

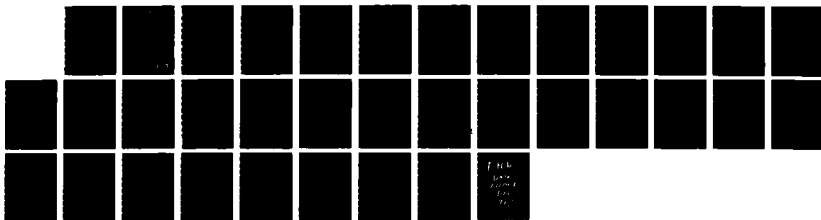
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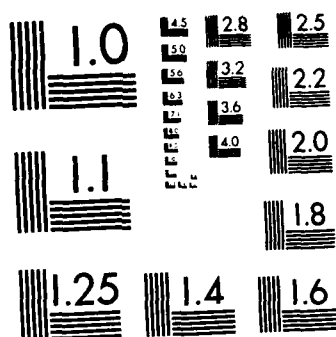
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SOVIET STATE
ERGONOMIC STANDARDS (GOST)

Prepared for

Foreign Science and Technology Center
U. S. Army Human Engineering Laboratory

U. S. Army LABCOM
Contract No. DAAL02-87-P-3314

by

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The Report Store
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910 Massachusetts Street
Lawrence, Kansas 66044

September, 1987

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ERGONOMIC STANDARDS (GOST)

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Abstract

This report identifies ninety-two Soviet standards pertinent to ergonomics. Indexes list the standards by numerical identifier, chronology, industry or commodity, and the type or subject of the standard.

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SOVIET STATE ERGONOMIC STANDARDS (GOST)

This report identifies ninety-two Soviet standards pertinent to ergonomics.

Most Soviet standards are identified by a simple, sequential number assigned at the time the standard is adopted. The sequential number is followed by a two digit year identifier showing the date of the current edition; e.g., GOST 21752-76 "'Man-Machine' System. Handwheels and Control Wheels. General Ergonomic Requirements." The current edition of this standard dates from 1976.

Approximately 20% of the Soviet standards are further grouped into broadly applicable, numbered topical sets--in Soviet parlance, "interbranch systems of standards." As of 1 January 1986, twenty-eight of these interbranch sets were in existence, numbered 1-31 with 5, 10, and 22 missing (see table 1).

Of the "interbranch systems of standards," sets 12, 29 and 30 are of special interest:

- 12 - System of Occupational Safety Standards (SSBT)
- 29 - System of Standards for Ergonomic Requirements and Ergonomic Support (no abbreviation).
- 30 - System of Standards for Ergonomics and Technical Esthetics (SSETE).

Set 12 contains 378 standards. This report includes thirty-six of these Occupational Safety Standards, selected to illustrate pertinence to military systems (see Table 2).

Set 29 currently includes only two standards:

GOST 29.05.002-82, "System of Standards for Ergonomic Requirements and Ergonomic Support. Digital Sign-Synthesizing Indicators. General Ergonomic Requirements"
and
GOST 29.05.006-85, "System of Standards for Ergonomic Requirements and Ergonomic Support. Cathode Ray Tube Monitors. General Ergonomic Requirements" (Supersedes GOST 23144-78).

Notice that 29.05.002-82 is the first edition of that standard, adopted in 1982, while 29.005.006-85 supercedes an earlier standard from 1978.

Only one standard carrying prefix 30.0 is listed in the 1986 GOST index:

GOST 30.001-83 "System of Standards of Ergonomics and Technical Esthetics. General Considerations."

Presumably sets 29 and 30 will grow as the system of ergonomics standards is extended. As in the case of 29.005.006-85, we can expect the mandatory reviews of earlier standards to result in the migration of some standards from the earlier sequential series into these "interbranch" classes.

In the GOST index, all standards are divided into commodity groups designated by letters; e.g., group A "Mining, Minerals and Fossil Fuels" and group L "Chemical Products and Rubber and Asbestos Goods." The groups are divided into numbered subgroups, e.g., L00 "Terms and Designations" and L6 "Rubber and Asbestos." Within subgroups there are further divisions, e.g., L62 "Tires."

Ergonomics standards with broad application are included in sub-subgroup T58 "System of Standards on Environmental Protection and Improved Use of Natural Resources, Occupational Safety and Scientific Organization of Labor." T58 is a division of subgroup T5 "System of Documentation," within group T "General Technical and Organizational-Methodological Standards."

Group T58 includes all but forty of the 378 standards from set 12, all of sets 29 and 30 and fifty-two of the earlier, sequentially numbered standards. T58 also includes forty-nine of the sixty-one environmental protection standards from "interbranch" set 17, but those have not been included in this report.

We have identified at least one ergonomics standard not indexed in group T58, i.e., GOST 16035-81 "Ergonomic Indicators of Product Quality, Terms, Definitions, Classifications and Nomenclature" (supercedes GOST 16035-70 and 16456-70). This standard was found indexed in group T51 "System of Documentation Reflecting Quality, Reliability, and Service Life Indicators of Performance." Presumably other standards pertinent to ergonomics may be identified by a complete reading of the entire GOST index structure, but such a detailed reading is beyond the scope of this project.

Furthermore, in the Soviet GOST system individual standards cite other standards as applicable. A thorough understanding of the current state of ergonomics application to particular industries and commodities will require reviewing the text of specific industry standards to identify which of the existing ergonomics standards are cited as applicable. Such a complete survey was not performed for this project.

Some of the sequentially numbered standards from group T58 may or may not have any ergonomic content, e.g., 17216-71 "Industrial Purity." Only an examination of the standard itself would determine whether or not it is pertinent to human factors issues, so these few borderline standards have been included in this report.

Most of the earlier sequentially numbered standards in group T58 are in two related collections. One collection is identified as "Man-Machine Systems," and the other collection is identified as "Systems of Automated Design." All of the Man-Machine collection are clearly ergonomic standards. Some of the Systems of Automated Design collection probably have human factors content, e.g., 23501.16-81 "Systems of Automated Design, Dialog Devices, General Requirements." The entire collection on Systems of Automated Design has been included here to give a complete picture of the Soviet approach to standardizing automated design systems.

Soviet State standards carry the following caveats: "Official Publication" and "Reproduction Prohibited." Most standards carry the notation "Failure to Comply with the Standard is an Offense under the Law." However, a certain number of standards are advisory rather than mandatory ("rekomentatel'nye GOSTy"). Preliminary indications are that many of the ergonomic standards are advisory standards.

Table 2 ERGONOMICS STANDARDS AND SELECTED SAFETY STANDARDS lists the full title of each of the ninety-two standards identified in this survey. The table is ordered just as the GOST Index is ordered, by sequential numerical identifier.

Three indexes have been constructed for this report: a chronological index, an index by industry or commodity to which the standard applies, and an index by the type of standard, i.e., the design issues, methods, specific objects or purpose covered.

DEVELOPMENT OF SOVIET STANDARDS

The State Committee of the USSR Council of Ministers for Standards (in short, "Gosstandart") is the national organ of state administration overseeing the standardization effort. The organizations reporting to "Gosstandart" and entrusted with responsibilities for processing and evaluating draft standards are research institutes and their branches, design offices, and testing and experimental facilities.

With minor exceptions, the exclusive authority to adopt standards is vested in "Gosstandart," regardless of the organizational affiliation of the unit developing the standard and submitting it for adoption. Compliance with the standards in effect is enforced by 244 territorial inspectorates of "Gosstandart."

A minor but potentially important exception is made for the USSR Committee for Construction, or "Gosstroy." "Gosstroy" is authorized to adopt standards on its own, but only within its sphere of responsibility. Some human factors standards may fall within the jurisdiction of "Gosstroy."

Standards are developed and submitted for evaluation to the research institutes of "Gosstandart" and for subsequent adoption to the committee by the so-called "leading" ("golovnye") and "basic" ("bazovye") organizations. Typically, these are research institutes and centers reporting to ministries responsible for particular economic sectors (e.g., the Ministry of Communications).

Two major organizations are responsible for ergonomics and would draft and review human engineering standards. The Academy of Sciences Institute of Psychology in Moscow, headed by Boris Lomov, is the lead organization for human factors research. VNIITE, All-Union Research Institute for Technical Aesthetics (alternately translated as All-Union Research Institute of Industrial Design), in Moscow coordinates applications of ergonomics in Soviet industries. Vladimir Munipov, Deputy Director of VNIITE, is in effect the coordinator of applications research. Munipov is also the principal coordinator for ergonomic research in all socialist countries.

For a more detailed description of the process by which Soviet state standards are developed see the companion report: "Development of Soviet State Ergonomic Standards (GOST)" by Noemi S. Galton and Bernard O. Williams, August, 1987, prepared for US Army HEL FSTC under US Army LABCOR contract DAAL02-87-P-3303.

STANDARDS APPLICATION WITH THE MILITARY

With rare exception, all "civilian" industries of the Soviet Union contribute to both the civilian economy and the military sector. This is also the case with the "open," non-secret enterprises furnishing equipment, assemblies and materials to both civilian and military enterprises.

A special division of the State Committee for Standardization is charged with advocating the interests of the military in the process of standardization. This division ("General Technology Department") verifies whether consultations and coordination with the military organizations involved have been adequately comprehensive. The General Technology Department reviews standards prior to their adoption by the State Committee for Standardization. (This was the procedure in the late 1970s; most likely, this is still the case).

In the late 1970's, standards coordinated with one or more military units were required to carry special designation when subsequently approved and published. Following the words "Official Publication" on the first page of the GOST, one or more asterisks appeared. The number of the asterisks corresponded to the number of military organizations (units, R & D facilities, industrial sectors, etc.) interested in a given standard.

It is impossible to tell from the asterisks which branch or service of the armed forces was involved, as the asterisks were the same for all of them. However, the subject matter of the standard in question offers clues (e.g., the Air Force or the Army are less likely to be interested in "Main Power Plants of Seagoing Craft" than the Navy). Copies of standards currently in effect would have to be examined to ascertain that the "asterisk" feature is current and to make use of it in further research.

Anthony Cacioppo has noted that the head design engineer has complete power to follow or ignore GOST standards in the development of specifically military systems, but pertinent GOST standards are usually followed in military systems. (See Cacioppo's keynote address, Proceedings of the Human Factors Society, 1986.)

Table 1.

SOVIET "INTERBRANCH SYSTEMS" OF STANDARDS

-
- 1 - State System of Standardization (GSS).
 - 2 - Unified System of Design Documentation (ESKD).
 - 3 - Unified System of Technological Documentation (ESTD).
 - 4 - System of Product Quality Indicators (SPKP).
 - 6 - Unified Systems of Documentation (USD).
 - 7 - System of Information and Bibliographic Documentation (no abbreviation).
 - 8 - State System of Measurement Unification (GSI).
 - 9 - Unified System of Prevention of Corrosion and Aging of Materials and Products (ESZKS).
 - 11 - Applied Statistics (no abbreviation).
 - 12 - System of Occupational Safety Standards (SSBT).
 - 13 - Microfilming (no abbreviation).
 - 14 - Unified System of Technological Production Support (ESTPP).
 - 15 - Development and Start-up of Production (no abbreviation).
 - 16 - Control of Technological Processes (no abbreviation).
 - 17 - System of Standards on Environmental Protection and Improved Use of Natural Resources (no abbreviation).
 - 18 - Quantitative Methods of Optimizing the Parameters of Standardization Subjects (no abbreviation).
 - 19 - Unified System of Programming Documentation (ESPD).
 - 20 - Unified System of State Control of the Quality of Production (no abbreviation).
 - 21 - System of Design Documentation for Construction (SPDS).
 - 23 - Assurance of Product Resistance to Wear (no abbreviation).
 - 24 - Unified System of Standards for Automated Control Systems (no abbreviation).
 - 25 - Strength Calculations and Tests in Machine Building (no abbreviation).
 - 26 - Unified System of Standards for Instrument Engineering (ESSP).
 - 27 - System of Standards "Reliability of Equipment" (SSNT).
 - 28 - System of Technical Service and Repairs of Equipment (no abbreviation).
 - 29 - System of Standards for Ergonomic Requirements and Ergonomic Support (no abbreviation).
 - 30 - System of Standards for Ergonomics and Technical Esthetics (SSETE).
 - 31 - System of Standards for Technological Rigging (no abbreviation).
-

Source: Gosudarstvennye standarty SSSR. Ukazatel' 1986.

Moscow, 1986 p. 8.

Notes: Abbreviations of Russian "system" (class) titles are quoted where officially designated.

The official Soviet list makes no mention of class 5, 10 and 22 standards.

Table 2.

ERGONOMICS STANDARDS AND SELECTED SAFETY STANDARDS

Designation	Title
12.0.003-74	Dangerous and Harmful Production Factors. Classification. (Duplicates COMECON standard 790-77)
12.1.001-83	Ultrasound. General Safety Requirements. (Duplicates COMECON standard 4361-83; Supersedes GOST 12.1.001-75)
12.1.002-84	Electric Fields of Industrial Frequencies. Admissible Intensity Levels and Requirements for Control at Work Stations. (Supersedes GOST 12.1.002-75)
12.1.003-83	Noise. General Safety Requirements. (Supersedes GOST 12.1.003-76)
12.1.006-84	Electromagnetic Fields of Radio Frequencies. Admissible Levels at Work Stations and Requirements for Control. (Supersedes GOST 12.1.006-76)
12.1.008-76	Biological Safety. General Requirements.
12.1.010-76	Explosion Protection. General Requirements. (Duplicates COMECON standard 3517-81)
12.1.020-79	Noise. Methods of Control on Seagoing and River Craft.
12.1.031-81	Lasers. Methods of Dosimetric Control of Laser Radiation.
12.1.037-82	Checks of Fitness for Duty of the Flying and Air Traffic Control Personnel. Methods for Evaluating the Hearing Function.
12.1.040-83	Laser Safety. General Considerations.
12.1.043-84	Vibration. Methods of Measurement at Work Stations in Production Facilities.
12.2.007.2-75	Power Transformers and Electric Reactors. Safety Requirements.
12.2.021-76	Explosion-Proof Electrical Equipment. Procedures for Coordinating Technical Documentation, Conducting Tests and Issuing Protocols and Certificates.
12.2.023-76	Cabin. Work Station of the Driver. Positioning of Controls in Trucks, Buses and Trolleybuses. Main Sizes and Technical Requirements. (Supersedes GOST 9734-61, GOST 12024-66)
12.2.032-78	Work Station for Work in a Sitting Position. General Ergonomic requirements.
12.2.033-78	Work Station for Work in a Standing Position. General Ergonomic Requirements.

- 12.2.035-78 Equipment for Divers and Support Means for Underwater Dives and Work. General Safety Requirements.
- 12.2.050-80 Seagoing Craft. General Safety Requirements.
- 12.2.098-84 Soundproof Cubicles. General Requirements.
- 12.2.101-84 Pneumatic Drives. General Safety Requirements for Design. (Duplicates COMECON standard 3274-81; Supercedes chapter 1 of GOST 12.2.001-73)
- 12.2.103-84 Technological Radiation Devices with Radionuclide Sources of Gamma Radiation. General Safety Requirements and Methods of Control.
- 12.3.012-77 Underwater Operations. General Safety Requirements.
- 12.3.021-80 Loading and Unloading in Ports. Safety Requirements.
- 12.3.029-82 Loading and Unloading at Sea. Safety Requirements. (Duplicates COMECON standard 3083-81)
- 12.4.012-83 Vibration. Means of Measurement and Control at Work Stations. Technical Requirements. (Supercedes GOST 12.4.012-75)
- 12.4.030-77 Special Clothing for Protection Against Water and Solutions of Surfactants. Technical Requirements. (Supercedes GOST 9773-61)
- 12.4.031-84 Means of Individual Protection. Determination of Grade. (Supercedes GOST 12.4.031-77)
- 12.4.034-85 Means of Individual Protection of Respiratory Organs. Classification and Markings. (Duplicates COMECON standard 4565-84; Supercedes GOST 12.4.034-78)
- 12.4.051-78 Means of Individual Protection of Hearing. General Technical Requirements. (Supercedes GOST 15762-70)
- 12.4.061-79 Methods for Determination of Human Ability to Work in Individual Means of Protection.
- 12.4.066-79 Means of Protecting Hands from Radioactive Substances. General Requirements and Instructions for Use.
- 12.4.067-79 Methods for Determining the Heat Content of a Human wearing Individual Protective Means.
- 12.4.068-79 Means of Individual Protection of Skin. Classification and General Requirements. (Duplicates COMECON standard 3954-82)
- 12.4.078-79 Materials for Individual Means of Protection. Methods for Determining Suitability for Decontamination.
- 12.4.094-80 Vibration. Dynamic Characteristics of the Human Body Impacted by Vibration. Methods of Determination. (Duplicates COMECON standard 3075-81; Supercedes GOST 17407-81)

- 29.05.002-82 System of Standards for Ergonomic Requirements and Ergonomic Support. Digital Sign-synthesizing Indicators. General Ergonomic Requirements.
- 29.05.006-85 System of Standards for Ergonomic Requirements and Ergonomic Support. Cathode Ray Tube Monitors. General Ergonomic Requirements. (Supersedes GOST 23144-78)
- 30.001-83 System of Standards of Ergonomics and Technical Esthetics. General Considerations.
- 16035-81 Ergonomic Indicators of Product Quality. Terms, Definitions, Classifications, and Nomenclature. (Supersedes GOST 16035-70 & 16456-70)
- 17216-71 Industrial Purity. Classes of Purity for Liquids.
- 17433-80 Industrial Purity. Compressed Air. Classes of Pollution. (Duplicates COMECON standard 1704-79; Supersedes GOST 17433-72)
- 21480-76 "Man-Machine" System. Mnemonic Panels. General Ergonomic Requirements.
- 21752-76 "Man-Machine" System. Handwheels and Control Wheels. General Ergonomic Requirements.
- 21753-76 "Man-Machine" System. Control Levers. General Ergonomic Requirements.
- 21786-76 "Man-machine" System. Audible Communication of Non-verbal Messages. General Ergonomic Requirements.
- 21829-76 "Man-Machine" System. Encoding of Visual Information. General Ergonomic Requirements.
- 21837-76 "Man-Machine" System. Multiple User Displays Consisting of Digital Sign-Synthesizing Luminescent Indicators. General Ergonomic Requirements.
- 21889-76 "Man-Machine" System. Chair of Human Operator. General Ergonomic Requirements.
- 21958-76 "Man-Machine" System. Operator Hall and Cubicles. Mutual Positioning of Work Stations. General Ergonomic Requirements.
- 22269-76 "Man-Machine" System. Work Station of the Operator. Mutual Positioning of the Elements of the Work Station. General Ergonomic Requirements.
- 22613-77 "Man-Machine" System. Dial Switches. General Ergonomic Requirements.
- 22614-77 "Man-Machine" System. Key and Push-Button Switches. General Ergonomic Requirements.
- 22615-77 "Man-Machine" System. Toggle Switches. General Ergonomic Requirements.
- 22902-78 "Man-Machine" System. Read-out Devices of Visual Indicators. General Ergonomic Requirements.
- 22973-78 "Man-Machine" System. General Ergonomic Requirements. Classification.
- 23000-78 "Man-Machine" System. Control Consoles. General Ergonomic Requirements.

23501.0-79	Systems of Automated Design. General Considerations.
23501.1-79	Systems of Automated Design. Stages of Development.
23501.2-79	Systems of Automated Design. Preparation, Coordination and Endorsement of Technical Specifications.
23501.3-79	Systems of Automated Design. Preparation, Coordination and Endorsement of Technical Proposals.
23501.4-79	Systems of Automated Design. General Requirements for Program Support.
23501.5-80	Systems of Automated Design. Conceptual Design.
23501.7-80	Systems of Automated Design. Pre-draft Research.
23501.9-80	Systems of Automated Design. General Requirements for Automated Data Banks.
23501.10-81	Systems of Automated Design. Types and Completeness of Documents.
23501.11-81	Systems of Automated Design. Contractor Design.
23501.12-81	Systems of Automated Design. Organization of Creation and Development.
23501.13-81	Systems of Automated Design. Monitoring System. General Considerations.
23501.14-81	Systems of Automated Design. Production, Adjustment and Tests.
23501.15-81	Systems of Automated Design. Start-up.
23501.16-81	Systems of Automated Design. Dialog Devices. General Requirements.
23501.17-82	Systems of Automated Design. General Requirements for Technical Support.
23501.001-83	Systems of Automated Design. Classification and Designation of Standards.
23501.106-85	Systems of Automated Design. Detail Design. (Supersedes GOST 23501.6-80)
23501.108-85	Systems of Automated Design. Classification and Designations. (Supersedes GOST 23501.8-80)
23501.118-83	Systems of Automated Design. Components of Methodological Support. Requirements for the Content of Documents.
23501.119-83	Systems of Automated Design. Systems of Means. Procedures for Development and Documentation.
23501.201-85	Systems of Automated Design. Systems of Means. General Technical Requirements.
23501.601-83	Systems of Automated Design. Assuring Adaptability to Manufacture. Standard Mathematical Models.
23501.602-83	Systems of Automated Design. Guidelines for Developing and Using Standard Mathematical Models and Designing Technological Processes.

- 23501.603-84 Systems of Automated Design. Preparation of Control Programs for Equipment with Program Numerical Control. General Considerations.
- 23501.604-84 Systems of Automated Design. Preparation of Control Programs for Equipment with Program Numerical Control. Guidelines for Developing a Postprocessor.
- 23501.605-84 Systems of Automated Design. Guidelines for Developing and Using Standard Mathematical Models for Selecting Technological Equipment.
- 24484-80 Industrial Purity. Compressed Air. Methods for Measuring Impurities. (Duplicates COMECON standard 1705-79)
- 24869-81 Systems of Standards for Industrial Purity in Machine Building and Instrument Engineering. General Considerations.
- 25166-82 Equipment for the Pulp and Paper Industry. Safety Requirements. (Duplicates COMECON standard 1854-79)
- 25571-82 Vibration. General Considerations for Methods of Calculating Vibration Isolation for the Work Station of Operators of Self-propelled Vehicles. (Supersedes GOST 12.4.025-76)
- 25791-83 Self-propelled Agricultural Tractors and Machinery. Methods for Determining the Reference Point for the Operator's Seat.
- 26143-84 Vibration. Rolling Stock of Municipal Electric Transportation. Vibration Norms.
- 26336-84 Tractors and Agricultural Machinery. System of Symbols Denoting the Control Organs and Means of Displaying Information. General Symbols. (Duplicates COMECON standard 4462-83)
- 26563-85 Vibration. Technological Equipment of the Pulp and Paper Industry. Methods and Means of Protection.
-

SOVIET ERGONOMIC STANDARDS
CHRONOLOGICAL INDEX

Only the first sentence of each title is given in this index unless further information is necessary to specify the subject. See Table 2 ERGONOMICS STANDARDS AND SELECTED SAFETY STANDARDS for the complete title of each standard.

Notes identifying identical COMECON standards are included with these index listings.

Standards are listed in chronological order by year groupings. Within each year the "interbranch standards" with the decimal series are listed first (i.e., Safety standards in the 12.0 series and Ergonomics standards in the 29.0 and 30.0 series), followed by the remaining standards with sequential serial numbers. These serial numbers indicate the order in which the standards were originally adopted.

Notes identifying GOST standards superceded by the current standards are included in the listings. These supercession notes give further information about the history of a given standard.

Many standards supercede an earlier edition with the same sequential number; e.g., 17433-80 supersedes GOST 17433-72, and 12.1.001-83 supercedes GOST 12.1.001-75.

Some standards supercede earlier ones with a different number; e.g., 29.05.006-85 supersedes GOST 23144-78, and 25571-82 supersedes GOST 12.4.025-76.

Some standards supercede more than one earlier standard; e.g., 16035-81 supercedes GOST 16035-70 and 16456-70.

Some supercede only part of an earlier standard; e.g., 12.2.101-84 supercedes chapter 1 of GOST 12.2.001-73.

SOVIET ERGONOMIC STANDARDS
CHRONOLOGICAL INDEX

17216-71	Industrial Purity.
12.0.003-74	Dangerous and Harmful Production Factors. (Duplicates COMECON standard 790-77)
12.2.007.2-75	Power Transformers and Electric Reactors.
12.1.008-76	Biological Safety.
12.1.010-76	Explosion Protection. (Duplicates COMECON standard 3517-81)
12.2.021-76	Explosion-Proof Electrical Equipment.
12.2.023-76	Cabin. Work Station of the Driver. (Supercedes GOST 9734-61, GOST 12024-66)
21480-76	"Man-Machine" System. Mnemonic Panels.
21752-76	"Man-Machine" System. Handwheels and Control Wheels.
21753-76	"Man-Machine" System. Control Levers.
21786-76	"Man-machine" System. Audible Communication of Non-verbal Messages.
21829-76	"Man-Machine" System. Encoding of Visual Information.
21837-76	"Man-Machine" System. Multiple User Displays Consisting of Digital Sign-Synthesizing Luminescent Indicators.
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Standards are listed in this index by industries and objects to which they apply. In some cases, e.g., Biological Safety or Explosion Protection, the subject listing is a field or range of application rather than a commodity or industry.

Some standards are listed under more than one subject and some subjects are represented under several alternative terms.

See Table 2 ERGONOMICS STANDARDS AND SELECTED SAFETY STANDARDS for the complete listing for each standard.

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Standards are listed in this index by the design issues, methods, specific objects or purpose covered, e.g., Electromagnetic Fields, Documentation for Design Systems, Protective Clothing, etc.

Some standards are listed more than once under alternative phrases; e.g., Testing Methods, Work Capability; and Work Capability with Protective Devices.

See Table 2 ERGONOMICS STANDARDS AND SELECTED SAFETY STANDARDS for the complete title of each standard.

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