



Self-Piercing Rivets Acceptance and Repair Methods

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. This specification provides the acceptance criteria for product joined by self-piercing rivets (SPR).

1.2 Applicability. Self-piercing rivets are rivets that do not require a pre-punched hole, but are pushed through the stack-up by a punch, and are flared by a die to join two or more layers together. The criteria established in this specification become mandatory when referenced on a product drawing or Statement of Requirements (SOR). Deviations from any acceptance criteria provided in this standard must be identified on the product drawing, an approved Product Quality Standard (PQS), a specific product/program supplement or in the Statement of Requirements.

1.3 Remarks. Self-piercing riveted joints are considered satisfactory when they meet the expected design service loads and satisfy functional performance requirements. The evaluation criteria contained in this document have been established as a basis for the manufacturing acceptance of self-piercing riveted joints and are the same for all applications using self-piercing rivets regardless of service load. Furthermore, riveted joints identified as discrepant often retain a percentage of their mechanical properties and may contribute to the integrity of the product.

For clarification of this standard or editorial comments, email the GM Global Weld Council at weld.council@gm.com.

Proposed changes to this standard must be presented to the Global Weld Council. To suggest a change to this standard, reference the "Procedure for Weld Standard Changes" on the Global Weld Council's web page.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW14057	GMW15563	GMW16804	GMW17330
GMW14085	GMW16435	GMW17000	

2.3 Additional References.

- GM Global Manufacturing System (GMS) Operating Guidelines and Global Launch Manual
- GM Global Quality Requirements for Corrective Action and Nonconforming Material
- GM Information Lifecycle Policy
- GM Weld Council at weld.council@gm.com
- Statement of Requirements (SOR)

3 Requirements

3.1 General Acceptance Criteria.

3.1.1 Correct Part Usage. Correct part usage includes the correct type (raised head - Figure 1, flush head – Figure 2), the correct head diameter and the correct shank diameter. An incorrect type (flush head vs. raised

head), or the wrong head diameter rivet, or the wrong shank diameter of self-piercing rivet that is installed in a joint is discrepant.

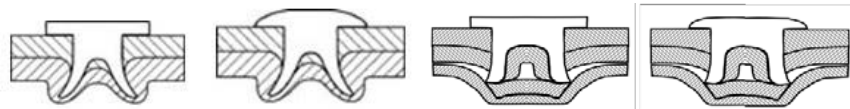


Figure 1: Raised Head 2T and 3T

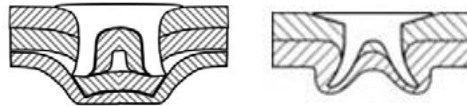


Figure 2: Flush Head 2T and 3T

3.2 Visual Acceptance Criteria.

3.2.1 Visual Criteria – Discrepant. The following criteria are discrepant conditions that can affect the conformance of the assembly.

3.2.1.1 Missing. Self-piercing rivets that are missing are discrepant.

3.2.1.2 Cracks. Riveted parts with cracks that are detectable in or around the rivet (except as shown in Figure 3) are discrepant. Part that exhibit bottom material cracks should be examined. Cracks in bottom material should not reach the rivet legs.

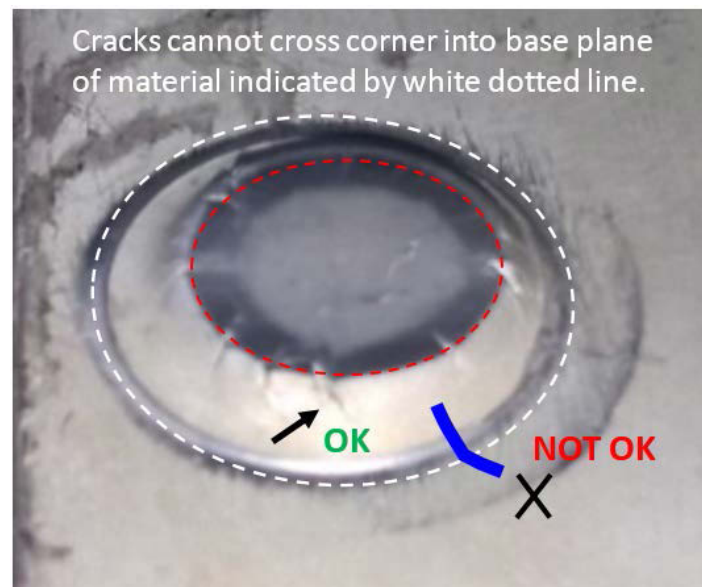


Figure 3: Crack Acceptance Criteria Zones on Die Side of Joint
(Shown Riveted with Flat Bottom Die)

3.2.1.3 Cracks in Three-Layer 2T Body-side Outer Rivets (Attachment Applications Only). A self-piercing rivet with a visual crack in the bottom layer (die side) of the joint, and extending into the base plane of material is discrepant.

3.2.1.4 Rivet break-through. A self-piercing rivet is discrepant if it breaks through the bottom sheet (die side). A joint with rivet break-through (see Figure 4) is discrepant.

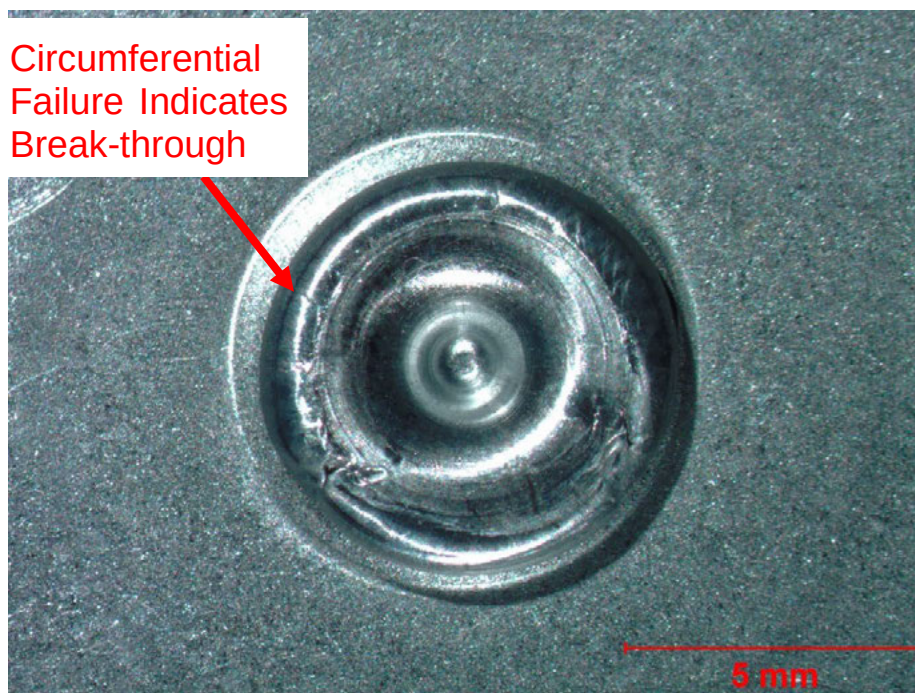


Figure 4: Rivet Break-through Example on Die Side of Joint (Shown Riveted with PIP Die)

3.2.1.5 Splits/Internal Fractures. A joint with split marks on the die side (See Figure 5) indicating internal fractures of the rivet is discrepant.



Figure 5: Split Marks/Internal Fractures Example on Die Side of Joint (Shown Riveted with PIP Die)

3.2.1.6 Button Disengagement. A self-piercing rivet with which the bottom layer of material below the rivet head material is missing is discrepant (Button dis-engagement). See Figure 6. Contact Product Engineering Design Release Engineer for specific repair methods.