RESOLUTION
No. 898
of 8 October 2008
Kyiv

On approval of the Technical Regulations on Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres

In accordance with Article 14 of Law of Ukraine "On Standards, Technical Regulations and Conformity Assessment Procedures" the Cabinet of Ministers of Ukraine resolves to:

1. Approve the attached Technical regulations equipment and protective systems intended for use in potentially explosive atmospheres and the plan of measures relating to their implementation.

2. Ministry of Industrial Policy to ensure implementation of the Technical regulations approved by this resolution and to control conformity to requirements of these regulations.

Prime Minister of Ukraine
Y. TIMOSHENKO

Ind. 33

APPROVED
by Resolution of the Cabinet of Ministers of Ukraine
of 8 October 2008 # 898
TECHNICAL REGULATIONS
on equipment and protective systems intended for use in potentially explosive atmospheres

General issues

1. These Technical regulations set forth requirements relating to ensuring safety of equipment and protective systems intended for use in potentially explosive atmospheres, conducting procedures of assessment of conformity to these requirements, as well as the rules for labeling and introducing the said equipment and protective systems into circulation.

2. These Technical regulations have been developed on the basis of Directive 94/9/EC of the European Parliament and EC Council of 23 March 1994 relating to equipment and protective systems intended for use in potentially explosive atmospheres.

3. In these Technical regulations the terms specified below are used in the following meaning:

aggressive substance - chemical substance that destroys other substance, equipment and protective systems which are intended for use in the potentially explosive environment;

potentially explosive zone – area in which a potentially explosive environment exists or can emerge provided that available natural or production factors exist in the amount that requires implementation of special measures during the assembly and operation of the equipment;

potentially explosive environment - chemically active environment in which an explosion can occur;

ex-components - parts of equipment or elements of design that can not be used individually and require making an additional decision regarding their inclusion in the equipment or protective systems;

intended use – use of equipment and protective systems while taking into account their groups, categories and other information supplied by the producer and which is required for their safe operation;

protective systems – systems intended for use in potentially explosive atmospheres (hereinafter - protective systems) - devices which immediately stop the process of emerging explosion, and/or limit the space in which the explosion can occur;

equipment intended for use in potentially explosive atmospheres (hereinafter - equipment) - machines, stationary or mobile installations and devices, controlling and measuring appliances, identification and warning systems, which together or individually are intended for production, transfer, storage, measuring, control and transformation of the energy and may be a cause of an explosion due to the existence of their own potential sources of fire;

potentially explosive environment - environment that can become explosive provided there are particular natural or production factors are present;

level of protection of equipment from explosion – level of protection of equipment under conditions specified in the regulatory documents.
Other terms are used in the meaning specified in Laws of Ukraine "On standardization", "On accreditation of conformity assessment authorities", "On standards, technical regulations and conformity assessment procedures", "On verification of conformity" and other regulatory-legal acts.

4. These Technical regulations shall apply to:

equipment and protective systems;

protective, controlling and managing devices that are intended for use outside a potentially explosive atmosphere and required for safe operation of equipment and protective systems;

transport vehicles are intended for use in potentially explosive atmospheres of mines and production facilities.

5. These Technical regulations shall not apply to:

products intended for medical use;

equipment and protective systems in the course of operation of which a risk of an explosion arises only in presence of potentially explosive substances and volatile chemicals;

equipment intended for household and non-productive use in conditions where potentially explosive environment emerges due to unpredictable leak of inflammable gas;

personal protection equipment;

general use equipment intended for transportation of passengers and cargo by air, automobile, rail or water transportation.

6. Producers of equipment and protective systems that are introduced into circulation, their authorized representatives, central executive authorities which carry out technical regulation and supervision of their technical conditions, and authorities responsible for conformity assessment are required to comply with requirements and rules set forth by these Technical regulations.

7. Introduction of equipment and protective systems into circulation shall be allowed only on condition of verification of their compliance with requirements of these Technical regulations in accordance with all applicable conformity assessment procedures and on condition that they are installed and serviced as required by the producer’s documentation.

8. Equipment can be divided into the following groups:

group I - equipment for use in mines (ore mines) dangerous due to the volume of ore gas and/or flammable dust;

group II - equipment for use in other potentially explosive environment.

9. Equipment of group II depending on the properties of a potentially explosive atmosphere for which it is intended, is divided into subgroups A, B and C.
10. Equipment intended for use in mines (ore mines), in which, in addition to mine gas may be other components as well, must conform to requirements applicable to equipment of group I, as well as the subgroup of group II which corresponds to such potentially explosive atmosphere.

11. By level of protection from explosion equipment of groups I and II is divided into the following categories:

1) М3 and 3 – anti-explosive equipment of high reliability, with the level of protection from explosion 2, which ensures operation and protection from explosion of the equipment only on condition of producer’s compliance with normal operating regime.

Equipment of the specified categories intended for use in potentially explosive zones of class 2, in which under normal operating conditions creation of a potentially explosive atmosphere is unlikely, or in the case it emerged – it will not last long;

2) М2 and 2 - equipment protected from explosion with the level of protection of 1, which ensures operation and protection from explosion not only in the case of producer’s compliance with the normal operating regime, but also in the event of one unlikely damage, provided for under standards for relevant types of protection from explosion.

Equipment of the specified categories is intended for use in potentially explosive zones of class 1, in which potentially explosive environment can emerge under normal operating conditions.

In the event of emergence of a potentially explosive atmosphere equipment of category М2 must be shut down;

3) М1 and 1 – equipment particularly protected from explosion with the level of protection from explosion 0, which ensures operation of additional, compared to level М2 and 2, equipment for protection from explosion, provided for under standards for relevant types of protection from explosion.

The said equipment must be able to preserve its capacity to operate in case of emergence of a potentially explosive atmosphere and to ensure protection from explosion in the event of two probable damages or to have two separate facilities for protection from explosion.

Equipment of such categories is intended for use in potentially explosive zones of class 0, in which potentially explosive environment is present all the time or during an extended period of time.

12. Introduction of equipment and protective systems into circulation shall be allowed in the event if they were designed, produced and tested in conformity with these Technical regulations, conform to safety requirements and ensure protection from danger to people, animals, property and environment when installed, serviced and operating.

13. Persons responsible for introduction into circulation of equipment and protective systems (the producer, his authorized representative or supplier), are required to take measures to:

comply with provisions of conformity assessment procedures in accordance with these Technical regulations;

declare and affix the national mark of conformity in compliance with these Technical regulations in the event of positive results of assessment of conformity.
14. At trade fairs, exhibitions, presentations, etc., it will be allowed to demonstrate equipment and protective systems that do not conform to requirements of these Technical regulations, if such equipment and systems will bear markings denoting that such products are not intended for introduction into circulation unless put in conformity with requirements of these Technical regulations.

During assembly, disassembly and demonstration of the equipment it will be necessary to take relevant safety measures to guarantee protection of people.

15. In the event where it has been established that the equipment or protective systems marked with the national mark of conformity, in the course of intended use may present a risk for people, animals, property and environment, a designated authority will immediately report it to the central executive authority in the area of technical regulation, specifying reasons of this non-compliance, which may result from:

non-conformity to principal requirements specified in these Technical regulations;

sub-quality implementation of national standards;

flaws in national standards.

16. The central executive authority in the area of technical regulation shall take all necessary measures to exclude such equipment or protective systems from the circulation, stop their supplies to the market and introduction in operation, as well as measures against legal persons that affixed the national mark of conformity.

17. Any decision passed in accordance with these Technical regulations, which restricts introduction into circulation or requires exclusion from the circulation of the equipment or protective systems, must be substantiated. Such a decision shall be notified to parties concerned simultaneously with the information concerning legal protection measures which they may apply in accordance with the legislation.

Safety requirements to equipment and protective systems

18. Equipment and protective systems shall be designed taking into account requirements concerning comprehensive protection from explosion, in accordance with which the producer will be required to implement measures for purposes of:

prevention of creation of a potentially explosive atmosphere due to production processes, as well as operation of the equipment or protective systems;

prevention of catching fire in a potentially explosive atmosphere from electric or non-electric sources of fire;

immediate termination of the process of developing explosion, and/or limiting the space in which an explosion can occur.

Equipment and protective systems must be designed and produced taking into account possible damages during their operation, possibility of their use for purposes other than intended and their operation in actual and possible conditions of the surrounding atmosphere.
Equipment and protective systems that are subject to special examination, servicing and repair shall be developed and produced in compliance with requirements of these Technical regulations.

19. Equipment and protective systems shall be complemented with operation instructions including:

information concerning application of the national mark of conformity of equipment or protective systems;

information required for safe assembly and disassembly, introduction in operation, use, servicing, repair (including emergency repair) and tune-up of the equipment;

information concerning class of potentially explosive zones in which equipment and protective systems can be installed;

electric parameters, pressure level, maximum temperature of the surface and surrounding atmosphere;

particular conditions of operation;

principal characteristics of devices which can be additionally provided along with the equipment or protective system;

necessary drawings and charts for assembly and disassembly, information required to guarantee safety.

20. Materials that are used to manufacture equipment and protective systems should not cause an explosion.

Under operating conditions envisaged by the producer there should not be a reaction between the materials used and components of the potentially explosive atmosphere that could have a negative impact on the level of protection from explosion.

Materials must be such that possible changes in their characteristics (compatibility with other materials, resistance to corrosion and wear, electric conductivity, impact strength, aging, temperature – related changes, etc.) would not be able to cause reduction of the level an protection from explosion.

21. To ensure compliance with safety requirements during the entire period of operation, equipment and protective systems must be designed and produced in accordance with the modern level of science and engineering in the area of protection from explosions.

Ex-components and spare parts for equipment and protective systems shall be designed and produced so that during their use they would ensure protection from explosion.

Equipment capable of emitting flammable gases or dust must be designed and produced "in an enclosed version".

Equipment that has openings and connections which are not tight must be designed so that emitting flammable gases or dust would not lead to creation of a potentially explosive atmosphere.
22. Equipment and protective systems, intended for use in a dusty atmosphere, must be produced so that the dust settling on the surface would not catch fire and that the equipment and systems would allow easy removal of dust. Temperature on the surface of parts of the equipment must be lower than the temperature of dust smoldering and the temperature of flashing of mixtures of air and dust. For this purposes devices reducing the temperature shall be used.

In the course of computation of thermo convection and maximum temperature of parts of the equipment it will be necessary to take into account the thickness of the layer of settled dust.

Equipment must be dust-proof.

23. Equipment and protective systems that are subjected to outside impact shall be required to have auxiliary protective equipment and be able to withstand outside impact without reduction of the level protection from explosion.

24. In the event where equipment and protective systems are placed within the casing which is part of equipment for protection from explosion, the casing can be opened only using special tools or in compliance with application of the rules for protection.

Parts of the equipment of categories М1 and 1, which may be sources of fire, can be opened only in the turned-off state or are produced under the category of protection from explosion "sparkless electric circuit".

Parts of the equipment of categories М2 and 2, which may be a cause for an explosion, can be opened only after the equipment is shut down or through respective blocking systems, or are produced under the category of protection from explosion "sparkless electric circuit".

Parts of the equipment that can be opened must bear warning messages affixed to them by the producer.

25. Equipment and protective systems must be developed and produced so that it would be possible to avoid traumas due to direct or indirect contact, to ensure absence of dangerous overheating or external radiation of accessible parts of the equipment, as well as to eliminate a possibility of a danger of non-electric nature, as well as a danger caused by overloaded equipment.

26. For prevention of dangerous overloading of the equipment at the stage of designing it is necessary to provide for measuring, regulating and controlling devices, for instance – automatic circuit breakers, devices limiting temperature, differential relays of pressure, flow meters, time lag relays, speeding indicators and/or similar devices.

27. If parts of the equipment that may cause a fire in a potentially explosive atmosphere, are located within a casing, it will be necessary to ensure the ability of the casing to withstand internal pressure in case of an explosion inside it and to prevent spreading of the explosion into the outside potentially explosive environment.

28. To ensure protection from explosion, it will be necessary to eliminate the following potential sources of fire:

flames, sparkles and electric arch, high temperature on the surface, radiation in the optical and electromagnetic ranges;
accumulation of electro-static charges that can cause dangerous electric discharges;

presence in parts of the equipment of diffused electric currents and leaking currents that can lead to dangerous corrosion, sparkles or surface overheating which can create a possibility of fire;

overheating as a result of friction or impact, for instance between materials and parts that are in contact with each other while rotating, or in case of obstruction from outside items.

Equipment and protective systems must be equipped with built-in measuring, controlling and regulating devices or must be designed so that processes of pressure equalization would not cause impact waves or pressures which may lead to an explosion.

In the event of changes in the surrounding atmosphere (within the range specified by the producer) and outside impacts (humidity, vibrations, pollution, etc.), equipment and protective systems will be required to continue perform its functions safely.

Component parts of equipment and protective systems must be designed to withstand relevant mechanical and temperature impacts and will be required to withstand impacts of actual or possible aggressive substances.

29. Protective devices must operate regardless of any necessary for operation of the equipment measuring, directing, regulating and controlling unit.

Possibility of quick identification of damages in protective device shall be ensured by relevant technical facilities.

Emergency shut-down of equipment must be carried out directly (without any intermediate command from the software) by the appropriate controlling device, with relevant signal being generated.

In the event of damage, a protective device, equipment and/or protective systems must remain safe.

Protective devices that carry out emergency shut-down must be prevented from a repeat start-up of operation. Operation of these devices can be resumed only after complete elimination of reasons for shut-down, and a new start-up will be carried out only on condition of resumption of the normal regime.

To ensure the maximum possible level of safety, controlling devices and indicators must conform to requirements of ergonomics and protection from explosion.

Devices performing measuring functions must be designed and produced taking into account of special requirements to operation and conditions of use in a potentially explosive atmosphere with a possibility of examination of their functioning and accuracy of readings.

When designing protective devices performing measuring functions a safety coefficient shall be applied to ensure, in case of maintaining proper operating conditions and taking into account possible errors of measuring systems, the adequate level of emergency threshold for prevention of possible explosion and/or fire in a potentially explosive atmosphere.

When designing software that controls protective systems and protective devices, particular attention shall be paid to prevention of risks relating to errors in the program.
30. Equipment and protective systems included in the automated processes must be equipped with manual shut-down system in case of deviation from regular operating conditions, provided it does not affect safety. Accumulated energy must be localized or diffused very quickly.

If after the shut-down of power supply the equipment and protective systems become sources of risk, a safe state of the system must be ensured regardless of other production systems.

Equipment and protective systems must be equipped with safe connections with cables and wires.

Protective systems with devices for identifying or alerting in connection with a potentially explosive atmosphere must be complemented with appropriate guidance materials.

Protective systems must be designed and produced so that to prevent the spread of an explosion by way of a chain reaction, detonation or spreading of the fire that has emerged.

During the shut-down of power supply protective systems must be operating during the period of time needed to eliminate the dangerous situation.

Choice of the materials for equipment and protective systems must be made taking into account possible maximum pressure caused by the explosion and its temperature impact.

At the stage of development of protective systems, the effects of possible surge in the pressure in the peripheral equipment and attached pipelines must be taken into account.

In the event where a level of the impact of pressure on the protective systems exceeds their strength, one should employ such devices for reduction of pressure that would not create risks for people.

Disconnecting devices intended for fast shut-down of equipment in case of an explosion must be explosion-proof and stable.

Protective systems must have the acceptable threshold for shut-down of power supplies of input and output devices, as well as those parts of the equipment which can not ensure safe operation.

Design of protective systems must allow sufficiently quick identification of any damages.

The basic principle for designing protective systems is to ensure safety in case of error.

In case of equipment with programming/software control protective systems and devices must operate directly (for instance, using disconnectors) without use of such programming/software control.

**Conformity assessment procedures**

31. Assessment of conformity of equipment to requirements of these Technical regulations shall be carried out by the producer or his authorized representative by applying procedures (modules for assessment of conformity), specified by Resolution of the Cabinet of Ministers of Ukraine of 7 October 2003 # 1585 "On approval of the Technical regulations modules for assessment of conformity and requirements relating to application of the national mark of conformity, which are used in technical regulations" (Official gazette of Ukraine, 2003, # 41, p. 2175; 2007, # 1, p. 31), taking into account groups and categories of the equipment.
32. For equipment of groups I and II the following conformity assessment procedures shall apply:

1) for categories М1 and 1 - type examination in accordance with module B in combination with the procedure for assurance of quality of production process in accordance with module D or the procedure for product examination in accordance with module F;

2) for categories М2 and 2 - type examination in accordance with module B in combination with the procedure for verification of conformity of the type under module C in accordance with provisions of sub-paragraphs "a" and "b" of paragraph 37 of the Technical regulations modules for assessment or the procedure for assurance of product quality under module E;

3) for categories М3 and 3 - procedure for internal control of production in accordance with module A in combination with additional requirements in accordance with module Aa (modified module A);

4) procedure for examination of products in accordance with module G as an alternative to procedures specified in sub-paragraphs 1 - 3 of this section.

33. For purposes of assessment of conformity of protective systems procedures specified in sub-paragraphs 1 or 4 of section 32 of these Technical regulations shall be applied.

34. Procedures specified in section 31 are applied to ex-components which in accordance with requirements of these Technical regulations must have relevant certificates and guidance of the producer or his authorized representative relating to their characteristics and methods of mounting of equipment or protective systems.

35. These Technical regulations do not limit the producer or his authorized representative in applying more complex modules for assessment of conformity of products, than those that are specified in sections 32 and 33.

36. In the course of assessment of conformity of equipment and protective systems the producer or his authorized representative shall prepare a declaration of conformity using the form presented in the annex and shall affix to every product the national mark of conformity in compliance with requirements of these Technical regulations.

37. Technical documentation provided by by the producer or by his authorized representative to the agency responsible for conformity assessment, requirements to which are specified in Resolution of the Cabinet of Ministers of Ukraine of 24 January 2007 # 59 "On approval of Procedure for designating authorities responsible for assessment of conformity of products, processes and services to requirements of technical regulations" (Official gazette of Ukraine, 2007, # 6, p. 223), must contain:

   technical conditions (specifications) for equipment and protective systems, technical documentation for production equipment and protective systems, as well as programs and methodologies for testing;

   operation documentations (technical description, operation instructions);

the list of standards from the officially published by the central executive authority in the area of standardization list of national standards, voluntary application of which can be regarded as proof of conformity of equipment to requirements of these Technical regulations;
results of conducted computations/estimates if the equipment, examinations, etc.

38. Producer or his authorized representative shall keep the declaration of conformity and technical documentation specified in section 36 of these Technical regulations during ten years after the introduction into circulation of the last equipment and/or protective systems and provide it for examination in cases specified by legislation.

Labeling

39. Each piece of equipment and protective systems must show the following information:

- name and address of the producer;
- the national mark of conformity;
- series or type;
- serial number;
- year of manufacture;
- marking indicating protection from explosion;
- additional information required for safe use.

40. To each unit of equipment or protective systems, their packaging and/or accompanying documentation, prior to the introduction into circulation, there will be affixed the national mark in conformity with Resolution of the Cabinet of Ministers of Ukraine of 29 November 2001 # 1599 "On approval of the description and rules for application of the national mark of conformity" (Official gazette of Ukraine, 2001, # 49, p. 2188) and the mark indicating the level of protection from explosion. Next to the national mark of conformity there must be affixed an identification number of the designated authority in accordance with the State registry of designated authorities for assessment of conformity.

41. Application of the national mark of conformity shall be carried out in accordance with requirements of the Technical regulations on assessment modules.

42. If equipment or protective systems are subject to other technical regulations that provide for application of the national mark of conformity, the equipment and protective systems must also conform to the requirements of the specified regulations.

In the event where one or several technical regulations during a transitional period for their implementation provide for the right of the producer to choose method of verification of conformity, application of the national mark of conformity means conformity only to those technical regulations which are applied by the producer. In such instances the documents or instructions accompanying the equipment or protective systems must contain registration data of applied regulations in accordance with official documents relating to their application.

43. Affixing to the equipment or protective systems marks similar in form to the national mark of conformity shall not be allowed.
## PLAN OF MEASURES
for implementation of the Technical regulations on equipment and protective systems intended for use in potentially explosive atmospheres

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