


DOT.FAST[®] Service Drip Oil Analysis

A fast, accurate way to improve the efficiency of your engine



WHY SHOULD YOUR FLEET USE
Drip Oil Analysis?





With new legislation requiring the use of low sulphur fuel oil, it is more important than ever to select the correct cylinder oil and to balance conditions in your engine.

Drip oil analysis gives you the answers.

Analysis of unburned cylinder oil which has passed through the combustion chamber and past the pistons and liners in the main engine is an effective way to monitor engine wear.

OEM TESTIMONIAL

“It is MAN’s experience that, in addition to regular scavenge port inspections, drip oil analysis can be a very useful tool to monitor combustion and cylinder conditions. Drip oil analysis can detect changes in cylinder liner wear and help with cylinder oil feed rate optimization programs.

“Chevron’s DOT.FAST® Service makes it possible to monitor, both onboard and onshore, the total amount of adhesive, abrasive and corrosive wear.”

– MAN Diesel A/S

Chevron's DOT.FAST® Service provides your fleet with both onboard and onshore analysis of drip oil.

The DOT.FAST Onboard Test Kit consists of the Drip Oil Analyzer, pipette, DispoRack™, and DOT.FAST Onboard Software. Everything you will need for a full year is supplied with your first order, and the service can be extended for subsequent years as required.



Drip Oil Analyzer and MicroMan® Pipette



DispoRack with 12 ITUs (Iron Testing Units)

Onboard Analysis

The benefits you receive from onboard analysis can include:

- Reduced consumption by optimizing cylinder oil feed rates
- Improved management of fuel with varying quality
- Early indication of engine wear
- Lower risk of scuffing
- Reduced build-up of abrasive deposits
- Easier compliance with engine builders' recommendations
- More controlled liner wear
- Onboard wear measurement with laboratory accuracy
- Increased time between overhauls
- Predictive maintenance and less downtime, i.e., Condition Based Monitoring (CBM)
- Monitoring of running-in of new units
- A valuable complement to regular engine inspections
- Improved operations

Onshore Analysis

The additional benefits of onshore analysis can include:

- Monitoring effectiveness of fuel purification
- Identifying system oil leakage (for example, through stuffing box glands)
- Consultancy service
- Monitoring piston and ring groove wear
- Indication of blow-by



FIELD EXPERIENCE

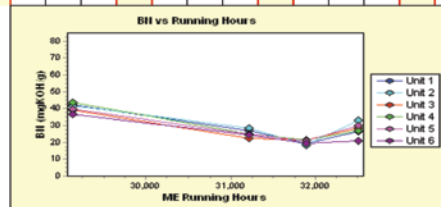
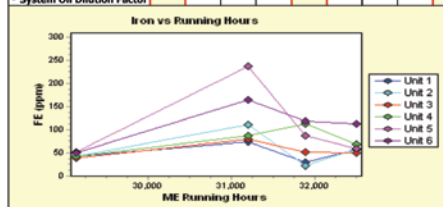
The DOT.FAST® Service was evaluated in cooperation with operators and equipment builders in the marine and power generation industries. In field tests onboard Wallenius Marine's M/V *Undine* and Suisse Atlantique's M/V *Général Guisan*, lubrication engineers and crew members found the DOT.FAST Drip Oil Analyzer to be both **effective** and **easy to operate**.

DOT.FAST® Service Drip Oil Monitoring Report



Data	1	2	3	4
ME Running Hours	29141	31206	31882	32498
Sulphur (%wt)	2.77	2.29	1.89	3.96
OFR (g/kWh)	0.92	0.73	0.68	1.15
MCR (%)	38	100	76	67

	Unit 1				Unit 2				Unit 3				Unit 4				Unit 5				Unit 6			
TBN	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
42.3	26.9	19.3	26.3	41.6	28.3	18.3	33.1	39.4	22.3	21.4	28.7	44.0	24.9	21.6	27.1	39.7	24.7	20.8	30.1	35.7	24.6	19.5	20.7	
Spectrographic (PPM):																								
AL	8	14	4	10	8	13	3	10	8	10	8	10	9	13	14	12	8	15	9	10	8	15	13	10
SI	17	24	10	19	17	22	8	17	18	18	16	17	18	19	23	19	18	25	18	18	17	24	24	19
CR	2	4	1	2	2	3	0	1	2	2	2	2	2	3	3	4	3	4	3	2	2	4	3	2
CU	1	3	17	2	4	7	22	4	2	3	26	2	1	30	108	16	1	7	23	2	3	7	30	4
FE	43	75	30	57	42	112	23	60	39	80	52	51	43	87	113	68	52	237	87	59	51	165	118	114
NI	45	80	13	41	45	74	10	34	52	70	23	37	52	69	31	49	54	85	24	35	53	87	36	49
PB	0	2	2	0	0	0	3	0	0	0	3	0	0	1	10	2	0	0	3	0	0	0	4	0
V	115	258	44	139	120	238	32	115	134	211	80	122	131	210	109	154	140	267	85	119	139	292	127	164
MG	70	73	28	74	66	73	25	77	66	58	36	74	68	64	40	72	69	71	36	75	66	77	40	76
P	12	21	362	20	27	35	378	18	11	24	307	14	3	13	289	15	10	16	306	16	45	12	291	12
MN	6	6	2	6	6	7	2	7	6	6	3	6	6	6	6	6	6	8	4	6	6	8	4	7
SODF*	4.45	6.4	96.92	4.03	8.2	9.48		3.79	4.45	6.87	80.33	2.61	2.11	3.79	76.54	3.32	3.75	4.27	80.57	3.32	13.11	3.32	75.83	1.9
* System Oil Dilution Factor																								



Chevron's laboratory provides complete analysis of your samples with review and comments by technical experts.

The Sulphur/Base Balance

High sulphur fuel oil burns to produce oxides of sulphur (SOx) during combustion. In the presence of water, these SOx form sulphuric acid which causes corrosion in the engine; different levels of sulphur in the fuel oil will cause varying levels of acidity.

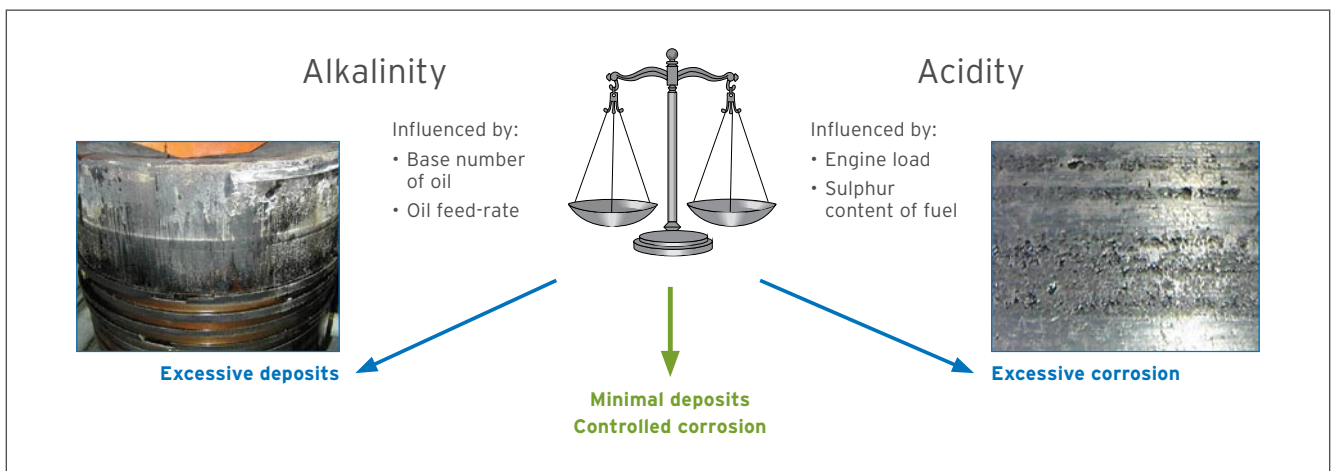
One function of the cylinder oil is to protect the engine from acidic corrosion. This is achieved by the alkalinity of the cylinder oil, defined by its base number (BN) and its feed rate. Too much alkalinity however, will result in the formation of excessive abrasive deposits on the

piston crown top lands, ultimately leading to increased liner wear and scuffing.

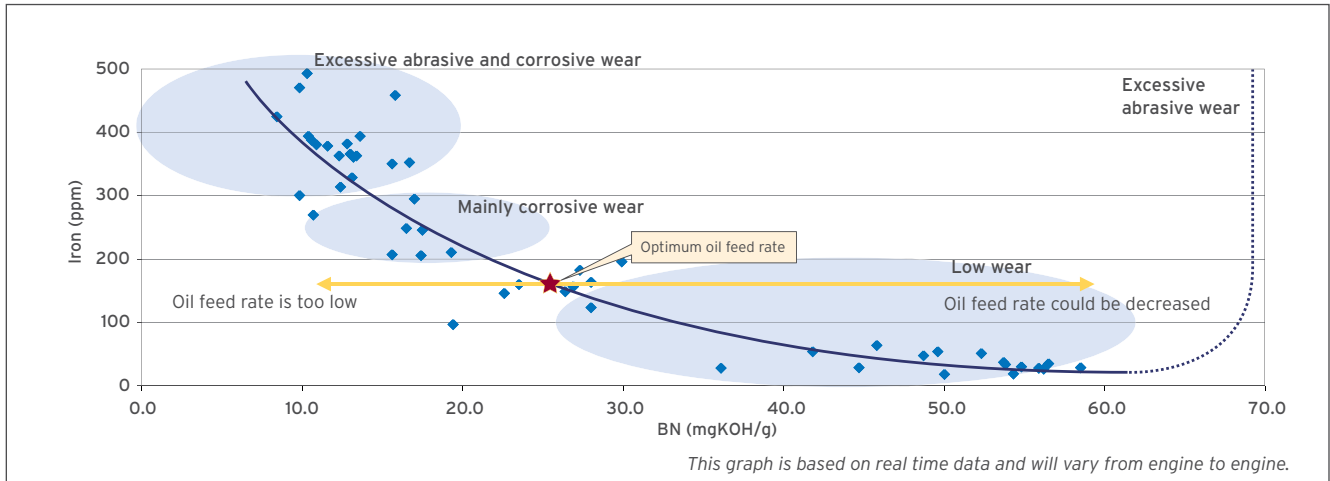
It is important to maintain the correct sulphur/base balance. This balance can be achieved by changing to a cylinder oil with an appropriate BN, by adjusting the cylinder oil feed rate or a combination of the two.

The total iron content measured by DOT.FAST® indicates the total corrosive and abrasive wear taking place in the engine, enabling you to make any necessary adjustments.

SULPHUR/BASE BALANCE



IRON CONTENT AS FUNCTION OF BN



Onboard Analysis

The DOT.FAST® Drip Oil Analyzer is unique and innovative in the industry and delivers onboard test results with laboratory accuracy. The DOT.FAST Drip Oil Analyzer comes with everything you need to prepare and test samples, including a custom-designed DispoRack and software to record, process and interpret results.

Using the Drip Oil Analyzer once every two weeks ensures effective management of your engine's lubrication. It can also be beneficial to do onboard drip oil analysis after changing to a new batch of fuel oil or to monitor the running-in process of new overhauled units.

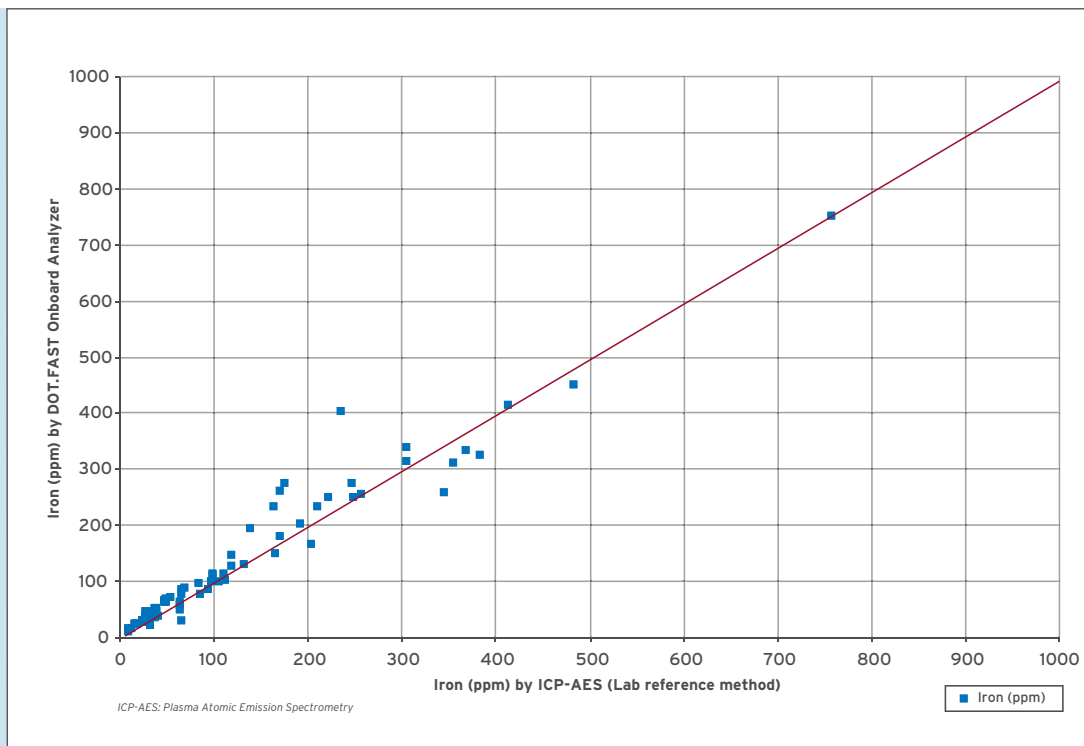
Onshore Analysis

Samples sent to Chevron's laboratory are fully analyzed (base number, iron and all other elements). The results are tabulated and reviewed by technical experts.

Recommendations are reported back to the ship. Historical data is maintained and can be accessed via a password-protected Internet site.

Subscribers to the DOT.FAST Service may send a full set of samples for analysis once every two months.

CORRELATION BETWEEN ONBOARD AND ONSHORE ANALYSIS



Extensive testing has shown that the Drip Oil Analyzer provides unbiased results compared with ICP-AES used in the laboratory.

OEM TESTIMONIAL

“Measuring the total iron content of piston underside drain oil with Chevron’s DOT.FAST® Service provides very valuable feedback of the piston running conditions in each cylinder, and allows operators to optimize cylinder oil feed rates for a specific set of operating conditions.”

– Wärtsilä Switzerland

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