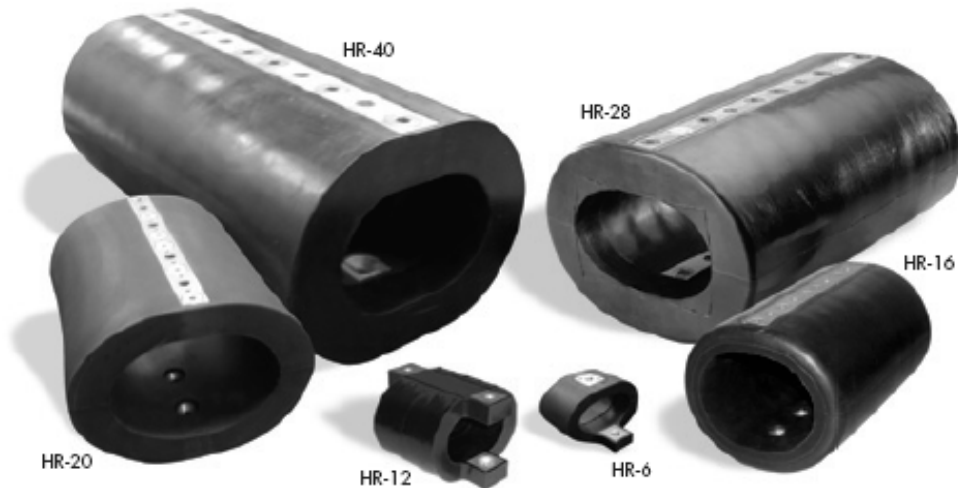


**WS-005****ITT Enidine Workmanship Standard for Elastomeric Products**

### SIGNATURES OF APPROVAL

Department	Role	Print Name	Signature	Date
Design Engineering	Design Engineer	Luke Joy	<i>Luke Joy</i>	11/3/2022
Engineering Manager	Engineering Manager	Rob Misevski	<i>Rob Misevski</i>	11/4/2022
Quality Assurance	Quality Engineer	Jerry DiVirgilio	<i>Jerry DiVirgilio</i>	11/2/2022

Note: Formal release date of this document from ITT Enidine is determined by the latest date present in the *ITT Enidine Signatures of Approval* block.

### REVISION HISTORY

Date:	Revision:	Description:	By:
09/22/10	-	Document Creation	R.M.Sanetick
03/14/11	A	Updated Section 1.0 Added Section 2.11 – PLCU Bond Adhesion Acceptance Criteria	R. Evans
03/25/22	B	Section 1.2: Updated to clarify disposition process Section 2: Assessment descriptions revised Section 2: Added description of figures	L. Joy
11/02/2022	C	Section 2.7: Added clarification on Backrind dimensional limits and also added visual clarification for depth and width of backrind.	J. DiVirgilio

## TABLE OF CONTENTS

<b>1.0</b>	<b>SCOPE .....</b>	<b>4</b>
1.1	OVERVIEW .....	4
1.2	DISPOSITION CRITERIA.....	4
<b>2.0</b>	<b>INSPECTION GUIDELINES – GENERAL .....</b>	<b>5</b>
2.1	TEARS AND CUTS.....	5
2.2	BOND SEPARATION .....	6
2.3	BLISTERS.....	7
2.4	FLOW/KNIT LINES .....	8
2.5	VOIDS/NON-FILLS .....	9
2.6	UNCURED/UNDERCURED ELASTOMER.....	10
2.7	BACKRIND.....	11
2.8	NEGATIVE SPRUES .....	13
2.9	EXCESSIVE FLASH .....	14
2.10	FINISH/SCRATCHES .....	15
2.11	PRODUCTION LOT CONFIDENCE UNITS – 80% RUBBER TEAR ACCEPTANCE CRITERIA .....	16
<b>3.0</b>	<b>INSPECTION GUIDELINES – ROD ENDS .....</b>	<b>17</b>
3.1	ROD END HOUSING COLOR.....	18
3.2	EXCESSIVE BLASTING .....	19
3.3	EXCESSIVE ADHESIVE.....	20

**1.0 SCOPE**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.***

Disposition Criteria

This document is intended to provide general elastomeric quality criteria and guidance in identification and disposition of workmanship issues. Any unacceptable features identified in this document or in part-specific supplemental inspection instructions shall be processed through a Material Review Board (MRB) for additional consideration and final disposition.



**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 and may require additional scrutiny by an MRB.

Tears and Cuts

Description

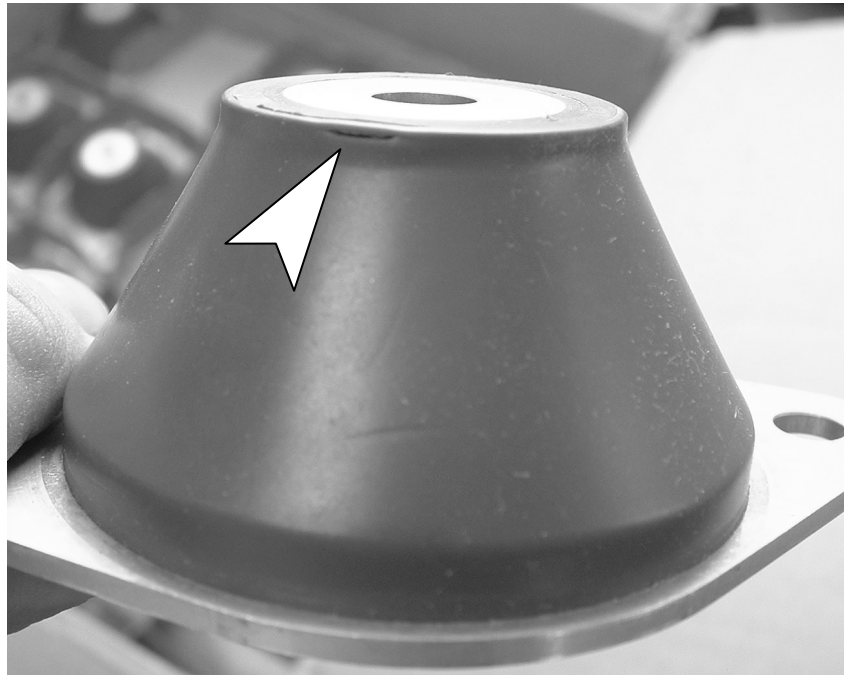
A rip or slice in the elastomer.

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.

Disposition

**Parts with Cuts and Tears are unacceptable.**





**ENIDINE STANDARD**

Bond Separation

Description

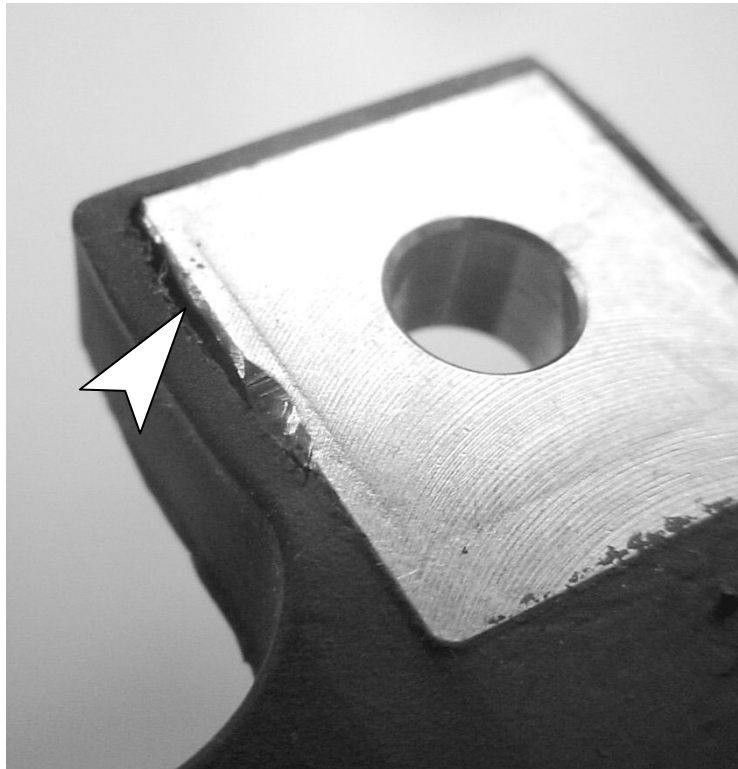
Elastomer which does not adhere to the parent material.

Assessment

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

Disposition

**Parts with Bond Separations are unacceptable.**



**Example of Bond Separation**



**ENIDINE STANDARD**

Blisters

Description

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

Assessment

Air trapped under the elastomer can lead to insufficient part stiffness and premature failure of the elastomer.

Disposition

**Parts exhibiting blisters are unacceptable.**



**Example of Blisters**



**ENIDINE STANDARD**

Flow/Knit Lines

Description

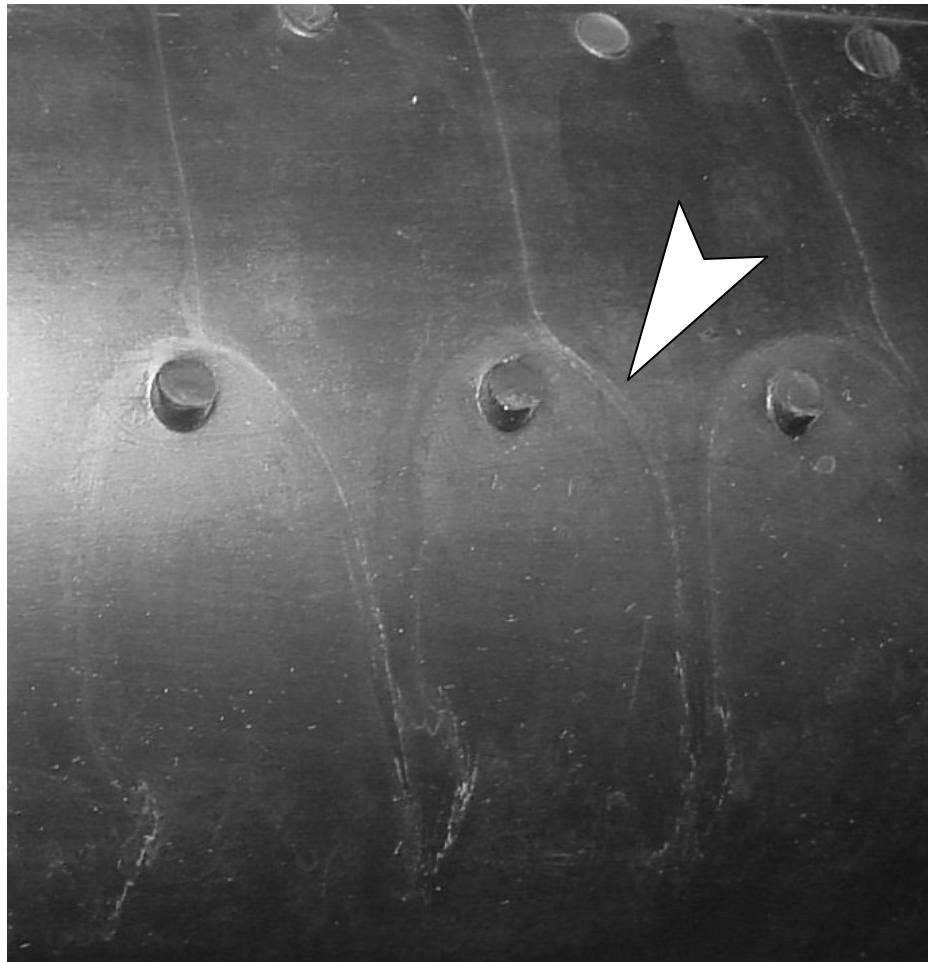
Visually apparent lines where two elastomer fronts merged during molding and did not fully blend together to form a continuous elastomeric section.

Assessment

A non-continuous elastomeric section has increased likelihood of performing outside the acceptable part tolerance.

Disposition

**Parts exhibiting Flow/Knit lines are unacceptable.**







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## ENIDINE STANDARD

### Voids/Non-fills

#### Description

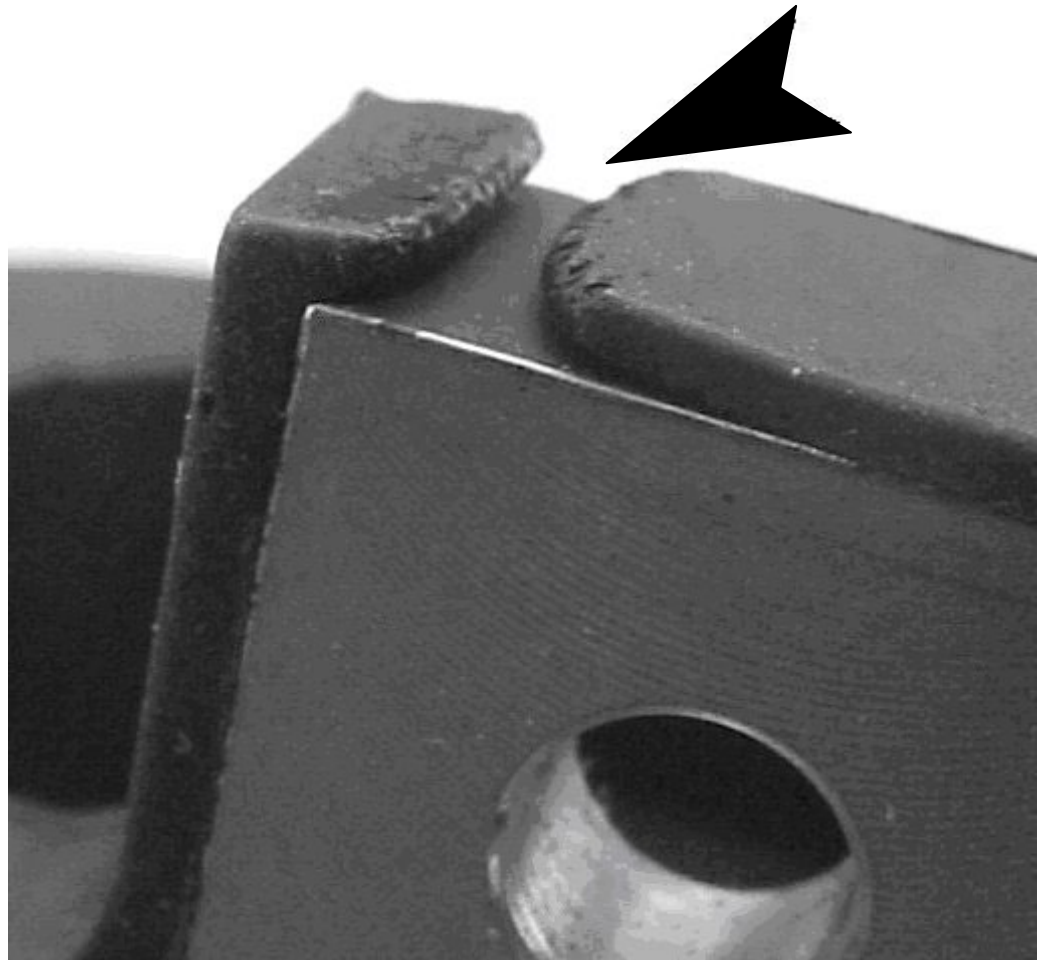
Pockets or missing areas of elastomer.

#### Assessment

Voids and non-fills will result in loss of performance capability and field life of the unit.

#### Disposition

***Parts with Voids and Non-fills are unacceptable.***





**ENIDINE STANDARD**

Uncured/Undercured Elastomer

Description

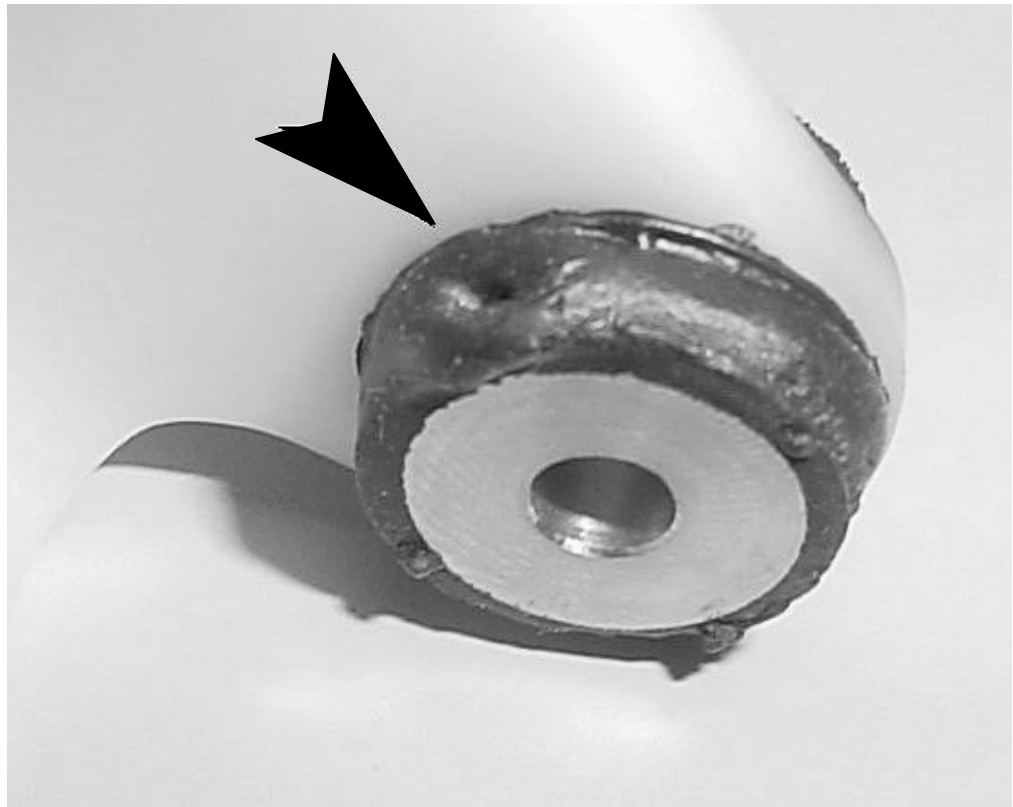
Uncured or Undercured elastomer may show a tacky or porous condition. Part may not maintain molded profile.

Assessment

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

Disposition

***Parts with Uncured or Undercured elastomer are unacceptable.***





Backrind

Description

A section of elastomer appearing ripped and recessed into the part, usually located at split-lines of the mold. Backrind is not considered splitting. Splitting will more closely resemble a crack or a sharp edge discontinuity of material not a continuous smooth transition of material.

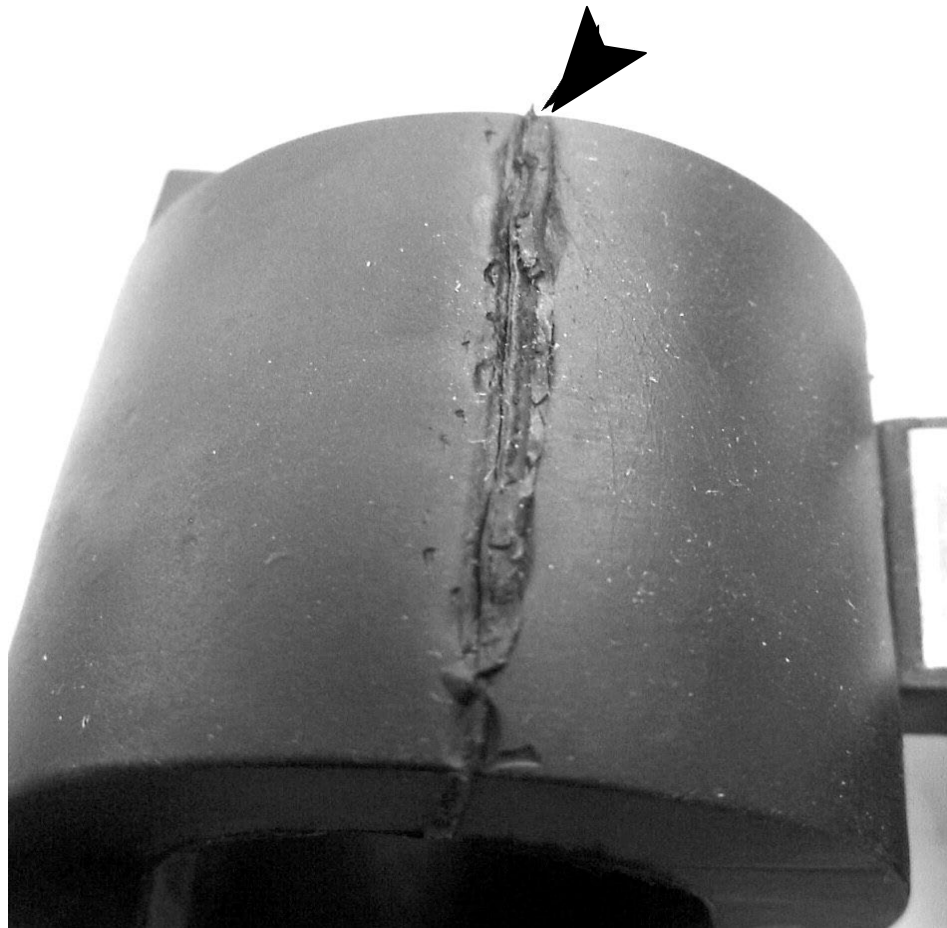
Assessment

Some amount of backrinding can be expected on parts with low-durometer rubber. Sections with excessive backrind are likely points for elastomer failure due to unintended stress concentrations or vulnerability to tear propagation.

For HERMs, splitting caused by backrind should be limited in depth to less than or equal to 17.5% of the HERM rubber thickness. The split's length must also be limited to the same, 17.5% HERM rubber thickness dimension (see diagram on next page). Depth of backrind to be measured with a dental pick to the nearest whole millimeter and be measured perpendicularly to the surface of the HERM.

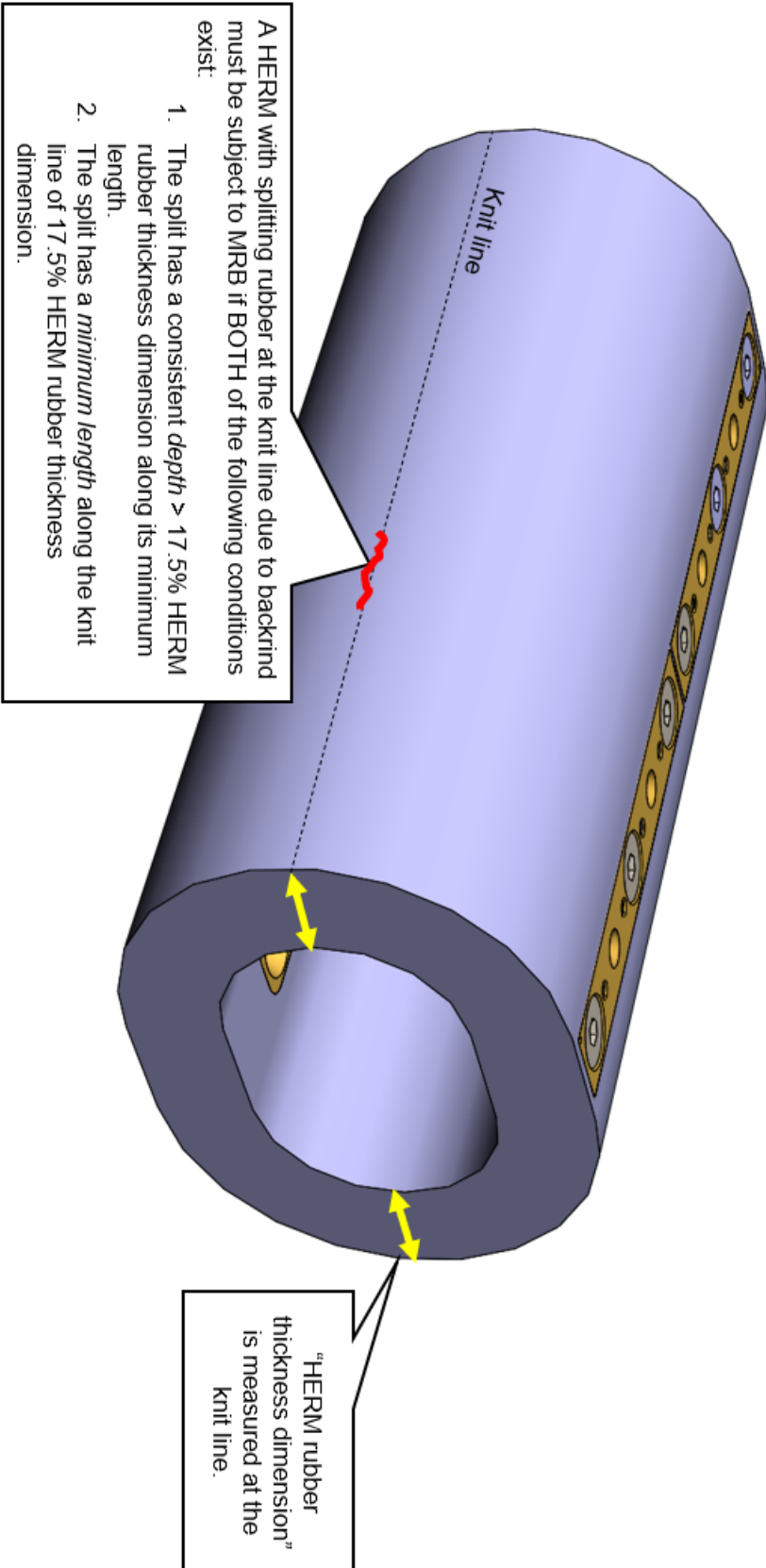
Disposition

***Parts with Excessive Backrind are unacceptable.***



***Example of Backrind on a HERM***

### Specific inspection criteria for backrind on HERMs





Negative Sprues

Description

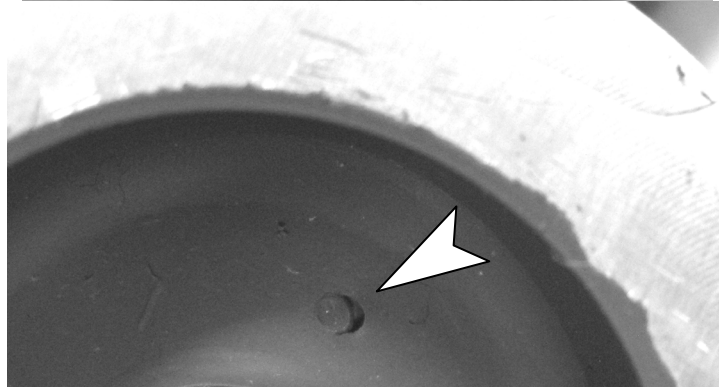
Fill locations which are below the elastomer surface. They appear as a circular void into the part. These may also appear as tears around a present sprue (the material is torn within the elastomeric section).

Assessment

The negative space left behind by a negative sprue becomes a likely point for elastomer failure.

Disposition

**Parts with Negative Sprues are unacceptable.**



**Example of Negative Sprues**



Excessive Flash

Description

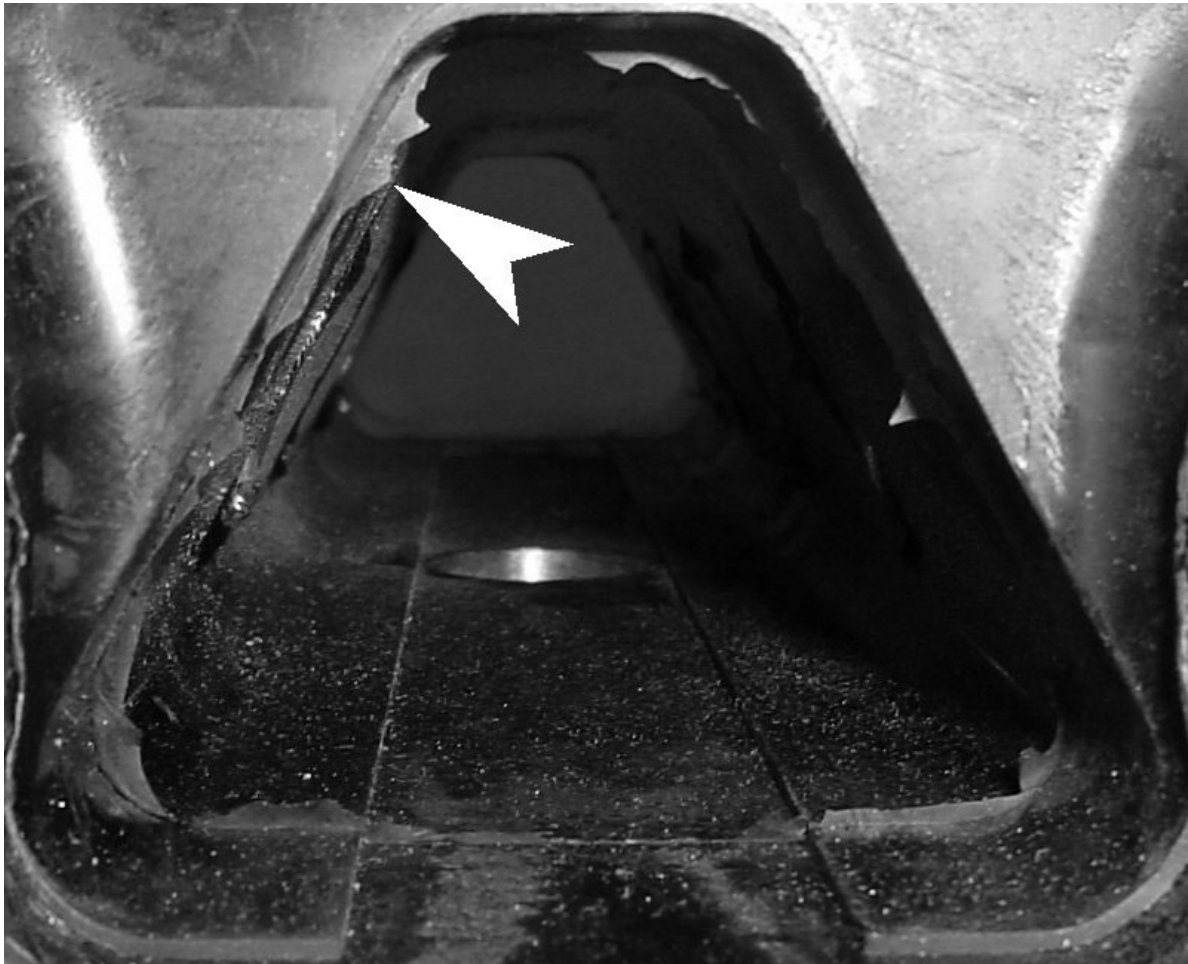
Flash is a thin extension of elastomer protruding from the elastomer body, usually located along mold split-lines. Excessive flash is considered to have an extension from the part surface of more than .050 inches unless otherwise specified on the drawing or other control document.

Assessment

Some level of flash is expected on most parts. Flash is considered excessive if it is:  
More than .050" in length from the surface  
More than .003" in thickness

Disposition

***Parts with excessive flash are unacceptable.***



**Example of Flash**





**ENIDINE STANDARD**

Finish/Scratches

Description

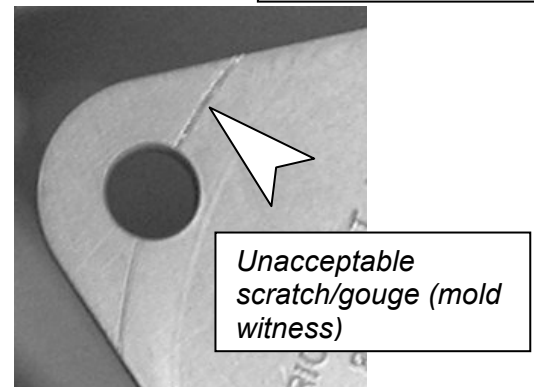
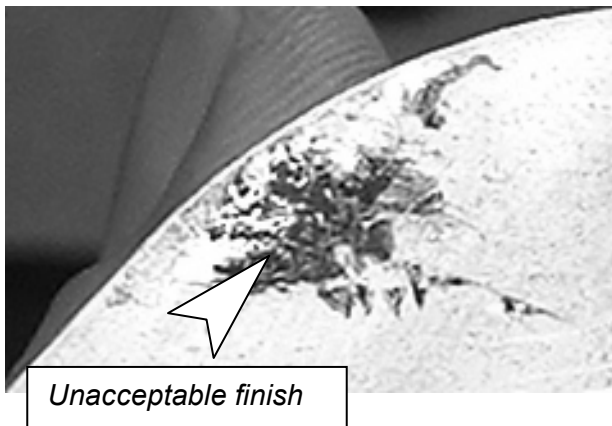
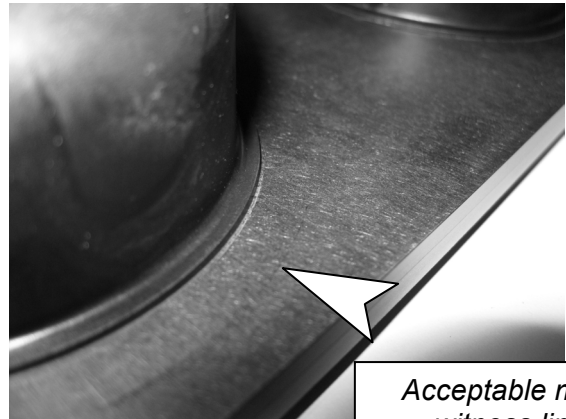
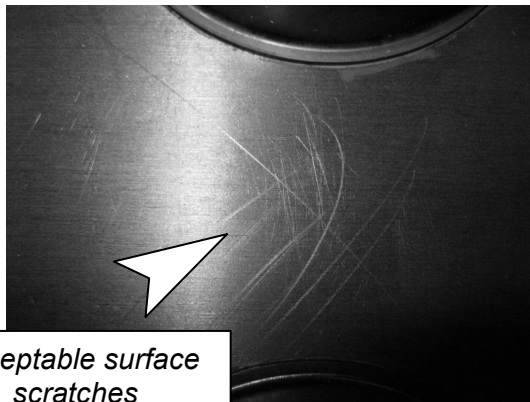
An inconsistent finish, scratches, scores, or gouges on metal components.

Assessment

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.

Disposition

***Inconsistent finish; part scratches or gouges with an apparent depth; or scratches or gouges that remove the material coating are all unacceptable. Superficial part scratches and shut off witness lines that do not break any protective surfaces are acceptable.***



**Examples of Surface Finishes and Scratches**



Production Lot Confidence Units – Bond Adhesion Acceptance Criteria

Description

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

Assessment

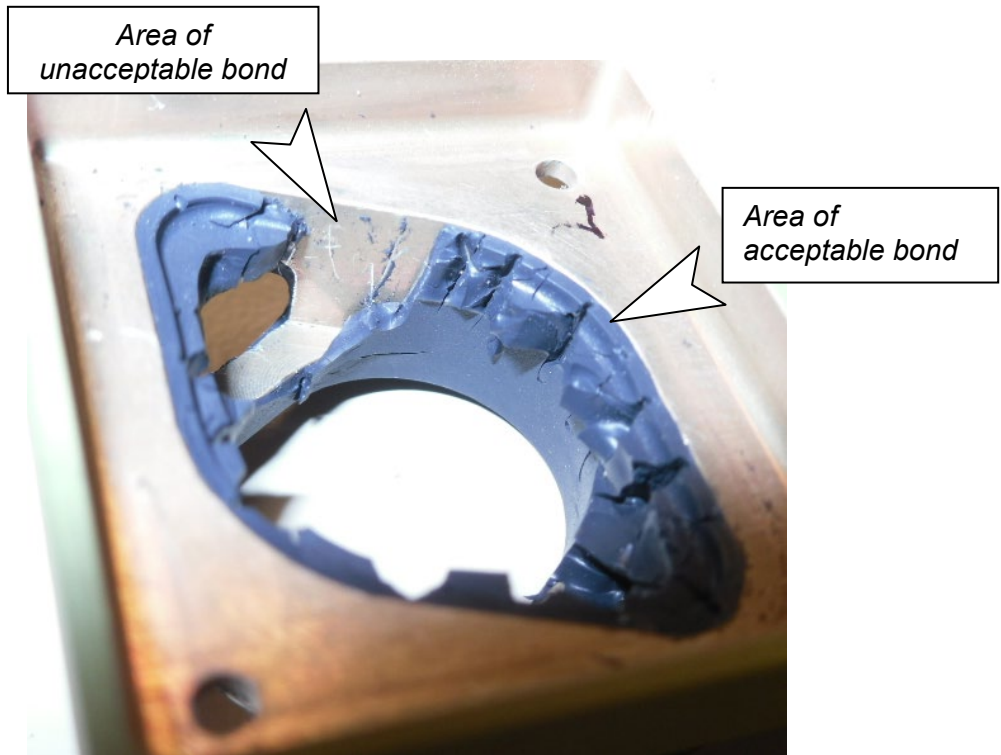
After unit separation and hand strip of elastomer, the unit shall show a minimum bond area adhesion percentage of elastomer bonded to its supporting structure. Unit is acceptable for greater than or equal to the specified minimum bond area remaining, and is unacceptable for less than the specified bond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

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

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.**



**Example of Bond Failure**

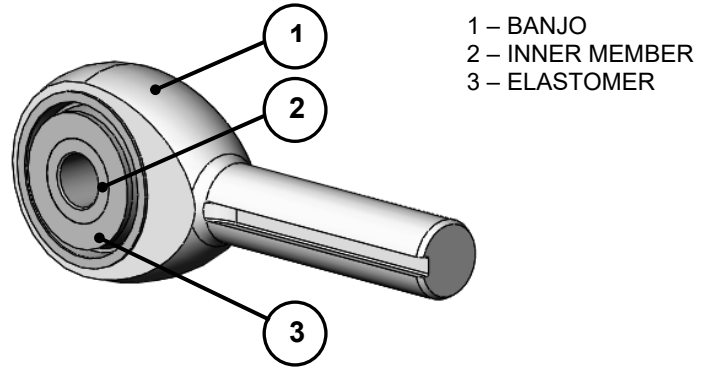




**3.0 INSPECTION GUIDELINES – ROD ENDS**

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 3.0.1.



**FIGURE 3.0.1 – Part Axes and Component Definitions**



**ENIDINE STANDARD**

Rod End Housing Color

Description:

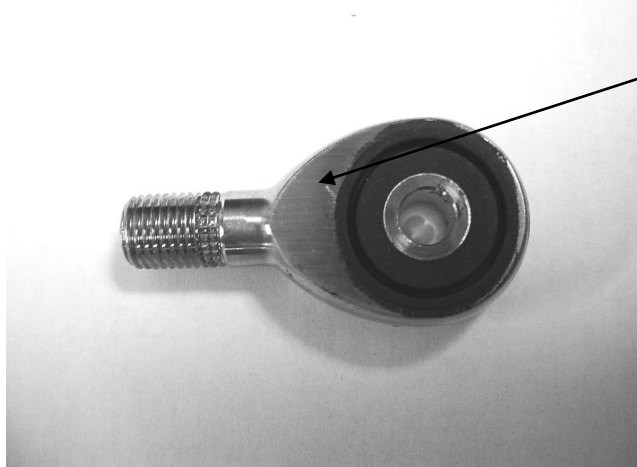
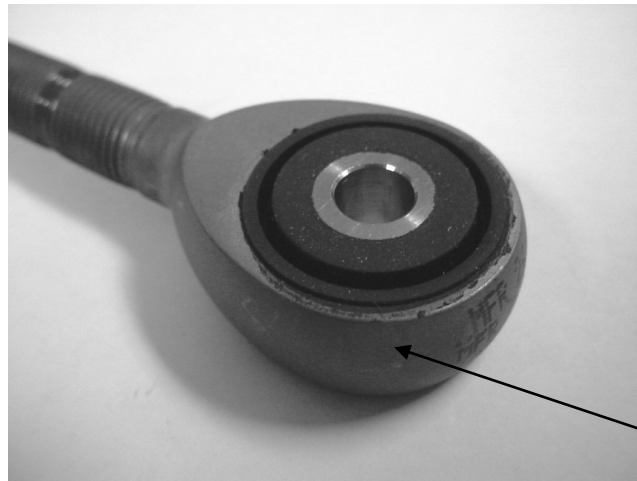
Lot-to-lot color variation for rod end banjos.

Assessment

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

Disposition

**Confirmation of acceptable material and finish (with Certificates of Conformance) are sufficient to approve parts.**



Acceptable finish color variation

**Example of Acceptable Finish Color Variation**



Excessive Blasting

Description:

Excessive blasting during preparation

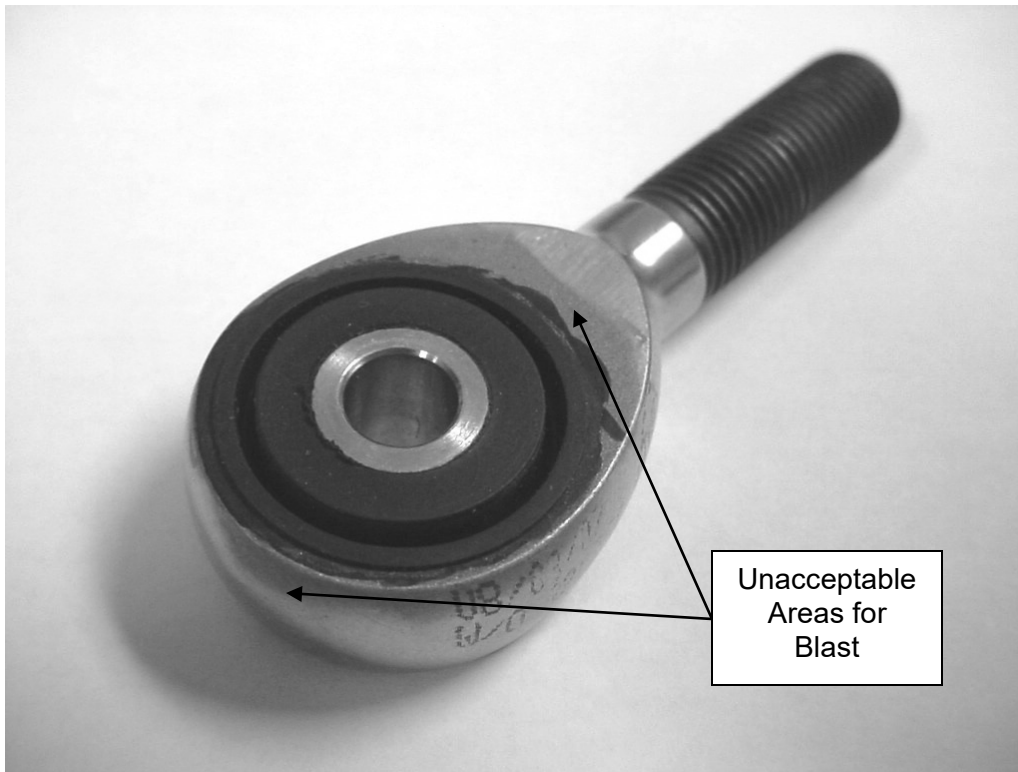
Assessment

Excessive blasting will change surface appearance and may result in falling short of surface roughness and finish standards for the part.

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.***



**Example of Unacceptable Blast Areas**



**ENIDINE STANDARD**

Excessive Adhesive

Description:

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

Assessment

Excessive adhesive on the shank of the banjo or on the inner member is unacceptable due to affecting part fit.

Disposition

**Parts with excessive adhesive are unacceptable.**

