In ongoing collaboration with its Research Centerlab, ABB continues to innovate, and has developed a new generation of lightning devices. The new OPR (Optimized Pulse Rod) range with increased initiation advance performances, represents further progress in terms of protection, operating autonomy and ease of maintenance. These advancements reinforce ABB’s position as international leader in direct lightning protection.

The high pulse voltage E.S.E lightning conductor

The unique efficiency of the OPR lightning conductor is based on a specific initiation advance; well before the natural formation of an upward leader, the OPR generates a leader that rapidly propagates to capture the lightning and direct it to earth. Validated in laboratory, this gain in time relative to the simple rod provides additional essential protection.

The advantage of initiation advance

During a storm the ambient electric field may rise to between 10 to 20 kV/m. As soon as the field exceeds a threshold representing the minimum risk of a lightning strike, the OPR lightning terminal is activated. It draw its energy from the ambient electric field the energy required to generate high voltage pulses, creating and propagating an upward leader. No other power sources are required, and no radioactive components are used.

Complete autonomy

ABB has proven commitment to research and development and continuously sets new benchmarks for the efficiency of lightning conductors.

Proven efficiency
The radius of protection $R_p$ of an OPR is given by the French standard NF C 17-102 of July 1995. It depends on the initiation advance $\Delta T$ of the OPR measured in the high voltage Laboratory, on the levels of protection I, II, III or IV calculated according to the lightning risk assessment guides or standards (IEC 62305-2) and on the height $h$ of the lightning conductor over the area to be protected (minimum height $= 2$ m).

$$R_p = h (2D-h) + \Delta L (2D + \Delta L)$$

For $h < 5$ m, see the radius of protection table opposite.

$\Delta T$ = initiation advance measured during efficiency tests according to appendix C of the French standard NF C 17-102.

For the OPR 60, limiting the value of $\Delta T$, that used in the radius of protection calculation, to 60 $\mu$s has been validated by the experiment conducted by the members of Gimelec (Group of Industries for Materials for Electrical Equipment and associated Industrial Electronics).

### ABB Manufacturing Quality

The reputation of the OPR has been earned through maintaining a consistently high quality in manufacturing. Before leaving the factory, each OPR has been tested for insulation breakdown at high voltage, and subjected to a current test that ensures its performance when conducting lightning discharges. The high voltage output pulses at the OPR are also examined to verify correct amplitude and frequency. The OPR is built to withstand the arduous conditions encountered in service, and its ongoing performance can be monitored simply and quickly using the OPR test set.
Early Streamer Emission lightning conductor: OPR

OPR lightning rod installed on the side of the building

OPR lightning rod installed on the roof of the building

As part of its ongoing product improvement, ABB reserves the right to modify the characteristics or the products described in this document. The information given is not contractual. For further details please contact the ABB company marketing these products in your country.