

EUR21_34 – LARGE MOTOR STATOR WINDING FAILURE DUE TO LIGHTNING TRANSFERRED OVERVOLTAGES

Author: Paolo Marini (Tecnimont)

Abstract – In polypropylene petrochemical plants high power motors are normally used to drive extruder or compressor machines required by this type of industrial process. Each motor of such a big size is usually fed by a dedicated supply captive transformer which often is directly connected to a high voltage overhead line. In case of lightning stroke hitting the overhead line, a surge voltage impinging on high voltage transformer windings can be transferred to the motor side due to the electrostatic and electromagnetic coupling of transformer windings, with the risk of endangering the motor stator winding to frame insulation as well as the stator winding inter-turn insulation. The effectiveness of installing surge arresters at motor terminals is evaluated by EMTP modeling and then comparing the resulted over-voltages to the impulse withstand limits given by IEEE standards for rotating machines.