

Metrology, standardization and certification

Theme 1: Fundamentals of metrology, standardization and certification

Lecture plan:

1. The concept of the quality of products, works and services.
2. Bases of Metrology.
3. Bases of standardization.
4. Bases of certification.

The concept of the quality of products, works and services

The **quality of an object** can be determined by comparing a set of inherent characteristics against a set of requirements. If those characteristics meet all requirements, high or excellent quality is achieved but if those characteristics do not meet all requirements, a low or poor level of quality is achieved. So the quality of an object depends on a set of characteristics and a set of requirements and how well the former complies with the latter.

Standardization *normalizes* of the quality; **metrology** *controls* quality;
Certification *guarantees* the quality of products, works and services

Bases of Metrology

Metrology - the science about measurements, methods and means to ensure their unity and ways to achieve the required accuracy.

Measurement is a process that is used to determine a value. In most cases this value will be a quantity.



Measurements in modern society are the basis of science and technology, are of paramount importance to take account of material resources and planning for domestic and foreign trade, to ensure product quality, interchangeability of units and parts and to improve technology, to ensure safety and other human activities.

To ensure scientific and technical progress, metrology should ahead of other fields of science and technology in its development, because for each of these precise measurements are one of the main ways to improve them

Objectives of metrology

1. Establishment of units of physical quantities, state gauges and exemplary measuring apparatuses or instruments
2. Development of the theory, methods and means of measurement and control
3. Ensuring the sameness (uniformity) of measurements
4. Development of assessment methods of errors, the state of measuring instruments and control devices
5. Development of the transmission methods of of the size units of measurement standards and exemplary measuring apparatuses to working measuring instruments

Sections of metrology

- Theoretical metrology
- Legal metrology
- Practical (applied) metrology

Theoretical Metrology develops fundamentals of metrology, based on research

Legal metrology is developing mandatory requirements for the application of physical quantities, measurement standards, measurement methods and tools

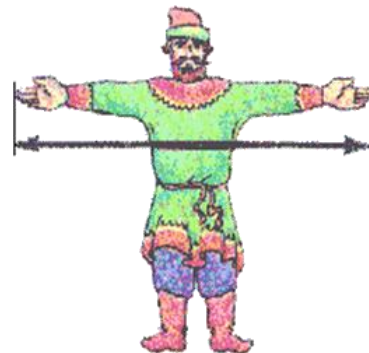
Practical metrology decide on the application in practice of theoretical developments of metrology and legal metrology regulations

A brief history of the development of metrology

The need for measurements arose from ancient times. At the initial stage of human development as the measures used by the means at hand. Many measures were anthropometric origin.

For example: the unit of measurement of weight of precious stones - carat (0.2 g), means "the seed of the bean", "pea". The unit of apothecary weight - "grain."

In Russia, used in everyday *vershok* - length of the phalange of index finger. *Elbow* - the distance from the elbow to the tip of the middle finger. *Sazhen* - distance between the tips of the middle fingers, diluted in side arms



A brief history of the development of metrology

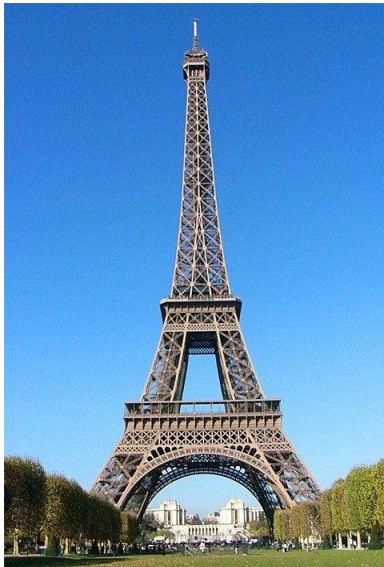
The first documents from Mesopotamia and Egypt stated that the length of the measurement system based on the foot, equal to 300 mm (in the construction of the pyramids).

In Rome foot equaled 297.1734 mm; in England - 304.799978 mm



A brief history of the development of metrology

The idea of building a measurement system based on the decimal owned by the French astronomer and mathematician Gabriel Mouton, who lived in the XVII century. It was later invited to take the unit of length one of forty million part of the earth's meridian. On the basis of a single unit - meters - the whole system was built, called the **metric**



Bases of standardization

Standardization - an activity to establish rules and characteristics for their voluntary and repeated use, aimed at the achievement of order in the sphere of production and circulation, and enhance the competitiveness of products, works and services

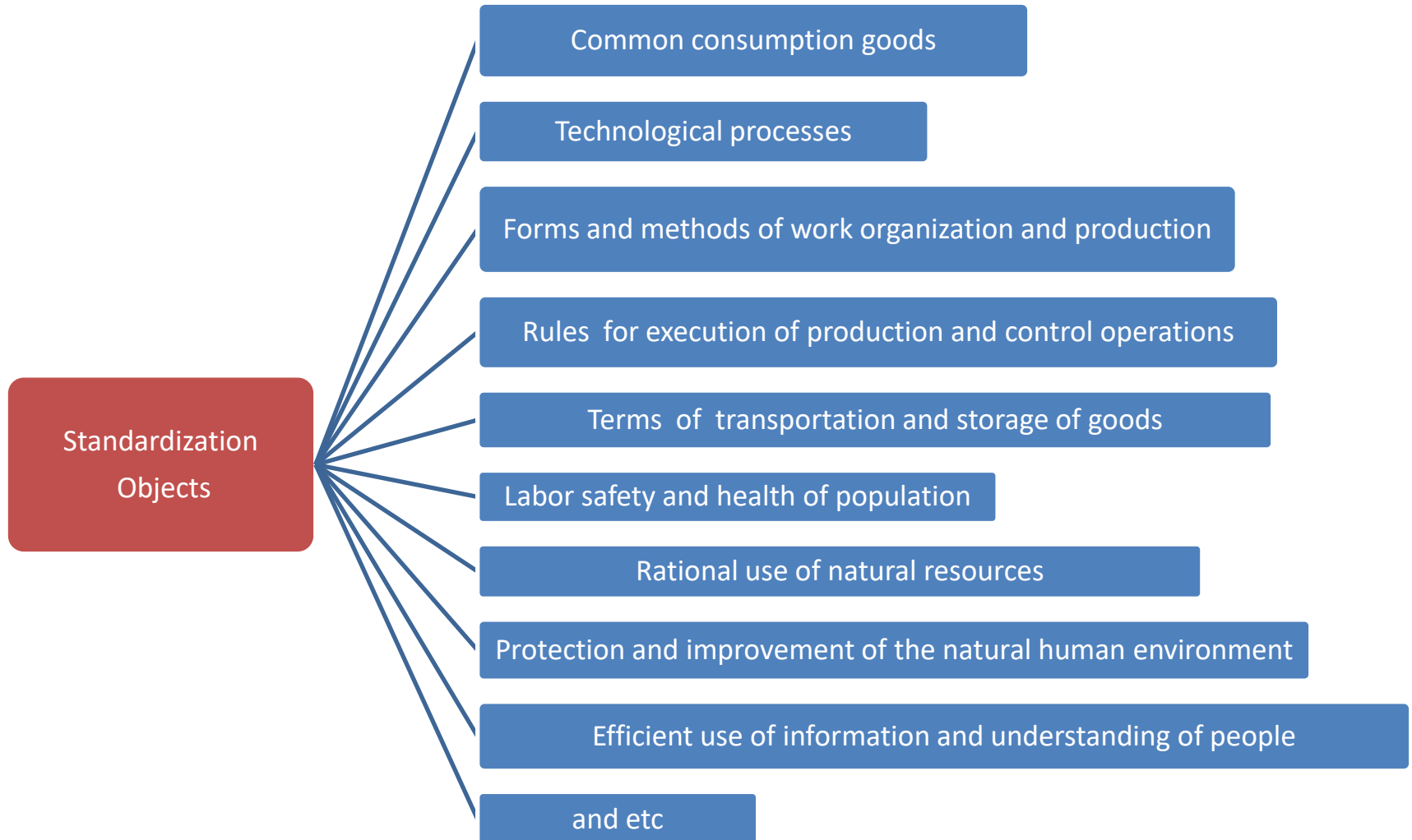
Standardization should be regarded as a *practical activity as management* and as a *science*.

Standardization as a practical activity is to establish regulations on standardization and application of rules, regulations and requirements, providing an optimal solution repetitive tasks in the areas of social production and social life

Standardization as a practice management system is carried out in the Russian Federation on the basis of the State standardization system, a system of planned management practice standardization activities. It is based on a set of normative and technical documents establishing interrelated demands on the organization and method of implementation of practical work on standardization

Standardization as a science about the methods and means of standardization identifies, summarizes and formulates the laws on standardization activities in general and its individual areas. Development of standardization as a science helps to improve the system of organization of these activities and contributes to the improvement of practical work in this field.

Standardization objects



Objectives of standardization

- increase the level of safety of life and health of citizens, property of individuals and legal entities, state or municipal property, environmental safety, animal and plant life and health safety and facilitating compliance with the requirements of technical regulations
- improve safety facilities, taking into account the risk of emergency situations of natural and technogenic character
- providing scientific and technical progress
- improving the competitiveness of products, works and services
- rational use of resources
- technical and information compatibility
- comparability of results of researches (tests) and measurements, technical, economic and statistical data
- interchangeability of products

Types of standards

- Regulation
- Interstate standards (GOST)
- State Standard of the Russian Federation (GOST R)
- Branch standard
- The enterprise standard
- Standards of scientific, technical and engineering societies
- Technical conditions
- Rules
- Recommendations

State Standardization System

State Administration of Standardization in the Russian Federation provides the State Committee of the Russian Federation for Standardization and Metrology (Gosstandart of Russia). Works on standardization in the field of construction organized by the State Committee for Housing and Construction Policy (Gostroy of Russia)



Gosstandart of Russia



Gosstroy of Russia

State Standardization System

State Standardization Committee shall function through the organs created by it. Territorial bodies of the State Standard are centers of standardization and Metrology (CSM), which is in Russia for more than 100 (for example, in Moscow, St. Petersburg, Tomsk, Novosibirsk, Irkutsk and others economically developed areas). By Russian standards services include research institutes of Russian State Standard (20 institutions) and the Technical Committees for standardization

For research institutes State Standard include:

VNIStandart - the leading institute in the field of State Standardization System.

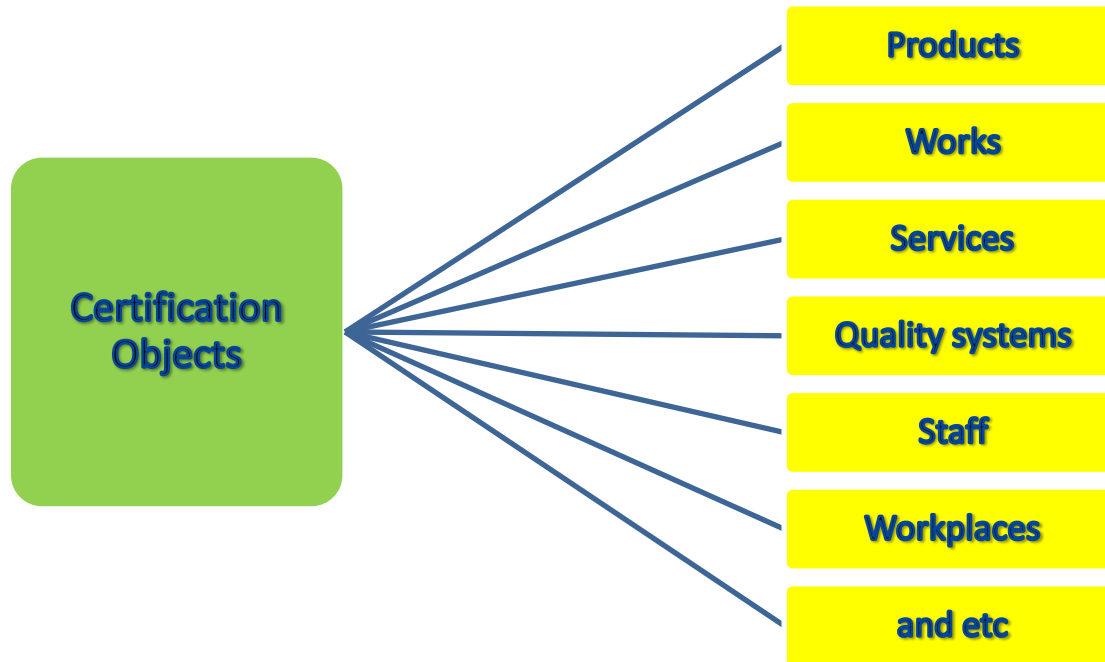
VNIIC - the leading institute in the field of certification of products, works and services.

VNIINMASH - the leading institute in the field of development of scientific bases of unification and aggregation in mechanical engineering and instrument making.

VNIKI - the leading institute in the field of comprehensive information on standardization and quality (design and development of a unified system of classification and coding of technical and economic information)

Bases of certification

Certification is a form of acknowledgment of conformity of objects to the requirements of technical regulations, provisions of standards or conditions of contracts carried out by the certification body.



Objectives of certification

- confirmation of compliance of products, processes of production, operation, storage, transportation, marketing and utilization, works, services or other objects to technical regulations, standards, terms of contracts
- safety control products for the environment, life, health and property
- assist customers in competent choice of products, works and services in domestic and international markets
- creating conditions for the free movement of goods through the territory of the state, as well as for the implementation of international economic, scientific and technical cooperation and international trade

The participants of the certification process

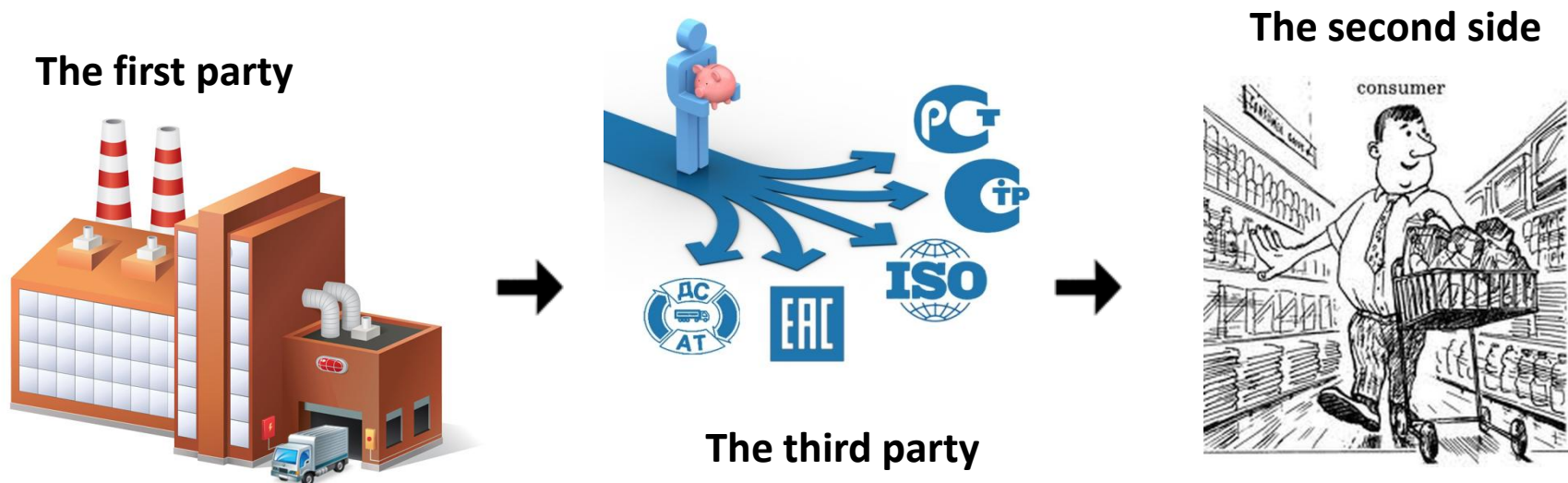
The certification of products, works and services and other objects have 3 sides.

The first party - the manufacturer or seller.

The second side - the consumer or buyer.

The third party - a person or body is recognized like an independent from the parties involved in the matter

The applicant shall submit an application to the certification body, where the identification of product and assessment of conformity are performed and if a positive decision is issued a certificate of conformity



Certification types

- mandatory certification(MC)
- voluntary certification (VC)
 1. ISO Guide 35:2006 Reference materials — General and statistical principles for certification
 2. ISO Guide 34:2009 General requirements for the competence of reference material producers
 3. ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories
 4. ISO/IEC Guide 99:2007 International vocabulary of metrology — Basic and general concepts and associated terms (VIM)

The certification tests are included the justification of the chosen method (scheme) of certification analysis; the information on the certification programme and/or procedure; on the development and certification of measurement procedures; obtained results of certification measurements or the values of calculation data and their evaluation.

Special features of the mandatory (MC) and voluntary certification (VC)

The purpose of the performing.

MC: security and environmental goods.

VC: ensuring the competitiveness of the commodity, product advertising that it meets not only the security, but also increased quality.

Grounds for certification.

MC: the laws of the state.

VC: on the initiative of individuals or legal entities on contractual terms between the applicant and the body VC (DC allowed).

The object of certification.

MC: lists of goods and services approved by the government.

VC: any objects to the applicant's discretion.

The essence of the conformity assessment.

MC: assessment of compliance with mandatory requirements stipulated by applicable law.

VC: conformity assessment of the applicant's requirements, consistent with the Standards Department as additional requirements for the mandatory.

Regulatory certification database.

MC: state standards, technical regulations, sanitary norms and rules, ie, approved by the state standard documents establishing mandatory requirements for the product.

VC: standards of all categories, including foreign and recognized national standard, proposed by the applicant

Zertifikat

mdc medical device certification GmbH
bescheinigt hiermit, dass das Unternehmen



RC ART Ltd.
15, Postovskogo str.
620146 Ekaterinburg
Russland

im Geltungsbereich

Entwicklung, Herstellung und Vertrieb von Reizstromgeräten
ein

Qualitätsmanagementsystem

eingeführt hat und anwendet.

Ein Audit von mdc hat den Nachweis erbracht,
dass dieses Qualitätsmanagementsystem
die Forderungen der folgenden Norm erfüllt:

EN ISO 13485

Medizinprodukte – Qualitätsmanagementsysteme –
Anforderungen für regulatorische Zwecke
(ISO 13485:2003)

Dieses Zertifikat ist gültig bis: 2013-10-13
Zertifikat-Registrier-Nr.: 4116.48.01/0
Stuttgart, den 2008-10-13

Leiter
Zertifizierungsstelle



mdc medical device certification GmbH
Kriegerstraße 6
D-70191 Stuttgart, Germany
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Fax: +49-(0)711-253597-10
Internet: <http://www.mdc-ce.de>



COPY

CERTIFICATE

The TÜV CERT Certification Body
for QM-Systems
of RWTÜV Systems GmbH

hereby certifies in accordance with TÜV CERT
procedure that

RENOLIT AG

67547 Worms / Germany

has established and applies a quality system for

Worms Plant
with development, manufacture and sale

An audit was performed, Report No. 20548874

Proof has been furnished that the requirements according to

DIN EN ISO 9001 : 2000

are fulfilled. The certificate is valid until **October 2005**

Certificate Registration No. **041006183**

The company has been certified since **1996**



Essen, 02.12.2002



The TÜV CERT Certification Body for QM systems
of RWTÜV Systems GmbH

СИСТЕМА СЕРТИФИКАЦИИ ГОСТ Р
ГОССТАНДАРТ РОССИИ



СЕРТИФИКАТ СООТВЕТСТВИЯ

№ РОСС RU.МЕ04.Н00135

Срок действия с 30.08.2007 по 30.08.2010

0748575

ОРГАН ПО СЕРТИФИКАЦИИ РОСС RU.0001.11МЕ04
ОРГАН ПО СЕРТИФИКАЦИИ ЭЛЕКТРОТЕХНИЧЕСКИХ ИЗДЕЛИЙ
ООО «НАУЧНО-ТЕХНИЧЕСКИЙ ЦЕНТР СЕРТИФИКАЦИИ ЭЛЕКТРОТЕХНИЧЕСКИХ ИЗДЕЛИЙ ДЛЯ
БЫТОВЫХ ЭЛЕКТРОПРИБОРОВ И АППАРАТУРЫ»
123007, г. Москва, ул. Шенюгина, д. 4, тел. (495) 259-8442, тел./факс (495) 259-8651

ПРОДУКЦИЯ

Трубы гибкие гофрированные из электроизоляционного материала для электромонтажных работ (см. приложение на 1 листе, бланк № 1559555)
ТУ 3491-010-47022248-2003 Серийный выпуск

код ОК 005 (ОКП):
34 9145

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ НОРМАТИВНЫХ ДОКУМЕНТОВ
ТУ 3491-010-47022248-2003 (пп. 2.1, 2.2, 2.3)

код ТН ВЭД:
3917 32 990 9

ИЗГОТОВИТЕЛЬ

ЗАО «Диэлектрические Кабельные Системы», ИНН 6905062011
170017, г. Тверь, Большие Перемерки, ул. Бочкина, 15

СЕРТИФИКАТ ВЫДАН

ЗАО «Диэлектрические Кабельные Системы»
170017, г. Тверь, Большие Перемерки, ул. Бочкина, 15
Тел. (4822) 48-08-81, факс (4822) 48-08-84

НА ОСНОВАНИИ

Протокол испытаний ИЛ ЭИ ООО НТЦС «БЭТИ» № 267-08 от 27.08.2007 г.
Рез. № РОСС RU.0001.21МЕ72 от 04.04.2005 г., до 04.04.2008 г.
Санитарно-эпидемиологическое заключение № 77.01.03.349.П.038465.05.07 от 28.05.2007 г., выдано
Управлением ФС по надзору в сфере защиты прав потребителей и благополучия человека по г. Москве
Сертификат пожарной безопасности № ССПБ.RU.ОП019.В01528 от 13.10.2006 г.,
выдан ОС «ПОЖПОЛИСЕРТ» АНОС «Электросерв» (рез. № ССПБ.RU.ОП.019 от 31.05.2004)

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

Схема сертификации – 3



Руководитель органа

Эксперт

(Signature)
подпись

И.А. Бондарев

Н.А. Бероева

Сертификат не применяется при обязательной сертификации

СИСТЕМА СЕРТИФИКАЦИИ ГОСТ Р
ГОССТАНДАРТ РОССИИ

1559555

ПРИЛОЖЕНИЕ

К сертификату соответствия № РОСС RU.МЕ04.Н00135

Перечень конкретной продукции, на которую распространяется действие сертификата соответствия

код ОК 005 (ОКП)	Наименование и обозначение продукции, ее изготовитель	Обозначение документации, по которой выпускается продукция
код ТН ВЭД СНГ		
34 9145	Трубы гибкие гофрированные из электроизоляционного материала для электромонтажных работ типов:	ТУ 3491-010-47022248-2003
3917 32 990 9	ТТТ/ПП Л 0(1) 16/10,7 IP55 УХЛ2; ТТТ/ПП Л 0(1) 20/14,1 IP55 УХЛ2; ТТТ/ПП Л 0(1) 25/18,3 IP55 УХЛ2; ТТТ/ПП Л 0(1) 32/24,3 IP55 УХЛ2; ТТТ/ПП Л 0(1) 40/31,2 IP55 УХЛ2; ТТТ/ПП Л 0(1) 50/39,6 IP55 УХЛ2; ТТТ/ПП Т 0(1) 16/10,7 IP55 УХЛ2; ТТТ/ПП Т 0(1) 20/14,1 IP55 УХЛ2; ТТТ/ПП Т 0(1) 25/18,3 IP55 УХЛ2; ТТТ/ПП Т 0(1) 32/24,3 IP55 УХЛ2; ТТТ/ПП Т 0(1) 40/31,2 IP55 УХЛ2; ТТТ/ПП Т 0(1) 50/39,6 IP55 УХЛ2; ТТТ/ПП СТ 0 25/18,0 IP55 УХЛ2; ТТТ/ПП СТ 0 32/24,0 IP55 УХЛ2; ТТТ/ПП СТ 1 25/18,0 IP55 УХЛ2; ТТТ/ПП СТ 1 32/24,0 IP55 УХЛ2	

Всего 28 типов



Руководитель органа

Эксперт

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подпись

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Н.А. Бероева

Thank you for attention