

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS FT-9553 Former Designation: TMS-9553
TITLE: Assembly and Testing Procedures for Projection Weld Nuts or Studs		CURRENT REV No.: 1404
		DATE: April 2014
WRITTEN/EDITED BY: Materials Engineering	APPROVED BY: Materials Engineering	SUPERSEDES: TMS-9553 – Feb. 2011
PRINTED COPIES OF THIS DOCUMENT MUST BE VERIFIED FOR CURRENT REVISION		
<i>This specification may involve hazardous materials, equipment, and procedures. This specification does not purport to address all of the safety issues associated with its use. The user is responsible to consult appropriate safety and health practices and to determine the applicability of regulatory limits prior to use.</i>		
Change Notice: Changed to new MPAPS format; editorial changes.		

1.0 APPLICATION

This specification is applicable to all NAVISTAR projection weld nuts and weld studs whose Engineering drawings, part assembly drawings, or installation drawings reference this specification. This specification is also applicable to NAVISTAR Engineering Standard Parts whose General Specifications (GS) reference this specification.

2.0 SCOPE

This specification covers assembly and testing procedures for projection weld nuts and studs. A quality plan and KCC values are included. Minimum values for the break-away torque and push-out force are shown in Table 1 for each projection weld nut size.

2.1 Restricted Chemical Substances

Effective January 1, 2007, all product supplied to the requirements of this specification must comply with the requirements of the MPAPS B-50 specification.

3.0 REFERENCE DOCUMENTS

Unless otherwise specified the latest issue of all referenced standards shall apply. The following specifications, standards, and regulations are referenced in this specification:

Quality System Standard ISO 9001 or TS-16949
 NAVISTAR Eng. Design Standard A-16
 NAVISTAR Manufacturing Standard MS-D-13
 NAVISTAR MPAPS A-6, Part I

NAVISTAR Eng. Standard Parts, Section E
 CFR Title 29, Part 1910
 MPAPS B-50

4.0 REQUIREMENTS

4.1 Projection Weld Process

The projection weld is a resistance weld. The weld nut/stud and base metal are pressed together by the electrodes. The flow of electrical current/fusion between the weld nut/stud and base metal is localized. Fusion occurs at points predetermined by the contact of three or more projections on the weld nut/stud with the subjacent base metal. The weld process should be controlled such that the fusion zone or fusion area at each projection shall not be less than 70 % of the base area of the projection.

4.2 Assembly Procedure

When the clamp force is applied to the upper and lower electrodes, the weld current is turned on and projections on the weld nut are fused to the workpiece. The production installation tooling and weld assembly process is validated by the performance of (destructive) validation tests in which the weld nut is twisted off or pushed out of the workpiece. The production assembly procedure is tested and

This document is restricted and may not be sent outside Navistar, Inc. or reproduced without permission from Corporate Technical Standards. Suppliers are required to assume all patent liability. ©2014 by Navistar, Inc.

APRIL 2014



Documents

Page 1 of 6

Document Sharing Hub

NUMBER: MPAPS FT-9553	TITLE: Assembly and Testing Procedures for Weld Nuts and Studs	REVISION: APRIL 2014
--	---	---------------------------------------

verified by the performance of (non-destructive) torsional and push-out tests in which a minimum torque value and push-out force are applied to verify that the weld nut has been properly installed on the workpiece.

4.3 Test Procedure

Each weld nut size and material thickness combination shall be tested to establish and validate the installation tooling and assembly process for that nut size and material thickness combination. Sufficient testing shall be performed to fully define and establish control limits for those process parameters affecting the performance/strength of the nut joint. Periodic validation (destructive) testing during each production run shall be performed as required to demonstrate that the assembly and weld process are both in-control and capable of meeting the minimum push-out force and twist-off torque values described in Table 1 for that size nut. Periodic in-process verification (non-destructive) testing during each production shift (8-hours) shall be performed as required to verify performance to minimum push-out and torque values as described in Table 2 for each size weld nut and material thickness combination.

4.3.1 Validation Testing

These are destructive tests performed to failure of the nut joint. The tests may be performed on production parts/panels or on test coupons of the same material and thickness as the production parts and with weld nuts installed using the production tooling. Note: For validation testing, damage pertains to loosening of the nut; distortion of the part or test panel is allowable. Frequency of testing will be determined by the manufacturing plant quality control department and will be included in the Quality Control Plan for each part.

4.3.1.1 Push-Out Validation Test

After assembly of the nut in the part or test coupon, the part or coupon is clamped in a test fixture as shown in Figure 1. A load is applied in the direction indicated and the load is increased to failure. The peak value of the load must meet or exceed the value shown in Table 1 for that nut size and material thickness combination.

4.3.1.2 Torque-Out or Twist-Off Validation Test

After assembly of the nut in the part or test coupon, the part or coupon is clamped in a test fixture as shown in Figure 2. A torque is applied in the direction indicated and the torque increased to failure. The peak value of the torque must meet or exceed the value shown in Table 1 for that nut size and material thickness combination.

4.3.2 In-Process Testing

These are non-destructive tests performed to verify satisfactory performance of the nut joint and to assure that the assembly process is in control. The tests are performed on the nuts after assembly in the production parts/panels. Frequency of testing will be determined by the manufacturing plant quality control department and will be a part of the Quality Control Plan for each part.

4.3.2.1 Push-Out or Pull-Out In-Process Test

After assembly of the nut in the production part, the part is held or clamped in a test fixture as shown in Figure 1. A test load is applied as indicated in Table 2 for that size nut and material thickness combination. There shall be no loosening of the nut and no damage to the part after application of the minimum load as indicated in Table 2.

4.3.2.2 Torque-Out or Twist-Off In-Process Test

After assembly of the nut in the production part, the part is held or clamped in a test fixture as shown