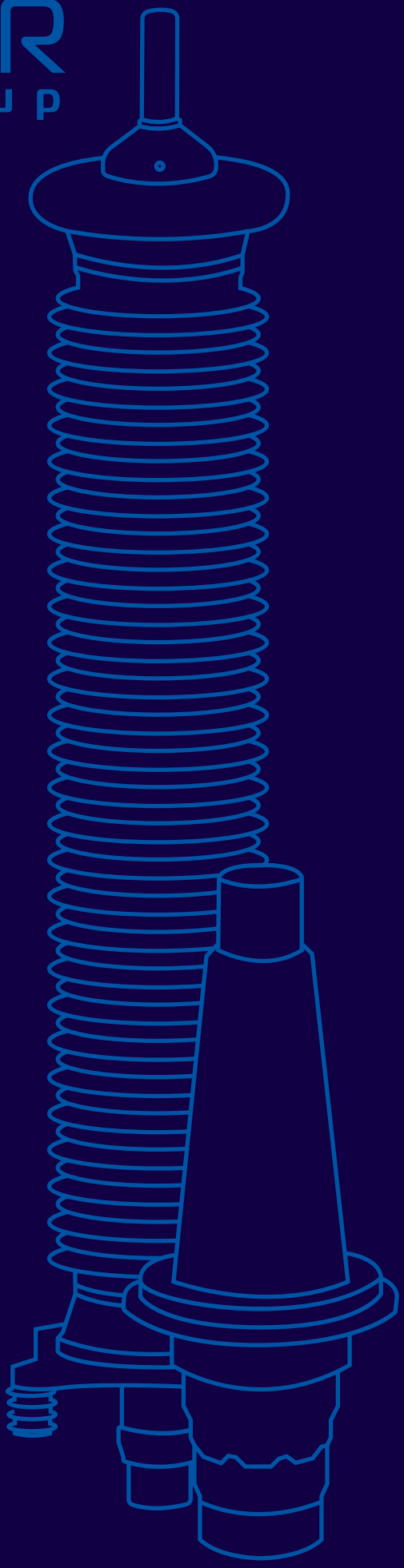
IZOLYATOR group



HIGH VOLTAGE CABLE FITTINGS "IZOLYATOR-AKS"

VOLTAGE CLASSES
110–550 KV

2024

“Izolyator” is an international multi-product industrial group of companies, the main activities of which are design, production, sales, after-sales technical support and factory repair of high voltage AC/DC insulating equipment, including ultra-high voltage classes.

The whole history of origin and development of Russian high-voltage bushings as a class of electrical equipment is inextricably linked with the Izolyator plant founded in 1896. Over the century-long history, the Izolyator Group of Companies has accumulated vast experience of participation in the most large-scale national and international energy projects, experience of successful solution of the most complex scientific, technical, production and technological tasks.

“Izolyator” is an official supplier of the largest electrical and power engineering companies in the world, including nuclear power.

The Izolyator-VV production complex is a leading scientific and technical partner of the Russian National Committee of the International Council on Large High Voltage Electrical Systems (CIGRE). The National Research Committee D1 “Materials and Development of New Test Methods and Diagnostic Tools” operates on the basis of the complex.

Alexander Zinovievich Slavinsky

General Director of “Izolyator Plant” LLC
Doctor of Engineering Science,
Associate Professor

Century-long experience — technologies of the future

Our mission

By contributing to a stable and reliable energy supply, we help everyone realize their potential.

Our vision

We strive to be one of the world's leading companies in the industry and help fill the world with energy and light by creating quality power in different parts of the world through smart and forward-looking solutions in the power industry.

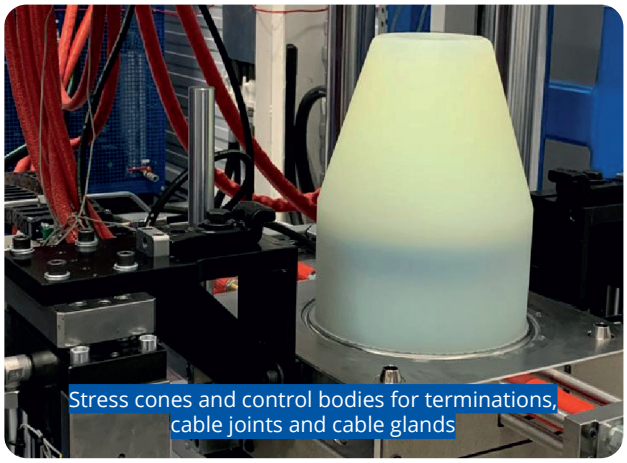
Social responsibility

We build our social policy on the basis of a harmonious combination of the interests of the company's owners, employees, local communities and society as a whole, while strictly complying with the laws of the Russian Federation.

Contents

Introduction

Removal of a 110 kV deflector from a mold


Stress cones and control bodies for terminations, cable joints and cable glands


Deflectors for terminations and cable joints

Izolyator Group is the flagship of the domestic production of high-voltage cable glands, including ultra-high voltage classes.

Over the century-long history, we have accumulated vast experience in the design and manufacture of cable glands for connection of transformers, as well as collected knowledge and accumulated practical skills in working with compounds, RIN-insulation and siliconorganic elastomers.

At the end of 2018, as part of the implementation of the state policy of import substitution, the management of the Izolyator Group of Companies decided to organize the “Cable Fittings for High and Extra High Voltage” business line. For its practical implementation, a new company, Izolyator-AKS LLC, was registered in April 2019.

Already in April 2020, the factory built from scratch produced its first products. Thus, Izolator-AKS LLC began to produce high quality cable fittings for cables with core cross-section up to 3000 mm² and for voltage classes 110–500 kV using innovative developments and equipment. By the end of 2020, the products of the Izolyator-AKS plant had successfully passed type tests, including a test for sealing.

In 2021, mechanical and climatic tests were completed. In June 2022, prequalification tests of cable fittings for 220 kV voltage class were completed.

In September 2022, cable fittings for the 220 kV voltage class were certified by PJSC Rosseti, in December cable fittings for the 110 kV voltage class were certified, and in May 2023 cable fittings for the 500 kV voltage class were certified.

Core business

Removal of a 110 kV deflector from a mold

Izolyator-AKS is a part of the Izolyator Group of Companies, a world leader in the development and production of high-voltage bushings, a company with a century-long history.

Izolyator-AKS is a manufacturer of innovative and high-tech cable fittings (cable joints and terminations, dry plug glands) for high and extra-high voltage classes from 110 to 500 kV for power facilities in Russia, near and far abroad.

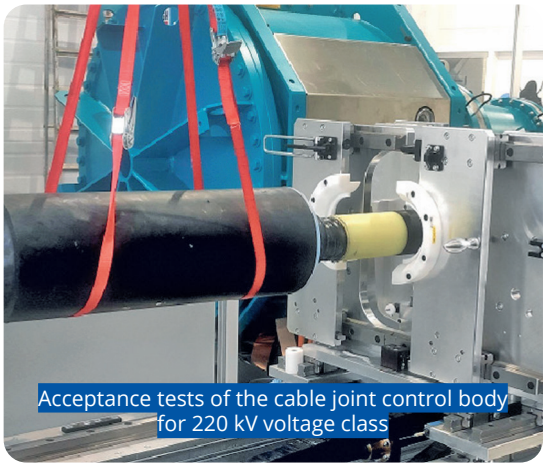
High-voltage cable fittings are used for connection and termination of cable lines and are widely used in construction and repair of power transmission lines.

The Izolyator-AKS plant carries out development, production, testing, delivery, installation and service maintenance of high-voltage cable fittings. The quality management system of these activities is certified and meets the requirements of ISO 9001:2015 international standard.

The company is a collective member of the Non-commercial partnership of cable manufacturers “International Association “Electrocable”.

Stress cones and control bodies for terminations, cable joints and cable glands

Deflectors for terminations and cable joints



Acceptance tests of the cable joint control body for 220 kV voltage class

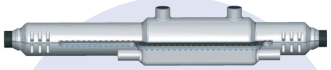
Cable fittings “IZOLYATOR-AKS”

CABLE FITTINGS FOR 110–500 kV VOLTAGE CLASSES

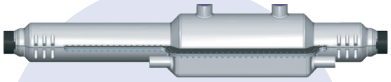
The Isolyator-AKS plant designs and manufactures high-voltage cable fittings for voltage classes from 110 to 500 kV for cable cross-section from 185 to 3000 mm² — a new business line of the “Isolator” Group of Companies.

We produce cable fittings of all types for cables with cross-linked polyethylene insulation: cable glands for connection of a power cable with an SF6 gas-insulated switchgear or a transformer (IKV), outdoor terminations with composite insulator for transition of overhead power line into cable one (IKM), including dry terminations (ISKM), cable joints with direct connection of shields (ISM) and with separation of shields — transposition (ISMR).

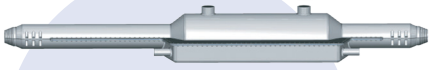
CABLE JOINTS



ISM-126 (-172)
ISMR-126 (-172)
Max. operating voltage 126/172 kV Cross-sections of cable cores for fittings, 185–2500 mm²



ISM-252
ISMR-252
Max. operating voltage 252 kV Cross-sections of cable cores for fittings, 400–2500 mm²

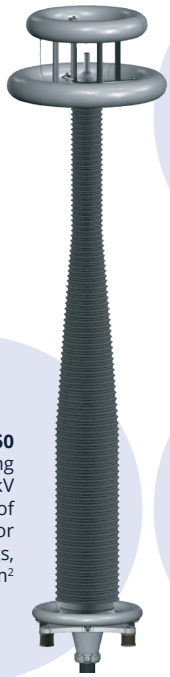


ISM-550 ISMR-550
Max. operating voltage 363/550 kV Cross-sections of cable cores for fittings, 500–3000 mm²

TERMINATIONS

IKM-126 (-172)
ISKM-126 (-172)
Max. operating voltage 126/172 kV Cross-sections of cable cores for fittings, 185–2500 mm²

IKM-252
ISKM-252
Max. operating voltage 252 kV Cross-sections of cable cores for fittings, 400–2500 mm²



IKM-550
Max. operating voltage 363/550 kV Cross-sections of cable cores for fittings, 500–3000 mm²

CABLE GLANDS

IKV-126 (-172)
Max. operating voltage 126/172 kV Cross-sections of cable cores for fittings, 185–2500 mm²

IKV-252
Max. operating voltage 252 kV Cross-sections of cable cores for fittings, 400–2500 mm²

IKV-550
Max. operating voltage 363/550 kV Cross-sections of cable cores for fittings, 500–3000 mm²

8 Advantages of cable fittings

Injection molding machine for the production of deflectors

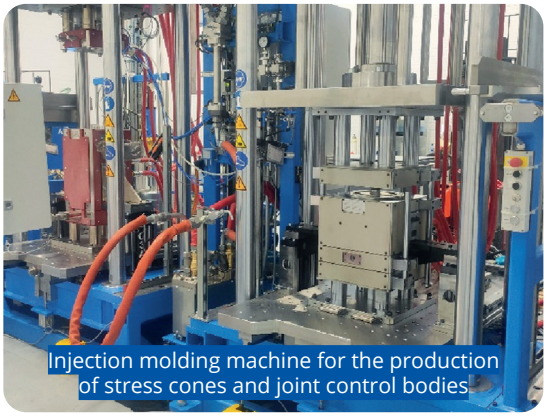
In-house development and optimization of cable fittings design is underway, taking into account the requirements and demands of the market. The production of semiconducting elements (deflectors) and reinforcing insulation of silicone stress cones and cable joint control bodies is carried out by trained highly qualified personnel on the most modern injection molding machines that ensure the highest quality and reliability of products due to vacuum preparation of the material.


Degassing station

High localization of components with strict selection of suppliers was achieved in order to ensure world-class quality of supplied products and significantly reduce the dependence of production on sanctions and other political and economic risks.

The use of the latest technologies has made it possible to reduce the weight and size parameters of the cable sleeve control bodies, while increasing their operational reliability. A qualified and multidimensional approach to the development and production of cable fittings allowed our company to:

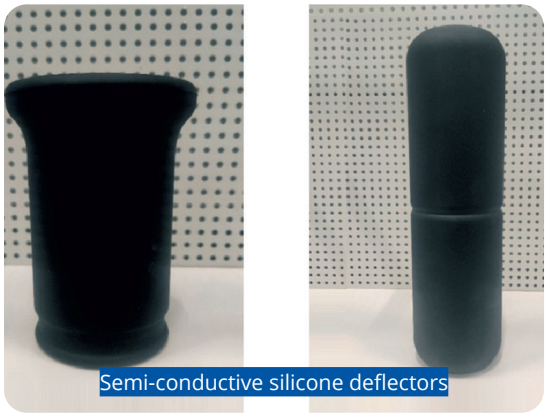
- optimize prices for products;
- shorten production and delivery times;
- simplify installation and reduce the cost of related construction works.


Injection molding machine for the production of stress cones and joint control bodies

In the company's laboratory, equipped with the latest technology, all manufactured stress cones of terminations and cable glands, as well as cable joint control bodies, are subjected to acceptance tests with increased voltage with measurement of the partial discharge level, which should not exceed 5 pC.

Laboratory for acceptance testing of cable fittings


Test bench for testing of fittings for 110–500 kV voltage classes


Semi-conductive silicone deflectors

The company has established a multifunctional service center, which performs:

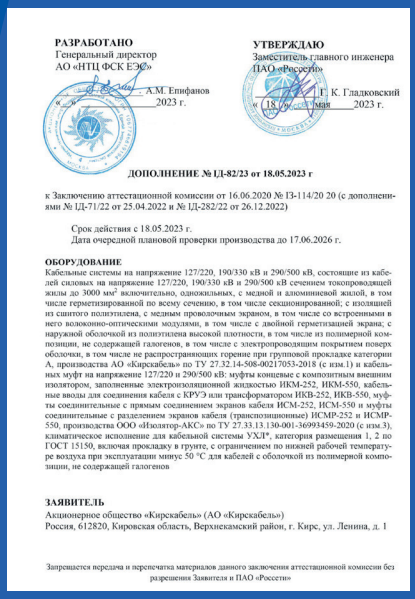
- conducting seminars and trainings for the personnel of customers and installation organizations on the technology of cable preparation and installation of cable fittings “Izolyator-AKS” (cable joints, terminations, cable glands from 110 to 500 kV);
- supervising the processes of cable preparation and installation of fittings;
- installation of all types of manufactured cable fittings;
- technical support of partners, customers, designers, installation organizations and enterprises operating cable fittings manufactured by Izolyator-AKS.

Cable glands of the IKV type are intended for connection of high-voltage cable lines of voltage classes 110, 150, 220, 330 and 500 kV to GIS cells and transformers. Outdoor terminations with composite insulator of the IKM type are hermetic terminations designed for overhead connection of cable lines of voltage classes 110, 150 and 220, 330 and 500 kV with power supply system elements.

Outdoor dry terminations with composite insulator of the ISKM type are hermetic dry self-supporting terminations esigned for overhead connection of cable lines of voltage classes 110, 150, 220 kV with power supply system elements.

Cable joints of the ISM type with direct connection of shields and cable joints of the ISMR type with separation (transposition) of shields are designed to connect high-voltage cables with crosslinked polyethylene insulation of voltage classes 110, 150, 220, 330 and 500 kV.

Certification and testing



РАЗРАБОТАНО
Генеральный директор
АО «НТЦ ФСК ЕЭС»
_____ А.М. Епифанов
_____ 2023 г.

УТВЕРЖДАЮ
Заместитель главного инженера
ПАО «Россети»
_____ Г. К. Гладковский
«18» мая 2023 г.

ДОПОЛНЕНИЕ № ЦД-82/23 от 18.05.2023 г

к Заключению аттестационной комиссии от 16.06.2020 № ПЗ-114/20 20 (с дополнениями № ЦД-71/22 от 25.04.2022 и № ЦД-282/22 от 26.12.2022)

Срок действия с 18.05.2023 г.
Дата очередной плановой проверки производства до 17.06.2026 г.

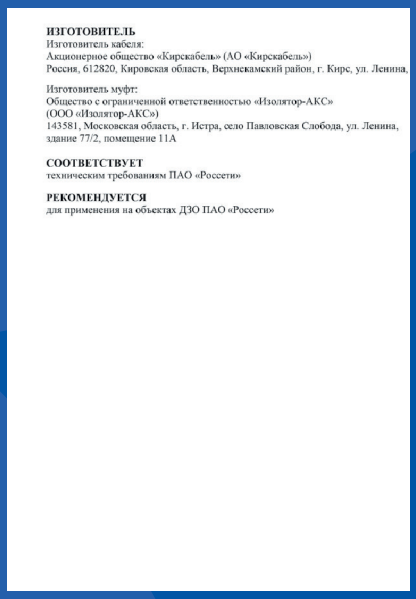
ОБОРУДОВАНИЕ

Кабельные системы на напряжение 127/220, 190/330 кВ и 290/500 кВ, состоящие из кабелей силовых на напряжение 127/220, 190/330 кВ и 290/500 кВ сечением токопроводящей жилы до 3000 мм² включительно, одножильных, с медной и алюминиевой жилой, в том числе герметизированной по всему сечению, в том числе секционированной; с изоляцией из сшитого полиэтилена, с медным проволочным экраном, в том числе со встроенными в него волоконно-оптическими модулями, в том числе с двойной герметизацией экрана; с наружной оболочкой из полиэтилена высокой плотности, в том числе из полимерной композиции, не содержащей галогенов, в том числе с электропроводящим покрытием поверх оболочки, в том числе не распространяющих горение при групповой прокладке категории А, производства АО «Кирскабель» по ТУ 27.32.14-508-00217053-2018 (с изм.1) и кабельных муфт на напряжение 127/220 и 290/500 кВ: муфты концевые с композитным внешним изолятором, заполненные электроизоляционной жидкостью ИКМ-252, ИКМ-550, кабельные вводы для соединения кабеля с КРУЭ или трансформатором ИКВ-252, ИКВ-550, муфты соединительные с прямым соединением экранов кабеля ИСМ-252, ИСМ-550 и муфты соединительные с разделением экранов кабеля (транспозиционные) ИСМР-252 и ИСМР-550, производства ООО «Изолятор-АКС» по ТУ 27.33.13.130-001-36993459-2020 (с изм.3), климатическое исполнение для кабельной системы УХЛ*, категория размещения 1, 2 по ГОСТ 15150, включая прокладку в грунте, с ограничением по нижней рабочей температуре воздуха при эксплуатации минус 50 °С для кабелей с оболочкой из полимерной композиции, не содержащей галогенов

ЗАЯВИТЕЛЬ

Акционерное общество «Кирскабель» (АО «Кирскабель»)
Россия, 612820, Кировская область, Верхнекамский район, г. Кирс, ул. Ленина, д. 1

Запрещается передача и перепечатка материалов данного заключения аттестационной комиссии без разрешения Заявителя и ПАО «Россети»



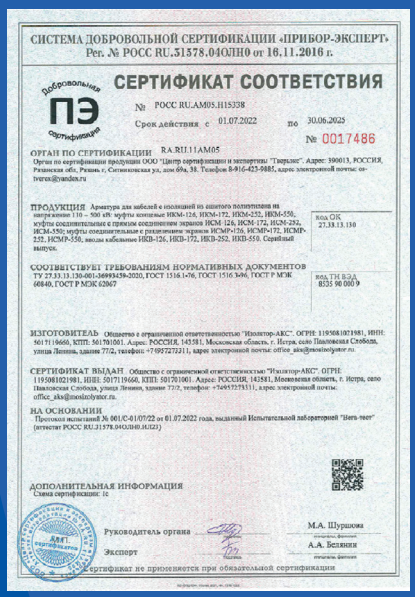
ИЗГОТОВИТЕЛЬ
Изготовитель кабеля:
Акционерное общество «Кирскабель» (АО «Кирскабель»)
Россия, 612820, Кировская область, Верхнекамский район, г. Кирс, ул. Ленина,

Изготовитель муфт:
Общество с ограниченной ответственностью «Изолятор-АКС»
(ООО «Изолятор-АКС»)
143581, Московская область, г. Истра, село Павловская Слобода, ул. Ленина, здание 77/2, помещение 11А

СООТВЕТСТВУЕТ
техническим требованиям ПАО «Россети»

РЕКОМЕНДУЕТСЯ
для применения на объектах ДЗО ПАО «Россети»

Certification of 550 kV cable fittings by Rosseti PJSC



СИСТЕМА ДОБРОВОЛЬНОЙ СЕРТИФИКАЦИИ «ПРИБОР-ЭКСПЕРТ»
Рег. № РОСС RU.31378.04ОЛН0 от 16.11.2016 г.

СЕРТИФИКАТ СООТВЕТСТВИЯ

№ РОСС RU.AM05.H15338
Срок действия с 01.07.2022 по 30.06.2025
№ 0017486

ОРГАН ПО СЕРТИФИКАЦИИ RA.RU.11AM05

ПРОДУКЦИЯ Арматура для кабелей с изоляцией из сшитого полиэтилена на напряжение 110 – 500 кВ: муфты концевые ИКМ-126, ИКМ-172, ИКМ-252, ИКМ-550; муфты соединительные с прямым соединением экранов ИСМ-126, ИСМ-172, ИСМ-252, ИСМ-550; муфты соединительные с разделением экранов ИСМР-126, ИСМР-172, ИСМР-252, ИСМР-550, вводы кабельные ИКВ-126, ИКВ-172, ИКВ-252, ИКВ-550. Серийный выпуск.
код ОК 27.33.13.130

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ НОРМАТИВНЫХ ДОКУМЕНТОВ ТУ 27.33.13.130-001-36993459-2020, ГОСТ 1516.1-76, ГОСТ 1516.3-96, ГОСТ Р МЭК 60840, ГОСТ Р МЭК 62067
код ТН ВЭД 8535 90 000 9

ИЗГОТОВИТЕЛЬ Общество с ограниченной ответственностью "Изолятор-АКС". ОГРН: 1195081071981, ИНН: 5017119660, КПП: 501701001. Адрес: РОССИЯ, 143581, Московская область, г. Истра, село Павловская Слобода, улица Ленина, здание 77/2, телефон: +74997272311, адрес электронной почты: office_aks@insulatorkr.ru

СЕРТИФИКАТ ВЫДАН Общество с ограниченной ответственностью "Изолятор-АКС". ОГРН: 1195081021981, ИНН: 5017119660, КПП: 501701001. Адрес: РОССИЯ, 143581, Московская область, г. Истра, село Павловская Слобода, улица Ленина, здание 77/2, телефон: +74953273311, адрес электронной почты: office_aks@insulatorkr.ru.

НА ОСНОВАНИИ Протоколов испытаний № 001/С-01/07/22 от 01.07.2022 года, выданный Испытательной лабораторией "Нить-тест" (аттестат РОСС RU.31378.04ОЛН0.ИЛ23)

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ
Схема сертификации: 1с

Руководитель органа М.А. Шушкова
Эксперт А.А. Белянин

Сертификат не применяется при обязательной сертификации

Certification for compliance with the requirements of regulatory documents

ARTALIX

СИСТЕМА СЕРТИФИКАЦИИ
ФЕДЕРАЛЬНОЕ АГЕНТСТВО ПО ТЕХНИЧЕСКОМУ РЕГУЛИРОВАНИЮ И МЕТРОЛОГИИ
СИСТЕМА ДОБРОВОЛЬНОЙ СЕРТИФИКАЦИИ «АРТАЛИКС»

Рег. РОСС RU.32311.04ТМР0

Орган по сертификации:
Общество с ограниченной ответственностью «АРТАЛИКС»
Адрес: 357538 г. Пятигорск, ул. Ермолова, 6, стр. 1, info@artalix.ru
www.artalix.ru
Рег. ARTALIX.RU.32311.ОС01.СМК01

СЕРТИФИКАТ СООТВЕТСТВИЯ
№ РОСС RU.32311.ОС01.СМК01.0629

Выдан
ОБЩЕСТВУ С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ "ИЗОЛЯТОР-АКС"
Юридический адрес: РОССИЯ, 143581, Московская область, город Истра, село Павловская слобода, улица Ленина, здание 77/2, помещение 11а
ИНН 5017119660

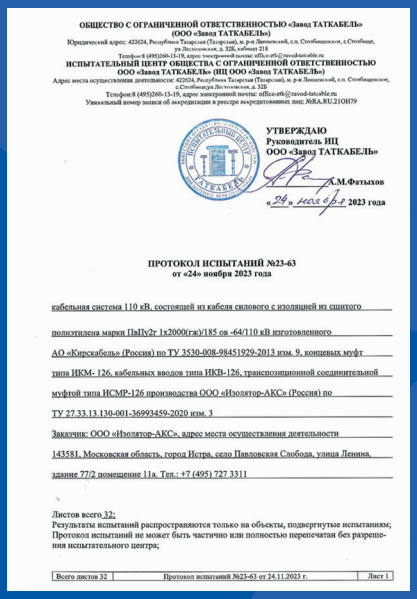
Дата выдачи: 21.12.2021 г. **Срок действия по: 20.12.2024 г.**

Настоящий сертификат удостоверяет
Система менеджмента качества применительно к работам
Проектирование, разработка, производство, комплектная поставка, сервисное обслуживание, монтаж и шеф-монтаж по монтажу вставочной кабельной арматуры.

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ
ГОСТ Р ИСО 9001-2015 (ISO 9001:2015)

Руководитель органа по сертификации Савельев М.А

Certification of the quality management system for compliance with the requirements of GOST R ISO 9001-2015 (ISO 9001:2015)



ОБЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ «Завод ТАТКАБЕЛЬ»
(ООО «Завод ТАТКАБЕЛЬ»)
Юридический адрес: 422624, Республика Татарстан (Татарстан), м. р-н Лаишевский, с.п. Столбищинское, с.Столбище, ул.Дослонская, д. 32Б, кабинет 214
Телефон:8 (495)260-13-19, адрес электронной почты: office-etk@zavod-tatcable.ru
ИСПЫТАТЕЛЬНЫЙ ЦЕНТР ОБЩЕСТВА С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ
ООО «Завод ТАТКАБЕЛЬ» (ИЦ ООО «Завод ТАТКАБЕЛЬ»)
Адрес места осуществления деятельности: 422624, Республика Татарстан (Татарстан), м. р-н Лаишевский, с.п. Столбищинское, с.Столбище,ул.Дослонская, д. 32Б
Телефон:8 (495)260-13-19, адрес электронной почты: office-etk@zavod-tatcable.ru
Уникальный номер записи об аккредитации в реестре аккредитованных лиц: RA.RU.21OH79

УТВЕРЖДАЮ
Руководитель ИЦ
ООО «Завод ТАТКАБЕЛЬ»
А.М.Фатыхов
«24» ноября 2023 года

ПРОТОКОЛ ИСПЫТАНИЙ №23-63
от «24» ноября 2023 года

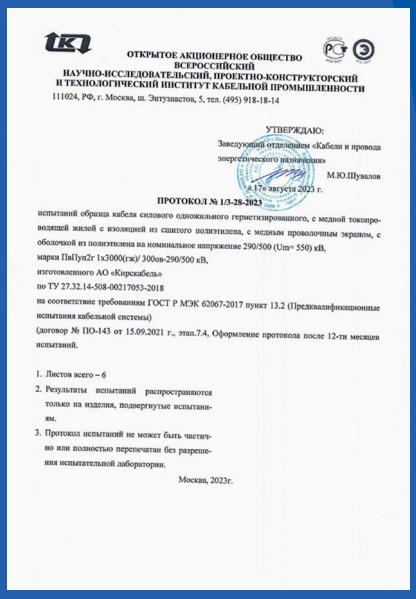
кабельная система 110 кВ, состоящей из кабеля силового с изоляцией из сшитого полиэтилена марки ПвПуЭг 1х2000(гж)/185 ов -64/110 кВ изготовленного АО «Кирскабель» (Россия) по ТУ 3530-008-98451929-2013 изм. 9, концевых муфт типа ИКМ- 126, кабельных вводов типа ИКВ-126, транспозиционной соединительной муфтой типа ИСМР-126 производства ООО «Изолятор-АКС» (Россия) по ТУ 27.33.13.130-001-36993459-2020 изм. 3

Заказчик: ООО «Изолятор-АКС», адрес места осуществления деятельности 143581, Московская область, город Истра, село Павловская Слобода, улица Ленина, здание 77/2 помещение 11а. Тел.: +7 (495) 727 3311

Листов всего 32;
Результаты испытаний распространяются только на объекты, подвергнутые испытаниям;
Протокол испытаний не может быть частично или полностью перепечатан без разрешения испытательного центра;

Всего листов 32	Протокол испытаний №23-63 от 24.11.2023 г.	Лист 1

Typical 110 kV tests according to IEC 60840



ОТКРЫТОЕ АКЦИОНЕРНОЕ ОБЩЕСТВО
ВСЕРОССИЙСКИЙ
НАУЧНО-ИССЛЕДОВАТЕЛЬСКИЙ, ПРОЕКТНО-КОНСТРУКТОРСКИЙ
И ТЕХНОЛОГИЧЕСКИЙ ИНСТИТУТ КАБЕЛЬНОЙ ПРОМЫШЛЕННОСТИ
111024, РФ, г. Москва, ш. Энтузиастов, 5, тел. (495) 918-18-14

УТВЕРЖДАЮ:
Заведующий отделением «Кабели и провода энергетического назначения»
М.Ю.Шувалов
« 17» августа 2023 г.

ПРОТОКОЛ № 1/3-28-2023

испытаний образца кабеля силового одножильного герметизированного, с медной токопроводящей жилой с изоляцией из сшитого полиэтилена, с медным проволочным экраном, с оболочкой из полиэтилена на номинальное напряжение 290/500 (Um= 550) кВ,
марки ПвПуп2г 1х3000(гж)/ 300ов-290/500 кВ,
изготовленного АО «Кирскабель»
по ТУ 27.32.14-508-00217053-2018
на соответствие требованиям ГОСТ Р МЭК 62067-2017 пункт 13.2 (Предквалификационные испытания кабельной системы)
(договор № ПО-143 от 15.09.2021 г., этап.7.4, Оформление протокола после 12-ти месяцев испытаний.

1. Листов всего – 6
2. Результаты испытаний распространяются только на изделия, подвергнутые испытаниям.
3. Протокол испытаний не может быть частично или полностью перепечатан без разрешения испытательной лаборатории.

Москва, 2023г.

500 kV pre-qualification tests according to IEC 62067

ОТКРЫТОЕ АКЦИОНЕРНОЕ ОБЩЕСТВО
ВСЕРОССИЙСКИЙ
НАУЧНО-ИССЛЕДОВАТЕЛЬСКИЙ, ПРОЕКТНО-КОНСТРУКТОРСКИЙ
И ТЕХНОЛОГИЧЕСКИЙ ИНСТИТУТ КАБЕЛЬНОЙ ПРОМЫШЛЕННОСТИ
111024, РФ, г. Москва, ш. Энтузиастов, 5, тел. (495) 918-18-14

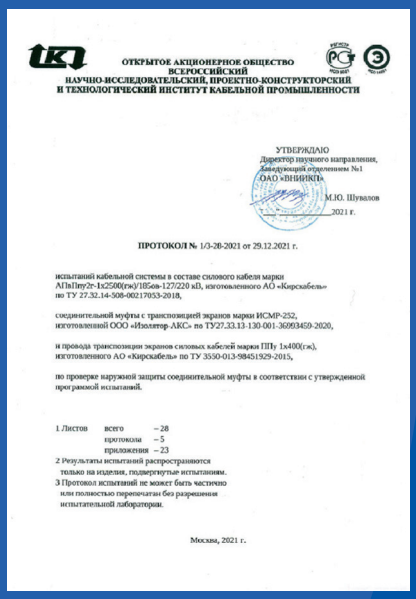
УТВЕРЖДАЮ
Заведующий отделением №1
М.Ю. Шувалов
«30» декабря 2021 г.

ПРОТОКОЛ № 1/3-22-2021

Испытаний на стойкость к внешним воздействующим факторам концевой муфты марки ИКМ-126,
изготовленной ООО «Изолятор-АКС»
по ТУ 27.33.13.130-001-36993459-2020
на соответствие требованиям ТУ 27.33.13.130-001-36993459-2020 пункты 1.5.1 и 1.5.2
(Стойкость к воздействию повышенной и пониженной температуры окружающей среды)

1. Листов всего – 17
   протокола 9
   приложения 8
2. Результаты испытаний распространяются только на изделия, подвергнутые испытаниям.
3. Протокол испытаний не может быть частично или полностью перепечатан без разрешения испытательной лаборатории.

Tests for resistance to elevated and reduced temperatures from –60 to +50 ˚C



ОТКРЫТОЕ АКЦИОНЕРНОЕ ОБЩЕСТВО
ВСЕРОССИЙСКИЙ
НАУЧНО-ИССЛЕДОВАТЕЛЬСКИЙ, ПРОЕКТНО-КОНСТРУКТОРСКИЙ
И ТЕХНОЛОГИЧЕСКИЙ ИНСТИТУТ КАБЕЛЬНОЙ ПРОМЫШЛЕННОСТИ

УТВЕРЖДАЮ
Директор научного направления,
Заведующий отделением №1
ОАО «ВНИИКП»
М.Ю. Шувалов
2021 г.

ПРОТОКОЛ № 1/3-28-2021 от 29.12.2021 г.

испытаний кабельной системы в составе силового кабеля марки
АПвПуп2г-1х2500(гж)/185ов-127/220 кВ, изготовленного АО «Кирскабель»
по ТУ 27.32.14-508-00217053-2018,

соединительной муфты с транспозицией экранов марки ИСМР-252,
изготовленной ООО «Изолятор-АКС» по ТУ27.33.13-130-001-36993450-2020,

и провода транспозиции экранов силовых кабелей марки ППу 1х400(гж),
изготовленного АО «Кирскабель» по ТУ 3550-013-98451929-2015,

по проверке наружной защиты соединительной муфты в соответствии с утвержденной программой испытаний.

1 Листов всего – 28
протоколы – 5
приложения – 23
2 Результаты испытаний распространяются только на изделия, подвергнутые испытаниям.
3 Протокол испытаний не может быть частично или полностью перепечатан без разрешения испытательной лаборатории.

Москва, 2021 г.

Mechanical tests of the external protection of the cable joint

Cable glands

Cable glands of the IKV type are designed for connection of high-voltage cable lines of voltage classes 110, 220, 330 and 500 kV to GIS cells and transformers.

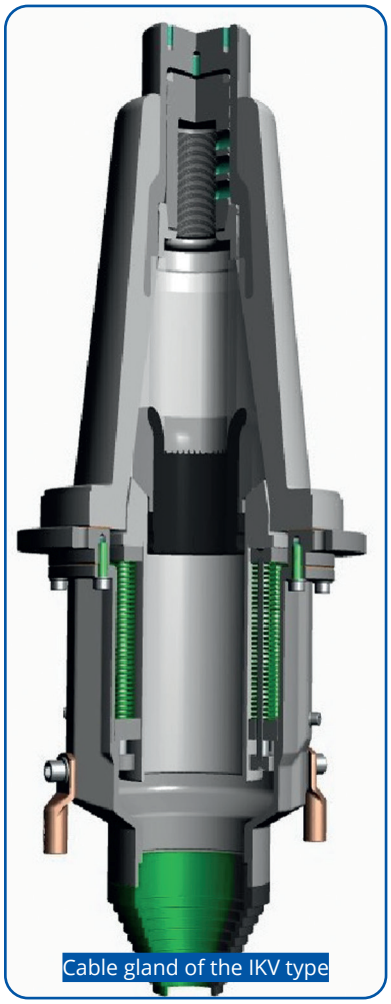
The glands are mounted on power cable with copper or aluminum core and cross-linked polyethylene insulation. The connection dimensions of the cable glands are fully compliant with IEC 62271-209.

35 kV voltage class	IKV-126	IKV-172	IKV-252	IKV-550
Max. operating voltage U_m, kV	126	172	252	363/550
Rated voltage U_o / U, kV	64/110	76/132; 87/150	127/220	190/330 290/500
Lightning impulse voltage, kV	550	750	1050	1550
Test voltage 2.5 U_o of industrial frequency 50 Hz, 30 min., kV	160	190; 218	318	580 (60 min.)
Partial discharge level at 1.5 U_o, pC	no more than 5	no more than 5	no more than 5	no more than 5
Cable core cross-sections, mm^2	185–250	185–250	400–2500	500–3000
Diameter range of prepared cable insulation, mm	43.2–94.8	43.2–94.8	67.0–115.0	81.1–135.0
Maximum diameter of cable sheath, mm	124	124	140	166
Climatic version	NF 1 (UHL)	NF 1 (UHL)	NF 1 (UHL)	NF 1 (UHL)
Operating temperature, ˚C	–60...+50	–60...+50	–60...+50	–60...+50
Required temperature during installation, ˚C	+15...+40	+15...+40	+15...+40	+15...+40
Length of the “dry-type” (“oil-filled type”) cable gland, L, mm	967 (1252)	967 (1252)	1079 (1419)	1520 (1960)
Depth of the “dry-type” (“oil-filled type”) cell input, C, mm	470 (757)	470 (757)	620 (960)	960 (1400)
Diameter of the “dry type” cell (“oil-filled type”), D, mm	249	249	480	415
Net weight without extension adaptor (nominal), kg	60	60	90	180

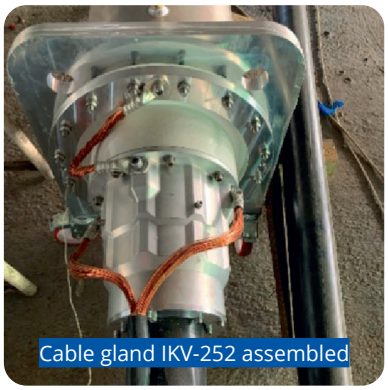
All values are nominal and need to be specified when ordering fittings.

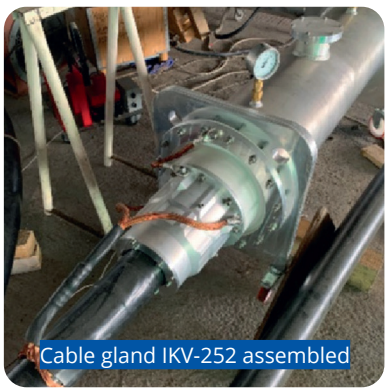
Cable gland design

- epoxy insulator (bushing) which can be supplied with an extension adapter, depending on the version of the GIS or transformer;
- bolted tip with breakaway heads (no special tools required);
- silicone stress cone;
- spring block, which ensures a tight fit of the stress cone to the insulator;
- flange, which presses the insulator to the GIS cell;
- cable sealing and alignment unit in the cable gland.


Cable gland of the IKV type


Cable gland IKV-126


Cable gland IKV-252 assembled


Cable gland IKV-252 assembled


Stress cone of the cable gland IKV-126 and IKV-252

Outdoor terminations

Outdoor terminations of the IKM type with a composite insulator are hermetic terminations designed for overhead connection of cable lines with power supply system elements.

The terminations are used for outdoor and indoor installation on cables with cross-linked polyethylene insulation for voltage classes 110, 150, 220, 330 and 500 kV.

Product characteristics	IKM-126	IKM-172	IKM-252	IKV-550
Max. operating voltage U_m, kV	126	172	252	363/550
Rated voltage U_o / U, kV	64/110	76/132; 87/150	127/220	190/330; 290/500
Lightning impulse voltage, kV	550	750	1050	1550
Test voltage 2.5 U_o of industrial frequency 50 H_z, 30 min, kV	160	190; 218	318	580 (60 min.)
Partial discharge level at 1.5 U_o, pC	no more than 5	no more than 5	no more than 5	no more than 5
Cross-sections of cable cores, mm^2	185–250	185–250	400–2500	500–3000
Diameter range of prepared cable insulation, mm	43.2–94.8	43.2–94.8	67.0–115.0	81.1–135.0
Maximum diameter of cable sheath, mm	124	124	140	166
Climatic version	NF 1 (UHL)	NF 1 (UHL)	NF 1 (UHL)	NF 1 (UHL)
Operating temperature, ˚C	–60...+50	–60...+50	–60...+50	– 0...+50
Required temperature during installation, ˚C	+15...+40	+15...+40	+15...+40	+15...+40
Maximum tilt angle from vertical, deg	30 (45)	30	30	30
Pollution class according to IEC 60815, GOST 9920-89	III–IV	III–IV	III–IV	III–IV
Leakage current path length, mm	4220	5300	8690	22 000
Maximum insulator bending force, kN	5.2	5	7.4	8
Length, L, mm	2225	2455	3505	6846
Width, A, mm	470	470	610	945
B, mm	1835	2065	3125	6496
C, mm	390	390	382	400
Cup diameter, D, mm	140	140	328	356
Securing hole spacing, E, mm	400 (345)	400 (345)	500 (400)	800
F, mm	279	279	279	–
Contact part diameter, G, mm	50 (60)	50 (60)	50 (60)	50 (60)
Contact part length, H, mm	185	185	185	185
Net weight (nominal), kg	165	165	362	960

All values are nominal and need to be specified when ordering fittings.

Termination design

• bolted tip with breakaway heads (no special tools required);

• head fitting;

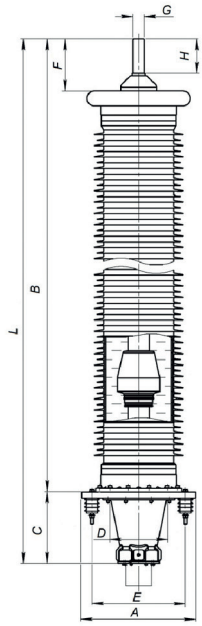
• gray composite insulator (fiberglass pipe with silicone skirts);

• silicone stress cone;

• dielectric fluid (does not require heating before pouring);

• joint base;

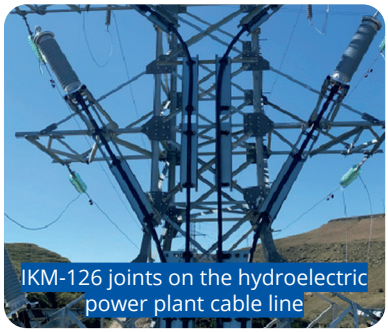
• cable sealing and alignment unit in the joint.



Termination IKM-126


Termination of the IKM type


Installation of the IKM joints for the Arctic LNG-2 project.


IKM-126 joints on the hydroelectric power plant cable line


IKM-126 joints on the power grid sub-station cable line


IKM-252 terminations

Outdoor dry terminations

Outdoor dry terminations of the ISKM type with composite insulator are hermetically sealed dry self-supporting terminations designed for overhead connection of cable lines with power supply system elements.

The terminations are used for outdoor and indoor installation at any angle on cables with crosslinked polyethylene insulation for voltage classes 110, 150 and 220 kV.

Product characteristics	ISKM-126	ISKM-172	ISKM-252
Max. operating voltage U_m, kV	126	172	252
Rated voltage U_o / U, kV	64/110	76/132; 87/150	127/220
Lightning impulse voltage, kV	550	750	1050
Test voltage 2.5 U_o of industrial frequency 50 Hz, 30 min., kV	160	190/218	318
Partial discharge level at 1.5 U_o, pC	no more than 5	no more than 5	no more than 5
Cross-sections of cable cores, mm^2	185–2500	185–2500	400–2500
Diameter range of prepared cable insulation, mm	50,5–95,0	50,5–95,0	76–115
Maximum diameter of cable sheath, mm	140	140	140
Climatic version	NF 1 (UHL)	NF 1 (UHL)	NF 1 (UHL)
Operating temperature, ˚C	–60...+50	–60...+50	–60...+50
Required temperature during installation, ˚C	+15...+40	+15...+40	+15...+40
Maximum angle of inclination from the vertical, deg.	180	180	180
Pollution class according to IEC 60815	III–IV	III–IV	III–IV
Leakage current path length, mm	6417	6417	8690
Maximum insulator bending force, kN	3	3	4,3
Length, L, mm	2667	2667	3577
Width, A, mm	470	470	710
B, mm	2255	2255	3195
Cup diameter, D, mm	245	245	300
Securing hole spacing, E, mm	400 (345)	400 (345)	600 (400)
F, mm	400	400	400
Contact part diameter, G, mm	50 (60)	50 (60)	50 (60)
Contact part length, H, mm	185	185	185
Net weight (nominal), kg	97	97	391

All values are nominal and need to be specified when ordering fittings.

Dry termination design:

• bolted tip with breakaway heads (no special tools required);

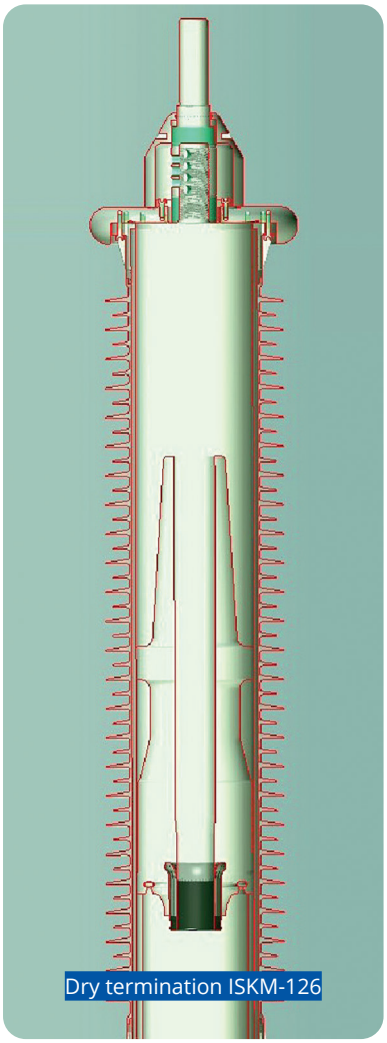
• head fitting;

• gray composite insulator (fiberglass pipe with silicone skirts);

• silicone stress cone;

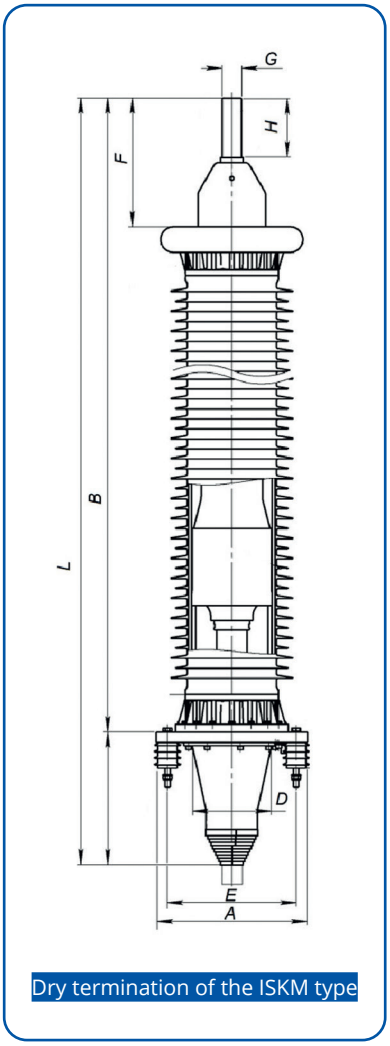
• joint base;

• cable sealing and alignment unit in the joint.



Dry termination ISKM-126

Dry termination ISKM-126



Dry termination of the ISKM type

Cable joints

Cable joints of the ISM type with direct connection of shields and cable joints of the ISMR type with separation (transposition) of shields are designed to connect high-voltage cables with cross-linked polyethylene insulation of voltage classes 110, 150, 220, 330 and 500 kV.

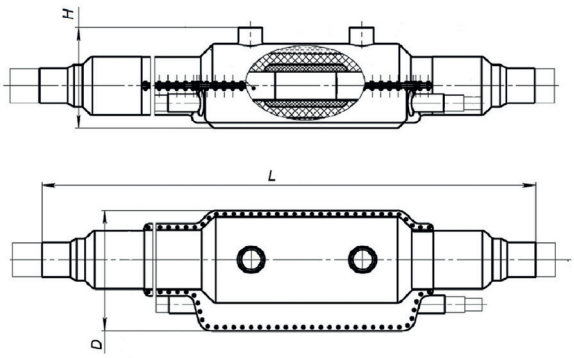
The main design element of the cable joints is a silicone control body, which undergoes highvoltage testing in factory conditions. The mounted joint body is protected from external influences by a durable fiberglass casing filled with hydrophobic compound.

35 kV voltage class	ISM(R)-126	ISM(R)-172	ISM(R)-252	ISM(R)-550
Max. operating voltage Um, kV	126	172	252	363/550
Rated voltage U_o / U, kV	64/110	76/132; 87/150	127/220	190/330; 290/500
Lightning impulse voltage, kV	550	750	1050	1550
Test voltage 2,5 U_o of industrial frequency 50 Hz, 30 min., kV	160	190/218	318	580 (60 min.)
Partial discharge level at 1.5 U_o, pC	no more than 5	no more than 5	no more than 5	no more than 5
Cross-sections of cable cores, mm^2	185–2500	185–2500	400–2500	500–3000
Diameter range of prepared cable insulation, mm	46.0–94.7	46.0–94.7	65.7–118.1	79.2–139.8
Maximum diameter of cable sheath, mm	124	124	140	166
Climatic version	NF 1 (UHL)	NF 1 (UHL)	NF 1 (UHL)	NF 1 (UHL)
Operating temperature, ˚C	–60...+50	–60...+50	–60...+50	–60...+50
Required temperature during installation, ˚C	+15...+40	+15...+40	+15...+40	+15...+40
Length of the “dry-type” (“oil-filled type”) cable gland, L, mm	967 (1252)	967 (1252)	1079 (1419)	1520 (1960)
Depth of the “dry-type” (“oil-filled type”) cell input, C, mm	470 (757)	470 (757)	620 (960)	960 (1400)
Diameter of the “dry type” cell (“oil-filled type”), D, mm	249	249	480	415
Net weight without extension adaptor (nominal), kg.	60	60	90	180

All values are nominal and need to be specified when ordering fittings.

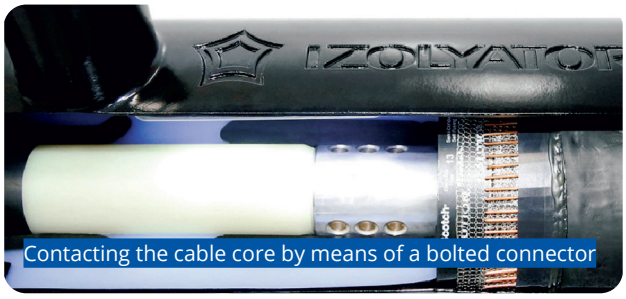
Cable joint design:

- bolted connector with breakaway heads (no special tools required);
- silicone control body;
- mounting tapes;
- compound (provides increased mechanical protection and sealing);
- fiberglass cover;
- heat-shrinkable components.

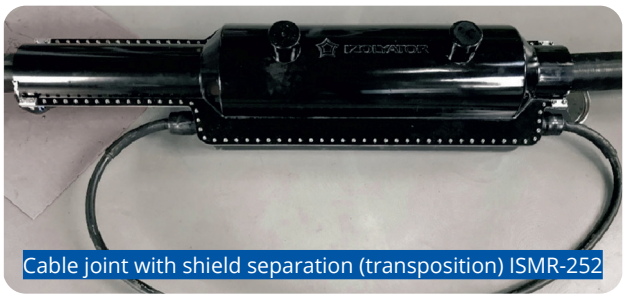


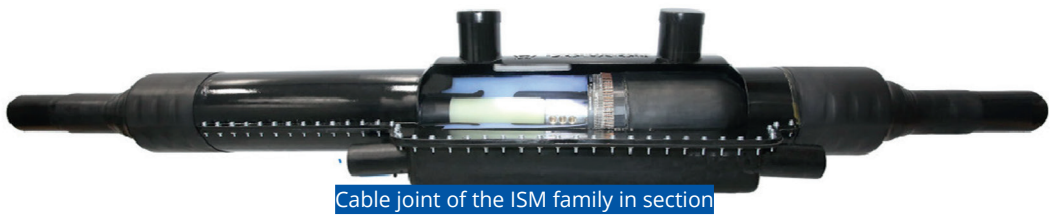
Cable joint ISM-126


Control body of the cable joint ISM-252



Contacting the cable core by means of a bolted connector


Cable joint with shield separation (transposition) ISMR-252


Cable joint of the ISM family in section

Cable form

Project name	
Customer	
Cable type	
Manufacturer	
Date	
Contact details	

1. Conductive core

Core material	aluminum/copper
Core shape segmented	round solid drawn round multiwire round multiwire
Cross-section, mm^2	
Core diameter, mm	minimum /maximum
Diameter of the core PP shield, mm	minimum /maximum

2. Insulation

Insulation material	CLP / ethylene propylene rubber
Insulation diameter, mm	minimum /maximum
Insulation thickness, mm	

3. Semi-conductive insulation shield

Type of the PP shield	extruded / easy removable
Diameter of the PP shield, mm	minimum/maximum
Thickness of the PP shield, mm	

4. Metal shield

Material	aluminum/copper
Shield type	copper round wire copper flat wire copper corrugated copper ribbon lead sheath aluminum corrugated sheath
Cross-section, mm^2	
Metal shield diameter, mm	
Optical fiber in the tube	yes / no

5. Intermediate sheath

Material	PE/PVC
Diameter, mm	
Thickness, mm	
Laminated layer, material	aluminum/copper

6. Armoring

Material	aluminum/copper/steel
Type	ribbon / flat wire / round wire
Armoring diameter, mm	

7. Outer shea

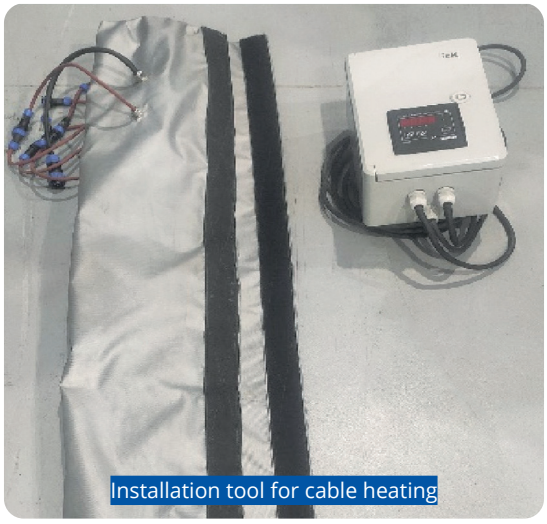
Material	PE / high density PE / pvc
Diameter, mm	
Thickness, mm	
PP layer on the sheath	yes / no

8. Power grid parameters

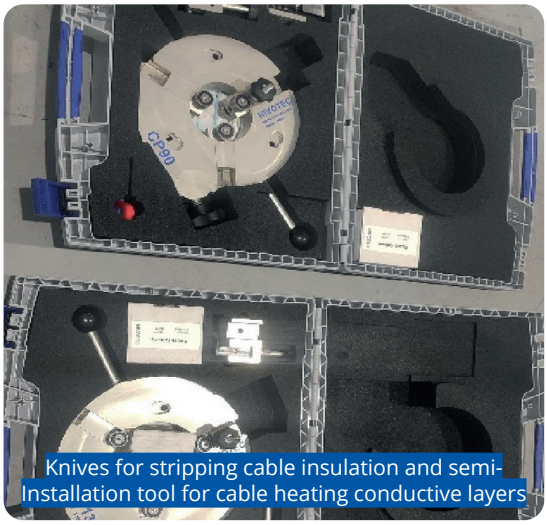
Rated voltage, kV	
Maximum operating voltage, kV	
Rated lightning impulse voltage, kV	
Core short-circuit current, kA	
Shield short-circuit current, kA	

Requirements for installation of cable fittings

Taking into account the special importance of qualitative installation of cable fittings to ensure their safety and reliability in operation and to minimize the risk of errors, installation should be carried out only by trained personnel in the presence of the chief engineer of “Izolyator-AKS”.



Installation tool for cable heating



Knives for stripping cable insulation and semi-conductive layers

Work on installation of cable fittings should be carried out in a prepared workplace at a temperature not lower than +15 ˚C, humidity not more than 65 %, and with sufficient electric lighting and and power to connect the installation tool.

The workplace for installation should be protected from dust, dirt and precipitation.

The cable must be properly prepared, i.e. heated and straightened, before cutting and installation. Immediately at a distance up to 1 m from the input to the cable fitting, the cable must be straight and coaxial with the joint.

At the input into a termination, a cable gland or a steel structure-mounted cable joint, the cable must be secured in a straight section with at least two clamps: the first clamp at a distance of approx. 0.9 m from the joint input, the second clamp at a distance of approx. 1 m from the first clamp.

The construction for installing the termination shall have a gap for cable input and avoiding a closed loop of magnetic material around the one phase cable.

For further information on all questions concerning the design, manufacture and installation of Izolyator-AKS cable fittings, please contact us at office_aks@mosizolyator.ru

Izolyator Group of Companies

Production and sales

Izolyator-VV Production Complex
High-voltage AC/DC bushings manufactured in Russia, including ultrahigh voltage classes.

MIM Company
Manufacturing and testing of high voltage bushings in India, sales and after sales support in South Asian countries.

Izolyator-AKS Plant
Designing, manufacturing, testing and technical support of cable fittings for 110–500 kV voltage classes, including development of designs according to individual requirements.

Representative office of Izolyator Group of Companies in Uzbekistan
Sales of high-voltage equipment manufactured by Izolyator Group of Companies and development of cooperation in Central Asian countries.

Service

After-sales technical support of Izolyator high voltage bushings and Izolyator-AKS cable fittings at all stages of the life cycle, diagnostics of high voltage equipment of other manufacturers.

Science

Designing, prototyping and mastering in series production of highvoltage bushings, including development of advanced technologies and designs according to individual requirements.

Testing

Testing of Izolyator AC/DC high-voltage bushings, testing of Izolyator-ACS cable fittings, testing of high-voltage equipment of other manufacturers in accordance with the scope of accreditation according to the international standard ISO/IEC 17025:2017 (GOST ISO/IEC 17025-2019).

University

Professional development of employees of Izolyator Group of Companies and partner companies in full-time and distance learning on the basis of a license from the Ministry of Education of the Moscow Region.

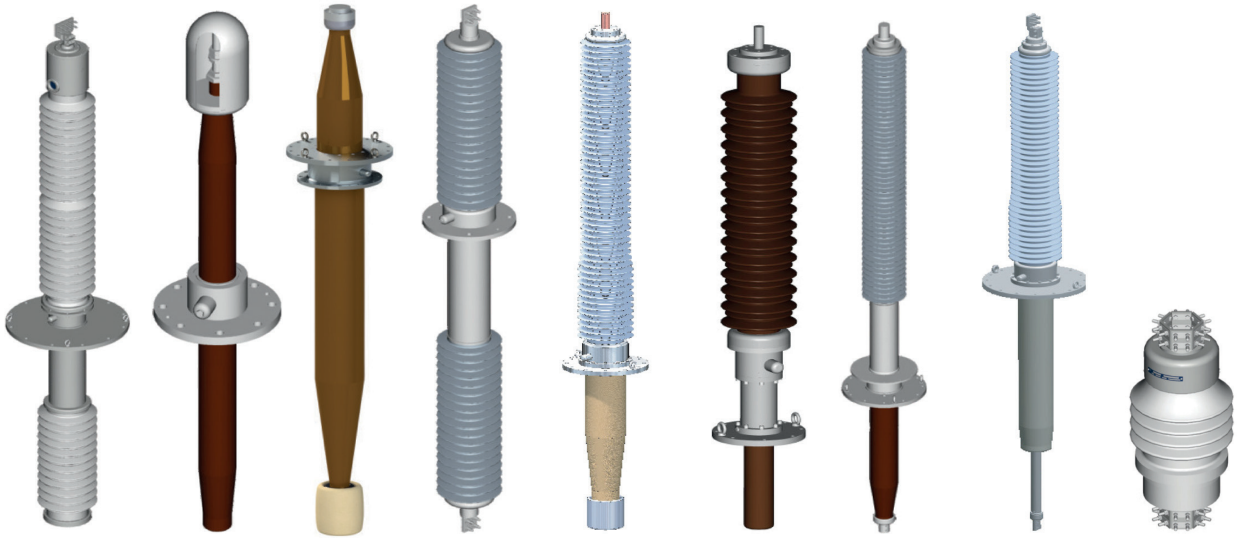
Bushings of 10–1150 kV voltage classes

The Izolyator Group of Companies designs, manufactures, maintains and repairs AC/DC high voltage bushings of voltage classes from 10 to 1150 kV for use in "oil — air", "oil — oil", "air — air", "SF6 gas — air", "oil — SF6 gas", "oil — SF6 gas", "liquid nitrogen — air" operating environments.

Innovative products

In the design of the majority of manufactured bushings the most perfect, solid internal insulation is used, which has high reliability and long service life.

There are two types of solid insulation: RIP and RIN. The RIN insulation is extremely hydrophobic and resistant to atmospheric moisture, which practically eliminates moisture in the insulation. The following are available as outer insulation: porcelain cover, polymer insulation directly applied to the inner insulation, composite cover with external silicone fins.



Bushings "oil — air" for oil switches

Voltage:
35–220 kV
Current:
1000–3150 A
Insulation:
RIP or RIN

Bushings "oil — oil" for cable connection of transformers

Voltage:
66–500 kV
Current:
630–2000 A
Insulation:
RIP or RIN

Bushings "oil — SF6 gas" for GIS

Voltage:
110–500 kV
Current:
800–3150 A
Insulation:
RIP or RIN

Linear bushings "air — air"

Voltage:
66–220 kV
Current:
2000–4000 A
Insulation:
RIP or RIN

Bushings "oil — air" for power transformers and shunt reactors

Voltage:
10–1150 kV
Current:
315–5000 A
Insulation:
RIP or RIN
(up to 550 kV)

Bushings "SF6 gas — air" for GIS

Voltage:
110 kV
Current: 2000 A
Insulation:
RIP or RIN

Bushings "oil — air», "air — air" for DC systems

Voltage:
±110–820 kV
Current:
1800–5400 A

Bushings "liquid nitrogen — air" for superconductor current limiters

Voltage:
up to 220 kV
Current:
до 1250 A

Removable bushings "oil — air" for power transformers

Voltage:
20–35 kV
Current: 6–20 кА

IZOLYATOR group

WE CREATE THE BASIS FOR STABLE AND SUSTAINABLE POWER SUPPLY

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Core business of the Izolyator Group of Companies

Reference list of the Izolyator Group of Companies