



SURFACE VEHICLE RECOMMENDED PRACTICE	J1333™	DEC2020
	Issued 1990-03 Revised 2015-03 Reaffirmed 2020-12	
Superseding J1333 MAR2015		
Hydraulic Cylinder Rod Corrosion Test		

RATIONALE

SAE J1333 has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE

SAE J1333 applies to hydraulic cylinders which are components of self-propelled work machines defined in SAE J1116.

1.1 Purpose

The purpose of SAE J1333 is to provide a laboratory method for determining the capacity of a hydraulic cylinder rod to resist corrosion, and the other cylinder components to withstand corrosion of the cylinder rod.

2. REFERENCES

2.1 Applicable Publications

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest version of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE J1116 Categories of Off-Road Self-Propelled Work Machines

SAE J1276 Standardized Fluid for Hydraulic Component Tests

SAE J1336 Hydraulic Cylinder Leakage Test

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For more information on this standard, visit
https://www.sae.org/standards/content/J1333_202012

2.1.2 ISO Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ISO 4406 Hydraulic fluid power - Fluids - Method for coding the level of contamination by solid particles

2.1.3 ASTM Documents

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org

ASTM B 117 Method of Salt Spray (Fog) Testing

ASTM B 368 Method for Copper-Accelerated Acetic Acid-Salt Spray (Fog) Testing (CASS Test)

3. DEFINITIONS

3.1 AVERAGE CYLINDER ROD VELOCITY

The sum of twice the stroke length divided by the sum of the movement time for the rod to extend and retract.

3.2 CYCLE

One extension and retraction of the cylinder rod for a specified stroke length.

3.3 CYCLE RATE

The number of cycles per unit of time.

3.4 RATED PRESSURE

The continuous duty operating pressure specified by the manufacturer.

3.5 SIDE LOAD

A continuous force which is in a direction, unless otherwise specified, perpendicular to the axial loading or the cylinder to simulate loading due to external forces on the cylinder as defined by the user.

3.6 STROKE LENGTH

The total distance traveled by the piston in completing one-half cycle.

4. TESTING CONDITIONS

4.1 Accuracy of Measurement

The accuracy of measurement unless otherwise stated shall be as follows:

- a. Temperature ± 3 °C (± 5 °F)
- b. Pressure $\pm 2\%$
- c. Leakage $\pm 2\%$
- d. Time $\pm 2\%$
- e. Length $\pm 2\%$

4.2 Test Fluids

The test fluid shall be SAE J1276 unless otherwise specified.

4.3 Fluid Test Temperature

The fluid test temperature, measured in the supply line, shall be 50 °C (122 °F) or 110 °C (230 °F) or as agreed between user and supplier.

4.4 Test Pressure

Operational test pressure shall be the manufacturer's rated pressure and measured at the cylinder work ports. A 10% transient overshoot is permissible unless another amount is agreed upon by the user.

4.5 Pressure Rise Rate

The pressure rise rate shall be a minimum of 150 MPa (21 755 psi) per second:

4.6 Contamination Level

Test system shall have a contamination level not to exceed ISO 4406 solid contaminant code -/19/16.

4.7 Stroke Length

The length of stroke for the operational test shall be equal to at least 15% of the maximum stroke length of the hydraulic cylinder.

4.8 Cycle Rate

The cycle rate shall be as specified by the manufacturer.

5. TEST EQUIPMENT

5.1 Salt-Fog Chamber

Use a salt-fog chamber having an atomizer and air circulating system, see ASTM B 117.

5.2 Test Fixture

Use a suitable test fixture, for example, an oscillating beam type, a conventional in-line beam type, or similar fixture, in which the test cylinder can be loaded and driven in either direction under both static and dynamic conditions with a side load.