

# OUR SOLUTION: YOUR CABLE.

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PRODUCTION OVERVIEW

### ■ Company

MUCKENHAUPT & NUSSELT is a cable production company in Wuppertal, which has been successful in the market since 1926 and, together with its approximately 100 employees, is constantly improving. This applies to the utilised materials as well as the functions of the cables.

The cable production company is the development partner for cables, which enquires and is interested in the operating conditions. The requirements of our target customers are the basis for the individual construction and production. The cables are not stored in the warehouse so they have to be sold if they “sort of” fit the purpose. We are flexible and can produce precisely the cable which exhibits the required features.

### ■ Applications and industries

The products are represented in many applications and a variety of industries. Wherever special cables, such as hybrid cables, with extensive demands are required, MUCKENHAUPT & NUSSELT is your development partner ready to experiment. We always focus on your operating conditions.

### ■ Exemplary industries

- Elevators/  
conveyor technology
- Automation
- Crane/lifting technology
- Lighting industry
- Robotics
- Event technology

### ■ Production and innovation

The cables are entirely produced in our factory in Germany.

Diverse machinery enables us to manufacture precise individual designs at short notice, where you can determine colour and printing.

### ■ Flexibility and speed

MUCKENHAUPT & NUSSELT produces sample quantities when required (also less than 500 m) up to major orders with short delivery times.

### ■ Quality & environment

MUCKENHAUPT & NUSSELT provides high-quality products and efficient processes.

The in-house laboratory and test field test each cable in terms of the required load; environmental management optimises the ecological impact of production and products.

The cable production company is certified according to DIN EN ISO 9001 as well as DIN EN ISO 14001.

### ■ MUNFLEX®

The corporate brand MUNFLEX® provides individual cable solutions according to customer-specific requirements, based on experience of more than 45,000 constructions.

## MATERIAL

### Insulation

- ≡ PVC, various compounds, in addition to standard, also special compounds, e.g. for movable use down to -40°C
- ≡ LD PE
- ≡ LD PE – cross-linked
- ≡ PP, various compounds
- ≡ PBT
- ≡ PUR
- ≡ TPE-E, various compounds
- ≡ TPE-S
- ≡ TPE-R (TPV)
- ≡ LSF0H (low-smoke, flame resistant, halogen-free)
- ≡ XL-LSF0H (low-smoke, flame resistant, halogen-free, cross-linked)

### Sheath

- ≡ PVC, various compounds, in addition to standard, also special compounds e.g. for movable use down to -40°C and outdoor use
- ≡ LD PE
- ≡ HD PE
- ≡ PUR, various compounds
- ≡ TPE-E, various compounds
- ≡ TPE-S
- ≡ TPE-R (TPV), various compounds
- ≡ LSF0H (low-smoke, flame resistant, halogen-free)
- ≡ XL-LSF0H (low-smoke, flame resistant, halogen-free, cross-linked)
- ≡ XL-LSF0H (low-smoke, flame resistant, halogen-free, oil-resistant, cross-linked)

## LIMITS

### Flat cables

- ≡ Width: max. 75 mm
- ≡ Number of cores: max. 24

### Round cables

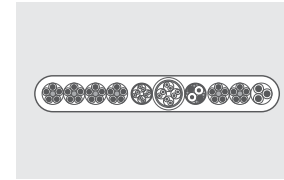
- ≡ Diameter: max. 40 mm
- ≡ Number of cores: max. 61 (roped layered, for paired and/or bundled stranding > 100)

### Cross sections

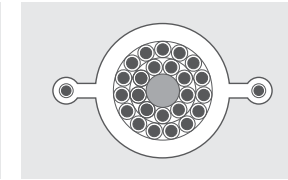
- ≡ Core: 0.14 mm<sup>2</sup> up to 185 mm<sup>2</sup>
- ≡ Total cross section for cables: up to approx. 200 mm<sup>2</sup> (incl. shielding)

## CABLE FORMS AND CONSTRUCTION COMPOUNDS

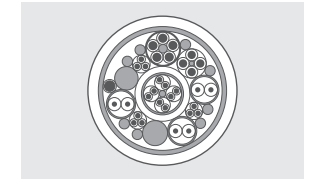
### Flat cables



### 2TY round cables



### Round cables



### All construction forms

Available with a homogenous cable structure, i.e. with a cross-section and core, paired or bundled stranding. For customer/application specific system cables, there is almost no limit on the variables.

### Conductors

Coarse-wired, fine-wired, finest-wired through to extremely flexible bare or tin-coated copper lead or other surface treatments as well as copper alloy or mixed lead reinforced with steel wire or tear-resistant threads. The versions range from simple stranding to special roped structures.

### Banding/barrier layers

Various manufacturing methods can be used to apply foils/banding made of PP, PE, polyester, PTFE, fabric, fleece etc. In addition, textile threads may be used to provide spun covers.

### Carrier elements

These are arranged centrally for round cables, and generally laterally for flat cables, consisting of steel wire (galvanised or stainless steel), aramid threads or cords made of natural fibres or other materials.

### Other components

*Components of system cables can also be installed in*

- ≡ sheaths made of PE, PA, PUR, PTFE etc.
- ≡ coaxial cables
- ≡ bus cables
- ≡ fibre optic cables or
- ≡ provided cables/elements

### Shielding

*As individual, element or overall shielding in the form of*

- ≡ foil shielding (St)
  - ≡ helical (D)
  - ≡ braids (C)
  - ≡ mixed braids (metal with textile threads)
- of bare or tin-plated copper or special materials.*

### Armouring

*Braids or shielding made (among other) of*

- ≡ galvanised steel wires
- ≡ stainless steel wires
- ≡ aramid threads
- ≡ or other materials

## Product certifications

(Status: September 2017)

### NATIONAL/EUROPEAN STANDARDS

As an indication for product safety and quality, numerous product certifications are available for, among other, the European and North America sector. The production site of MUCKENHAUPT & NUSSELT is therefore subject to permanent monitoring by VDE, UL and KEMA.

#### ≡ HAR

≡ H03VV-F	Flexible PVC cables
≡ H05VV-F	Flexible PVC cables
≡ H05VV5-F	Oil resistant PVC control cables
≡ H05VVC4V5-K	Shielded, oil-resistant PVC control cables
≡ H05VVH6-F	PVC flat cables
≡ H07VVH6-F	PVC flat cables
≡ H05V3V3H6-F	PVC flat cables, cold resistant

#### ≡ VDE assessment with production control

- ≡ VDE registration no. 7008: MUNFLEX®-Y flat cable 450/750V, suitable for exterior use, movable use down to -40° C.
- ≡ VDE registration no. 7516: MUNFLEX®2000 PVC control cables LiYY, LiYYCY, LiYYSY 300/500V with reduced dimensions.

#### ≡ ECOLAB® certificate

Material resistance to aggressive cleaning and disinfecting agents.

Valid for our sheath materials TPE-R (TPV) flame resistant and TPE-R (TPV) halogen-free.

#### ≡ ECE RI 18 in connection with ISO 6722

Resistance to the spreading of flames. Valid for the products MUNFLEX® Special JZ Li12Y11Y 7x0.75 mm<sup>2</sup> and 18x0.75 mm<sup>2</sup> as well as MUNFLEX® Special OZ Li12Y11Y 2x1.5 mm<sup>2</sup>.

## Product certifications

(Status: September 2017)

### UL-758 AWM (AVLV 2/8)

#### ≡ Core styles

≡ PVC	60°C	300 Volt	1160
≡ PVC	80°C	300 Volt	10053 1729 1007
≡ PVC	80°C	600 Volt	1011
≡ TPE	80°C	300 Volt	10042
≡ TPE	90°C	300 Volt	10479 10108
≡ TPE	90°C	0.6; 1.0 kV	10258
≡ TPE	90°C	1000 Volt	11641
≡ PP	80°C	300 Volt	10467
≡ PP	80°C	0.6; 1.0 kV	10492

#### ≡ Sheath styles

≡ PVC	80°C	300 Volt	2464
≡ PVC	80°C	0.6; 1.0 kV	2570
≡ PVC	60°C	no voltage rating	2493 2490
≡ PVC	60°, 80°C	30 Volt	2448
≡ TPE	90°C	1000 Volt	22022
≡ TPU	80°C	300 Volt	20911 20870 20233 no voltage rating 20235
≡ TPU	80°C	0.6; 1.0 kV	20234
≡ TPU	80°C	0.6; 1.0 kV	10553
≡ TPU	80°C	0.6; 1.0 kV	10587
≡ TPR	90°C	300 Volt	21529
≡ TPR	90°C	600 Volt	21530
≡ TPR	90°C	1000 Volt	21387

All core/sheath material combinations are possible for cables with UL approval, whereby the temperature and voltage class of the cores must correspond to at least those of the sheath.

With this modular system, almost all customised cable solutions are possible with approval for the North America market.

#### ≡ cULus

Possible material combinations of core/sheath according to cULus (UL-758 and CSA 22.2) are:

≡ PVC/PVC	≡ PP/PVC	≡ TPE/PVC
PVC/PUR	PP/PUR	TPE/PUR
		TPE/TPR

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