

ICON[®] Arctic

flame retardant



oil resistant



cold resistant



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

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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.

The ICON product range

Properties	Sheath	PVC						PVC arctic grade				PVC								LSZH			PE	LSZH				
	Insulation	PVC						PVC		XLPE		XLPE											XLPE + MICA		Silicone			
		ICON Base 10200 M0	ICON Chem 30200 MH	ICON Base 10204 M0	ICON Base 10210 M0	ICON Chem 30211 M0	ICON Base Pro 60400 M2	ICON Base Pro 60410 M2	ICON Arctic 40200 MN	ICON Arctic 40210 MN	ICON Arctic 40100 MN	ICON Arctic 40110 MN	ICON Base 10100 M1	ICON Chem 30100 MH	ICON Base 10104 M1	ICON Base 10110 M1	ICON Base 10120 M1	ICON Base 10130 M1	ICON Chem 30111 M1	ICON Chem 30113 M1	ICON Safe 20100 M3	ICON Safe 20110 M3	ICON Safe 20120 M3	ICON Chem 30113 M9	ICON Safe 20810 M3	ICON Safe 20810 M3	ICON Safe 20510 M3	ICON Safe 20810 M3
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)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●		●	●	●	●	
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	✉

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 chloride PVC	polyvinyl chloride 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	ICON Arctic 40200 MN	ICON Arctic 40210 MN