

Material Standards & Specifications

Specialty Products Company



MSS	4.010	Ball Joint Performance Test
Approved by:	CCH	
Revision:	B	
Date:	08/11/15	

Scope:

This test is to cover ball joint assemblies purchased to SPC designs.

Background:

A specification was needed to cover ball joint performance criteria such as markings, turning torque, pullout/pushout strength and articulation angles.

General Requirements:

- Assemblies are to be clean and free of debris.
- Assemblies are to be shipped in a manner to prevent damage to the parts.
- Assemblies are to be complete as received with all parts to print.
- All required markings are to be clear, legible and as specified on the drawings.
- All finishes must conform to print requirements.
- Grease boots are to be installed properly and must not be cracked or torn.
- Grease boots must be colored as required by the drawings.
- Grease/lubricant must be applied per drawing.
- Other certifications must be provided by the supplier as required.

Articulation Test:

- The specific articulation range of the ball joint stud with respect to the housing is critical to proper application performance and shall be as called out on the drawing for the assembly.
- Articulation is to be measured as ball joint stud motion with respect to its housing starting from the neutral or centered position to its extreme position.
 - For example: $\pm 30^\circ$ would require a total articulation of 60°
 - Articulation angle is omni-directional unless otherwise specified
- The ball joint grease boot should stay in place for the full range of articulation.

Turning Torque:

- Turning torque is a proven indication of proper part fit and wear capability.
- When turning the ball joint stud with respect to its housing the test should be done at low speed, either by hand or with a fixture.
 - Torque measurement must be taken with a calibrated tool or sensor
 - Stud or the housing may be clamped in a stationary position in a manner to prevent addition of external clamping pressure which may affect torque readings.
 - Torque testing should be performed no less than 48 h after assembly.
 - Rotate stud a minimum of five complete revolutions to minimize congelation and other factors prior to recording torque.

- The ball joint boot may be removed for torque testing.
- Stud should be normal (90°) to opening where it protrudes from housing during testing.
- Turning speed should be approximately 5 RPM unless specified on the drawing.

Pullout/Pushout Test:

- The pullout strength of the ball joint assembly is a proven indication of its capability to perform as needed
- This is a test to failure of the ball joint stud with respect to its housing.
- Pullout testing should be done with a hydraulic test stand capable of pulling apart the ball joint assembly in a slow-steady motion:
 - A hand pump is acceptable for hydraulic power.
 - The load should be applied at a slow-steady rate without impact or jerking.
 - Pulling speed should not exceed 0.2 [INCH/SEC]
 - All loads must be taken with calibrated gauges or sensors.
 - The direction of load should be with the ball joint stud in the centered or neutral position.
 - Max pullout strength and failure mode should be recorded for each test specimen. (Example: Load-3550 [LBF] Mode-Stud pulled through retainer ring)
 - The rubber boot and excess grease should be removed prior to testing
 - Proper Personal Protective Equipment should be worn during testing. Safety glasses are a minimum requirement. Watch out for any flying debris from the ball joint!
 - Visually examine each test specimen before and after testing. If any anomalies are found prior to testing submit parts to Quality for evaluation. Report any testing anomalies to Engineering for evaluation.

Cam-out Test:

- The cam-out strength of the ball joint assembly is an accepted method of test for ball joint assemblies where the loading on the stud is approximately at a right angle to the housing.
- This test is to be run with a fixture as shown in SAE J193 or with IP-103-9 SPC fixture.
 - A hand pump is acceptable for hydraulic power.
 - The load should be applied at a slow-steady rate without impact or jerking.
 - Pulling speed should not exceed 0.2 [INCH/SEC]
 - All loads must be taken with calibrated gauges or sensors.
 - The direction of load should be with the ball joint stud in the centered or neutral position.
 - Max pullout strength and failure mode should be recorded for each test specimen. (Example: Load-3550 [LBF] Mode-Stud pulled through retainer ring)
 - The rubber boot and excess grease should be removed prior to testing
 - Proper Personal Protective Equipment should be worn during testing. Safety glasses are a minimum requirement. Watch out for any flying debris from the ball joint!
 - Visually examine each test specimen before and after testing. If any anomalies are found prior to testing submit parts to Quality for evaluation. Report any testing anomalies to Engineering for evaluation.