PTK1

Oil Analysis Patch Test Kit

With PTK1, oil cleanliness can be visually analyzed in the field without waiting for lab results and losing control of the analysis process. The PTK1 kit provides the opportunity to see the type, concentration, and actual size of particulate contamination inside the system.

HY-PRO

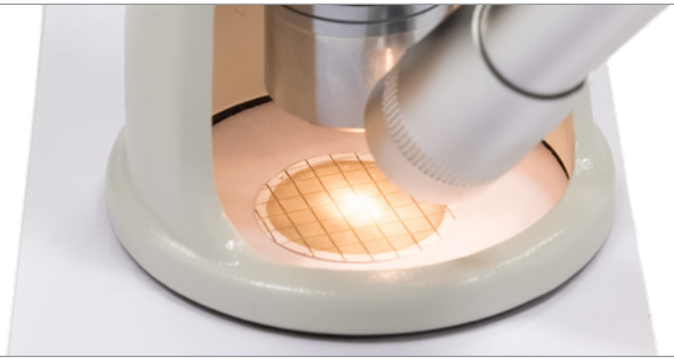
hyprofiltration.com/PTK1

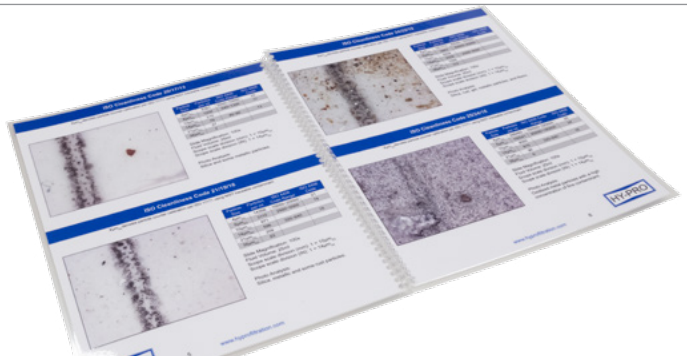
Protect your investment and your equipment.

From the sample bottles to the microscope, everything you need for running patch tests on your oil comes neatly packed away in the PTK1 case. Watertight, crushproof, and dust proof, the Pelican™ Protector Case that houses every PTK1 protects your test equipment so whether you're stowing it for flights between plants or working in the dirtiest of environments, your test equipment is safe and ready when you need it.

See the difference.

With the 100x magnification field microscope and included patch light in every PTK1, examining and monitoring the condition of your oils has never been easier.





ISO Codes have never been easier.

Included in every PTK1 is a visual correlation chart to determine approximate ISO cleanliness codes and types of contamination present in your system. Combined with using Hy-Pro filter elements, you'll be amazed as you watch contamination disappear from your fluids sample after sample.

PTK1 Specifications

Complete PTK-1 Kit includes:

100x Magnification field microscope with battery operated patch light (2 AAA batteries included)

Pelican™ 1520 – watertight, crushproof, and dust proof case

1.2µ filter test patches with patch mounting cards and adhesive covers to protect samples from ambient contamination and to preserve samples for future reference

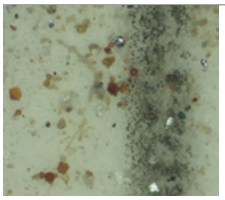
Forceps for filter patch handling

Vacuum pump to extract fluid samples from the system and process 25 ml sample through filter patch

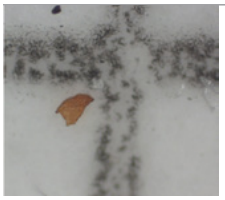
Funnel assembly with ml fill line for accuracy

Sample bottles (6)

Solvent dispenser with dispensing filters



Visual correlation chart to determine approximate ISO Cleanliness Code of patch test kit sample



Visual correlation chart to determine type of particles captured on the patch

Instruction Manual

VTK

On-Site Varnish Test Kits

Condition monitoring is critical in staying ahead of lube oil degradation issues. Varnish Test Kits from Hy-Pro provide on-site access to laboratory grade Membrane Patch Colorimetric (MPC) testing as a key piece in predicting potential varnish problems before unit trip or fail-to-start conditions occur, all according to the world recognized ASTM D7843-12 standard for the measurement of insoluble oxidation by-products.

HY-PRO

hyprofiltration.com/VTK

Unmistakably easy.

Specifically calibrated for MPC testing according to ASTM D7843-12, the Spectrophotometer in every VTK provides incredible ease of use in colorimetry testing for your fluids with results displayed right on the screen.

Bring the lab to you.

VTKs put the same equipment used in labs around the world directly at your disposal to give you access to the most accurate varnish potential testing and trending. Everything you need to properly prepare and analyze a filter patch for varnish potential comes included.

Results before your eyes.

Testing in-house provides the fastest results to understand the status of your fluid. With varnish removal filtration from Hy-Pro and VTK on-site testing, you'll be amazed as your fluids become cleaner sample after sample.

VTK Specifications

Complete Varnish Test Kit includes:

Spectrophotometer calibrated for MPC ΔE

Bench piston vacuum pump (120V AC, 1P, 60 Hz)

.45µ 47 mm membrane filter patches (100)

Glass filter funnel + filter holder top assembly

125 ml glass mixing flask (for sample oil & solvent)

Glass filter funnel flask with vacuum pump tube port

Solvent dispenser with cap, squirt nozzle, and syringe filters (3)

Forceps

Vacuum pump hose

Instruction manual including details on patch preparation, spectrophotometer operation, sample result interpretation and solutions for lube oil varnish

[1]MPC testing should be performed to specifications documented in ASTM D7843-12. For more information or to purchase a report, visit http://www.astm.org/Standards/D7843.htm

PM-1

On-Line ISO Code Particle Monitor

Get fast and accurate ISO cleanliness code readings from your hydraulic and lube oils in real time with the PM-1 Particle Monitor.

HY-PRO

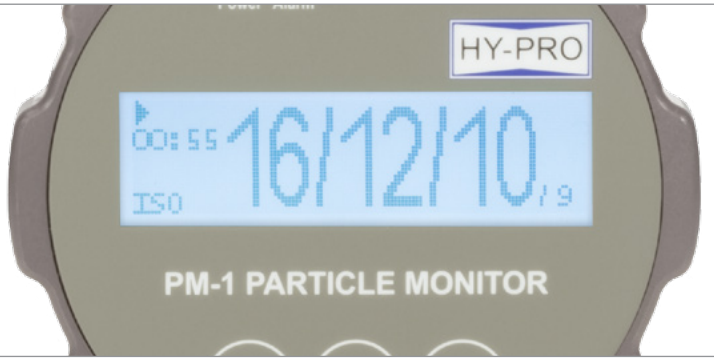
hyprofiltration.com/PM1

Eliminate the guesswork.

Dedicating PM-1 to hydraulic and lube systems can eliminate the need for bottle sampling and let's you know how clean your oil is at all times. PM-1 can be integrated into operating software for constant monitoring and can also be set up to trigger alarms if a system gets too dirty, giving you complete control of your fluids and your systems.

Unmistakably easy.

As the PM-1 analyzes your fluids, the on-screen counts update in real time to show you the ISO cleanliness codes for the 4µ, 6µ, 14µ and 21µ channels in incredible clear and easy to read figures.



Perfectly integrated.

Add the PM-1 to almost any Hy-Pro Filtration System with Special Option code "O" (where applicable) to get real time ISO Codes integrated directly on your filtration and always know exactly how clean your hydraulic and lube oils are.

PM-1 Specifications

Display	The device is calibrated to ISO 11943. It calculates and displays results according to ISO 4406:99, SAE AS 4059, NAS 1638 und GOST 17216.
Voltage	9-33 V dc
Operating Pressure	Up to 6,090 psi (420 bar) dynamic
Protection Class	IP67
Flow Rate	50-400 ml/min (required for operation)
Fluid Connection	M16 x 2.0 (Minimess®)
Electric Connection	M12 x 1 (8 Pole)
Data Memory	On-board 4MB storage capacity
Fluid Compatibility	Mineral oils, phosphate esters and specified synthetics (Skydrol by special option only). Not for use with water glycol or other water based fluids. Water levels above saturation in any fluids will cause the PM-1 to malfunction.
Temperature Range	**Oil** 14°F to 176°F (-10°C to 80°C) **Air** 14°F to 176°F (-10°C to 80°C) **Storage** -4°F to 176°F (-20°C to 80°C)
Interface	RS-232, analog output 4-20 mA configurable, digital alarm output, digital input to start and stop readings

Ordering Information

PM-1	PM-1 Particle Monitor
PM-1-PWRSUP-60[1]	PM-1 electrical power supply for portable use (120V AC, 1P, 60 Hz to 24 V dc)
PM-1-PWRSUP-50[1]	PM-1 electrical power supply for portable use (220V AC, 1P, 50 Hz to 24 V dc)
PM-1-PWRCAB	PM-1 9-33 V power cable with M-12 x 1 (8 pole) connection 15' (5 m) power cable plus 1 x 8 pole connection for PM-1
PM-1-HKIT-60	Portability kit for PM-1. Includes: Pelican™ case, sampling hoses for high pressure Minimess® & low pressure lube application adapters, outlet line flow control attachment, PM-1-PWRSUP-60 power supply (60 Hz) and PM-1-DAT data/power adapter.
PM-1-HKIT-50	Portability kit for PM-1. Includes: Pelican™ case, sampling hoses for high pressure Minimess® & low pressure lube application adapters, outlet line flow control attachment, PM-1-PWRSUP-50 power supply (50 Hz) and PM-1-DAT data/power adapter.
PM-1-BR	PM-1 back mounting bracket with rubber vibration suppression
PM-1-USB	USB adapter – RS-232 serial
PM-1-DAT[1]	15' (5 m) data cable with open ends
PM-1-FITLOW	Low pressure lube system fittings to replace standard Minimess® inlet & outlet connections.[2] Suitable for low pressure systems< 29 psi (2 bar) where achieving minimum flow index 50,000 reading (50 ml/min) is not possible.
PM-1-SC[3]	PM-1 Soft Calibration
PM-1-HC[3]	PM-1 Hard Calibration

[1]For PM-1portable counting you must purchase the PM-1-DAT AND either the PM-1-PWRSUP-60 (for 60 Hz) or the PM-1-PWRSUP-50 (50 Hz) to power the unit. The unit cannot be powered with just the PM-1-PWRSUP-60 or -50. The PM-1-DAT allows for connection to RS232 data port for data acquisition and download.
[2]Minimess® is a registered trademark of Hydrotechnik GMBH.
[3]It is recommended that the unit receives a soft calibration every 2 years of service to ensure the unit is still operating as intended. If soft calibration indicates the unit is not functioning properly, a hard calibration should be performed.

HY-PRO

OA-TO

Turbine Oil Analysis

Hy-Pro offers two levels of analysis for turbine oils to provide insight into system conditions and to help predict and prevent fluid contamination related issues.

HY-PRO

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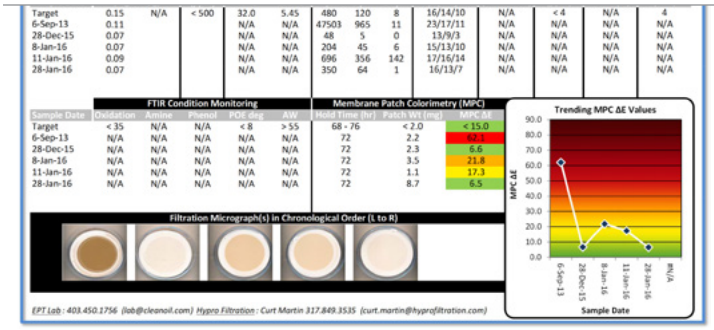


Target	0.15	N/A	< 500	32.0	5.45	480	120	8	16/14/10	N/A	< 4	N/A	4
6-Sep-13	0.11			N/A	N/A	47503	965	11	23/17/11	N/A	N/A	N/A	N/A
28-Dec-15	0.07			N/A	N/A	48	5	0	13/9/3	N/A	N/A	N/A	N/A
8-Jan-16	0.07			N/A	N/A	204	45	6	15/13/10	N/A	N/A	N/A	N/A
11-Jan-16	0.09			N/A	N/A	696	356	142	17/16/14	N/A	N/A	N/A	N/A
28-Jan-16	0.07			N/A	N/A	350	64	1	16/13/7	N/A	N/A	N/A	N/A

FTIR Condition Monitoring | Membrane Patch Colorimetry (MPC)

Sample Date	Oxidation	Amine	Phenol	POE deg	AW	Hold Time (hr)	Patch Wt (mg)	MPC ΔE
Target	< 35	N/A	N/A	< 8	> 55	68 - 76	< 2.0	< 15.0
6-Sep-13	N/A	N/A	N/A	N/A	N/A	72	2.2	62.1
28-Dec-15	N/A	N/A	N/A	N/A	N/A	72	2.3	6.6
8-Jan-16	N/A	N/A	N/A	N/A	N/A	72	3.5	21.8
11-Jan-16	N/A	N/A	N/A	N/A	N/A	72	1.1	17.3
28-Jan-16	N/A	N/A	N/A	N/A	N/A	72	8.7	6.5

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

Trending MPC ΔE Values

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

Comprehensive analysis

Newer generation group II based turbine oils typically have an anti-oxidant additive package made up of sacrificial amines and/or phenols that are depleted as oxidation and oil degradation occurs. The RULER (Remaining Useful Life Evaluation Routine) test compares remaining levels of anti-oxidant additive versus the levels found in new oil to give you the big picture of exactly how your oil is holding up.

MPC

ASTM developed standard (ASTM D7843-12) for quantifying the amount of oil degradation by-products in the oil that can lead to the formation of varnish deposits. We recommend monitoring MPC monthly on older fluids that may have depleted anti-oxidant levels and quarterly for new fluids.

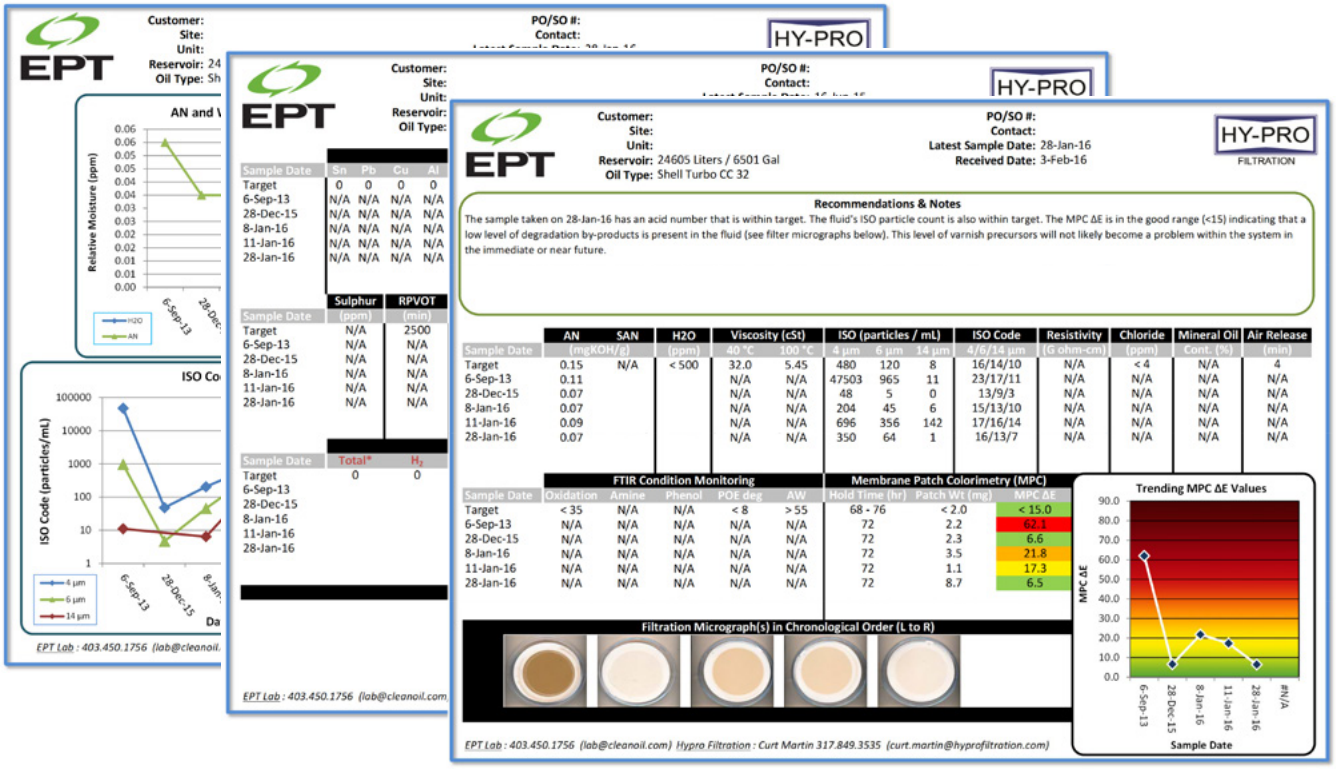
Trending

OA-TO is an invaluable tool to establish a baseline for condition based recommendations to eliminate servo valve deposits, high acid number, water, or high ISO Codes. And once a Hy-Pro contamination solution has been implemented, OA-TO trends your progress toward success and trouble free operation.

Analysis Specifications

Oil Analysis Testing	OA-MPC601311	OA-TO601368
Description	**MPC varnish potential test includes:** MPC colorimetry patch test and photo	**Full analysis package includes:** TAN Metals analysis ppm Water % Karl Fischer Viscosity at 40°C MPC varnish potential MPC patch weight ISO particle count RULER
Recommended Frequency	Monthly for varnish potential and ICB element condition monitoring	Bi-annually for overall lube oil condition monitoring
Testing Standards	MPC/Patch Weight: ASTM D7843	TAN: ASTM D664 Metals: ASTM D5185 Water: ASTM D7546 Viscosity: ASTM D445 ISO Codes: ISO 11500/4406 MPC/Patch Weight: ASTM D7843
Sample Size Required	100mL (sample bottle included)	350mL (sample bottle included)
Fluid Compatibility	Mineral oils and turbine oils	Mineral oils and turbine oils

Sample Report



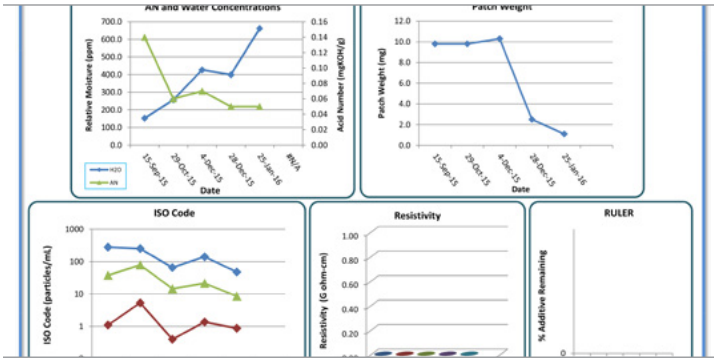
OA-PE

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.

HY-PRO

hyprofiltration.com/OA-PE

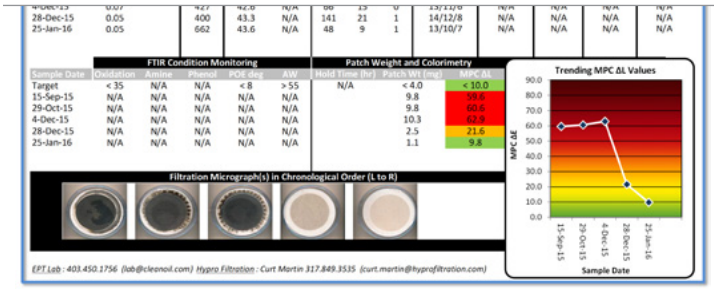


Comprehensive analysis

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