

Finite Element Analysis of SIWO-KUL™ Cables

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SIWO-KUL™ is a very flexible single core cable with an operating temperature for continuous service extending from -55°C up to 180°C . It is a suitable connection cable for high voltage machines, for transformers, generators, motors, etc. Thanks to its good anti-friction properties and abrasion resistance it is also well suited for traction machines and shipbuilding.

The paper presents a detailed Finite Element Analysis (FEA) performed on SIWO-KUL™.

First part of the FEA is dedicated to Ampacity calculations.

For classical applications of SIWO-KUL™, current rating values can be found in empirical tables or are results of analytical calculation based on IEC 60287.

For more specific configurations, we have developed a Finite Element model to obtain accurate cable rating and temperature estimation. Several examples are given in stationary or transient states.

FEA results are compared with existing ampacity tables and results from analytical calculations, showing that these classical methods are approximations including substantial safety margins.

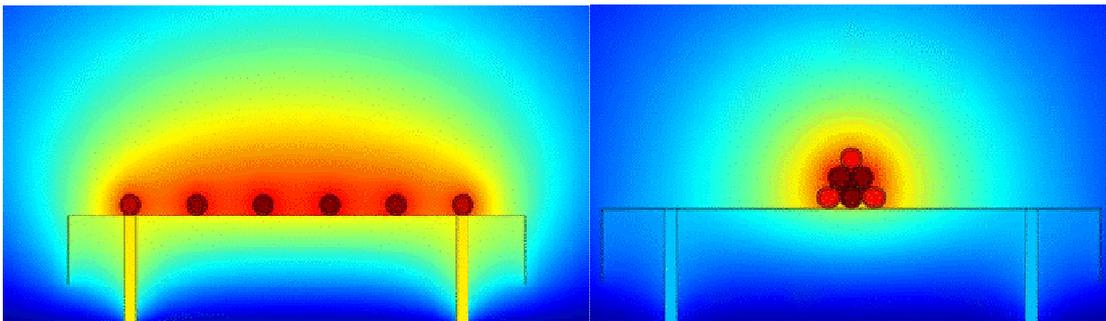


Fig. 1: Examples of FEA of SIWO-KUL™. Six cables are layed on a metallic cable tray.

Another important topic is the distribution of electrical field for SIWO-KUL™ cable and their connection. Finite Elements (FE) are used to calculate the electrical field magnitude through the different layers of the cable. These calculations are compared to measurements results.

Key words: Ampacity; Cable rating; Finite Elements; Industrial cables; Derating factors; Electrical field distribution