



Pall Corporation

# HRP020/HRM

## HRP020/HRM Purifier for Phosphate Ester Fluids

FLUID CONDITIONING PURIFIERS



*Filtration. Separation. Solution.<sup>SM</sup>*

PIH HRP020/HRMa

# HRP020/HRM Purifier for Phosphate Ester Fluids

## Performance Requirements

### Introduction

Phosphate ester is used extensively in industries requiring fire resistant fluids in their hydraulic or lubrication systems. In addition to its fire resistant properties phosphate ester is also an excellent lubricant, comparable with or better than mineral oils. In large steam turbines phosphate ester has nearly 40 years experience as the operating fluid in governor control systems. It is however more susceptible to degradation in the presence of water. Effective fluid conditioning is essential to avoid or break the fluid degradation cycle. The most damaging effect of fluid degradation is the formation of acids, which can in extreme cases corrode vital metal components.

### Fluid Conditioning Requirements

To minimise fluid degradation the following parameters need to be controlled.

- **Keep the water level low.**

A water content of 1000 p.p.m. is often taken as the upper acceptable limit for water in phosphate ester, but 500 p.p.m. or less will ensure no effective hydrolysis, with the associated acid formation.

- **Minimise air entrainment in the reservoir fluid and at the pump.**

Air compression in the system pump can cause "dieseling" producing very high local temperatures with the associated fluid thermal stress and carbon formation.

- **Maintain a low acidity level.**

A total acid number, or neutralisation number, of 0.2 mg KOH/g is typically taken as the maximum acceptable level. This will however vary from one system supplier to another.

In addition to the provision of effective fluid conditioning it remains important that system design and plant maintenance ensure that water ingress and air entrainment are reduced to a minimum.

The 'Pall' HRP020 fluid conditioning purifier utilises the proven principle of vacuum dehydration to reduce water and entrained air in the fluid system.

**The Pall Fluid Conditioning Purifier removes 100% of free water and as much as 80% of dissolved water. It also removes 100% of free and entrained gases and up to 65% of dissolved gases. Particulate removal is achieved using a 3 micrometer high Beta rated ( $\beta_{5(C)} \geq 1000$  rated) 'Ultipor III' filter element to filter the fluid before discharge back to the system reservoir.**

**The Pall Fluid Conditioning Purifier uses ion exchange resin elements to effectively scavenge any acid that may form. Ion exchange resins, unlike fullers earth or activated alumina, does not contain any extractable metals which can increase air entrainment and so promote "dieseling". Pall ion exchange elements can recondition damaged phosphate ester and extend fluid life effectively lowering fluid costs.**

Details of the Purifier and its operations can be found in the Pall brochure on the HNP021. A technical brief entitled "Improved Maintenance and Life Extension of Phosphate Esters Using Ion Exchange Treatment" is available on request and covers in detail the Pall position on reconditioning phosphate esters.

### Fluid Conditioning System Offer In Modular Form

The purifier is supplied in a modular form comprising of an HNP021 series fluid conditioner connected downstream of the ion exchange unit. The ion exchange unit contains either 2, 4 or 7 resin elements, dependant on the system size to be treated. As a guide use 2 elements for systems less than 3000L, 4 elements for systems between 3000L and 6000L and 7 elements for systems up to 12,000L, above this size consult sales office. If the initial total acid number is greater than 0.5mg KOH/g, consult the Pall sales office before proceeding. In addition the ion exchange unit can be supplied for connecting to existing **Pall** purifiers where system acid levels have become unacceptable.

There is a flow switch in the main flow line on the HRM which indicates that the purifier is running. This means that the ion exchange units will be completely autonomous units with no requirement for on site wiring or commissioning to an existing purifier.

## HRP020/HRM Purifier for Phosphate Ester Fluids Instrumentation and Control



### Specifications

Dry weight purifier:	160 kg
Ion exchange unit:	310 kg
Inlet/outlet connection:	1" BSP
Flow rate:	20 L/min
Total motor power:	3.7 KVA
Maximum viscosity:	300 cSt
Maximum service temperature:	70°C
Maximum inlet pressure:	2 bar g
Maximum outlet pressure:	7 bar g
Operating vacuum:	-0.8 bar g
Particulate filtration:	<b>Pall Ultipor III</b> ( $\beta_{5(c)} \geq 1000$ )
Acid control elements:	<b>Pall</b> ion exchange resin element

### Scope of supply

- 1 off purifier unit (HNP021 Series)
- 1 off ion exchange unit (HRM Series)
- Connecting hose (3 metres)
- Connecting electrical cable (5 metres)
- 1 off ion exchange element removal tool

## HRP020/HRM Purifier for Phosphate Ester Fluids Ordering Information

Purifier 'Pall' Part No: **HRP020**    **Z**   
Table 1 Table 2 Table 3 Table 4

Replacement Element 'Pall' Part No: **Inlet: HM55420**  
**Outlet: HC9100FKP8Z**  
**Air Breather: HC0293SEE5**  
**Resin Elements: HC0653FAG39Z**

**Table 1**

Code	Voltage*
<b>R</b>	380 V 3PH
<b>T</b>	415 V 3PH
<b>U</b>	440 V 3PH

\*For other voltage please contact the sales office

**Table 2**

Code	Electrical Frequency
<b>3</b>	50 Hz
<b>4</b>	60 Hz

**Table 3**

Code	No. of Elements
<b>02</b>	2
<b>04</b>	4
<b>07</b>	7

**Table 4**

Code	Mounting
<b>C</b>	Castors and wheels fitted
<b>N</b>	Frame mounted

Ion Exchange Module Only Part No:      
 For fitment to 'Pall' Purifier Table 3 Table 1 Table 2 Table 4

Replacement Resin Element Part No: **HC0653FAG39Z**

This is the standard anionic exchange element. For other ion exchange elements please contact the sales office.



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