TECHINICAL INFORMATION

IEC 61238-1 Compression and Mechanical Connectors for Power Cables for rated voltages up to 30 kV (Um = 36 kV).

1. Scope and object of IEC61238-1

Compression and mechanical connectors for power cables for rated voltages up to 30kV(Um=36kV), e.g. burried cables or cables installed in buildings, having

a) conductors complying with IEC60228 and IEC60228A with cross-sectional areas 10mm² and greater for copper and 16mm² and greater for aluminum,

b) a maximum continuous conductor temperature not exceeding 90℃

Class A

These are connectors intended for electricity distribution or industrial networks in which they can be subjected to short-circuits of relatively high intensity and duration. As a consequence, Class A connectors are suitable for the majority of applications.

Class B

These are connectors for networks in which overloads or short-circuits are rapidly cleared by the installed protective devices, e.g. fast-acting fuses.

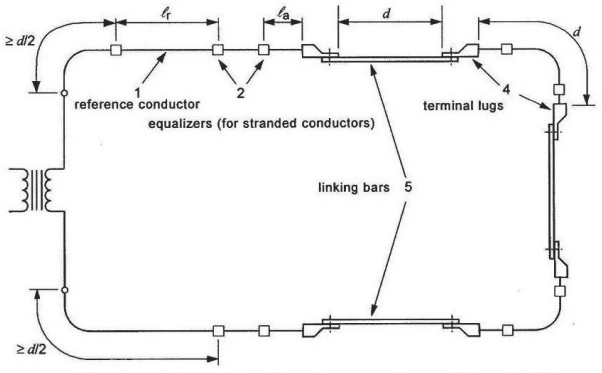
Depending on the application, the connectors are subjected to the following tests :

Class A : heat cycle, short-circuit tests and mechanical tests.

Class B : heat cycle tests only.

2. IEC 61238-1 Class A Test Process.

Installation : All conductors of the same cross-sectional area in the test loop shall be taken from the same continuous core and installed in a location where the air calm and the ambient temperature between 15℃ and 30℃



Typical test circuit for through connectors and terminal lugs

where

$d \geq 80\sqrt{A}$ or 500 mm, whichever is the greater

A is the corresponding conductor cross-sectional area, in mm²

$\ell_r \geq \ell_a + \ell_b + \ell_j$ (for ℓ_j, see Figure 3)

For stranded conductors:

$\ell_a, \ell_b \approx 15\sqrt{A}$ or 150 mm, whichever is the greater

- Heat Cycle Test - Total 1000 cycles required.

  - First heat cycle :

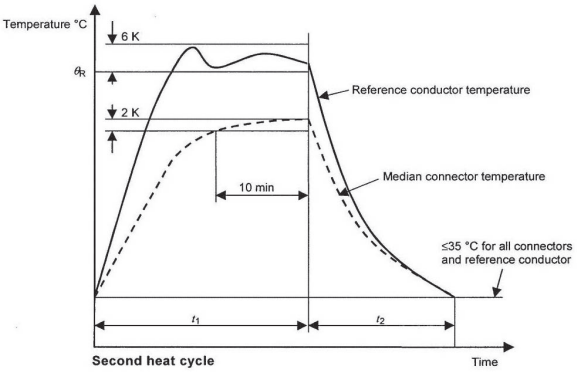
  Current is circulated in the test loop, bringing the reference conductor to 120℃ at equilibrium. Equilibrium is defined as the moment when the reference conductor and the connectors do not vary in temperature by more than ±2 K for 15 min.if the temperature of the median connector is equal to or greater than 100℃ the reference conductor temperature for subsequent heat cycles shall be deemed to be 120℃ if not, then the current shall be increased until the median connector temperature reaches 100℃ at equilibrium, subject to the reference conductor temperature not exceeding 140℃ If the temperature of the median connector does not reach 100℃ even with a reference conductor temperature of 140℃ the test shall be continued at that temperature.

TECHINICAL INFORMATION

- Second heat cycle :

The second heat cycle is to determine the heat cycle duration and temperature profile which will be used on the test loop for all subsequent heat cycles. Current is circulated in the loop until the main reference conductor temperature reaches the value θ_R determined in first heat cycle, with a tolerance of +6/0 K and the median connector temperature is stable within a band of 2K over a 10 min period.
An elevated current may be used to reduce the heating period.

Nominal conductor cross-sectional area, A	mm²	Al Cu	16≤A≤50 10≤A≤35	50≤A≤150 35≤A≤95	150≤A≤630 95≤A≤400	A>630 A>400
Time	min		5	10	15	20



- Subsequent heat cycles :

Measurements shall be made at the following cycles (Class A)
0 (before the first heat cycle)
200 cycles, before short-circuit
200 cycles, after short-circuit
250
Then every 75 cycles
(in total 14 measurements)

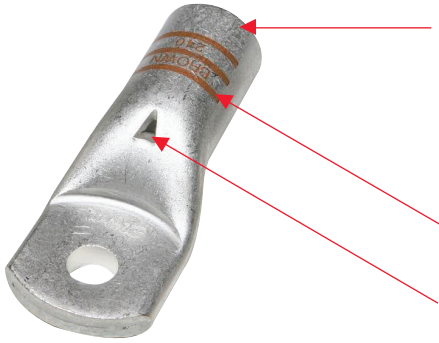
- Short-circuit tests (for Class A connectors only).

Six short-circuits are applied after the 200th heat cycle.
The short-circuit current level shall be such that it raises the bare reference conductors from a temperature of ≤ 35℃ to a temperature between 250℃ and 270℃
The maximum temperature, time and approximate current, or the actual current and time, used for the short-circuit test, shall be recorded and stated in the test report. After each short-circuit, the test loop shall be cooled to a temperature ≤ 35℃

- Mechanical Tests.

The conductor lengths, between connector and tensile test machine jaws, shall be ≥500mm.
The rate of application of the load shall not exceed 10N per square millimetre of cross-sectional area and per second up to the value in copper 60 x Aa(mm²) : maximum 20000N, which is then maintained for 1 min.

- Quality Products.



Barrel Diameter : Type of conductors -
- compacted.
- non-compacted.
- flexible(class 5 and 6, according to IEC60228)
- number and arrangement of strands.

Color coding on the barrel for easy selection of crimping dies.

Eye-hole(inspection hole)

- Quality Approved by DnV(Det Norske Veritas).

Certificate No : E-10595
Application : Cable shoes for installation inside switchboards/ enclosures onboard ships and mobile offshore units.