刺破线扣系列（Magnet Wire Terminals & Splices）

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1. 范围 Scope

本规范适用产品型号如下:

序号	产品型号 Part No.	材质 Material	材料厚度 T	压接范围 (CMA)	压接范围 (mm^2)
1	TSP9001G-2	黄铜 Brass	0.50mm	CMA 1500-5000	0.8—2.5
2	TSP9002G-2	黄铜 Brass	0.40mm	CMA 600-3000	0.3—1,5
3	TSP9003G-2	黄铜 Brass	0.50mm	CMA 600-3000	0.3-1.5
4	TSP9006G-2	黄铜 Brass	0.50mm	CMA 3000-7000	1.5—3.5
5	TSP9010G-2	黄铜 Brass	0.45mm	CMA 1500-3300	0.75—1.65
6	TSP9011G-2	黄铜 Brass	0.64mm	CMA 7000-14000	3.55—7.10
7	TSP9012G-2	黄铜 Brass	0.64mm	CMA 5000-10000	2.54—5.07

2、压接要求 Crimping Requirements

2.1 电线/漆包线与端子选型应用原则

2.1 Selection and Application Principles for Wire/Enameled Wire and Terminals

a、所选端子的压接范围必须与被压接漆包线和引出电子线的总面积相符合。

a、 The crimping range of the selected terminal must be compatible with the total area of the enameled wire and the outgoing electronic wire to be crimped。

b、端子中最多容纳三根漆包线和额外的引出线。电子线剥线长度根据需要确保所有导体完全穿过接头，没有任何绝缘延伸到压接区域。漆包线不需要预先剥除绝缘膜。

b、 The terminal should accommodate a maximum of three enameled wires and additional outgoing wires. The stripping length of the electronic wire should be sufficient to ensure that all conductors pass through the connector completely, with no insulation extending into the crimping area. The enameled wire does not require prior stripping of the insulating film。

c、一个端子中，最大和最小漆包线的直径之比不能大于 2：1。

c、 The ratio of the diameters of the largest and smallest enameled wires within a single terminal should not exceed 2:1。

d、用于压接铝漆包线时必须使用 9 齿且镀锡的端子。特殊情况需要经工程师确认。

d、 When crimping aluminum enameled wires, it is necessary to use 9-tooth and tin-plated terminals. Special circumstances require confirmation by an engineer。

e、压接铝漆包线时，建议铝线的直径不要小于 0.20mm。0.32mm 以下要考虑压接后的强度。

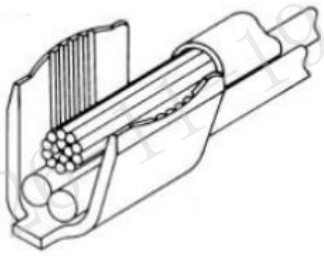
e、 When crimping aluminum enameled wires, it is recommended that the diameter of the aluminum wire should not be less than 0.20mm. Consideration should be given to the strength after crimping for diameters below 0.32mm。

f、在有引出线的情况下，漆包线直径的总和加上二倍的端子厚度不能超过该端子的压接宽度。如果没有引出线，可以不用考虑这一原则。

f、 In the case of outgoing wires, the sum of the diameters of the enameled wires plus twice the thickness of the terminal should not exceed the crimping width of the terminal. If there are no outgoing wires, this principle does not need to be considered。

g、压接时漆包线放在下面，引出线放在上面。

g、 During crimping, the enameled wire should be placed below, and the outgoing wire should be placed above。



h、在压接之前，不要将多跟电线拧在一起。

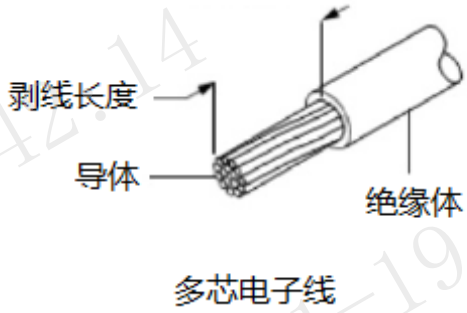
h、 Do not twist multiple wires together before crimping。

i、端子的送料方向如下图所示。

i、 The feeding direction of the terminal is shown in the figure below。

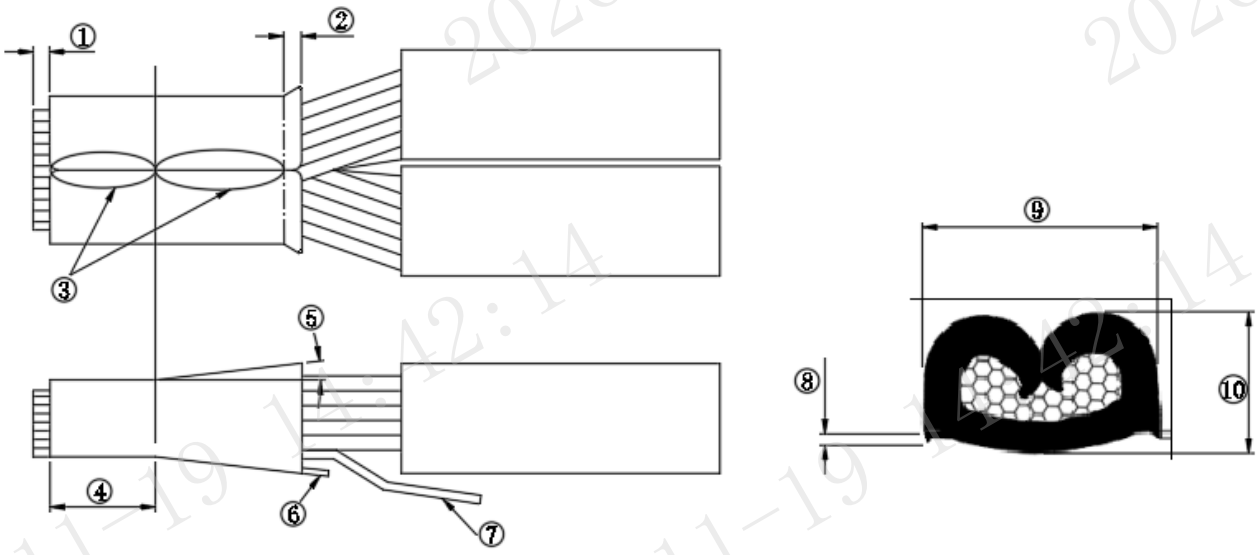
j、在电子线的剥线操作时不应该刮伤或切断电线的线丝，绝缘材料剥离后应避免不会压接到端子压线脚内。

j、 During the stripping operation of the electronic wire, the wire strands should not be scratched or cut. After stripping the insulating material, it should be avoided that the stripped portion is not pressed into the crimping slot of the terminal。



多芯电子线

2.2 压接注意事项 2.2 Precautions for Crimping



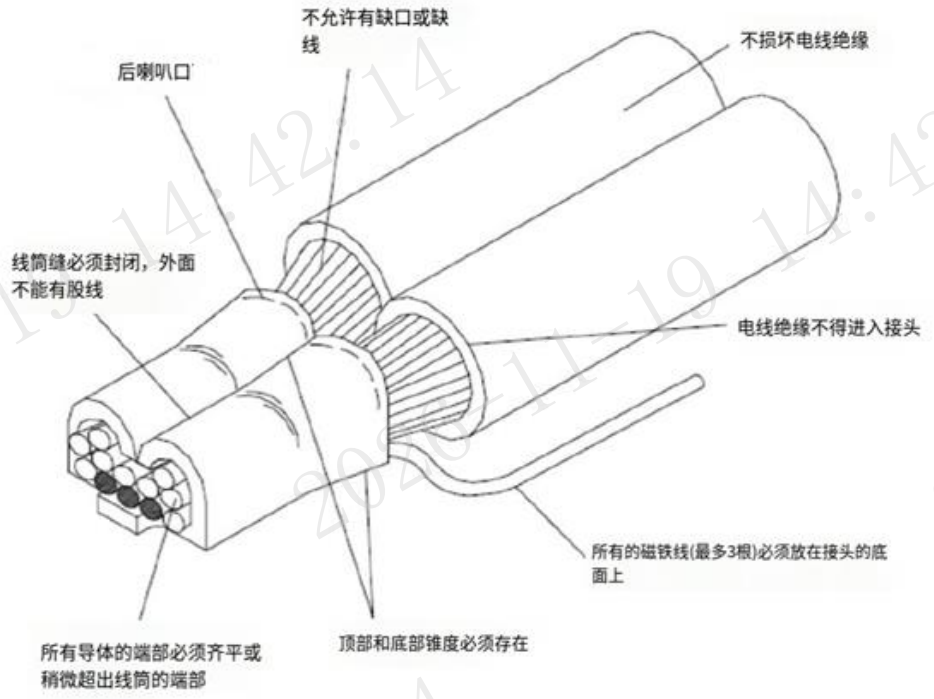
序号 No.	项目 Project	标准 Standard
1	电线状态 Wire Status	芯线必须超出端子本体，并由切刀切断
2	喇叭口	必须要有后喇叭口
3	电线状态	芯线压接区不可有飞丝现象
4	压接状态	此区域是平整区，用于测量压接高度，占端子总长度的 50%
5	压接状态	此区域锥形 6°最大
6	料带裁切余量	1.50mm 最大
7	电线状态	压接底部不应有断掉的芯线
8	压接毛刺	0.13mm 最大
9	压接宽度	见下表
10	压接高度	见下表

压接高度和宽度的参数参考下表，由于电线和漆包线的组合很多，这里设定电线和漆包线的总面积之和为 A，压接高度用 CH 表示。The reference parameters for crimping height and width are provided in the following table. Since there are numerous combinations of wires and enameled wires, the total area of the wire and enameled wire is designated as A, and the crimping height is represented by CH.

序号 No.	产品型号 Part No.	材料厚度 T	压接范围 (CMA)	压接范围 (mm^2)	压接宽度 mm +0.15	压接高度 mm +/-0.05
1	TSP9001G-2	0.50mm	1500-5000	0.8—2.5	2.8	CH=0.260A+1.4
					3.56	CH=0.215A+1.21
2	TSP9002G-2*	0.40mm	600-3000	0.3—1,5	2.8	CH=0.265A+1.04
					2,3	CH=0.326A+1.21

3	TSP9003G-2	0.50mm	600-3000	0.3—1.5	2.8	CH=0.263A+1.25
4	TSP9006G-2	0.50mm	3000-7000	1.5—3.5	3.56	CH=0.205A+1.52
					4.57	CH=0.175A+1.33
5	TSP9010G-2	0.45mm	1500-3300	0.75—1.65	2.8	CH=0.2633A+1.147
6	TSP9011G-2	0.64mm	7000-14000	3.55—7.10	4.57	CH=0.1604A+1.8694
7	TSP9012G-2	0.64mm	5000-10000	2.54—5.07	4.57	CH=0.1614A+1.6852

***:TSP9002G-2:此料号适于不大于 28AWG（Φ0.32mm)的线材。The P/N for the applications using wire size 28 AWG [0.32 mm] or smaller.**



2.3 压接的判定原则

压接操作时必须按压接宽度和高度的要求进行压接，压接切面只是辅助判定，其是对压接参数的一种校验。

行业内有压缩比的要求，一般定义铜导线/铜漆包线的压接后与压接前的压缩比范围为 70%~90%。这个也是一个辅助判定，是在压接高度和宽度合格的前提下进行判定，不能通过压缩比的范围来反过来定义压接参数，因为压缩比的范围很宽的，压接参数不能定义太宽的公差。

对于铝漆包线的压接，由于其比较软，其压缩比要比铜线低很多，一般定义为 50%~75%。

2.3 Criteria for Crimping Evaluation

During the crimping operation, the crimping must be performed according to the required crimping width and height. The crimping cross-section is only a supplementary criterion and serves as a verification of the crimping parameters.

Within the industry, there are requirements for the compression ratio. Generally, the compression ratio for copper conductors/copper enameled wires after crimping compared to before crimping ranges from 70% to 90%. This is also a supplementary criterion and should be evaluated on the premise that the crimping height and width are qualified. The compression ratio range cannot be used to retroactively define the crimping parameters, as the range of compression ratios is quite broad, and the crimping parameters should not have excessively wide tolerances.

For the crimping of aluminum enameled wires, due to their relative softness, their compression ratio is much lower than that of copper wires, typically ranging from 50% to 75%.

3、压接效果及实例

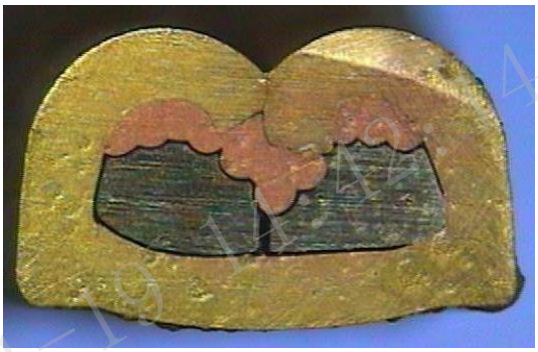
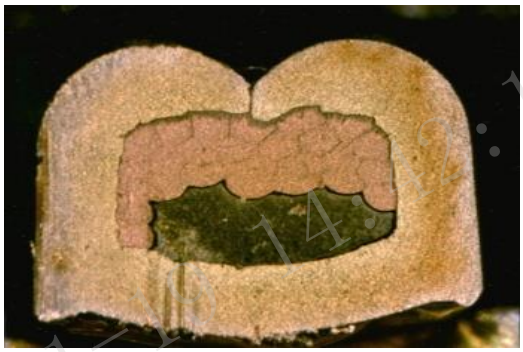
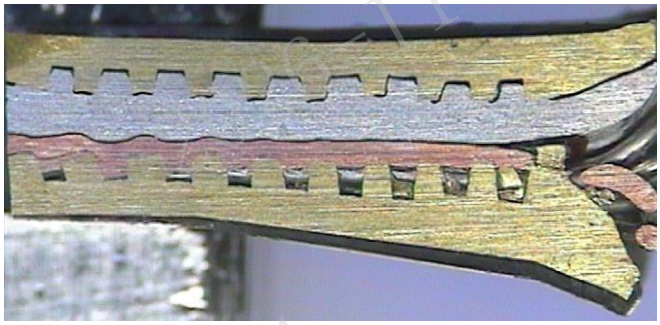
3.1 合格的压接参考图片

对于合格切面的判定原则，无论是漆包线的组合是什么样的，在切面中都不允许有空隙，有了空隙就代表电线没有得到充分的压缩。

3. 3. Crimping Effect and Examples

3.1 Reference Images of Acceptable Crimping

For the principle of determining an acceptable cross-section, regardless of the combination of enameled wires, no gaps are allowed in the cross-section. The presence of gaps indicates that the wires have not been sufficiently compressed.

3.2 切面磨到了齿形槽中

有一些切面在研磨时，磨到了端子的齿形槽中，从而无法判定端子是否合格，特别是在计算压缩比时，无法得到正确的结果。

在磨到齿形槽中时，材料的壁厚会出现明显的不均匀现象。因为在齿槽中的材料会薄很多。也有可能会有空隙存在。

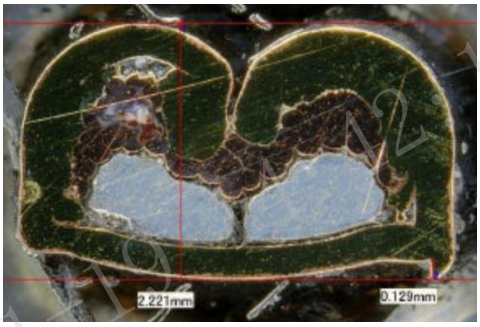
下面这些图片是一些磨到端子齿槽中的图例

3.2 The Cutting Surface Is Ground into the Toothed Groove

During grinding, some cutting surfaces are ground into the toothed groove of the terminal, making it impossible to determine whether the terminal is acceptable. This is especially problematic when calculating the compression ratio, as accurate results cannot be obtained.

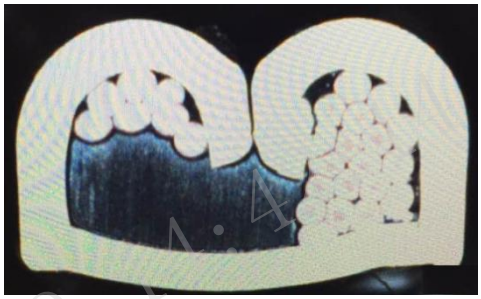
When the cutting surface is ground into the toothed groove, the wall thickness of the material becomes significantly uneven. This is because the material within the groove is much thinner. Additionally, there may be gaps present.

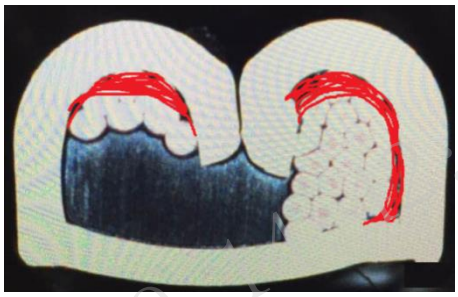
The following images are examples of cutting surfaces ground into the toothed grooves of the terminals.



下面两个图片是同一个切面，左图可以看到切面磨到了齿槽中，可以看到明显的材料壁厚不均匀，也有空隙。右图是展示在原图的基础上进行的修补，按材料壁厚均匀进行的修补。

The following two images show the same cutting surface. In the left image, it can be seen that the cutting surface has been ground into the toothed groove, resulting in a significant unevenness in the material's wall thickness and the presence of gaps. The right image demonstrates a repair made to the original image, where the repair is based on achieving a uniform wall thickness of the material.





3.3 不合格的切面

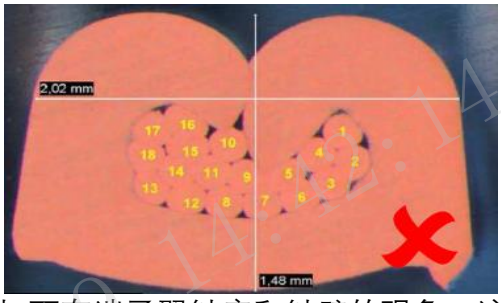
无论是压接漆包线还是电子线，都不能出现不合格的切面。关于不合格的切面，这里整理了一些电子线的图片，漆包线的压接与这个相同。

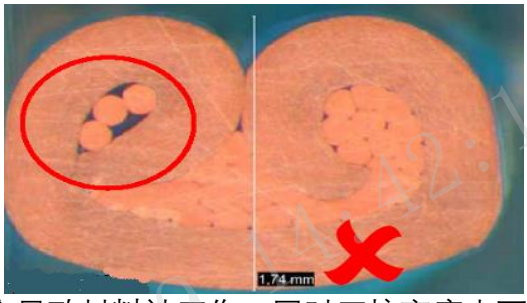
下面两个图片压接太松，电线没有压紧，有空隙。是不合格的压接。

3.3 Unqualified Cross-Sections

Whether it is crimping enameled wires or electronic wires, unqualified cross-sections should not occur. Regarding unqualified cross-sections, we have compiled some images of electronic wires here, and the crimping of enameled wires follows the same principle.

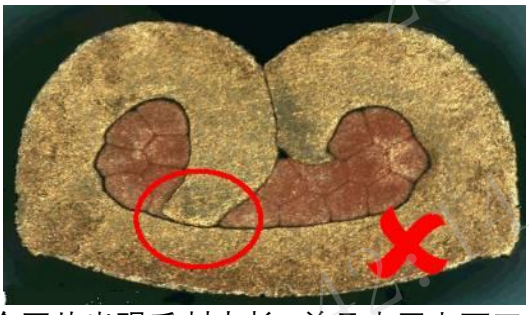
The following two images show loose crimping, where the wires are not tightly compressed and there are gaps. This is unqualified crimping.

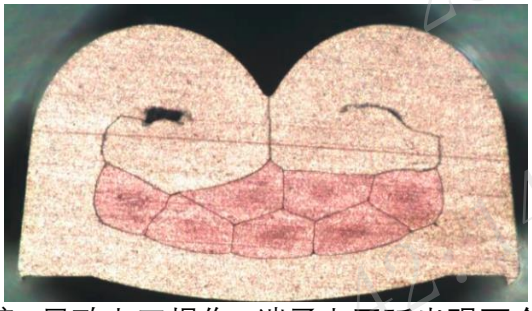


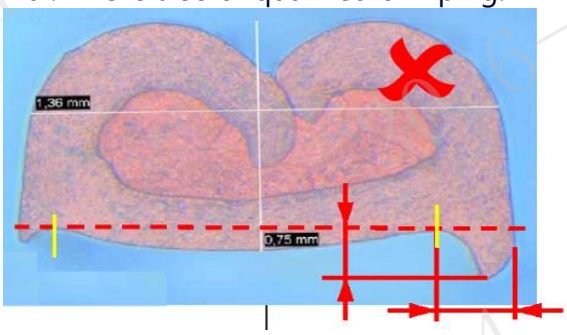
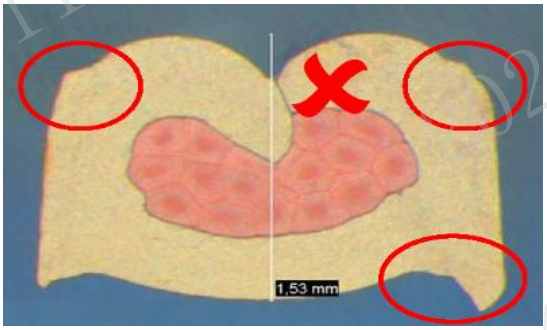


下面两个切面有端子翼触底和触壁的现象，这样会导致材料被压伤，同时压接高度也不稳定，这也是不合格的压接。

The next two cross-sections exhibit the phenomenon of the terminal wings touching the bottom and walls, which can cause the material to be crushed and also results in unstable crimping heights. This is also unqualified crimping.





下面两个图片出现毛刺太长，并且由于上下刀片相撞，导致上刀损伤，端子上圆弧出现两个凹坑，这也是不合格的压接。

The following two images show excessive burrs, and due to the collision between the upper and lower blades, the upper blade has been damaged, resulting in two indentations on the upper arc of the terminal. This is also unqualified crimping.