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ICON® Arctic

ICON® Arctic

… offers excellent properties for applications in extremely cold environments:

- Thanks to a specially developed PVC-compounds called, FRILON, ICON® Arctic cables are especially suited for installation down to –30 °C and permanent operating temperatures down to –60 °C.
- The cold temperature behaviour of ICON® Arctic cables is proven by cold bend, cold impact and cold elongation tests according to IEC 60811 at test temperatures down to –55 °C, depending on the cable design.
- ICON® Arctic cables are designed according to the latest standard for instrumentation cables (EN 50288-7) and combine outstanding properties at extremely cold temperatures with superior flame retardancy behaviour.

LEONI

ICON® Arctic
Instrumentation Cables

The well-known range of ICON® instrumentation cables includes cables dedicated to arctic conditions, i.e. extremely low temperatures.

The extended requirements are related to installation and operation conditions. In arctic areas cable installations shall be done at low temperatures without pre-heating of the cables. Temperatures down to –30 °C are common. Today most PVC compounds are not suitable for installation at temperatures below –5 °C in order to avoid cracks. In case installation was performed at lower temperatures cables had to be pre-heated. The cable temperature had to be continuously observed during installation.

To fulfil such arctic conditions a new PVC sheathing compound was developed, called FRILON. This compound enables design and construction of instrumentation cables suitable for installation and operation at extremely low temperatures. It combines in an outstanding way cold resistance with excellent fire protection behaviour. Other properties, like cold impact, cold bending and cold elongation were improved regarding extremely low temperatures as well.

Typical characteristics of our arctic grade cable in extension to the standards mentioned below are:

Temperature ranges:

Installation	**–30 °C to +50 °C**
Operation	**–60 °C to +70 °C**

LEONI cold resistant cables are suitable for installation at temperatures down to –30 °C without necessity of pre-heating of cables. In addition to excellent cold flexible behaviour during installation our cables are guaranteed in service at temperatures down to –60 °C with the function of the measurement and control system remaining undisturbed.

FRILON fulfils the requirements of ST2 according to IEC 60502-1 as well as of TM52 according to EN 50290-2-22.

Properties		Sheath	PVC	PVC	PVC
		Insulation	PVC	PVC	PVC
			RE–Y(St)Y–fl	RE–Y(St)Ÿ–fl	RE–Y(St)Yv–fl	RE–Y(St)YSWAY–fl
Electrical properties						
operating voltage	300 V		●	●	●	●
	500 V		●	●	●	●
insulation resistance	100 MΩ x km		●	●	●	●
	300 MΩ x km					
	5000 MΩ x km					
Temperature range – installation						
	–30 °C up to +50 °C					
	–5 °C up to +50 °C		●	●	●	●
Temperature range – operation						
	–60 °C up to +70 °C					
	–30 °C up to +70 °C		●	●	●	●
	–30 °C up to +80 °C					
	–30 °C up to +90 °C					
	–30 °C up to +105 °C					
Chemical and physical properties						
oil resistance			+	+++	+	+
zero halogen						
resistance to chemicals			+	+	+	+
Reaction to fire						
single cable burning test	IEC 60332-1-2		●	●	●	●
bunched cable test	IEC 60332-3-24 (Cat. C)		●	●	●	●
smoke density	IEC 61034, <40 %					
light transmittance	IEC 61034, >60 %					
fire resistance acc. to	IEC 60331-21					
	BS 6387 Cat. CWZ					
Installation & environmental properties						
suitable for direct burial					■	++
cable bending radius	7.5 x diameter		●	●	●	
	10 x diameter					●
	15 x diameter					
suitability for tensile loads			○	○	○	+++
suitability for pressure and impact loads						+++
resistance against rodents						++
protection against inducing currents						++

Ranking for marked criteria as			
excellent	+++	limited	○
improved	++	depending on national regulations	■
good	+		
complied	●	on request	✉

			PVC arctic grade				PVC												LSZH					PE	LSZH			
			PVC		PE		PE							XLPE				PE			XLPE			XLPE + MICA		Silicone	
RE-Y(St)YMYSWAY-fl	RE-Yw(St)Yw-fl	RE-Yw(St)YwSWAYw-fl	RE-Y(St)Y-fl	RE-Y(St)YSWAY-fl	RE-2Y(St)Y-fl	RE-2Y(St)YSWAY-fl	RE-2Y(St)Y-fl	RE-2Y(St)Yö-fl	RE-2Y(St)Yv-fl	RE-2Y(St)YBY-fl	RE-2Y(St)YQY-fl	RE-2Y(St)YSWAY-fl	RE-2Y(St)YMYSWAY-fl	RE-2X(St)Y-fl	RE-2X(St)YSWAY-fl	RE-2X(St)YMYSWAY-fl	RE-2X(L)2Y4YSWAYfl	RE-2Y(St)H	RE-2Y(St)HSWAH	RE-2Y(St)HQH	RE-2X(St)H	RE-2X(St)HSWAH	RE-2X(L)2Y4YSWA2Y	RE-2X(St)H CI	RE-2X(St)HSWAH CI	RE-2G(St)H CI	RE-2G(St)HSWAH CI
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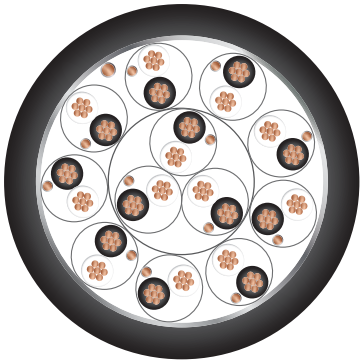
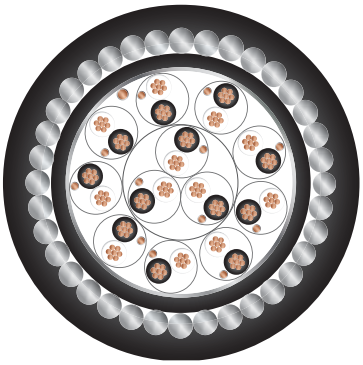
See two examples of our ICON® Arctic grade cable designs:





Characteristics

Application	For transmission of analogue and digital signals in instrument and control systems; allowed for use in zone 1 and zone 2 group II classified areas (IEC 60079-14); not allowed for direct connection to low impedance source, e.g. the public mains electricity supply. Recommended for indoor and outdoor installation in case of extreme low-temperature, on racks, trays, in conduits, in dry and wet locations; not for direct burial.	For transmission of analogue and digital signals in instrument and control systems; allowed for use in zone 1 and zone 2 group II classified areas (IEC 60079-14); not allowed for direct connection to low impedance source, e.g. the public mains electricity supply. Recommended for indoor and outdoor installation in case of extreme low-temperature, on racks, trays, in conduits, in dry and wet locations; for direct burial.
Conductor	plain annealed copper wire, 7-stranded, size 0.5 mm^2	plain annealed copper wire, 7-stranded, size 0.5 mm^2
Insulation	polyvinyl cloride PVC	polyvinyl cloride PVC
Individual screen	24 µm aluminium PETP tape over solid tinned copper drain wire, 0.6 mm Ø, plastic tape under and above screen	24 µm aluminium PETP tape over solid tinned copper drain wire, 0.6 mm Ø, plastic tape under and above screen
Wrapping	at least 1 layer of plastic tape	at least 1 layer of plastic tape
Collective screen	24 µm aluminium PETP tape over 7-stranded tinned copper drain wire, 0.5 mm^2	24 µm aluminium PETP tape over 7-stranded tinned copper drain wire, 0.5 mm^2
Inner sheath	–	polyvinyl chloride PVC, black, Frilon
Armour	–	galvanised round steel wires
Outer sheath	polyvinyl chloride PVC, black, Frilon	polyvinyl chloride PVC, black, Frilon
Cable type	RE-Y(St)Y-fl PiMF	RE-Y(St)YSWAY-fl PiMF

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