



Durability Test of Exhaust Pipe Connections

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. Determination of the dynamic strength in a bench test.

1.2 Applicability. For all pipe connections of mufflers, catalytic converters, diesel particulate filters and connecting flanges.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

None

2.3 Additional References.

Component Technical Specification (CTS)/Drawing Specification

3 Resources

3.1 Facilities. Force controlled test bench with closed control loop, travel sensor and cycle counter. The test device shall be suitable for dynamic forces of 100 N to 2000 N with regard to a test frequency range of 10 Hz to 20 Hz (sine). The test facility shall have a valid International Organization for Standardization (ISO) certificate which is noted in a test report.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment.

3.2.1 Peak Value Recorder. Peak value recorder to automatically record the oscillation amplitude, with automatic shutoff for the testing machine when the oscillation amplitude exceeds the adjusted limiting values.

3.2.2 Attachment of Test Piece.

3.2.2.1 Attachment of Flange. The flange shall be attached on a rigid fixing device without gasket with regard to bolted joint specified by drawing. The connection shall be such that pipe connection/welded joint of the flange is not impaired.

The force application shall ensure the malleability of the pipe. The force shall be located according to paragraph 3.2.2.2.

3.2.2.2 Attachment of Mufflers, Catalytic Converters and Diesel Particulate Filters. The test piece shall be mounted such that the pipe connection is not impaired (see Figure 1).

The force application shall ensure the malleability of the pipe. A link with a Universal (U)-joint at the ends shall be installed between load cell and force application.

3.3 Test Vehicle/Test Piece. At least five (5) new production parts shall be tested for each pipe connection/type. The parts shall be produced as specified by assembly drawing. The pipe length shall be ≥ 200 mm, however ≤ 300 mm measured from pipe welding joint. Pipe connections shall be extended with a pipe as specified by drawing, if necessary. To the correct lug-in depth, tightening torque of the production clip shall be ensured, in order to guarantee a defined rigidity at the connection point.

Conditioning of parts, if applicable, shall be taken from the Component Technical Specification (CTS)/Drawing Specification.

3.4 Test Time. The actual test duration is dependent on specific test conditions.

Calendar time: 3 days

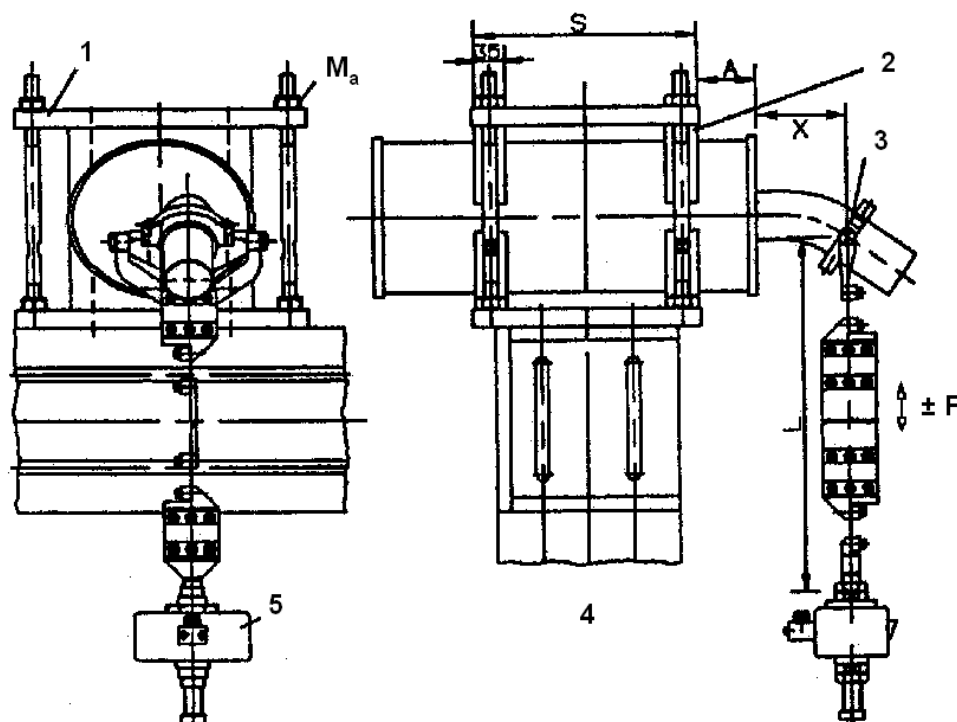
Test hours: 50 hours

Coordination hours: 2 hours

3.5 Test Required Information. Component Technical Specification (CTS)/Drawing Specification.

3.6 Personnel/Skills. Technician basic skills needed:

- Ability to perform exhaust component changes.
- Skilled in test bench usage.



Note:

1 Base plates.

2 Clamping claws.

3 Force application.

4 Universal clamping system.

5 Force gauge 5 kN maximum.

A = Distance between bottom of pot and clamping claw A = 65 mm.

L = The length of force application measured from load cell connection to the center of pipe connection shall be 150 mm minimum.

M_a = The tightening torque of clamping claw shall be selected in such a way that the pot casing is neither deformed nor impaired.

S = Muffler clamping length S = 245 mm.

X = Lever arm measured from center of pipe welding joint to center of force application; X = 150 mm.

Figure 1: Muffler Schematic