

Polytron

Lubrication Technology Based on Micro-Metallurgical Process

Automotive Division

Agenda

- Company Information
- Product details
 - How Does it Work
 - Characteristics
 - Benefits
 - Range of products
- Product Applications
- User References

Background

- ❑ Manufacturing Plant is located in California, USA
- ❑ Until 1994 Polytron was primarily used by armies, mainly in helicopters, armored tanks & submarines
- ❑ Commercially available since 1994
- ❑ Focus on Asia , Africa and Australia since 2003 – China, Malaysia, Vietnam, Thailand, Cambodia, Myanmar, Philippines, and more.
- ❑ India launch in 2015

Polytron's Mission & Goals

- **Mission**: To help all Industries reduce their Maintenance and Operational cost by up to 65%, and double, triple or even quadruple service life of their equipment.
- **Goals**: To provide significant cost savings for our clients through:
 - Extended Oil change intervals 300% - 600%
 - Average Fuel savings of up to 20%; Electrical Energy savings of up to 10%.
 - Elimination of engine/equipment wear up to 95% and major reduction in parts and equipment replacement.
 - Increasing productivity – near zero down time
 - Reducing up to 75% emission pollutants from Vehicles & Industries.
 - Considerably reducing volumes of waste oil.

Resulting in:

Lowest Possible Production cost
Highest possible Productivity
Cleaner Environment

Result \longrightarrow Polytron Products **FOR**

With the following major features

In passenger cars, light & heavy duty trucks and other equipment

Polytron products:

- * Eliminate up to 95 % of Engine and Equipment wear and extend service life of engines and equipment by 600% to 900%.
- * Reduce engine & equipment operating temperature, vibrations and noise level.
- * Eliminate deposits buildup and keep engines / equipment completely clean.
- * Extend oil change intervals & oil filter life by 300% to 600%.
- * Contribute to considerable fuel and oil economy.
- * Contribute to 40% to 75% cleaner emission gases.
- * In the event of oil loss, engine / equipment is protected for tens of kilometers / work hours.
- * Resulting in reduction of up to 60% in maintenance and operational cost.





Volvo Group Trucks Technology

STD 417-0001 approval request

Data supplied by requesting company

Company name:*	Eptech Corporation
Brand name:*	Polytron 15W-40
Oil code:	OS246091
Viscosity grade:	15W-40
Marketing area:	North America, South America
Core DI (%)	Lubrizol 40007 (6.5%)
Booster 1 (%)	Polytron MTC D347 (10%)
Booster 2 (%)	Lubrizol 48041 (1.5%)
Other approvals:	ACEA
	API CJ-4
	OEM CES20081, DDC93K218

*) As they shall appear in approved products lists

Date of submission 1-Apr-04

Submitted by

Name: David Glass
Company: Eptech Corporation

Return approval to: Eptech Corporation
Name: David Glass

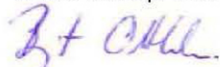
Approval

Volvo VDS-4 approval	Yes
Mack EO-O Premium Plus approval	Yes
Renault VI RLD-3 approval	Yes

Approval date: April 14, 2014 **Approval #:** 417-0001-14-651

Validity: Approval expires two years after the approval date.
For approval extension, a complete and updated approval form must be submitted at the expiry date ± two months.

Signed: Volvo Group Trucks Technology


Bengt Otterholm
Lubricants Coordinator



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FEB 25 2009

Eptech Corporation
1048 Irvine Avenue
#629
Newport Beach, CA 92660

OFFICE OF
AIR AND RADIATION

Dear M/S

Pursuant to your February 2, 2009 notification, the following fuel additive has been registered per 40 CFR 79.23 (our internal identification number precedes the name):

234020001 Polytron Fuel Conditioner

Please call (202) 343-9303 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "K. Simon".

Karl J. Simon
Director
Compliance and Innovative Strategies Division

Test Engineering Inc.
12718 Cimarron Path
San Antonio, Texas 78249-3423

Date: 06/15/15

EPTECH Corporation
1048, Irvine Avenue, # 629
Newport Beach,
CA - 92660

RE: CONFORMANCE TO DFS OIL SPECIFICATION 93K218

Results from engine and bench tests, in accordance with DFS Oil Specification 93K218, have been presented to TEI for review as requested by DDC. In view of the results, we would like to make the following comments.

The results reported on the registration request have been found to be within DFS Oil Specification 93K218 limits and specification; hence oils formulated as stated in your request can be labeled as conforming to DFS Oil Specification 93K218.

Company Name: EPTECH Corporation

Product Name: POLYTRON 15W-40

SAE Grade: 15W-40

The oil shall be used per the ambient temperature and grade guidelines in the engine specific Operation and Maintenance (O & M) manual, as well as in any DDC service documents.

Please notify TEI and DDC immediately if, for any reason, the formulation for this oil changes. Changes to the oil formulation, without written approval, may void this letter of conformance. In addition, as per DFS Oil Specification 93K218, this product is subject to future field sample analysis for compliance.

Sincerely,


Steve L. Gearhart

cc: M. Belay / J. Cruz / J. Dean



August 12, 2015

EPTECH CORPORATION Ltd.
1048, Irvine Avenue, # 629
Newport Beach, CA 92660
USA
ep_tech@msn.com

CONFORMANCE TO CES 20081 ENGINE OIL SPECIFICATION

Results from tests according to CES 20081 have been presented to Cummins. In view of the results I would like to give the following comments.

The results have been found to be within the CES 20081 limits and hence oils formulated as stated in your request can be labeled as conforming to CES 20081. This letter may not be used as a Cummins Inc. endorsement of the product but may be used as proof that the product meets the specification.

The oils shall be used per the ambient temperature and SAE grade guidelines in the engine specific Operation and Maintenance (O & M) manual as well as in any Cummins service documents. Please notify Cummins Inc. if the formulation of this product changes.

Brand Name: POLYTRON 15W-40
SAE Grade: 15W-40

I hope this information will be of assistance to you.

Sincerely,

A handwritten signature in black ink, appearing to read 'Daniel Nyman'.

Daniel A. Nyman
Chemical Technology

DISCLAIMER: Product registration means the manufacturer or marketer has faithfully collected information pertinent to the requirements of the specification, and with the full intention to conform to the specification. However, it is still the responsibility of the manufacturer or marketer to ensure satisfactory performance of its products in all aspects at all times. Registration for CES 20081 does not waive product liability of the manufacturer or marketer. Cummins does not warrant the performance of non-Cummins products, registered or not.

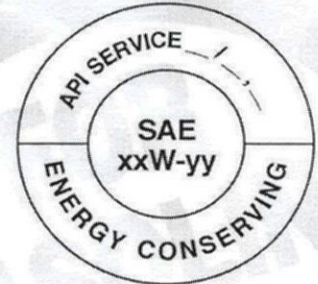
Cummins Inc.
500 Jackson Street
Columbus, IN 47201 USA
Phone 1 812 377 5000
cummins.com

Revision Date: February 27, 2015

SCHEDULE A - LICENSE AGREEMENT

*The marks referred to and licensed under the Agreement between API and
EPTECH CORPORATION
for the period beginning 2/13/2015 and ending 2/13/2016 are as follows:*

API SERVICE SYMBOL



Licensee is authorized to display the API Service Symbol on the following products:

BRAND NAME	SAE VISCOSITY GRADE	SERVICE CATEGORY * = Energy Conserving, **=CI-4 PLUS
POLADYNE	10W-30	SL *
POLADYNE	10W-40	CI-4/SL
POLADYNE	15W-40	CI-4/SL
POLADYNE	40	CF,CF-2/SL
POLADYNE	50	CF,CF-2/SL
POLADYNE	5W-20	SL *
POLYTRON	10W-30	SL *
POLYTRON	10W-40	CI-4/SL
POLYTRON	15W-40	CI-4/SL
POLYTRON	5W-20	SL *
POLYTRON	5W-30	SL *

Engine Oil Licensing and Certification System

1220 L Street, NW • Washington, DC 20005-4070 • USA • www.api.org/eolcs

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Kevin Ferrick
EOLCS Manager of Operations

Date: 2/25/2015

Polytron Metal Treatment Concentrate (MTC) & Fuel Conditioner (FC)

- Polytron MTC treats the metal surfaces using Micro Metallurgical process; it does not treat the oils it is added to;
- It is engineered for all friction surfaces in all types of engines, hydraulics, gears, etc. In fact it can be used in any equipment and mechanisms that require lubrication with the same results of dramatic reduction in friction and almost complete elimination of wear & tear.
- Polytron dosages are economical:
Polytron MTC, 5% to 10% by volume.
Polytron FC , 0.05% to 0.1% by volume.
- Polytron MTC is compatible with all lubricants, mineral, organic and synthetic.
- Polytron FC is compatible with all fuels, gasoline, diesel, fuel oil, kerosene, HFO, etc.
- Polytron is purely petroleum based, and doesn't contain any solid particles.
- In engines it is absolutely essential to use Polytron MTC together with Polytron FC in order to get the best possible performance off of an engine over its service life.

Some Immediately Noticeable Benefits of using Polytron

- Reduced temperature
- Reduced vibrations
- Reduced noise level
- Reduced electrical power consumption
- Considerable reduction in emission pollutants
- Increased engine power and smoother operation
- Very effective protection of the engine against moisture and water flooding.



Possible Problems That Can be Solved Immediately, using Polytron

- Overheating
- Excessive vibrations
- Excessive noise hazard
- Excessive electrical power consumption
- Poor air quality in closed areas with high concentration of engine operated equipment
- Sluggish engine and equipment operation
- Reinstating and putting vehicles and equipment back to work after they submerged in water during flood (like in floods that occur in some countries)

Additional Benefits of using Polytron, Measurable Over Short Period of Time

- Reduction in fuel consumption, 10% on the average. (through monitoring fuel consumption.)
- Reduction in wear by more than 95% (through used oil analysis.)
- Extending oil change intervals 300% to 600% (through used oil analysis.)
- Reduction in top-up volumes of oil (through monitoring oil consumption.)



Possible Problems That Can be Solved within short period of time using Polytron

- Excessive fuel consumption (due to older equipment, or poor maintenance)
- Excessive wear (due to high loads, insufficient lubrication or defects in equipment production and design, or poor maintenance, or harsh environment).
- Need to change the oil more frequently (due to engine aging problems or poor maintenance).
- Excessive top-up volumes of oil (due to engine aging problems or poor maintenance).

Major Benefits of using Polytron, Measurable Over Service Life of Equipment.

- Extended service life of equipment to overhaul by 600% to 900%
- Considerable reduction in replacement parts
- Considerable reduction in equipment replacement



Combined Value of the Benefits

- Up to 65% Reduction in Maintenance and Operational Costs
- Up to 90 % Reduction in Downtime
- Considerable Increase in Productivity
- Much cleaner emissions
- Much less waste oil

Polytron main Products and their main Applications

Polytron MTC



Packages:

473 ml bottle (for passenger cars and light vehicles)

4 lit bottle (for trucks and heavy duty equipment)

19 lit pail, 208 lit drum (for trucks and heavy duty equipment fleets)

- Diesel and Gasoline Engines
- Auto / Manual Transmissions
- Differentials
- Power Steering
- Hydraulics (5% to 10% added to a lubricant by volume) in :
 - a. Farm machinery
 - b. Construction Equipment
 - c. Other off-highway applications.
 - d. Heavy Duty Diesel Trucks
 - e. Light Diesel Trucks.
 - f. Diesel/ Gasoline passenger cars.
 - g. Pumps.
 - h. Diesel Electrical Generators.
 - i. Diesel Marine Engines
 - j. Mining Equipment.
 - k. Two-cycle engines.
 - l. Torque Converters

Compressors (5% added to compressor oil)

In all the industries and applications where any types of compressors are used.

Open Gear Oils (10% added to gear oil) in:

- open gears
- wire ropes and cables

All the grades that provide lubrication for mining equipment including:

- girth and pinion gears on rod and ball mills
- rack and pinion gears on shovel dipsticks
- swing and pinion gears on top of the lower frame of shovels and draglines which are sometimes served with an automatic lubrication system.

Open Gear Oils for electric shovels and draglines.

Metalworking Cutting Oils (10% by volume) for:

- milling, shaping, planing, lathe work, drilling and pipe perforating operations. Broaching, gear hobbing, threading, tapping and other demanding works.

- machining of aluminum and aluminum alloys, copper, brass, bronze, and high strength copper alloys.

Benefits in using Polytron :

- tools may last up to 200% longer
- much smoother surface finish.
- prevents welding (sticking to the cutting tool) in ferrous and non-ferrous metals.

Polytron main Products and main Applications (continued)

Polytron Penetrating Lubricant



Packages:

200 ml spray can

4 lit bottle

19 lit pail, 208 lit drum

1. Excellent lubricant for:

- slides - guides - ways - chains
- screws - cams - racks
- pinion sets - moving parts of electrical and air tools.
- moving parts of conveyors and electrical motors in a variety of industrial and commercial equipment.

Direct benefits:

- Keeps equipment parts clean from any deposit build-up.
- Lowers operating temperature and noise level.
- Eliminates 95% to 99% of equipment wear extending its service life by 600% to 900%
- Equipment is protected in wider range of temperatures
- Protects equipment in harsh environment of dust moisture and extreme temperatures.

Machining of ferrous and non ferrous metals.

Spraying or brushing the product on cutting tools or saw blades from time to time results in the following

Direct benefits:

- cutting tool service life may be extended 100% to 200% or more
- much smoother surface finish.
- prevents welding (sticking of processed metal to the cutting tools) in ferrous and non-ferrous metals.

Protection of Electrical contacts, terminals and electrical collectors from corrosion and electrical oxidation, and as moisture repellent in electric-motor operated equipment, like cranes, elevators, etc.

Preventive lubrication

of parts before assembly of mechanisms (or engines).

Lubrication of parts for smoother / easier fitting-in during assembly of mechanisms (or engines).

- Very effective in penetrating and retarding rusty and oxidized surfaces in mechanisms that work in severe conditions of moisture and temperature.

And many more applications ...

For any specific application that is not listed here, please be advised to consult the local distributor.

A glimpse at the Type of Customers that buy and use Polytron products

DEFENSE

- Israeli Army
- Singapore Navy & Army
- French Army
- Serbian Army
- Korean Army

CORPORATE & GOVT.


- Steel mills
(Europe, Malaysia, Singapore, and more)
- Manufacturing plants
(Malaysia, Singapore, and more)
- Shipping vessels
(Singapore and more)
- Power plants
(Bulgaria, Serbia, and more)
- Quarries and Cement Plants
(Israel, Malaysia, Serbia, Bulgaria, Greece and more)
- Transportation, Railroad, Trucking

RETAIL


- Auto part stores
- Car agencies
- Repair Shops
- Gas Stations

Testimonial

Before

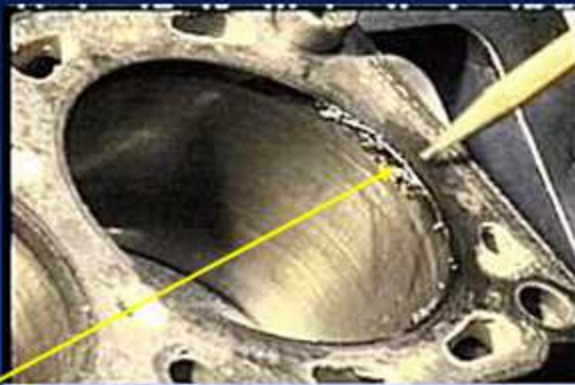
CONTROL CERTIFICATE TEST (GOVT. OF GUJARAT)				
296777	Co. & HC Level at Idling (%volume) (ppm) (N Hexane)			
	CO	HC	CO2	O2
	0.000	10	0.00	20.90
	Prescribed Standard Co.	Measured Level Co.	Prescribed Standard HC	Measured Level HC
	0.50	0.00	750	10
TESTED DATE: 28/05/2015 11:19 AM				
TESTED VEHICLE				
				
AUTHORISED CENTRE CODE : 116 / P / 2005				
SHARDA PETROLEUM SERVICE Highway Road, Chandkheda, Ahmedabad-382 424				

After

CONTROL CERTIFICATE TEST (GOVT. OF GUJARAT)				
296777	Co. & HC Level at Idling (%volume) (ppm) (N Hexane)			
	CO	HC	CO2	O2
	0.000	1	0.00	20.90
	Prescribed Standard Co.	Measured Level Co.	Prescribed Standard HC	Measured Level HC
	0.50	0.00	750	10
TESTED DATE: 30/05/2015 11:00 AM				
TESTED VEHICLE				
				
AUTHORISED CENTRE CODE : 116 / P / 2005				
SHARDA PETROLEUM SERVICE Highway Road, Chandkheda, Ahmedabad-382 424				

The Cab Company - USA

Not Treated



Sludge and
Carbon
build-up

Treated with Polytron



Cylinder walls
are always
clean



Oil filters are
clean



As a result of
using Polytron MTC,
and FC the piston-skirt
(orange arrow) and rings
(red arrow) are totally
clean of any deposits

Partial List of User References

Mining & Construction

SAMWOH Group, Singapore – Transport & Logistics,
Infrastructure, Mining, Oil & Gas, etc.

P.T. Karimun Granite, Indonesia – Quarry

KÄRNTNER MONTANINDUSTRIE, Austria – Mining

Kfar Giladi Quarries, Israel

SBI – E&M, Africa – Infrastructure and Construction

Transportation & Automobiles

The Cab Company, USA

Dragster Racing

Australian Abalone Exports Pty. Ltd.

Pacific Rail Road-Yukon White Pass

Manufacturing – Cement, Steel, etc.

Wietersdorfer & Peggauer Zementwerke GmbH, Austria - Cement, mortar, plaster and
building materials.

Magnifin Magnesiaprodukte GmbH & Co KG, Austria - Magnesium oxide and
hydroxide powders

Fritz Egger GmbH & Co., Austria – Wood furniture

Tridonicatco Sdn Bhd

Electrical Power Generation Plants

Public Power Corporation - Greece

User References

We treated the engine with 2.5L of Polytron MTC (10% treatment).

We could see that one day after treating the engine, it was running smoothly with considerable reduction in smoke and noise.

Loy Wei Choo (Quarry Consultant, Singapore)

During Polytron usage, cost of production, cost of maintenance and cost of fuel usage were reduced. At the same time because more machinery was put to 24 hour usage, our productivity increased.

Huang Hong Hee (COO- Building Material Grp
Hong Leong Asia Ltd)

Due to strong vibration in gearbox, we brought in Polytron MTC. There was a remarkable improvement in the situation.

Eng. H. Kasper (Head of Maintenance,
Wietersdorfer & Peggauer Zementwerke GmbH)

Yukon Railway Company. / USA

Locomotive Diesel Engine

User reference from Master Mechanic

Problem

Excessive fuel consumption and thick black smoke.

After adding Polytron FC

They had 30% savings on fuel and the smoke cleared up by about 50%



WHITE PASS & YUKON ROUTE

"Scenic Railway of the World"

P.O. Box 436
Skagway, Alaska 99840

(907) [REDACTED]

(907) [REDACTED]

www.whitepass[REDACTED].com

Mr. Gary Petifor:

White Pass has tested Polytron Diesel conditioner in our engine #94. We had a 30% savings in fuel and cleaned up about 50% for stack smoke emissions. It is our intention to start next season by purchasing a 55 gallon drum of Polytron Diesel conditioner and use it in all 13 of our locomotives. As long as we obtain the results we have experienced we should use approximately a 55 gallon drum per month.

Mark Schaefer,

Master Mechanic



WHITE PASS & YUKON ROUTE
"Scenic Railway of the World"

P.O. Box 436
 Skagway, Alaska 99840
 (907) [REDACTED]
 (907) [REDACTED] Fax
 www.whitepassrailroad.com

June 24, 1999

To Whom It May Concern:

We put Polyron hydraulic oil treatment in the railbus on June 5, 1999. Before putting it in the machine, the temperatures were hitting 180 degrees on the hill at the hardest pull on the hill.

By my records, after we put in the Polyron, the temperatures ran an average 2 days later of 12 to 15 degrees cooler. This allowed us to make the hard pull on this hill and not worry about getting too hot.

Here are the temperatures at the mile post that was the point where we heated up before:

Mile Post	Temp Before	Temp After Polyron
37	156	138
36	170	150
35	175	158
34	180	167

As you can see, it helped our heating problem out and we are happy with the results.

Carey L. Dorn
 Mechanic
 White Pass & Yukon Route

Yukon Railway Company. / USA

Locomotive Diesel Engine

User reference from a Mechanic

Problem

Overheating when climbing up a hill

After adding Polytron MTC

The temperature dropped by more than 13 °F and engine was not overheating anymore.

Landscaping Company / Greece

User references from company owner (continued)

Problem

Manual Transmission of a truck
that lost its fluid in the middle of
the road and got very noisy, and
was intended for repair.

After applying Polytron MTC

The noise stopped , and it is
after 1 year now in operation
and it is still going strong.

Costly repairs and downtime
were avoided.

From:
Grigoris Janetos
Landscaping Co.
Megalopolis Arkadia
GREECE

May 12, 2010

To whom it may concern !

My name is Grigoris Janetos, an owner of Landscaping company in Megalopolis, Arkadia, Greece. My company owns and operates many grader, loader, trucks and other pieces of equipment that operate in harsh environment.

In this letter I would like to outline the extraordinary performance characteristics that I and my mechanics witnessed with Polytron products on some pieces of our equipment.

It concerns Volvo truck Model F16 year make 1993 (with manual transmission).

The transmission was losing its fluid. By the time the driver became aware of the problem it was too late. The transmission was still shifting gear without any problems but the noise coming out of the gearbox was loud and alarming.

When the mechanics opened the gearbox they saw only 0.5 liter of red-brown fluid (indicating that it was burnt). They decided to take the truck to TRAKAS Repair shop located in Tripolis for repair. They told me that the repair should cost several thousands of Euros.

Before making the final decision, I called Polytron distributor that confirmed that I could use Polytron MTC to try and save the transmission..

After only 2 km of having Polytron MTC in the transmission the noise in the transmission stopped. The owner of TRAKAS repair shop went crazy when he heard the news. Anyways, after 1 year the truck is still in operation without any transmission problems.

The owner of Landscaping Co
Megalopolis, Arkadia
Greece



Grigoris Janetos

From:
Grigoris Janetos
Landscaping Co.
Megalopolis Arkadia
GREECE

May 12, 2010

To whom it may concern !

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In this letter I would like to outline the extraordinary performance characteristics that I and my mechanics witnessed with Polytron products on some pieces of our equipment.

It concerns Caterpillar loader model 943, year make 86 with 15.000 work-hours.

In this loader, each time when the operator hit the gas pedal, heavy white smoke was coming out of the exhaust pipe. I was joking about the condition of this loader, because the problem was so big that we needed two operators to work on this Cat loader, one operator to operate it, and the other to add oil into the oil pan.

I was aware of this problem from the very time that I bought this loader, that's why I bought it dirty cheap.

Since the engine was in very bad shape, I planned to repair or replace it. One evening before the end of a work day I called Polytron distributor to ask him if we could try using Polytron to help with the problem, before I took it to a repair shop. The distributor suggested me to try it. When I had the conversation with the Distributor, it was the end of the day and the operator had to leave within 30 minutes, so I intended to apply Polytron the following day. To my surprise, the distributor told me that if the problem was frozen piston rings (as a result of massive carbon buildup on and around the rings), 30 minutes was enough for Polytron to take care of the problem.

When I told the operators to apply Polytron MTC to try fix the problem, they responded with humor. But 20 minutes of engine operation with Polytron MTC added, the smoke stopped. The operators couldn't believe their own eyes. Being skeptical they let the engine idle more for some time, then pushed the gas pedal down all the way to produce some visible smoke, but there was none.

The engine continued operating smoothly with no smoke. It made me very happy once again, since I avoided massive expenses on repairs and loss of revenues on down time.

The owner of Landscaping Co
Megalopolis, Arkadia
Greece



Grigoris Janetos

Landscaping Company / Greece

User references from company owner (continued)

Problem

Heavy white smoke coming out of
an engine, indicating that engine
requires overhaul.

After applying Polytron MTC

The white smoke dissipated,
indication that the engine came
back to normal operation.
Thousand of Euros and
downtime were saved.

Used oil analysis.

Polytron MTC Performance comparison tests

based on "Used Oil Analysis"

In recent years "Used Oil Analysis" became a part of preventive maintenance program of many commercial and industrial entities like power plants, manufacturing plants, trucking companies, cab companies, construction equipment companies, etc.

What is "Used Oil Analysis?"

A sample of used oil is taken out of an engine (transmission, or other equipment) while it is warm and is put in a special analyzer that analyzes the oil for the following data.

1. Concentration of wear metals (in units of parts per million, ppm, by weight).

Why concentration of metals?

Different components within an engine, transmission or equipment are made of different metal alloys. For example, some engines may have bearings that are made of alloys containing copper, chromium and lead all combined. Every such component has a normal amount of wear which is accumulated over time from a statistical data of used oil analysis for that specific equipment. When used oil analysis indicates higher concentration of these metals than expected in specific make and model of the equipment under test, this may be indicative of a beginning of mechanical problem that most of the time can be fixed easily before a catastrophic failure and irreversible damage occurs, thus saving thousands of dollars on unnecessary repairs and downtime.

2. Viscosity:

A parameter which indicates the condition of a fluid as a lubricant.

The lower the Viscosity and Viscosity Index compared to these parameters in new oil, the more the oil deteriorates in performance as a lubricant. This deterioration is caused by combustion gases that penetrate the oil system, metal particles that get into the oil as a result of the wear process, and shear and thermal breakdown of the oil.

3. TBN (Total Base Number):

indicates the extent of motor oil oxidation. The lower the TBN the less ability it has to neutralize acidic compounds and more likely to be corrosive.

The acidic compounds are caused by combustion gases that penetrate the oil system and metal particles that get into the oil as a result of wear process.

When the TBN number is lower than 2 it is recommended to replace the oil.

4. Other chemicals that indicate specific engine problems (like penetration of coolant into the oil system, penetration of fuel, penetration of dust through air system, etc.)

This tested data is compared to a data base of test results that were accumulated over the years for the specific equipment (model and make) the condition of which we want to establish.

How can used oil analysis help you see the difference in performance between lubricants that contain Polytron MTC additive package and those which do not?

1) Right before the a normal oil change, take a sample of used oil from the engine under test and submit it to a laboratory for a "Used Oil Analysis" in order to get "Base Line" results (make sure that the sample is taken from midstream while the engine is still warm). together with the following information:

- a. Manufacturer name, model and year make of the equipment.
- b. Miles / hours of the oil in operation.
- c. Hours/miles of the equipment in operation (from the date of purchase to the date of submission of the used oil for analysis).

2) Together with the used oil sample also submit a sample of original clean oil to be analyzed as a reference, because there are some elements that are part of an additive package of motor oil that have to be counted out when interpreting the test results

3) Change the oil and add to the new oil 10% of Polytron MTC (or use Polytron motor oil). After 500 to 600 miles change the oil and oil filter again and add 10% Polytron MTC (or use Polytron motor oil). The reason why we recommend to do that is as follows: Since Polytron MTC has very powerful cleaning ability, it dissolves all the build-up on the engine parts and suspends it into the oil.

Expected results

- 1) 600% - 900% times lower concentration of wear metals (which means reduction in wear by at least 600% to 900%).
- 2) Viscosity and TBN are maintained at their acceptable level 300% - 600% longer, which means that the oil can serve 300% - 600% longer, extending maintenance intervals 300% to 600%.

SBI-EM (Engineering & Manpower Services) Ltd
 Site: 803

[24- 3011 samples.doc](#)

Used oil analysis (continued).

Caterpillar Excavator 330B

Sample of used oil analysis interpretation based on which a maintenance consulting company recommends the users to take care of problems that are developing in this engine before Polytron MTC is applied, although it is recommended to use Polytron FC to clean upper engine parts, fuel system parts and slow down their wear process and lower soot concentration

At this stage the working condition of the engine is considered at 60%, which means it may break down in short time if the problem are not taken care of.

3 60% = Working Condition

Sample No.	Sample Date	Equipment No.	Equipment Type	Component Type	Oil Type	Contains PMF?	Was Oil Changed?	Total Work Hrs.	Oil Work Hrs.
1008	23/5/06	15-76-863	Caterpillar 330B Excavator	Engine	Total TIR 7400 15W40	No	Yes	8,727	265

Soot Level	Fuel Content	Water Content	Acidity TAN	Alkalinity TBN	Viscosity at 40°C
4	ND	ND	--	--	121.61

Sample Elemental Content (ppm)																	
Mo	K	Na	B	P	Zn	Ba	Ca	Ag	Sn	Ni	Mg	Pb	Si	Al	Cr	Cu	Fe
5	17	33	1	1074	1082	0	2382	0	0	3	241	7	64	31	14	306	136

Comments	
The sample's Viscosity is HIGH . Its soot content is HIGH . Its dust/sand content is VERY HIGH . No water was found in the sample, however its Sodium and Potassium contents are HIGH indicating a possible slow leak of coolant into engine oil. The sample's Iron, Copper and Chromium contents are VERY HIGH indicating engine abrasion. Recommendations: Check and service air intake system. Check and service cooling system – it may be leaking.	

19.06.06 (803) Dear Zvi / Michael Fadida

1. We didn't receive any reports about any maintenance that has been done on this engine since 05.07.05, but it is clear that the recommendations were performed only partially.
2. The condition of the engine deteriorated since the last "oil analysis". This engine has to be stopped and all the recommendations performed.
3. Recommendations:
 - a. Replace air filter (if not yet replaced).
 - b. Make sure that the cooling system is sealed and clean, including after cooler and oil cooler.
 - c. If the subsystems in (b) are found to be in order, make sure that the engine head gasket seals well.
 - d. If the above is found to be in order, make sure that the lobes work properly, injectors timing, valves and turbo clearances are in order.
 - e. Do not operate the engine unless all the recommendations are performed thoroughly.
 - f. After performing the above referenced recommendations, before the unit is put to work, change the oil. There is no need to analyze the used oil.
 - g. Make sure you use oil recommended by the manufacturer.
 - h. As soon as the unit becomes operational, you have to perform 2 consecutive FC* treatments (1:1000 by volume)
 - i. After the new oil accumulates 200 work-hours it has to be changed + oil sample taken and then to perform 1 x FC* (1:1000 by volume).
 - j. Until further notice, not to exceed 200 work-hours between oil changes.

* **Very important** to report back whether the recommendations were performed.

* MTC - Polytron MTC (complementary oil additive package).

* FC - Polytron FC (complementary fuel additive package).

Sincerely,
 Alex / Maintenance Consultant

SBI-EM (Engineering & Manpower Services) Ltd

Site: 803

[24-3946samples.doc](#)

4

85% = Working Condition

Sample No.	Sample Date	Equipment No.	Equipment Type	Component Type	Oil Type	Contains MTC?	Was Oil Changed?	Total Work Hrs.	Oil Work Hrs.
1553	5/7/06	15-76-863	Caterpillar 330B Excavator	Engine	Total TIR 7400 15W40	No	Yes	9,017	269

Soot Level	Fuel Content	Water Content	Acidity TAN	Alkalinity TBN	Viscosity at 40°C
3	ND	ND	--	--	94.39

Sample Elemental Content (ppm)																		
Mo	K	Na	B	P	Zn	Ba	Ca	Ag	Sn	Ni	Mg	Pb	Si	Al	Cr	Cu	Fe	
1	2	9	2	1240	1320	0	2896	0	0	1	321	2	11	4	2	13	23	

Comments
The sample's Viscosity is typical. No results suggest abnormal engine wear. (Viscosity and wear metal content, which were high in the previous sample from this engine, are now typical).

25.07.06 (803) Dear Zvi / Michael Fadida

1. The working condition of the engine improved a lot. Looks like you followed the recommendation and it paid off.
2. If MTC* is not used, at this stage do not extend oil change intervals beyond 250 work-hours.
3. Make sure to use anti-freeze fluid in the cooling system.
4. Treat the fuel for this engine in 2 consecutive fuelings with FC* (1:1000 by volume), without waiting for the next maintenance break.
5. Until further notice, not to exceed 250 work-hours between oil changes.
6. May take oil samples every other oil change (every ~ 500 work hours).
7. From the next oil change start adding MTC* (10% by volume).
8. If MTC* is added to new oil, you can change the oil every 1000 work-hours and take oil samples every 2000 work-hours.

* **Very important** to report back whether the recommendations were performed.

* MTC - Polytron MTC (complementary oil additive package).

* FC - Polytron FC (complementary fuel additive package).

Sincerely,
 Alex / Maintenance Consultant

Used oil analysis, Caterpillar Excavator 330B (continued)

Based on this samples, looks like the technicians acted according to the recommendations given in the former document, and the condition of the engine improved considerably, since the concentration of Iron and Silicon and Soot went down and the viscosity is acceptable, etc. Now the consultant advises to start using Polytron MTC and if used to change the oil every 1000 work hours and take used oil sample every 2000 work hours. The working condition of the engine now is at 85% which is good for such an engine.

Used oil analysis (continued).

Main wear metal example : typical result

Concentration of iron wear particles

Without
Polytron



With
Polytron

