CTX50 SEALED RECEPTACLE CRIMP TERMINAL

1.0 SCOPE

This specification details the crimping information and common practices of general crimps for the Molex Sealed CTX50 receptacle terminal. Please refer to sales drawing 349050400 PSD for additional part information. The information in this document is for reference and benchmark purposes only. Customers are required to complete their own validation testing if tooling and/or wire is different than what is shown in this specification.

All measurements are in **millimeters** and **Newtons** unless specified otherwise.

Some terminals shown in this document are generic representations. They are not intended to be an image of any terminal listed in the scope.

2.0 PRODUCT DESCRIPTION

DEFINITION OF TERMS:

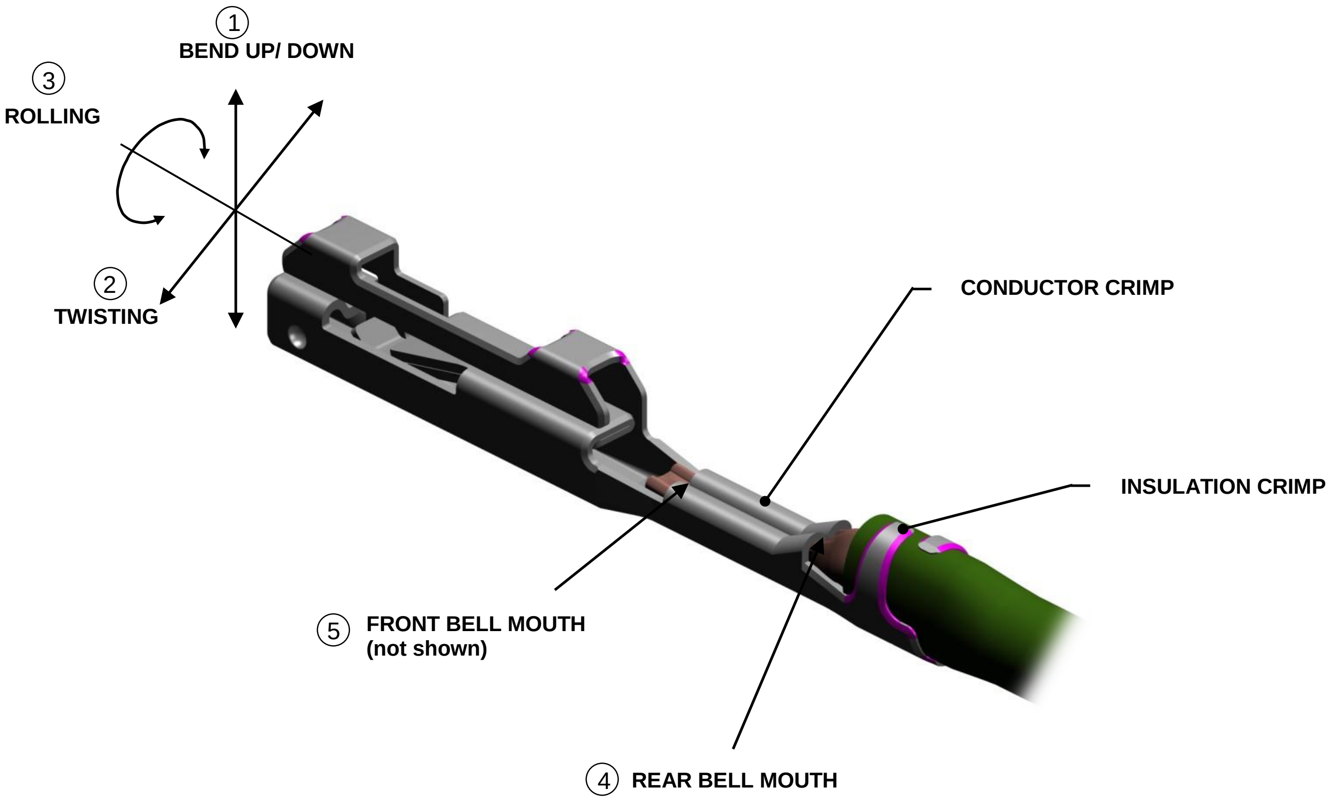


Figure 1

DEFINITIONS OF TERMS (CONT.):

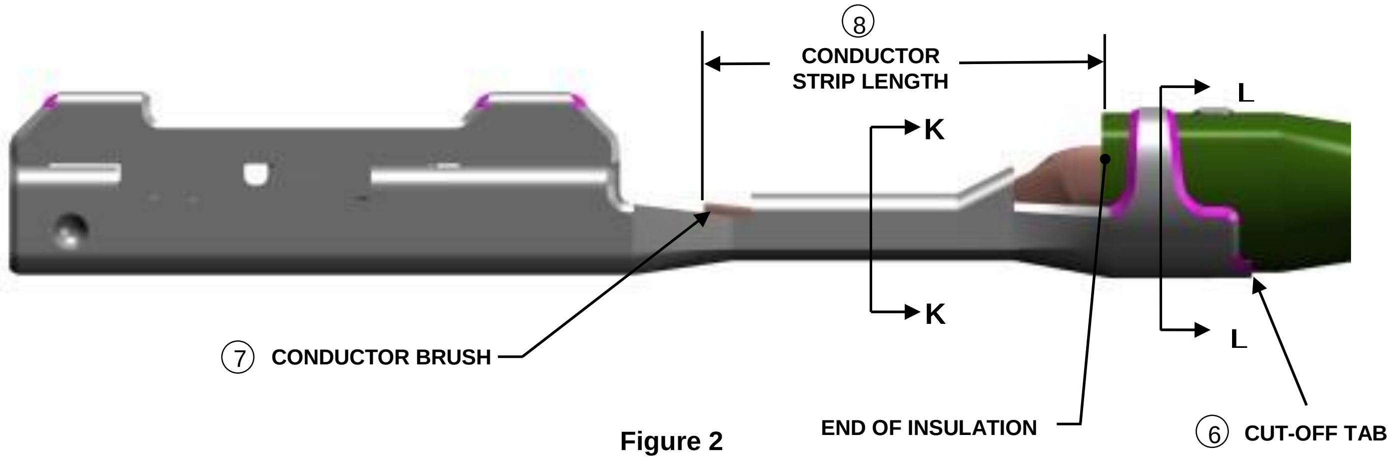


Figure 2

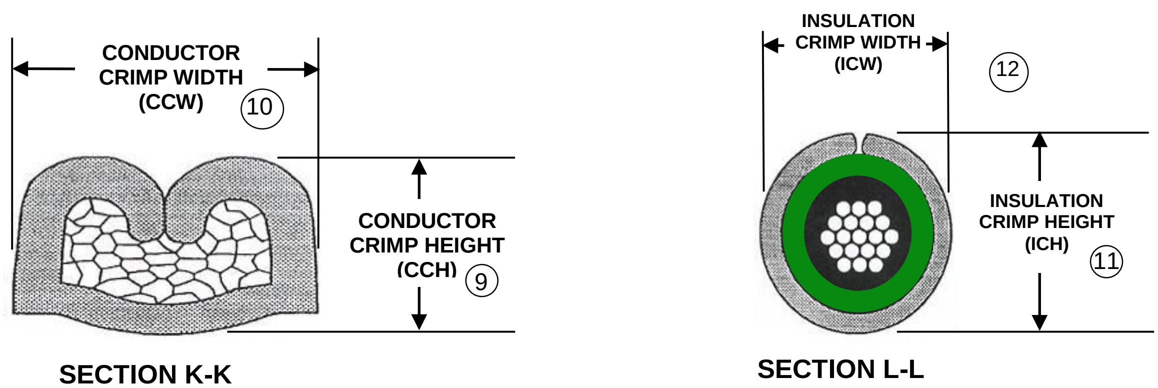


Figure 3

STRAIGHTNESS MEASUREMENTS

The crimping process may result in some bending between the conductor crimp and the terminal box. This bending must not exceed the limits shown in **Table 3**.

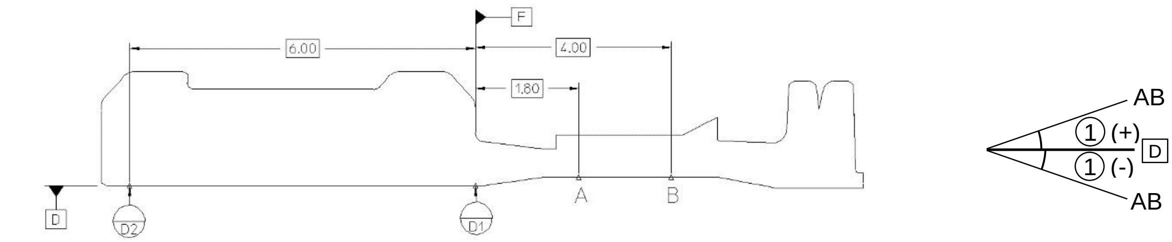


Figure 4

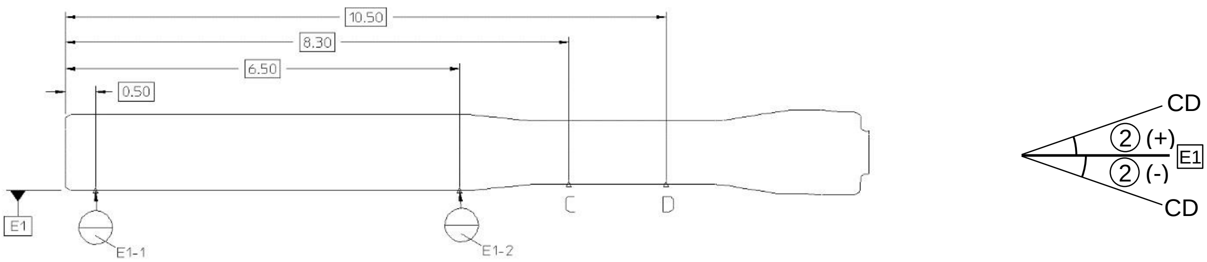


Figure 5

BEND UP/DOWN ①

To measure bend up/down, establish datum D as shown in Figure 4 then measure the angle of the line defined by points A and B with respect to the datum. Positive angles are defined as bend up and negative angles are defined as bend down.

TWISTING ②

To measure twisting, establish datum E1 as shown in Figure 5**,** then measure the angle of the line defined by points C and D with respect to the datum.

Rolling ③

To measure rolling, cross section the part 3.25 ±0.50 mm behind datum F, then clamp the part in a vice as shown in Figure 6. Using a shadowgraph, focus the graph to see the bottom edge of terminal and establish line X. With line X established, refocus the graph to sectioned crimp edge. Measure the angle of the line defined by points E and F with respect to line X.

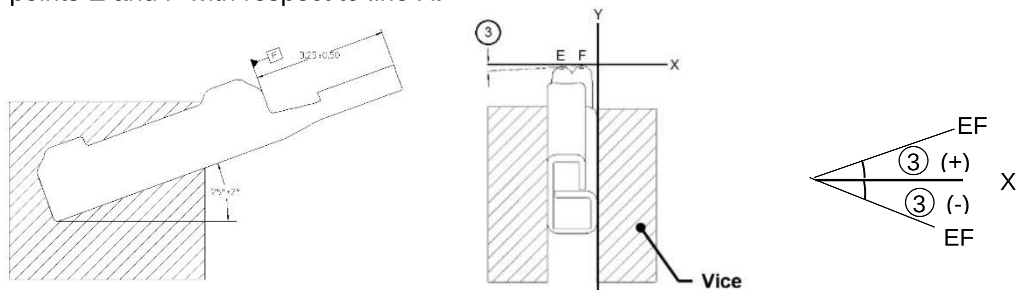


Figure 6

BELLMOUTH (FLARE) ④ ⑤

The flare that is formed on the edge of the conductor crimp acts as a funnel for the wire strands. This funnel reduces the possibility that a sharp edge on the conductor crimp will cut or nick the wire strands. A rear bellmouth is required on the conductor crimp. A front bellmouth is optional. **Caution**: Excessively large bellmouth will reduce crimp area and reduce pull forces. **See Table 3** for bellmouth specifications.

⑤ Front Bellmouth not required

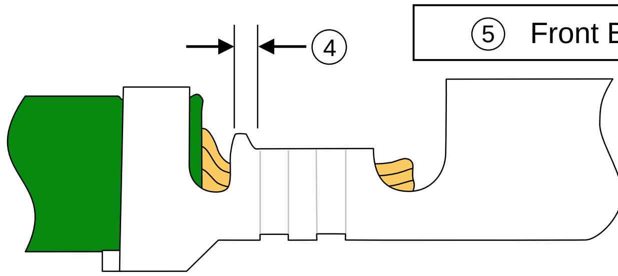


Figure 7

CUT- OFF TAB 6a 6b

This is the material that protrudes outside the insulation crimp after the terminal is separated from the carrier strip. A cut-off tab that is too long may expose a terminal outside the housing and it may fail electrical spacing requirements. In most situations, a tool is setup to provide a cut-off tab that shall not exceed the value indicated in **Table 3**.

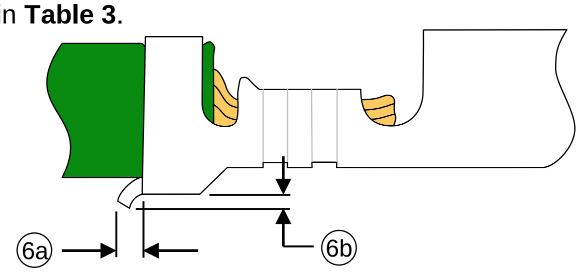


Figure 8

CONDUCTOR BRUSH

The conductor brush is made up of the wire strands that extend past the conductor crimp on the contact side of the terminal. This helps ensure that mechanical compression occurs over the full length of the conductor crimp. The conductor brush should not extend into the contact area or above the conductor crimp/transition wall height (whichever is tallest).

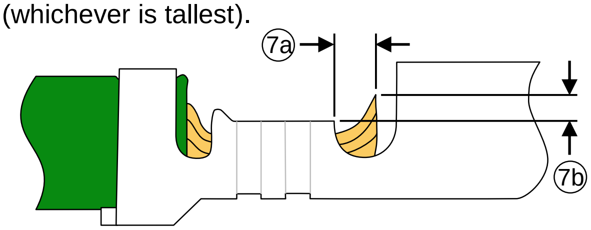


Figure 9

CONDUCTOR STRIP LENGTH ⑧

The strip length is determined by measuring the exposed conductor strands after the insulation is removed. The strip length determines the conductor brush length when the end-of-insulation position is centered in the transition area between conductor and insulation crimps. See **Table 3** for the length requirement.

CAUTION: Care must be taken to ensure that all conductor strands are equal in length (no diagonally cut strands). No scratched or missing strands are permitted. The insulation cut must be uniform (no diagonally cut insulation and no extrusions of insulation).

CONDUCTOR CRIMP

This is the metallurgical compression of a terminal around the wire's conductor. This connection creates a common electrical path with low resistance and high current carrying capabilities.

CONDUCTOR CRIMP HEIGHT ⑨

The conductor crimp height is measured from the top surface of the formed crimp to the bottom most radial surface. Do not include the extrusion points in this measurement. Measuring crimp height is a quick, non-destructive way to help ensure the correct metallurgical compression of a terminal around the wire's conductor and is an excellent attribute for process control. The crimp height specification is typically set as a balance between electrical and mechanical performance over the complete range of wire stranding and coatings, and terminal materials and plating. Although it is possible to optimize a crimp height to individual wire strands and terminal plating, one crimp height specification is normally created. See **Table 2** for crimp height specifications.

INSULATION CRIMP HEIGHT ⑪

Insulation crimp heights are specified in **Table 2**. Sealed CTX50 receptacle terminal are designed to accommodate multiple wire sizes. Although within the terminal range, an insulation grip may not completely surround the wire, an acceptable insulation crimp will still be provided.
The insulation crimp should be visually evaluated to confirm it provides adequate compression on the wire. It should also be evaluated by sectioning through the center of the crimped insulation grip. The grip should compress the insulation but not pierce it or otherwise damage the integrity of the insulation. The grip should not contact the conductors under any circumstance. Mechanically, the insulation grip should withstand repeated flexing of the wire without pulling out of the grip. The wire is flexed 5 times each in two perpendicular planes in the following sequence: b to a, a to b, b to c, c to b, then repeat as shown in **Figure 10**.

Once the optimum setting for an insulation crimp height is determined, it is important to document it. The operator can then check it as part of the setup procedure.

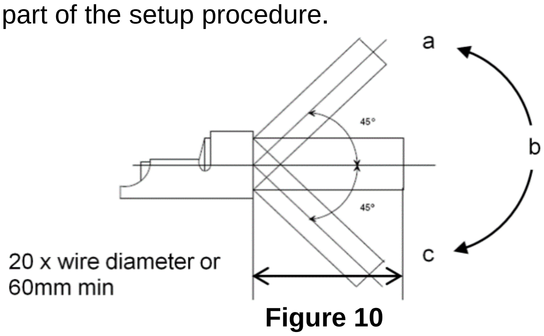


Figure 10

CONDUCTOR ANVIL FLASH (EXTRUSIONS / BURR) (13a) (13b)

These are the small flares that form on the bottom of the conductor crimp resulting from the clearance between the punch and anvil tooling. If the anvil is worn or the terminal is over-crimped, excessive extrusion can result.

An uneven extrusion may also result if the punch and anvil are misaligned, if the feed is misadjusted or if there is insufficient or excessive terminal drag.

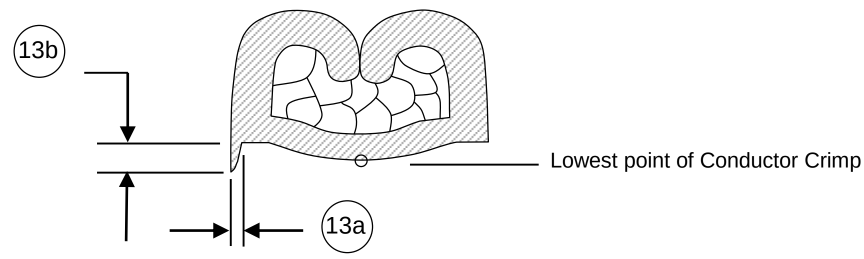


Figure 11

INSULATION AND CONDUCTOR GRIP STEP (14) (15)

The insulation grip step is the offset between the insulation grip and Datum D. The conductor grip step is the offset between the conductor grip and Datum D (see **Figure 12** and **Table 3**).

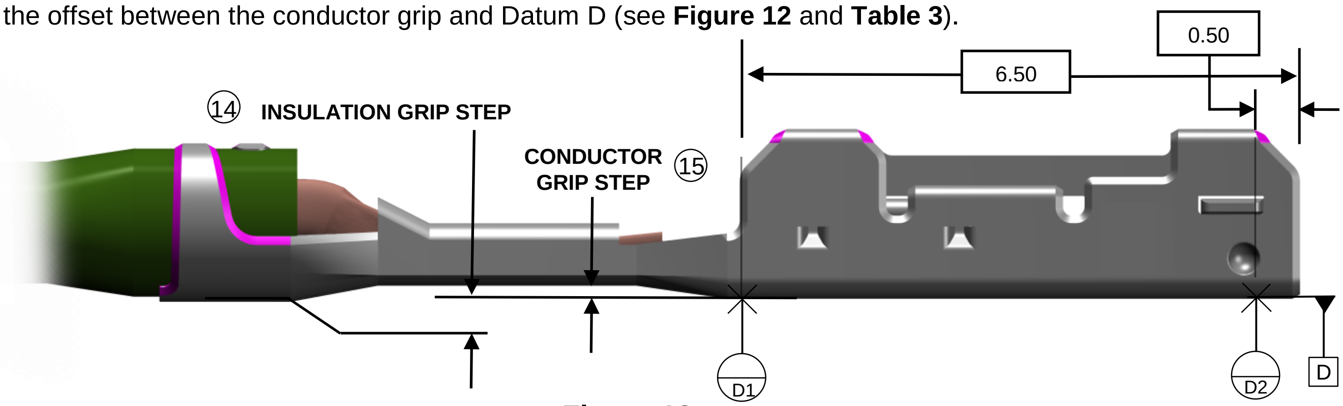


Figure 12

END-OF-INSULATION POSITION

This is the location of the insulation in relation to the transition area between the conductor and insulation crimps. Equal amounts of the conductor strands and insulation needs to be visible in the transition area. The end-of insulation position ensures that the insulation is crimped along the full length of the insulation crimp and that no insulation gets crimped under the conductor crimp. The end-of-insulation position is set by the wire stop and strip length for bench applications. For automatic wire processing applications the end-of-insulation position is set by the in/out press adjustment (see **Figure 2**).

WING DISSYMMETRY ⑯
Wing dissymmetry is the crimped offset between the ends of core wings (see **Figure 13** and **Table 3**).

SPACE BETWEEN WING TIPS AND CRIMP BOTTOM ⑰
The space between the crimp wing tips and the bottom of the crimp is designed to assure no contact between wing tips and the crimp bottom (see **Figure 13** and **Table 3**).

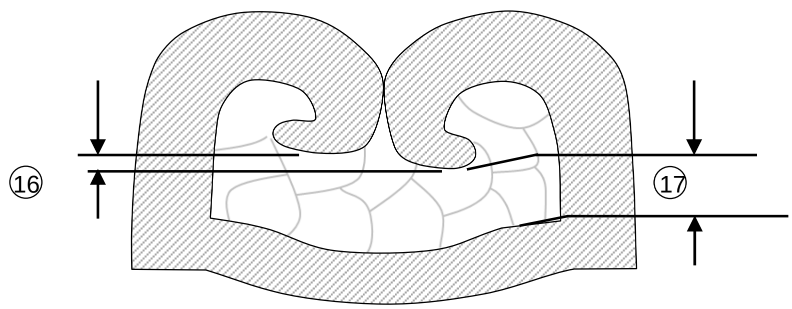
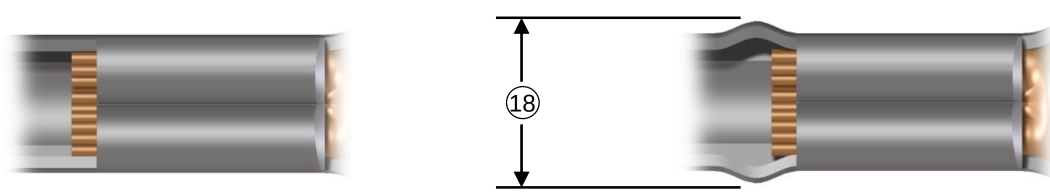


Figure 13

⑱

CRIMP BULGE
Caution needs to be taken with the crimp tooling to prevent a bulge in the transition area during crimping. The transition should generally flow smoothly from the conductor crimp to the terminal box. Any bulge must not exceed the width shown in **Table 3**. See **Figure 14** for an example of crimp bulge.



Good Crimp (No Bulge) **Bad Crimp (Bulge)**

Figure 14

WIRE CONDITION AFTER CRIMP

The wire, after crimping, should not have any scratches, grooves or dents. Such imperfections act as a leak path at the junction between the wire and the mat seal. At a minimum, check the condition of the wire on a sample length of 30mm as shown in **Figure 15**

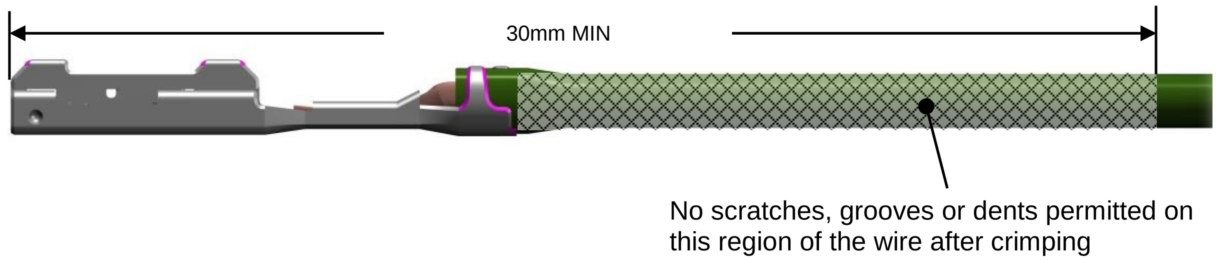


Figure 15

3.0 PRODUCT SPECIFICATIONS

Table 1

Terminal Family	Gender	Sealing	Product no.	Plating	Special Characteristics	Grip Code	Wire Size	Insulation Diameter Range
CTX50	Receptacle	Mat Seal	34905-3444	Ag	High Performance Silver (HP Ag)	S	0.13 mm²	0.95 – 1.05
			34905-2444	Sn	Standard Performance Tin (Std Sn)			
			34905-3443	Ag	High Performance Silver (HP Ag)	L	0.35 mm²	1.20 – 1.40
			34905-2443	Sn	Standard Performance Tin (Std Sn)			

Table 2

Molex Product Attribute		Validated Wire		Conductor Barrel		Insulation Barrel		Pull Out Force MIN
Grip Code	**Special Characteristics**	**Wire Type**	**Wire Size**	**CCH ± 0.03**	**CCW ± 0.03**	**ICH ± 0.03**	**ICW ± 0.03**	
S	Standard Performance Tin (Std Sn)	Acome FLR2X-A CuMg	0.13mm²	0.515	0.83	1.175	1.175	40
	High Performance Silver (HP Ag)							40
L	Standard Performance Tin (Std Sn)	Acome FLR2X A3ZHA	0.35mm²	0.66	1.04	1.53	1.35	50
	High Performance Silver (HP Ag)							50

The above specifications are guidelines to an optimum crimp. Crimp heights/widths are applicable for punch/anvil tooling shown in **Figures 18-21**.

Pull force should be measured with no influence from the insulation crimp.

Customers are required to complete their own validation testing if tooling and/or wire is different than what is shown in this specification.

All terminal crimps should be validated to:
USCAR 21 Rev 2

Wires are in accordance with the following specifications:
GMW15626

Table 3

Specifications			
Balloon #	**Feature**	**Requirement**	
1	Bend Up/Down		± 1.0°
2	Twisting		± 2.0°
3	Rolling	S	Not Applicable
		L	±3.0°
4	Rear Bell Mouth	S	0.65 ±0.15
		L	0.45 ±0.15
5	Front Bell Mouth		Not Applicable
6	Cut-Off Tab	a	0.20 MAX
		b	No Burr
7	Conductor Brush	a	0.50 ± 0.20
	From D1-D2 (see Figure 9)	b	Not to extend above conductor crimp/transition height
8	Conductor Strip Length	S	3.7 mm for 0.13mm² wire
		L	3.5 mm for 0.35mm² wire
9	Conductor Crimp Height		See Table 2
10	Conductor Crimp Width		See Table 2
11	Insulation Crimp Height		See Table 2
12	Insulation Crimp Width		See Table 2
13	Conductor Anvil Flash	a	0.10 MAX
		b	0.10 MAX
14	Insulation Grip Step	S	+ 0.14 ± 0.10(Above Datum D)
		L	-0.035 ± 0.10(Below Datum D)
15	Conductor Grip Step		0.14 ± 0.05
16	Wing Dissymmetry		0.10 MAX
17	Space Between Wing Tips	Wire ≤ 0.22 mm²	No Contact
	and Crimp Bottom	Wire > 0.35mm²	0.10 MIN
18	Crimp Bulge		1.25 MAX

4.0 REFERENCE DOCUMENTS

Reference documentation for general practices is located on the website per the below links:

1. Molex Quality Crimping Handbook http://www.molex.com/images/products/apptool/qual_crimp.pdf
2. Molex-Recognizing Good Crimps http://www.molex.com, search for Application Tooling

5.0 PROCEDURE

5.1 GENERAL MEASUREMENT AND EVALUATION REQUIREMENTS

Crimp Height Measurement (Extrusion Evaluation)

1. Complete tool set-up procedure.
2. Crimp a minimum of 5 samples.
3. Place the flat blade of the crimp micrometer across the center of the dual radii of the conductor crimp as seen in **Figure 16** or **17**. Do not take the measurement near the conductor bell mouth.
4. Rotate the micrometer dial until the point contacts the bottom most radial surface. If using a caliper, be certain not to measure the conductor anvil flash (extrusion/burr) of the crimp.

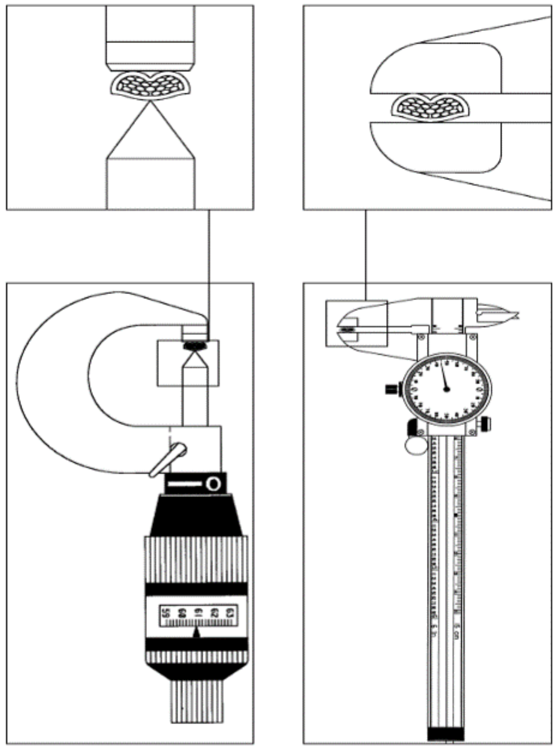


Figure 16 **Figure 17**

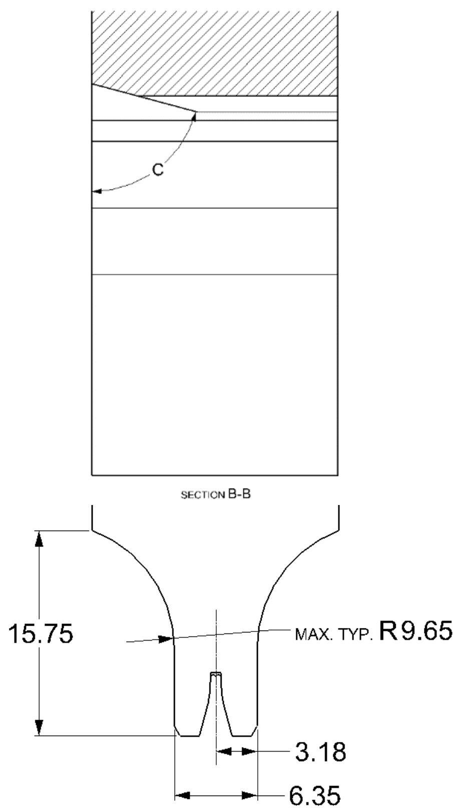
6.0 CRIMP TOOLING GEOMETRY

The crimp tooling information shown below defines the tooling that Molex used to perform validation testing to establish recommended crimp height and widths. The user is responsible for validating crimp performance based on tooling, equipment and wire that is being used.

Table 4 (See Figure 18 for geometry)

Wire Application		Conductor Punch (mm)												
Grip Size	Wire Size	A	B	C	D	E ±0.025	F ±0.025	G ±0.025	H ±0.025	I	J	K	L	Z	Z Polished	AA
S	0.13mm²	R0.210	0.10	75º	0.390	0.300	0.560	1.390	3.310	1º	2.5º	3º	15º	0.113	0.090min.	R0.02
L	0.35mm²	R0.267	0.20	45º	0.478	0.432	0.737	1.651	3.175	1.5º	3º	3º	15º	0.128	0.100min.	R0.02

General Tolerances (unless specified)	
1 PLACE	± 0.13
2 PLACES	± 0.025
3 PLACES	±0.005
ANGULAR	± 0.5°



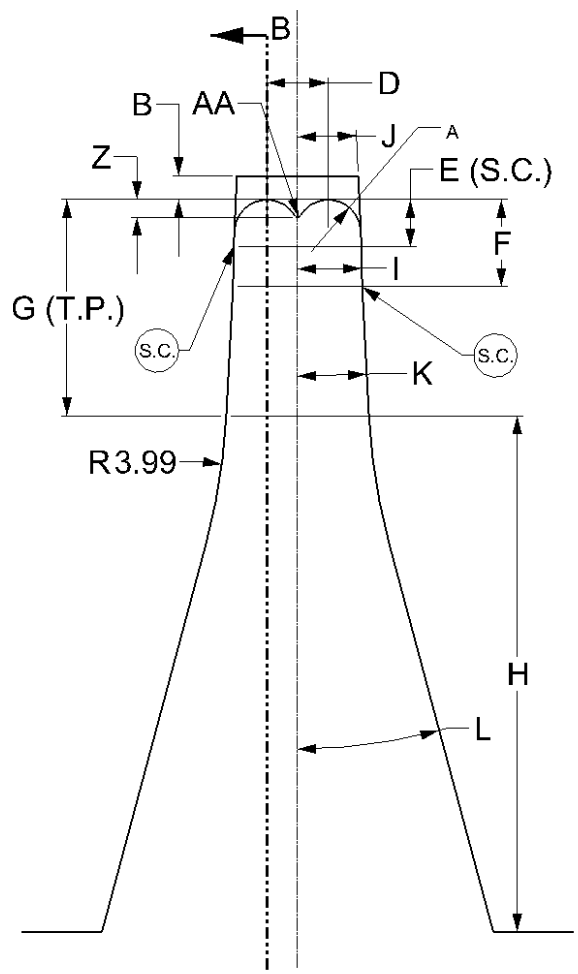
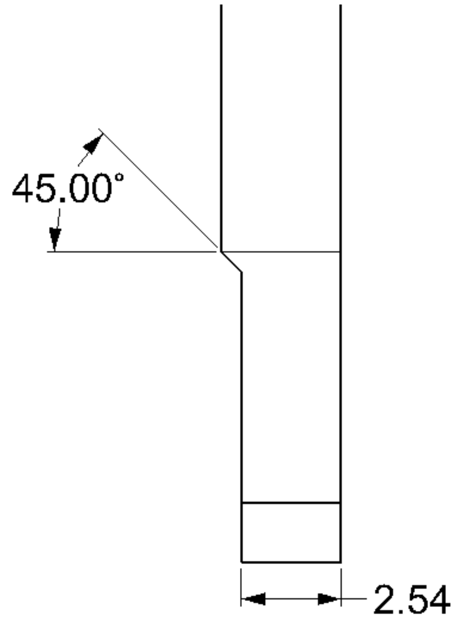


Figure 18

Table 5 (See Figure 19 for geometry)

Wire Application		Insulation Punch (mm)			
Grip Size	Wire Size	M ± 0.025	N ± 0.13	O	P
S	0.13mm²	0.560	5.080	15º	3º
L	0.35mm²	0.6096	5.842	15.54º	3.22º

General Tolerances (unless specified)	
1 PLACE	± 0.13
2 PLACES	± 0.025
3 PLACES	±0.005
ANGULAR	± 0.5°



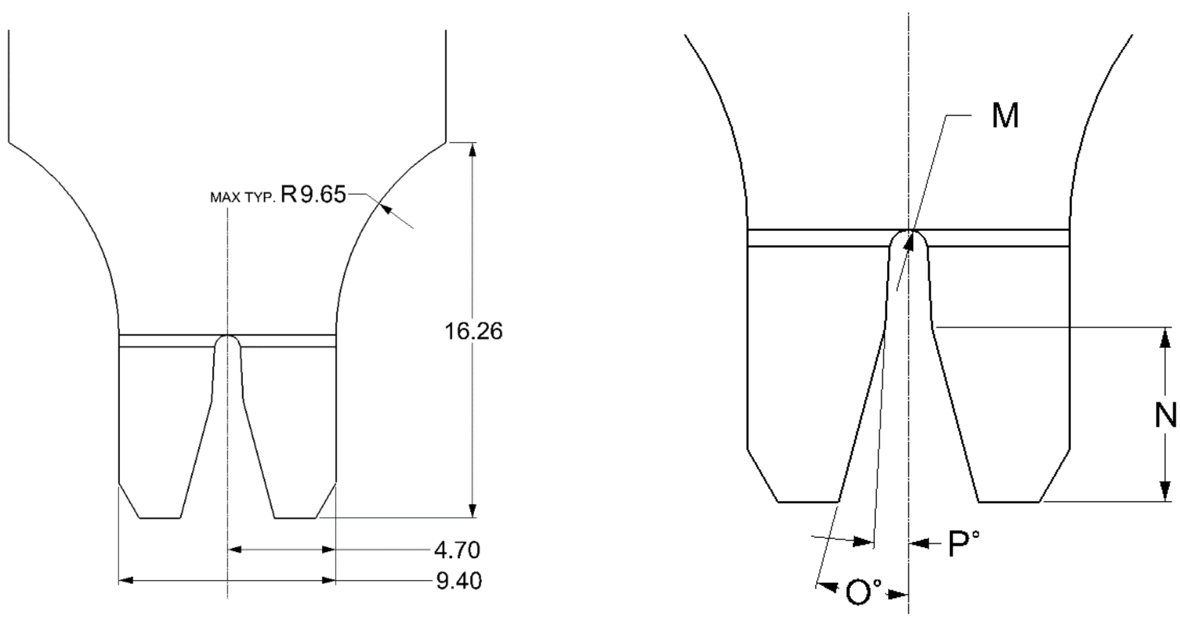


Figure 19

Table 6 (see Figure 20 for geometry)

Wire Application		Anvils (mm)								
Grip Size	**Wire Size**	**Q**	**R** ± 0.025	**S** ± 0.025	**T** ± 0.025	**U** ± 0.025	**V** ± 0.025	**W**	**X**	**Y**
S	0.13mm²	0.650	0.800	0.090	0.610	0.965	0.198	0.152	3.439	Y
L	0.35mm²	0.8712	1.016	0.127	0.609	1.320	0.279	0.304	3.429	Y

General Tolerances (unless specified)	
1 PLACE	± 0.13
2 PLACES	± 0.025
3 PLACES	±0.005
ANGULAR	± 0.5°

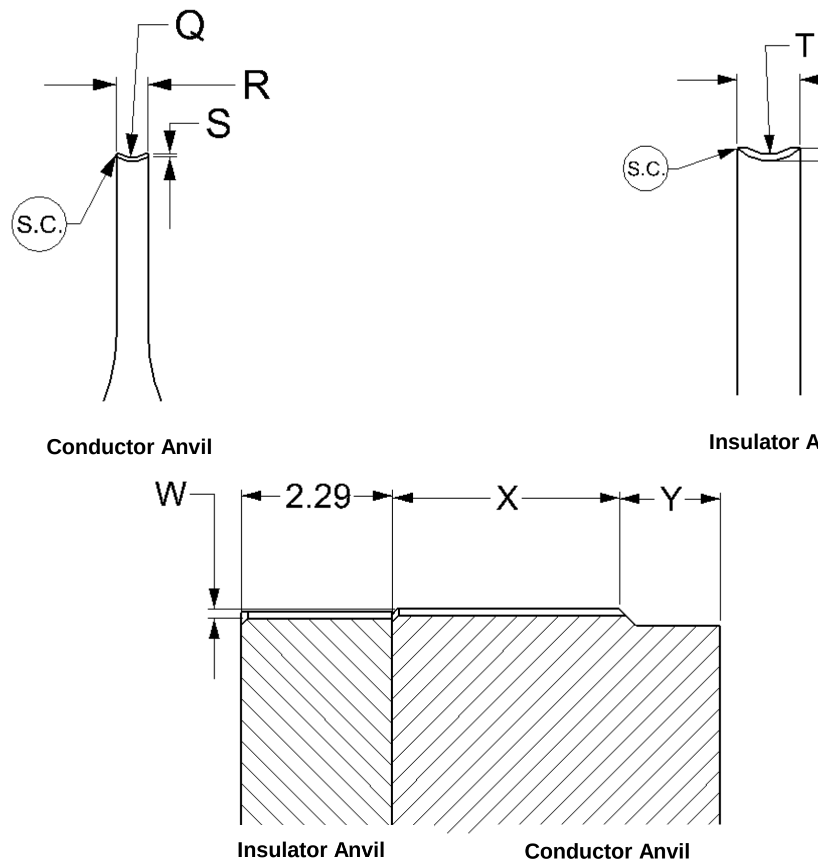


Figure 20

7.0 CRIMP STRAIGHTNESS

A sample method for maintaining crimp straightness is shown in **Figure 21**.

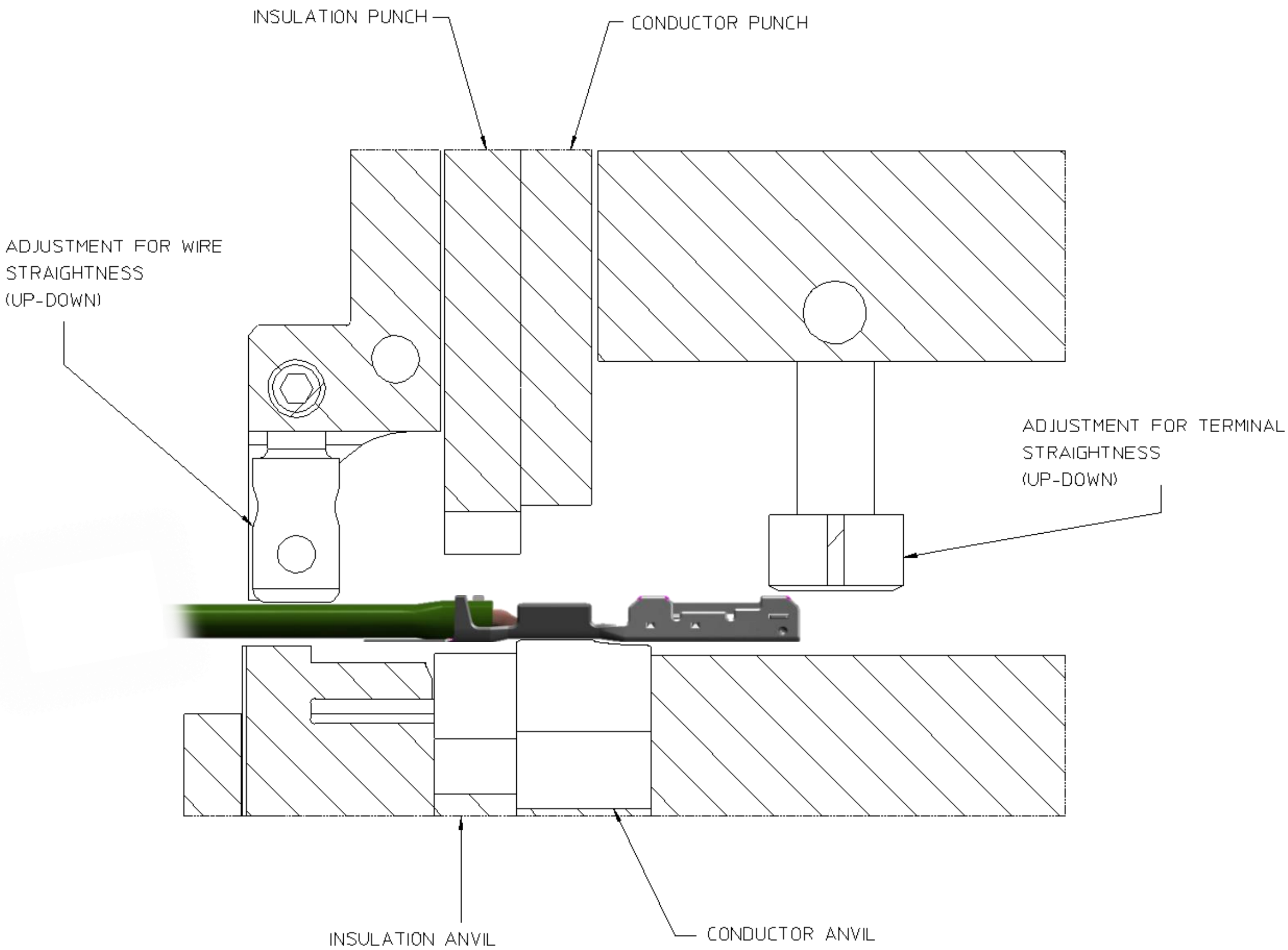


Figure 21

8.0 APPLICATION TOOLING

Application tooling for the Terminals can be obtained directly from Odyssey Tool.

www.odysseytool.com

Application number / Molex terminal grip size;
ODY501621 / Large 0.35mm^2 wire
ODY501623 / Small 0.13mm^2 wire

9.0 REVISION LOG

REVISION	DATE	DESCRIPTION
A	8/01/2016	Initial Release
B	9/02/2016	Modification to Applicator Supplier
C	3/28/2017	Update views for terminal, Update Small grip CCH and Rolling Requirement

NOTE: Please refer to www.molex.com to ensure the latest revision of this document.