

HEAT SHRINK
MV JOINTS
JTS / JTM





About the group

**FOR OVER A CENTURY,
NEXANS HAS PLAYED A CRUCIAL ROLE
IN THE ELECTRIFICATION OF THE PLANET AND
IS COMMITTED TO ELECTRIFY
THE FUTURE.**

The Group is leading the charge to the new world of electrification: safe, sustainable, renewable, decarbonized and accessible to everyone. The Group is a leader in the design and manufacturing of cable systems and services across four main business areas: Building & Territories, High Voltage & Projects, Industry & Solutions and Telecom & Data.

Nexans is the first company of its industry to create a Foundation supporting sustainable initiatives bringing access to energy to disadvantaged communities worldwide. The Group pledge to contribute to carbon neutrality by 2030.

HISTORY THE LIVING HISTORY OF NEXANS

Nexans is proud of its long lasting history of over 120 years. 120 years of innovation, flagship projects and international growth.

120 years of destiny that we owe to two remarkable personalities: François Borel, genius inventor, and Edouard Berthoud, brilliant industrialist.

With over a century of experience, Nexans has never stopped building the future of electricity and will continue for the years to come.

More than 120 years, 3 industrial revolutions... and starting a new chapter



**INNOVATION
BY NEXANS,
INNOVATIVE BY
NATURE**

In 2019, Nexans completed the first chapter of an epic industrial story that started in the 19th century. After more than 120 years of conquests, major achievements and pioneering inventions, the Group is now starting the second chapter in its history.

LET'S GET CONNECTED

A full range of standardized or customized accessories for your low, medium and high voltage power networks.

Our solutions

Nexans is a leading specialized innovator, manufacturer and distributor of low, medium and high voltage accessories: cable joints and terminations, connectors and bushings, junction cabinets, ferrules and lugs, etc.



LEANER. SMARTER. SIMPLER.
**FOR NEXANS, INNOVATION IS THE ART OF DOING THINGS BETTER FOR
THE BENEFIT OF OUR CUSTOMERS AND THE COMMUNITY.**

Company presentation

INTRODUCTION

The origins of the Nexans Offida began with a company called ITALCO founded in 1969. Three entrepreneurs from Milan set up the company in order to manufacture high quality metal-connectors for the Italian energy networks. The company's focus soon shifted towards the design and manufacturing of accessories for cable installers.

In 1990 the company was bought by the Alcatel group which for the first time delivered the global marketplace onto ITALCO's doorstep. In 2000, Alcatel decided to separate its "cable" activities within the group on a global scale and as a result of this move Nexans was created.

Nexans, from the Latin word "nexus" (link), active in the energy cable production, soon decided to create a highly specialized group of companies known as the Power Cable Accessories Business Unit (PCABU) in order to focus efforts on the sales and development of MV cable and cable accessories.

With expertise in various technologies Nexans manufactures a wide variety of cable Accessories like cold shrink (Nexans Power Accessories France), heat shrink (Nexans Italia, Offida), slip on, screened connectors and bushings (Nexans Network Solutions, Euromold in Belgium), as well as ferrules and lugs with shear bolt technology (Nexans Power Accessories Germany, GPH in Hof).

With a long experience in the production of accessories for electrical cables, Nexans has the competence to work with customers on a global scale and create personalized solutions that are specifically adapted to our clients requirements and environment.



PRODUCTION

The production unit of Nexans Italia in Offida has been certified according to ISO 9001, ISO 14001 as well as ISO/TS 22163 - IRIS (International Railway Industry Standard), ISO 45001 and ISO 37001.

In order to guarantee the highest level of quality to our end customers, the Offida plant is specialized in the production of all the core-components of its products such as: heat-shrink tubes, mastics and resins for electrical applications.



R&D AND LABORATORY

Heatshrink tubes Heatshrink technology dates back to 1960s. In Nexans, thanks to R&D activity, HS technology has been improved and tailored according to the market needs. Today we produce a complete range of tubes to cover Low and Medium voltage applications till 52kV in our Extruders/ Expanders lines with diameters starting from 20mm till 300mm and up to 4 different layers.

Mastics for electrical use: the complete range of our mastics have been developed and are manufactured totally in company, they are produced by means of a 630 liter mixer in a dedicated part of the plant.

Resins for electrical use, casting and insulating, have been designed by Nexans Italy for more than 35 years.

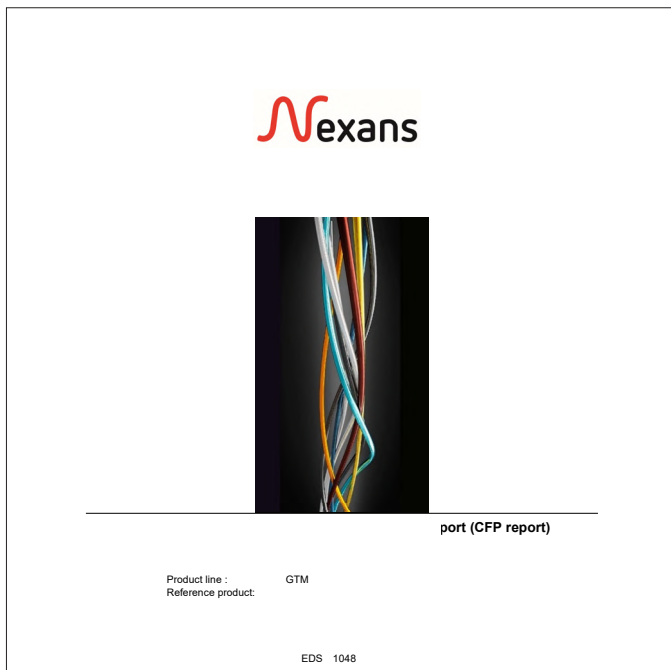
Our group of engineers and technicians use the most advanced tools and equipment to create, verify and test all our products among the different laboratories and material research centers of the Nexans group.

Offida has extensive know how in the field of heat shrink materials as well as mastics.

We are well equipped to perform physical and chemical analysis of insulating, anti-tracking, and stress control materials, both for tubing and mastics. We supply training and failure analysis for all our customers. In the electrical laboratory we can perform type test and routine test (PD measurement at hot and ambient temperature, heating cycles in air and water, humidity and salt fog).

Certifications







HEAT SHRINK MEDIUM VOLTAGE STRAIGHT/TRANSITION JOINTS FOR SINGLE/THREE CORE CABLES UP TO U_{max} 42 kV

DESIGN : one single tube "GT125"

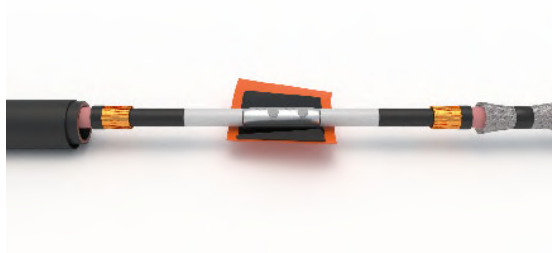
The new range of Nexans **JTS** heat shrink medium-voltage straight joints is compatible with single or three-core polymeric cables with copper wire screen, copper tape screen or with Aluminum tape screen.

For **12 to 24kV** applications, the Nexans **JTS 17/24** heat shrink joint is the new high performance, compact and easy-to-install joint:

a single body with all electrical functions integrated!



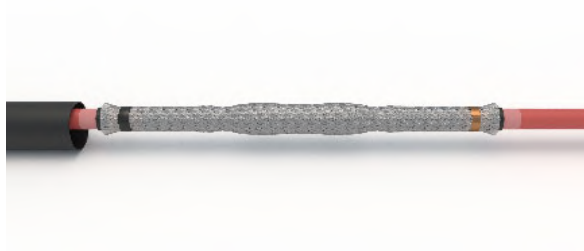
A double layer pad with conductive rubber inside and **HK** orange mastic outside ensure a Faraday cage and smooth the effect of the electrical field and of the voltage gradient in the connector area.



The **JTS 17/24** is using the Nexans "**TRIPLE GT125**", an integrated stress control field, insulating and conductive tube, which can support voltage classes up to **24 kV** up to 400 mm².



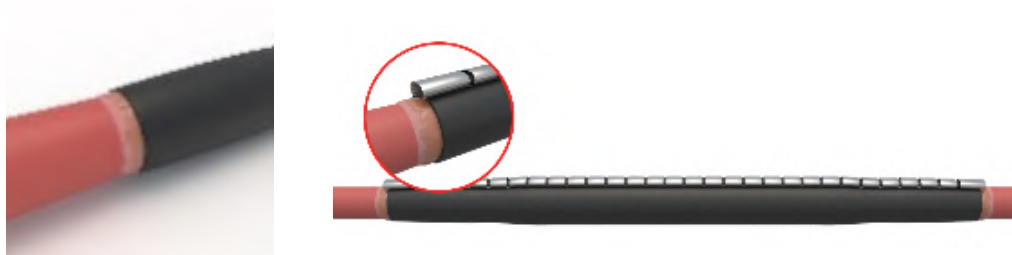
The electrical continuity of the screen is ensured by a tinned copper stocking with roll constant force springs in case of copper wire/tape screen (**CS type**).



A standard tinned copper tape plus an earthing ferrule in case of only copper wire screen (**W type**).



Finally, the outer sheath is restored with heavy wall adhesive lined tubing or in case of limited space with a wrap-around sleeve with or without Al foil

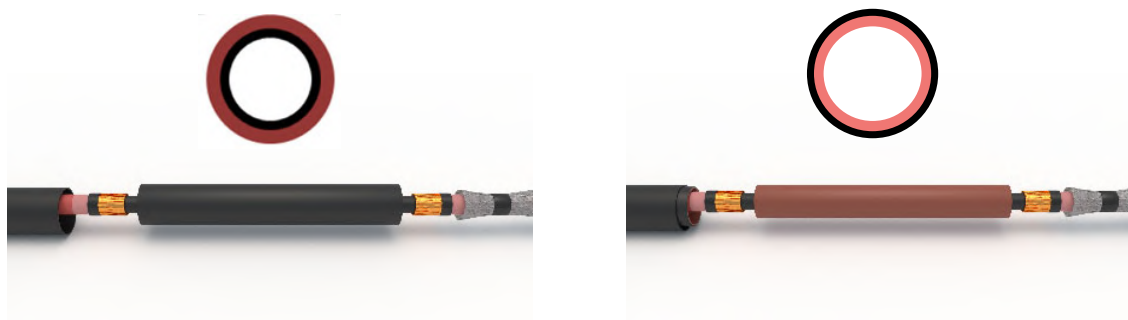


MC types are supplied with **GPH®** mechanical connectors.



For **12 to 24 kV** applications from 400mm² up to 1200mm² and **36 to 42 kV** applications, the Nexans **JTS 36/42** heat shrink joint is also a high performance, compact and easy-to-install joint: Double bodies with all the electrical functions integrated!

The **JTS 36/42** is using an integrated co extruded “stress control field + insulating” (**DUAL GT12**) nested in a co extruded “insulating + conductive” tube (**DUAL GT25**), which can support voltage classes up to **42 kV**.



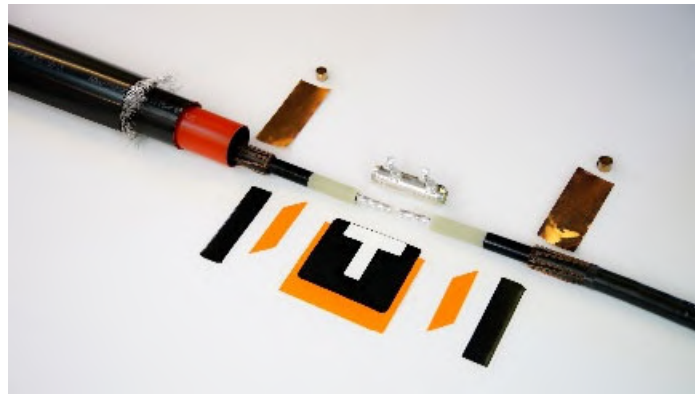
All the rest is the same as the **17-24JTS**.

The new Nexans JTS/JTM Heat Shrink joint - Features & Benefits

- Tube nesting / positioning and parking issues eliminated
=> typical jointing errors eliminated
- **Only one tube** to shrink for the 3 functions
(stress control–insulation–conductive) for voltage classes
12/17 & 24 kV up to 400 mm²



- **Only two tubes** to shrink for the 3 functions
(stress control–insulation + insulation–conductive) for voltage classes 36 & 42 kV and 12/17&24 kV from
400 up to 1200mm²



- Reduced installation time / training time, with standard cable preparation work
- Simplified stress control with 2-layer plate as used with Nexans cold shrink joints => no need to conform the mastic before shrinking the tube
- Design adapted for all type and brands of mechanical / crimping connectors
- Standard screen continuity with a copper stocking
=> simplify and reduce the installation time

- **JTM** transition joints type are designed to connect single core/three core paper insulated cable (PILC, belted, screened, HSL, armored or not) to single/three core polymeric insulated cables.
=> same tubing design is used (triple wall up to 24 kV, two tubes for 36/42 kV voltage classes).



INSTALLATION

Each kit contains easy guided installation instructions with installation steps made by 3D pictures.

PRODUCT RANGE

The product line is designed for polymeric cables from 16 to 1200 mm² and up to U_{max} 42 kV with different screen type (CWS-CTS, Al Foil).



JTS are available for single core/three core armored cables.



Transition joints are designed to connect different polymeric cables to most common paper insulated cables (PILC-HSL) from 12 up to 42 Kv



The **JTS** are fully type tested in accordance with **IEC 60502-4** and the Cenelec **Hd 629.1** standards.

17JTS1 W (CS) - 24JTS1 W (CS)

HEAT-SHRINKABLE MV STRAIGHT JOINTS FOR UNARMoured SINGLE CORE POLYMERIC CABLES WITH COPPER WIRE OR COPPER TAPE SCREEN
Up to Umax 24 kV

APPLICATION
17-24JTS1 W heat-shrinkable straight joints are designed for unarmoured, plastic insulated cables with Cu wire or Cu tape screen, to accommodate either crimped or mechanical connectors.

TECHNICAL CHARACTERISTICS AND DESIGN
17-24JTS is the **NEW** high performance, compact and easy to install joint. A single body with all the electrical functions integrated!

The Nexans “**TRIPLE GT125**” is an integrated stress control field, insulating and conductive tube, which can withstand high voltage applications up to 24kV.

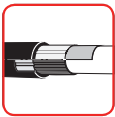
A double layer pad with conductive rubber inside and HK orange mastic outside ensure a Faraday cage and smooth the effect of the electrical field and of the voltage gradient in the connector area.

The electrical continuity of the screen is ensured by a tinned copper stocking with constant force roll springs in case of copper wire/tape screen (**CS type**) or with a standard tinned copper tape plus an earthing ferrule in case of only copper wire screen (**W type**).

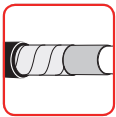
The outer sheath is restored with heavy wall adhesive lined tubing.
MC types are supplied with “Nexans GPH” mechanical connectors.

Um kV	Type	Section range (mm²)	Length L (mm)	DOI Insulation (mm)	DOE Outer (mm)
12/17,5	17JTS1.95W-(CS)	25÷95	600	12-24	20-38
12/17,5	17JTS1.240W-(CS)	70÷240	600	16-32	24-44
12/17,5	17JTS1.300W-(CS)	95÷300	600 (750 CS)	18-34	26-48
12/17,5	17JTS1.400W-(CS)	185÷400	750 (1000 CS)	22-38	30-52
24	24JTS1.95W-(CS)	25÷95	600	18-28	24-40
24	24JTS1.240W-(CS)	70÷240	600	20-36	26-46
24	24JTS1.300W-(CS)	95÷300	600 (750 CS)	22-38	28-52
24	24JTS1.400W-(CS)	185÷400	750 (1000 CS)	24-40	32-54

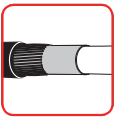
- 17JTS type tested with BIL at 95 kV, PD at 2Uo (≤ 10 pC)
- 24JTS type tested with BIL at 150 kV, PD at 2Uo (≤ 10 pC)



For cables with additional vapor screen please contact our sales office.



CS type is suitable both cables with copper wire / copper tape screen.



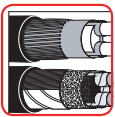
W type is supplied with standard metallic tape design and earth ferrule for copper wire screen cable.



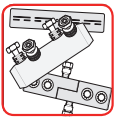
For other cable types please contact our sales office.



Please contact our sales office when inquiring joints for same type cables with different cross sections.



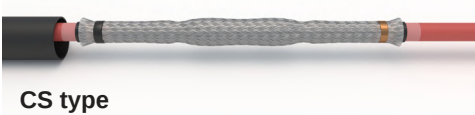
Various earth connection design solutions exist for armoring. For exact details contact our sales office.



Design accommodates various connector/ferrule types.



Various earth for connection kits are available for screen connection. For exact details contact our sales office.



Specifications and Standards
CENELEC HD 629.1 S2
IEC 60502-4

36JTS1 W (CS) - 42JTS1 W (CS)

HEAT-SHRINKABLE MV STRAIGHT JOINTS FOR UNARMoured SINGLE CORE POLYMERIC CABLES WITH COPPER WIRE OR COPPER TAPE SCREEN
Up to Umax 42 kV

APPLICATION
36-42JTS1 W heat-shrinkable straight joints are designed for unarmoured, plastic insulated cables with Cu wire or Cu tape screen, to accommodate either crimped or mechanical connectors.

TECHNICAL CHARACTERISTICS AND DESIGN
36-42JTS is the **NEW** high performance, compact and easy to install joint. Double bodies with all the electrical functions integrated!

The Nexans **36-42JTS** is an integrated coextruded “stress control field + insulating” nested in a coextruded “insulating + conductive” tube, which can withstand high voltage applications up to 42kV.

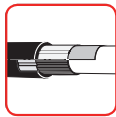
A double layer pad with conductive rubber inside and HK orange mastic outside ensure a Faraday cage and smooth the effect of the electrical field and of the voltage gradient in the connector area.

The electrical continuity of the screen is ensured by a tinned copper stocking with constant force roll springs in case of copper/wire tape screen (**CS type**) or with a standard tinned copper tape plus an earthing ferrule in case of only copper wire screen (**W type**).

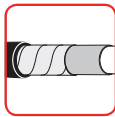
The outer sheath is restored with heavy wall adhesive lined tubing.
MC types are supplied with “Nexans GPH” mechanical connectors.

Um kV	Type	Section range (mm²)	Length L (mm)	DOI Insulation (mm)	DOE Outer (mm)
36	36JTS1.95W-(CS)	25÷95	600 (750 CS)	18-32	32-48
36	36JTS1.240W-(CS)	70÷240	750 (900 CS)	24-38	34-54
36	36JTS1.300W-(CS)	95÷300	750 (900 CS)	26-40	34-58
36	36JTS1.400W-(CS)	185÷400	750 (1000 CS)	28-44	38-62
42	42JTS1.95W-(CS)	25÷95	600 (750 CS)	20-34	34-50
42	42JTS1.240W-(CS)	70÷240	750 (900 CS)	26-42	38-54
42	42JTS1.300W-(CS)	95÷300	750 (900 CS)	28-46	40-60
42	42JTS1.400W-(CS)	185÷400	750 (1000 CS)	32-48	42-64

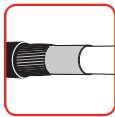
- 36JTS type tested with BIL at 200 kV



For cables with additional vapor screen please contact our sales office.



CS type is suitable both cables with copper wire / copper tape screen.



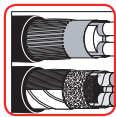
W type is supplied with standard metallic tape design and earth ferrule for copper wire screen cable.



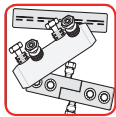
For other cable types please contact our sales office.



Please contact our sales office when inquiring joints for same type cables with different cross sections.



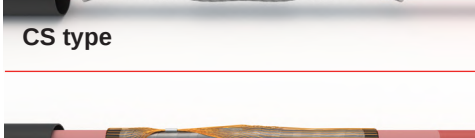
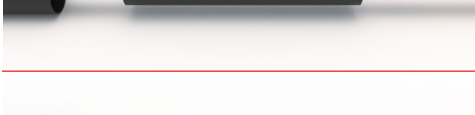
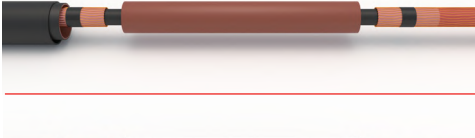
Various earth connection design solutions exist for armoring. For exact details contact our sales office.



Design accommodates various connector/ferrule types.



Various earth for connection kits are available for screen connection. For exact details contact our sales office.



Specifications and Standards
CENELEC HD 629.1 S3
IEC 60502-4

17JTS1 WSK2.0 (MC) - 24JTS1 WSK2.0 (MC)

HEAT-SHRINKABLE MV STRAIGHT JOINTS FOR UNARMORED SINGLE CORE POLYMERIC CABLES WITH AL TAPE SCREEN (AHXAMK-WP)
Up to Umax 24 kV

APPLICATION
17-24JTS1 WSK2.0 heat-shrinkable straight joints are designed for unarmoured, plastic insulated cables with Al tape screen, to accommodate either crimped or mechanical connectors (MC).

TECHNICAL CHARACTERISTICS AND DESIGN
17-24JTS is the **NEW** high performance, compact and easy to install joint. A single body with all the electrical functions integrated!

The Nexans “**TRIPLE GT125**” is an integrated stress control field, insulating and conductive tube, which can withstand high voltage applications up to 24kV.

A double layer pad with conductive rubber inside and HK orange mastic outside ensure a Faraday cage and smooth the effect of the electrical field and of the voltage gradient in the connector area.

The electrical continuity of the screen is ensured by a tinned copper stocking with roll constant force springs.

The outer sheath is restored with heavy wall adhesive lined tubing. Wrap around sleeve, with Al foil, available upon request (**WSK3.0**). Kit with cheese grader instead of constant force roll springs available (**WSK FC**). **MC types** are supplied with “Nexans GPH” mechanical connectors.

Um kV	Type	Section range (mm²)	Length L (mm)	DOI Insulation (mm)	DOE Outer (mm)
12/17,5	3x17JTS1.95WSK 2.0	25÷95	600	12-24	20-38
12/17,5	3x17JTS1.240WSK 2.0	70÷240	600	16-32	24-44
12/17,5	3x17JTS1.300WSK 2.0	95÷300	750	18-34	26-48
12/17,5	3x17JTS1.400WSK 2.0	185÷400	750	22-38	30-52
24	3x24JTS1.95WSK 2.0	25÷95	600	18-28	24-40
24	3x24JTS1.240WSK 2.0	70÷240	600	20-36	26-46
24	3x24JTS1.300WSK 2.0	95÷300	750	22-38	28-52
24	3x24JTS1.400WSK 2.0	185÷400	750	24-40	32-54

- **17JTS** type tested with BIL at 95 kV, PD at 2Uo (≤ 10 pC)
- **24JTS** type tested with BIL at 150 kV, PD at 2Uo (≤ 10 pC)



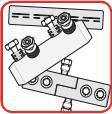
For other cable types please contact our sales office.



Please contact our sales office when inquiring joints for same type cables with different cross sections.



Various earth connection design solutions exist for armoring. For exact details contact our sales office.



Design accommodates various connector/ferrule types.



Various earth for connection kits are available for screen connection. For exact details contact our sales office.

36JTS1 WSK2.0 (MC) - 42JTS1 WSK2.0 (MC)

HEAT-SHRINKABLE MV STRAIGHT JOINTS FOR UNARMORED SINGLE CORE POLYMERIC CABLES WITH AL TAPE SCREEN (AHXAMK-WP)
Up to Umax 42 kV

APPLICATION
36-42JTS1 WSK2.0 heat-shrinkable straight joints are designed for unarmoured, plastic insulated cables with Al tape screen, to accommodate either crimped or mechanical connectors (MC).

TECHNICAL CHARACTERISTICS AND DESIGN
36-42JTS is the **NEW** high performance, compact and easy to install joint. Double bodies with all the electrical functions integrated!

The Nexans **36-42JTS** is an integrated coextruded “stress control field + insulating” nested in a coextruded “insulating + conductive” tube, which can withstand high voltage applications up to 42kV.

A double layer pad with conductive rubber inside and HK orange mastic outside ensure a Faraday cage and smooth the effect of the electrical field and of the voltage gradient in the connector area.

The electrical continuity of the screen is ensured by a tinned copper stocking with roll constant force springs.

The outer sheath is restored with heavy wall adhesive lined tubing. Wrap around sleeve, with Al foil, available upon request (**WSK3.0**). Kit with cheese grader instead of constant force roll springs available (**WSK FC**). **MC types** are supplied with “Nexans GPH” mechanical connectors.

Um kV	Type	Section range (mm²)	Length L (mm)	DOI Insulation (mm)	DOE Outer (mm)
36	3x36JTS1.95WSK2.0	25÷95	750	18-32	32-48
36	3x36JTS1.240WSK2.0	70÷240	1000	24-38	34-54
36	3x36JTS1.300WSK2.0	95÷300	1000	26-40	34-58
36	3x36JTS1.400WSK2.0	185÷400	1000	28-44	38-62
42	3x42JTS1.95WSK2.0	25÷95	1000	20-34	34-50
42	3x42JTS1.240WSK2.0	70÷240	1000	26-42	38-54
42	3x42JTS1.300WSK2.0	95÷300	1000	28-46	40-60
42	3x42JTS1.400WSK2.0	185÷400	1000	32-48	42-64

- **36JTS** type tested with BIL at 200 kV



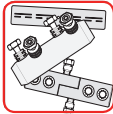
For other cable types please contact our sales office.



Please contact our sales office when inquiring joints for same type cables with different cross sections.



Various earth connection design solutions exist for armoring. For exact details contact our sales office.



Design accommodates various connector/ferrule types.



Various earth for connection kits are available for screen connection. For exact details contact our sales office.

17JTS3 CW - 24JTS3 CW

HEAT-SHRINKABLE MV STRAIGHT JOINTS FOR UNARMoured THREE CORE POLYMERIC CABLES WITH COPPER WIRE OR COPPER TAPE SCREEN
Up to Umax 24 kV

APPLICATION

17-24JTS3 CW heat-shrinkable straight joints are designed for unarmoured, plastic insulated cables with Cu wire or Cu tape screen, to accommodate either crimped or mechanical connectors.

TECHNICAL CHARACTERISTICS AND DESIGN

17-24JTS is the **NEW** high performance, compact and easy to install joint. A single body with all the electrical functions integrated!

The Nexans “**TRIPLE GT125**” is an integrated stress control field, insulating and conductive tube, which can withstand high voltage applications up to 24kV.

A double layer pad with conductive rubber inside and HK orange mastic outside ensure a Faraday cage and smooth the effect of the electrical field and of the voltage gradient in the connector area.

The electrical continuity of the screen is ensured with a standard metallic tape plus earthing ferrules (**CW type**) while for tape screen an additional earthing braid is provided (**AW type**).

The outer sheath is restored with heavy/medium wall adhesive lined tubing. Vapor barrier protection available upon request (VS). MC types are supplied with "Nexans GPH" mechanical connectors.

Um kV	Type	Section range (mm²)	Length L (mm)	DOI Insulation (mm)	DOE Outer (mm)
12/17,5	17JTS3.95CW	25÷95	1200	12-24	38-66
12/17,5	17JTS3.240CW	70÷240	1200	16-32	46-80
12/17,5	17JTS3.300CW	95÷300	1400	18-34	52-86
12/17,5	17JTS3.400CW	185÷400	1400	22-38	62-94
24	24JTS3.95CW	25÷95	1200	18-28	46-72
24	24JTS3.240CW	70÷240	1400	20-36	48-88
24	24JTS3.300CW	95÷300	1400	22-38	54-92
24	24JTS3.400CW	185÷400	1600	24-40	68-96

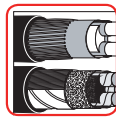
- **17JTS** type tested with BIL at 95 kV, PD at 2Uo (≤ 10 pC)
- **24JTS** type tested with BIL at 150 kV, PD at 2Uo (≤ 10 pC)



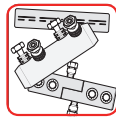
For other cable types please contact our sales office.



Please contact our sales office when inquiring joints for same type cables with different cross sections.



Various earth connection design solutions exist for armoring. For exact details contact our sales office.

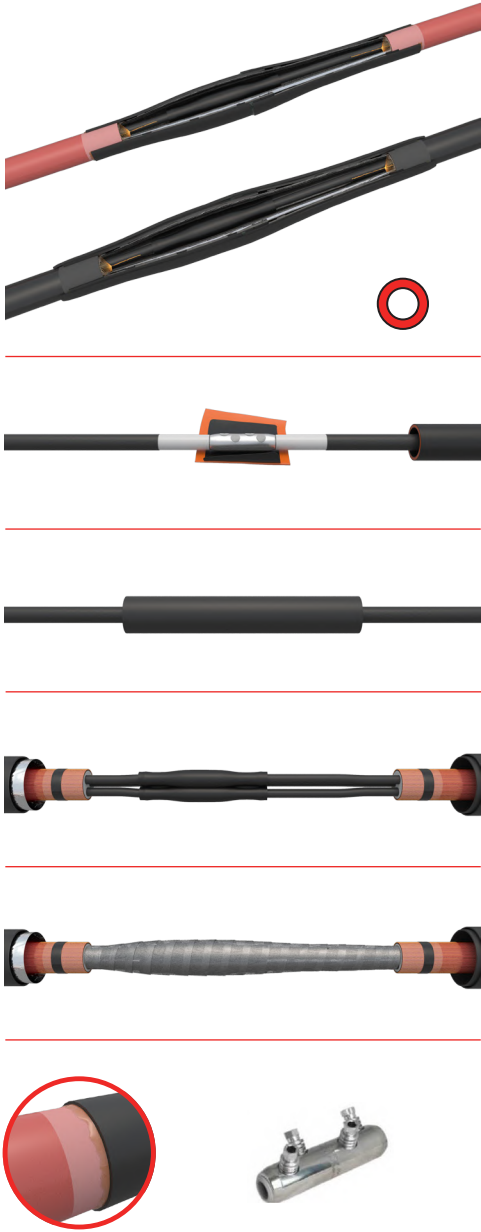


Design accommodates various connector/ferrule types.



Various earth for connection kits are available for screen connection. For exact details contact our sales office.

Specifications and Standards
CENELEC HD 629.1 S2
IEC 60502-4



36JTS3 CW - 42JTS3 CW

HEAT-SHRINKABLE MV STRAIGHT JOINTS FOR UNARMoured THREE CORE POLYMERIC CABLES WITH COPPER WIRE OR COPPER TAPE SCREEN
Up to Umax 42 kV

APPLICATION

36-42JTS3 CW heat-shrinkable straight joints are designed for unarmoured, plastic insulated cables with Cu wire or Cu tape screen, to accommodate either crimped or mechanical connectors.

TECHNICAL CHARACTERISTICS AND DESIGN

36-42JTS is the **NEW** high performance, compact and easy to install joint. Double bodies with all the electrical functions integrated!

The Nexans **36-42JTS** is an integrated coextruded “stress control field + insulating” nested in a coextruded “insulating + conductive” tube, which can withstand high voltage applications up to 42kV

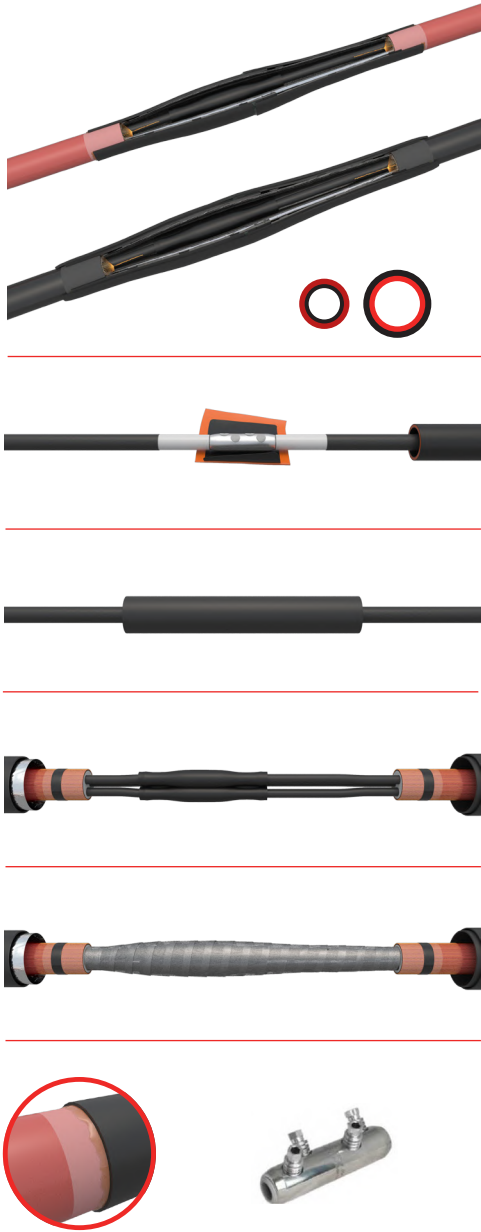
A double layer pad with conductive rubber inside and HK orange mastic outside ensure a Faraday cage and smooth the effect of the electrical field and of the voltage gradient in the connector area.

The electrical continuity of the screen is achieved with a standard metallic tape plus earthing ferrules (**CW type**) while for tape screen an additional earthing braid is provided (**AW type**).

The outer sheath is restored with heavy/medium wall adhesive lined tubing. Vapor barrier protection available upon request (VS). MC types are supplied with “Nexans GPH” mechanical connectors.

Um kV	Type	Section range (mm²)	Length L (mm)	DOI Insulation (mm)	DOE Outer (mm)
36	36JTS3.95CW	25÷95	1400	18-32	64-92
36	36JTS3.240CW	70÷420	1600	24-38	66-112
36	36JTS3.300CW	95÷300	1600	26-40	70-118
36	36JTS3.400CW	185÷400	1800	28-44	80-132
42	42JTS3.95CW	25÷95	1400	20-34	64-94
42	42JTS3.240CW	70÷420	1600	26-42	66-114
42	42JTS3.300CW	95÷300	1600	28-46	70-122
42	42JTS3.400CW	185÷400	1800	32-48	80-136

- **36JTS** type tested with BIL at 200 kV



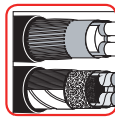
Specifications and Standards
CENELEC HD 629.1 S3
IEC 60502-4



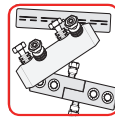
For other cable types please contact our sales office.



Please contact our sales office when inquiring joints for same type cables with different cross sections.



Various earth connection design solutions exist for armoring. For exact details contact our sales office.



Design accommodates various connector/ferrule types.



Various earth for connection kits are available for screen connection. For exact details contact our sales office.

17JTS3 K - 24JTS3 K

HEAT-SHRINKABLE MV STRAIGHT JOINTS FOR ARMoured THREE CORE POLYMERIC CABLES WITH COPPER WIRE OR COPPER TAPE SCREEN
Up to Umax 24 kV

APPLICATION
17-24JTS3 K heat-shrinkable straight joints are designed for armoured, plastic insulated cables with Cu wire or Cu tape screen, to accommodate either crimped or mechanical connectors.

TECHNICAL CHARACTERISTICS AND DESIGN
17-24JTS3 K is the **NEW** high performance, compact and easy to install joint. A single body with all the electrical functions integrated!

The Nexans “**TRIPLE GT125**” is an integrated stress control field, insulating and conductive tube, which can withstand high voltage applications up to 24kV.

A double layer pad with conductive rubber inside and HK orange mastic outside ensure a Faraday cage and smooth the effect of the electrical field and of the voltage gradient in the connector area.

Screen connection and armour continuity material whether SWA, STA, DSTA are included in the kit.

The outer sheath is restored with heavy/medium wall adhesive lined tubing. MC types are supplied with “Nexans GPH” mechanical connectors.

Um kV	Type	Section range (mm²)	Length L (mm)	DOI Insulation (mm)	DOE Outer (mm)
12/17,5	17JTS3.95K	25÷95	1200	12-24	40-74
12/17,5	17JTS3.240K	70÷240	1400	16-32	48-92
12/17,5	17JTS3.300K	95÷300	1400	18-34	56-98
12/17,5	17JTS3.400K	185÷400	1600	22-38	64-102
24	24JTS3.95K	25÷95	1200	18-28	48-82
24	24JTS3.240K	70÷240	1400	20-36	54-98
24	24JTS3.300K	95÷300	1600	22-38	58-98
24	24JTS3.400K	185÷400	1800	24-40	66-106

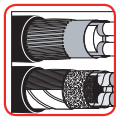
- **17JTS** type tested with BIL at 95 kV, PD at 2Uo (≤ 10 pC)
- **24JTS** type tested with BIL at 150 kV, PD at 2Uo (≤ 10 pC)



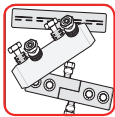
For other cable types please contact our sales office.



Please contact our sales office when inquiring joints for same type cables with different cross sections.



Various earth connection design solutions exist for armoring. For exact details contact our sales office.

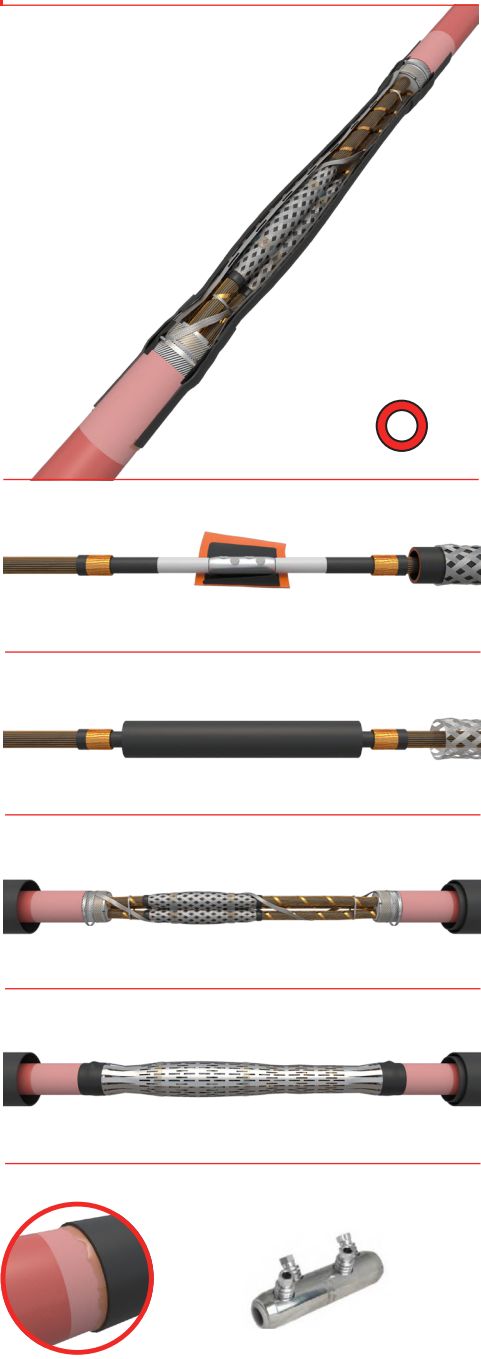


Design accommodates various connector/ferrule types.



Various earth for connection kits are available for screen connection. For exact details contact our sales office.

Specifications and Standards
CENELEC HD 629.1 S2
IEC 60502-4



36JTS3 K - 42JTS3 K

HEAT-SHRINKABLE MV STRAIGHT JOINTS FOR ARMoured THREE CORE POLYMERIC CABLES WITH COPPER WIRE OR COPPER TAPE SCREEN
Up to Umax 24 kV

APPLICATION
36-42JTS3 K heat-shrinkable straight joints are designed for armoured, plastic insulated cables with Cu wire or Cu tape screen, to accommodate either crimped or mechanical connectors.

TECHNICAL CHARACTERISTICS AND DESIGN
36-42JTS is the **NEW** high performance, compact and easy to install joint. Double bodies with all the electrical functions integrated!

The Nexans **36-42JTS** is an integrated coextruded “stress control field + insulating” nested in a coextruded “insulating + conductive” tube, which can withstand high voltage applications up to 42kV

A double layer pad with conductive rubber inside and HK orange mastic outside ensure a Faraday cage and smooth the effect of the electrical field and of the voltage gradient in the connector area.

Screen connection and armour continuity material whether SWA, STA, DSTA are included in the kit.

The outer sheath is restored with heavy/medium wall adhesive lined tubing. MC types are supplied with “Nexans GPH” mechanical connectors.

Um kV	Type	Section range (mm²)	Length L (mm)	DOI Insulation (mm)	DOE Outer (mm)
36	36JTS3.95K	25÷95	1200	18-32	64-92
36	36JTS3.240K	70÷240	1400	24-38	66-112
36	36JTS3.300K	95÷300	1400	26-40	70-118
36	36JTS3.400K	185÷400	1600	28-44	80-132
42	42JTS3.95K	25÷95	1200	20-34	64-94
42	42JTS3.240K	70÷240	1400	26-42	66-114
42	42JTS3.300K	95÷300	1600	28-46	70-122
42	42JTS3.400K	185÷400	1800	32-48	80-136

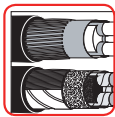
- **36JTS** type tested with BIL at 200 kV



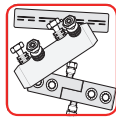
For other cable types please contact our sales office.



Please contact our sales office when inquiring joints for same type cables with different cross sections.



Various earth connection design solutions exist for armoring. For exact details contact our sales office.

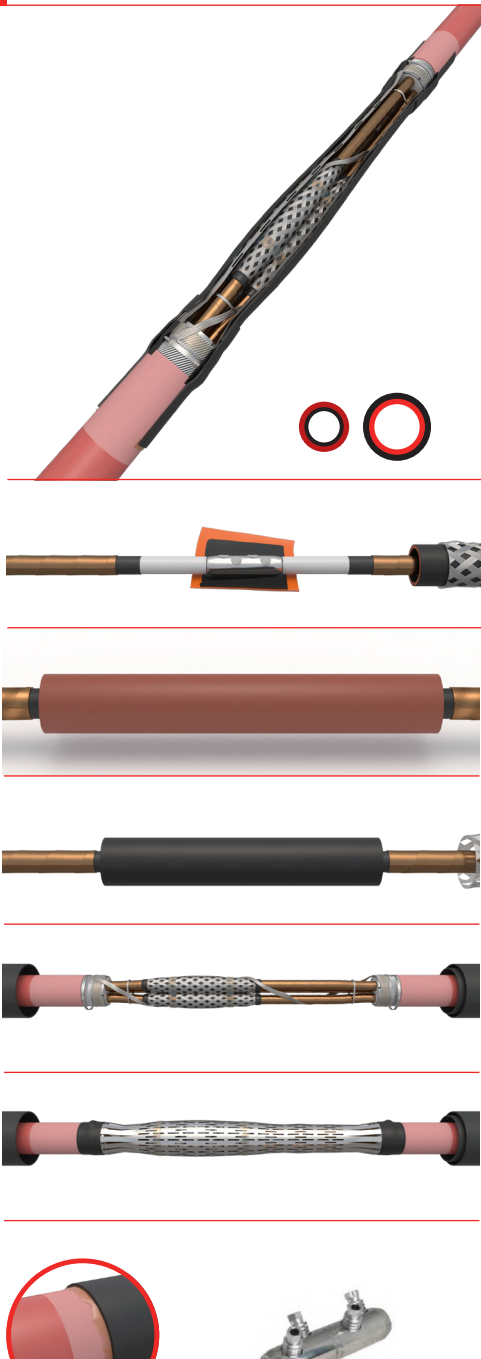


Design accommodates various connector/ferrule types.



Various earth for connection kits are available for screen connection. For exact details contact our sales office.

Specifications and Standards
CENELEC HD 629.1 S3
IEC 60502-4





Customer references

JTS joints have been sold starting from 2018 in more than 80000 pcs :

- GERMANY
- BALKANIC AREA (SERBIA, CROATIA, BULGARIA, MACEDONIA)
- AUSTRIA
- SWITZERLAND
- POLAND
- BELGIUM
- LITHUANIA
- FINLAND
- SWEDEN
- DENMARK
- BELGIUM
- UK
- ITALY
- MIDDLE EAST (SAUDI ARABIA, EAU, ISRAEL, JORDAN)
- .INDIA
- AUSTRALIA - NEW ZEALAND





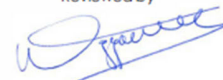
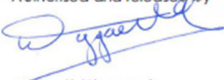
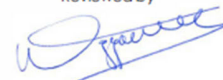
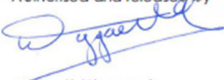
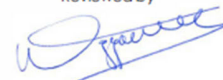
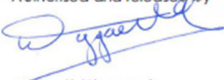
Type Tests

Voltage class. 6,3/11 kV- 8,7/15 kV

Type Test Report	
Document No.	08817-18-0885
Copy No.	1
Number of pages	72
Apparatus	Three core heat-shrinkable straight through joint for polymeric power cable with a rated voltage of 8.7/15 (17.5) kV Type II
Designation	17JIT3.300K, 17JTS3.300K
Serial Number	Test sample
Manufacturer	Nexans Italia S.p.A. Contrada Tesiono 63073 Offida ITALY
Client	Nexans Italia S.p.A. Contrada Tesiono 63073 Offida ITALY
Date(s) of test(s)	29 June to 28 September 2018
Tested by	IPH Institut „Prüffeld für elektrische Hochleistungstechnik“ GmbH Landsberger Allee 378A 12681 Berlin GERMANY
Test(s) performed	According to HD 629.1 S2: 2006 + A1: 2008 "Test requirements on accessories for use on power cables of a rated voltage from 3.6/5 (7.2) kV up to 20.8/36 (42) kV Part 1: Cables with extruded insulation"
The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this document has been subjected to the series of proving tests in accordance with: HD 629.1 S2: 2006 + A1: 2008 "Test requirements on accessories for use on power cables of a rated voltage from 3.6/5 (7.2) kV up to 20.8/36 (42) kV Part 1: Cables with extruded insulation"	
The results are shown in the record of proving tests and the oscillograms attached hereto. The values obtained and the general performance are considered to comply with the above Standard(s). The ratings assigned by the Manufacturer are listed on the rating page. The document applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designations with that tested rests with the Manufacturer.	
Date	09 August 2019
Test Engineer in charge	Detlef Jägust
Approved by	Hannes Zinnbauer
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 Deutsche Akkreditierungsstelle D-PL-12107-01-00 IPH Institut "Prüffeld für elektrische Hochleistungstechnik" GmbH is accredited testing laboratory by DAKkS according to EN ISO/IEC 17025:2005. The accreditation is valid only for the scope listed in the annex of the accreditation certificate D-PL-12107-01-00. www.dakks.de	
 测思 CENTRE ELECTROTECHNIQUE SPERIMENTALE PARIS-EST	
Trust the Power of Experience	



Voltage class. 12,7/22 kV – (400-630 sq.mm)

ELAB-QFORM-01001 Rev. 01.6											
 ELECTRICAL TESTING LABORATORY Nexans Network Solutions N.V. – Div. EUROMOLD ZUID III, Industrielaan 12 B-9320 EREMBODEGEM (AALST) (Site 2)											
TEST REPORT No. TE 413 21 14: contains 36 pages including 7 appendices											
Requestor: Nexans Power Accessories Italy Contrada Tesino 181B 63035 OFFIDA, (AP) ITALY											
SECURITY CLASSIFICATION: FOR PUBLICATION											
<table border="1"><tr><td>TEST OBJECT TYPE</td><td>: 24 kV single core heat shrinkable straight through joint : 24JTS1.630</td></tr><tr><td>Rated voltage U_0/U</td><td>: 12/20 kV</td></tr><tr><td>Highest system voltage U_m</td><td>: 24 kV</td></tr><tr><td>Manufacturer</td><td>: Nexans Power Accessories Italy (NPAI)</td></tr><tr><td>Request number</td><td>: TRF A2021-015</td></tr></table>		TEST OBJECT TYPE	: 24 kV single core heat shrinkable straight through joint : 24JTS1.630	Rated voltage U_0/U	: 12/20 kV	Highest system voltage U_m	: 24 kV	Manufacturer	: Nexans Power Accessories Italy (NPAI)	Request number	: TRF A2021-015
TEST OBJECT TYPE	: 24 kV single core heat shrinkable straight through joint : 24JTS1.630										
Rated voltage U_0/U	: 12/20 kV										
Highest system voltage U_m	: 24 kV										
Manufacturer	: Nexans Power Accessories Italy (NPAI)										
Request number	: TRF A2021-015										
Start and end date 01/06/2021 – 18/10/2021	Test specification CLC EN IEC 61442 Ed. 2:2005 – Test methods CLC HD 629.1 S3: 2019 – Test requirements Test series: Table 12-test sequence B1(I)										
TEST RESULT: the test object successfully passed the prescribed test series.											
ELAB											
<table border="1"><tr><td>Certified Tester Approved by  D. Pennewaert</td><td>Technical Manager Reviewed by </td><td>Strategic Lab Manager Authorised and released by  K. Weygaerts</td></tr></table>		Certified Tester Approved by  D. Pennewaert	Technical Manager Reviewed by 	Strategic Lab Manager Authorised and released by  K. Weygaerts							
Certified Tester Approved by  D. Pennewaert	Technical Manager Reviewed by 	Strategic Lab Manager Authorised and released by  K. Weygaerts									
Erembodegem, 04 th November 2021 Made in 1 copy Copy no. 1											
  No. 144-TEST											
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Test report No. TE 413 21 14	Page 1 of 36										



Voltage class. 12,7/22 kV – (240 sq.mm)

Rev. 014



ELECTRICAL TESTING LABORATORY

Nexans Network Solutions N.V. – Div. EUROMOLD
ZUID III, Industrielaan 12
B-9320 EREMBODEGEM (AALST) (Site 2)

TEST REPORT

No. TE 413 19 01: contains 22 pages including 8 appendices

Requestor:	Nexans Power Accessories Italy Contrada Tesino 181B 63035 OFFIDA, (AP) ITALY
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SECURITY CLASSIFICATION: FOR PUBLICATION

TEST OBJECT	: 24 kV single core heat shrinkable straight through joint for XLPE insulated, aluminium tape screen cable
TYPE	: 24JTS1.240MC-WSK
Rated voltage U_0/U	: 12,7/22 kV
Highest system voltage U_m	: 24 kV
Manufacturer	: Nexans Power Accessories Italy (NPAI)
Request number	: TRF A2019-024

Start and end date	Test specification
09/04/2019 - 20/06/2019	CLC HD 629.1 S2 (02/2006) + A1 (09/2008): Test requirements CLC EN IEC 61442 Ed. 2 (03/2005): Test methods Test series: Table 10 for the cable cross-section 240 mm ²

TEST RESULT: the test object successfully passed the prescribed test series.

ELAB

Certified Tester Approval D. Pennewaert	Technical Manager Approval K. Weygaerts	Strategic Lab Manager Approval K. Weygaerts
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Erembodegem, 25 June 2019

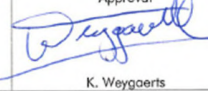
Made in 2 copies
Copy no. 1



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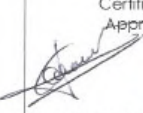
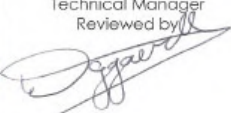
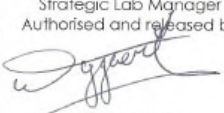


Voltage class. 12,7/22 kV

ELAB-GFORM-010-01 Rev. 014		
 ELECTRICAL TESTING LABORATORY Nexans Network Solutions N.V. - Div. EUROMOLD ZUID III, Industrielaan 12 B-9320 EREMBODEGEM (AALST) (Site 2)		
TEST REPORT No. TE 413 19 04: contains 36 pages including 8 appendices		
Requestor:	Nexans Power Accessories Italy Contrada Tesino 181B 63035 OFFIDA, (AP) ITALY	
SECURITY CLASSIFICATION: FOR PUBLICATION		
TEST OBJECT	: 24 kV single core heat shrinkable straight through joint for XLPE insulated, aluminium tape screen cable	
TYPE	: 24JTS1.300W	
Rated voltage U_0/U	: 12,7/22 kV	
Highest system voltage U_m	: 24 kV	
Manufacturer	: Nexans Power Accessories Italy (NPAI)	
Request number	: TRF A2019-003	
Start and end date	Test specification CLC HD 629.1 S2 (02/2006) + A1 (09/2008): Test requirements CLC EN IEC 61442 Ed. 2 (03/2005): Test methods Test series: Table 5 - test sequence B1 (I)	
09/04/2019 - 27/06/2019		
TEST RESULT: the test object successfully passed the prescribed test series.		
ELAB		
Certified Tester Approval  D. Pennewaert	Technical Manager Approval 	Strategic Lab Manager Approval  K. Weygaerts
Erembodegem, 27 June 2019	Made in 2 copies Copy no. 1	 
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Page 1 of 36		



Voltage class. 20,8/36 kV – (95-300 sq.mm)

ELAB-GFCRM-010-01 Rev. 016	
 ELECTRICAL TESTING LABORATORY Nexans Network Solutions N.V. – Div. EUROMOLD ZUID III, Industrielaan 12 B-9320 EREMBODEGEM (AALST) (Site 2)	
TEST REPORT Nos. TE 413 20 27 _ TE 413 21 07: contains 61 pages including 7 appendices	
Requestor:	Nexans Power Accessories Italy Contrada Tesino 181B 63035 Offida, (AP) Italy
SECURITY CLASSIFICATION: FOR PUBLICATION.	
TEST OBJECT TYPE	: 42 kV single core heat shrink straight through joint : 42JTS1.300
Rated voltage U_0/U	: 20,8/36 kV
Highest system voltage U_m	: 42 kV
Manufacturer	: Nexans Power Accessories Italy (NPAI)
Request number	: TRF A2020-048 _ TRF A2020-048B
Start and end date	Test specification CLC HD 629.1 S3 (03/2019): Test requirements CLC EN IEC 61442 Ed. 2 (03/2015): Test methods Test series: Table 12 – test sequence B1(I) – B2
29/10/2020 – 04/06/2021	
TEST RESULT: the test object successfully passed the prescribed test series.	
ELAB	
Certified Tester Approved by  J. Cauwel / D. Pennewaert	Technical Manager Reviewed by  K. Weygaerts
Strategic Lab Manager Authorised and released by  K. Weygaerts	
Erembodegem, 14 th July 2021	Made in 1 copy Copy no. 1
  No. 144-TEST	
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Test report No. TE 413 20 27 TE 413 21 07	Page 1 of 61

HEAT SHRINK TUBE GT125

Multi-layer tube (outer layer conducting/ inner layer insulating/inner-most layer stress control)



Typical Characteristics

GT125 is a co-extruded screened insulating and stress-control tube. It is composed by a stress-control inner-most layer (black color), an insulating inner layer (red color) and a conducting outer layer (black color).

Suitable as stress grading, primary insulation and screen in joints up to 24 kV.

GT125 ensures a continuous operating temperature from -40 °C to +135 °C and it has a minimum shrink temperature of 125°C.

General Information

Packaging – Shelf

The product is supplied as tubes of specified dimension. It can be supplied as singularly pieces, in box or as part of joint kit.

Storage shall be in accordance with good commercial practice.

The product should be stored in the original packaging, protected from dust, heat, sunlight and moisture. The product should be stored between -20 °C and +40 °C.

Safety and Handling

Relevant safety data and references, any necessary warning labels as well as information about REACH registration are to be found in the product safety data sheet.

Technical properties of stress control material (black inner-most layer)

Properties	Unit	Specification range	Test method
Density	g/cm ³	1.30 +/- 10%	ISO 1183
Tensile strength	MPa	≥ 4	ISO 37
Ultimate elongation	%	≥ 200	ISO 37
Dielectric constant	-	≥ 5	IEC 62631-2-1
Volume resistivity	Ω.cm	≥ 1·10 ⁰⁸	IEC 62631-3-1
Dielectric strength	kV/mm	≥ 3	IEC 60243
Long term ageing (3000 h at 100°C ± 3°C)			IEC 60684-2
Ultimate elongation	%	≥ 100	ISO 37

Technical properties of insulating material (red inner layer)

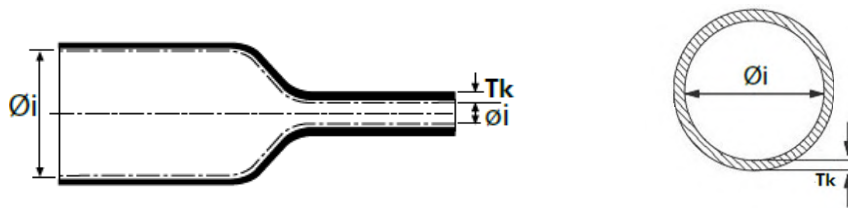
Properties	Unit	Specification range	Test method
Density	g/cm ³	1.20 +/- 10%	ISO 1183
Tensile strength	MPa	≥ 13	ISO 37
Ultimate elongation	%	≥ 350	ISO 37
Dielectric constant	-	≤ 3.5	IEC 62631-2-1
Volume resistivity	Ω.cm	≥ 1·10 ¹²	IEC 62631-3-1
Dielectric strength	kV/mm	≥ 14	IEC 60243
Water absorption	%	≤ 0.5	ISO 62
Heat Ageing (168 h at 150 °C ± 3°C)			IEC 60684-2
Tensile strength	Mpa	≥ 10	ISO 37
Ultimate elongation	%	≥ 200	ISO 37

Technical properties of semi-conductive material (black outer layer)

Properties	Unit	Specification range	Test method
Density	g/cm ³	1.00 +/- 10%	ISO 1183
Tensile strength	MPa	≥ 10	ISO 37
Ultimate elongation	%	≥ 350	ISO 37
Volume resistivity	Ω.cm	≤ 1·10 ⁰⁵	IEC 62631-3-1
Water absorption	%	≤ 0.5	ISO 62

The compounds are made by specialized companies located in Europe in accordance with our formulations. Before being extruded, all batches of compounds are carefully checked by our quality service. During the extrusion, cross-linking (E-beam) and expansion process, the tubes are subjected to very accurated manufacturing procedures in terms of dimensions and electrical-mechanical properties.

Dimensions



type	Øi		Tk		Standard cut length (mm)
	E min (mm)	R max (mm)	E min (mm)	R max (mm)	
GT125-50 (60-12)	60	12	4.0	11.0	300
GT125-60 (70/15)	70	15	4.0	11.5	350
GT125-80 (80/24)	80	24	5.0	12.0	400

Note: R= dimensions after free recovered E= dimensions as supplied (expanded)

Other information:

Cut tolerance:
-0%; +5% all size

Longitudinal change after free
recovery: -10%; +5%

Concentricity:
Expanded ≥ 50%
Fully recovered ≥ 85%

HEAT SHRINK TUBE GT4

Heavy-wall insulating and outer sealing tube with adhesive



Typical Characteristics

GT4 is a black heavy wall co-extruded tube with adhesive designed for outer protection in joints.

Suitable as primary insulation in low voltage applications or as outer protection in low (LV) and medium voltage (MV) applications. It ensures a continuous operating temperature from -40 °C to +135 °C and it has a minimum shrink temperature of 125°C.

The adhesive layer ensures a water tight seal and eliminates moisture ingress. Provide excellent adhesion to a variety of cable substrates, and various metals.

The tubes size and recovered wall thickness are in full compliance with the DIN47640

GT4 is UV and weather resistant, provides excellent abrasion and impact resistance for LV and MV joints; the sleeve can be classified as Low Smoke Zero Halogen (LSZH) in accordance with IEC 61034-1/2.

General Information

Packaging – Shelf

The product is supplied as tubes of specified dimensions. It can be supplied as singularly pieces, in box or as part of joint kit.

Storage shall be in accordance with good commercial practice.

The product should be stored in the original packaging, protected from dust, heat, sunlight and moisture. The product should be stored between -20 °C and +40 °C.

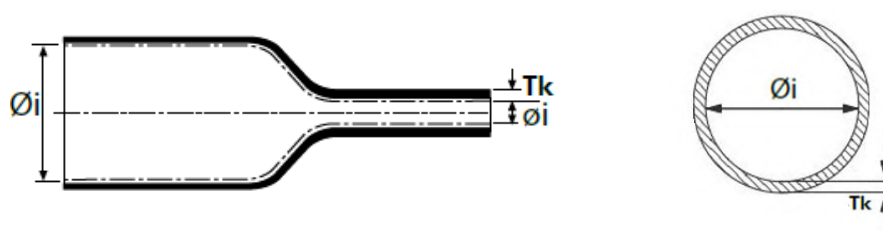
Safety and Handling

Relevant safety data and references, any necessary warning labels as well as information about REACH registration are to be found in the product safety data sheet.

Technical properties

Properties	Unit	Material Requirements	Test method
Density	g/cm ³	1.1 +/- 10%	ISO 1183
Tensile strength	MPa	≥ 13	ISO 37
Ultimate elongation	%	≥ 350	ISO 37
Dielectric constant	-	≤ 5	IEC 62631-2-1
Volume resistivity	Ω.cm	≥ 1·10 ¹²	IEC 62631-3-1
Dielectric strength	kV/mm	≥ 14	IEC 60243
Water absorption	%	≤ 0.5	ISO 62
Content of carbon black (UV Resistance)	%	≥ 2.5	ISO 11358
Heat Ageing (168 h at 150°C ± 3°C)			IEC 60684-2
Tensile strength	MPa	≥ 10	ISO 37
Ultimate elongation	%	≥ 200	ISO 37
Fungus and mildew resistance		GL0	ASTM G 21
Chemical resistance		Treatment with 0,1N Na ₂ SO ₄ , H ₂ SO ₄ , NaOH, NaCl	

Dimensions



type	Application range		Øi		Tk	
	from (mm)	to (mm)	E min (mm)	R max (mm)	E min (mm)	R max (mm)
GT4-15 (15/4)	5	14	15	4	0.8	2.7
GT4-20 (23/6)	7	18	23	6	0.8	3.1
GT4-30 (34/8)	9	28	34	8	1.3	4.3
GT4-40 (43/12)	13	38	43	12	1.4	4.8
GT4-50 (56/16)	17	48	56	16	1.5	4.8
GT4-70 (73/21)	22	60	73	21	1.2	4.8
GT4-90 (90/22)	24	71	90	22	1.2	4.8
GT4-110 (115/25)	28	81	115	25	1.1	4.8
GT4-120 (130/36)	39	100	130	36	1.1	4.8
GT4-180 (180/55)	58	170	180	55	1.6	5.0
GT4-220 (230/67)	72	210	230	67	1.8	5.5
GT4-260 (260/74)	79	230	260	74	1.8	5.5

Note:

R= dimensions after free recovered

E= dimensions as supplied (expanded)

Other information:

Cut tolerance:
-0%, +5% all size

Longitudinal change after free
recovery: -10%; +5%
IEC 60684-3-214

Concentricity:
Expanded ≥ 50%
Fully recovered ≥ 85%
IEC 60684-3-214

All drawings, designs, specifications, plans and particulars of weights, size and dimensions contained in the technical or commercial documentation of Nexans is indicative only and shall not be binding on Nexans or be treated as constituting a representation on the part of Nexans.

 Laboratoire Essais Feu - NRC 18, rue Lortet – BP 7153 69007 LYON FRANCE Tel 04.72.72.24.24 UL CTDPA2477	RAPPORT D'ESSAIS TEST REPORT	Numéro de dossier : <i>File number</i> RPE-LEF-19-193-C Index 1
Référence de l'échantillon <i>Sample reference</i>	GT4-90 DSRTK	

INFORMATIONS SUR LE DEMANDEUR / APPLICANT INFORMATION
--

Unité, Société, service / <i>Unit, Plant, service</i>	Nexans Italia Spa
Nom du demandeur / <i>Requestor Name</i>	M.Finello / E.Menghi
Votre référence interne / <i>Internal reference</i>	
Adresse / <i>Address</i>	Contrada Tesino 181/B Offida
Tél. / <i>Phone</i>	+39 0736 888912
e-mail	sante_marcello.finello@nexans.com

INFORMATIONS SUR LES TESTS ET ANALYSES DEMANDES <i>INFORMATION ON THE ANALYSIS & TEST REQUIRED</i>
--

Date de réception des échantillons : 03/12/2019
Sample delivery date

Nombre d'essais / <i>Test number</i>	Norme appliquée / <i>Standard applied</i>
2	NF EN 60332-1-2 (2005) + A11(2017)

Déviation, addition ou suppression par rapport aux normes
Deviation, addition or suppression compared to the standard

Test 1 : Point d'impact de la flamme 10cm en dessous du bord inférieur des tubes
flame impact 10cm below the lower tube edge

Test 2 : flamme directement sur le tube.
flame impact on the tube

la mesure prise en compte est la hauteur dégradée / test output is the damaged lenght

Il est entendu que le rapport d'essai délivré par le Laboratoire ne concerne que l'objet identifié ci-dessus. Il ne pourra préjuger de la conformité de l'ensemble des produits fabriqués sur lequel le prélèvement a été effectué. Ce rapport ne doit pas être reproduit même partiellement sans l'approbation écrite du laboratoire. Seule la version française fait foi.
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 Laboratoire Essais Feu - NRC 18, rue Lortet – BP 7153 69007 LYON FRANCE Tel 04.72.72.24.24 UL CTDPA2477	RAPPORT D'ESSAIS TEST REPORT	Numéro de dossier : <i>File number</i> RPE-LEF-19-193-C Index 1
Référence de l'échantillon <i>Sample reference</i>	GT4-90 DSRTK	

Essai de propagation verticale de la flamme sur conducteur ou câble isolé selon
Vertical flame propagation on insulated conductor or cable according to
IEC 60332-1-1 & 1-2 ed1.0 (2004-07)

Conditions d'essai / Test Conditions :

	Mesure / Measurement	Prescriptions
Débit d'air (l/min) <i>Air flow rate</i>	10.62	[10.31 - 10.88] ⁽¹⁾
Débit de propane (l/min) <i>Propane flow rate</i>	0.642	[0.637 - 0.653] ⁽¹⁾
Temps de montée en température <i>Flame calibration</i>	47/48/48	De/from 100 à/at 700°C en/in [40 ; 50] s ⁽²⁾
Diamètre du câble (mm) <i>Cable diameter</i>	34.1	NA
Temps d'application de la flamme (s) <i>Flame application duration</i>	121	⁽³⁾



⁽¹⁾ débits de gaz calculés après exploitation des incertitudes de mesure et corrections issues des étalonnages de nos débitmètres / *Gas flow rates calculated after uncertainty measurement and correction assessment of our mass flow meters.*

Débits normatifs / Normative flow rate

Débit d'air	10.0± 0.3 l/min
Débit de propane	0.650 ± 0.10 l/min

⁽²⁾ La norme impose une montée en température de 100 à 700°C en 45±6s / *The standard prescribes a temperature ramp from 100 to 700°C in 45±6s*

⁽³⁾ Temps normalisé d'application de la flamme (s) : 1 seconde supplémentaire est ajoutée au temps normalisé pour prendre en compte les incertitudes de mesure sur le chronomètre / *Normative flame application duration (s) : 1extra seconde is added to the normative duration to take into account the chronometer uncertainty measurement*

Il est entendu que le rapport d'essai délivré par le Laboratoire ne concerne que l'objet identifié ci-dessus. Il ne pourra préjuger de la conformité de l'ensemble des produits fabriqués sur lequel le prélèvement a été effectué. Ce rapport ne doit pas être reproduit même partiellement sans l'approbation écrite du laboratoire. Seule la version française fait foi.
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 Laboratoire Essais Feu - NRC 18, rue Lortet – BP 7153 69007 LYON FRANCE Tel 04.72.72.24.24 UL CTDPA DA2477	RAPPORT D'ESSAIS TEST REPORT	Numéro de dossier : <i>File number</i> RPE-LEF-19-193-C Index 1
Référence de l'échantillon <i>Sample reference</i>	GT4-90 DSRTK	

Diamètre câble Ø (mm) <i>Cable diameter</i>	Durée d'application de la flamme (s) <i>Flame application time</i>
Ø ≤ 25	60
25 < Ø ≤ 50	120
50 < Ø ≤ 75	240
Ø > 75	480

Date de réalisation de l'essai / *Date of the test* : 06/12/2019

L'essai a été réalisé sur un échantillon de câble prélevé par le client.

The test has been carried out on the sample given by the customer.

Résultats / Results :

	Temps d'extinction (s) <i>Extinguishment after</i>	H1 (mm)	H2 (mm)	H2 – H1 (mm)
Prescriptions	NA	NA	NA	NA
Test 1 : câble	145	Le câble est intact après essai <i>cable is intact after test</i>		
Test 2 : tube	69	Hauteur endommagée / <i>Damaged length</i> 123mm		

Date du rapport

Report Date

10/12/2019

réalisés par

written by

Technicien(s)/ technician(s)

B. JACQUETTE

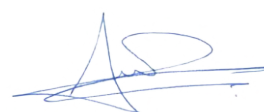


validé par

validated by

Responsable Technique / Technical Responsible

M. AUVERGNE



Il est entendu que le rapport d'essai délivré par le Laboratoire ne concerne que l'objet identifié ci-dessus. Il ne pourra préjuger de la conformité de l'ensemble des produits fabriqués sur lequel le prélèvement a été effectué. Ce rapport ne doit pas être reproduit même partiellement sans l'approbation écrite du laboratoire. Seule la version française fait foi.
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CERTIFICATE

This certificate states that all heathsrinkable tubes manufactured by Nexans Italia are Halogen-free.

This means that the product material does not contain any compounds derived from fluorine, chlorine, bromine, iodine or astatine.

**Marcello Finello
R&D Manager
Nexans Italia Power Cable accessories**

M. Finello

TEST REPORT

Object tested: GT8-140 ESPA

Test specification: Aliphatic and aromatic hydrocarbons resistance tests
Annex A: Tests for aliphatic hydrocarbon resistance - Heptane / Benzene mixture (90/10)
Annex B: Tests for aromatic hydrocarbon resistance - Benzene

Place of tests: NEXANS ITALY S.p.A. - Chemical laboratory
Contrada Tesino 181/b
63073 OFFIDA (AP)

Data
28 July 2015

Technical Manager
MF

Chemical
Laboratory Responsible
T.Collina

Annex A – Heptane / Benzene (90/10)

Specimens: GT8-140 Batch n° S/1571-4889

Test Condition: RT per 24h

Separation rate: 25mm/min

	sample 1	sample 2	sample 3	sample 4	sample 5	AVERAGE
Thickness (mm)	2.40	2.35	2.40	2.45	2.50	
Tensile strength (MPa)	20.0	21.7	21.0	22.1	22.4	21.4
Elongation at break (%)	563	623	690	637	687	640

Specimens: GT8-140 Batch n° S/1571-4889

Test Condition: 7 days in Heptane / Benzene (90/10) at RT ($20^{\circ}\text{C} \pm 1^{\circ}\text{C}$), then @ $100^{\circ}\text{C} \pm 20^{\circ}\text{C}$ per 24 h

Separation rate: 25mm/min

	sample 1	sample 2	sample 3	sample 4	sample 5	AVERAGE
Thickness (mm)	2.10	2.22	2.03	2.20	2.15	
Tensile strength (MPa)	18.4	21.1	14.1	19.4	19.4	18.5
Elongation at break (%)	551	563	415	535	547	522

RESULTS

	Before treatment	After treatment	Δ %	Request %
Tensile strength (MPa)	21.4	18.5	-15.7	± 25
Elongation at break (%)	640	552	-15.9	± 25

Annex B – Benzene

Specimens: GT8-140 Batch n° S/1571-4889

Test Condition: RT per 24h

Separation rate: 25mm/min

	sample 1	sample 2	sample 3	sample 4	sample 5	AVERAGE
Thickness (mm)	1.42	1.55	1.65	1.45	1.60	
Tensile strength (MPa)	21.7	22.4	21.1	20.1	22.7	21.6
Elongation at break (%)	663	658	590	642	751	661

Specimens: GT8-140 Batch n° S/1571-4889

Test Condition: 4 weeks in Benzene at RT ($20^{\circ}\text{C} \pm 1^{\circ}\text{C}$), then @ $100^{\circ}\text{C} \pm 20^{\circ}\text{C}$ per 24 h

Separation rate: 25mm/min

	sample 1	sample 2	sample 3	sample 4	sample 5	AVERAGE
Thickness (mm)	1.00	1.07	1.02	0.90	1.10	
Tensile strength (MPa)	17.1	18.7	16.9	16.7	18.0	17.5
Elongation at break (%)	550	544	514	553	550	542

RESULTS

	Before treatment	After treatment	Δ %	Request %
Tensile strength (MPa)	21.6	17.5	-23.4	± 25
Elongation at break (%)	661	542	-21.9	± 25

TEST REPORT

Object tested:

➤ GT4 – Heat shrinkable heavy wall tube with adhesive.
Suitable as primary insulation in low voltage applications or as outer protection in low and medium voltage applications.

The results shown in this report are suitable for the following tubes, belonging to the internal insulating and external protective tubing type:

- GT3 - Heat shrinkable medium wall tube with adhesive.
- GT8 - Heat shrinkable medium wall tube without adhesive.
- GT9 - Heat shrinkable heavy wall tube without adhesive.
- GT11 – Heat shrinkable wrap-around sleeve with glue.

The previous listed tubes are all made with the same compound material.

Test specification:

EA TS 09-13 (Issue 1:1981)
Technical specification for high voltage heat-shrinkable components for use with high voltage solid type cables up to and including 33kV

Place of tests:

NEXANS ITALY S.p.A. - Electrical laboratory
Contrada Tesino 181/b
63035 OFFIDA (AP)

Pages:

N° 25

Data
22 January 2007

Technical Manager
E. Menghi

Electrical & Chemical
Laboratory Responsible
A. Vannicola

TABLE OF TESTS

Test	Property	Test requirements	Result
1	Corrosion resistance <i>Tensile Strength</i> <i>Ultimate Elongation</i>	500 hours at 120°C ± 3°C <i>8N/mm² minimum</i> <i>100% minimum</i>	Passed
2	Density	Measured and Recorded	0.98 g/cm ³
3	Dimensions <i>Wall thickness ratio</i> <i>Longitudinal change</i> <i>Length – Expanded</i> - <i>Internal dia. – Expanded</i> - <i>Internal dia. – Fully recovered</i> -	<i>.6 Min</i> <i>10% Max</i> <i>As specified by purchaser</i>	Passed
4	Electric Strength	10MV/Metre Min.	Passed
5	Flame Retardance	N/A	
6	Fungus Resistance	N/A	
7	Heat Shock	No splitting, cracking, dripping or flowing after 30 mins at 200°C	Passed
8	Low Temperature Flexibility	No cracking after 4 hours at minus 20°C Max	Passed
9	Relative Permittivity	2 Min. to 5 Max.	Passed
10	Secant Modulus (2% Strain)	170 N/mm ² Max.	Passed
11	Solvent Resistance	As detailed in table 4	Passed
12	Tensile Strength and Ultimate Elongation	10 N/mm ² Min. 200% Minimum	Passed
13	Thermal Ageing <i>Tensile Strength</i> <i>Ultimate Elongation</i>	500 hours at 120°C ± 3°C <i>8 N/mm² Min</i> <i>100% Min</i>	Passed
14	Tracking Resistance	N/A	
15	Visual Examination	Free from pin holes, cracks, inclusions and other visible defects.	Passed
16	Volume Resistivity	10 ¹⁰ Ohm Meters Min.	Passed
17	Water Absorption	0,5 Max. 24 hours @ 25°C 1 Max. 24 hours @ 50°C	Passed
18	Water Vapour Permeability	25°C 75 RH – 5g/m ² /d 38°C 90 RH – 10g/m ² /d	Passed
19	Weather Resistance <i>Tensile Strength</i> <i>Ultimate Elongation</i> <i>Electric Strength</i> <i>Tracking Resistance</i>	<i>8 N/mm² Min.</i> <i>200% Min.</i> <i>N/A</i> <i>N/A</i>	Passed

1. CORROSION RESISTANCE

Specimens:

Code	Lot n°
GT4-90 (90/25)	B050621206

Conditioning of specimens :

Time	Temp.	R Humidity
24 h	22 °C	93 %

Parameters:

Specimen	Length of specimens	Expanded Ø of specimens	Mandrel tube Al Ø	Heating time	Heating temperature
1	150mm	90mm	56,2 mm	500 hours	120 °C
2					
3					
4					
5					

Value measured:

Specimen	Test temperature	Visual inspection	Tensile Strength (N/mm ²)	Ultimate Elongation (%)	Result
1	21°C	No corrosion, adhesion	29.1	590	Passed
2		No corrosion, adhesion	31.4	560	Passed
3		No corrosion, adhesion	28.7	610	Passed
4		No corrosion, adhesion	27.6	560	Passed
5		No corrosion, adhesion	26.3	580	Passed
Mean value			28.6	580	Passed

Pictures:

		
Specimens before test	Specimens after test	Tensile Strength test

2. DETERMINATION OF DENSITY

Method A - Immersion

Specimens:

Code	Lot n°
GT4-90 (90/25)	B050621206

Standard:

ASTM D-1505 / ISO R-1183 / UNI7092-72

Condition of test:

Ambient temperature	Humidity
22°C	50%

Value measured:

Weight in air (A) g.	Weight in alcohol (B) g.	Liquid density (pt) g/ml
2.94	2.55	0.85

Density
0.98 g/cm ³

Pictures:

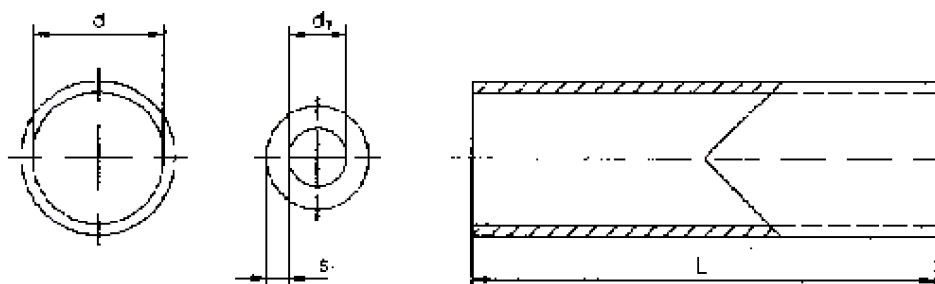


Test equipment

3. DIMENSION

Specimens:

Code	Lot n°
GT4-90 (90/25)	B050621206



Coated type	Ref	Uncoated type	Ref	d/d ₁ (mm)	s ₁ (mm)	L (m)
GT4-20	DSRTK 19	GT9-20	DSRU 19	23/6	2,4	1,5
GT4-30	DSRTK 30	GT9-30	DSRU 30	34/8	3,0	1,5
GT4-40	DSRTK 38	GT9-40	DSRU 38	42/12	3,7	1,5
GT4-50	DSRTK 51	GT9-50	DSRU 51	56/16	4,1	1,5
GT4-70	DSRTK 68	GT9-70	DSRU 68	73/22	4,3	1,5
▶ GT4-90	DSRTK 85	GT9-90	DSRU 85	90/22	4,3	1,5
GT4-120	DSRTK 120	GT9-120	DSRU 120	130/40	4,3	1,5
GT4-140	DSRTK 140	GT9-140	DSRU 140	147/42	4,5	1,5
GT4-160	DSRTK 160	GT9-160	DSRU 160	167/50	4,5	1,5
GT4-180	DSRTK 180	GT9-180	DSRU 180	187/60	4,5	1,5
GT4-200	DSRTK 200	GT9-200	DSRU 200	200/70	4,5	1,5

Value measured:

Specimen	Wall thickness ratio Expanded mm						Longitudinal change %	Length expanded mm	Internal dia. Expanded mm	Internal dia. fully recovered mm
1	0.9	0.9	1	1	1	0.9	-0.5	150	94.4	21.6
2	1	1	1	0.9	0.9	0.9	-0.7	150	94.8	21.1
3	1	1	1	0.9	0.9	0.9	-0.3	150	94.1	21.4

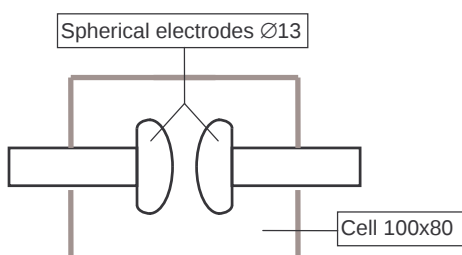
4. ELECTRIC STRENGTH

Specimen:

Codice	Lotto n°
GT4-90	B050621206

Standard :

- IEC 243/67 Test on plastic material



Condition of Specimen:

Conditioning	Temp.	Humidity
4 h	22 °C	50 %

Test condition:

Amb. Temp.	R. Humidity
22 °C	50 %

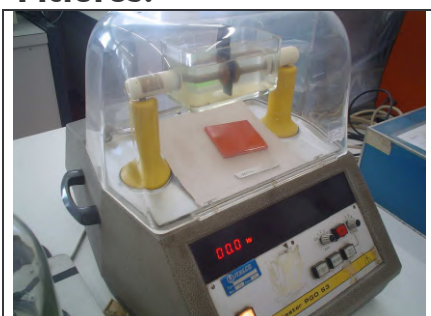
Value measured:

Specimen n°	1	2	3	4	5	Mean value
Discharge voltage in kV	66.82	66.48	67.77	70.29	68.24	67.92
thickness in mm	4.2	4.1	4.2	4.2	4.1	4.2

Test result :

Mean calculated value
16.17 MV/m

Pictures:



Test equipment

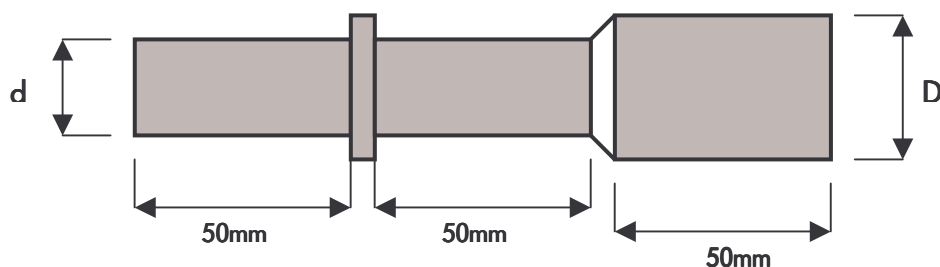
7. HEAT SHOCK

Specimens:

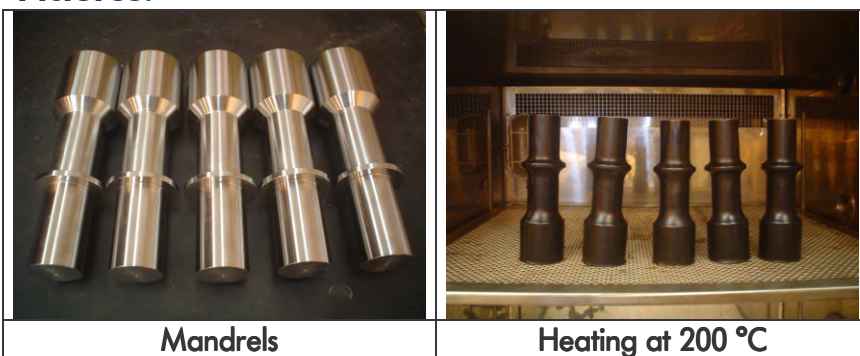
Code	Lot n°
GT4-90 (90/25)	B050621206

Parameters:

Specimen	Ø of expanded specimens (mm)	Mandrel Ø d (mm)	Mandrel Ø D (mm)	Heating time (min.)	Heating temperature (°C)	Result
1	90	45	67,5	30	200	Passed
2						Passed
3						Passed
4						Passed
5						Passed



Pictures:



8. LOW TEMPERATURE FLEXIBILITY

Specimens:

Code	Lot n°
GT4-90 (90/25)	B050621206

Parameters:

Specimen	Internal Ø of tube after full recovery (mm)	Strip Length/Width (mm)	Ø of mandrel (mm)	Cooling time (hr)	Cooling temperature (°C)	Result
1	21,6	150 / 6	11	4	-20	Passed
2						Passed
3						Passed

Pictures:

		
Specimens	Cooling at -20 °C	Bending in 2 sec.

9. RELATIVE PERMITIVITY

Specimens:

Code	Lot n°
GT4-90 (90/25)	B050621206

Standard:

IEC 250, ASTM D150

Measure before thermal ageing:

Sample°	GT4-90			
Thickness (cm.)	0.200	0.200	0.200	0.200
Temperature °C	22	22	22	22
Voltage (Volt)	500	1000	1500	2000
Capacity in pF 100 ÷	3.140	3.140	3.140	3.140
Dielectric constant (ϵ_r)	3.5968	3.5968	3.5968	3.5968
Tg δ	0.005	0.018	0.018	0.018
Power frequency (Hz.)	50	50	50	50

Thermal ageing:

Time	Temp.	R Humidity
500 h	120 °C	0 %

Measure after thermal ageing:

Sample°	GT4-90			
Thickness (cm.)	0.200	0.200	0.200	0.200
Temperature °C	22	22	22	22
Voltage (Volt)	500	1000	1500	2000
Capacity in pF 100 ÷	3.320	3.320	3.320	3.320
Dielectric constant (ϵ_r)	3.4018	3.4018	3.4018	3.4018
Tg δ	0.004	0.016	0.016	0.016
Power frequency (Hz.)	50	50	50	50

Pictures:



Test equipment

10. SECANT MODULUS AT 2% ELONGATION

Specimens:

Code	Lot n°
GT4-30 (34/8)	B040611106

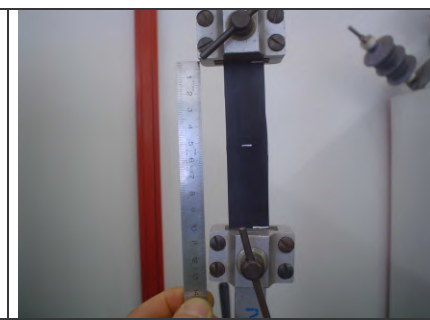
Test condition:

Amb. Temp.	R. Humidity
21 °C	45 %

Value measured:

Specimen	Dimension width / thickness	Area (mm ²)	Rate (A)	Distance (B)	Secant modulus at 2% elongation	Result
1	25/2.8	70	10mm/min.	102	6.78N/mm ²	Passed
2	25/2.8	70	10mm/min.	102	6.33N/mm ²	Passed
3	25/2.8	70	10mm/min.	102	5.94N/mm ²	Passed
4	25/2.8	70	10mm/min.	102	6.63N/mm ²	Passed
5	25/2.8	70	10mm/min.	102	6.68N/mm ²	Passed
Mean value	25/2.8	70	10mm/min.	102	6.47N/mm ²	Passed

Pictures:

	
Test equipment	Specimen during test

11. SOLVENT RESISTANCE

Specimens:

Code	Lot n°
GT4-90 (90/25)	B050621206

Condition of Specimen during immersion:

Solvent	Conditioning time	Conditioning temp.
MIND compound for BS6480 cables	16 h	85 °C

Condition of Specimen after immersion:

Conditioning time	Conditioning temp.	Humidity
1 h	23 °C	0 %

Value measured:

Specimen	Splitting	Dielectric Strength* (MV/m)	Tensile Strength** (N/mm ²)	Ultimate Elongation** (%)	Result
1	No splits				Passed
2	No splits				Passed
3	No splits				Passed
1		12.8			Passed
2		13.2			Passed
3		12.5			Passed
1			26.8	478	Passed
2			26.2	465	Passed
3			25.9	490	Passed
Mean value		12.8	26.3	478	

* Test performed as reported in report 4

** Test performed as reported in report 12

Condition of Specimen during immersion:

Solvent	Conditioning	Temp.
Water	16 h	85 °C

Condition of Specimen after immersion:

Conditioning	Temp.	Humidity
1 h	23 °C	0 %

Value measured:

Specimen	Splitting	Dielectric Strength* (kV/mm)	Tensile Strength** (N/mm ²)	Ultimate Elongation** (%)	Result
1	No splits				Passed
2	No splits				Passed
3	No splits				Passed
1		12.2			Passed
2		12.7			Passed
3		13.1			Passed
1			28.3	488	Passed
2			29.2	465	Passed
3			28.6	463	Passed
Mean value		12.7	28.7	472	

* Test performed as reported in report 4

** Test performed as reported in report 12

Condition of Specimen during immersion:

Solvent	Conditioning	Temp.
Insulating oil to BS148	0.5 h	30 °C

Condition of Specimen after immersion:

Conditioning	Temp.	Humidity
1 h	23 °C	0 %

Value measured:

Specimen	Splitting	Dielectric Strength* (MV/m)	Tensile Strength** (N/mm ²)	Ultimate Elongation** (%)	Result
1	No splits				Passed
2	No splits				Passed
3	No splits				Passed
1		12.5			Passed
2		12.1			Passed
3		12.7			Passed
1			26.1	482	Passed
2			26.8	475	Passed
3			25.6	478	Passed
Mean value		12.4	26.2	478	

* Test performed as reported in report 4

** Test performed as reported in report 12

Condition of Specimen during immersion:

Solvent	Conditioning	Temp.
Tallow oil	0.5 h	30 °C

Condition of Specimen after immersion:

Conditioning	Temp.	Humidity
1 h	23 °C	0 %

Value measured:

Specimen	Splitting	Dielectric Strength* (MV/m)	Tensile Strength** (N/mm ²)	Ultimate Elongation** (%)	Result
1	No splits				Passed
2	No splits				Passed
3	No splits				Passed
1		13.8			Passed
2		13.2			Passed
3		13.6			Passed
1			28.2	520	Passed
2			29.7	532	Passed
3			29.1	498	Passed
Mean value		13.5	29.0	516	

* Test performed as reported in report 4

** Test performed as reported in report 12

Condition of Specimen during immersion:

Solvent	Conditioning	Temp.
Creosote to BS144	0.5 h	30 °C

Condition of Specimen after immersion:

Conditioning	Temp.	Humidity
1 h	23 °C	0 %

Value measured:

Specimen	Splitting	Dielectric Strength* (MV/m)	Tensile Strength** (N/mm ²)	Ultimate Elongation** (%)	Result
1	No splits				Passed
2	No splits				Passed
3	No splits				Passed
1		13.8			Passed
2		14.3			Passed
3		13.6			Passed
1			27.3	530	Passed
2			27.8	513	Passed
3			26.9	524	Passed
Mean value		13.9	27.3	522	

* Test performed as reported in report 4

** Test performed as reported in report 12

Condition of Specimen during immersion:

Solvent	Conditioning	Temp.
Inhibisol	0.5 h	30 °C

Condition of Specimen after immersion:

Conditioning	Temp.	Humidity
1 h	23 °C	0 %

Value measured:

Specimen	Splitting	Dielectric Strength* (kV/mm)	Tensile Strength** (N/mm ²)	Ultimate Elongation** (%)	Result
1	No splits				Passed
2	No splits				Passed
3	No splits				Passed
1		12.8			Passed
2		12.3			Passed
3		11.9			Passed
1			29.1	475	Passed
2			28.6	490	Passed
3			28.2	463	Passed
Mean value		12.3	28.6	476	

* Test performed as reported in report 4

** Test performed as reported in report 12

Condition of Specimen during immersion:

Solvent	Conditioning	Temp.
Paraffin	0.5 h	30 °C

Condition of Specimen after immersion:

Conditioning	Temp.	Humidity
1 h	23 °C	0 %

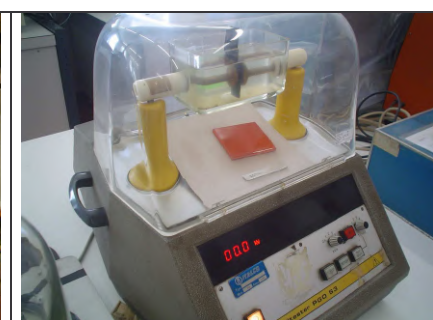
Value measured:

Specimen	Splitting	Dielectric Strength* (kV/mm)	Tensile Strength** (N/mm ²)	Ultimate Elongation** (%)	Result
1	No splits				Passed
2	No splits				Passed
3	No splits				Passed
1		13.7			Passed
2		12.8			Passed
3		13.2			Passed
1			28.4	553	Passed
2			29.1	542	Passed
3			27.8	610	Passed
Mean value		13.2	28.4	568	

* Test performed as reported in report 4

** Test performed as reported in report 12

Pictures:

		
Splitting test	Dielectric Strength test	Tensile Strength test
		
Conditioning of specimens		

12. TENSILE STRENGTH AND ULTIMATE ELONGATION

Specimens:

Code	Lot n°
GT4-90	B050621206

Standard:

ASTM D-412/ ISO 37 Determination of tensile stress-strain properties

Condition of test:

Test temperature	Conditioning time	Dumb-bell	Thickness samples	Machine speed
22°C	18h	Type 2	2mm	70mm/min.

Tensile strength value measured:

specimen 1	specimen 2	specimen 3	specimen 4	specimen 5
32.3 N/mm ²	35.3 N/mm ²	34.9 N/mm ²	37.8 N/mm ²	36.1 N/mm ²

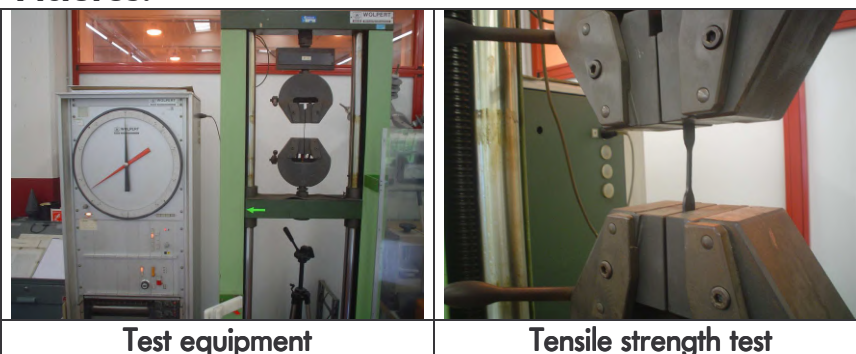
Mean value
35.3 N/mm ²

Elongation at break value measured:

specimen 1	specimen 2	specimen 3	specimen 4	specimen 5
740%	760%	680%	650%	780%

Mean value
722 %

Pictures:



Test equipment

Tensile strength test

13. THERMAL AGEING

Specimens:

Code	Lot n°
GT4-90	B050621206

Standard:

ASTM D-412/ ISO 37 Determination of tensile stress-strain properties

Condition of test:

Conditioning temperature	Conditioning time	Dumb-bell	Thickness samples	Machine speed
120°C	500 hours	Type 2	2mm	70mm/min.

Tensile strength value measured:

specimen 1	specimen 2	specimen 3	specimen 4	specimen 5
27.5 N/mm ²	29.4 N/mm ²	28.7 N/mm ²	26.7 N/mm ²	26.9 N/mm ²

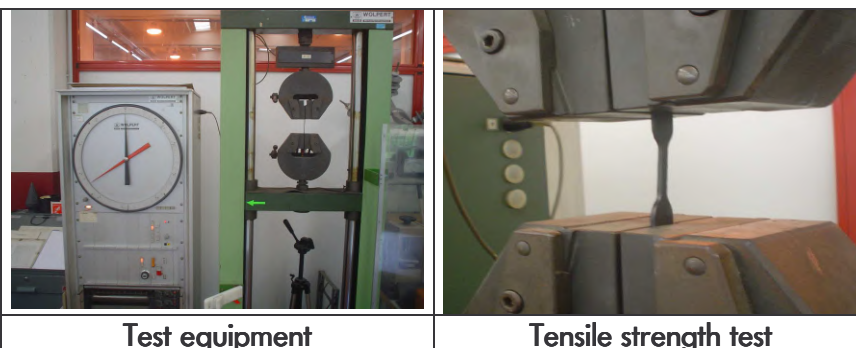
Mean value
27.8 N/mm ²

Elongation at break value measured:

specimen 1	specimen 2	specimen 3	specimen 4	specimen 5
583%	608%	590%	595%	610%

Mean value
597 %

Pictures:



Test equipment

Tensile strength test

15. VISUAL EXAMINATION

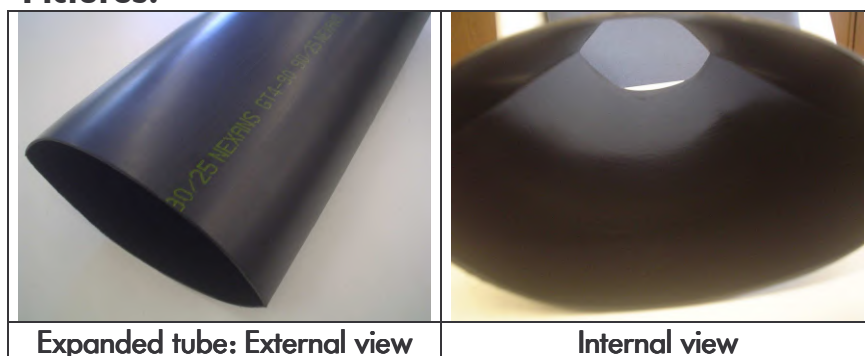
Specimens:

Code	Lot n°
GT4-90	B050621206

Specimens: complete tubing in the expanded condition

Result: the specimen is free of holes, bubbles, line marks, cracks, inclusions or other general defects.

Pictures:



Expanded tube: External view

Internal view

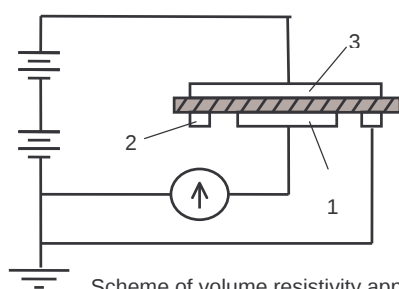
16. VOLUME RESISTIVITY

Specimens:

Code	Lot n°
GT4-90	B050621206

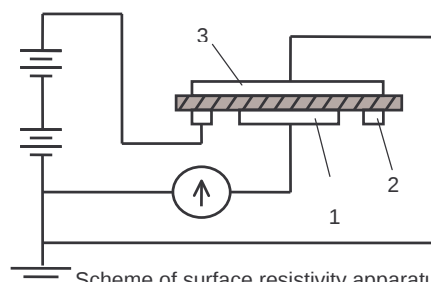
Standard :

- IEC 93/80



Scheme of volume resistivity apparatus

1. Main electrode Ø50mm
2. Guard electrode Ø70mm
3. Up electrode 110x110mm



Scheme of surface resistivity apparatus

Measure before thermal ageing:

Conditioning time	Conditioning temperature	Thickness samples	Volume resistivity
4h	22	2mm	$4.83 \times 10^{13} \Omega \text{ cm}$

Measure after thermal ageing:

Conditioning time	Conditioning temperature	Thickness samples	Volume resistivity
500h	120°C	2mm	$5.32 \times 10^{13} \Omega \text{ cm}$

Pictures:



Equipment

17. WATER ABSORPTION

Specimens:

Code	Lot n°
GT4-90	B050621206

TEST AT 25°C

Dimensions measured:

	specimen 1	specimen 2	specimen 3
Inner diameter (Ø)	17.91	18.35	18.27
Outer diameter (Ø)	26.35	26.37	26.43
Thickness (mm)	4.22	4.01	4.08
Length (mm)	24.8	25.3	25.4

Pre-conditioning parameters :

Temperature	Time
105°C	1 hour

Weight (g) after pre-conditioning and cooling:

specimen 1	specimen 2	specimen 3
9.315	9.289	9.294

Parameters test (distilled water):

Conditioning temperature	Conditioning time
25 °C	24 hour

Weight (g) measured after immersion:

specimen 1	specimen 2	specimen 3
9.402	9.309	9.312

Mean value water absorbed	
0.19 %	Passed

TEST AT 50°C

Dimensions measured:

	specimen 1	specimen 2	specimen 3
Inner diameter (Ø)	18.12	17.68	18.06
Outer diameter (Ø)	26.50	26.32	26.08
Thickness (mm)	4.19	4.32	4.01
Length (mm)	25.3	24.6	25.1

Pre-conditioning parameters :

Temperature	Time
105°C	1 hour

Weight (g) after pre-conditioning and cooling:

specimen 1	specimen 2	specimen 3
9.298	9.235	9.254

Parameters test (distilled water):

Conditioning temperature	Conditioning time
50°C	24 hour

Weight (g) measured after immersion:

specimen 1	specimen 2	specimen 3
9.340	9.272	9.288

Mean value water absorbed	
0.41 %	Passed

Pictures:

		
Specimens	Immersion test	Weight of specimens

18. WATER VAPOUR PERMEABILITY

Specimens:

Code	Lot n°
GT4-90	B050621206

Test condition:

Chamber Temp,	R. Humidity
25 °C	75 %

Dimensions measured:

specimen	1	2	3	4	5
Thickness (mm)	0.9	0.9	1.0	1.0	0.9

Measured value:

specimen	1	2	3	4	5	Mean value
Permeability (g/m ² /d)	1.1	0.9	1.7	0.6	1.3	0.9

Test condition:

Chamber Temp,	R. Humidity
38 °C	90 %

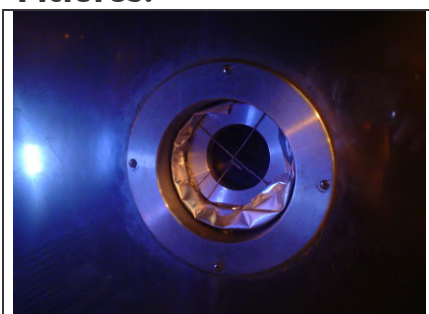
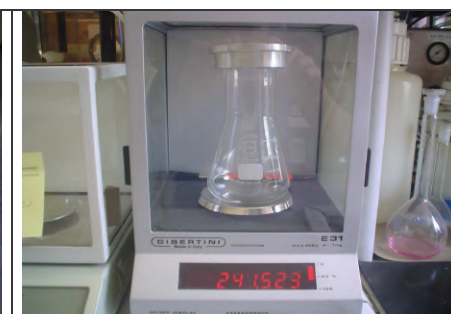
Dimensions measured:

specimen	1	2	3	4	5
Thickness (mm)	1.0	0.9	0.9	0.9	0.9

Measured value:

specimen	1	2	3	4	5	Mean value
Permeability (g/m ² /d)	4.4	3.8	4.9	3.1	3.4	3.9

Pictures:

		
Specimen during the test	Condensed vapour	Specimen weight after test

19. WEATHER RESISTANCE

Specimens:

Code	Lot n°
GT4-90	B050621206

Test cycles (209x24h):

- 1- 102 min. of ultraviolet light exposure.
- 2- 18 min. of ultraviolet light exposure with water spray.
- 3- Cycle 1 and 2 repeated 9 times
- 4- 6h period of darkness without water spray.

Atmospheric condition of test:

Ozone concentration	Sulphur dioxide concentration	Temp. when arc is ON	Temp. when arc is Off	Rel. humidity when arc is ON	Rel. humidity when arc is OFF	Water spray temperature
23 ppbm	21 ppbm	50°C	25°C	50%	97%	20°C

Tensile strength value measured**:

specimen 1	specimen 2	specimen 3	specimen 4	specimen 5
25.8 N/mm ²	24.7 N/mm ²	26.1 N/mm ²	25.4 N/mm ²	24.3 N/mm ²

** Test performed as reported in report 12

Mean value
25.3 N/mm ²

Elongation at break value measured**:

specimen 1	specimen 2	specimen 3	specimen 4	specimen 5
592%	573%	568%	510%	525%

** Test performed as reported in report 12

Mean value
554 %

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