

## Alkaline rust and scale remover

### 1 General Description

Ardrox<sup>®</sup> 185L is a highly alkaline concentrated solution in water containing sequestrants. It is also available as a powder under the name Ardrex<sup>®</sup> 185.

Ardrox<sup>®</sup> 185L is primarily intended for the removal of heavy rust and scale from ferrous components in immersion tanks but it is also capable to remove oil, grease and some air-dried paints. It will not attack or cause hydrogen embrittlement in ferrous alloys and there is markedly less tendency for re-rusting to occur than with acid pickling.

When used in conjunction with the adequate other Ardrex<sup>®</sup> specialties, Ardrex<sup>®</sup> 185L can be used to remove scale from hot-end jet engine components.

It can also be used for cleaning parts made of Titanium.

#### Approvals

✓ SAE	ARP 1755B (conformance)
✓ CFMI	CFM56
✓ Rolls Royce	CSS244 & OMat
✓ SNECMA	DMR 70-620
✓ GE	SPMC 70-80-04
✓ Pratt & Whitney	SPMC 70-12-00
✓ Turbomeca	

Ask your Chemetall representative for a complete list of approvals

### 2 Physical and Chemical Properties

Property	Unit	Typical Value - Ardrex <sup>®</sup> 185L	Test Method
Appearance	-	colorless to light yellow liquid	-
Density	g/ml	Approx. 1.43 at 20°C / 68°F	-
pH	-	14 at 20% at 20°C / 68°F	=

Property	Unit	Typical Value - Ardrex <sup>®</sup> 185	Test Method
Appearance	-	off-white powder	-
Water solubility	-	completely miscible	-
pH	-	14 at 100 g/L at 20°C / 68°F	=

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

### 3 Application

Ardrox<sup>®</sup> 185L is usually used at a concentration of 30-50% by volume in water, depending on the amount of rust or scale to be removed. This corresponds to a concentration of 200 - 375 g/L of Ardrex<sup>®</sup> 185 in water.

Ardrex<sup>®</sup> 185 must always be dissolved in cold water. There will be an exothermic reaction and the solution will heat up to 50-60°C / 120-140°F.

The Ardrex<sup>®</sup> 185L is applied by immersion between 82 and 93°C (180 and 200°F). Agitate with mechanical agitation, do not use air agitation.

The immersion time will vary according to the degree of contamination, light rust being removed in approximately 10 minutes while heavy rust may take about an hour.

Run cleaning solution as per the instructions of the engine manufacturer standard procedure.

Thorough water rinsing must take place after the use of Ardrox<sup>®</sup> 185L. If no further immediate surface treatment is to follow, the use of a dewatering and protective fluid such as an Ardrox<sup>®</sup> 3-series is desirable to give protection from re-rusting.

If the components are heavily contaminated with oil or grease, the life of the Ardrox<sup>®</sup> 185L bath will be prolonged if they are first degreased (e.g. with an Ardrox<sup>®</sup> 6-series product).

### Titanium Processing

Ardrox<sup>®</sup> 185L can be used for cleaning Titanium between 70 and 90°C (160-195°F). Concentration should be set at 34-50 % by volume (or 250-375 g/L) for a short soak of 4-5 minutes or at 10-20 % by volume (or 70-150 g/L) for a long soak (5 to 30 minutes).

Run cleaning solution as per the instructions of the engine manufacturer standard procedure.

Solutions of Ardrox<sup>®</sup> 185L which are used for de-rusting steel should not be used for cleaning titanium. The presence of iron in Ardrox<sup>®</sup> 185L solutions causes higher than normal surface activity on titanium alloys. A dedicated Ardrox<sup>®</sup> 185L bath should be set up to clean titanium.

### 4 Effects on materials

Being strongly alkaline, Ardrox<sup>®</sup> 185L solution will rapidly attack aluminum, zinc, tin and lead and their alloys. A marginal attack on copper and its alloys may occur and the copper taken into solution may plate out again on ferrous parts. Glass and ceramics are etched by Ardrox<sup>®</sup> 185L solutions and there may be some degradation of rubbers and certain plastics such as polymethylmethacrylate (e.g. 'Perspex').

Intending users are advised to check the compatibility of the Ardrox<sup>®</sup> 185L with any special materials, which they wish to use prior to the application of the product.

### 5 Equipment materials

Solutions of Ardrox<sup>®</sup> 185L may be used in mild steel tanks but heating elements should be constructed of stainless steel or Inconel. Seals and gaskets are preferably made of P.T.F.E.

### 6 Storage

Ardrox<sup>®</sup> 185L: keep in tightly closed container. Avoid contact with amphoteric metals. Do not store near acids. Storage: 0-40°C.

Ardrox<sup>®</sup> 185: keep in tightly closed container, in a cool, dry and well-ventilated place. Protect from humidity and water. Storage: < 40°C.

### 7 Safety guidance

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

### 8 Waste release

Any release shall respect all the applicable national and local regulation.

### 9 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.

## Method of Control

### Required chemicals

- ✓ Thymolphthalein indicator solution
- ✓ 0.1N Sulphuric acid solution

### Measure

Restore the volume of the tank to its original level, if necessary, by adding water. Thoroughly mix and take a sample of 100-200mL. After allowing to cool to ambient, add active carbon, stir and allow to stand for 30 minutes. Filter solution through a Whatman No1 paper until ~100 mL is obtained. Pipette 25 ml into a 250 ml volumetric flask. Make up to the mark with distilled water. Pipette 10 mL of this solution into an Erlenmeyer flask and add 5-10 drops of Thymolphthalein. Titrate against 0.1N Sulphuric acid solution until the blue color is discharged leaving a pale yellow-green solution. Record the volume used as V (ml). The bath strength is calculated as follows:

$$\begin{aligned} \text{Measured strength (\% by volume Ardrex}^{\text{®}} \text{ 185L)} &= V \times 1.13 \\ \text{Measured strength (g/l Ardrex}^{\text{®}} \text{ 185)} &= V \times 8.07 \end{aligned}$$

### Replenishment of the bath

If the bath is below the required strength, add further Ardrex<sup>®</sup> 185L according to the following:

$$\text{Ardrox 185L (l)} = \left( \text{required strength} \left( \% \frac{v}{v} \right) - \text{measured strength} \left( \% \frac{v}{v} \right) \right) / 100 * \text{volume of solution (l)}$$

$$\text{Ardrox 185 (g)} = \left( \text{required strength} \left( \frac{g}{l} \right) - \text{measured strength} \left( \frac{g}{l} \right) \right) * \text{volume of solution (l)}$$

If the bath is above the required strength, add water according to the following:

$$\text{Water (l)} = \left( \frac{\text{measured strength} \left( \% \frac{v}{v} \right)}{\text{required strength} \left( \% \frac{v}{v} \right)} - 1 \right) * \text{volume of solution (l)}$$

$$\text{Water (l)} = \left( \frac{\text{measured strength} \left( \frac{g}{l} \right)}{\text{required strength} \left( \frac{g}{l} \right)} - 1 \right) * \text{volume of solution (l)}$$

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**Head Office**  
Chemetall GmbH  
Trakehner Straße 3  
60487 Frankfurt am Main  
Germany

T +49 69 7165 0  
F +49 69 7165 3018  
[surfacetreatment@chemetall.com](mailto:surfacetreatment@chemetall.com)  
[www.chemetall.com](http://www.chemetall.com)

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