



Technical Specification for the exhaust muffler on a diesel engine.

Rev 0

29 July 2022

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Approved by: **Principal Engineer**

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1. Scope

Two generating sets will be installed on a coach to provide electrical power to the trainset. Each genset will be rated at 250 kVA (three phase, four wire, 400V/230V, 50 Hz alternator). Each diesel engine requires a muffler, thus two mufflers will have to be supplied in total.

2. Operational environment

2.1 Climatic conditions

It is a mandatory requirement that the train operates under the following conditions:

- Between coastal and inland areas, with a height change from 0 to 2,100 m above sea level.
- Ambient conditions from -10°C to +50°C can be expected.
- The train shall be able to operate and be stabled in an atmosphere of average humidity in excess of 80%, and regularly as high as 100%

Note:

- When operating or stabled at coastal areas, the train will encounter a humid and salty atmosphere which is extremely corrosive.
- When operating or stabled inland, the train will experience dry, dusty and windy conditions.
- When operating, the train will encounter driving rain and wind, with a risk of lightning strikes.
- During certain periods of the year, grass seeds and dry leaves could pose a threat to air inlets and filters.

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2.2 Vehicle acceleration

The supplier must note that acceleration forces in a train can be high. These accelerations can be caused by shunting or during in- train dynamics (buffing impact). Suppliers shall clearly indicate what precautions they would take to prevent or minimize risk of failures caused by such accelerations. The equipment shall be capable of withstanding inertia loads associated with the following extreme acceleration levels:

- Longitudinally, (acceleration In x-direction) $\pm 5g$
- Laterally, (acceleration In y-direction) $\pm 1g$
- Vertical, (accelerations in z-direction) $(\pm 1g)^*$

* = 2 at the vehicle end, falling linearly to 0,5g at the vehicle centre.

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3. Design and performance requirements

- 3.1. The diesel engine is a Kirloskar 6SL8800TA model.
- 3.2. Only the muffler is required, the piping will be done by Transnet Engineering.
- 3.3. The muffler should reduce the exhaust noise level to 70 dBA or less.
- 3.4. The muffler must fit into a cylindrical space with the following dimensions:
 - 3.4.1. 400 mm diameter
 - 3.4.2. 1400 mm length
 - 3.4.3. The muffler will be installed in a pocket on the roof of the coach.
- 3.5. The supplier must supply all necessary equipment for fitment of the muffler.
- 3.6. The exhaust pipe has an outer diameter of 133 mm.
- 3.7. Suppliers are welcome to verify any physical details or dimensions with the procurement officer in charge.
- 3.8. Any drawing or other necessary documentation can be requested from the procurement officer in charge. The drawing in Figure 3.1 is PEC084A0158.

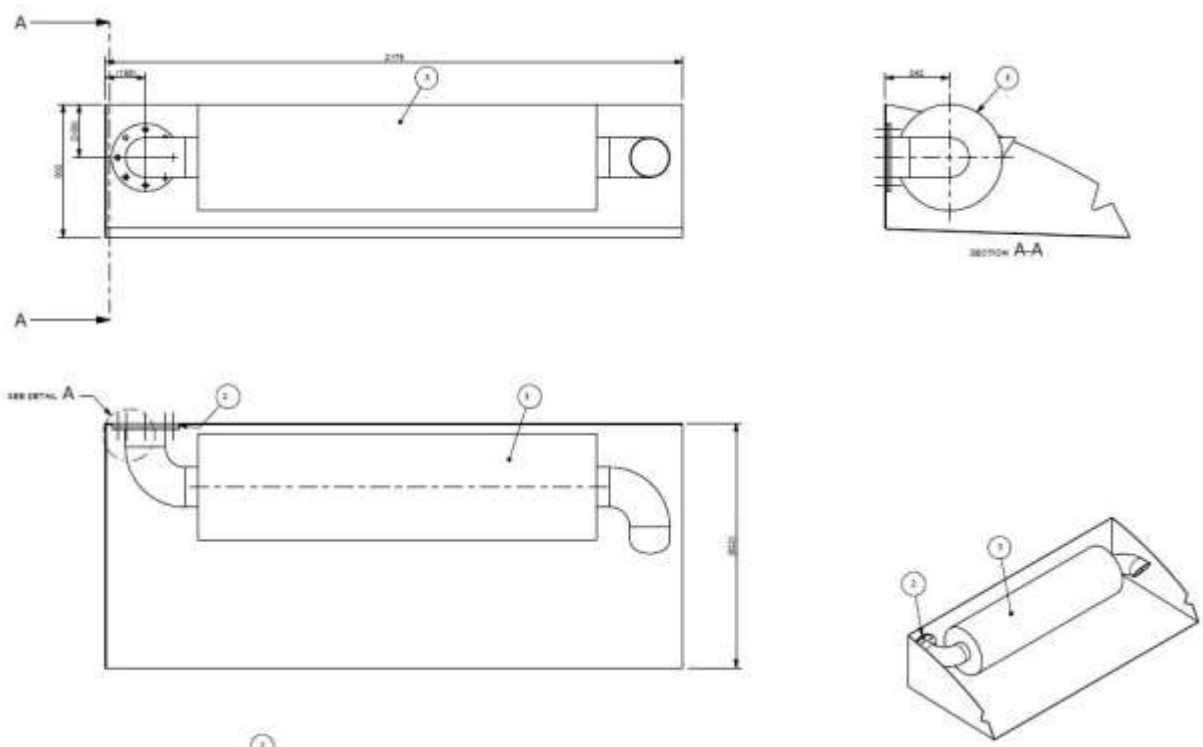


Figure 3.1. Drawing of the position for the muffler.

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4. Quality assurance

- 4.1. The supplier shall be required to install and operate a quality management system which is based on international standard ISO 9001.
- 4.2. Transnet engineering's quality requirements as per PD_SES_NAT_QA_SPEC_0023/001 quality assurance specification shall be adhered to at all times.

5. General requirements

- 5.1. Suppliers shall compile a clause by clause response in full and must indicate whether their offer complies with each of the specifications in Section 3. Design and performance requirements.
- 5.2. The supplier/bidder shall submit a design proposal for the muffler required as described in this specification.
- 5.3. If necessary the suppliers shall be invited to present the concept to the Transnet technical team for clarification purposes only.
- 5.4. Failure to submit a design proposal with this tender will be viewed as unresponsive and will be treated as technically non-compliant.
- 5.5. Any technical queries from the supplier shall be done so through the procurement officer in charge.
- 5.6. Any referenced specification can be obtained from the configuration office via the procurement officer in charge.
- 5.7. The supplier shall assist and provide training for the installation of the muffler.
- 5.8. Complete maintenance manual, installation guides and spare part list must be provided.
- 5.9. First Article Inspection (FAI) will be conducted in two stages; the first stage will be at the supplier's premises and the second will be the TE premises after fitment to the coach.
- 5.10. All equipment and construction whether detailed in this specification or not shall comply with the requirements of the occupational health and safety act (Act 85 of 1993) as amended by applicable authorities.

- 5.11. This specification states the minimum requirements related to the work and in no way absolves the tenderer responsibility for sound engineering practice.
- 5.12. The work shall be carried out in an efficient and professional manner in accordance with this specification and to the satisfaction of the technical team in charge. Unless otherwise specifically stated in this document, all materials and equipment shall be new, free from rust, defects, undamaged and suitable for the purpose for which it will be used.
- 5.13. The equipment as made and supplied shall be complete in every respect, using the most advanced proven technology extensively supported by reputable local companies and be built to good engineering practice.
- 5.14. Any omissions or sub-standard requirements of this specification shall be brought to the attention of Transnet at the tender stage.

6. Warranty

- 6.1. The tenderer shall guarantee for a period of 24 months after successful commissioning of the coach that all components and materials are new and fit for the specific purpose which they are purchased for and free from any defects in design, workmanship and material and are in strict accordance with the contract, unless otherwise agreed in writing. Defective equipment shall be replaced at the supplier's costs.
- 6.2. If any specific component, fail more than three times within two years after commissioning of the equipment, Transnet Engineering could, after due consultations with the contractor, declare such a component "inherently defective". The contractor will then become liable for re-design, or replacement of the specific component(s) with superior components.

7. Product packaging and marking

The product shall be packaged in a kit form to prevent transportation and storage damage. Each component must be clearly marked with an item number.

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