

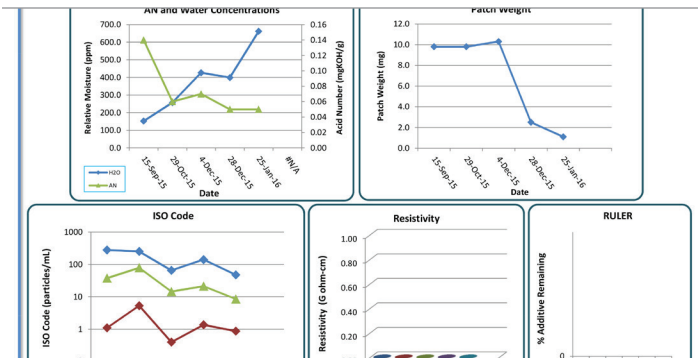
# OA-PE

## Phosphate Ester Analysis

Maintaining phosphate ester based fluids can be complex. Hy-Pro has solutions that make it easy and the first step in achieving trouble free EHC and high temp hydraulic operations is understanding the condition of your fire resistant fluids.



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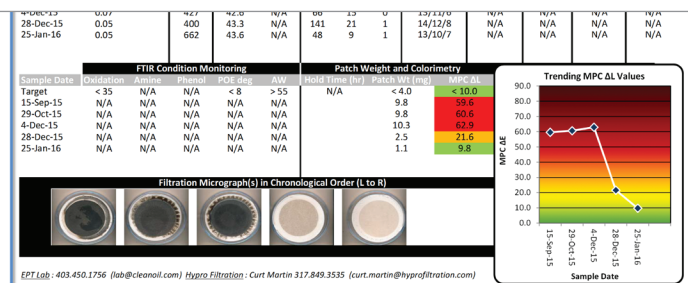


### Comprehensive analysis

OA-PE is the most comprehensive phosphate ester analysis package currently available. In addition to common metrics such as AN (acid number), water and resistivity, the OA-PE also reports dissolved metals, SAN (strong acid), patch weight, ISO code and MPC to provide the whole picture of your fluids.

### Restoration focused

With phosphate ester there are no sacrificial additives and fluids are typically condemned based on contamination that could be removed. OA-PE arms you with the information you need to avoid premature fluid replacement or a bleed and feed routine and to implement a solution to restore the fluid to normal operating condition.



### Trending

OA-PE is an invaluable tool to establish a baseline for condition based recommendations to eliminate servo valve deposits, electro-kinetic corrosion, high acid number, water, low resistivity or black fluid. And once a Hy-Pro contamination solution has been implemented, OA-PE trends your progress toward success and trouble free operation.

# Analysis Specifications

## Oil Analysis Testing

OA-PE601370

## Description

### Full analysis package includes:

- TAN
- Metals analysis ppm
- Water % Karl Fischer
- Viscosity at 40°C
- Resistivity
- ISO particle count
- MPC patch weight + photo

## Recommended Frequency

Monthly for varnish potential and ICB element condition monitoring

## Testing Standards

- TAN: ASTM D664
- Metals: ASTM D5185
- Water: ASTM D7546
- Viscosity: ASTM D445
- Resistivity: ASTM D1169
- ISO Codes: ISO 11500/4406
- MPC/Patch Weight: modified ASTM D7843.

## Sample Size Required

250mL (sample bottle included)

## Fluid Compatibility

Phosphate esters

## Sample Report

Customer: **HY-PRO**  
Site: **HY-PRO**  
Unit: **HY-PRO**  
Reservoir: N/A  
Oil Type: Fy

AN and V

Sample Date	H2O	AN
15-Sep-15	~150	~600
29-Oct-15	~250	~350

ISO Coc

Sample Date	4 µm	6 µm	14 µm
15-Sep-15	~100	~100	~100
29-Oct-15	~100	~100	~100
4-Dec-15	~100	~100	~100

EPT Lab : 403.450.1756 (lab@cleanoil.com)

PO/SO #: **HY-PRO**  
Contact: **HY-PRO**  
Latest Sample Date: 16 Jan 16

Customer: **HY-PRO**  
Site: **HY-PRO**  
Unit: **HY-PRO**  
Reservoir: N/A  
Oil Type: Fy

Sample Date	Sn	Pb	Cu	Al
Target	0	0	0	0
6-Sep-13	N/A	N/A	N/A	N/A
28-Dec-15	N/A	N/A	N/A	N/A
8-Jan-16	N/A	N/A	N/A	N/A
11-Jan-16	N/A	N/A	N/A	N/A
28-Jan-16	N/A	N/A	N/A	N/A

Sample Date	Sulphur (ppm)	RPVOT (min)
Target	N/A	2500
6-Sep-13	N/A	N/A
28-Dec-15	N/A	N/A
8-Jan-16	N/A	N/A
11-Jan-16	N/A	N/A
28-Jan-16	N/A	N/A

Sample Date	Total*	H <sub>2</sub>
Target	0	0
6-Sep-13	N/A	N/A
28-Dec-15	N/A	N/A
8-Jan-16	N/A	N/A
11-Jan-16	N/A	N/A
28-Jan-16	N/A	N/A

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Customer: **HY-PRO**  
Site: **HY-PRO**  
Unit: **HY-PRO**  
Reservoir: N/A  
Oil Type: Fy

PO/SO #: **HY-PRO**  
Contact: **HY-PRO**  
Latest Sample Date: 16 Jan 16

PO/SO #: **HY-PRO**  
Contact: **HY-PRO**  
Latest Sample Date: 25-Jan-16  
Received Date: 1-Feb-16

FILTRATION

**Recommendations & Notes**

The sample taken on 25-Jan-16 has an acid number that is within target. The fluid's moisture content is above target. The fluid's viscosity and ISO particle count are within target. The MPC ΔI is in the good range (< 10) indicating that a low level of contamination is present in the fluid (see filter micrographs below). Phosphate ester contaminants detected by MPC are often the result of microdieseling or other forms of fluid degradation. This level of contamination will not likely become a problem within the system in the immediate or near future. The patch weight is within target. Spectrographic analysis reveals low levels of dissolved metals that are within target.

Sample Date	AN (mgKOH/g)	SAN	H2O (ppm)	Viscosity (cSt) 40 °C	Viscosity (cSt) 100 °C	ISO (particles / mL) 4 µm	ISO (particles / mL) 6 µm	ISO (particles / mL) 14 µm	ISO Code 4/6/14 µm	Resistivity (G ohm-cm)	Chloride (ppm)	Mineral Oil Cont. (%)	Air Release (min)
Target	0.05	N/A	200-500	41.9	5	480	120	8	16/14/10	>10.0	0	< 0.5%	5
15-Sep-15	0.14	0.01	152	43.6	N/A	281	38	1	15/12/7	N/A	N/A	N/A	N/A
29-Oct-15	0.06		257	44.3	N/A	253	79	5	15/13/10	N/A	N/A	N/A	N/A
4-Dec-15	0.07		427	42.6	N/A	66	15	0	13/11/6	N/A	N/A	N/A	N/A
28-Dec-15	0.05		400	43.3	N/A	141	21	1	14/12/8	N/A	N/A	N/A	N/A
25-Jan-16	0.05		662	43.6	N/A	48	9	1	13/10/7	N/A	N/A	N/A	N/A

Sample Date	Oxidation	Amine	Phenol	POE deg.	AW	Hold Time (hr)	Patch Wt (mg)	MPC ΔI
Target	< 35	N/A	N/A	< 8	> 55	N/A	< 4.0	< 10.0
15-Sep-15	N/A	N/A	N/A	N/A	N/A	N/A	9.8	59.6
29-Oct-15	N/A	N/A	N/A	N/A	N/A	N/A	9.8	60.6
4-Dec-15	N/A	N/A	N/A	N/A	N/A	N/A	10.3	62.9
28-Dec-15	N/A	N/A	N/A	N/A	N/A	N/A	2.5	21.6
25-Jan-16	N/A	N/A	N/A	N/A	N/A	N/A	1.1	9.8

**FTIR Condition Monitoring**

**Patch Weight and Colorimetry**

**Filtration Micrograph(s) in Chronological Order (L to R)**

EPT Lab : 403.450.1756 (lab@cleanoil.com) Hypro Filtration : Curt Martin 317.849.3535 (curt.martin@hyprofiltration.com)

**Trending MPC ΔI Values**

Sample Date	MPC ΔI
15-Sep-15	~60
29-Oct-15	~60
4-Dec-15	~60
28-Dec-15	~20
25-Jan-16	~10

Testing

