



**NOTE**

All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Unless otherwise specified, dimensions have a tolerance of  $\pm 0.13$  [ $\pm .005$ ] and angles have a tolerance of  $\pm 2^\circ$ . Figures and illustrations are for identification only and are not drawn to scale.

## 1. INTRODUCTION

This specification covers the requirements for application of AMPLIVAR\* 9-serration pigtail splices. These splices will accept wire sizes and combinations within the range of 400 to a combined total of 22,000 circular mil area (CMA). All are designed to be crimped with precision dies and various power assist units.

A multiple bussed termination option is available. It extends the functional range of 9 serration AMPLIVAR splice part numbers 62304-2, 62306-2 and 62308-2 by leaving the carrier strip in place as a conductive path between multiple terminals. See Paragraph 3.4.J for details.

When corresponding with TE Connectivity personnel, use the terminology provided on this specification to help facilitate your inquiry for information. Basic terms and features of this product are provided in Figure 1.

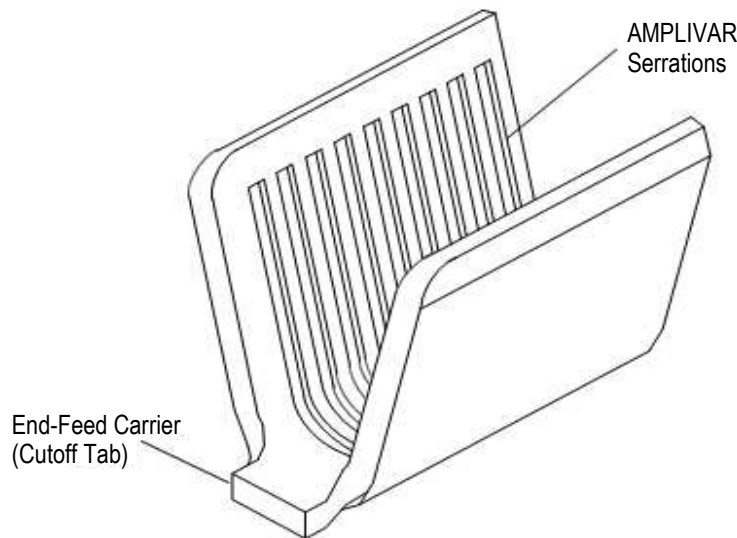


Figure 1

## 2. REFERENCE MATERIAL

### 2.1. Revision Summary

This paragraph is reserved for a revision summary of the most recent additions and changes made to this specification which include the following:

- Updated instructional material references in Paragraph 2.4

### 2.2. Customer Assistance

Reference product base part number 62306 and product code 1040 are representative of AMPLIVAR 9-serration pigtail splices. Use of these numbers will identify the product line and help you to obtain product and tooling information when visiting [www.te.com](http://www.te.com) or calling the number at the bottom of page 1.

### 2.3. Drawings

Customer drawings for product part numbers are available from [www.te.com](http://www.te.com). Information contained in the customer drawing takes priority.

## 2.4. Instructional Material

Instruction sheets (408-series) provide product assembly instructions or tooling setup and operation procedures and customer manuals (409-series) provide machine setup and operating procedures. Instructional material that pertain to this product are:

- [408-4357](#) AMP-O-LECTRIC\* Model "G" Terminating Machine 356462-[ ] for Through-Splice Terminals
- [408-7424](#) Checking Terminal Crimp Height or Gaging the Die Closure
- [408-8014](#) Standard-Type End-Feed Applicators
- [408-8024](#) Miniature Quick-Change Applicator (End-Feed Type)
- [408-8039](#) Heavy Duty Miniature Quick-Change Applicator (End-Feed Type) with Mechanical or Air-Feed Systems
- [408-8053](#) Miniature (Mini) Quick-Change Applicators
- [408-8059](#) Suggested Preventative Maintenance Schedule for Applicators
- [408-9816](#) Handling Reeled Product
- [408-35038](#) Multiple Bussed Termination Setup on CQM II for APT-5A Terminating Machines
- [409-5841](#) AMPLIVAR Product Terminators
- [409-5842](#) AMP-O-LECTRIC Model "G" Terminating Machine 354500-[ ]
- [409-5876](#) AMPLIVAR Direct Connect Product Terminator
- [409-10204](#) AMP 3K/40\* CE Terminating Machines PN 2161400-[ ] and AMP 5K/40\* CE Terminating Machines PN 2161500-[ ]
- [409-32022](#) AMPLIVAR Product Terminators APT-5A and APT-5E (All Models)
- [409-32034](#) AMP 3K Terminating Machine 1725950-[ ] and AMP 5K\* Terminating Machine 1725900-[ ]
- [409-32035](#) AMP-O-LECTRIC Model G II and G II+ Terminators

## 3. REQUIREMENTS

### 3.1. Safety

Do not stack product shipping containers so high that the containers buckle or deform.

### 3.2. Storage

#### A. Ultraviolet Light

Prolonged exposure to ultraviolet light may deteriorate the chemical composition used in the product material.

#### B. Shelf Life

The product should remain in the shipping containers until ready for use to prevent deformation to components. The product should be used on a first in, first out basis to avoid storage contamination that could adversely affect performance.

#### C. Reeled Splices

Care must be taken to prevent twisting, bending, or other distortion that would prevent smooth feeding of the reeled product through automatic machine feed mechanisms. Store coil wound reels horizontally and traverse wound reels vertically. Review reel tag data to determine if breaks in the strip are present within the reel.

### D. Chemical Exposure

Do not store product near any chemical listed below as they may cause stress corrosion cracking in the material.

Alkalies	Ammonia	Citrates	Phosphates	Citrates	Sulfur Compounds
Amines	Carbonates	Nitrites	Sulfur Nitrites		Tartrates



**NOTE**

Where the above environmental conditions exist, phosphor-bronze splices are recommended instead of brass if available.

### 3.3. Wire Size and Preparation

AMPLIVAR\* 9-serration pigtail splices accept magnet wire (3 magnet wires max) and stranded or solid copper lead wire of various sizes and combinations. Lead wire strip length, as shown in Figure 2, shall be 1.14 – 2.16 [.045 – .085] longer than the splice or as needed to ensure that all conductors are laced completely through the splice without any insulation extending into the crimp area. **Magnet wire leads do not require pre-stripping of the insulation film.**



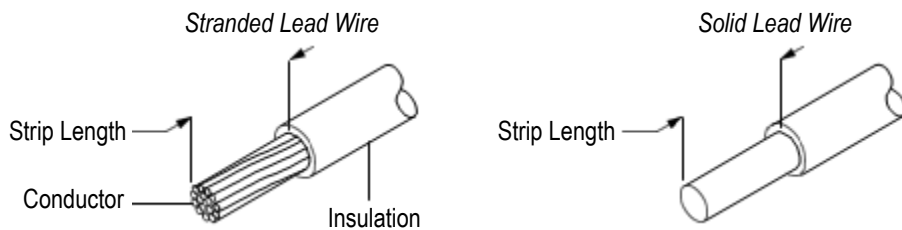
**CAUTION**

Reasonable care must be taken not to nick, scrape, or cut any strands during the stripping operation. All magnet wires must lay side-by-side in the bottom of the splice. Other wire, splice, and crimp parameters must be considered as specified in the General Application Guidelines listed in TE product catalog 82221, magnet wire terminals and termination systems.



**NOTE**

Do not twist multiple wires together prior to crimping.



**Figure 2**

### 3.4. Crimped Splice Requirements

Figure 3 illustrates the crimp features required for typical pigtail and thru type splices after termination.

#### A. Crimp Width and Crimp Height

Optimum electrical and mechanical performance is achieved by reducing the cross-sectional area of the wires and splice by a predetermined percentage. Crimp width is fixed in the application tooling. Crimp height must be set and maintained as determined from the crimp height formula provided on the splice Customer Drawing. See Figure 3.

#### B. Crimp Length

For optimum crimp length effectiveness, the crimp must be within the area shown and must meet the crimp dimensions provided in Figure 3. Effective crimp length shall be defined as that portion of the splice, excluding tapers, fully formed by the crimping tool. Instructions for adjusting, repairing, and inspecting tools are packaged with the tools. See Paragraph 2.4, Instructional Material and Paragraph 6, TOOLING.

#### C. Crimp Tapers

Top and bottom crimp tapers shall conform to the dimensions given in Figure 3. Crimp tapers contribute to crimp effectiveness and reduce the risk of nicked and/or broken conductor strands due to sharp material edges at the ends of the splice.

#### D. Cutoff Tabs

Cutoff tabs shall not exceed the dimension shown in View A, Figure 3.

#### E. Cutoff Burrs

Cutoff burrs shall not exceed the dimension shown in View A, Figure 3.

### F. Wire Barrel Flash

Wire barrel flash, which can be caused by incorrect set up and/or worn and broken crimp tooling, shall not exceed the dimension shown in Section X-X, Figure 3.

### G. Conductor Extension

Conductors must extend completely through the splice. Excess magnet wire and lead wire strands will be trimmed off by the application equipment as shown in Figure 3.

### H. Splice Seam

The splice seam must be closed with no evidence of loose wire strands visible in the seam as shown in Figure 3. Single wire strand exposure may occur in seam beyond effective crimp length. See Figure 3.

### I. Tensile Strength

Crimp quality shall be judged solely on proper crimp width, crimp height, and conformance to the requirements shown in Figure 3.



#### NOTE

When crimped as specified, crimp tensile strength will be approximately 70% of the tensile strength of the smallest wire in the splice.

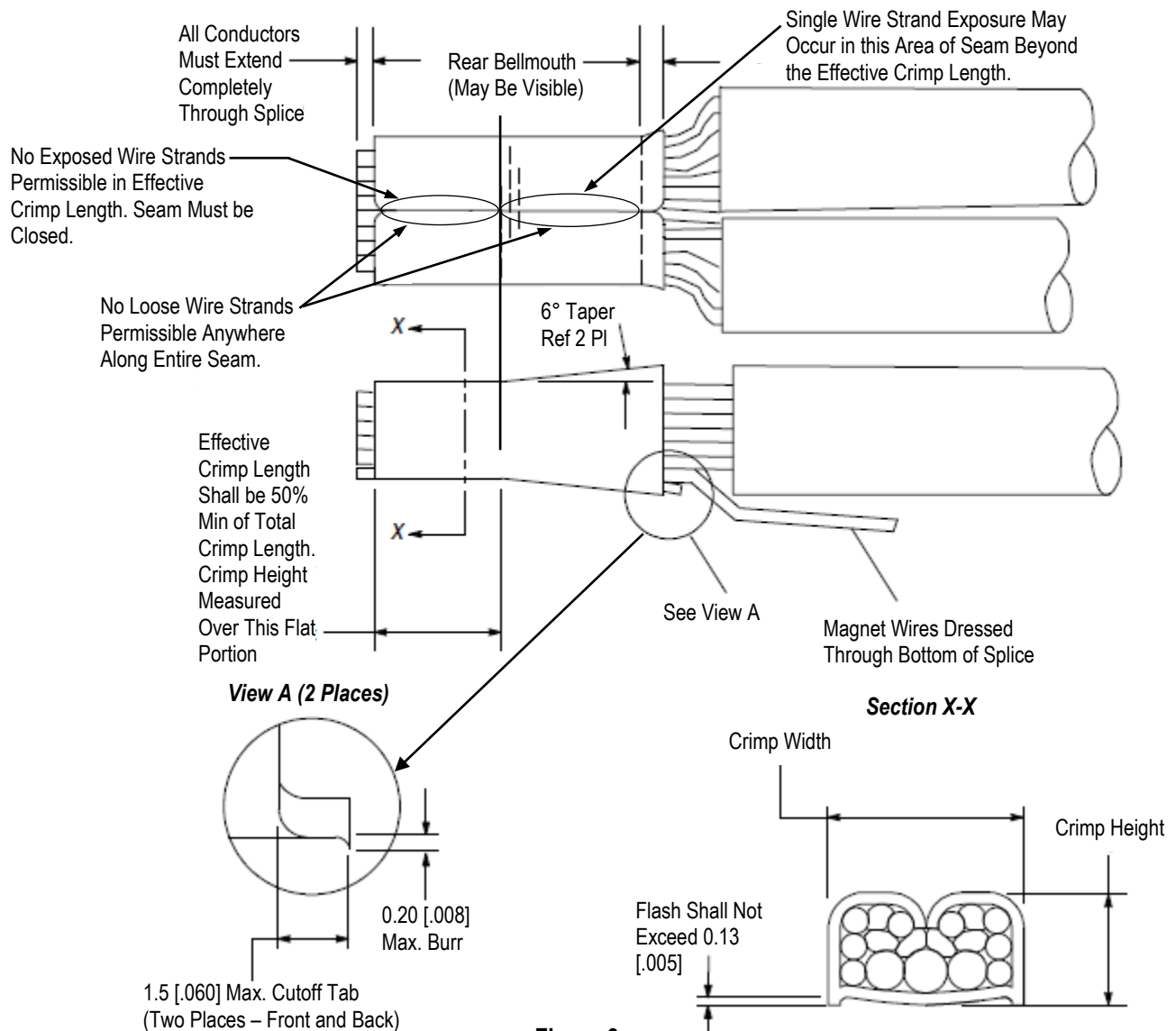


Figure 3

## J. Multiple Bussed Terminations

A multiple bussed termination option is available that extends the functional range of 9 serration AMPLIVAR\* splice part numbers 62304-2, 62306-2 and 62308-2 by leaving the carrier strip in place as a conductive path between multiple terminals. Figure 4 illustrates examples of double and triple buss terminations, but larger quantity multiple bussing is permissible. CMA range restrictions may apply. See Customer Drawing for details. All standard crimp quality requirements of Figure 3 and Figure 6 apply.



Figure 4

### 3.5. Splice Repair

If a splice is not crimped correctly or it has been damaged, it cannot be repaired or re-terminated. It must be cut from the wires and replaced with a new splice.

## 4. GENERAL APPLICATION GUIDELINES

To assist you in obtaining the optimum AMPLIVAR product termination, the following guidelines are recommended

- All magnet wires must be placed in the bottom of the wire barrel before crimping. If lead wire is to be crimped in the same termination, it should be placed on top of the magnet wires.
- Wire barrels are designed to accept a maximum of three insulated magnet wires plus stranded lead wires
- The ratio of magnet wire diameters crimped in any wire barrel should not exceed 2:1. This ratio is approximately a range from the largest to the smallest magnet wire of six sizes
- The sum of the circular mil area (CMA) of the magnet wires and any lead wires should not exceed the capacity of the splice.
- The sum of the diameters of the individual magnet wires plus twice the terminal stock thickness must be equal to or less than the crimp width
- Magnet wire of 26 AWG [0.40 mm] or smaller should be used with 7-serration splices having “shallow serrations,” and magnet wire of 28 AWG [0.32 mm] or smaller should be used with 9-serration splices having “shallow serrations” (part numbers identified with asterisk [\*] are in the tabular data on the following technical pages).
- Magnet wire of 20 AWG [0.81 mm] or larger having an insulation thickness heavier than “single film coated,” should not be used with splices having “shallow serrations” (those part numbers marked with an asterisk [\*] in the tabular data on the following technical pages).
- When aluminum magnet wire is used, splices and terminals must be tin plated

## 5. QUALIFICATION

Due to numerous wire sizes and combinations, Underwriters Laboratories Inc. (UL) and CSA International will not grant blanket approval for splice part numbers. Customers must submit their end product to these agencies for application evaluation.

## 6. TOOLING

This section provides a selection of tools for various application requirements. They include semi-automatic and automatic machines for power-assisted application of strip form contacts. Modified designs and additional tooling concepts may be available to meet other application requirements. See Figure 5.



### NOTE

TE Connectivity's (TE) tool engineers have designed machines for a variety of application requirements. For assistance in setting up prototype and production line equipment or questions about tooling, contact TE tool engineering through your local TE representative or call the product information number at the bottom of page 1.

### 6.1. Applicator

Applicators are designed for the full wire size range of strip-fed, precision formed contacts, and provide for high volume, heavy duty, production requirements. The applicators can be used in bench or floor model power units.

### 6.2. Power Units

A power unit is an automatic or semi-automatic device used to assist in the application of a product. Power unit includes the power source used to supply the force or power to an applicator.

### 6.3. Bench Machines

A bench machine is a dedicated unit that applies a specific, strip-fed, formed contact. Bench machines incorporate the aspects of the applicator and power unit in a single machine and often provide advantages such as reduced footprint, excess wire trim, and ease of use when compared to applicator/power unit combinations. While it is possible to convert a bench machine to run various terminals, it is not practical in a high-volume production environment because the tooling is incorporated into the machine and requires a skilled technician to perform the conversion and subsequent set-up.

A separate model of the APT-5 machine is available to perform multiple bussed terminations. An "add-on" conversion kit is also available to upgrade existing APT-5 machines to the multiple bussed termination model.

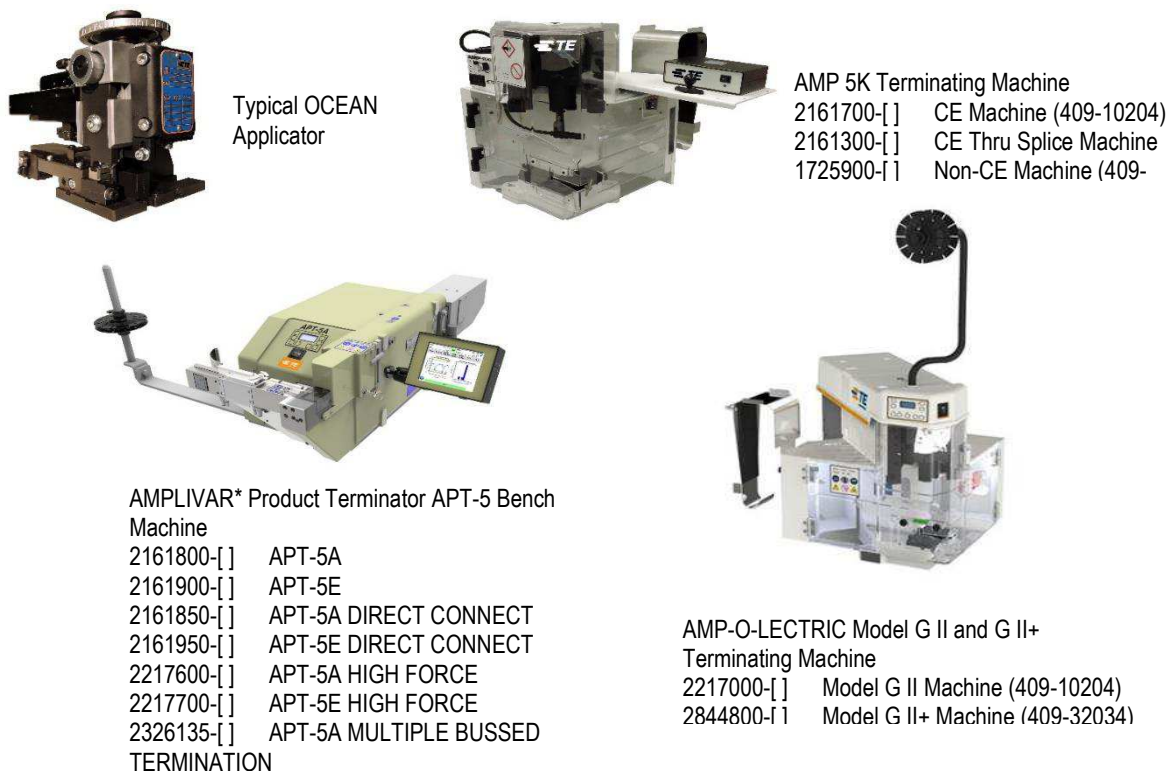


Figure 5

### 7. VISUAL AID

Figure 6 shows a typical application of an AMPLIVAR pigtail splice. This illustration should be used by production personnel to ensure a correctly applied product. Applications which DO NOT appear correct should be inspected using the information in the preceding pages of this specification and in the instructional material shipped with the product or tooling.

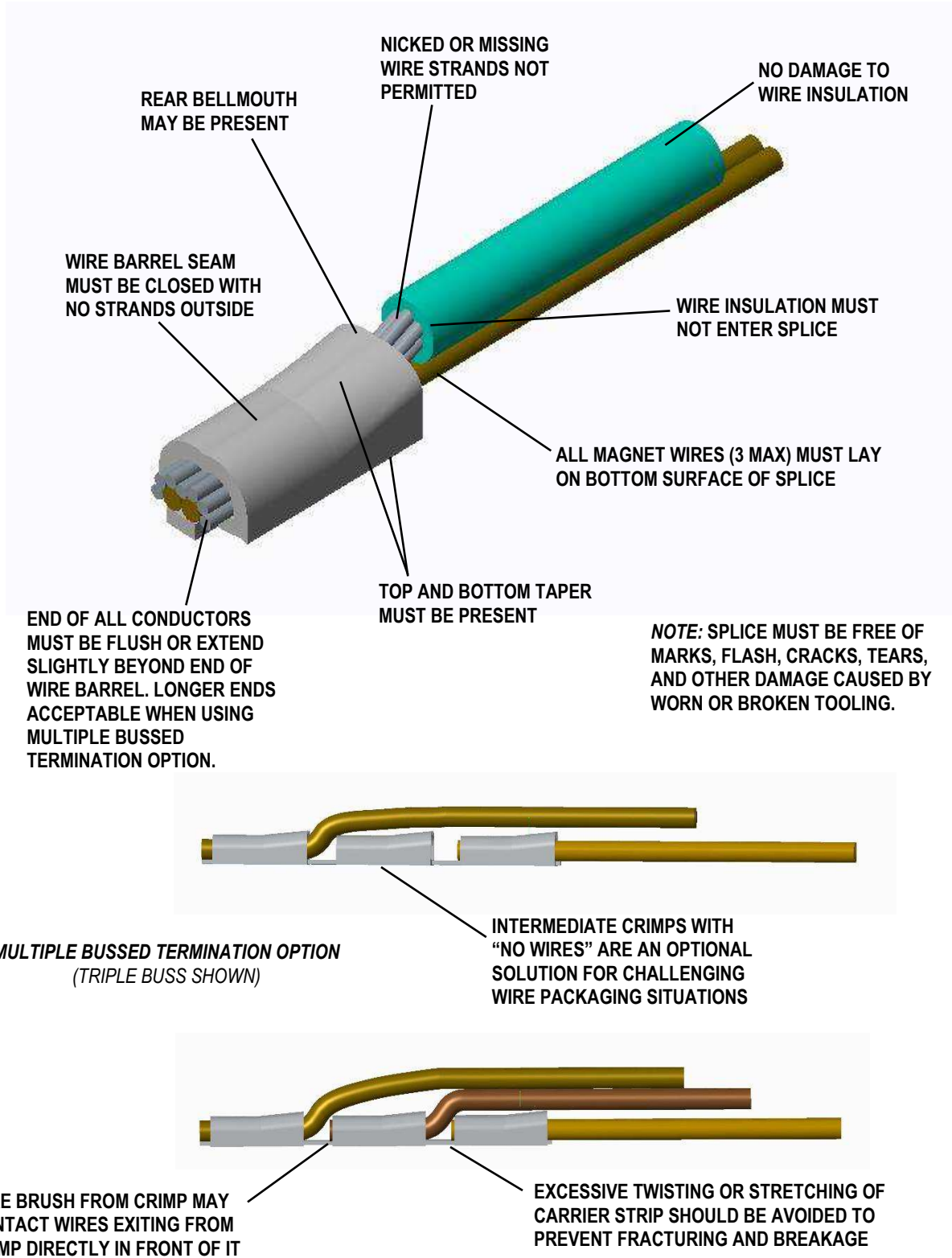


Figure 6: Visual Aid