–90 seconds. Slight agitation of components is recommended to free any trapped air. Drain for 30 seconds over the remover tank.

## 5. Rinse with water

Conditions as for 3.3. It is recommended that this rinse stage be kept separate from the pre-rinse to facilitate effluent treatment.

## 6. Drying

Dry in air recirculating oven at 50°–60°C (122°–140°F), for 15 minutes maximum. Longer times may be required for larger components. To assist drying, either clean, filtered, low pressure, compressed air (1.7 bar/25 psi maximum) or a hot water dip (80°–90°C / 176°–194 °F maximum for up to 20 seconds) can be used prior to oven drying. Use the minimum oven time required to obtain thoroughly dry components.

## 7. Development

Apply developer Ardrex 9D4A or Ardrex 9D1B.

### Contact Time:

Ardrex 9D4A: 10-30 min.

Ardrex 9D1B: Maximum 5–10 min.

### **3.8 Inspection**

When applicable, low pressure, clean filtered air at 0.3 bar/5 psi (maximum) should be used to remove excess powder prior to inspection under black (UV) light, (1000  $\mu\text{W}/\text{cm}^2$  minimum) in a darkened area.

## **4 EFFECTS ON MATERIALS**

When Ardrox 9813 is used in the prescribed manner, no significant corrosion is likely to occur on commonly used constructional metals.

The product may stain or soften some plastics and rubbers and, where appropriate, a compatibility test should be carried out.

## **5 LABOR AND ENVIRONMENTAL PROTECTION**

Before operating the process described it is important that this complete document, together with any relevant Safety Data sheets, be read and understood.

All local and national regulations on the transport, storage, use and waste treatment of chemicals in concentrated or diluted form and as working solutions must be obeyed.

## **6 GENERAL INFORMATION**

Chemetall supplies a wide range of chemical products and associated equipment for cleaning, descaling, paint and carbon removal, metal working and protection. Sales Executives are available to advice on specific problems and applications.

## **7 SAFETY AND HANDLING**

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

## **KEEP OUT OF REACH OF CHILDREN**

## **8 STORAGE**

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

Store Ardrox 9813 at temperatures between +10 °C and +40°C (50-104 °F), in a dry place, away from oxidizing chemicals and from sources of heat. Avoid direct exposure to sunlight. The shelf life for Ardrox 9813 is 36 months.

## 9. DISPOSAL

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> 9814

Fluorescent Post-Emulsifiable Penetrant

## 1. DESCRIPTION

ARDROX 9814 is a fluorescent penetrant, to be used with a separate emulsifier. The product gives crisp indications with exceptionally low levels of background fluorescence and has excellent heat and UV fade characteristics. It is ideal for electrostatic application.

It is normally used in conjunction with Ardrox 9881 hydrophilic emulsifier (maximum concentration 10% v/v) and with the Ardrox 9D4A or 9D1B developer and the Ardrox surface technologies.

Ardrox 9814 is also approved to the AMS 2644 as Method C, solvent removable penetrants.

### CONFORMANCES:

✓ SAE	AMS 2644
✓ Pratt & Whitney	PMC 4352, 4353 & 4353
✓ Rolls Royce	CSS 232 & OMat
✓ SAFRAN	IN-5000
✓ GE Commercial Engines	GE Commercial Engines SPM
Ask your Chemetall representative for a complete list of approvals.	

## 2. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTY	ARDROX 9814
Appearance	Clear, bright, highly fluorescent, yellow liquids
Density in g/ml at 20°C / 68°F	Approx. 0.90
Flash Point	100°C / 212°F (Pensky Martens closed cup)
Sensitivity Level	4

These are typical values only and do not constitute a specification.

## 3. METHOD OF USE

Ardrox 9814 may be applied by brushing, tank immersion or by electrostatic spraying. The following typical process sequence illustrates the recommended method of use for general industrial applications. However, where relevant, the process specifications of the approving authorities must be followed.

## 1. Pre-Cleaning

All surface contamination such as rust, paint residues, grease, scale etc. must be completely removed. Ensure that the component is completely dry and not too hot or cold (10°-50°C / 50°-122°F).

## 2. Penetrant Application

Apply penetrant to the surface and leave for a suitable dwell period. Allow components to drain as necessary. The combined application and drainage period should be at least 10 minutes. If the drain time exceeds 1 hour, the penetrant should be re-applied to the surface.

## 3. Remove excess penetrant

Penetrant removal by water washing: 15–35°C (59–95°F) for approx. 1 min. at 1.4-1.7 bar (20-25 psi). Remove excess penetrant by one or a combination of the following methods:

- a) air agitated water rinse tank
- b) spray rinsing
- c) manual spray rinse
- d) wipe with a clean lint-free tissue, dampened in Ardrex solvent remover

The times given are a rough guide only. Practical trials should be carried out to find the optimum.

## 4. Emulsify

Immerse in Ardrex 9881 at maximum 10% v/v in water at ambient temperature for 30–90 seconds. Slight agitation of components is recommended to free any trapped air. Drain for 30 seconds over the remover tank.

## 5. Rinse with water

Conditions as for 3.3. It is recommended that this rinse stage be kept separate from the pre-rinse to facilitate effluent treatment.

## 6. Drying

Dry in air recirculating oven at 50°–60°C (122°–140°F), for 15 minutes maximum. Longer times may be required for larger components. To assist drying, either clean, filtered, low pressure, compressed air (1.7 bar/25 psi maximum) or a hot water dip (80°–90°C / 176°–194 °F maximum for up to 20 seconds) can be used prior to oven drying. Use the minimum oven time required to obtain thoroughly dry components.

## 7. Development

Apply developer Ardrex 9D4A or Ardrex 9D1B.

### Contact Time:

Ardrex 9D4A: 10-30 min.

Ardrex 9D1B: Maximum 5–10 min.

### **3.8 Inspection**

When applicable, low pressure, clean filtered air at 0.3 bar/5 psi (maximum) should be used to remove excess powder prior to inspection under black (UV) light, (1000  $\mu\text{W}/\text{cm}^2$  minimum) in a darkened area.

## **4 EFFECTS ON MATERIALS**

When Ardrox 9814 is used in the prescribed manner, no significant corrosion is likely to occur on commonly used constructional metals.

The product may stain or soften some plastics and rubbers and, where appropriate, a compatibility test should be carried out.

## **5 LABOR AND ENVIRONMENTAL PROTECTION**

Before operating the process described it is important that this complete document, together with any relevant Safety Data sheets, be read and understood.

All local and national regulations on the transport, storage, use and waste treatment of chemicals in concentrated or diluted form and as working solutions must be obeyed.

## **6 GENERAL INFORMATION**

Chemetall supplies a wide range of chemical products and associated equipment for cleaning, descaling, paint and carbon removal, metal working and protection. Sales Executives are available to advice on specific problems and applications.

## **7 SAFETY AND HANDLING**

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

## **KEEP OUT OF REACH OF CHILDREN**

## **8 STORAGE**

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

Store Ardrox 9814 at temperatures between +10 °C and +40°C (50-104 °F), in a dry place, away from oxidizing chemicals and from sources of heat. Avoid direct exposure to sunlight. The shelf life for Ardrox 9814 is 36 months.

## 9. DISPOSAL

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> 9881

Penetrant Remover / Hydrophilic Emulsifier

## 1. DESCRIPTION

ARDROX 9881 is a hydrophilic type emulsifier used for the removal of the Ardrox<sup>®</sup> 981x series of post-emulsifiable fluorescent penetrants (Method D). It is to be diluted in water then applied by immersion or foam-on method.

The use of Ardrox 9881 minimizes background fluorescence on part surfaces, as well as bleed out of excess penetrant from hollow parts. It is economical to use since it can be applied at 10% by volume for immersion and less than 5% for foam-on applications.

Ardrox 9881 is a blend of biodegradable surface-active agents, coupling solvent and corrosion inhibitors. It is low in sulphur, halogen and alkali metal content. In addition to that, Ardrox 9881 shows an improved odor and bath stability and it is designed to meet the harshest surfactant regulations.

Ardrox 9881 is available as bulk concentrate material or ready-to-use (5%) foam-on aerosol cans on special order.

### APPROVALS:

✓ SAE	AMS 2644
✓ CFM International	as per AMS 2644
✓ Pratt & Whitney	PMC 4355-6 & FPM Master Supplement
✓ Rolls Royce	CSS 232 & OMat 621K
✓ SAFRAN Group	IN-5000
✓ GE Commercial Engines	as per AMS 2644

Ask your Chemetall representative for a complete list of approvals.

## 2. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTY	TYPICAL VALUE	UNIT	TEST METHOD
Appearance	-	Clear, pink liquid	-
Density at 20°C / 68°F	1.01	g/ml	Volumetric
pH at 100 g/l	8.2 – 9.2	-	-

These are typical values only and do not constitute a specification.



### 3. OPERATION PROCEDURE

The procedure described below is recommended for general use. Where relevant, the process specifications of the approving authorities must be closely followed.

After suitable pre-cleaning, penetrant application and the necessary penetrant contact time, the components are initially given either a spray or air agitated water rinse (for approx. 1 minute) before the Ardrox 9881 solution is applied.

The recommended concentration is up to 10% by volume in water (Ardrox 9881 is approved to AMS 2644 to a maximum of 10 % concentration). The components should be completely immersed, withdrawn and allowed to drain.

The total contact time should be determined experimentally and will be dependent on the material and its surface finish. The time should be adjusted to the shortest possible contact time to give the minimum acceptable level of background. The contact times below serve as a guide only.

**Immersion Time:** 30 sec. to 90 seconds  
**Drain Time:** 30 seconds

Draining's may be returned to the Ardrox 9881 tank. After a suitable period of contact, the components are thoroughly rinsed with water either by spray application or immersion in an air agitated tank for the minimum period needed to give an acceptable level of background fluorescence.

The components should then be thoroughly dried in an air-circulating oven at a temperature between 50°–60°C (122°–140°F) using the minimum drying time before application of the developer (15 minutes maximum).

### 4. BATH MAINTENANCE

The concentration of the Ardrox 9881 emulsifier solution should be measured and maintained with the use of a refractometer specifically calibrated using known dilutions of Ardrox 9881.

### 5. EFFECTS ON MATERIAL

When Ardrox 9881 is used in the prescribed manner, no significant corrosion is likely to be encountered on commonly used metals. Equipment/tank should be constructed of stainless steel.

### 6. LABOR AND ENVIRONMENTAL PROTECTON

Before operating the process described it is important that this complete document, together with any relevant Safety Data sheets, be read and understood.

All local and national regulations on the transport, storage, use and waste treatment of chemicals in concentrated or diluted form and as working solutions must be obeyed.

## 7. GENERAL INFORMATION

Chemetall supplies a wide range of chemical products and associated equipment for cleaning, descaling, paint and carbon removal, metal working and protection and non-destructive testing. Sales Executives are available to advise on specific problems and applications.

## 8. SAFETY AND HANDLING

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

## KEEP OUT OF REACH OF CHILDREN

## 9. STORAGE

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

Store in a cool place, with protection from freezing conditions. Shelf-life is 36 months.

## 10. DISPOSAL

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX BASE OIL HF

**Magnetic Particle Carrier Solvent**

## PRIMARY APPLICATION

ARDROX BASE OIL HF is a high flash petroleum-based solvent used for suspending Magnetic Particle Inspection particles. This suspension is used during the Magnetic Particle Inspection Process in both stationary and mobile magnetizing equipment. Ardrex Base Oil HF is used for both visible and fluorescent MPI applications. Ardrex Base Oil HF's, low fluorescence, and low odor and worker safety combination, make it ideal for use as a carrier media in Magnetic Particle Inspection applications.

## CHEMICAL CHARACTERISTICS

Appearance .....	Water-white
Odor.....	Mild hydrocarbon odor
Specific Gravity.....	0.820
Flash Point.....	212°F
Lbs per Gallon .....	6.83
Refractive Index.....	1.452
Vapor Pressure at 68°F (mm of Mercury) .....	0.001 kPa at 20°C
Initial Boiling Point .....	235°C
Viscosity at 100°F.....	2.6 cSt

## APPROVALS

Ardrex Base Oil HF is approved by ASTM E-1444, AMS 2641, & BS4069. Check with your Chemetall representative for complete approvals.

## APPLICATION PROCEDURE

For stationary MPI equipment, the suspension is held in a sump at the base of the unit and is applied to the part being inspected by a spray flow-on system supplied from the sump re-circulating pump. For mobile or portable equipment, apply the suspension by spray from a pressure pot fitted with a stirrer. Aerosols are also appropriate for this type of magnetizing equipment.

**NOTES ON USE** (See Safety Data Sheet)**SAFETY AND HANDLING**

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

**KEEP OUT OF REACH OF CHILDREN****STORAGE**

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

**SHELF LIFE**

The shelf life for Ardrox Base Oil HF is 3 years.

**DISPOSAL**

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> P6R

## PRIMARY APPLICATION

ARDROX P6R is a penetrant system for flaw detection consisting of three aerosol products which are used in a sequence to reveal surface defects. The system consists of Ardrex P6R Red Penetrant, Ardrex 9D1B Developer and Ardrex 9PR50 Solvent Remover.

Ardrex NQ-1 can be used as the developer to view the components under ultra violet light. This will give higher sensitivity as compared to conventional color contrast penetrants.

### CONFORMANCES:

- ✓ Defense Standard MIL-STD-271
- ✓ ASTM E-1444
- ✓ SAE AMS 3044

Ask your Chemetall representative for a complete list of approvals.

## CHEMICAL CHARACTERISTICS

PROPERTY	TYPICAL VALUE	UNIT	TEST METHOD
Appearance	Dark red liquid	-	-
Density	0.98	g/ml	-
Flash Point	>210	°C	Pensky Marten closed cup

## APPLICATION PROCEDURE

The following process sequence illustrates the recommended method of use:

1. Ensure that the surface to be inspected is free from rust, scale, carbon, oil or grease or other contaminants.
2. Apply Ardrex P6R to the area and allow the penetrant to remain on the surface for 10-30 minutes. After the recommended contact time, remove the excess penetrant by washing the surface with water, or by wiping off the excess penetrant with a cloth moistened with Ardrex 9PR50. Do not spray the Ardrex 9PR50 directly onto the surface. If water has been used to remove excess penetrant, dry the surface with clean, forced air or in a hot air re-circulating oven at 140° - 176°F (60° - 80°C).
3. Apply an even coating of Ardrex 9D1B developer to the surface. Allow this to stand for 10 - 30 minutes.
4. The surface is now ready for inspection for defects under good lighting conditions. Defects will appear as red indications against a bright white background.

5. When defects are difficult to interpret, or where high sensitivity is required, use Ardrex NQ-1 Developer and inspect under ultraviolet light. The defects will appear as black indications against a bright fluorescent background.

## **EFFECT ON MATERIALS**

No significant corrosion is likely to occur when the products are used in the prescribed manner.

## **EQUIPMENT**

Equipment/tanks should be constructed of 316 or 320 stainless steel.

## **KEEP OUT OF REACH OF CHILDREN**

## **STORAGE**

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

## **SHELF LIFE**

The shelf life for Ardrex P6R is 3 years.

## **DISPOSAL**

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

# ARDROX<sup>®</sup> P136E

**Water Washable Fluorescent Penetrant**

## PRIMARY APPLICATION

ARDROX P136E is a level 4 water washable fluorescent penetrant, characterized by its controlled washability, which makes it less susceptible to over-washing. This high entrapment feature truly makes it unique in comparison to other water washable products. Flaw finding is enhanced by its excellent bleed back properties.

Ardrox P136E has a flash point of well over 300°F (149°C). Very low in odor, it contains no petroleum solvents, no heavy metals, and no fats, oils or greases as constituents. There is no loss of sensitivity due to evaporation nor will this product break down under high temperature conditions. It provides:

- Bright, crisp indications
- Low residual background
- Exceptionally high and UV fade resistance
- Over-wash resistance
- Low toxicity

**NOTE:** Propellant used in aerosol contains VOC

### APPROVAL & CONFORMANCES:

- ✓ ASME Boiler & Vessel Code Section V, Article 6
  - ✓ SAE AMS 2644
  - ✓ All major aerospace engine and airframe manufacturers.
- Ask your Chemetall representative for a complete list of approvals.

## CHEMICAL CHARACTERISTICS

PROPERTY	TYPICAL VALUE	UNIT	TEST METHOD
Appearance	Yellow-green liquid	-	-
Density	7.97 to 8.14	lbs/gal	-
Flash Point	350	°F	PMCC
Sulphur Content	100	ppm	-
Chloride Content	100	ppm	-
Fluoride Content	25	ppm	-

Sodium Content	60	ppm	
Viscosity	21.87 to 26.73	Centistokes	ASTM D445

## APPLICATION PROCEDURE

Ardrox P136E may be applied by aerosol, brushing, tank immersion, conventional and electrostatic spraying. The following typical process sequence illustrates the recommended method of use.

### 1. PRECLEAN/DRY

All surface contamination (rust, paint residues, greases, scale, etc.) must be completely removed. After cleaning, make sure that the component is completely dry and cool,  $\leq 125^{\circ}\text{F}$  ( $53^{\circ}\text{C}$ ), before applying the penetrant.

### 2. PENETRANT APPLICATION

Apply penetrant to the surface and allow a dwell period of 10 – 30 minutes. If the contact period exceeds 120 minutes, the penetrant should be reapplied to the surface.

### 3. WATER WASH - 25 to 40 psi, 1 to 3 minutes $50^{\circ}$ to $100^{\circ}\text{F}$ ( $10^{\circ}$ to $38^{\circ}\text{C}$ ).

Use either one or a combination of manual spray or automatic spray tank rinses. The times given are a guide only. Practical trials should be carried out to establish the most suitable conditions for specific components.

### 4. OVEN DRY, AIR RECIRCULATING Oven set at $160^{\circ}\text{F}$ ( $71^{\circ}\text{C}$ ) Maximum

Use the minimum time necessary to thoroughly dry the components. Use clean, filtered, low-pressure compressed air to remove pockets of water before oven drying.

### 5. APPLY DEVELOPER

Dry powder developer, Ardrox 9D4A, may be applied in specially designed dust storm cabinets or by electrostatic spray; dwell time: 2 to 5 minutes. Non-aqueous developers, Ardrox 9D1B or NQ1, are applied by spray; dwell time: 10 – 30 minutes. If using the aqueous developer Ardrox 9D76, it is applied prior to Step 4, oven dry. In most cases developers are required by government or prime contractor specifications.

### 6. INSPECTION

Component should be inspected under UVA (365-nm) illumination in a darkened area

## EFFECTS ON MATERIALS

Ardrox P136E is non-corrosive to most common metals. It meets the corrosion requirements of AMS 2644 for aluminum, steel and magnesium. It is compatible with titanium and nickel alloys. It may stain or soften some plastics and rubbers; where appropriate, a compatibility test is recommended.



## **NOTES ON USE** (See Safety Data Sheet)

It is recommended that tanks, in the process line, be constructed from stainless steel (Grade 304 or equivalent). For areas, which are exposed to water, mild steel may be used provided it is free from rust, scale and other contaminants.

## **SAFETY AND HANDLING**

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

## **KEEP OUT OF REACH OF CHILDREN**

## **STORAGE**

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

## **SHELF LIFE**

The shelf life for Ardrex P136E is 3 years.

## **DISPOSAL**

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

For more information on any of these products please visit

[www.intechnde.com](http://www.intechnde.com)

Email: [Sales@intechnde.com](mailto:Sales@intechnde.com)

Call any of 3 locations below:

### British Columbia

140 - 8851 Beckwith Road  
Richmond, B.C.  
V6X 1V4  
Tel: 604 276 8006  
Fax: 604 276 8725  
Toll Free: 1 800 677 8884

### Alberta

6211 Roper Road  
Edmonton, Alberta  
T6B 3G6  
Tel: 780 448 9575  
Fax: 780 466 1280  
Toll Free: 1 888 576 7756

### Ontario

#48 1200 Speers Road  
Oakville, Ontario  
L6L 2X4  
Tel: 289 430 0286  
Fax: 780 466 1280

