



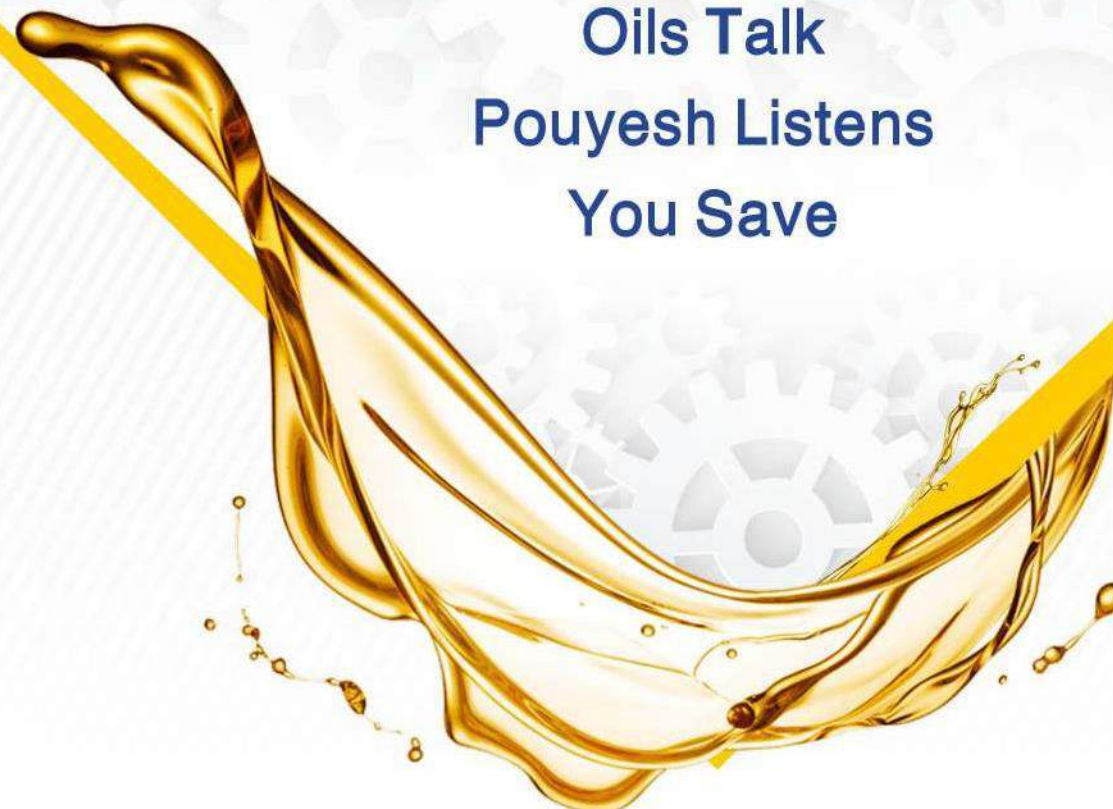
POUYESH

Payesh Vaziat Yekta Shargh Co

www.pouyesh.co



**Oils Talk
Pouyesh Listens
You Save**



OIL CONDITION MONITORING
IS OUR SPECIALITY IS OUR SPECIALITY



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Department of Manufacturing and Procurement of Materials and tools required for Conditions monitoring of oil, grease,

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➤ Oil Analysis Laboratory Services Department ➤

■ Brief introduction of the department

Currently, with a comprehensive oil analysis laboratory and experienced specialists with more than thirty years of experience in condition monitoring services (OCM) of mechanical equipment and transformers and quality assessment of new oil, the company offers the country's industries.

What is Condition Monitoring (OCM)?

Continuous and regular data of information from inside the machine through sampling and testing its oil to ensure the condition of the device. Identifying any possible defects in the early stages of identifying and controlling abnormal erosion factors Repair planning Corrective measures in time before damage occurs Quality control of parts and consumables.

Most of the small and large industries, including the road transport industry, sea and air-rail), construction, mining, agricultural production, steel complexes, petrochemicals, oil cement refineries, and power and gas plants) etc. use OCM programs





Pouyesh OCM Facilities

1. A specialized OCM laboratory for testing transformers and mechanical equipment
2. ISO-IEC 17025
3. Professionals experienced in OCM and Personnel experienced in performing oil tests
4. Specialized personnel with adequate experience in sampling





OCM in mechanical equipment

Nowadays, the importance and necessity of using modern maintenance systems is common knowledge. The equipment condition monitoring program through OCM is an effective and exotic method in maintenance programs currently applied in most organizations, companies, and industries in the country and helps them to gain impressive direct and indirect economic benefits.

Proper sampling periods in normal conditions

1	Turbine's oil reservoir, compressor, hydraulic system, and short-term routine tests	500 h
2	Turbine's oil reservoir, compressor, hydraulic system, and long-term routine tests	3000 h
3	Engine's oil reservoir	200 h
4	Sample of oil returning from the turbine bearing/compressor	500 h
5	Gearbox's oil reservoir and short-term routine tests	500 h
6	Gearbox's oil reservoir and long-term routine tests	3000 h

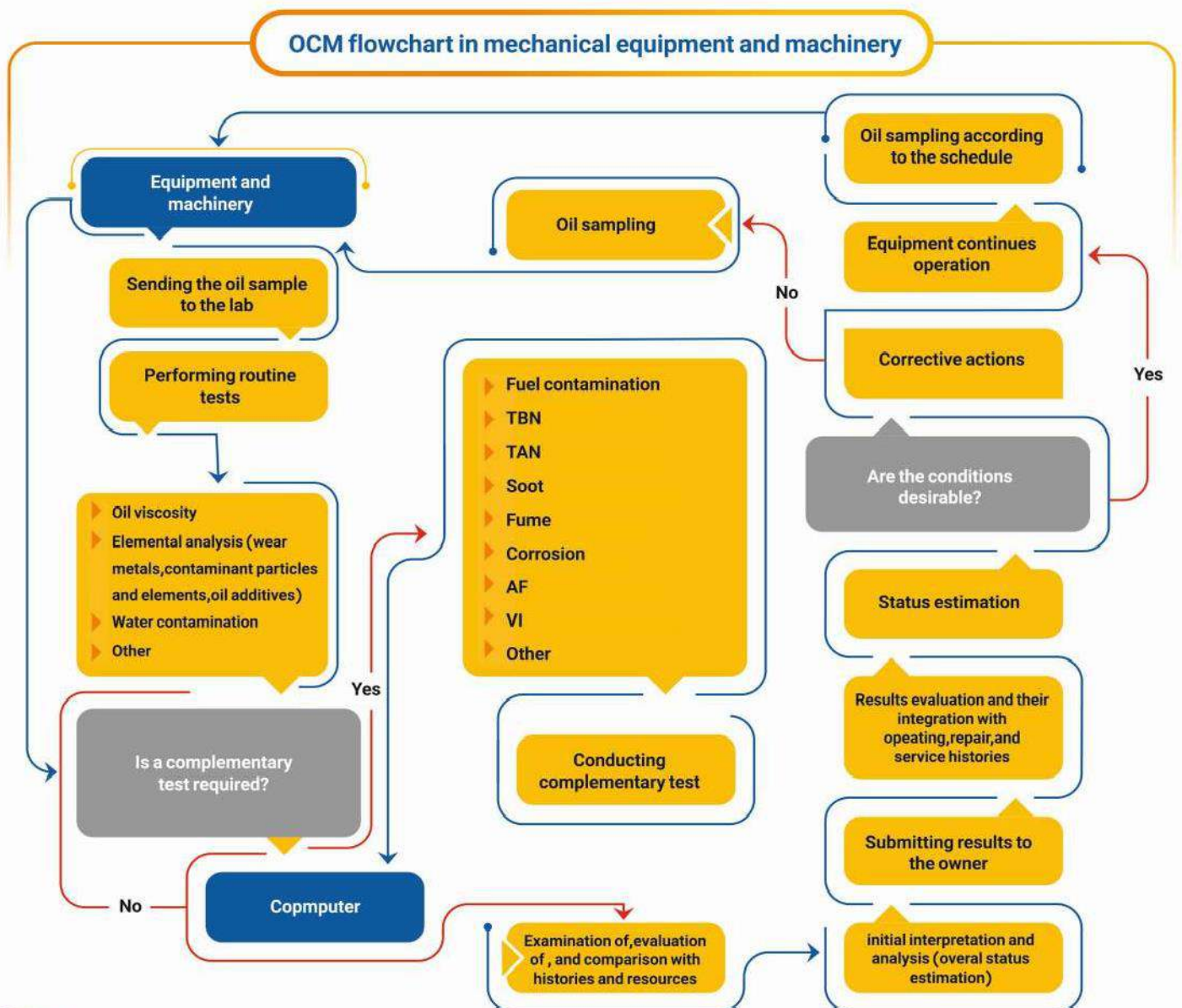
Why is OCM important in mechanical equipment?

- ◆ To increase equipment reliability
- ◆ To keep equipment in standby mode for longer periods
- ◆ To evaluate the wear process in mechanical equipment
- ◆ To timely identify and control the factors causing abnormal wear in mechanical equipment
- ◆ To evaluate the quality of new and working oils in mechanical equipment
- ◆ To troubleshoot in real time
- ◆ To evaluate the equipment in the guarantee period
- ◆ To evaluate the performance of filters in mechanical equipment
- ◆ To decrease the operating costs of equipment
- ◆ To have possible documented technical and management controls
- ◆ To perform PM activities based on results of OCM, as required
- ◆ To determine the date for oil change or physical/chemical treatment



Our company offers an OCM program for mechanical equipment (turbine, compressor, engine, gear system, hydraulic system, and others) that includes:

- ◆ Determination of sampling points
- ◆ Determination of the sampling period
- ◆ Characterization of short-term routine tests
- ◆ Characterization of long-term routine tests
- ◆ Providing testing services
- ◆ Analysis of test results
- ◆ Providing software-assisted services for OCM in mechanical equipment.





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List of available tests for OCM implementation in mechanical ex

No	Test	Testing method
1	Elemental analysis of oil (19 elements)	ASTM D6595
2	Elemental analysis of grease (19 elements)	ASTM D6595
3	Elemental analysis of gas oil (19 elements)	ASTM D6595
4	Vis @ 40°C	ASTM D445
5	Vis @ 100°C	ASTM D445
6	Viscosity Index (V.I)	ASTM D2270
7	Vis @ 50°C	ASTM D445
8	Viscosity extrapolation	ASTM D341
9	Water (Coulometric Karl-Fischer Titration)	ASTM D6304 - IEC 60814
10	Water (Volumetric Karl-Fischer Titration)	ASTM E203
11	Water count HFC oils	Calculation
12	Water (distillation)	ASTM D95
13	water and sediments (centrifuge)	ASTM D96 - D2273
14	Crackle test for water in oil	Crackle test
15	Wear debris monitoring in oils using particle quantification (P.Q)	ASTM D8184
16	Wear intensity ratio (TDPQ)	Analex PQ90
17	Direct Reading Ferrography (D.R.F)	Predict DR5
18	Analytical Ferrography (A.F)	ASTM D7690
19	Brookfield viscosity testing	ASTM D2983
20	High-Temperature High-Shear (HTHS) viscosity	ASTM D4741, ASTM D4683
21	of apparent viscosity at low temperatures	ASTM D4684
22	Cold Cranking Simulator (CCS)	ASTM D5293
23	foaming characteristics	ASTM D892
24	high-temperature foaming characteristics at 150°C	ASTM D6082
25	Open cup flash point	ASTM D92
26	Closed cup flash point	ASTM D3828
27	Closed cup flash point	ASTM D93
28	Fire point	ASTM D92
29	Pour point	ASTM D97 – ISO 3016
30	fuel dilution	ASTM D8004
31	insolubles in pentane/toluene	ASTM D893
32	Determining the evaporation loss of lubricating oils by the Noack method	ASTM D5800
33	Oxidation stability (RBOT)	ASTM D2272
34	Dry Tost	ASTM D7873
35	TOST	ASTM D943



List of available tests for OCM implementation in mechanical equipment

No	Test	Testing method
36	Shear stability @ 30 or 90 or 120 cycles	ASTM D6278
37	Varnish potential testing in V.P.T oil	ASTM D7843
38	Particle Density (PD)	BS ISO4407
39	Fluid cleanliness PC (ISO 4406-99)	ISO4406-99
40	Fluid cleanliness PC (NAS1638, ISO4406-99)	NAS 1638, ISO 4406-99
41	Particle Analyzer (particle morphology)	ASTM D7596
42	Total Acid Number (TAN by color-indicator titration)	ASTM D974
43	Total Acid Number (TAN by potentiometric titration)	ASTM D664 – IEC62021-1
44	Total Basicity Number (TBN by potentiometric titration)	ASTM D2896
45	Total Basicity Number (TBN by color-indicator titration)	ASTM D974
46	Water Separability @ 54°C or 82°C	ASTM D1401
47	Air Release Value	ASTM D3427 – IP313
48	Copper Corrosion	ASTM D130
49	demulsibility characteristics of lubricating oil	IP-19
50	Ash content	ASTM D482
51	Sulfated Ash	ASTM D874
52	Wear Scars of Lubricating Oils (Four-ball Method)	ASTM D4172
53	Welding Point of Lubricating Oils (Four-ball Method)	ASTM D2783
54	Density	ASTM D4052, ASTM D70
55	Color	ASTM D1500
56	Fourier-Transform Infrared Spectroscopy	FTIR
57	Condition Monitoring of Used Lubricants by Trend Analysis using Fourier Transform Infrared	ASTM E2412
58	Rust prevention (Method A or B)	ASTM D665
59	Cloud Point	ASTM D2500
60	Specific Gravity	ASTM D4052
61	API Gravity	ASTM D4052
62	Soot	ASTM D7686
63	Spot Test	---
64	Sulfur Content	ASTM D4294
65	PH	ASTM D1287
66	Evaporation Loss	ASTM D972
67	Viscosity-Gravity Constant (VGC)	ASTM D2501
68	Corrosion Preventive Characteristics	ASTM D1743
69	Wear Scars of Lubricating Greases (Four-ball Method)	ASTM D2266
70	Welding Point of Lubricating Greases (Four-ball Method)	ASTM D2596



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List of available tests for OCM implementation in mechanical equipment

No	Test	Testing method
71	Estimation of Deleterious Particles in Lubricating Grease	ASTM 1404
72	Grease Soap Type	---
73	NLGI grade	DIN 51818
74	Saponification Number	ASTM D94
75	Determining the Water Washout Characteristics of Lubricating Greases	ASTM D1264
76	Worked or Unworked Penetration @ 25°C	ASTM D217
77	The tendency of lubricating grease to corrode copper under specific static conditions	ASTM D4048
78	Dropping Point of Lubricating Grease	ASTM D566
79	Oil Separation from Lubricating Grease	ASTM D1742
80	Oxidation Stability of Fuel	ASTM D2274
81	Distillation of Petroleum Products at Atmospheric Pressure	ASTM D86
82	Distillation Characteristics of Petroleum Products in Vacuum	ASTM D1160
83	Distillation of the Fuel Oil at Atmospheric Pressure	ASTM D86
84	PONA	ASTM D6730
85	Carbon Residue (in 10% distillation residue)	ASTM D189
86	Ramsbottom Carbon Residue	ASTM D524
87	Conradson Carbon Residue	ASTM D189
88	Mercaptan Content	ASTM D3227
89	Melting Point (cooling curve)	ASTM D87
90	Cetane Index	ASTM D976
91	Gum Content – Unwashed	ASTM D381
92	Gum Content - Washed	ASTM D381
93	Chloride Ion Content in Water	ASTM D512
94	Sulfate Ion Content in Water	ASTM D516
95	Total Hardness	ASTM D1126
96	cloud Point	ASTM D1120
97	Reserve Alkalinity	ASTM D1121



OCM's importance in electric transformers

A transformer or a reactor may get involved in the following problem. Persistence of these problems may result in the failure and unplanned outage of the machine:

1. Change in chemical properties of the oil that requires chemical treatment
2. High moisture or suspended particle content in the oil that requires physical treatment
3. High moisture content in paper insulation that requires normal drying of paper
4. Engagement in internal faults (thermal or electrical) that require real-time evaluation and repair

In these conditions, the oil quality in the machine should be evaluated by continuous sampling for a proper period, and the gases dissolved in the oil should be analyzed and measured to examine the presence of internal faults in the machine.

Proper sampling period under normal conditions

1	Active part's oil reservoir	Annual
2	On-load tap changer's oil reservoir	Annual
3	Oil-impregnated bushings	Per two years

Why OCM is important in electric transformers?

- ◆ Increased reliability and standby time of electric transformer
- ◆ Significant decrease in operating costs
- ◆ Preventing premature aging
- ◆ It is possible to order an alternative before the unplanned outage of transformer
- ◆ On-time detection of oil treating or change necessity
- ◆ Evaluation of oil mixing probability



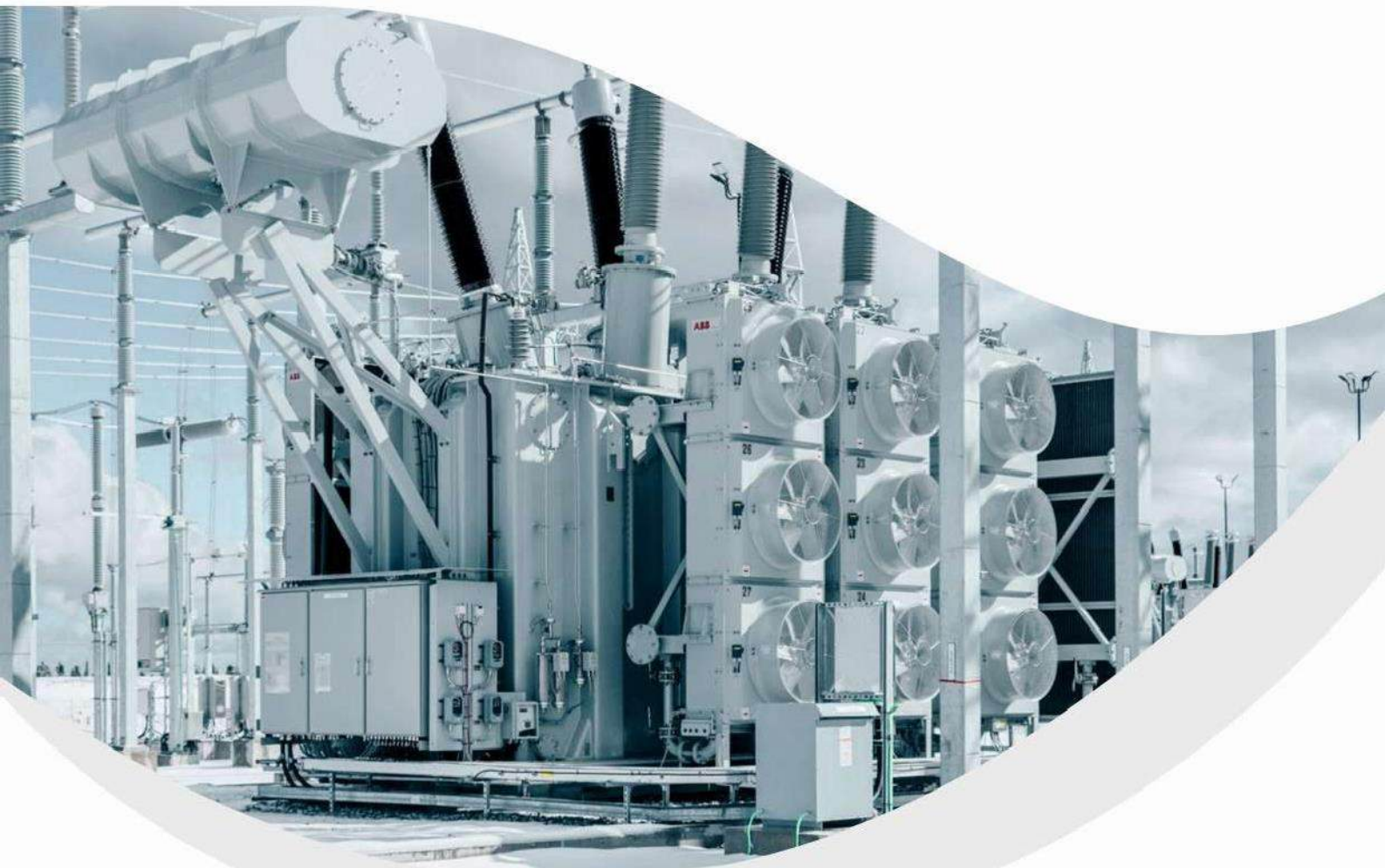


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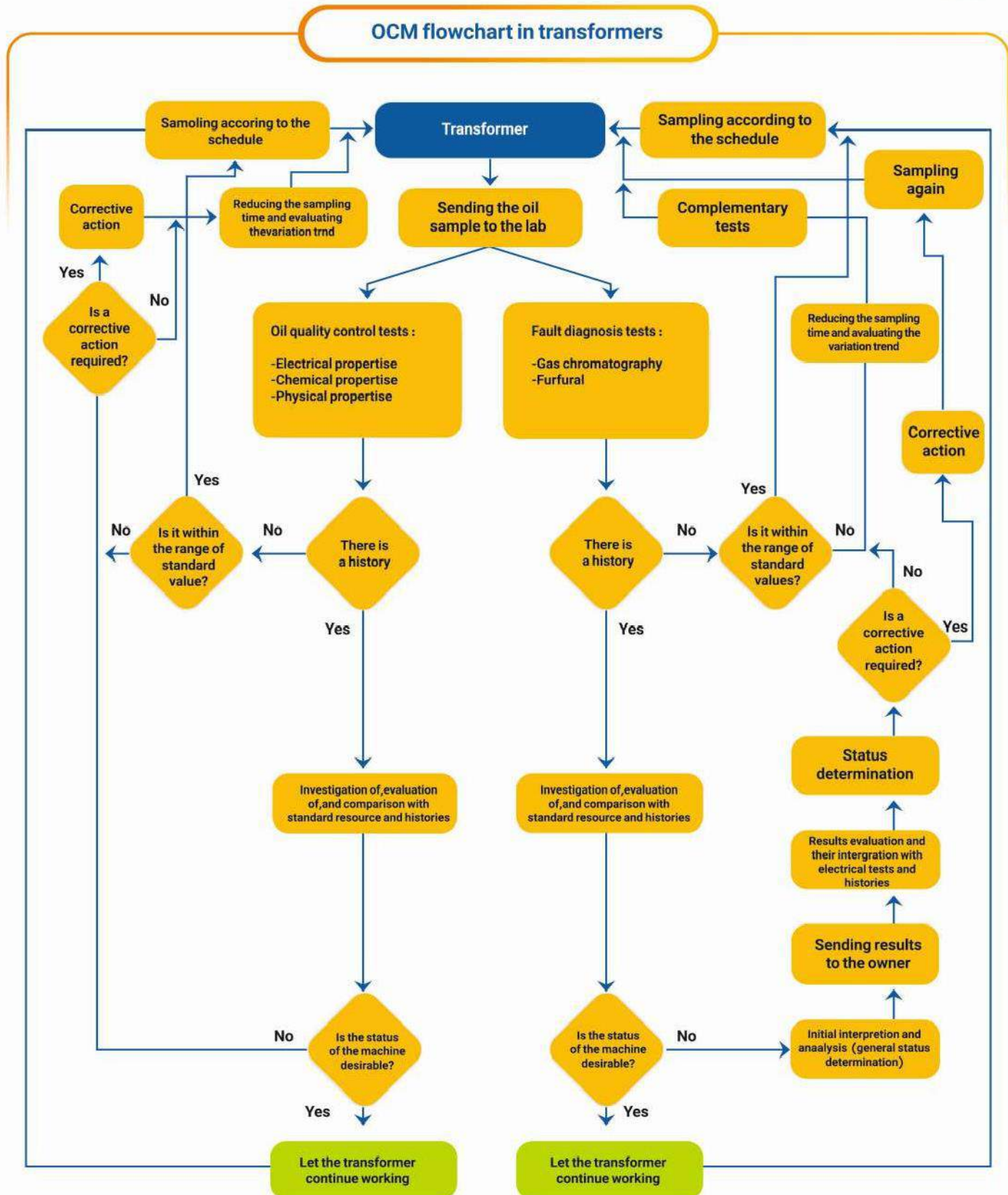
Providing an OCM schedule for transformers (active part, on-load tap changer, and oil-impregnated bushing) and reactors

- ◆ Determination of sampling points
- ◆ Determination of the sampling period
- ◆ Determination of routine tests and, as required, complementary tests
- ◆ Providing testing services
- ◆ Analysis and evaluation of test results and DGA
- ◆ Providing specialized software services for OCM in transformers
- ◆ Different teams of experienced professionals to be trained on the sampling procedure





OCM flowchart in transformers





List of available tests for OCM implementation in transformers

	Type of test	Test method	Variation meaning
Electrical properties	Dielectric strength	IEC 60156	- Indicating the presence of some contaminations such as moisture,
	Dielectric dissipation factor (tg δ , resistivity, permittivity)	IEC 60247	suspended particles, and so on - Effects of oil aging - Indicating the time of the oil change or its treatment (physical or chemical)
Chemical properties	Acidity	IEC62021-1/IEC62021-2	- Indicating oil aging
	Surface tension	ASTM D971/ISO 6295	- Presence of polar contaminants and other materials due to oil aging
	Corrosive sulfur	IEC 62535-Annex A	- Indicating the time of the oil change or its treatment (physical or chemical)
	The potential of corrosive sulfur	IEC 62535	- Oil quality in terms of corrosion
	Total sulfur content	ISO 14596	- Oil quality in terms of resistance against oxidation (or determining the residual life)
	DBDS	IEC 62697-1	- Specifying the time of addition of inhibitors (in oils containing artificial inhibitors)
	Color number and appearance characteristics	ISO 2049	- Determining when metal deactivator additives are required to be added
	Inhibitor content	IEC 60666	
	Metal deactivator additive	IEC 60666	
	Stray gassing	ASTM D7150	
Physical properties	Oil stability against oxidation (164, 332, and 500 hours)	IEC 61125	
	Viscosity @ 40° and 100°C	ISO 3104	- Determining the oil type (classification)
	Viscosity @ -30°C	ISO 3104	- Indicating the heat transfer capability of oil
	Flash point	ISO 2719	- Proper oil performance at different temperatures
	Pour point	ISO 3016	
Contaminations	Density	ISO 12185	
	Moisture content	IEC 60814	- Indicating the presence of contaminants in the oil
	Oil cleanliness	IEC 60970/ISO 4406	- Indicating the oil treatment time (physical, chemical)
	Askarel contamination	EPA/600/R-98/109	- Indicating the presence of harmful environmental pollutants and carcinogens
	Polycyclic aromatics (PCA)	IP 346	
Performance	Sediment and sludge content	IEC 60422-Annex C	
	Gas chromatography	ASTM D3612	- Indicating the presence of electrical or thermal faults in the transformer oil
	Furfural content	IEC 61198	- Indicating the presence of thermal faults in the paper insulation of the transformer - Degradation of the paper insulation of the transformer - Estimating the transformer life (paper insulation life)



Sampling principles, tools, and containers

The following should be considered in sampling from mechanical equipment:

- ◆ During sampling, the oil must be in a homogenous state.
- ◆ During sampling, the machine must be in operation, if possible.
- ◆ For sampling from the reservoir, the sample must be obtained from the middle depth of the oil reservoir.
- ◆ The oil suction pump (as required) and sufficient sample volume must be used for produce tests.
- ◆ Inserting the sample number on the container and providing a datasheet beside the sample
- ◆ Using standard containers and a disposable hose in every sampling round
- ◆ The following should be considered in sampling from transformers:
 - Sampling to conduct quality control tests according to IEC 50567
 - Sampling to conduct DGA test according to IEC 60457



For samples (such as turbine and hydraulic systems), UCVD containers are the best option when cleanliness testing is important, the container should be fully clean, and no contamination should enter the sampling process. Due to internal vacuum pressure, there is no need to use a sampling pump.



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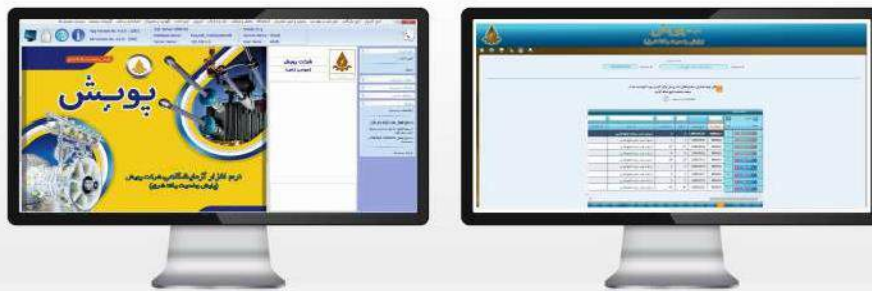


Pouyesh's specialized OCM software

- Evaluation and analysis of OCM results for mechanical equipment (turbine, compressor, hydraulic system, gear system, and engine)
- Evaluation and analysis of OCM results for transformers and reactors (active part, on-load tap changer, and bushing)

With capabilities in:

- ◆ Recording OCM histories and result evaluation
- ◆ Searching results of different parts of each mechanical equipment regarding its code
- ◆ Searching results of different parts of each transformer regarding its code
- ◆ Providing reports from laboratory service records individually for each customer
- ◆ Transferring results through the internet for each customer
- ◆ Transferring results through data for each customer in offline mode
- ◆ Performing analysis and evaluation of results based on ASTM, ISO, or IEC standards
- ◆ Using updated standards (last version) in the analysis and evaluation of results
- ◆ Evaluation of the equipment status in terms of health or preventive action requirement
- ◆ Evaluation of oil status in terms of treatment, replacement, or adding additives to the oil to improve its properties



Industries provided by our OCM services

- ◆ Some power plants and regional electric companies
- ◆ Some petrochemical complexes
- ◆ Some gas refineries
- ◆ Some oil producers
- ◆ Some transportation companies of the Ministry of Roads and Urban Development
- ◆ Some manufacturing plants
- ◆ Some mines
- ◆ Some civil companies



Department of draftsmanship of materials and tools required for conditions monitoring of oil, grease, and fuel

■ A brief introduction to the department

Pouyesh Co. offers services in the following five fields by employing creative, professional, and talented human forces, collaborating with foreign partners through its international offices around the world in UAE, Turkey, Austria, and the USA, and offering diverse services and products relying on state-of-the-art technologies.

- ◆ Manufacturing testing apparatuses for conditions monitoring of oil, grease, and fuel;
- ◆ Procuring testing apparatuses from credible brands in the world, such as Spectro Scientific, TANNAS KING, Rigaku, Koehler, CANNON, and others;
- ◆ Providing standard materials, calibration, and consumable/spare parts;
- ◆ Providing and equipping different shops and industries with small-scale laboratories and on-site oil condition monitoring.





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Our products

Taking advantage of technical directors with more than 20 years of experience in oil, grease, and fuel condition monitoring and more than 14 years of experience in manufacturing test apparatus, our company has been successful in the design and production of more than 30 test apparatus. The critical point in manufacturing these machines is the accurate conformance with conditions mentioned in the test methodology and using electronic and mechanical parts made by world-class companies .

No.	Name	Standard for machine's operating procedure
1	Oxidation Stability Tester - RBOT	ASTM D2272
2	Rust-Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water	ASTM D665
3	Demulsibility	IP19
4	Foaming Characteristics of Lubricating Oils	ASTM D892
5	Water & Sediment in Lubricating Oils	ASTM D96 ASTM D2273
6	Copper Strip Corrosion – Oil & Grease	ASTM D130
7	Evaporation Loss - Noack	ASTM D5800
8	Kinematic Viscometer	ASTM D445
9	Air Release Value	ASTM D3427
10	High-Temperature Foaming Characteristics	ASTM D6082
11	Kinematic Viscometer / 0.02°C stability	ASTM D445
12	Kinematic Viscometer / 0.05°C stability	ASTM D445
13	Filter Ability of Engine Oil	ASTM D6794 ASTM D6795
14	Oxidation Characteristics of Turbine Oil	ASTM D943 ASTM D2274 ASTM D7873
15	Hydrolytic Stability of Hydraulic Oils	ASTM D2619
16	Filter Ability of Hydraulic Oils	Afnor (wet:nf-e48 6918 Dry: nf-e48 - 690)
17	Thermal Stability of Hydraulic Oils	Cincinnati Milacron Procedure a or b
18	Demulsibility Characteristics of Hydraulic Oils	ASTM D2711
19	Vacuum Distillation System	ASTM D1160
20	Gum Content in Fuels by Jet Evaporation	ASTM D381
21	Ramsbottom Carbon Residue of Petroleum Products	ASTM D524
22	Dropping Point of Lubricating Grease	ASTM D566
23	Work Con Penetration of Lubricating Grease	ASTM D217
24	Water Washout Tester	ASTM D1264
25	Estimation of Deleterious Particles in Lubricating Grease	ASTM D1404
26	Water Separability of Petroleum Oils and Synthetic Fluids	ASTM D1401
27	Four-Ball Wear and Extreme Pressure Test Machine	ASTM D2783 ASTM D2596 ASTM D2266 ASTM D4172



Our products

No.	Name	Standard for machine's operating procedure
28	Oil Separation from Lubricating Grease	ASTM D1742
29	Oxidation Stability of Mineral Insulating Oil	BS148 IEC 61125C
30	Potentially Corrosive Sulfur	IEC 62535
31	Freezing Point of Aqueous Engine Coolants	ASTM D1177
32	Boiling Point of Engine Coolants	ASTM D1120
33	Foaming Tendencies of Engine Coolants in Glassware	ASTM D1881
34	Corrosion Test for Engine Coolants in Glassware	ASTM D1384
35	Corrosion of Cast Aluminum Alloys in Engine Coolants under Heat-Rejecting Conditions	ASTM D4340
36	Simulated Service Corrosion Testing of Engine Coolants	ASTM D2570
37	Cavitation Corrosion and Erosion-Corrosion Characteristics of Aluminum Pumps with Engine Coolants	ASTM D2809

All machines are available with a 12-month guarantee and 10 years of after-sale services on the condition that the apparatus operation accurately conforms to the related standard.



Note: to be aware of the feasibility of manufacturing new test apparatus not on the above list, call our



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Some important brands of imported machines and equipment that can be procured by our company

Spetro Scientific, USA
TANNAS KING, USA
KOEHLER, USA
CANNON, USA
Herzog, USA
LAWLER, USA
LOVIBOND, United Kingdom

AMETEK

Spectro Scientific
Confidence in knowing



KING
REFRIGERATION

CANNON
INSTRUMENT COMPANY

HERZOG
by PAC

Koehler
INSTRUMENT COMPANY, INC.

Some test apparatus that can be imported and procured by our company

- CCS-2100LT Automated Cold-Cranking Simulator
- TBS® HTHS Viscometer
- MRV TP-1 – King Mini-Rotary Viscometer
- CP610 – Cloud & Pour Point
- SB+2 | Scanning Brookfield Plus Two
- TEOST
- SpectrOil 100 - Elemental analysis
- SpectrOil M - Elemental analysis
- LaserNet 200 - Particle analysis
- CoolCheck 2 - Coolant & DEF
- Open and Closed Cup Flash Point Tester (All models)
- Pour Point And Cloud Point
- Distillation Systems
- Falex Pin
- Lovibond® Colour Measurement
- KF Karl Fischer



Our Customers





Pouyesh Co., official representative of oil , test apparatus of KEP POWER Ukraine

Insulating oil breakdown voltage tester



Intertek



4K040
ДСТУ ISO/IEC 17025

Technical specifications

Oil dielectric tester	OLT-80	OLT-100
Output AC voltage, kV	symmetrical 0 ... 80	symmetrical 0 ... 100
Accuracy, kV	± 1	
Resolution, kV	0.1	
Power supply frequency, Hz	50 / 60 ± 1	
Output voltage rise rate, kV/sec	0.5 ... 10.0	
Switch-off time at flash over, µs	< 5	
Oil temperature measurement range, °C	– 10 ... + 99	
Standards	IEC 60156 ГОСТ 6581 ASTM D877 ASTM D1816 IP 295 other standards – on request	
Electrodes	«mushroom» IEC 60156 («sphere» IEC 60156; «plane» ASTM D877, ASTM D1816 – on request)	
Display	monochrome, 128x64	
Interface language	Russian, English	
Nonvolatile memory capacity, test reports	512	
PC connectivity	USB type-B	
Printer	thermal printer, 57 mm standard paper	
Power supply voltage, V	190 ... 245 (47 Hz ... 63 Hz)	
Power consumption, kV·A, max	< 100	
Weight, kg, max	21	30
Dimensions, W x H x D, mm, max	461 x 280 x 271	530 x 315 x 320
Ambient operation temperature, °C	– 10 ... + 40	
Ambient storage temperature, °C	– 20 ... + 50	
Relative air humidity	Non condensing	
Atmospheric pressure, mm Hg	630 to 800	

KEP reserves the right to make changes to the specifications without notice



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Pouyesh Co., official representative of oil , test apparatus of KEP POWER Ukraine

Insulating oil dielectric loss tester



Intertek



4K040
ДСТУ ISO/IEC 17025

Technical specification

Digital Automatic Dissipation Factor Measurement Apparatus	Tangent-3M
Dissipation factor (DF) measuring range	0.0001 ... 1.0000 (0.01% ... 100 %)
DF measuring accuracy	$\pm (0.03 \text{ tg}\delta + 0.0002)$
Resolution	0.00001
Output AC voltage, V RMS	1940 ... 2060
Measuring uncertainty, %	2.5 of reading
Capacitance measuring range, pF	5 ... 30
Testing temperature, °C	90
Temperature measuring accuracy, °C	± 1
Measuring time for «Program 1 (measuring at 70 °C and 90 °C), minutes	35
Measuring time for «Program 2 (measuring at 70 °C, 80 °C and 90 °C on increasing temperature and measuring at 90 °C, 80 °C and 70 °C on decreasing temperature), minutes	85
Input voltage, V	$230 \pm 10 \%$
Frequency, Hz	50 ± 1
Power consumption, kVA, max	0.3
Dimensions W x H x D, mm	405 x 90 x 260
Weight (incl. package), kg, max	5
Ambient operation temperature, °C	+ 10 ... + 35
Ambient storage temperature, °C	+ 5 ... + 40
Relative air humidity	Non condensing
Atmospheric pressure, mm Hg	630 to 800



Some important brands of standard and calibration materials, spare/consumable parts that can be procured by our company



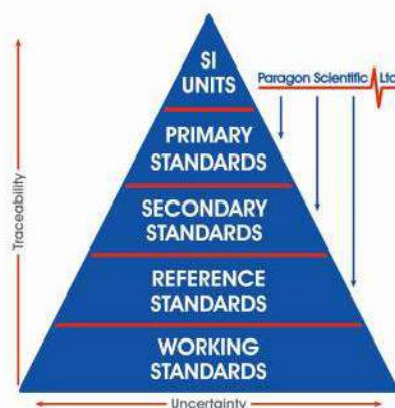
Pouyesh Co. is the official representative of several companies, including PARAGON Scientific (United Kingdom), SCP SCIENCE (Canada), CHIRON (Norway), and MecOil (Italy).

Also, Pouyesh Co. can procure spare/consumable parts and standard materials from other brands that are specifically associated with our activities.

Paragon Scientific Ltd



The Hierarchy of Standards



SCP SCIENCE



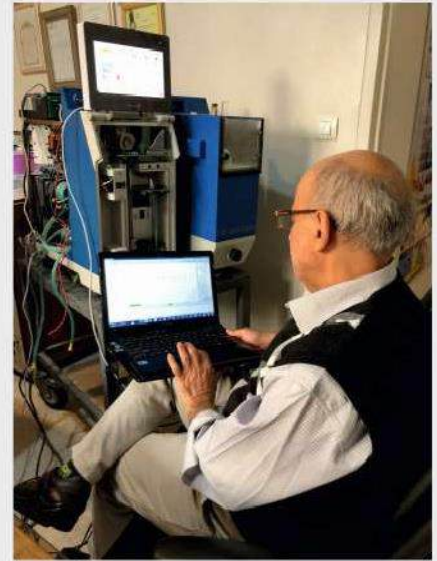
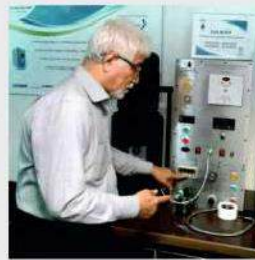


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Repair and commissioning of test apparatus by technical specialists

Regarding the complicated technologies used in laboratory equipment, the high cost of most equipment, and the special demand of industries for maintenance and repair, our company is engaged with the repair of laboratory equipment employing experienced professionals.

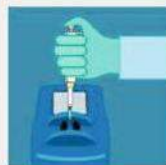


Equipping shops with mini-laboratories (On-Site Oil Analysis Condition Monitoring)

Procuring testing and portable machines of famous world-class brands, our company can establish mini-labs on the site of customers. Currently, most large companies use these pieces of equipment to chase the delivery of upgraded reports and results and save time. Call our specialists for more information and submit a request for training seminars.



COLLECT A
REPRESENTATIVE
OIL SAMPLE
FROM ASSET



ON-SITE TESTS
WITH MINILAB &
TRUVU 360 DEVICE
CONSOLE (TDC)



DIAGNOSTICS
AND
RECOMMENDATIONS
WITH TRIVECTOR



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POUYESH

Payesh Vaziat Yekta Shargh Co

Department for training and consulting services on OCM and lubrication

■ A brief introduction to the department

Since OCM programs in industries are executed to achieve the goals of this program, honorable authorities of OCM and OCM users must have adequate information about the program and its requirements and be familiar with tests, the application of each test, and the allowable range of results of each test. They must also recognize different preventive actions regarding the results of OCM tests.

To this end, our company has prepared various training courses for users that are presented by well-known instructors in Iran. In addition, it is possible to propose training courses containing the specific syllabuses intended by organizations.





Training course 50004

Condition monitoring and fault diagnosis in transformers through OCM and gas chromatography

Goal: making specialists of the repair and maintenance department familiar with OCM in transformers to reduce repair and maintenance costs, extend the lifetime of transformers, and increase their reliability

- ◆ OCM introduction
- ◆ Evaluation of the most critical factors of failure and life reduction in transformers and a brief introduction to different oil types used in these machines (mineral and non-mineral)
- ◆ An introduction to different physical, chemical, and electrical tests for transformer oils
- ◆ Evaluation of physical, chemical, and electrical properties of used oils of transformers based on standard IEC 60422
- ◆ Evaluation of physical, chemical, and electrical properties of new oils of transformers based on standard IEC 60296
- ◆ Evaluation of physical, chemical, and electrical properties of new and used non-mineral insulating oils based on associated standards
- ◆ An introduction to the Furfural test
- ◆ How to recognize on-time corrective actions (physical treatment, chemical treatment, and oil change) on transformer oils
- ◆ Evaluation of mixing of oils
- ◆ Gas production mechanism in transformers and introduction of different faults in transformers
- ◆ Analysis of gas chromatography testing results according to IEEE C57.104 using key gasses, Rogers ratio, and Durenberger methods
- ◆ Analysis of gas chromatography testing results according to IEC 60599, using gas ratio and dual triangle methods
- ◆ Evaluation of new methods for the analysis of gases insoluble in oil
- ◆ Aging evaluation and life estimation in transformers based on IEC TR 62874, evaluation of main processes resulting in degradation of paper insulation in transformers
- ◆ An introduction to primary and complementary tests in evaluating the aging process of paper insulation, method of sampling from transformers

Training course 50005

Condition monitoring and fault diagnosis in mechanical equipment through OCM and wear debris

Goal: making specialists of the repair and maintenance department familiar with OCM to reduce repair and maintenance costs, extend machine lifetime, and increase the reliability of mechanical equipment

- ◆ An introduction to OCM, repair and maintenance strategy, the role of CM in executing the PM program
- ◆ Quality control, validity, and conformance of consumable oils, getting familiar with some OCM standards (e.g., ASTM and ISO)
- ◆ An introduction to OCM tests, analysis/interpretation of test results, selecting the equivalent oil and its evaluation
- ◆ Evaluation of changes in physical, chemical, and electrical properties of oils and their effects on the machine
- ◆ Identifying and controlling contaminations in new and used oils, identifying and controlling the cleanliness of new and used oils
- ◆ Examining factors affecting the life reduction and wear augmentation in mechanical equipment and machines
- ◆ Examining parameters determining corrective actions on the oil
- ◆ Evaluation of oil lifetime and determinative parameters of the time of oil change
- ◆ Evaluation of wear trend in parts and normal/abnormal wear in equipment
- ◆ Examining the procedure of creating an OCM program in different industries, methodology, points of sampling, sampling period for equipment, and proper routine tests



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Training course 50006

Lubrication in turbines and compressors

Goal: getting familiar with different types of turbines and compressors, their lubrication system, and the components of these systems

- ◆ A brief introduction to different types of turbines, the role of oil in turbines, examining different components of the lubrication system in turbines
- ◆ Examining the properties of turbine oils and their formulations, introducing different mineral base oils and how they are produced
- ◆ An introduction to synthetic base oils, comparison of mineral base and synthetic base oils
- ◆ An introduction to tests required to be conducted on turbine oils, examining properties of available additives for turbine oils
- ◆ Examining the lifetime of turbine oils and factors shortening it, an introduction to oxidation products of turbine oils and methods to eliminate them
- ◆ Examining the oil cleanliness based on ISO and NAS standards, examining the consistency of turbine oils
- ◆ Examining the standards of new and used oils of turbines, examining the analysis and interpretation of results of tests conducted on turbine oils
- ◆ Classification of turbine oils according to ISO 6743-06, a brief introduction to the structure of compressors
- ◆ Critical factors in selecting the proper oil to be used in compressors, properties of compressor oils
- ◆ An introduction to base oils in compressors and their classification according to ISO 6743-06 and ISO 6743-3

Training course 50007

An introduction to different types of greases, their properties, and applications

Goal: getting familiar with different types of greases, their properties, their applications, and how they are produced

- ◆ Grease definition and its history, its advantages and disadvantages, an introduction to constituents of grease
- ◆ An introduction to different types of greases regarding the base oil and thickener, introducing characteristics, and classification of greases
- ◆ An introduction to tests required to be performed on greases, examining the consistency of different greases
- ◆ Properties and characteristics of some greases extensively used in industry, points to be considered in grease selection
- ◆ Examining the time intervals for grease change, the effect of warehousing on grease properties, and the production of greases
- ◆ Getting familiar with basic instruction for producing some widely-used greases, examining the desirability of greases
- ◆ An introduction to synthetic greases

Training course 50008

Lubrication in internal combustion engines

Goal: getting familiar with lubricants and lubrication of internal combustion engines, properties, and tests required for lubricants

- ◆ A brief introduction to different types of engines and their structures
- ◆ Examination of classification of engine oils and the function of oils in engines
- ◆ Examining single and multi-grade engine oils and their operating temperature range
- ◆ Examining the classification of oils in terms of quality and desirability level, an introduction to some conventional standards in the car industry
- ◆ Structure of engine oils and a brief review of their constituents
- ◆ An introduction to tests required to examine the quality of engine oils
- ◆ Introducing and comparing properties of mineral and non-mineral oils (mineral, synthetic, and Ester oils)
- ◆ Examining different additives used in engine oils and their effects, examining the sludge development mechanism in engine oils
- ◆ Examining factors that cause the oil deterioration, examining different types of internal and external contaminations in engine oils
- ◆ Evaluation of the origination of wear elements in engine oils



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- Providing specialized testing services for OCM in transformers and mechanical equipment
- Manufacturing, importing, and repairing oil, grease, and fuel condition monitoring instrumentation
- Procurement and importation of standard and calibration materials and consumable/spare parts
- Providing training and consulting services related to OCM and lubrication

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