



Hem Flange Adhesive Acceptance Criteria and Repair Procedures

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 standard provides the acceptance criteria and repair procedures for hem flange adhesive(s) applications in automotive products for which GM is responsible for establishing or approving product design.

1.2 Applicability. This standard applies to any application where a hem flange adhesive is used for bonding exterior automotive closure panels.

The criteria established in this standard become mandatory when referenced in product release information or an approved Product Quality Standard (PQS) document. Deviations from any adhesive criteria provided in this standard must be identified in product release information or an approved PQS document.

1.3 Remarks. Hem adhesive applications are considered satisfactory when they meet the acceptance criteria defined in this standard, the sealer visual aid, and/or program specific PQS.

1.4 Clarification. For clarification of this standard or editorial comments, email the GM 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 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.

GMW15563

2.3 Additional References.

- Global Manufacturing System (GMS) Operating Guidelines.
- Global Quality Requirements.
- Procedure for Weld Standard Changes.

3 Requirements

3.1 General Acceptance Criteria.

3.1.1 Correct Material. The hem adhesive applied shall be the material specified in the design release documentation and/or the Process Data Sheet for Sealer Application (see Appendix A, Figures A1 and A2). The product is non-conforming if incorrect material is being applied.

3.1.2 Expired Material. The hem adhesive applied shall be use prior to the expiration date found on the material container. Use of expired material causes the product to be non-conforming.

3.1.3 Substrate Condition. Cleaning of the faying surfaces is not required unless visibly contaminated by dirt, dust, oil, corrosion, or other foreign matter. Preparation of the faying surfaces is not required unless specified in the material specifications.

3.2 Visual Acceptance Criteria.

3.2.1 Location. The bead position across the flange or panel may be adjusted to achieve wet out, fill the hem nose, squeeze out to the inside of the panel, post-cure bond line, and to minimize or eliminate excess material squeezed out of the exterior part of the joint. The bead position on the flange, including the start and stop location, is properly located when installed within 6 mm from the start and stop location indicated in the design release documentation and/or the Sealer Visual Aid (see Figure A2). Beads not properly located require the process to be adjusted to the specified start and stop locations as well as bead position along the flange (see Figure A2, A3, and A4). The final location, assembly criteria, and post-cure tear down criteria based on the validation process will be documented in the Sealer Visual Aid or PQS (see Figures A2, A3 and A4). Any tune-in or process change requires verification by destructive test and documentation.

3.2.2 Missing Bead. The hem adhesive applied shall be applied as defined in the Sealer Visual Aid or PQS. Missing beads-cause the product to be non-conforming.

3.3 Measurable Acceptance Criteria.

3.3.1 Wet Out. Wet out is defined as the “footprint” of adhesive surface area on each of the panels of the hem joint that the adhesive covers pre-cure/before paint. Wet out acceptance criteria is to be documented through use of a PQS.

3.3.2 Bond Line. Bond Line is defined as the “footprint” of adhesive surface area on each of the panels in a hem joint that the adhesive covers post-cure. Bond line must be validated after post sealer/primer bake for all closures hem adhesive. See Appendix C for procedure.

3.3.3 Bond Line Width. The post-cure bond line width on the inner panel hem flange and outer panel hem flange mating surface is to be 100% of the inner flange width (see Figure A5) in the high risk corrosion areas (see Appendix D). If the bond line width is less than 100% of the inner hem flange in the high-risk corrosion areas then the bead is to be adjusted to eliminate the condition.

3.3.4 Voids, Skips or Interruptions. Any voids, skips or interruptions in hem adhesive bead applications in high-risk corrosion areas cause the product to be non-conforming and the bead needs to be adjusted. Any voids, skips or interruptions in adhesive bead applications larger than 10 mm in areas other than high-risk corrosion areas cause the product to be non-conforming and the bead needs to be adjusted. See Table 1 for bond line length requirements. Skips, voids, or interruptions in high-risk corrosion areas (see Appendix D) cause the product to be non-conforming.

Table 1: Bond Line Length Targets for Hem Adhesive ^{Note 1}

Specified Hem Adhesive Bond Length Location	Maximum Allowable Length (mm) for any Single Discontinuity (Post-Cure)
High risk corrosion area	0
All others	10 mm ^{Note 2}

Note 1: Effective Bond Length is defined as $Le = La - Ld$.

Where:

Le = Effective Bond Length

La = Actual Bond Length

Ld = Combined discontinuity lengths

Note 2: No more than a 20% total discontinuity in a released bead allowed.

3.4 Disposition/Repair Procedure.

3.4.1 All known and suspect product with non-conforming hem adhesive bonds must be handled in accordance with Global Quality Requirements for corrective action and non-conforming material. See Table B1 in Appendix B to determine when a hem adhesive bond is discrepant.

3.4.2 When required, repair of parts, assemblies, or vehicles with non-conforming hem adhesive bonds shall be performed according to the procedures specifically authorized by the appropriate Product Engineer.

4 Manufacturing Process

4.1 Process Control. The source is responsible for establishing practices and test methods to assure that the criteria of this standard are met and are consistent with the GM Joining and Dispense Process Control Procedure, GMW15563.

4.2 Adhesive Cure Control. The painting source is responsible for establishing practices and test methods to assure that the cure and/or post-cure cycle criteria are met and are consistent with the applicable material specifications.

5 Notes

5.1 Glossary.

Bond Line: Intermediate layer of adhesive used to connect substrates of similar or different materials.

Faying Surfaces: Pre-bonded pair of close-fitting surfaces that are to be connected.

Product Quality Standard (PQS): Measurable requirements for product characteristics which, when satisfied, ensure the product meets internal and external customer requirements. (Refer to GMS Operating Guidelines.)

Source: The source is the facility installing or applying the hem adhesive.

5.2 Acronyms, Abbreviations, and Symbols.

ELPO Electrodeposition Priming Operation

GMS Global Manufacturing System

PQS Product Quality Standard

6 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:

GMW17153

7 Release and Revisions

This standard was originated in March 2014. It was first approved by the GM Global Weld Council in October 2014. It was first published in October 2014.

Issue	Publication Date	Description (Organization)
1	OCT 2014	Initial publication.

Appendix A

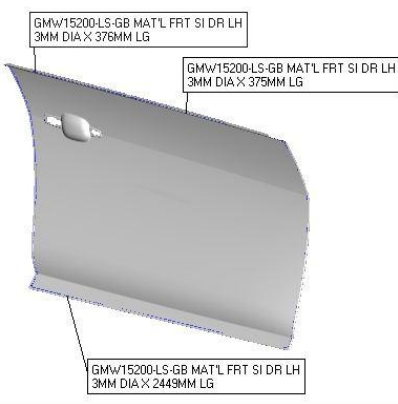
GM		Process Data Sheet - Sealer/Adhesive Application				Proprietary									
Supplier Name *	Geometric		Station Number *	SA110_B01											
Process Engineer *	Holly Davis		Description	Pedestal Sealer											
Project Name *	DHAM_GMX351_Current_Production		Tool Number	MAM05578L											
Project Version *	020	Model Year	2014	Number	Model	Station Function	Sealer								
* Indicates Required Fields															
--- UNCONTROLLED WHEN PRINTED ---															
				NOTES: Image illustrates start diameter and location only. Dispense material to achieve wet-out and applicable appearance standards. Tune in bead to eliminate squeeze out and evaluate to the product release information and or an approved Product Quality Standards (PQS). Follow local work instructions to document changes. See Sealer Visual Aid for set-up dimensions and math deviations. (GMNA)											
<table border="1"> <thead> <tr> <th>Part</th> <th>Rev</th> <th>Part Description</th> </tr> </thead> <tbody> <tr> <td>AKY29791</td> <td>001</td> <td>GMW15200-LS-GB MAT'L FRT SI DR LH</td> </tr> </tbody> </table>				Part	Rev	Part Description	AKY29791	001	GMW15200-LS-GB MAT'L FRT SI DR LH	<table border="1"> <thead> <tr> <th>Comments</th> </tr> </thead> <tbody> <tr> <td> </td> </tr> </tbody> </table>				Comments	
Part	Rev	Part Description													
AKY29791	001	GMW15200-LS-GB MAT'L FRT SI DR LH													
Comments															

Figure A1: Process Data Sheet for Hem Flange Adhesive Application

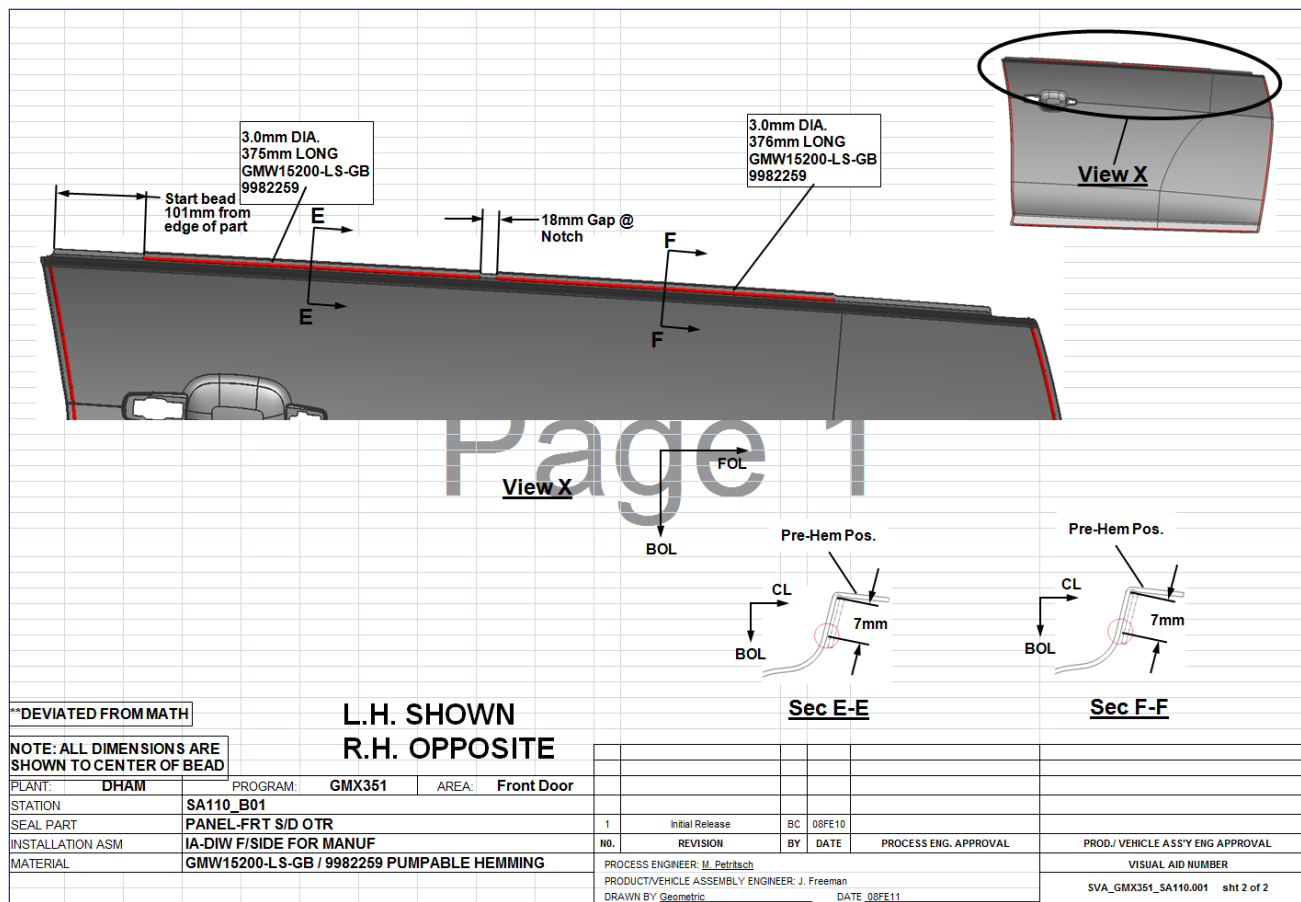


Figure A2: Sealer Visual Aid for Hem Flange Adhesive Application