

Specification for Ferrous debris monitor along with accessories:

Scope of supply:

The scope should cover the Design, supply, installation testing, commissioning and proving of 01 set of ferrous debris monitor along with accessories. This specification stipulates the technical and functional requirements of ferrous debris monitor in line with ASTM D8120-17 and the equipment and its accessories shall meet to ASTM D8120-17 or latest.

Purpose:

Ferrous debris monitor is meant for quantitative measurement of ferrous debris content of in-service bearing grease and oil samples of Diesel Locomotives in PPM (parts per million) by weight.

Technical details:

| Sl No. | Description | Details |
|--------|-----------------------|---|
| 1. | For Grease Testing | The Grease sample which has to be checked to be filled in a disposable sample pot/boat with the help of a spatula. By placing the sample into the instrument, ferrous debris content present in the sample should be displayed on the screen within 15 seconds. Minimum Grease sample quantity required for each test shall be 4 or 5 ml by volume. |
| 2. | For Oil Testing | The Oil sample which has to be checked to be filled in a suitable disposable sample syringe/tube. By placing the sample into the instrument, ferrous debris content present in the sample should be displayed on the screen within 15 seconds. Minimum Oil sample quantity required for each test shall be 5 ml by volume. |
| 3. | Display resolution | 1 PPM |
| 4. | Measuring Range | 50 ml bottle - 0-2500PPM (Minimum) 10 ml Syringe - 0-15000PPM (Minimum) 5ml Syringe - 0-15000PPM (Minimum) 5ml Test tube - 0-15000PPM (Minimum) 4 or 5 ml Grease pot-0-8000PPM (Minimum) |
| 5. | Sample Media | 50 ml sample bottles, 10ml syringes, 5ml syringes & test tubes and 4 or 5 ml grease pot. (i.e. the equipment shall support multiple sample size) |
| 6. | Repeatability | For Grease and Oil samples +/- 3% |
| 7. | Test Time | Less than 1 Minute to stabilize from Power ON, less than 15 sec per sample. The instrument shall work on AC Electrical power |
| 8. | Power supply | Single Phase For AC operated instrument: 110-250 V AC auto selected 50/60 HZ (power supply shall be short circuit protected). |
| 9. | Operating temperature | 15°C - 40°C |
| 10. | Relative humidity | 10% - 90% |
| 11. | Weight | 4 Kg - 5 Kg |

Detailed Specification of the system:

1. Instrument shall measure ferrous wear particle concentration in grease and oil in PPM (Parts per million in weight)
2. Microprocessor based instrument that has internal diagnostic ability ensuring calibration and functioning of the instrument.

3. The equipment shall have simple setup, easy operation and required for processing of data and is compatible with accessories.
4. To quantify ferromagnetic particles of size 0 to 2000 microns using magnetometry principle by presenting the grease sample/lube oil without any dilution or other preparation.
5. Water contamination in grease sample/lube oil should not affect the reading.
6. Interface: A touch screen panel which allows setting of instrument operation parameters, test parameters and communication protocol. Data entry shall be via a simple and intuitive touch pad screen with full alphanumeric keypad and backlit graphics display, for clear used prompts and easy viewing of results. Automatic date and time linked to each sample number should be recorded before testing. The results should show in a tabular display and in graphical format to enable trending by sample number.
7. Data Storage: Data from each test should be stored in the internal memory of the instrument, which may then be transferred to a host PC via an RS232/USB interface. Data can then be fully analyzed and trends can be easily monitored by importing into a database.
8. Out Put: digital
9. Software: Suitable software to be installed for transferring data from the apparatus to the computer for record purpose.
10. Standards: At least two calibration standards of uniformly suspended ferrous material that provide equivalent magnetic susceptibilities within the lower and upper quartiles of the all measurement ranges shall be supplied. The third standard for mid range point may be provided for all measurement ranges.
11. In case of Other than OEM, OEM Calibration certificate should be submitted along with Material, Minimum validity up to 3 Years.

B. Accessories:

1. Separate calibration standards for grease and oil to standardize the equipment to meet the above measuring ranges, which are required for efficient operation of ferrous debris monitor unit, shall be supplied with the equipment.
2. Power supply cable, RS232/USB connector, Software CD and carrying case.
3. The following consumables to be supplied along with the instrument.

| SI No. | Accessories | Qty. |
|--------|------------------------|------------|
| 01. | Grease sample Adaptor | 03 Nos. |
| 02. | Grease pots (4 ml/5ml) | 15000 Nos. |
| 03. | 50 ml sample bottles | 50 Nos. |
| 04. | 10ml syringes* | 50 Nos. |
| 05. | 5ml syringes | 50 Nos. |
| 06. | 5 ml test tubes | 50 Nos. |

All above accessories should be suitable / compatible with the supplied ferrous debris analyzer.

NOTE: If any other accessories are required to perform the test and for successful commissioning, the same shall be provided by the bidder.

C. Terms and Conditions:

1. Dependability –Control Safety:

- i. The equipment should be compacting dependable and reliable in operation and should full meet the functional requirement under severe conditions.
- ii. All the controls if any should be governed in the display screen for all the possible operations and should be conveniently located.
- iii. Equipment should be incorporating all safety devices so as to provide complete protection the operator and the equipment from all possible operational failures.

2. Installation & commissioning:

- i) The installation and commissioning shall have to be done by the firm under the supervision of adequate number of technical experts immediately after joint inspection of the items or receipt of call for commissioning.
- ii) Firm shall commission the equipment within 30 days from the date of intimation by the consignee in respect of receipt at site.
- iii) If an assembly/sub-assembly is required to be taken back to the manufacturer's premises for repairs/replacement either before commissioning or during warranty, the manufacturer or his agent would be required to submit an indemnity bond. In case the entire machine has to be taken back, a Bank guarantee would have to be submitted. Indemnity Bond for Bank guarantee should be of adequate value so as to cover the cost of the assembly/sub-assembly / Paid up cost of the machine.

3. Proving Test:

Equipment performance shall be monitored for a period of one month. After one month the Equipment will be tested for a period of two shifts of 8 hrs and after satisfactory results proving test certificate will be issued.

4. Training:

- i) Necessary training in the operation and maintenance of the machine shall be imparted for Railway personnel by the supplier at the Railway premises after the machine is installed and successfully commissioned.
- ii) Further, training should also be given to the staff along with the detailed circuits of electrical for further maintenance.

5. Technical Literature:

- i) 03 copies of Operating, Instructions & Maintenance manual along with the detailed drawings and schematic diagram covering the Mechanical & Electrical portion (Electrical circuit and wiring diagram) of the machine should be supplied free of cost along with the equipment.
- ii) Manual and catalogue giving part list number of each component and assembly drawings shall also be provided with the machine in quadruplicate free of cost. The manufacturer or supplier will clearly indicate the guideline for trouble shooting of the machine.

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(CMS/DSL/WD14)