No.36 Recommended procedure for the determination of contents of metals and other contaminants in stern tube lubricating oil

(1992)
(Rev.1 1997)
(Rev.2 Aug 2011)
(Rev.3 Nov 2020)

1. General

As provided by paragraph 1.2.14 of IACS UR Z21(Rev.4), a lubricating oil analysis should be carried out at the required intervals.

The documentation on lubricating oil analysis is to be available on board. Each analysis, to be performed by an appropriate method, should include the minimum parameters as listed:

- water contents, refer Section 4
- chloride contents, refer Section 4
- contents of bearing metal particles, refer Section 4 and 6
- oil ageing (resistance to oxidation), refer Section 5

2. Sampling procedure

Oil samples should be taken under service conditions, i.e. with a rotating shaft and the system at service temperature.

The samples are to be drawn from the same agreed position in the system which should be positively identified.

These samples, unless supervised by a Surveyor, are to be collected and identified by the Chief Engineer.

3. Contaminants determination

The contents of the following metals should be determined:

- in connection with contents of wear metals:

  Chromium
  Copper
  Iron
  Lead
  Nickel
  Silicon
  Tin

- in connection with contents of sea water:

  Magnesium
  Sodium

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4. Metal and water content values

The metal and water content values should be considered taking into account the type of seals used and the chemical composition of the bearing material.

Suggested upper limits are given below for guidance only:

Water	1%	Nickel	10 ppm
Chromium	10 ppm	Silicon	40 ppm
Copper	50 ppm	Tin	10 ppm
Iron	30 ppm	Magnesium	30 ppm
Lead	10 ppm	Sodium	80 ppm
Chloride content in water	70 ppm (ingress of salt water)		

These limits should be considered versus the elapsed time.

It is important to have results of a number of sequential analyses in order to observe any trends taking place.

5. Oil ageing

Oxidation characteristics such as Total Acid Number (TAN), viscosity and oil appearance depend upon the type of oil used. Hence no recommended value is listed. Instead observation of any trends (such as viscosity and change in colour etc.) based on sequential analysis should be made. TAN is adversely influenced by oxidation for most typical oil lubricant types and also by hydrolysis in the case of unsaturated Environmentally Acceptable Lubricants (EALs). Observation of any trends on TAN should be made based on sequential analysis in conjunction with the limits defined by the oil maker for continued use in service.

6. Other analysis

Microscopic analysis of the particles may be recommended to identify the failure process and, where applicable, non-metallic bearing or seal material.

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