

Abstract of the first stage

The basic purpose for which the aim of the current stage has been iterated in the general plan is to sketch the overall framework of the research domain and the research guidelines that are going to be addressed by the project.

The introduction covers the general framework of the project and the need of this approach felt at national level and if considering the national and European tendencies in the occupational health and safety stated by ATEX Directive and by other European Directives.

The first chapter stipulates certain laws that regulates safety to explosion in industries and the conditions on the evaluation, testing, certification and marking of products intended for use in the areas with hazard of explosive atmospheres. There have also been stipulated briefly the abilities of INCD-INSEMEX for the domain of the project.

Chapter two addresses the basic issues of the objective settled for the current stage. The first part covers the specific features the concerned domain and the classification of low current equipment. The main idea of the presented aspects is that they are being used in several applications, starting with monitoring, access control, alarming and going to data transfer etc.

The following sub-chapter covers the aspects related to the electric parameters of low current installations. There has been analyzed the maximum power transfer towards the area with explosive atmosphere hazard, observing the safety operating mode to non-ignition.

The next sub-chapter analyzes sensitivity to ignition of explosive atmospheres triggered by gaseous combustible substances. It comprises the ignition curves for combustible gaseous mixtures in normal temperature and pressure conditions and there have been identified the qualitative aspects of these curves: explosivity limits, minimum ignition energy. Subsequently, there has been settled that the magnitude of the minimum ignition energy should be tens and hundreds of microJouli.

The results of the laboratory testing in explosive atmospheres of low current installation and equipment show a stochastic character.

Consequently, it was necessary to identify the limit electric parameters for the safe operating mode to non-ignition in relation to the a priori selected ignition probability of 10^{-3} .

The following two sub-chapters cover the conditions of maximum power transfer and of safe interconnection of long lines at the sources with linear characteristic features.

The last chapter shows the elements related to the evaluation of the explosion risk. It has been underlined the importance for the evaluation of explosion hazards neighbouring the processing plants that may be triggered by the combustible substances that are being transferred, stored or processed by these plants. The stress is put on the need to correlate protection to explosion of equipment with the explosion hazard of the areas where they are located.