



M&R Hydraulics have been providing hydraulic solutions & support services for a multitude of clients' for over 30 years.

### **Emergency repairs**

Our skilled and experienced engineers are available at short notice, 24 hours a day, to provide an on-site emergency hydraulics parts and mobile repair service.

### **Cylinder refurbishment**

We provide a complete re-manufacturing service for hydraulic pistons, rods and cylinder tubes of all makes.

### **Filtration Equipment**

M&R Hydraulics are the UK representative for Hy-Pro high performance filtration products.

### **Hoses & components**

Our warehouse contains over 200,000 components & turnaround schedules that our clients find invaluable.



**HY-PRO**

# Case Studies

## Case Study 3 – Improved Oil Cleanliness



**HY-PRO**

# Case Study 3 – Improved Oil Cleanliness

## - The Problem

Client was quoted in excess of £12000 for replacement oil & £3000 for labour.



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# Case Study 3 – Improved Oil Cleanliness

## - The Problem



### Challenges

- Location
- Tank connections
- Dirty/dusty environment
- ISO unreadable on 25µm & 40µm Single Pass Filtration fitted

### Improvement

- Cleaner oil
- Cost savings
- Zero downtime



HY-PRO

The logo consists of the text 'HY-PRO' in a bold, black, sans-serif font, centered within a white rectangular field. This field is enclosed by a double-line border: an inner blue line and an outer white line. The overall shape is a horizontal rectangle with slightly tapered ends.

# Case Study 3 – Improved Oil Cleanliness - The Problem

Breathers x 8 identified as a major cause of dirt ingress



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# Case Study 3 – Improved Oil Cleanliness - The Solution



Fitting a HY-Pro Filtration high viscosity system

- 6µm Hy-Pro media fitted for 4 weeks, reduced to 3µm AB media for continuation of the process with added water absorption capability
- Replaced with new upgraded Hy-Pro breather elements

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# Case Study 3 – Improved Oil Cleanliness - The Results



External analysis confirmed lower ISO code now a readable 19/17/13  
Patch results matched the above ISO code. Analysis water PPM fell within customer parameters



Customer:		M & B Hydraulics Ltd		
Machine Description:		No. 1 Red Oil & No. 2 Black Oil samples		
Substrate:		Belted line retardant oil		
Date for issue:		22.08.2019		
No. 1 Red Oil	No. 2 Black Oil	Visual appearance	No. 1 Red Oil Cherry red	No. 2 Black Oil Black Turbid
		% of filtered	100%	100%
0.5 mg / 100 ml	0.4 mg / 100 ml	Water Content	0.1% ppm	0.1% ppm
		Total contamination (mg / 100 ml oil)	0.5 mg	0.4 mg
		Estimated Viscosity	16.3 cSt	16.3 cSt
		Estimated ISO Code	18/17/13	18/17/13
		Estimated ISO Code	18/17/13	18/17/13

The oil has been analysed for contaminants using the Gravimetric Patch Test method, which involves drawing a quantity of oil through a 0.5µm & 5µm micron membrane. This detects more contaminants than the ISO 4406 or NAS 3888 methods, including oil oxidation products which are responsible for varnish formation. The membrane patch test, if integrated with further instruments, can meet the following standard: Gravimetric test according to ASTM D 143-79 & Colorimetric test according to ASTM D 7582-02 to measure the colour of the oil contaminants on the membrane surface.

**Red Oil View** - Illustrates the overall contamination (mg / 100 ml oil)  
**Magnified View** - Illustrates the estimated particle count (200 & 500 sizes).  
Flakes can originate from filter, seal, gaskets or clearing debris.

**No. 1 Red Oil** The level of observation of the test membrane suggests the overall contamination is within recommended limits for a hydraulic system, being estimated at **0.5mg / 100ml oil & ISO 18/17/13 & NAS 8**.  
Contaminants seen include micron sized carbon deposits, fibre and miscellaneous unsorted particle.

**No. 2 Black Oil** The level of observation of the test membrane suggests the overall contamination is outside recommended limits for a hydraulic system, being estimated at **0.4mg / 100ml oil & ISO 18/17/13 & NAS 8**.  
Contaminants seen include micron sized carbon deposits, fibre and miscellaneous unsorted particle.

**Water Content**  
Water content is **0.1% ppm**

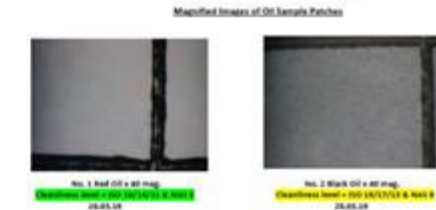
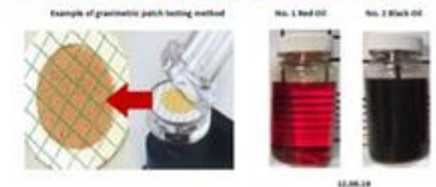
**Estimated Viscosity**  
Estimated viscosity is **16.3 cSt**

**Estimated ISO Code**  
Estimated ISO Code is **18/17/13**

**Estimated ISO Code**  
Estimated ISO Code is **18/17/13**

Recommended cleanliness levels reference only

ISO Class	NAS	Conditions	Contamination level (mg / 100 ml oil)	Conditions
ISO 15/14/11	8	Acceptable	Less than 2 mg	Acceptable
ISO 14/13/10	7	Acceptable	Greater than 2mg see below	Acceptable
ISO 13/12/9	6	Acceptable		
ISO 12/11/8	5	Caution		
ISO 11/10/7	4	Caution		
ISO 10/9/6	3	Caution		
ISO 9/8/5	2	Caution		
ISO 8/7/4	1	Caution		
ISO 7/6/3	0	Caution		
ISO 6/5/2	0	Caution		
ISO 5/4/1	0	Caution		



# Case Study 3 – Improved Oil Cleanliness - The Results



## Improvements

- Cleaner oil optimized with 3 $\mu$ m Hy-Pro filtration media
- Reduced dirt ingress on breathers by upgrading to microglass
- Less filter changes required on the existing integrated filtration system

## Timings

- 6 weeks from order to install
- Completed in two visits, including follow up oil analysis

## Savings

- Oil & disposal of dirty oil (£15,000) – less cost of Hy-Pro high viscosity filtration (£6800)
- Savings £8200 plus annual savings on reduced downtime & failed parts

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**HY-PRO**



# Contact Us



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