



Technical Bulletin / Safety Alert

Unique ID No : DES-2017-TBSA-04 **Rev:** 0

Subject : MDR 074246 DES – Mechanical Exhaust Flametrap

Date : 31st August 2017

Applicable to : VLI JUG-A-0 Diesel Engine System currently complying to MDR 074246 DES (only)

Details of Revision : 0 - Original Issue

Note: Minimum PPE required to carry out any inspections contained in this TBSA shall be protective clothing & footwear, safety glasses, hearing protection & any site specific requirements. A JSA or equivalent should be carried out prior to performing these tasks.

Description:

VLI Diesel Division (VLIDD) advises the occurrence of an incident involving the failure of a Mechanical Exhaust Flametrap (MEF) installed in the MDR 074246 DES exhaust conditioner on a vehicle at a NSW underground coal mine. Subsequent to completion of a site based investigation of the incident, VLI was provided with the failed MEF for further analysis.

Investigation:

Examination of the failed MEF unit showed a hole had breached through the internal element core. The failure is highlighted by the protruding foil material around the affected area on the exit side of the MEF. Closer inspection of the inlet side of the MEF element core which is directly exposed to internal environment of the exhaust conditioner was noted to be considerably clogged with what appears to be an accumulation of an “oily particulate” substance. After patching the breached hole in the failed MEF element core, the MEF was installed in another DES at VLI workshop and backpressure testing of the unit was performed. The test results verified the element was substantially blocked therefore restricted exhaust flow till the catastrophic failure occurred.

VLI carried out an internal assessment of Design Registered Approvals, associated drawings, VLI Mechanical Code D Documentation & Parts Manuals in relation to MEF servicing. VLI have produced over 130 of the MDR 074246 DES engine packages with minimal issues.

Conclusion:

VLI conclude that the failure of the Mechanical Exhaust Flametrap was due to an excessive build-up of diesel exhaust material within the Mechanical Exhaust Flametrap.

The Quality or Frequency of cleaning of the Mechanical Exhaust Flametrap in this Diesel Engine System was certainly a major contributing factor to the failure Mechanical Exhaust Flametrap.

Recommendations:

VLI recommend that owners of Plant with MDR 074246 DES systems installed; review their inspection and maintenance schedules of their MEFs.

Cleaning of the MEFs can vary due to engine tuning and/or internal wear of the diesel engine.

Inspection Procedure:

- a) The recommend inspection of the Mechanical Exhaust Flametrap is visual only. That is; check for any visual blockage at both ends and check for any deformation of the substrate.

Cleaning Procedure

- a) For cleaning of the MEF whilst in the vehicle is recommended to be carried out daily. The procedure would be to open the drain valve located at the base of the exhaust conditioner and using mains water pressure, flush down thru the MEF (never use a pressure washer) until the core appears clean and water exiting out the Exhaust Conditioner drain runs clear. If possible, use compressed air to blow into the channels of the MEFs core's outlet face. Use a maximum of 550 kPa air pressure for cleaning. Keep the air nozzle approximately 50mm away from the MEFs core's face.
- b) For cleaning of the MEF - when removed from the DES; use compressed air to blow into the channels of the MEF core's outlet face. Continue until the MEFs core's inlet face is clean. Use a maximum of 550 kPa air pressure for cleaning. Keep the air nozzle no closer than 50mm away from the MEFs core's face.
- c) Soak flame trap in recommended cleaning agent (from Table 1 below) for minimum of 4 hours, and then remove the MEF and immerse in hot water to ensure that there is no excess cleaner left in the MEFs core. Use compressed air to blow out the MEF (as above Max 550Kpa no closer than 50mm from the face of the MEF) to ensure the core is dry.

Other cleaning methods/procedures:

- I. Thermal Cleaning in a kiln: The gas temperature has to be increased to a minimum of 400°C for at least 2-3 minutes in order to facilitate cleaning of the MEF.
- II. Ultrasonic Washing: Ultrasonic washes have been used successfully to clean foils with caution to the wash mix used not affecting fecral foil material.
- III. Pressure Washer: A pressure washer should not be used on the foil as it will affect the foil layout and possibly bend the material inside creating restrictions.

Table 1

Product name	Supplier	Primary ingredient	Comments	Suitability
Touchdown	True Blue Chemicals	Non-volatile solvent (2-Butoxyethanol)	More an all-purpose cleaner. Cheaper, less harmful to use. Has foaming agents so not applicable for this application.	Not Suitable
Ardox 666	Chemetall	Dichloromethane, cresol, phenol, solvent naphtha, xylene, potassium hydroxide, and <i>chromium</i>	The VOCs could cause coking if not rinsed properly; the potassium hydroxide could react with some component in the foil substrate. Not recommended.	Not Suitable
Biodegreaser	All Pro	Sodium hydroxide	Whilst currently believed to be working well, has potential corrosion effects of sodium hydroxide on the of the foil material)	Suitable but not recommended.
CP Concentrate Degreaser	Gunk	Petroleum solvent	Appears to be only available in US only. Requires 5 in 1 dilution with petroleum solvents.	Suitable
Cellarclean	True Blue Chemicals	Petroleum solvent	Most similar local product to Gunk. Is non-foaming.	Suitable
Power Plus, Big O, Desolve. Specific product to be confirmed	All Pro	Petroleum solvent	Equivalent product(s) in All Pro range.	Suitable – confirm specific product with vendor.

Notes: -

Essentially Petroleum Solvents are recommended by Mechanical Exhaust Flametrap manufacturer, although a thorough washing off of these products is recommended to eliminate any combustible residue.

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