



Testing the Force Fit of Exhaust Pipe Clamped 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. Determining the force fit of exhaust system pipe connections in laboratory test.

1.2 Applicability. For all exhaust system pipe connections which are connected by means of a clamp.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW15261

2.3 Additional References.

- Component Technical Specification (CTS)
- Exhaust Pipe Part Drawing
- Subsystem Technical Specification (SSTS)

3 Resources

3.1 Facilities.

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 Heating oven to condition the pipe connection to a minimum of +600 °C for 1 h.

3.2.2 Torsion testing device.

3.2.2.1 Data acquisition (X-Y recorder).

3.2.2.2 Torque load cell with a measuring range of 10 N·m to 500 N·m.

3.2.2.3 Torque angle gauge with a measuring range of 0 degrees to 90 degrees.

3.2.2.4 Leak measuring equipment according to GMW15261.

3.3 Test Vehicle/Test Piece. The test shall be performed on five (5) new, 300 mm long pipe sections, manufactured under production representative conditions, the dimensions of which are in the upper tolerance range, according to the drawing specifications. The surface properties of the pipe sections shall correspond to the series production parts, as per the part drawing for the pipe.

3.4 Test Time.

Calendar time: 1 week
 Test hours: 40 hours
 Coordination hours: 2 hours

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Experience and training in the use of the referenced test equipment are required. Prior experience and training in setting up and running this procedure or similar tests will be beneficial to achieving a successful test.

4 Procedure

4.1 Preparation. See 4.3.

4.2 Conditions.

4.2.1 Environmental Conditions. Not applicable.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.3 Instructions.

4.3.1 Pairing the Pipe Sections. To pair the pipe sections, the 300 mm long sections of insert and push-on pipes shall be measured in the connection area. The outer lower (minimum) and upper (maximum) diameters of the insert pipe shall be determined. The inner lower (minimum) and upper (maximum) diameters of the push-on pipe shall be determined.

The measured values shall be documented in Table 1.

To pair the pipe sections, the tolerances of the insert and push-on pipes (Column I in Table 1) shall be in the upper range.

Table 1: Pipe Pairing Report ^{Note 2}

Pipe wall thickness: _____ Pipe material: _____ Surface condition: _____ Pipe manufacturer: _____								
A	B	C	D	E	F	G	H	I
Insert Pipe - Outer Diameter (mm)				Push-On Pipe - Inner Diameter (mm)				
Part Number	Minimum (Min)	Maximum (Max)	Average Value	Part Number	Minimum (Min)	Maximum (Max)	Average Value	Tolerance
	$\geq \text{Nominal}_{\text{Min}}$ Note 1	$\geq \text{Nominal}_{\text{Max}}$ Note 1			$\geq \text{Nominal}_{\text{Min}}$ Note 1	$\geq \text{Nominal}_{\text{Max}}$ Note 1		

Note 1: Nominal value in accordance with Component Technical Specification (CTS)/part drawing.

Note 2: Test number of pipe = Column A, E; Measured pipe diameter = Column B, C, F, G; Column D = $(B + C)/2$; Column H = $(F + G)/2$; Column I = H – D.