WS-005

ITT Enidine Workmanship Standard for Elastomeric Products
## SIGNATURES OF APPROVAL

<table>
<thead>
<tr>
<th>Department</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineer</td>
<td></td>
<td>Sept 23, 2010</td>
</tr>
<tr>
<td>Production Planning</td>
<td></td>
<td>10/11/10</td>
</tr>
<tr>
<td>Quality</td>
<td>James Merkel</td>
<td>09/23/2010</td>
</tr>
</tbody>
</table>

## REVISION HISTORY

<table>
<thead>
<tr>
<th>Date:</th>
<th>Revision</th>
<th>Description</th>
<th>By:</th>
</tr>
</thead>
<tbody>
<tr>
<td>09/22/10</td>
<td>-</td>
<td>Document Creation</td>
<td>R.M. Sanetick</td>
</tr>
<tr>
<td>03/14/11</td>
<td>A</td>
<td>Updated Section 1.0</td>
<td>R. Evans</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Added Section 2.11 – PLCU Bond Adhesion Acceptance Criteria</td>
<td></td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS

## 1.0 SCOPE

1.1 OVERVIEW

1.2 DISPOSITION CRITERIA

## 2.0 INSPECTION GUIDELINES – GENERAL

2.1 TEARS AND CUTS

2.2 BOND SEPARATION

2.3 Blisters

2.4 FLOW/Knit Lines

2.5 Voids/Non-Fills

2.6 Uncured/Undercured Elastomer

2.7 Backrind

2.8 Negative Sprues

2.9 Excessive Flash

2.10 Finish/Scratches

2.11 Production Lot Confidence Units – 80% Rubber Tear Acceptance Criteria

## 3.0 INSPECTION GUIDELINES – ROD ENDS

3.1 Rod End Housing Color

3.2 Excessive Blasting

3.3 Excessive Adhesive
1.0 SCOPE

1.1 Overview

This document addresses general inspection criteria for proper workmanship of elastomeric parts. Quality shall inspect the sample lot for the conditions identified within this document in addition to the standard inspection criteria.

*This document does not supersede or replace any current Enidine quality standard or procedure. Its use is intended to assist the inspector in identifying potential quality issues. Standard inspection criteria and methods still apply.*

- Unless otherwise noted, where there is any discrepancy between this document and the part drawings the part drawings shall govern.
- Where there is any discrepancy between this document and Part-Specific Supplemental Inspection Instructions, the Part-Specific Supplemental Inspection Instructions shall govern.
- Where there is any discrepancy between Section 2.0 of this document and subsequent sections, the subsequent sections shall govern.

1.2 Disposition Criteria

This document is intended to provide general elastomeric quality criteria and guidance in identification and disposition of workmanship issues. Any anomalies not specifically identified in this document or part-specific supplemental inspection instructions shall be processed through MRB.
2.0 INSPECTION GUIDELINES – GENERAL

The following descriptions and terminologies are general quality concerns for elastomeric products. These shall be used to evaluate general part quality.

2.1 Tears and Cuts

2.1.1 Description
A rip or slice in the elastomer.

2.1.2 Assessment
Tears and Cuts in the elastomer can lead to premature part failure due to unintended stress concentration, tear propagation, and/or environmental penetration to the bond line leading to premature bond failure.

2.1.3 Disposition
Parts with Cuts and Tears are unacceptable.
2.2 Bond Separation

2.2.1 Description
Elastomer which does not adhere to the parent material.

2.2.2 Assessment
Bond Separations can lead to premature part failure due to environmental penetration to the bond line leading to premature bond failure.

2.2.3 Disposition

*Parts with Bond Separations are unacceptable.*
2.3 Blisters

2.3.1 Description
Visual evidence of air trapped under the elastomer which protrudes from an otherwise uniform elastomeric surface.

2.3.2 Assessment
Blisters indicate poor cure conditions and possibly insufficient bond due to air trap at the bond line. Blistered locations can lead to insufficient part stiffness and premature elastomer failure.

2.3.3 Disposition
Parts exhibiting blisters within the working section of the isolator are unacceptable. Blisters within non-working sections of the elastomer (thin stress relief runups) may be submitted for Engineering review through a Request for Deviation and consideration for Part-Specific Inspection Instruction inclusion. Deviations MUST be provided prior to receipt/processing of these parts.
2.4 Flow/Knit Lines

2.4.1 Description
Visually apparent lines where two elastomer fronts merged during molding and did not fully blend together to form a continuous elastomeric section.

2.4.2 Assessment
Flow/knit lines indicate a poor molding process and/or material deficiency and are likely points for elastomer failure.

2.4.3 Disposition
*Parts exhibiting Flow/Knit lines are unacceptable.*
2.5 Voids/Non-fills

2.5.1 Description
Pockets or missing areas of elastomer.

2.5.2 Assessment
Voids and Non-fills indicate a poor molding process, tool venting deficiency, and/or material deficiency.

2.5.3 Disposition
*Parts with Voids and Non-fills are unacceptable.*
2.6 Uncured/Undercured Elastomer

2.6.1 Description
Uncured or Undercured elastomer may show a tacky or porous condition. Part may not maintain molded profile.

2.6.2 Assessment
Uncured or Undercured elastomer will not give the performance properties (stiffness, durability, bond, etc.) required for cured elastomer.

2.6.3 Disposition
Parts with Uncured or Undercured elastomer are unacceptable.
2.7 Backrind

2.7.1 Description
A section of elastomer appearing ripped and recessed into the part, usually located at split-lines of the mold.

2.7.2 Assessment
Backrind indicates a poor molding process and/or material deficiency and are likely points for elastomer failure.

2.7.3 Disposition
*Parts with Backrind are unacceptable.*
2.8 Negative Sprues

2.8.1 Description
Fill locations which are below the elastomer surface. They appear as a circular void into the part. These may also appear as tears around a present sprue (the material is torn within the elastomeric section).

2.8.2 Assessment
Negative Sprues indicate a poor molding process and/or material deficiency and are likely points for elastomer failure.

2.8.3 Disposition
Parts with Negative Sprues are unacceptable.
2.9 Excessive Flash

2.9.1 Description
Flash is a thin extension of elastomer protruding from the elastomer body, usually located along mold split-lines. Excessive flash is considered to have an extension from the part surface of more than .050 inches unless otherwise specified on the drawing or other control document.

2.9.2 Assessment
Some level of flash is expected on most parts. The presence of excessive flash shows poor workmanship in mold fit and/or post-cure finishing. Flash is considered excessive if it is:
- More than .050" in length from the surface
- More than .003" in thickness

2.9.3 Disposition
*Parts with excessive flash are unacceptable.*
2.10 Finish/Scratches

2.10.1 Description
An inconsistent finish, scratches, scores, or gouges on metal components.

2.10.2 Assessment
Finish disruption may indicate abrasion within the mold or at another processing step (blasting, cleaning, handling). The resulting nonuniform finish may lead to loss of environmental protection and lack of conformity to part finish requirements. Deeper scratches or gouges may also result in the loss of part strength.

2.10.3 Disposition
Inconsistent finish is unacceptable. Part scratches or gouges with an apparent depth or that remove the material coating are unacceptable. Superficial part scratches and shut off witness lines that do not break any protective surface are acceptable.
2.11 Production Lot Confidence Units – Bond Adhesion Acceptance Criteria

2.11.1 Description
Method for calculation of bond adhesion acceptance for production lot confidence units. Minimum bond area adhesion percentage shall be specified on controlling documents.

2.11.2 Assessment
After unit separation and hand strip of elastomer, the unit shall show a minimum bond area adhesion percentage of elastomer bonded to its supporting structure. Unit is acceptable for greater than or equal to the specified minimum bond area remaining, and is unacceptable for less than the specified bond area.

\[
\text{Bond Adhesion Percent} = \left[ 1 - \left( \frac{\text{Surface Area of Unacceptable Bond}}{\text{Total Bond Area}} \right) \right] \times 100
\]

2.11.3 Disposition
If Bond Adhesion Percent \( \geq \) Minimum Bond Area Percentage, the unit is acceptable.
If Bond Adhesion Percent < Minimum Bond Area Percentage, the unit is unacceptable.
3.0 INSPECTION GUIDELINES – ROD ENDS

The following descriptions and terminologies are general quality criteria for elastomeric Rod Ends. These shall be used to evaluate general part quality.

Elastomer Rod Ends generally consist of the components described in Figure 3.1.

FIGURE 3.1 – Part Axes and Component Definitions

1 – BANJO
2 – INNER MEMBER
3 – ELASTOMER
3.1 Rod End Housing Color

3.1.1 Description:
Lot-to-lot color variation for rod end banjos.

3.1.2 Assessment
Components made from CRES may exhibit color and finish ranging from a polished silver to a matte dark gray with conforming processes.

3.1.3 Disposition
Confirmation of acceptable material and finish (with Certificates of Conformance) are sufficient to approve parts.
3.2 Excessive Blasting

3.2.1 Description:
Excessive blasting during preparation

3.2.2 Assessment
All blasted surfaces should be covered during the molding process by either adhesive or bonded elastomer.
Exposed blasting on the banjo will change surface appearance, resulting in unacceptable roughness and finish.

3.2.3 Disposition
Parts that have exposed blasted surfaces on the outer profile of the banjo or exposed inner member surfaces are not acceptable.
Blast that goes to the outer profile, shank, or is excessive on the flats (as shown) is unacceptable.
3.3 Excessive Adhesive

3.3.1 Description:
Elastomer adhesive that extends beyond the outer face diameter (as indicated) and is irregular in appearance.

3.3.2 Assessment
Excessive adhesive on the flat faces and outer profile of the banjo is a workmanship issue.
Excessive adhesive on the shank of the banjo or on the inner member will affect part fit and is not acceptable.

3.3.3 Disposition
*Parts with excessive adhesive are unacceptable.*