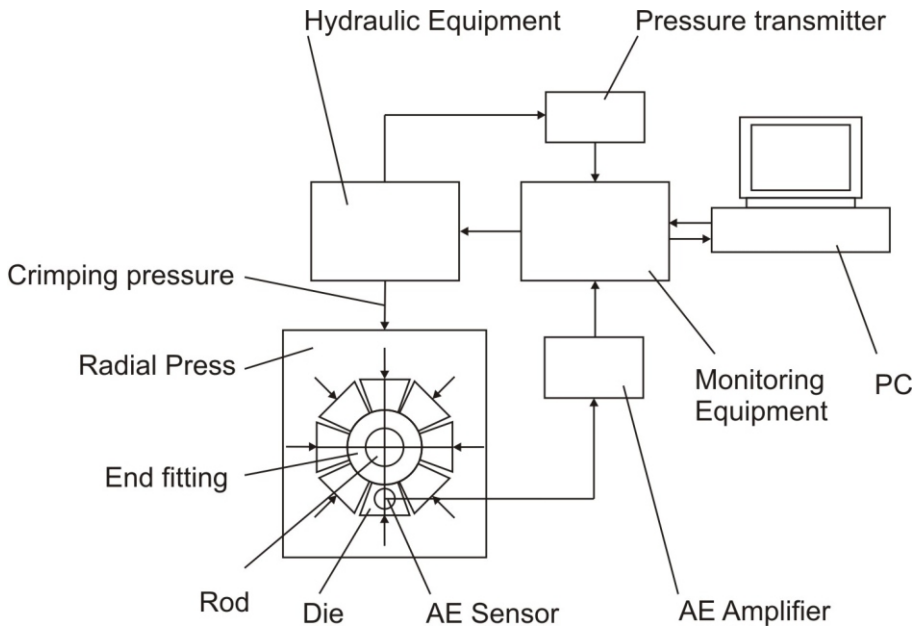
Equipment

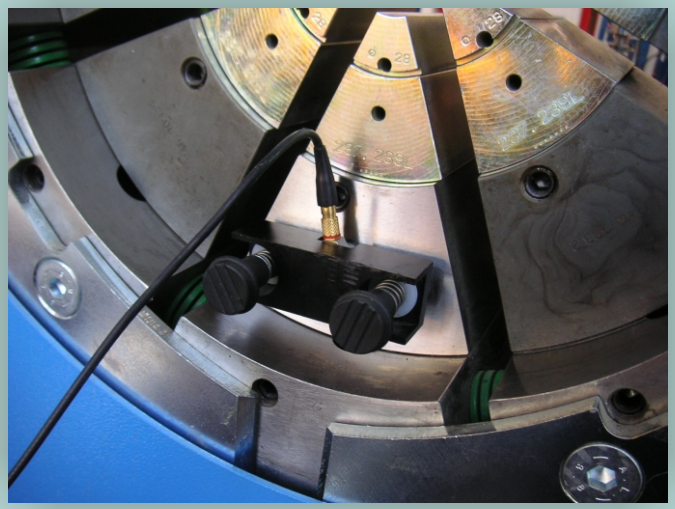
The acoustic sensor mounted on the die of the crimping press detects AE appearing in the crimping process of the fittings on the rod of the composite insulator. The electrical signal is filtered and amplified. The equipment for AE monitoring and for crimping pressure control receives the AE signal and an electric signal of pressure from the hydraulic installation of the crimping press by means of pressure transducer. The equipment communicates with the computer on which the software is installed. The monitoring equipment also limits the crimping pressure achieved by the hydraulic installation.



Calea Bucureşti 144
200515 Craiova, Romania
Phone: +40 351 404 888; +40 351 404 889
Fax: +40 251 415 482; +40 351 404 890
E-mail: market@icmet.ro; icmet@icmet.ro
www.icmet.ro

RESEARCH, DEVELOPMENT AND TESTING NATIONAL INSTITUTE FOR ELECTRICAL ENGINEERING

EQUIPMENT FOR CRIMPING COMPOSITE INSULATORS



Application

A composite insulator consists of glass reinforced polymer(GRP) rod, two metal end fittings attached to the rod during assembling and a series of electrically insulating rubber sheds.

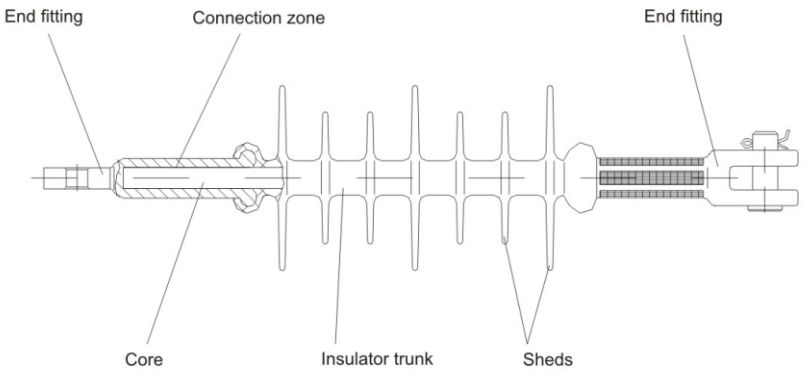
The bonding between the GRP rod and the metal end fitting in the insulators is strongly dependent on the magnitude of compression applied during crimping and the friction coefficient between the fitting and the rod. The excessive crimping deformation may result in core fracture. On the other hand, low crimping deformation will provide a too weak joint. A hydraulic press is used to drive the die set in the radial direction, towards the end fitting.

The standard crimping process is achieved in three steps. In the first step, the crimping pressure increases up to the set value. In the second step ,the pressure is held at this value until the set holding time is elapsed. In the third step the pressure is discharged.

Two main factors affect the crimping process, for the same forming load and for the same joint. These are material properties and tolerances of the components. In practice, due to the above mentioned factors, it is impossible to set an optimal crimping pressure assuring a proper fittings-rod assembly.

An acoustic emission (AE) may be definite as a transient elastic wave by the rapid release of energy within a material. With AE equipment we can "listen" to the sounds of fiber glass breaking and cracks growing. The AE technique used for monitoring the crimping process of the end fittings indicates only if the cracks occurred.

The new method for controlling the crimping precess provides a crimping pressure and the time for maintaining it depending on the AE threshold values.



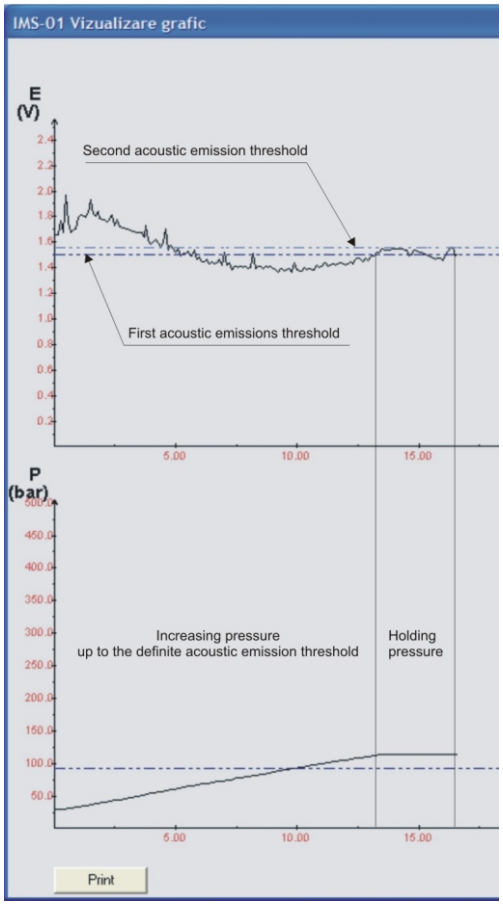
Method

The crimping process by controlling the AE is achieved in three steps too.

In the first step, the crimping pressure increases up to the pressure determined by reaching the first acoustic emission threshold value.

In the second step, the pressure is held until reaching the second acoustic emissions threshold.

In the third step the pressure is discharged.



The method for crimping the fitting on the composite insulator rod using AE and crimping pressure monitoring provides:

- Insulators free from any intralaminar damage due to optimal crimping of the fittings on the insulator rod
- Metallic end-fittings with different hardnesses can be used because the system automatically controls the crimping pressure depending on AE
- Crimpings when the differences in the diameters of the rod and end-fittigs are within the allowed tolerance field