Technical Regulations of the Customs Union "On the security of equipment operating under excessive pressure" (TR CU 032/2013)

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Lists of standardization documents,
ensuring compliance with the requirements
of this Technical Regulation

This technical regulation is designed in accordance with the Agreement on common principles and rules of technical regulation in the Republic of Belarus, the Republic of Kazakhstan and the Russian Federation on November 18, 2010 .

This technical regulation establishes the customs territory of the Customs Union uniform mandatory for application and enforcement of safety requirements for equipment operating under positive pressure, first put into circulation and intended for use in the customs territory of the Customs Union (hereinafter - the equipment) to ensure the free movement of equipment.

If, in respect of equipment made other technical regulations of the Customs Union, establish requirements for it, such equipment must comply with the requirements of the technical regulations of the Customs Union.

I. Scope

1 This technical regulation establishes safety requirements for equipment in the development (design), production (manufacturing), as well as labeling requirements for equipment in order to protect human life and health, property, prevention of actions misleading consumers.

2 This technical regulation applies to the following types of equipment:

a) vessels for gases, liquefied gases, dissolved under pressure, vapors and used for production environments in group 1 and having:

maximum allowable operating pressure in excess of 0.05 MPa, a capacity greater than 0,001 m and the product of the maximum allowable working pressure on the value of the capacity to be over 0.0025 MPa · m^3;

maximum allowable operating pressure in excess of 20 MPa, the capacity of more than 0.0001 m to 0,001 m , inclusive.

Categories receptacles for gases and used for production environments in group 1 are shown inTable 1 of the N 1 to this technical regulation ;

b) receptacles for gases, liquefied gases, dissolved under pressure, vapors and used for production environments and group 2 with:

maximum allowable operating pressure in excess of 0.05 MPa, a capacity greater than 0,001 m and the product of the maximum allowable working pressure on the value of the capacity of well over 0,005 MPa · m^3 ;

maximum allowable operating pressure in excess of 100 MPa, the capacity of more than 0.0001 m to 0,001 m , inclusive.

Categories receptacles for gases and used for production environments group 2 are shown inTable 2 of the N 1 to this technical regulation ;

c) intended to contain liquids used for the working fluid in group 1 and having:

maximum allowable operating pressure in excess of 0.05 MPa, a capacity greater than 0,001 m and the product of the maximum allowable working pressure on the value of the capacity of well over 0.02 MPa · m^3 ;

maximum allowable operating pressure in excess of 50 MPa, the capacity of more than 0.0001 m to 0,001 m , inclusive.

Categories receptacles for liquids and used for production environments in group 1 are shown in Table 3, the N 1 to this technical regulation ;

d) intended to contain liquids used for the working media group 2 and having:

maximum allowable operating pressure in excess of 1 MPa, a capacity greater than 0.01 m , and the product of the maximum allowable working pressure on the value of the capacity, is more than 1 MPa · m^3 ;

maximum allowable operating pressure in excess of 100 MPa, the capacity of more than 0.0001 m to 0.01 m , inclusive.

Categories receptacles for liquids and used for production environments group 2 are shown inTable 4, the N 1 to this technical regulation ;

d) boilers having a capacity of more than 0,002 m , designed to produce hot water at a temperature above 110 ° C, or steam overpressure is more than 0.05 MPa, and the vessels of the fired, having a capacity of more than 0,002 m .

Categories of steam, hot water boilers and vessels fired are shown in Table 5, the N 1 to this technical regulation ;

e) a conduit having a maximum allowable working pressure in excess of 0.05 MPa, a nominal diameter of 25 mm, for gases and vapors and used for production environments in group 1.

Categories pipelines intended for gases and vapors and used for production environments in group 1 are shown in Table 6, the N 1 to this technical regulation ;

g) pipes having a maximum allowable operating pressure in excess of 0.05 MPa, a nominal diameter of 32 mm and the product of the maximum allowable working pressure on the nominal diameter of more than 100 MPa · mm for gases and vapors and are used to working media group 2.

Categories pipelines intended for gases and vapors and used for production environments group 2 are shown in Table 7, the N 1 to this technical regulation ;

h) pipes having a maximum allowable operating pressure in excess of 0.05 MPa, a nominal diameter of 25 mm and the product of the maximum allowable working pressure on the nominal diameter of more than 200 MPa · mm, intended for liquids and used for production environments in group 1.

Categories pipelines designed for liquids and used for production environments in group 1 are shown in Table 8 of the N 1 to this technical regulation ;

and) pipes having a maximum allowable operating pressure in excess of 1 MPa, a nominal diameter of 200 mm and the product of the maximum allowable working pressure on the nominal diameter of more than 500 MPa · mm, intended for liquids and used for production

environments in Group 2.

Categories pipelines designed for liquids and used for production environments group 2 are shown in Table 9, the N 1 to this technical regulation ;

a) items of equipment (assembly units) and accessories to it, pressure-resistant;

l) fittings having a nominal diameter of 25 mm (for equipment with fluid group 1), fittings, having a nominal diameter of 32 mm (for equipment used for gas with fluid group 2), fittings, having a nominal diameter of 200 mm (for pipes, designed for liquids and used for production environments group 2);

m) showing and safety devices;

n) pressure chamber (except single medical);

o) devices, and safety devices.

3 This technical regulation does not apply to the following products:

a) pipelines, field and local distribution pipelines designed to transport gas, oil and other products, with the exception of equipment used on the pressure regulating stations or compression stations;

b) a network of gas distribution and gas consumption in the network;

c) equipment specially designed for use in nuclear power equipment, working with radioactive environment;

g) vessels working under pressure created by the explosion inside them, in accordance with the process or during combustion mode of self-propagating high-temperature synthesis;

d) equipment specially designed for use in marine and river vessels and other floating facilities and objects underwater use;

e) the braking equipment of railway rolling stock, vehicles and other means of transportation;

g) vessels specifically designed for use in airplanes and other aircraft;

h) equipment for defense purposes;

s) of the equipment shall not constitute separate vessels (hull pumps or turbines, steam engine cylinders, hydraulic, internal combustion engines, air compressors, and machinery);

k) medical single pressure chamber;

l) equipment with a spray bottle;

m) shell of high-voltage electrical equipment (switchgear, control gear, transformers and rotating electrical machines);

n) and the shell casing of elements of the transmission of electric energy (power cables and communication cables), working under excessive pressure;

o) equipment manufactured (produced) of non-metallic flexible (elastic) shell;

n) silencers or exhaust gas inlet;

p) vessel or siphons for carbonated beverages.

II. Basic Concepts

4 For the purposes of this technical regulation used mean the following:

"Balloon" - a vessel having 1 or 2 neck to install valves, flanges or fittings designed for transportation, storage and use of compressed, liquefied or dissolved gases;

"Pressure chamber" - a vessel in which there is an low and (or) high blood pressure, which is equipped with instruments and equipment, and in which people can be accommodated;

"Barrel" - a vessel of cylindrical or other shape, which may be rolled from one place to another, and to put on the ends without additional supports and which is intended for the transport and storage of liquid and other substances;

"Commissioning" - documented event, fixing equipment availability for use (use);

"Capacity" - the volume of the inner cavity of the equipment determined by a given nominal size in the drawings;

"Group work environments" - a set of working environments, subdivided into:

Group 1, which includes working environment consisting of flammable, oxidizing, flammable, explosive, toxic and highly toxic gases, liquids and vapors in the single-phase state, and mixtures thereof;

Group 2, which includes all other operating environments that are not assigned to Group 1;

"Internal pressure", "external pressure" - the overpressure acting on the inner or outer wall surface of the equipment;

"Pressure test" - the excess pressure at which the test equipment for strength and density;

"Working pressure" - maximum excess pressure arising in the normal flow of the workflow;

"Pressure allowed" - the maximum operating pressure for the equipment (element), set on the basis of conformity assessment and (or) control based on strength;

"Pressure rated" - the pressure at which the calculation is performed on the durability of the equipment;

"Pressure conditional" - design pressure at 20 ° C, used in calculating the strength of standard vessels (units, parts, fittings);

"Nominal diameter," "conditional pass" - a numerical designation of size equal to the rounded value of the inner diameter of which is indicated for all the hardware components other than the ones specified on the outside diameter or the size of the thread. Nominal diameter and nominal inside diameter in millimeters without indication of the dimension;

"Identification of equipment" - the procedure for inclusion of equipment to the scope of this technical regulation and the establishment of the unit follows the accompanying technical documentation;

"Manufacturer" - a legal entity or natural person registered as an individual entrepreneur, who carried on his behalf manufacture or production and sale of equipment and are responsible for its compliance with the safety requirements of this technical regulation;

"HRSG" - unit, wherein the heat source used combustible gases or other process streams;

"Boiler energy technological" - or steam boiler (including soda recovery) in which the refining furnace technology materials;

"Electrode boiler" - steam or hot water boiler, which uses the heat generated by an electric current flows through the water;

"Boiler with heating" - a steam or hot water boiler, which uses the heat generated by the heating elements;

"Hot water boiler" - a device for heating the water under pressure above atmospheric, and is used as coolant out of the device;

"Steam boiler" - a device designed to generate steam at a pressure above atmospheric pressure, the device is used;

"Safety case" - a document containing an analysis of the risk, as well as details of the design, operation, technical documentation about the minimum required security measures to accompany the equipment at all stages of the life cycle, and supplemented by information on the results of risk assessment at the stage of operation after overhaul ;

"Limiting condition of the equipment" - the state of the equipment in which it further operation is invalid;

"Intended use" - the use of equipment in accordance with its purpose and characteristics specified in the technical documentation of the manufacturer;

"Mass production" - the type of production, characterized by the manufacture of similar products on the model design decisions and (or) the use of standard processes associated with unchanging types of equipment, including assembly operations for manufacturing (production) recurring items of equipment regardless of the type of their further assembly;

"Repair of the equipment" - the recovery of damaged, worn or degraded for any reason vascular elements with bringing them to a healthy state;

"Destination Resources" - the total operating time, when the operation of the equipment which is to be terminated, regardless of its technical condition;

"Vessel" - a hermetically closed container (permanently installed or mobile) are designed to maintain the chemical, thermal and other processes, as well as for storage and transport of gases, liquids and other substances;

"The life of the designated" - calendar duration of operation of the equipment, above which the operation is to be terminated, regardless of its technical condition;

"Lifetime settlement" - the life of a calendar year, set by the design and calculated from the date of commissioning of the equipment;

"Medium temperature" - the minimum (maximum) temperature of the medium at normal flow of the process;

"The wall temperature calculation" - the temperature at which the defined physical and mechanical properties, the allowable stress of the material and the calculation is carried out on

the strength of the pieces of equipment;

"The wall temperature permissible" - the maximum (minimum) wall temperature at which permitted operation of the equipment;

"A person authorized by the manufacturer" - registered in accordance with the laws of the State - a member of the Customs Union and the Common Economic Space in its territory a legal entity or natural person as an individual entrepreneur, performing the functions of the foreign manufacturer on the basis of a contract with him in terms of ensuring compliance with the requirements of the technical equipment Regulations and in part responsible for the discrepancy between the equipment requirements hereof;

"Safety device" - a device designed to protect vessels, boilers, piping from damage in excess of the permissible values of the pressure or temperature;

"Cycle of life" - the time period since the release of the equipment manufacturer to recycling;

"Tank" - a mobile vessel, permanently mounted on the frame of a truck on the chassis of a vehicle (trailer), including tank trucks, or other vehicles designed for the transport and storage of gaseous, liquid and other substances;

"Maintenance of equipment" - the stage of the life cycle from the time the commissioning of the equipment prior to its disposal;

"Piece of equipment" - subassembly of equipment designed to perform one of its basic functions.

III. Handling on the market

5 equipment put into circulation on the market when it is under the present technical regulations and other technical regulations of the Customs Union, which apply to the equipment, and provided that it has been evaluated (confirmation) of compliance in accordance with Section VI of these technical regulations and other technical regulations customs union, the action of which it is subject.

6 Equipment, conformity to the requirements of the technical regulations has not been confirmed, no one has to be labeled with a mark of products on the market states - members of the Customs Union and is not allowed to be released into circulation.

IV. Ensuring the safety of the equipment in the development (design), manufacturing (production)

7 The equipment must be designed (designed) and manufactured (produced) so that when used as directed, operation and maintenance ensures that it meets safety requirements.

8 In order to determine the risks for the equipment must be factored is the next major hazards:

a) any unprotected moving elements;

b) Vibration;

c) the presence of highly explosive elements;

g) invalid parameter deviations in design, assembly units and safety devices which affect safety;

d) fire, emergency situations of natural and man-made disasters;

e) overheating;

g) the excess pressure (working pressure does not exceed the permitted);

h) damage caused by the deposition of impurities working environment on the internal surfaces of equipment components;

i) corrosion or other types of surface wear items of equipment;

a) failure of safety devices and safety systems;

l) Termination of auxiliary equipment;

m) flame failure in the furnace combustion chamber;

n) the disappearance of the voltage on all instrumentation, devices, remote and automatic control;

a) reduction of the motive liquid below the minimum level;

n) improving the working environment above the maximum level;

p) reduction of water flow through the boiler below the minimum value;

c) reducing the pressure of the coolant in the path of the boiler below the minimum level of significance;

m) rise in coolant temperature at the outlet of the equipment to the limit specified by the manufacturer;

y) the failure of the level gauges working environment of direct action.

9 For the identified hazards in the design of an assessment of risk calculation, experimental, or by experts according to the operation of similar types of equipment.

10, depending on the equipment capacity or nominal diameter, as well as the maximum allowable working pressure is classified by category (1st, 2nd, 3rd and 4th) in accordance with Annex N 1 to this technical regulation .

11 Safety equipment is ensured by compliance with the development (design), manufacturing (production) of the safety requirements set out in this section and the N 2 to this technical regulation .

12 In the production (manufacturing) equipment and safety devices provided by the manufacturer of their compliance with the parameters and characteristics of established project design, and the requirements hereof.

13 manufacturer is testing the equipment in the project design.

14 Deviations from project documentation in the production (manufacturing) equipment shall be agreed with the developer (designer).

15 The equipment should be safe for a lifetime when the user steps to ensure its security, set out in the technical documentation.

16 Technical documentation accompanying the equipment includes:

a) passport equipment;

b) a copy of the safety case;

c) the general view drawing;

d) passport safety devices (if any, in accordance with the project documentation);

d) payment capacity of the relief devices (if any, in accordance with the project documentation);

e) calculation of the strength of the equipment;

g) Manual (user) manual;

h) the drawings, diagrams, calculations, and other documentation in accordance with the supply (contract).

17 Passport equipment is the key instrument for the identification of the equipment.

A passport is mandatory for equipment handling equipment in the customs territory of the Customs Union at all stages of the life cycle of the equipment.

The passport is issued by the manufacturer of equipment.

On the passport equipment manufacturer will be sealed and shall indicate the date of issue.

18 Depending on the type of hardware equipment passport shall contain information in accordance with paragraphs 19 - 23 of these technical regulations .

19 Passport pipeline includes the following information:

a) the name and address of the owner;

b) Appointment;

c) the date of manufacture (production);

d) work environment;

d) the operating parameters of the working environment: pressure, MPa (kgf / cm), temperature, ° C;

e) the life expectancy;

g) design life;

h) the estimated number of starts;

s) diagrams, drawings, certificates and other documents for manufacturing (production) and the installation of the pipeline.

Passport boiler 20 includes the following information (volume data forming manufacturer depending on the type of boiler)

a) General information:

the name and address of the manufacturer;

The date of manufacture (production);

the type (model);

name and destination;

serial number;

expected lifetime;

design life of the boiler and the main parts;

Estimated number of starts;

the geometric dimensions of the boiler and its components;

b) specifications and parameters:

calculated fuel and its calorific value, MJ / kg (kcal / kg);

fuel consumption, m / h (t / h);

the type and characteristics of the combustion unit (burner);

design, operation, test pressure, MPa (kgf / cm);

maximum hydraulic resistance of the boiler at nominal capacity, MPa (kgf / cm);

minimum allowable pressure at rated temperature, MPa (kgf / cm);

nominal temperature of the steam leaving the boiler, ° C;

the estimated temperature of the superheated steam (liquid), ° C;

Nominal temperature of the fluid at the boiler inlet, ° C;

nominal and maximum liquid temperature at the boiler outlet, ° C;

nominal, minimum and maximum steam capacity, t / h;

nominal, minimum and maximum output in kW;

heating surface of the boiler and the main parts, m ;

capacity, m ;

minimum and maximum flow rate, m / hr;

c) information on the safety devices (including the type, quantity, location of installation, cross-sectional area, the nominal diameter, the discharge coefficient of vapor or liquid, the size (range) of the opening);

g) information on the liquid level indicator (water) (including a pointer type, quantity, location of the installation);

d) information on the main reinforcement (including the number, nominal diameter, nominal pressure, operating parameters, body material, the place of installation);

e) information on basic equipment for measurement, control, signaling, control and automatic protection (including the number, type (name));

g) information on the pumps (including the type, amount, operating parameters, drive);

h) information about the basic elements of the boiler manufactured (made) out of sheet steel (including the number, size, material, welding and heat treatment);

i) information on the elements of the boiler manufactured (made) of pipes (including the number, size, material, welding and heat treatment);

a) information on the fittings, lids, bottoms, reducers, flanges (including the number, size, material);

l) information on the coolant (including the name, the maximum allowable operating temperature, the temperature of spontaneous combustion in open space, the solidification temperature, boiling point, the change (curve) the boiling point as a function of pressure, and other data that affect the safe operation);

m) drawings, diagrams, drawings of the boiler and its essential elements and other documents (consolidated list of factory changes, pick list, specification, specifying the size of assembly

units, etc.);

n) other information to ensure the safe operation of the boiler.

21 Passport vessel includes the following information:

a) General information:

the name and address of the manufacturer;

The date of manufacture (production);

serial number;

expected lifetime;

b) information on the technical characteristics and parameters:

business, design, test pressure, MPa (kgf / cm);

Working medium temperature, ° C;

estimated wall temperature, ° C;

minimum allowable negative wall temperature, ° C;

the name of the working environment;

group working environment;

increase to compensate for corrosion (erosion), mm;

capacity, m ;

Empty weight in kilograms;

gross weight of the fill medium, kg;

c) information about the main parts (including the number, size, material, welding (soldering));

d) information on fittings, flanges, caps, mounting hardware (including the number, size, material);

e) information on the safety devices, the main valve, instrumentation, safety devices (including the number, nominal diameter, design pressure, body material, the place of installation);

e) the drawings, diagrams, drawings and other documents of the vessel (combined leaf plant changes, a pick list, specification, specifying the size of assembly units, etc.);

g) any other information to ensure the safe operation of the vessel.

22 Passport container includes the following information:

a) General information:

the name and address of the manufacturer;

The date of manufacture (production);

designation of the container;

environment for which it was designed bottle;

serial number;

b) information on the technical characteristics and parameters:

working pressure, MPa (kgf / cm);

test pressure, MPa (kgf / cm);

main dimensions of the cylinder, drawing the container;

capacity, l;

weight in kilograms;

thread on the neck;

seal openings;

operating temperature range, ° C;

the maximum number of refills;

design life from date of manufacture (production) years;

c) requirements for the transport and storage container;

d) requirements for the installation of the container;

e) requirements for the operation of the container;

e) any other information to ensure the safe operation of the cylinder.

23 Passport fixtures includes the following information:

a) General information:

the name and address of the manufacturer;

The date of manufacture (production);

name, designation and identification (serial) number;

appointment of reinforcement;

information on conformity assessment;

b) information about the technical specifications:

nominal diameter (DN);

nominal pressure (PN) or the working pressure (Pp), MPa (kgf / cm);

work environment;

fluid temperature, ° C;

tightness of the gate;

climatic performance and environmental parameters;

type of connection to the pipeline;

hydraulic characteristics (coefficient of resistance, or the conditional throughput, or flow coefficient);

resistance to external influences (in case it is necessary to provide this information);

weight in kilograms;

reliability;

safety performance;

type and its main technical characteristics;

c) information about the materials of main parts;

g) any other information to ensure the safe operation of the boiler.

24 Manufacturer may add the information specified in paragraphs 19 - 23 of these technical regulations, information reflecting the specific design features of the equipment.

25 The safety equipment is prepared during the development phase (design) equipment.

The justification given security risk analysis for the equipment, as well as the minimum necessary safety measures.

Original of the safety equipment is kept by the developer (designer), and a copy - the manufacturer of the equipment and the organization operating the equipment.

26 The manufacturer shall provide guidance equipment (instruction) manual.

Manual (user) manual is prepared during the development phase (design) equipment.

27 Manual (user) manual includes:

a) information on the design, principle of operation, characteristics (properties) of the equipment;

b) instructions for installation or assembly, setup or adjustment, maintenance and repair of equipment;

c) guidance on the use of equipment and safety measures to be observed during operation of the equipment (including commissioning, proper use, maintenance, repair of all kinds, periodic diagnostics, testing, transportation, packaging, preservation and storage conditions);

d) assigned indicators (designated storage period designated lifetime and (or) the assigned resource) depending on the design features.

At the end of the designated indicators (designated shelf life, design life and (or) the assigned resource) specified in the user manual (user manual) manual, stops operation of the equipment and to decide on the direction of its repair, or disposal of, or to check and an establishing new parameters assigned (assigned resource, shelf life, life);

d) a list of critical failures, possible human error, which lead to an incident or accident;

e) personnel actions in the event of an incident, a critical failure or accident;

g) limit state criteria;

h) the instructions for decommissioning and disposal;

i) information on the qualifications of the service staff;

a) name, address and contact information of the manufacturer (person authorized by the manufacturer), importer.

28 Manual (user) manual prepared in Russian and in the presence of the corresponding requirements in the legislation of the states - members of the Customs Union and the Common Economic Space (hereinafter - the Member States) in the official languages of the Member States.

Manual (user) manual is issued on paper, there may be accompanied by a set of operational documents on electronic media. The set of non-domestic purpose equipment manufacturer's discretion may be accompanied by manual (user) manual only on an electronic medium.

29 On the equipment shall be marked in a clearly legible and indelible label containing the following information:

a) name and (or) the designation of the type, brand, model equipment;

b) the parameters and characteristics that may affect safety;

c) name of the material from which it is made (produced) equipment (items);

g) the trademark of the manufacturer (if available);

d) the serial number;

e) The date of manufacture (production).

30 Place marking is determined by the design organization and is specified in the user manual (user manual) manual.

If the information specified in paragraph 29 of this technical regulation , it is impossible to put on the product, they can only be specified in the attached to this equipment manual (user manual) manual.

31. equipment designed for the transport of liquefied petroleum gases (cylinders and tankers), applied distinctive coloring and identification information in accordance with the requirements of Annex 3 N to this technical regulation . When coating (plating) of the equipment corrosion-resistant and heat-insulating materials paint over the entire length can not be made.

32 Elements and completing equipment labeled in accordance with the contract for the supply of (contract). Labelling should provide their identification.

33 Technical documentation on the equipment stored at the manufacturer (person authorized by the manufacturer) for the design life from the date of removal from the production of this equipment or the termination of its production.

34 Rules of operation of the equipment established by the legislation of the Member States.

V. Ensuring compliance with safety requirements

35 Match equipment requirements hereof provided by direct implementation of these requirements or by the requirements of the standards included in the list of standards as a result of which, on a voluntary basis, compliance with these technical regulations.

36 Research methods (tests) and measurements of equipment sets the standards included in the list of standards containing rules and methods (tests) and measurements, including the rules of sampling required for the application and enforcement of the requirements of this Technical Regulation and implementation of assessment (confirmation) that equipment.

VI. Grade (s) that the unit

37 The equipment produced in circulation in the customs territory of the Customs Union shall be subject to assessment (confirmation) of compliance requirements hereof.

38 Appraisal (s) equipment compliance with these technical regulations take the form of state control (supervision) in the form of conformity. * 38)

39 State control (supervision) over observance of this technical regulation is carried out in accordance with the laws of the Member States. * 39)

40 Confirmation of the equipment requirements hereof (hereinafter - the conformity assessment) is done by:

a) certification by an accredited certification body (assessment (confirmation)) included in the Unified Register of certification bodies and testing laboratories (centers) of the Customs Union (hereinafter - the certification body);

b) a declaration of compliance on the basis of their own evidence, and (or) the evidence obtained with the certification body or an accredited testing laboratory (center) included in the Unified Register of certification bodies and testing laboratories (centers) of the Customs Union (hereinafter - the accredited testing laboratory) .

41 Conformity assessment is carried out according to the schemes of certification and declaration provided for in this technical regulation.

42 Declaration of conformity of the equipment requirements hereof is held by the applicant in respect of the equipment of the 1st and 2nd categories, as well as equipment of any category, to which manufacturing with permanent connections made at the place of operation.

43 Certification is carried out on equipment 3rd and 4th categories.

44 The only document confirming that the equipment requirements hereof, is either a declaration of conformity or the certificate of conformity.

45 In carrying out conformity applicant generates a set of documents for the equipment, which includes:

a) the safety case;

b) Passport of the equipment;

c) Guide (instructions) for use;

d) the project documentation;

e) the results of strength analysis and calculation capacity of the relief devices (if any, in accordance with the project);

e) production schedules and information on the process (data on the materials used, semi-finished products, components, welding materials, the methods and parameters of welding and heat treatment methods and results of non-destructive testing);

g) information about the test (measurement);

h), the test equipment of the manufacturer's authorized by the manufacturer and the person (or) accredited testing laboratory;

and) a document to confirm the characteristics of the materials and components (if any);

k) certificates of conformity, declaration of conformity or test reports for materials, components (if any);

l) a list of the standards referred to in Section V of this technical regulation , which were used in the manufacture of (manufacturing) equipment (if they are used by the manufacturer);

m) documents proving the qualification of specialists and staff of the manufacturer;

n) other documents, directly or indirectly, confirming compliance with the equipment requirements hereof (subject to availability).

46 Declaration of conformity of equipment with the requirements of these Technical Regulations made under the following schemes:

a) The scheme applies to 1d commercially available equipment 1st and 2nd categories, while the applicant generates a set of documents referred to in paragraph 45 of this technical regulation , provides production control and takes measures to ensure that the manufacturing process ensures conformity of the equipment requirements these technical regulations, conducts tests on samples of the test laboratory or an accredited testing laboratory receives and records the declaration of conformity;

b) The scheme applies to 2d games equipment (single product) 1st and 2nd categories, while the applicant generates a set of documents referred to in paragraph 45 of this technical regulation , is testing samples to the testing laboratory or an accredited testing laboratory, and takes registers the declaration of conformity;

c) 3D diagram applies to mass-produced items of equipment of the 1st and 2nd categories and components of equipment 1st and 2nd categories, while the applicant generates a set of documents referred to in paragraph 45 of this technical regulation , provides production control and take measures to ensure that the manufacturing process ensures conformity of pieces of equipment and components requirements hereof, is testing samples in an accredited testing laboratory receives and records the declaration of conformity;

g) scheme applies to 4e party equipment elements of the 1st and 2nd categories and components of equipment 1st and 2nd categories, while the applicant generates a set of documents referred to inparagraph 45 of this technical regulation , is testing samples

accredited testing laboratory receives and records the declaration of conformity;

d) circuit 5d apply to equipment the 1st, 2nd, 3rd and 4th categories, which doizgotovlenie using permanent connections made at the place of operation in the following cases:

it is impossible to conduct tests in full prior to installation of the equipment at the site of its operation;

the development (design) and manufacturing (production) of the equipment does not apply the standards set forth in paragraph 36 of this technical regulation , including innovative equipment. In applying the procedure 5d applicant generates a set of documents referred to in paragraph 45 of this technical regulation , provides production control and takes measures to ensure that the manufacturing process ensures conformity of the equipment requirements hereof, and shall send to the certification application for the type of research equipment;

certification body conducts research with the type of equipment received from the applicant's documents. If the applicant has not applied the standards referred to in paragraph 36 of this technical regulation , the certification body assesses the possibility of replacing the requirements of these standards stated requirements. Study of the type of equipment depending on the documents submitted by the applicant is conducted by one of the following ways:

study sample as representative of all subsequently produced equipment;

examination of the documents submitted, the test sample or core (critical) components of the equipment;

registration and issuance of the applicant certification body for positive results of research equipment type certificate for the type of equipment on a single form, approved by the decision of the Eurasian Economic Commission. This certificate is an integral part of the declaration of conformity.Contained therein stated hardware requirements as set forth sufficient evidence of compliance with the equipment requirements hereof, used for checking compliance with these technical regulations conducted by the state control (supervision) * 46.5.6)

applicant accepts the declaration of conformity and shall register it in the prescribed manner.

47 When declaring the conformity schemes 1d, 3d and 5d applicants may be registered in accordance with the legislation of the Member State in its territory a legal entity or natural person as an individual entrepreneur, is a manufacturer or authorized personnel only.

When declaring the conformity schemes 2d and 4d applicants may be registered in accordance with the legislation of the Member State in its territory a legal entity or natural person as an

individual entrepreneur, is a manufacturer, sellers or persons authorized by the manufacturer.

48 As the evidentiary materials that are the basis for the declaration on the basis of his own evidence, used the documents referred to in paragraph 45 of these technical regulations , and standards set forth in Section V of this technical regulation .

49 Minutes of testing equipment may be used for evidentiary purposes, which are the basis for the declaration on the basis of his own evidence, the presence of these indicator values, confirming that the claimed equipment all apply to him the requirements hereof.

50 Declaration of Conformity is issued in accordance with a single form of a declaration of conformity with technical regulations of the Customs Union and the rules of its design approved by the decision of the Board of the Eurasian Economic Commission on December 25, 2012 N 293 .

51 The declaration of conformity shall be registered in the prescribed manner. The declaration of conformity starts from the date of its registration in the Unified Register of certificates of conformity and for the declaration of conformity. Validity of the declaration of compliance with commercially available equipment is not more than 5 years. For party equipment (single product) the validity of the declaration of conformity is not installed.

Declaration of Conformity party hardware requirements hereof applies only to equipment belonging to a particular party.

52 Certification of equipment is carried out under the following schemes:

a) The circuit 1c applies to commercially available equipment, wherein:

applicant generates a set of documents referred to in paragraph 45 of these technical regulations , and provides for the certification of the certification body;

certification body carries out sampling of the applicant to perform the tests;

accredited testing laboratory is testing samples of the equipment;

certification body conducts analysis of the production of the manufacturer and the results of testing equipment and samples with positive results shall issue a certificate of conformity;

certification body conducts inspection control of certified equipment by testing samples in an accredited testing laboratory and (or) the analysis of the production;

b) scheme 3c applies to parties of equipment, in which:

applicant generates a set of documents referred to in paragraph 45 of these technical regulations , and provides for the certification of the certification body;

certification body or accredited testing laboratory carries out sampling of the applicant to perform the tests;

accredited testing laboratory is testing samples of the equipment;

certification body carries out the analysis of the test results of samples and equipment in case of positive results shall issue a certificate of conformity;

c) scheme 4c applies to a single product, in which:

applicant generates a set of documents referred to in paragraph 45 of these technical regulations , and provides for the certification of the certification body, which shall contain the identifying characteristics of a single product;

certification body shall notify the applicant a decision on the application containing the conditions of certification;

accredited testing laboratory on behalf of the certification body is testing a single product;

certification body carries out the analysis of the test results of a single product and the positive results of issue to the applicant a certificate of conformity;

g) scheme 7c applies to equipment intended for of batch and mass production, as well as in the case of planning modifications to the equipment at the same time:

applicant generates a set of documents referred to in paragraph 45 of these technical regulations , and provides for the certification of the certification body;

certification body conducts research equipment type one of the following ways:

study of a sample of equipment for the planned production model as representative of all future products;

analysis of the technical documentation, sample test equipment or major components.

Results of the study are drawn the conclusion, in which the certification body assesses the conformity of the type of equipment specified requirements.

Analysis of production of the applicant conducted by the certification body. Results of the analysis are drawn act.

With the positive results of the analysis of the type of equipment and production certification body draws up a certificate of conformity, and outputs it to the applicant.

53 The certification body conducts inspection control of certified equipment for the duration of the certificate by testing samples of the equipment by accredited testing laboratory and (or) the analysis of the production. With the positive results of the inspection control the certificate of conformity is confirmed, as stated in the act of surveillance. With negative results of the inspection control certification body shall take one of the following decisions:

a) suspend the certificate of conformity;

b) cancel the certificate of conformity.

54 When you make changes to the design (composition) of the equipment or technology for its production, which may affect the conformity of the equipment requirements hereof, the applicant in advance in writing notify the certification body, which decides on the need for new tests and (or) analysis state of production equipment.

55. certification schemes 1c and 7c applicants may be registered in accordance with the legislation of the Member State in its territory a legal entity or natural person as an individual entrepreneur, is a manufacturer or authorized personnel only.

When certification schemes 3c and 4c applicants may be registered in accordance with the laws of a Member State in its territory a legal entity or natural person as an individual entrepreneur, is a manufacturer, sellers or persons authorized by the manufacturer.

56 The applicant may apply to the application for certification in any certification body, having the proper scope of accreditation.

57 Certificate of Compliance issued in accordance with a single form of a certificate of conformity with technical regulations of the Customs Union and the rules of its design approved by the decision of the Board of the Eurasian Economic Commission on December 25, 2012 N 293 .

58 The validity of the certificate of conformity of the equipment is:

a) using the scheme 1c, 3c and 4c - 5 years;

b) using the scheme 7c - during its service life, or an assigned resource.

59 Documents and Materials, confirming the results of certification, are stored in the certification body that issued the certificate of compliance, over the estimated life of the

equipment, the last certification.

60 At the request of customers (buyers) and (or) stakeholders copy of the declaration of conformity or the certificate of conformity must be provided to them free of charge by the manufacturer (person authorized by the manufacturer) or the seller.

VII. Marking equipment single sign of products on the market of the - of the Customs Union

61 The equipment complies with the requirements of the technical regulations and conformity assessment procedures the past, one marked with a mark of products on the market states - members of the Customs Union.

62 Marking a single sign of products on the market states - members of the Customs Union is carried out before the release of the equipment in circulation in the market.

63 A single sign of products on the market of the - of the Customs Union is applied to each piece of equipment in any way, providing crisp and clear throughout the life of the equipment, as well as given in annexed operational documents.

64 Marking of equipment a single sign of products on the market states - members of the Customs Union indicates compliance with its requirements of technical regulations of the Customs Union, applicable to the equipment and providing for the application of a single mark of products on the market states - members of the Customs Union.

VIII. Safeguard clause

65 The competent authorities of the Member States shall take all measures to control and ban of issue equipment in the customs territory of the Customs Union, as well as for the withdrawal from the market of equipment not complying with the requirements hereof. * 65.1)

In this case, the competent authority of a Member State shall notify the competent authorities of other Member States of the decision specifying the reasons for its adoption and the provision of evidence, explaining the need for the implementation of this measure.

Appendix N 1. Equipment Classification by Category of danger

Appendix N 1
to the technical regulations of the Customs
Union "On the safety of the equipment,
operating under excessive pressure "
(TR CU 032/2013)

1 Categories of equipment are determined in accordance with tables 1 - 9 of this document .

Safety devices are classified according to category 4, except for safety devices manufactured (made) for the specific equipment that can be classified in the same category as the equipment for which they are made (produced).

Category 2 equipment designed for use with design temperature above the transition temperature creep of the metal is increased by 1 (except category 4).

3 Transition temperature creep is:

400 ° C for carbon and low alloy steels silico;

450 ° C - for low-alloy chromium-molybdenum and molybdenum vanadium steel;

525 ° C - for high-chromium alloy martensitic and austenitic steels class;

575 ° C - for the iron-nickel alloys and nickel-based.

Table 1: Categories of receptacles for gases and used for production environments in group 1

Table 1

Category	Capacity of equipment (m)	The product of the maximum allowable working pressure and capacity values (MPa · m)	Maximum allowable working pressure (MPa)
1	2	3	4
1st	More than 0,001	more than 0.0025 to 0.005 inclusive	above 0.05
2nd	More than 0,001	more than 0.005 to 0.02 inclusive	above 0.05
3rd	more than 0.0001 to 0.001 inclusive	not standardized	More than 20 to 100 inclusive
	More than 0,001	more than 0.02 to 0.1 inclusive,	above 0.05
4th	more than 0.0001 to 0.001 inclusive	not standardized	over 100
	More than 0,001	above 0.1	above 0.05

Table 2: Categories of receptacles for gases and used for production environments in Group 2

Table 2

Category	Capacity of equipment (m)	The product of the maximum allowable working pressure and capacity values (MPa · m)	Maximum allowable working pressure (MPa)
1	2	3	4
1st	More than 0,001	more than 0.005 to 0.02 inclusive	above 0.05
2nd	More than 0,001	more than 0.02 to 0.1 inclusive,	above 0.05
3rd	more than 0.0001 to 0.001 inclusive	not standardized	from 100 to 300 inclusive
	more than 0.001 to 1, inclusive	greater than 0.1 up to 0.3 inclusive	above 0.05
	over 1	not standardized	more than 0.05 to 0.4 inclusive
4th	more than 0.0001 to 0.001 inclusive	not standardized	over 300
	more than 0.001 to 1, inclusive	More than 0.3	More than 0.4
	over 1	not standardized	More than 0.4

Table 3: Categories of receptacles for liquids and used for production environments in group 1

Table 3

Category	Capacity of equipment (m)	The product of the maximum allowable working pressure on the value of capacity (MPa · m)	Maximum allowable working pressure (MPa)
1	2	3	4
1st	above 0.01	More than 0.02	more than 0.05 to 1, inclusive
2nd	More than 0,001	More than 0.02	over 1 to 50, inclusive
	more than 0.0001 to 0.001 inclusive	not standardized	over 50
3rd	More than 0,001	not standardized	over 50

Table 4: Categories of receptacles for liquids and used for production environments in Group 2

Table 4

Category	Capacity of equipment (m)	The product of the maximum allowable working pressure on the value of capacity (MPa · m)	Maximum allowable working pressure (MPa)
1	2	3	4
1st	above 0.01	over 1	over 1 to 50, inclusive
2nd	more than 0.0001 to 0.01 inclusive,	not standardized	over 100
	above 0.01	over 1	over 50

Table 5: Categories of steam, hot water boilers and vessels fired

Table 5

Category	Capacity of equipment (m)	The product of the maximum allowable working pressure on the value of capacity (MPa · m)	Maximum allowable working pressure (MPa)
1	2	3	4
1st	more than 0.002 to 0.1 inclusive,	to 0.005 inclusive	above 0.05
2nd	more than 0.002 to 0.4 inclusive,	more than 0.005 to 0.02 inclusive	more than 0.05 to 3.2 inclusive
3rd	more than 0.002 to 1, inclusive	more than 0.02 to 0.3 inclusive,	more than 0.05 to 3.2 inclusive
4th	more than 0.002 to 0.01 inclusive,	not standardized	over 3.2
	more than 0.01 to 1, inclusive	More than 0.3	More than 0.3
	over 1	not standardized	above 0.05

Table 6 Categories pipelines intended for gases and vapors and used for production environments in group 1

Table 6

Category	Nominal Diameter (mm)	The product of the maximum allowable working pressure on	Maximum allowable working pressure (MPa)

		the nominal diameter (MPa · mm)	
1	2	3	4
1st	more than 25 to 100 inclusive	not standardized	more than 0.05 to 1, inclusive
	more than 25 to 100 inclusive	to 100 inclusive	over 1 to 3.5 inclusive
2nd	from 100 to 350 inclusive	not standardized	more than 0.05 to 1, inclusive
	more than 25 up to 350 inclusive	from 100 to 350 inclusive	over 1 to 3.5 inclusive
	more than 25 to 100 inclusive	not standardized	more than 3.5
3rd	more than 350	not standardized	more than 0.05 to 1, inclusive
	from 100 to 350 inclusive	more than 350	over 1 to 3.5 inclusive
	over 100	not standardized	more than 3.5

Table 7: Categories pipelines intended for gases and vapors and used for production environments in Group 2

Table 7

Category	Nominal Diameter (mm)	The product of the maximum allowable working pressure on the nominal diameter (MPa · mm)	Maximum allowable working pressure (MPa)
1	2	3	4
1st	more than 32	from 100 to 350 inclusive	more than 0.05 to 3.2 inclusive
	from 32 to 100 inclusive	not standardized	over 3.2
2nd	over 100	more than 350 to 500 inclusive	more than 0.05 to 3.2 inclusive
	from 100 to 250 inclusive	not standardized	over 3.2
3rd	More than 250		over 3.2
	More than 250	More than 500	more than 0.05 to 3.2 inclusive

Table 8: Categories of pipelines designed for liquids and used for production environments in group 1

Table 8

Category	Nominal Diameter (mm)	The product of the maximum allowable working pressure on the nominal diameter (MPa · mm)	Maximum allowable working pressure (MPa)
1	2	3	4
1st	over 25	More than 200	more than 0.05 to 1, inclusive
2nd	over 25	More than 200	over 1 to 8 inclusive
	over 25	more than 350	from 8 to 50, inclusive
3rd	over 25	not standardized	over 50

Table 9: Categories of pipelines designed for liquids and used for production environments in Group 2

Table 9

Category	Nominal Diameter (mm)	The product of the maximum allowable working pressure on the nominal diameter (MPa · mm)	Maximum allowable working pressure (MPa)
1	2	3	4
1st	More than 200	More than 500	over 1 to 50, inclusive
2nd	More than 200	not standardized	over 50

Appendix N 2. Safety requirements for equipment in the development (design), manufacturing (production)

Appendix N 2
to the technical regulations
of the Customs Union "On the security
of equipment operating under
excessive pressure "
(TR CU 032/2013)

1 In the development (design) of the equipment shall be calculated taking into account the strength of its projected loads that may arise in the course of its operation, transportation, transportation, installation and projected deviations from such loads. This takes into account

the following factors:

a) the load acting on the inner and outer surfaces of the equipment;

b) the ambient temperature and the temperature of the working environment;

c) static pressure under the operating conditions and the pressure conditions in testing by weight content in the equipment;

g) the inertia when moving, wind and seismic effects;

d) the reactive force (counter), which are transmitted from the supports, fixtures, pipes;

e) fatigue under variable loads;

g) erosion and corrosive effects of the environment, including erosion-corrosion wear;

h) chemical reaction due to instability of the processed fluids and process;

i) changes in the mechanical properties of the materials during operation.

2 The equipment must exclude the possibility of injury in cases of:

a) The opening and closing of hatches or equipment condition monitoring devices;

b) technological operations associated with the production of the equipment under pressure, putting into operation mode, and pressure relief;

c) technological operations associated with the risk of falling from the work site personnel to maintain the equipment;

d) the emergence within the equipment overpressure or vacuum when the inside of the equipment people;

e) the occurrence of unacceptable temperature external surfaces;

e) the decomposition of unstable environments.

3 The equipment shall be designed to allow the inspections necessary to confirm its compliance with safety requirements.

4 Project equipment is determined by its boundaries (limits).

5 The project depending on the destination equipment should provide its equipment:

a) safety devices;

b) means for measuring the level of liquid working medium;

c) means for measuring the pressure;

d) means for measuring the temperature of the working environment;

d) stop and control valves;

e) nutritional devices;

f) means for controlling the thermal displacement.

6 Equipment design should provide safe access to the instruments of security and monitoring devices parameters of the working environment of the equipment.

7 Draft equipment should include the use of:

a) means of monitoring and measurement, the error in the working conditions which do not exceed the maximum permissible deviation of the control parameter;

b) means of measurements in accordance with the operating conditions of the equipment.

8 The project should be equipped with the hardware devices, drainage medium and remove air, allowing:

a) to avoid water hammer, vacuum failure, corrosion, or the emergence of uncontrolled chemical reactions (which take account of operational processes and testing);

b) to ensure safe cleaning, inspection and maintenance.

9 Draft equipment should provide security processes filling or draining the equipment in case of:

a) The overflow or overpressure, as well as the need of the equipment under pressure arising periodically while filling equipment;

b) uncontrolled discharge of the working environment when draining equipment;

c) the risks associated with the accession to power of pressure and disconnecting from it during filling and discharging equipment.

10 In order to prevent corrosion, erosion-corrosion wear or other chemical to the fluid during operation and protection from equipment provided by:

a) minimization of impacts due to case design;

b) the possibility of replacing pieces of equipment that may be subject to this effect.

11 If necessary, equipment is equipped with devices to ensure minimization of the consequences when the external fire.

Necessary to provide additional coverage for the safe operation of equipment. Internal parts and field equipment requiring frequent inspection, adjustment and maintenance, should have lighting that provides safety.

12 In the equipment for which there is a risk of overheating, eliminated or minimized factors arising from overheating and reduce its safety. For these purposes, provided:

a) the device for limiting the supply or removal of heat, limiting the level of operating medium in order to avoid local or general overheating of the metal;

b) sampling locations working environment in order to assess its impact on the formation of deposits of impurities and (or) corrosion damage;

c) measures to prevent the damage associated with deposits of impurities;

g) for the safe removal of residual or excess heat after you disconnect the equipment;

d) measures to prevent the formation of explosion-hazardous mixtures and flame propagation (flame arrestors plamyaotsekateli, hydraulic valves).

13 Evaluation of the strength of equipment based on the methods of calculation or on the results of experimental tests without calculation used in cases where the product of the maximum allowable working pressure and the value of the capacity of the equipment is less than 0.6 MPa · m , or if the product of the maximum allowable working pressure and the values nominal diameter of less than 300 MPa · mm.

14 To calculate the strength of the equipment, the following calculation methods that can complement each other:

a) using the formulas set forth in the rules for calculating the strength of the equipment;

b) on the basis of numerical analysis of the stress state;

c) on the basis of consideration of limit states and fracture mechanics.

15 In calculating the strength of taking into account all the possible load factors and the probability of their simultaneous occurrence, all possible failure mechanisms (ductile or brittle materials creep, fatigue of materials, stress corrosion cracking) in accordance with the purpose of equipment and during its operation.

16 to ensure the safety of equipment requires the following conditions:

a) the value of the design pressure shall be not less than the maximum allowable working pressure for which the equipment is intended. Calculated amount of pressure into account static head and dynamic loads of the working environment, an increase in pressure due to the instability of working environments and processes. Equipment consisting of several cameras that work with different pressures for the design pressure taken or each pressure alone or pressure, which requires greater wall thickness calculated piece of equipment;

b) the calculated temperature set safe limits on the use of materials and equipment;

c) the equipment and materials used for production (produced) equipment used in a range of design temperatures;

d) taking into account all the possible combinations of pressure, temperature and other stresses encountered during operation, transport, transportation, and test equipment.

17 when calculating the strength of the materials into account the following characteristics:

a) yield strength, yield strength at 0.2 percent and 1 percent of permanent deformation at normal temperatures and settlement;

b) tensile strength (tensile strength), tensile normal temperatures and settlement;

c) limit long-term strength and creep strength at the design temperature and a specified number of hours;

d) description of the low-cycle fatigue strength, or for a given number of cycles and stress levels;

d) Young's modulus (Young's modulus) and calculated at normal temperatures;

e) the value of plastic deformation at break of standard samples;

g) the toughness;

h) fracture toughness (stress intensity factor).

18 Strength calculations are made taking into account the strength of welded joints coefficients whose values depend on the materials to be welded, welding technology (soldering), form of the compound, the method and extent of non-destructive testing processes and equipment operation. Items of equipment operating under external pressure or experiencing compressive stresses from other stresses, should be checked for dimensional stability.

19 In calculating the strength of the equipment are taken into account projected deviation of operating parameters during its operation permitted inaccuracies of manufacture (production), possible deviations of the mechanical characteristics of the materials used.

20 Strength analysis provides a margin of safety equipment, which is included in the determination of allowable stresses.

21 Permissible voltage when calculating the strength of the load limit of equipment operating under static loads shall be determined by the following formulas:

a) for plastic and low-carbon, ferritic, austenitic-ferritic martensitic steels and iron-based alloys:

$$[\sigma] = \min\left\{\frac{R_{e/t} \text{ или} R_{P0,2/t}}{1,5}; \frac{R_m}{2,4}; \frac{R_{m/10^n}}{1,5}; \frac{R_{P1/10^n}}{1}\right\},$$

where:

- Allowable stress in the calculation of the strength of the load limit of equipment operating under static loads;

- The minimum value of the yield stress at the maximum allowable temperature;

$R_{P0,2/t}$ - Minimum value of yield strength at 0.2 percent residual strain and the maximum allowable temperature;

- Minimum value of tensile strength (tensile strength) at 20 ° C;

$R_{m/10^n}$ - The average value of the yield strength prolonged for 10 hours at the maximum allowable temperature;

$R_{P1/10^n}$ - An average value of 1 percent creep in 10 hours at the maximum allowable temperature;

b) for austenitic chromium-nickel steel, aluminum, copper and their alloys:

$$[\sigma] = \min\left\{\frac{R_{P1/t}}{1,5}; \frac{R_{m/t}}{3}; \frac{R_{m/10^n}}{1,5}; \frac{R_{P1/10^n}}{1}\right\},$$

where:

- Minimum value of proof stress at 1 percent of the residual strain and the maximum allowable temperature;

- Minimum value of tensile strength (tensile strength) at the maximum allowable temperature;

c) for aluminum casting alloys:

$$[\sigma] = \frac{R_{m/t}}{7};$$

g) for titanium and titanium alloys:

$$[\sigma] = \frac{R_{m/t}}{3};$$

d) for the sheet metal and rolled tubes of titanium and titanium alloys:

$$[\sigma] = \frac{R_{m/t}}{2,6}.$$

22 is allowed to determine the allowable stress for austenitic steels according to the following formula:

$$[\sigma] = \frac{R_{P0,2/t}}{1,3}.$$

23 For steel castings allowable stress value defined by the formulas referred to in paragraphs 21 and 22 of these requirements is multiplied by 0.8 if subjected to the continuous casting of non-destructive testing, or 0.7 if not subjected to the continuous casting of non-destructive testing.

24 In the case of aluminum, copper and alloys thereof are no data on the yield strength and long-term strength, the allowable voltage is determined by the following formula:

$$[\sigma] = \frac{R_{m/t}}{3,5}$$

25 In the development (design), production (manufacturing) equipment from non-metallic materials for non-metallic materials values of tensile strength and elastic modulus of rupture correspond to the values set out in the design documentation, and are as follows:

a) for the composite based on uglerovinga:

tensile strength - at least 160 kgf / mm ;

modulus of elasticity - at least 11000 kgf / mm ;

b) for the composite based on organorovinga:

tensile strength - at least 170 kgf / mm ;

modulus of elasticity - at least 6500 kgf / mm ;

c) for the composite based on steklorovinga:

tensile strength - not less than 90 kgf / mm ;

modulus of elasticity - at least 5000 kgf / mm .

In the equipment 26 as a binder may be used thermoplastic or duroplastic polymer material.

Temperature curing (polymerization) of the binder should be below the softening temperature of the material non-metallic binder.

The softening temperature of the material should not be lower than 100 ° C.

27 Welded joints shall not be external or internal defects (damage) which may affect the safety of the equipment. The minimum values of mechanical properties of welded joints of the equipment shall not be less than the minimum values of the mechanical characteristics of the materials being bonded.

28 Incoming inspection of welds performed by the equipment manufacturer. Methods of non-destructive testing and its volume determined by the project developer, the equipment on the

basis of the need for more accurate and complete identification of unacceptable defects with the features and properties of materials specified in the design documentation of the equipment.

29 when calculating the strength of the welded joints of equipment elements permissible voltage value multiplied by a safety factor of welds 1. The coefficient strength of welds determined by calculating the strength of the equipment depending on the material, volume control, welding technology and design of the weld.

30. maximum stresses arising in the field of the edge effect or stress concentration, defined on the basis of a numerical analysis, safety factors are set depending on the mechanical characteristics of the materials used and the type of stress.

31 Experimental tests of strength equipment are carried out on the sample. During the tests, it is possible to monitor the critical areas of equipment with the help of test and measurement tools that can reliably detect the strains and stresses.

32 The program of experimental tests includes:

a) pressure test for leaks and strength to confirm there is no leakage of the medium or permanent deformation exceeding allowable values;

b) the creep test and fatigue of materials, which takes into account the processes of operation of the equipment;

c) additional tests which take into account other factors, and are held, if necessary.

33 In the development (design) of equipment installed technical performance, minimizing the possibility of an incident, an accident during its operation.

34 The equipment is made (produced) of materials and supplies provided by the project documentation and ensure its compliance with safety requirements throughout the life cycle.

35 The equipment is made (produced) of materials and supplies that are provided in the contract delivery markings (no damage), which provides the ability to identify with these manufacturer's documentation materials or semi-finished products.

36 On sheets, plates, tubes and forgings used in the manufacturing (production) of the equipment shall be maintained manufacturer's mark. If there is a semi-finished cutting into parts, then each of them shall bear identical labeling method that you used when applying marking materials manufacturer.

37 When selecting materials and (or) for the manufacture of semi-finished products (manufacturing) equipment is necessary:

a) determine the parameters for the design calculations, as well as the main characteristics of the materials and their processing capability;

b) result in the technical documentation of the data used in the manufacture (manufacturing) equipment materials.

38 In the production (manufacturing) equipment used materials:

a) having the properties (ductility, strength), allowing their use in the operation and withstand the test equipment. When selecting a material based on its fragility or crack. When using a brittle material includes measures to eliminate brittle fracture (increased safety factor);

b) having chemical resistance to the working environment in which the equipment is intended.Changes in chemical and physical properties of materials throughout its service life, or assigned resource equipment shall not give rise to a breach of its safe operation;

c) suitable for the intended types of processing;

d) selected so that when combined with each other provides strength to the equipment during the lifetime of the equipment.

39 used in the equipment is considered ductile material, if the tension test its elongation after fracture of not less than 14 percent, and the toughness determined in samples from the concentrator type KCV (with V-notch) is not less than 27 J / cm at a temperature above 20 ° C but not higher than the minimum allowable temperature.

40 In the case where the production (manufacturing) change the characteristics of the material or having residual stresses affecting the safety of the equipment, then held his heat treatment. Type of heat treatment equipment and its modes are determined by the developer of the project equipment.

41 In the production (manufacturing) equipment and safety devices provided by the manufacturer of the performance characteristics and parameters in the project design, in accordance with the safety requirements of technical regulations of the Customs Union "On the security of equipment operating under excessive pressure" (TR CU 032/2013) with subject to the applicable processes and control systems.

42 In the production (manufacture) parts by rolling, stamping, rounding is not allowed change in the mechanical properties of materials, damage, cracks and other defects that may affect

the safety of the equipment.

43 Items of equipment collected together must ensure the safety of equipment and appropriate to its purpose. All one-piece or welds pieces of equipment should be available for non-destructive testing.

44 Equipment, equipped with quick release covers must have device, excluding the possibility of the inclusion of the pressure equipment with incomplete closure of the lid and the lid opening in the presence of excess pressure equipment.

45 The boiler safety devices are installed, the automatic shutdown of the boiler or its components with unacceptable deviations from the calculated modes of operation.

46 A piece of equipment, which is limited to the internal volume of stop valves and pressure which may increase beyond the allowable shall be equipped with safety devices, automatically preventing overpressure by the issue of the working environment in the atmosphere or heat-recovery system.

47 As the safety devices are used:

a) lever-freight safety valves direct action;

b) safety valve action;

c) pulse safety devices consisting of a pulsed valve and the main safety valve;

g) safety devices with membrane disrupting (membrane safety devices).

48 Safety devices are placed in areas accessible for maintenance.

49 Vents safety devices and impulse lines impulse safety devices in areas of potential accumulation of condensate drainage pipes are equipped to remove condensate.

Install shut-off valves or other fittings in drainage pipes are not allowed. Wednesday, coming out of the pressure relief devices and drains, to play in a safe place. Discharged highly explosive, toxic and technological environment in group 1 are sent to a closed system for recycling, or a system of organized burning, or in the atmosphere - for the gas density relative to air of 0.8 or less.

It is forbidden to combine discharges containing substances which are capable, when mixed to form an explosive mixture or unstable compounds.

50 Construction of pipelines connecting safety devices (of lead, which discharge and drainage) should exclude the possibility of freezing in their working environment.

When installing one nozzle or several safety devices conduit cross-sectional area of the nozzle or pipe should be not less than 1.25 of the total cross-sectional area mounted thereon safety valves. In determining the cross-section of the connecting pipe is longer than 1000 mm to the meaning of its linear resistance (pressure drop).

51 Lever-weight loaded or spring safety valve is equipped with a device to check the health of their actions during the operation of the equipment by the forced opening.

Pulse pressure relief valve is equipped with a device enabling the forced opening of the safety valve remotely by the control board.

The design of spring loaded safety valves shall be so tightening the spring over the value set by regulation to operate at a given pressure. Spring safety valves are protected from unacceptable heating or cooling, as well as from direct exposure to the working environment.

52 equipment designed for an operating pressure which is less than the pressure of the supply of its source, is equipped on the intake connecting piping automatic a reducing device with pressure gauge and safety valve mounted on the side of lower pressure after the reducing device.

Reduction and cooling devices provide automatic temperature control. In the case of installing a bypass (bypass) is also equipped with a reducing device.

For a group of vessels 53, operating at the same pressure may be fitted with one of the reducing device manometer and a safety valve on a common mounting the connecting pipe to the first branch to one of the vessels. In this case, the installation of safety devices themselves vessels is not necessary if they excluded the possibility of increasing the pressure.

If a reducing automatic device due to physical properties of the work environment may not work reliably, not install a flow regulator, with provision for protection against pressure increase.

54 Number of safety valves, their size and bandwidth are defined in such a way that the equipment does not produce overpressure exceeding the maximum allowable working pressure:

a) more than 0.05 MPa - for vessels in which the overpressure is less than 0.3 MPa;

b) 15 percent - for vessels in which the excess pressure is 0.3 MPa to 6 inclusive;

c) 10 percent - for vessels in which the overpressure is greater than 6 MPa.

55 When working safety valves, excess pressure in the vessel is allowed no more than 25 percent of the maximum allowable working pressure, provided that the excess is provided for guidance (instructions) to operate the vessel.

56 Safety valves must protect boilers, super heaters, economizers and pipelines on the excess pressure in them for more than 10 percent of the maximum allowable working pressure. Overpressure at full opening safety valves for more than 10 percent of the maximum allowable working pressure allowed if provided for the calculation of the strength of the boiler, superheater, economizer and pipeline.

57. steam boilers with operating pressures up to 4 MPa (except mobile boilers and boiler steam capacity of less than 35 t / h) set only impulse safety valves. On mobile boiler plants may not be mounted lever-truck safety valves.

58 Each steam boilers on and off working environment superheater safety valves are installed.Number and location of the installation are determined by the development (design).

The total capacity of the boilers installed on the safety devices shall not be less than the rated capacity of the equipment.

59 The capacity of the safety valves is confirmed by the relevant tests of the prototype of the safety valve of this design, carried out by the manufacturer and indicated in the passport of the equipment.

60 Safety devices for steam and hot water boilers are installed on sockets or pipes directly connected to boilers, as follows:

a) steam boilers with natural circulation without superheater - on the upper drum or the steam drum;

b) in the once-through boiler steam, as well as forced circulation boilers - on the weekends collectors or vapor outlet conduit;

c) on the hot-water boilers - on the weekends collectors or drum;

g) on the reheater is possible to install all safety devices on the input side of the superheater steam;

d) to be switched off on the water economizers - not less than 1 safety device on the outlet and inlet of water.

61 In the presence of the boiler superheater unswitched of safety valves with a capacity of not less than 50 percent of the rated output of the boiler is installed at the outlet of the superheater header.

62. steam boilers with operating pressures up to 4 MPa pulse pressure relief valves are installed on the indirect action unswitched outlet header superheater or steam line to the main shut-off valves, while at the drum boilers for 50 percent of the valves on the total bandwidth selection for a couple of pulses produced by the drum boiler.

With an odd number of identical valves allowed for the selection of a pair of pulses from the drum for not less than one-third of None for more than one second valves installed on the boiler. On block units in the case of placing safety valves on steam line directly from the turbine is allowed for the momenta of all the safety valves to use superheated steam, with 50 percent of valves supplied additional electrical pulse from the contact pressure gauge connected to the boiler drum.

When an odd number of identical relief valves may be additional electrical pulse supplied from the contact manometer, connected to the boiler drum, not less than one third but no more than one second valve.

63. disconnected boiler economizers place safety valves, methods of their adjustment and the pressure of the opening defined by the designer.

On the quick steam boilers, which during firing or stop the boiler first (along the water) of the heating surface is disconnected from the rest of the heating surface of stop valves must install, the number and size of safety valves for the first part of the heating surface defined project documentation.

64 Diaphragm safety devices are installed on vessels and pipelines:

a) If the lever-freight and spring-loaded safety valves can not be applied due to their inertia or for other reasons;

b) before the safety valve if the safety valves can not reliably operate due to the harmful effects of the work environment (corrosion, erosion, polymerization, crystallization, kick is, freezing) or a possible leakage through the closed valve is highly explosive, toxic, environmentally hazardous substances. In this case, the equipment shall be a device that allows you to check the integrity of the membrane;

c) in parallel with the safety valves to increase capacity pressure relief systems;

g) on the output side of the safety valves to prevent the harmful effects of working environments from the relief system and to eliminate the influence of fluctuations on the part of

the counter-pressure system on the reliability of the safety valves.

65 The need for and the place of installation of membrane safety devices, as well as their design is determined by the project equipment. Protective membranes are installed only intended for them mounts.

Diaphragm safety devices are located in places that are open and accessible for inspection, mounting and dismounting. The connecting pipes are protected from freezing in their working environment, and themselves safety devices are installed on sockets or pipes directly connected to the equipment.

When you install diaphragm safety devices in series with the pressure relief valve (before the valve or behind) the space between the disc and the safety valve outlet tube is reported to the signal pressure gauge (to control the proper membrane).

You can install the device before switching membrane safety devices in the presence of twice the number of membrane devices while providing protection of equipment from overpressure at any position of the switching device.

66 To control the level of liquid in the equipment having the media interface, apply the liquid level measuring instruments working environment. Along with liquid level indicator on the equipment installed sound, light and other signaling and blocking, limits liquid.

67 On the boiler, except the ram, and the heated flame or flammable gases vessel, which is likely to fall below the allowable liquid level, set at least 2 pointers liquid level of direct action.

Allowed as an additional set of duplicate liquid level indicators indirect action. The number and place of installation of the liquid level indicator in boilers (including step-by evaporation in drums or external separator) except once-through boilers and heated flame or combustion gases are determined receptacles project equipment.

68 Liquid level indicator of direct action must have an independent connection to the equipment. You can install two liquid level indicator of direct action on the connecting tube (column) with a diameter of at least 70 mm.

Installation on fluid levels of direct action of intermediate flanges and valves, except for point level sensor liquid is not allowed. This requirement shall not apply to the flanges valves, which is part of the liquid level indicator.

Connecting to a liquid level indicator of direct action and its connecting pipes or fittings other devices is not allowed except for point level sensor liquid, if it does not disrupted liquid level indicator.

69 Configuration pipes connecting liquid level indicators with the equipment must exclude education in their water bags and provide the ability to clean the pipes. Connecting pipes should be protected from thermal heating fuel combustion products and from freezing.

70 Liquid level indicators of direct action and highlights arranged so that the liquid level is visible from the workplace staff. On equipment with operating pressures up to 4 MPa, liquid level indicators are supplied direct enclosures to protect personnel in the event of damage of transparent plates.

71 The width of the observation slit liquid level indicator is determined by the design of the equipment.

72 Liquid level indicators are provided with shut-off valve to turn them away from the equipment and purge. On valving specified (molded, stamped or marked with paint) direction of opening and closing, and on tap further stated his position orifice. The inner diameter of the passage of stop valves must be at least 8 mm. To drain water when flushing liquid level indicator provides a funnel with a safety device and a discharge pipe for discharging equipment.

73 When the pressure in the equipment of more than 4.5 MPa, liquid level indicators are supplied with two successive sets of shut-off valves to turn them away from the equipment.

74 If the distance from the ground, which made the observation of the liquid level in the equipment to liquid level indicator of direct action is more than 6 m, and if the fluid level is not visible from the workplace staff, set 2 discount remote liquid level indicator . In this case, the equipment may be installed 1 liquid level indicator of direct action.

Promotions remote liquid level indicators are connected directly to the equipment separate fittings independently of other liquid level indicators and have the soothing device.

75 In the heat recovery boilers and power technology boilers remote liquid level indicators are set on the remote (remote) data management boilers.

76 Steam boilers equipped with electric automatic power off when the level is below the maximum permissible level.

77 boilers are equipped with automatic sound and light alarms upper and lower limits of water. Similar alarms should act in all respects, which are activated to stop the automatic devices and safety equipment.

78 Steam boilers regardless of the type and steam production are equipped with automatic controls of feed water. Steam boiler steam temperature at the outlet of the primary reheater or more than 400 ° C equipped with automatic means for controlling the temperature of steam.

79 On boilers with superheater, each steam line to the main shut-off valves are provided means for measuring the temperature of the superheated steam. On boilers with reheat steam temperature measuring means mounted on the inlet and outlet of steam.

80 On boilers with natural circulation and superheated steam with a capacity exceeding 20 tonnes of steam / h once-through boilers with a capacity of more than 1 ton of steam / h, together with showing the measuring instruments measuring instruments are provided with a continuous recording of the temperature of the superheated steam.

81. superheaters with several parallel sections addition means measuring the temperature of the steam, steam lines mounted on a common superheated steam, are installed means of periodic measurements of the magnitude of steam temperature at the outlet of each section, and in boilers with a steam temperature of 500 ° C - outlet-side coils superheater 1 Instrument per meter width of the flue.

82 On boilers with a capacity of more than 400 tons of steam / h on the output of the superheater coils installed measurement tools with continuous recording of the temperature of the steam. On boilers with desuperheaters for adjusting the steam superheat temperature before and after the desuperheater installed measuring instruments corresponding quantities.

At the water inlet 83 to the economizer and the economizer outlet water, but also in pipelines feedwater steam boiler without economizer provides a means of measuring the temperature of the feedwater.

84. water boilers measuring the water temperature set at the entrance of water into the boiler and the water outlet from the boiler.

85. hot water boilers with a capacity of more than 4.19 tons of steam / h installed recording equipment measuring the water temperature at the outlet of the boiler.

86 In order to control the temperature of the metal and preventing its increase beyond acceptable values for kindling, stops and maneuvering modes boiler provides means for measuring the temperature of the walls of its elements. The need to install temperature measurement devices, their number and location are determined by the project developer of the boiler.

87 vessels operating under varying temperature walls are fitted with temperature measurement to control the speed and uniformity of the warm body of the vessel in length and height, as well as pointers thermal displacement. The need to equip the vessels by means of temperature measurement and thermal displacement pointers, permissible speed heating and cooling vessels are determined by the project developer and the container specified by the manufacturer in the passport of equipment or in the user manual (user manual) manual.

88 Equipment and its individual cavities with different values of pressure measuring devices are equipped with direct pressure.

89 Steam boilers with a capacity of more than 10 tonnes of steam / h and hot water boilers with a capacity of more than 21 pair GJ / h must be fitted with a means of measuring the pressure recording.

90 Other means of measuring the pressure placed:

a) in the boiler drum;

b) on the boiler with superheater superheater in front of the main shut-off valve;

c) on the fitting of the vessel or pipe between the tank and the shut-off valve;

g) on the once-through boiler superheater in front of the main shut-off valve.

91. water boilers measuring the pressure placed on the water inlet and outlet of the boiler water from the boiler to the valves.

92 Accuracy class measuring the pressure shall not be less than:

a) 2.5 - operating at a pressure of not more than 2.5 MPa;

b) 1.5 - with an operating pressure of from 2.5 to 14 MPa inclusive;

c) 1 - with an operating pressure greater than 14 MPa.

93 When installing the measuring pressure at a height of more than 5 m provides a means of duplicate measurements of pressure.

94 The design of the equipment provides for the safe purging, testing and measuring the pressure off.

95 Valve type, the amount and the place of installation of equipment are determined by the project developer on the basis of the security provided by the project and disconnect the equipment and its components.

96 In the group of feed water in boilers pump head is selected to meet the requirements of technical regulations of the Customs Union "On the security of equipment operating under excessive pressure" (TR CU 032/2013), as well as the basis of providing the boiler feed with the highest operating pressure or with the greatest pressure loss in the feedwater line.

97 Water supply nutrients devices is determined by the rated capacity of steam boilers with the flow of water on a continuous or periodic purge desuperheat, maintenance-reducing cooling and cooling units, as well as the possibility of loss of water or steam.

98 type, characteristics, quantity and circuit of the nutrient devices provide safe operation of the boiler during operation, including emergency stop.

99 In the development (design) of pipelines is necessary to:

a) for pipes with nominal diameter of 150 mm with the operating temperature of 300 ° C or more in the project to determine the required number of indicators for monitoring the movements of thermal expansion of the piping and monitoring of the correctness of the support-suspension system;

b) to provide a device for condensate removal in cases where the inside of pipes transporting vaporous working environment, perhaps his education. These devices must be located in the lower points of the piping;

c) to consider the possibility of damage from violations of the hydraulic regime, as well as the erosion-corrosion wear;

g) provide for measures and means to reduce vibration and eliminate the possibility of accidental destruction and depressurization of pipelines, which are subject to vibration during operation;

d) to provide devices which cut the branch pipeline in those cases where these pipelines are contained working environment group 1;

e) To minimize the risk of accidental exit of working media. Locations for the work environment must be clearly labeled with the name of the working environment;

g) develop technical documentation for underground pipelines, containing the information necessary for safe maintenance, inspection and repair (steel grade, diameter, pipe thickness, length of the pipeline, the location of supports, expansion joints, hangers, valves, air-vent and drainage devices, welded joints and the distance between them and from them to the wells and the subscriber terminal, the location indicator for monitoring the condition of the pipeline and the parameters of the working environment).

100 The design pressure chamber must be capable of inspection (including inner surface), cleaning, washing, flushing and repair of pressure chamber.

101 In the development (design) pressure chambers accounted for the stress caused during installation and under the influence of inertial forces.

102 Duration of people in the chamber defined by the project and indicated in the passport. In the case of a long stay of people in the chamber provides compartments with different functional purpose.

103 Project equipment should include grommets or seals for high-pressure electric cables, provides mechanical strength, axial and radial sealing, gas tightness cable glands as a whole and its conductive elements, and dielectric strength over the entire range of pressures in the pressure chamber.

104 The design pressure chamber shall be capable of opening pressure chamber inside and outside.Not allowed to use locks to close the doors or covers in a recompression chamber.

105 For visual or television monitor the situation inside the pressure chamber and to illuminate the interior space project equipment provided portholes fitted with the outer cover, which protects the glass window from mechanical damage.

In the development (design), manufacturing (production) windows hyperbaric chambers used light permeable materials with safety factor of safety of not less than the housing pressure chamber and light transmission of not less than 85 percent.

106 Project equipment provides air supply and gas supply for the following purposes:

a) forming a gaseous medium in the chamber;

b) providing a stationary work of the respiratory system;

c) the maintenance and change of pressure in the chamber;

d) Maintenance and change in the composition of the gaseous medium in the chamber for oxygen and indifferent gases;

d) sluicing.

107 air supply and gas supply provided by an increase in pressure in the chamber at a rate of not less than 0.2 MPa / min for pressures from 0.1 to 1.7 MPa inclusive (1-17 kgf / cm), not less than 0.1 MPa / minutes. (1 kgf / cm · min.) - for pressures greater than 1.7 MPa (17 kgf / cm) and maintaining the pressure with an accuracy of 0.025 MPa (0.25 kgf / cm). Reducing the pressure in the pressure chamber is produced with a rate of 0.003 - 0.9

MPa / h (0.03 - 9 kgf / cm · h);

108 Means gas control pressure chamber must ensure the accuracy of measurements of oxygen, helium and carbon dioxide, as well as the possible harmful substances.

109 system and fire protection should provide an outbreak of fire in the chamber or the prerequisites of fire (smoke, uncontrolled rise in temperature), activate an alarm and extinguishing fire detection by all available means in the chamber.

110 Tools for automatic control must provide a safe environment within the pressure chamber of human presence.

111 Each compartment is equipped with a pressure chamber and gateway pressure gauge, which is mounted outside on the nipple, welded to the shell pressure chamber or in the control pressure chamber systems.

112 Power network pressure chamber should have backup power sources to ensure uninterrupted operation of elements of air and gas systems, and fire protection.

113 All the switching and control gear and protective power electrical equipment installed outside the pressure chamber. Power cables in the chamber must be non-combustible insulation. The project should include the presence of a recompression chamber system ESD protection, the possibility of grounding internal removable metal products, equipment and housing pressure chamber.

114 Project equipment is determined by the need to install lighting. Lamps installed inside pressure chamber must be sealed, designed for operating pressures of the medium.

115 Project provides for the use of equipment of communication with people who are inside the pressure chamber.

116 Pipelines, steam and water heaters installed inside the pressure chamber, and the compressed air supply and gas mixtures that are installed outside the pressure chamber, designed seamless copper pipes or stainless steel pipes.

117 For internal pressure chamber equipment used incombustible (Fire resistant) material, guaranteed by formation of toxic substances in a gaseous medium pressure chamber.

Appendix N 3. Requirements distinctive color and identity

Appendix N 3
to the technical regulations
of the Customs Union "On the security

of equipment operating under
excessive pressure "
(TR CU 032/2013)

I. Cylinders

Name of gas	Colouring cylinders	The label text	Color printing	Color stripes
1	2	3	4	5
Nitrogen	black	nitrogen	yellow	brown
Ammonia	yellow	ammonia	Black	-
Argon crude	black	crude argon	White	White
Argon Technology	black	Argon Technology	blue	blue
Argon clean	gray	pure argon	green	green
Acetylene	White	acetylene	red	-
Butylene	red	butylene	yellow	Black
Naftogaz	gray	petrogas	red	-
Bhutan	red	Butane	White	-
Hydrogen	dark green	hydrogen	red	-
Air	black	compressed air	White	-
Helium	brown	Helium	White	-
Nitrous oxide	gray	nitrous oxide	Black	-
Oxygen	Blue	oxygen	Black	-
Medical oxygen	Blue	Medical oxygen	Black	-
Hydrogen sulfide	White	hydrogen sulfide	red	red
Sulfur dioxide	black	sulfur dioxide	White	yellow
Carbon dioxide	black	carbon dioxide	yellow	-
Phosgene	Protective	-	-	red
Freon-11	aluminum	Freon-11	Black	blue
Freon-12	aluminum	Freon-12	Black	-
Freon-13	aluminum	Freon-13	Black	2 red
Freon-22	aluminum	Freon-22	Black	2 yellow
Chlorine	Protective	-	-	green
Cyclopropane	Orange	cyclopropane	Black	-
Ethylene	Purple	ethylene	red	-
All other combustible gases	red	name of the gas	White	-
All other non-combustible gases	black	name of the gas	yellow	-

Note 1: The inscription is applied circumferentially to the cylinder length of at least 1/3 the circumference, while the band - the entire circumference. The height of the letters on the cylinders up more than 12 liters to be 60 mm, and the width of the strip - 25 mm. On cylinders up to 12 L size of the letters and stripes should be determined depending on the lateral surface

of the cylinder.

2 is allowed to paint in gray or yellow color of small cylinders (12 liters) for breathing apparatus and self-rescuers with compressed air.

II. Tank trucks for transportation of liquefied petroleum gas

The outer surface of tank trucks for transportation of liquefied petroleum gas is painted in a light gray color. On both sides of the vessel applied distinctive red stripe width of 200 mm with an inscription in black over it "Propane - flammable". On the rear bottom of the vessel is put a black inscription "flammable".