D&E EVENT

Het ontwerpen van innovatieve elektronica

Woensdag 19 april 2023

1931 Congrescentrum 's-Hertogenbosch

WAT MAAKT EEN KRIMP NU EEN PERFECTE KRIMP?

Remco van de Griendt – Field Application Engineer

Introduction

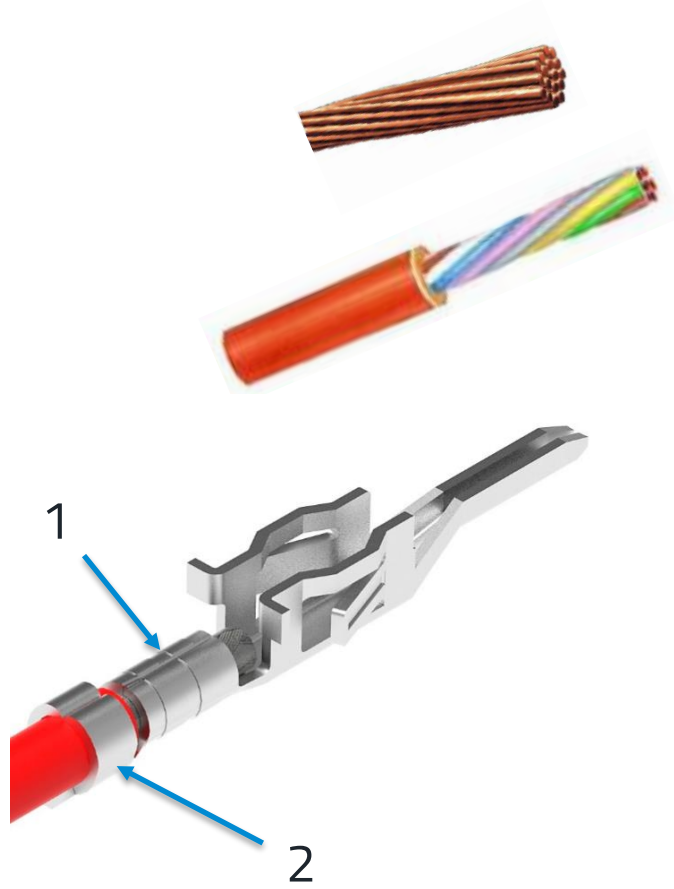
- Wires
- Definition of a crimp
- Conducter styles
- Tooling
- Control of a crimp

Wire & cable

- **Stranded conductor**
  - Suitable for semi-automatic or automatic processing
- **Jacketed cable**
  - Suitable only for semi-automatic processing
- **Ribbon flat cable**
  - Preferred for internal connections

Wire & Cable materials

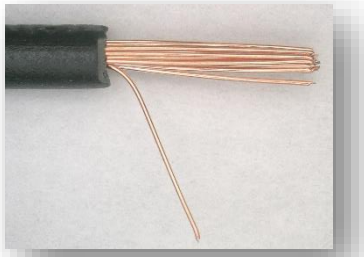
- **Wording :**
  - **Core:** several conductors (called strands) result in one core
  - **Cable**: combination of several wires in a common insulation
  - **Global crimp:**
    - **Wire crimp:** crimp edges for the wire area (1)
    - **Isolation crimp:** crimp edges for the isolation area (2)



IEC mm² style

- **Standard stranded conductor in mm²**
  - Defines with electrical maximum resistance value
  - Not twisted

  - Does not define numbers of single conductors
  - Maybe more expensive handling because after stripping the stranded conductor spreads like a „broom“



AWG style

- **UL standard - AWG stranded basics**
  - concentric wires including twisting (better handling)
  - UL defines number of single wires
    - Example: AWG12:
      - 7 x Ø 0,813mm or 19 x Ø 0,455mm or 65 x Ø 0,254mm
  - UL standard also defines insulation diameter
  - **!!The smaller the AWG size the bigger the mm²!!**

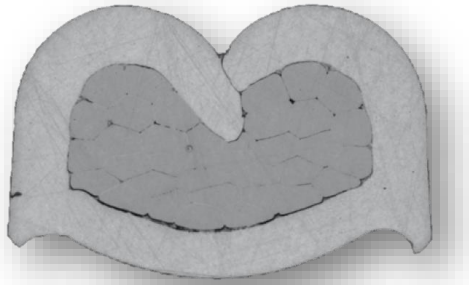
UL styles

UL style	AWG	Voltage in (V)	Insulation Material	Wall thickness Insulation (mm)	Temperature (C°)
1007	32 - 16	300	PVC	0.53	105
1015	28 - 9	600	PVC	0.76	105
1061	30 - 16	300	PVC	0.23	80
1569	28 - 10	300	PVC	0.38	105
1609	32 - 6	125	ETFE	0.13	105

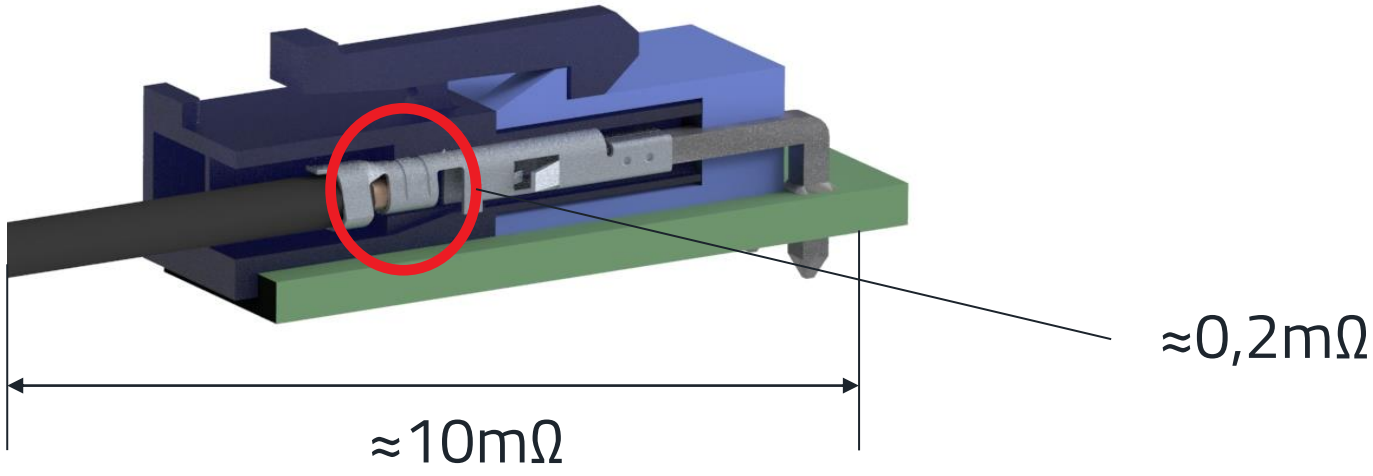
Crimp definition

- **Generally:** connection process hardly removable and not repairable

- **Cable crimp main features:**
  1. nearly gas-tight

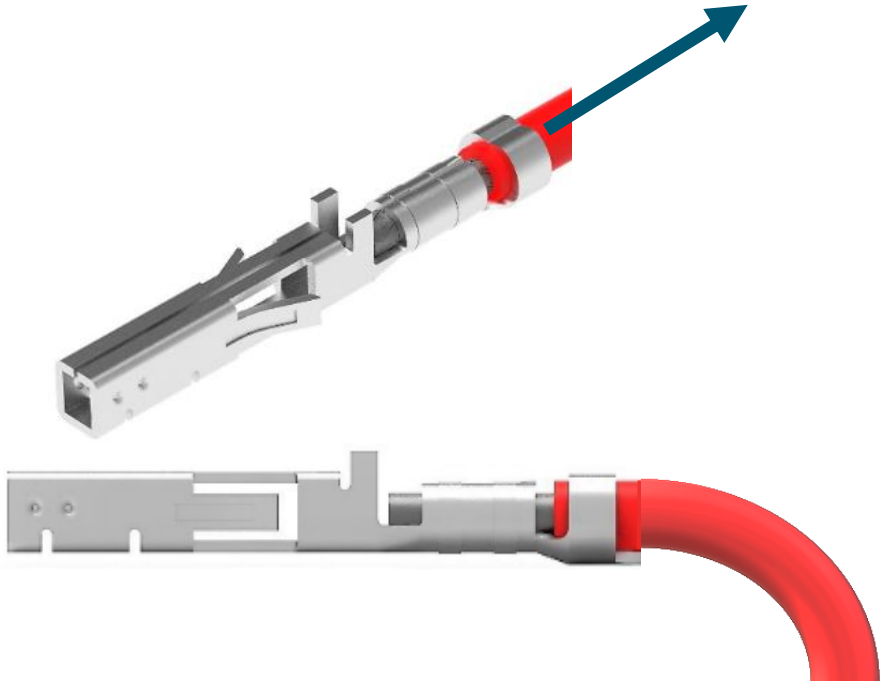


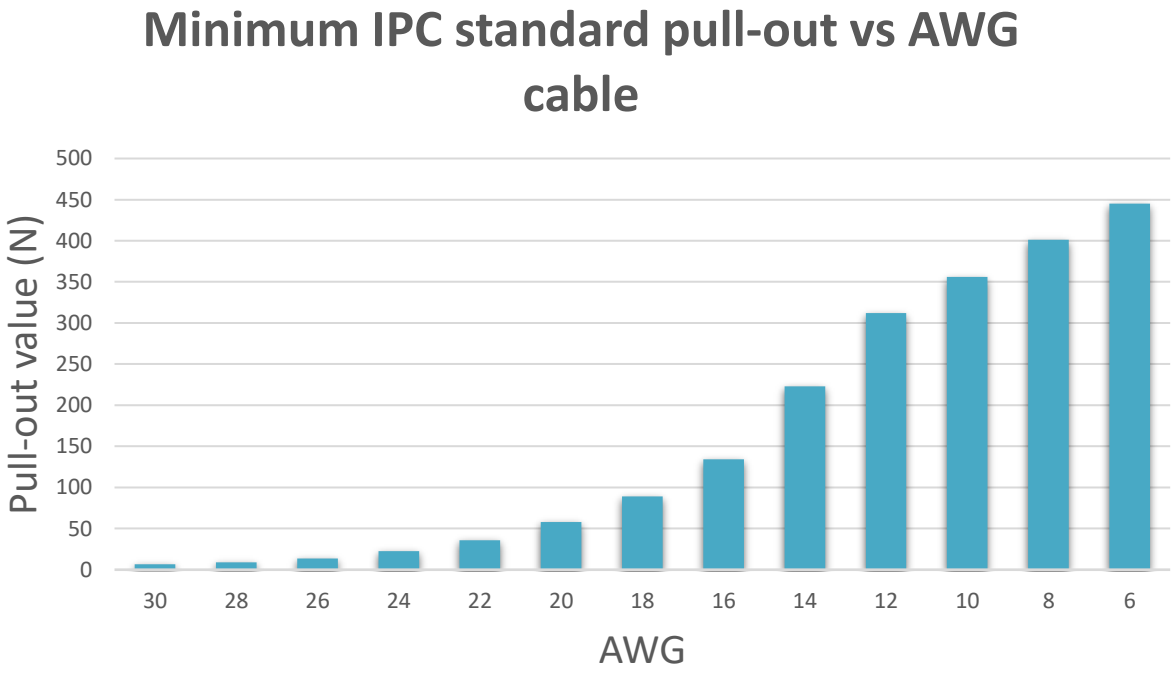
  2. High electrical characteristics - low contact resistance



Crimp definition

- **Cable crimp main features:**
  1. nearly gas-tight
  2. High electrical characteristics - low contact resistance
  3. High mechanical strength





Terminal – wire compatibility

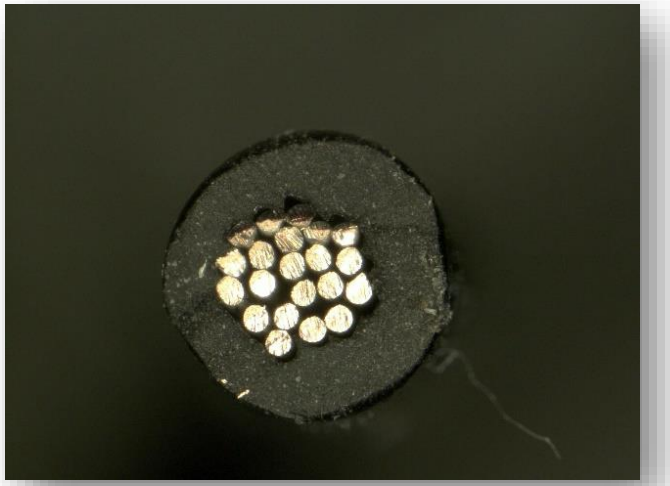
- **Right cross section**
  - terminal range must fit with:
    - wire cross section
    - insulation diameter

AWG – mm²

Ø

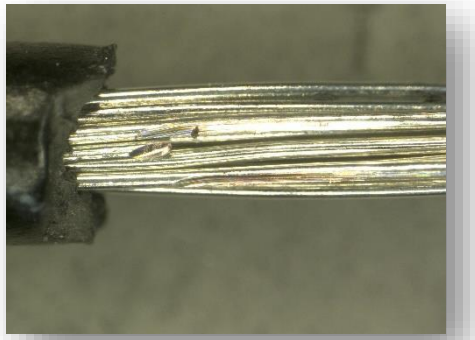
Stranded conductor preparation (manually)

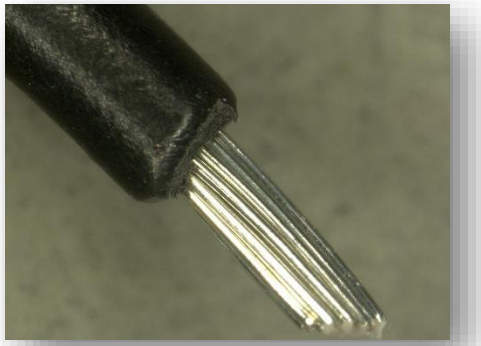
- **Cut**
  - After cutting the stranded endings should be almost round



Stranded conductor preparation (manually)

- **Stripping**
  - The stripping knives cuts the insulation but may not damage the single wires. Afterwards the insulation is pulled off.





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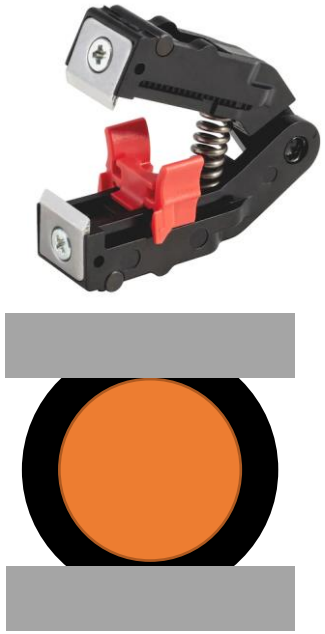
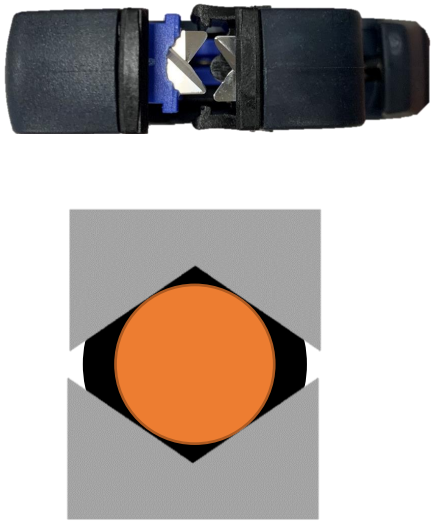
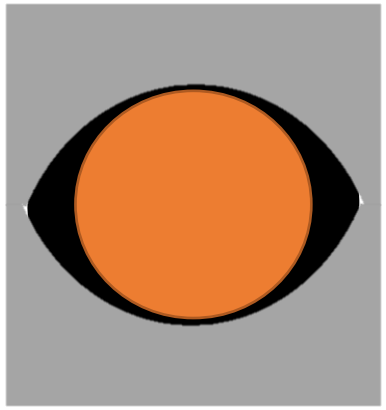


Standard



≈30-12 AWG

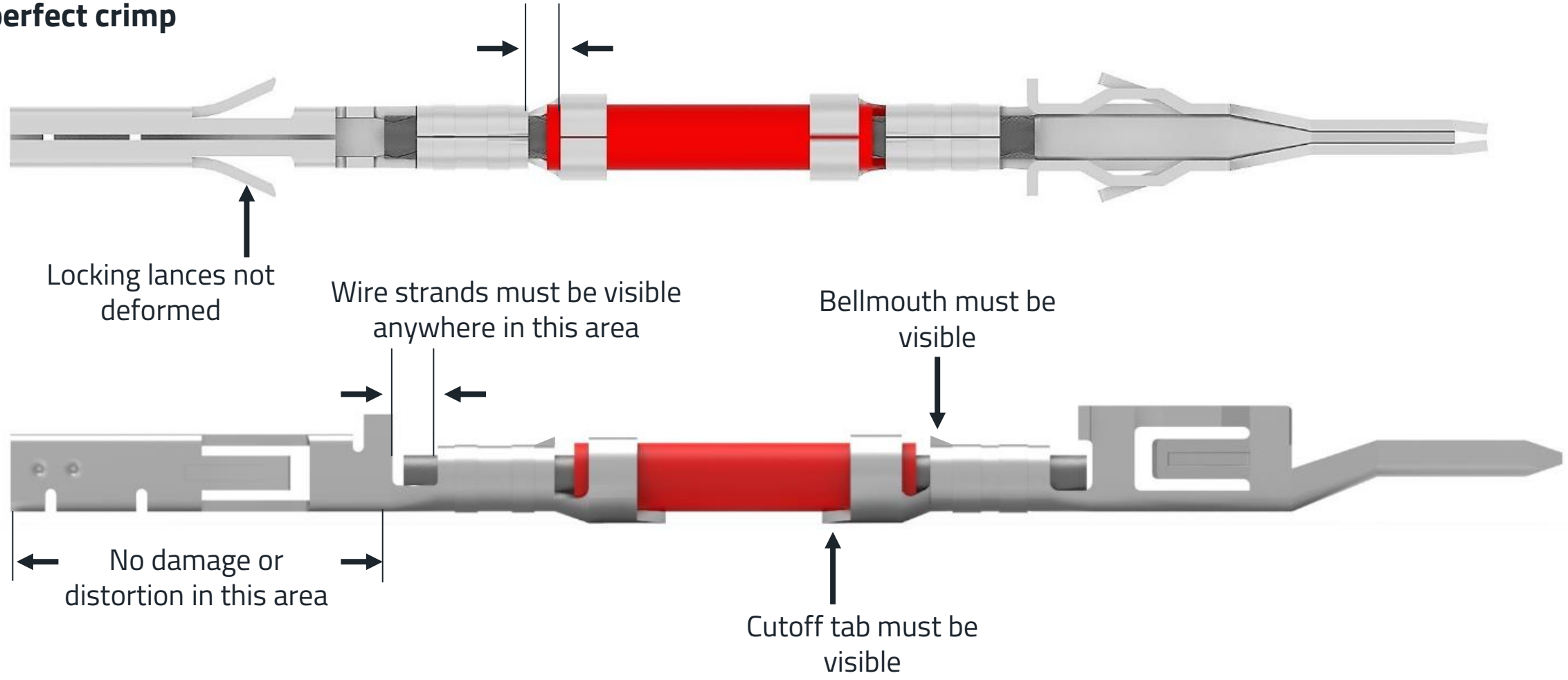


>12 AWG
(Redcubes)

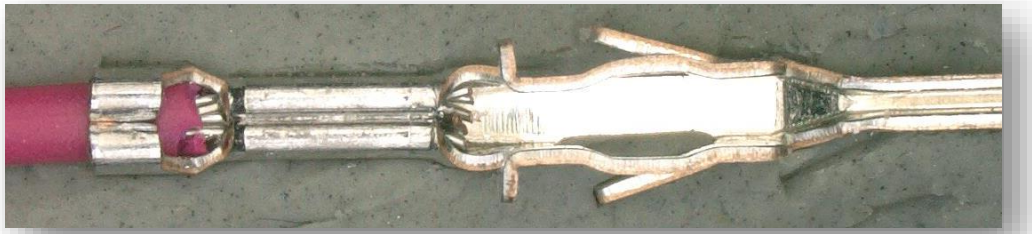
Crimping tool

Visual control

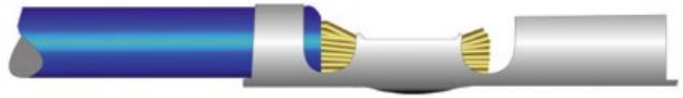
- **A perfect crimp**



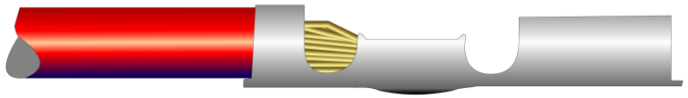
Visual control



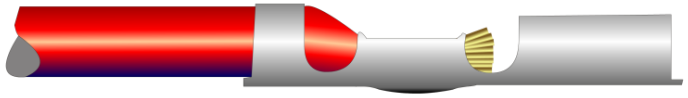
- Inserted correctly



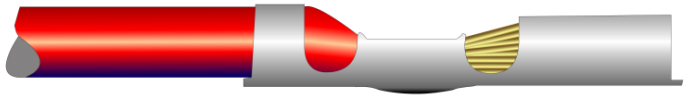
- not far enough inserted



- Stripped too short



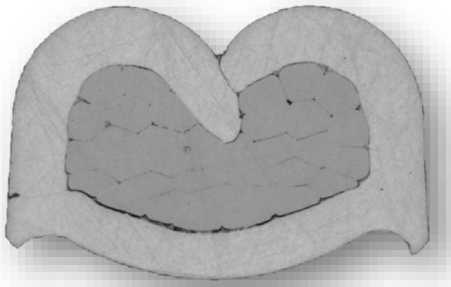
- Inserted too far



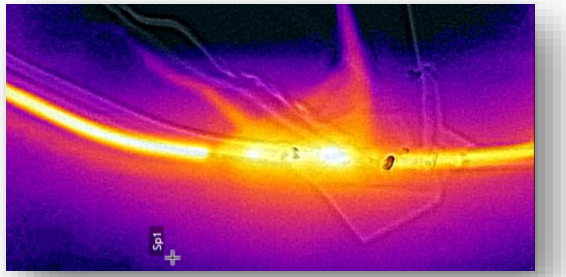
- Stripped too long

Crimp characteristics

- **Cable crimp main features:**
  1. nearly gas-tight



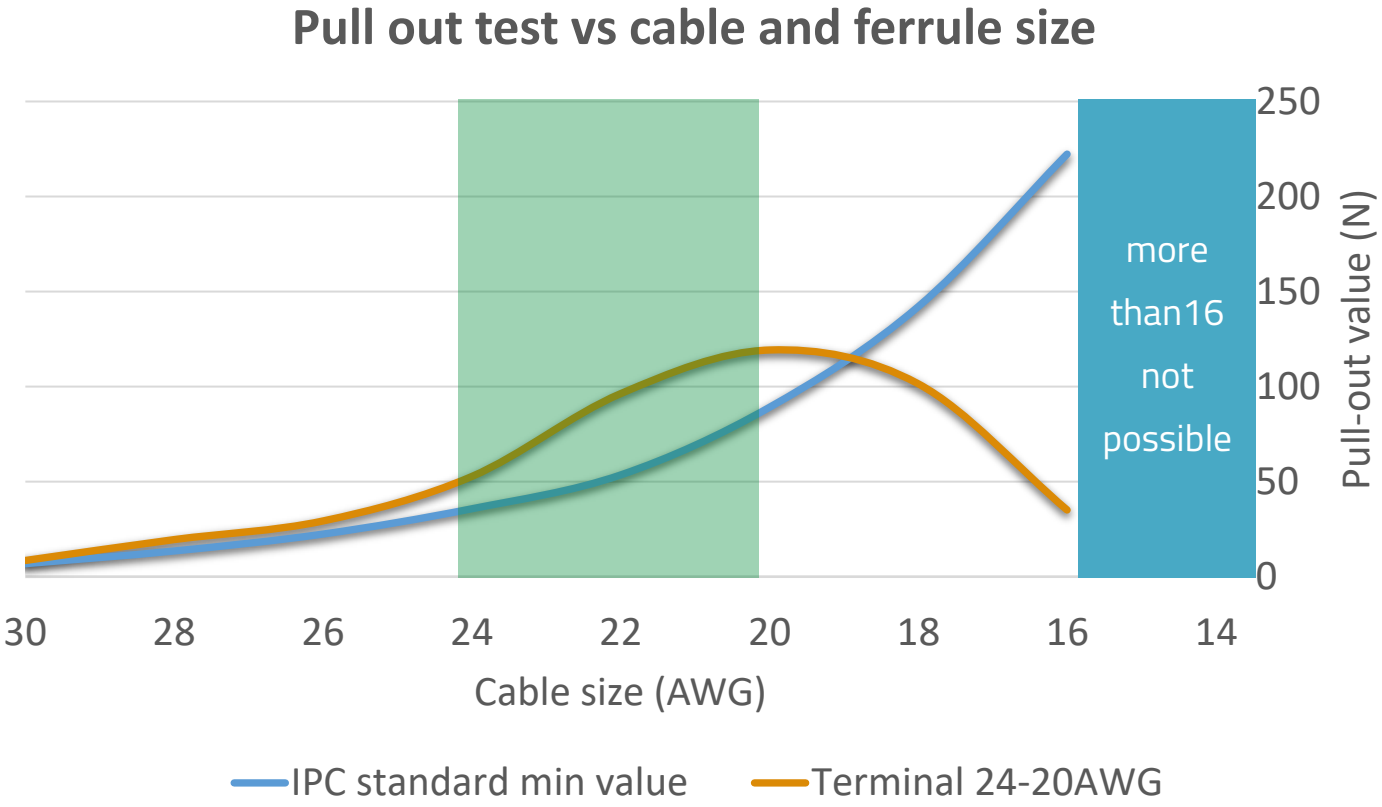
  2. High electrical characteristics - low contact resistance



  3. High mechanical strength

Pull-out : use the appropriate wire

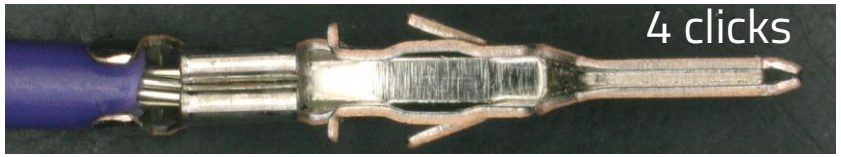
- **24-20 AWG terminal tested with a full range of wires:**

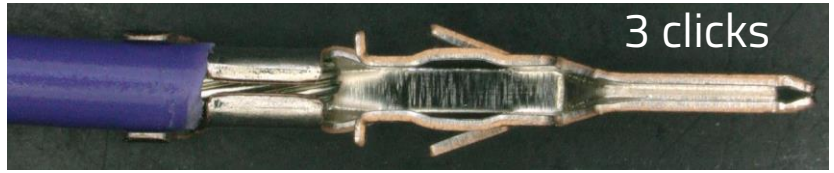


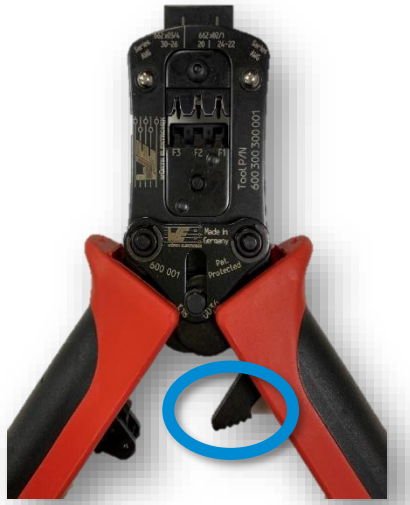
Pull-out resistance decreases when using bigger or smaller wires

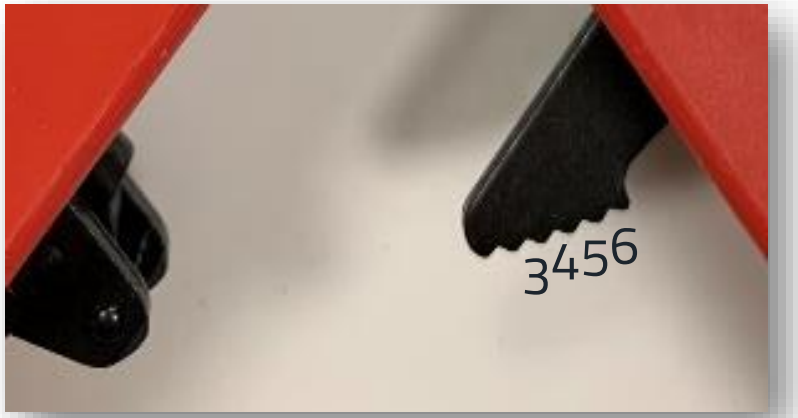
The right compression - test

- **24-20 AWG terminal pull out test with 22 AWG wire**

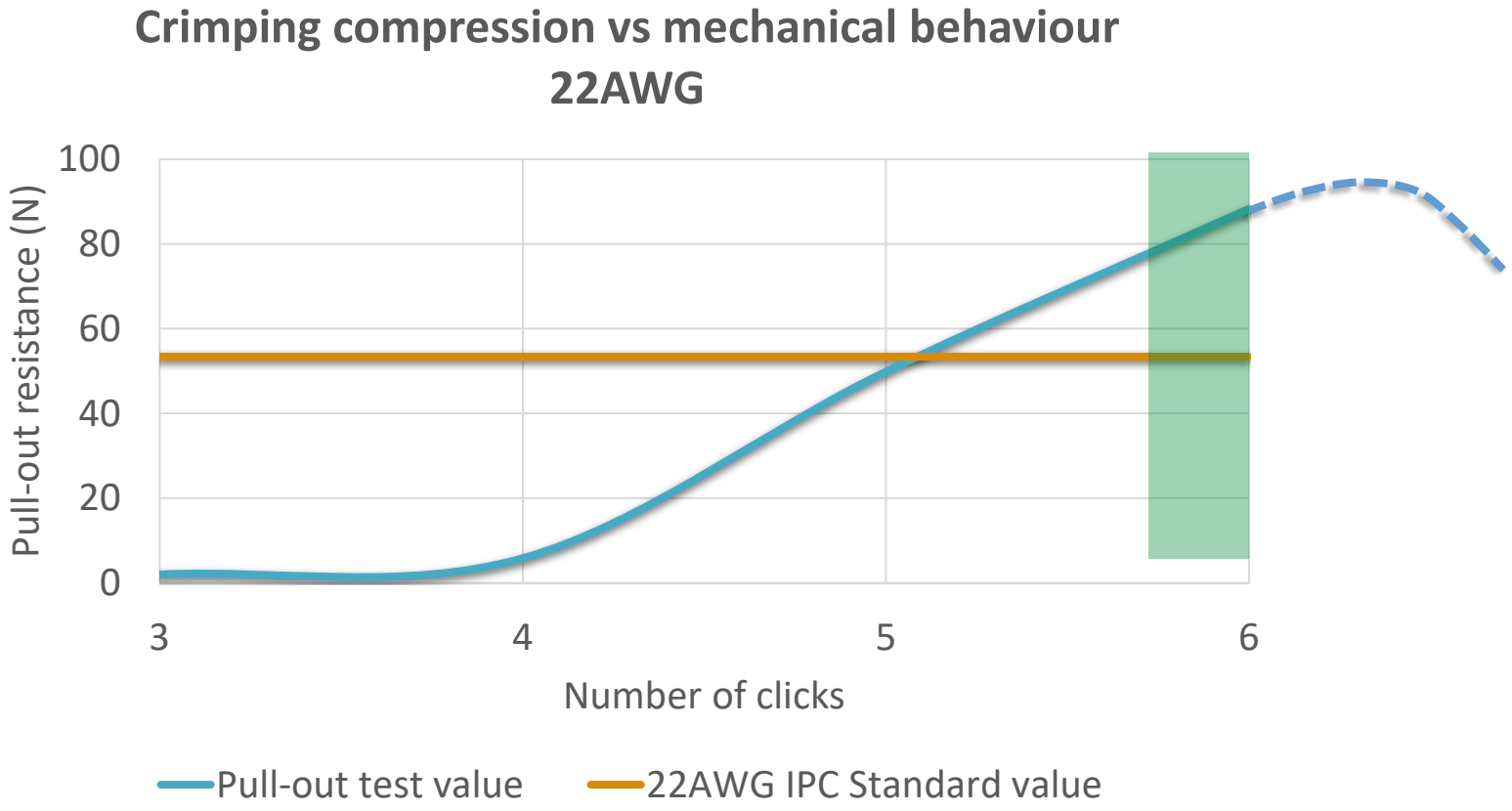




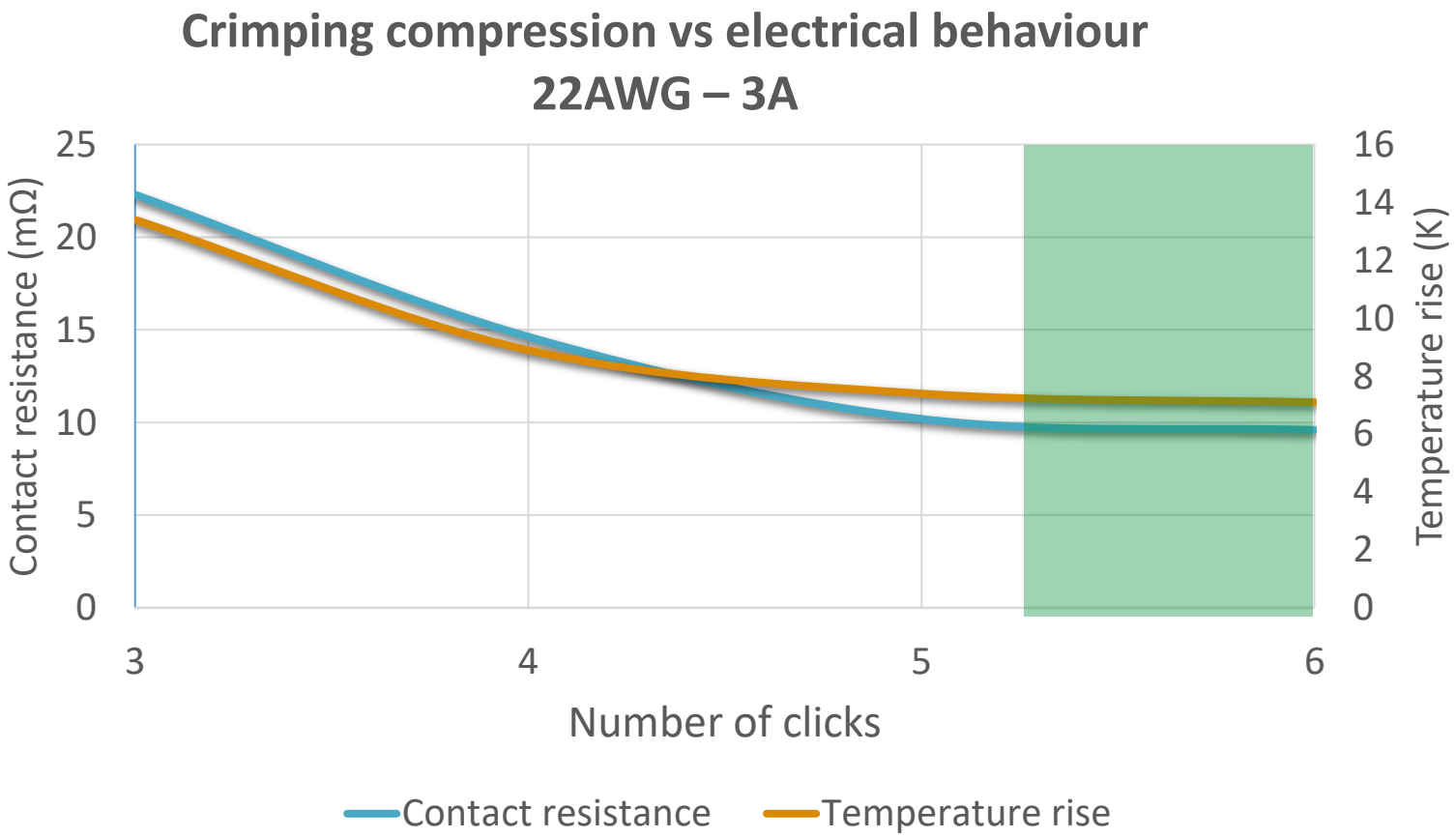


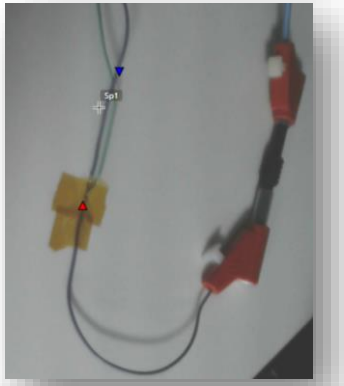


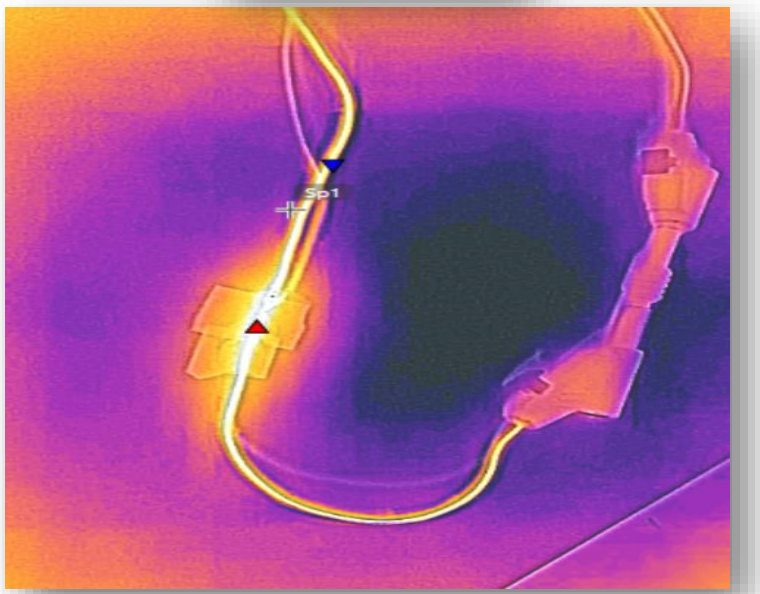
1- Pull-out consequence



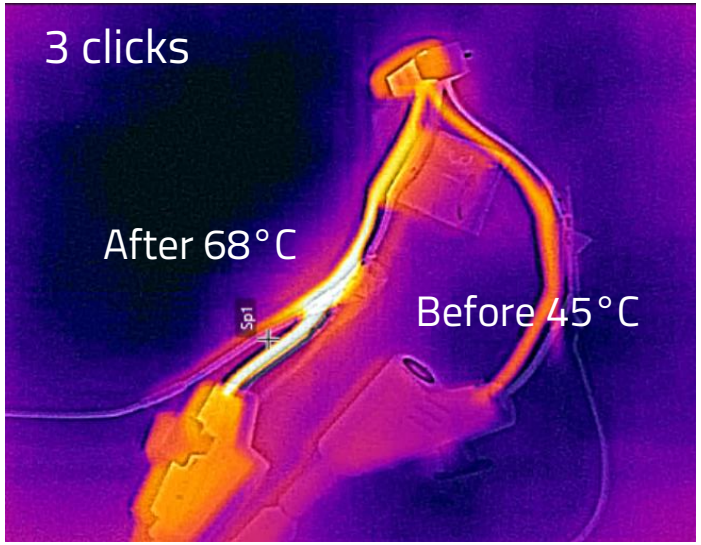
2- Electrical consequence



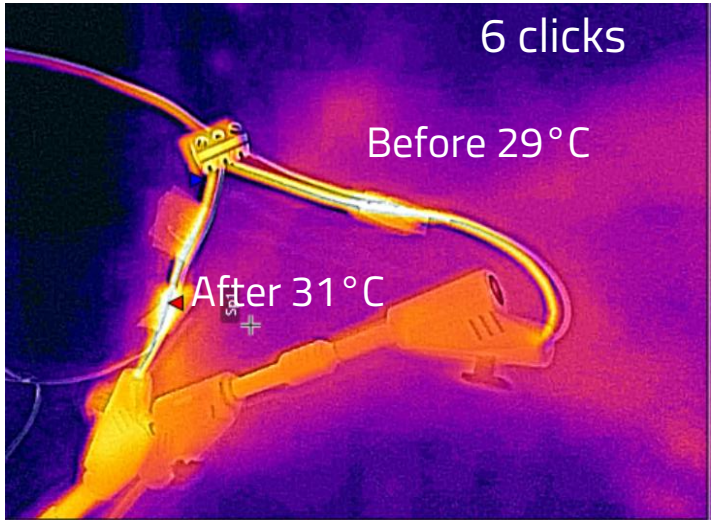




3- Gastight – salt spray resistance



Comparative ΔT test before and after salt spray



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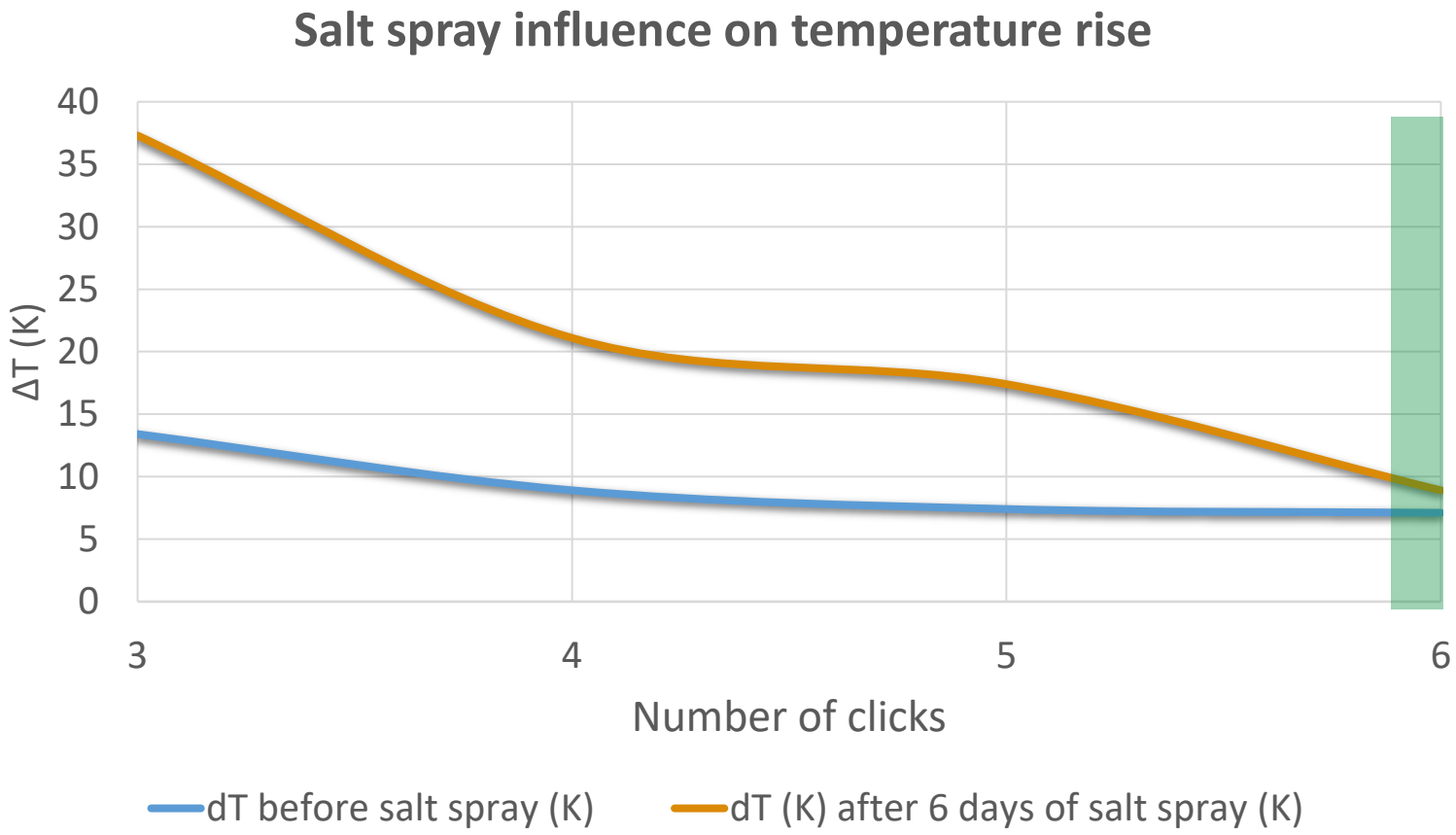


Cross section check

3 clicks

4 clicks

5 clicks

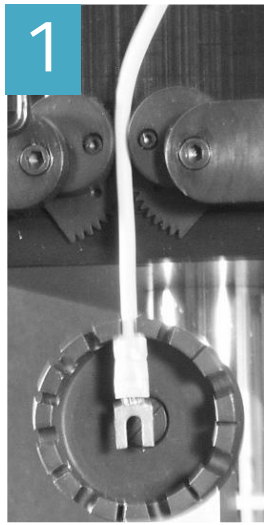
6 clicks

Crimp quality inspection

- **First sample:**
  1. Pull-out test
  2. Height measurment
  3. Visual check

- **Batch manufacturing:**
  - Height measurment

1



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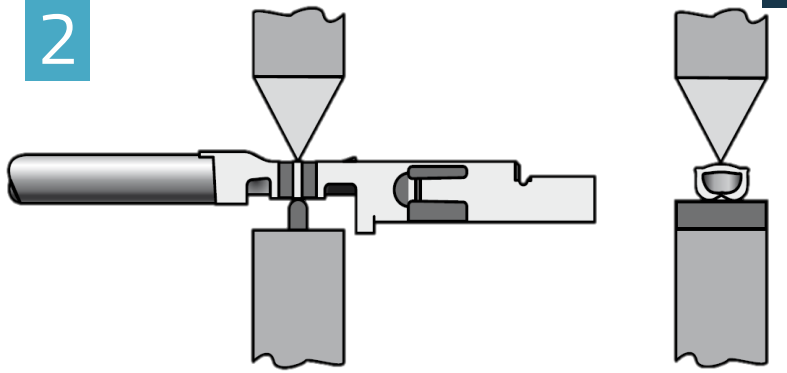

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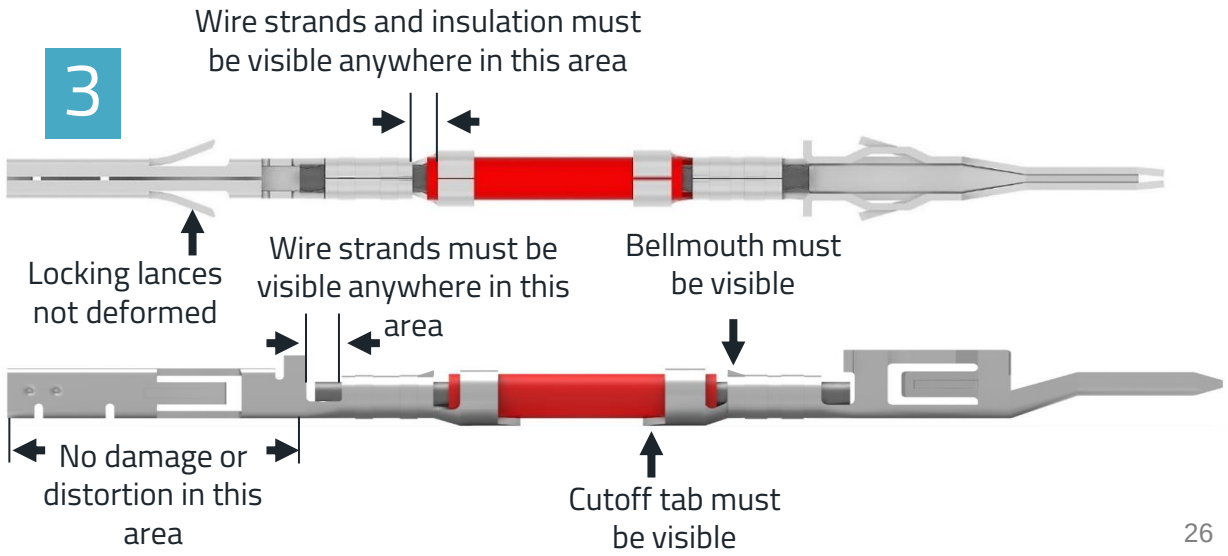

Crimp quality inspection

- **Cable crimp main features:**
    1. nearly gas-tight
    2. High electrical characteristics - low contact resistance
    3. High mechanical strength

Contact

- Contactgegevens: Remco van de Griendt tel: 0031 6 109 84 436 e-mail: remco.vandegriendt@we-online.com
- Standnummer: 16
- Demo rondom krimpen voor onze stand