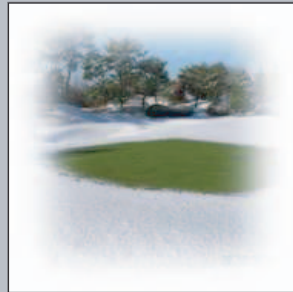


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Heating Technology

▶ Application

- Pipe Line Freeze Protection
- Pipe Line Temperature Maintenance
- Tank, Vessel, Hopper, Silo, Tank-lorry Heating
- Long Distance Transportation of Fluids
- Snow Melting System
- Floor Warming System
- Roof and Gutter De-icing
- Bundle Tube Trace
- Industrial Heater
- Wireless Data Transmission

▶ Business Area

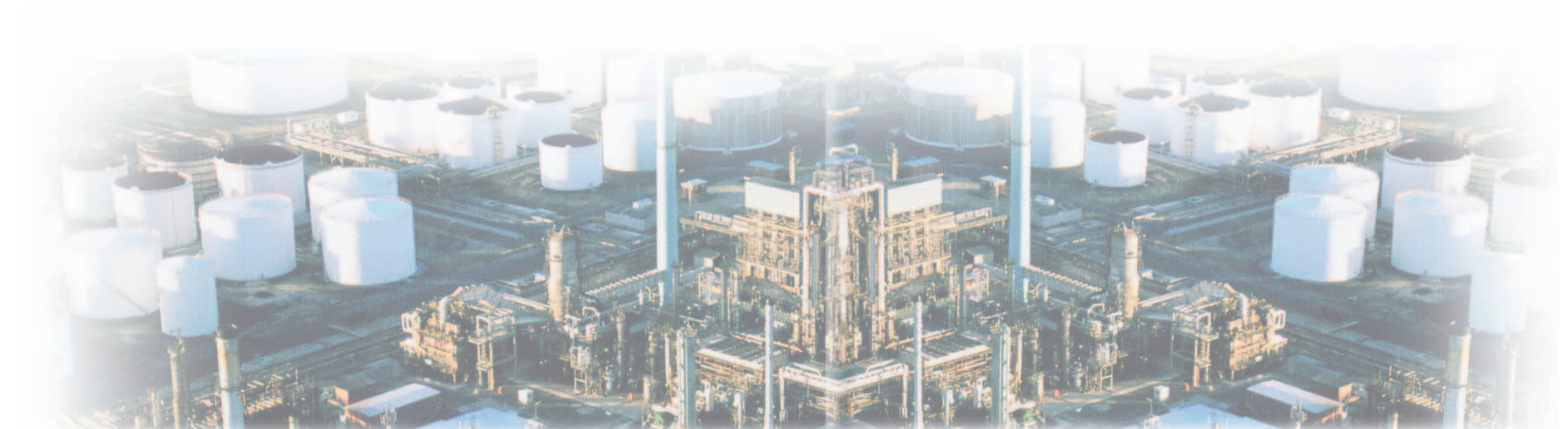
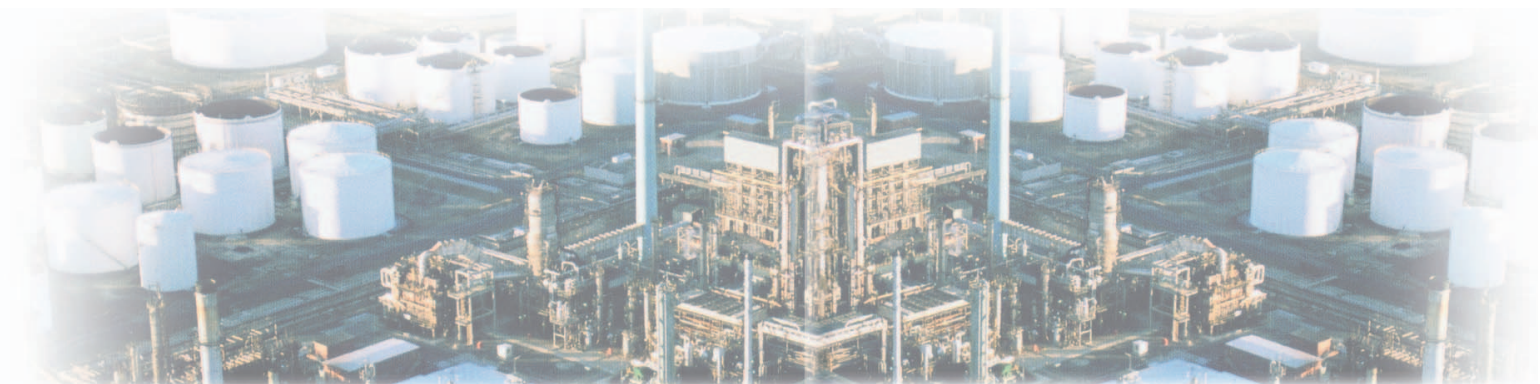
- System Design & Engineering
- Drawing Work Support
- Manufacturing
- Supervising
- Installation & Commissioning
- Maintenance & Repair Work

▶ Product & Sales Items

- Series Resistance Heating Cable
- Self Regulating Heating Cable
- Long Line Heating Cable
- Skin Effect Current Tracing System
- Mineral Insulated Heating Cable
- Snow Melting & Floor Warming Cable
- Bundle Tube Trace
- Industrial Heater
- Wireless Data Transmission

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Heating Technology

Industrial Cable Applications...

- Series Resistance Cable
- Self Regulating Cable
- Skin Effect Trace System
- Mineral Insulated Cable
- Snow Melting Cable
- Floor Warming Cable



Your Applications...

- Frost protection Safe product and protection against frost damages
- Temperature maintenance Reliable adherence to in-process, down-time and storage temperatures for liquid and gas media
- Heating Calculated heating of material and liquid media for the accurately timed attainment of the required in-process and storage temperatures

Pipe Heating

Temp' maintenance and freeze protection
Heating of simple as well as complex pipe systems, from short to very long including the heating of all components such as flanges, valves, pumps and other equipment.



Tank Heating

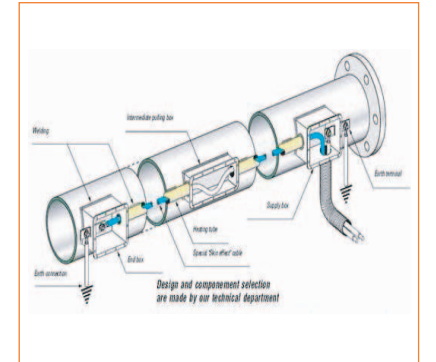
Heating of all kinds of chemical tanks, vessel, containers, tank-lorry, hopper, silos and others for the reliable and safe temperature maintenance of the media stored within.



Heating Technology

Long Line Tracing

Pipe line temperature maintenance and freeze protection
One(1) point power feeding system max. circuit length
Series heating system....5km
Skin effect system.....30km



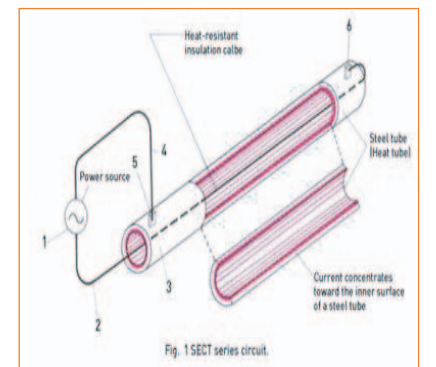
Lawn Base System

Golf country club & stadium Applications:
Golf putting green, tee box, cart road, stadium etc



Snow Melting System

All kinds of snow melting system.
Series heating SMS
Skin effect SMS



Floor Warming
Roof & Gutter De-icing



Series Resistance Heating Cables

SCW HEATING SYSTEM

- High chemical resistance
- For all type industries
- High operating temperature
- May be used in liquids
- Highly flexible
- Small bending radius
- Easy to install and maintenance
- Moisture protected
- High loading
- For all type of application

UL Listed



Heatrace
Electric Heating Products

Pipe line temperature maintenance Pipe line freeze protection Tank, Vessel, Instrument tracing

SCW is preferred where flexible series cables are desirable or when heated lengths exceed the limitations of cut to length cables.

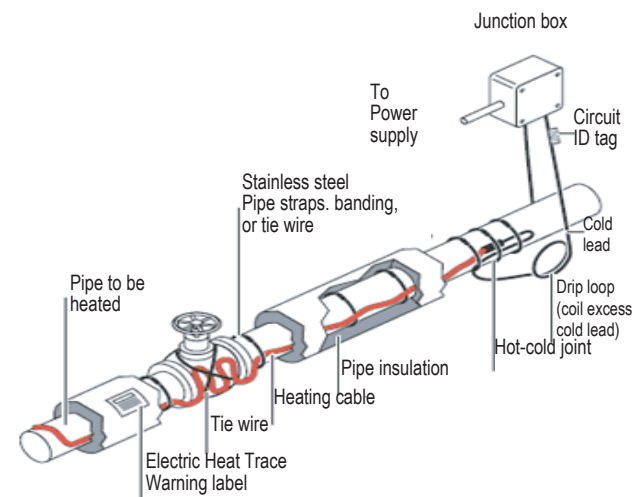
SCW series resistance heating cable is functioned by the heat output from the core, circuit lengths up to 18000 feet can be energized from a single power supply point.

The series circuitry of SCW provides consistent watt-perfoot power output along the entire length of the cable with no voltage drop.

SCW series withstands the temperature exposure associated with steam purging.

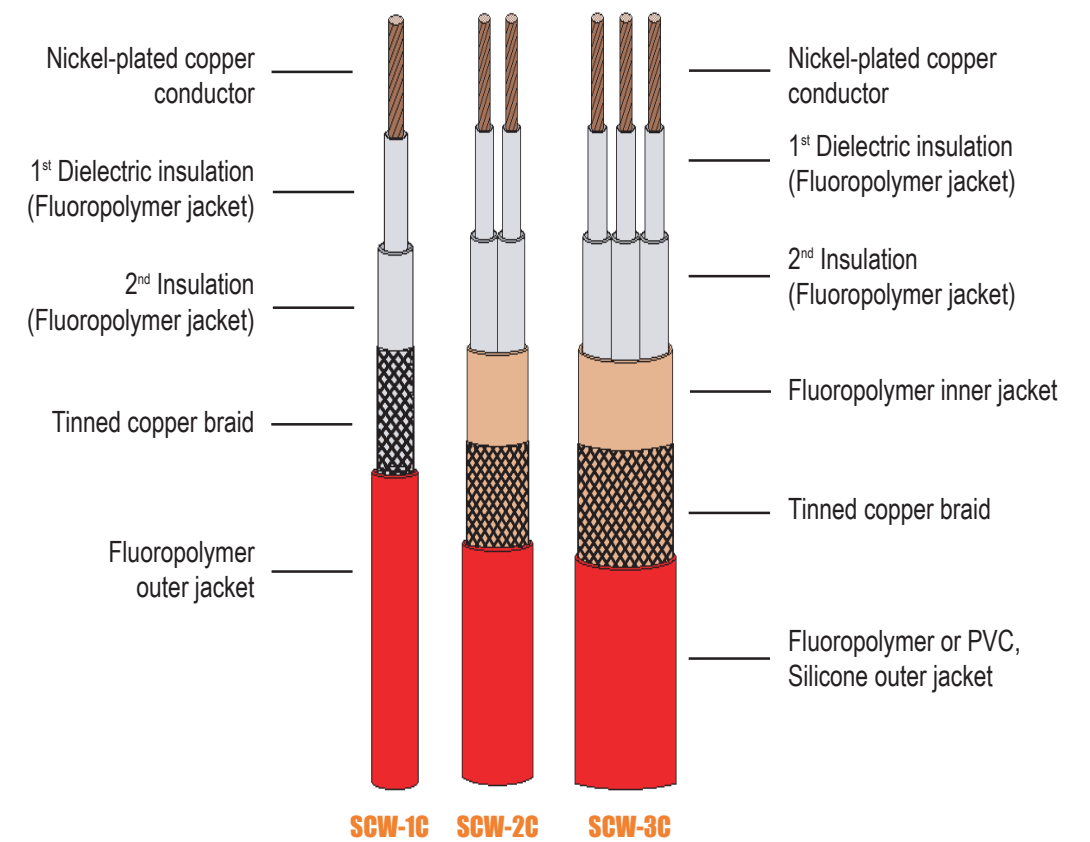
Heatrace SCW is light weight, easy to install and provides proven long term performance and reliability.

SCW cables are approved for use in ordinary and hazardous area.

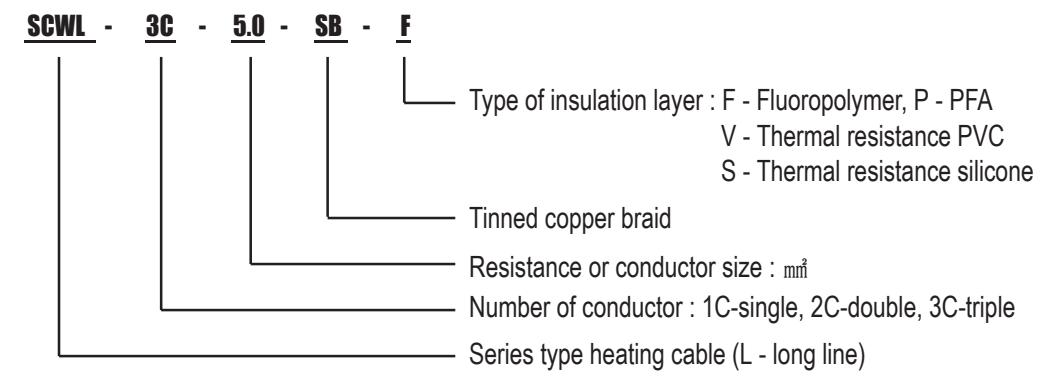


Series Resistance Heating Cables

SCW Heating Cable Construction



Ordering Information



Series Resistance Heating Cables

SCW Heating Cable Construction

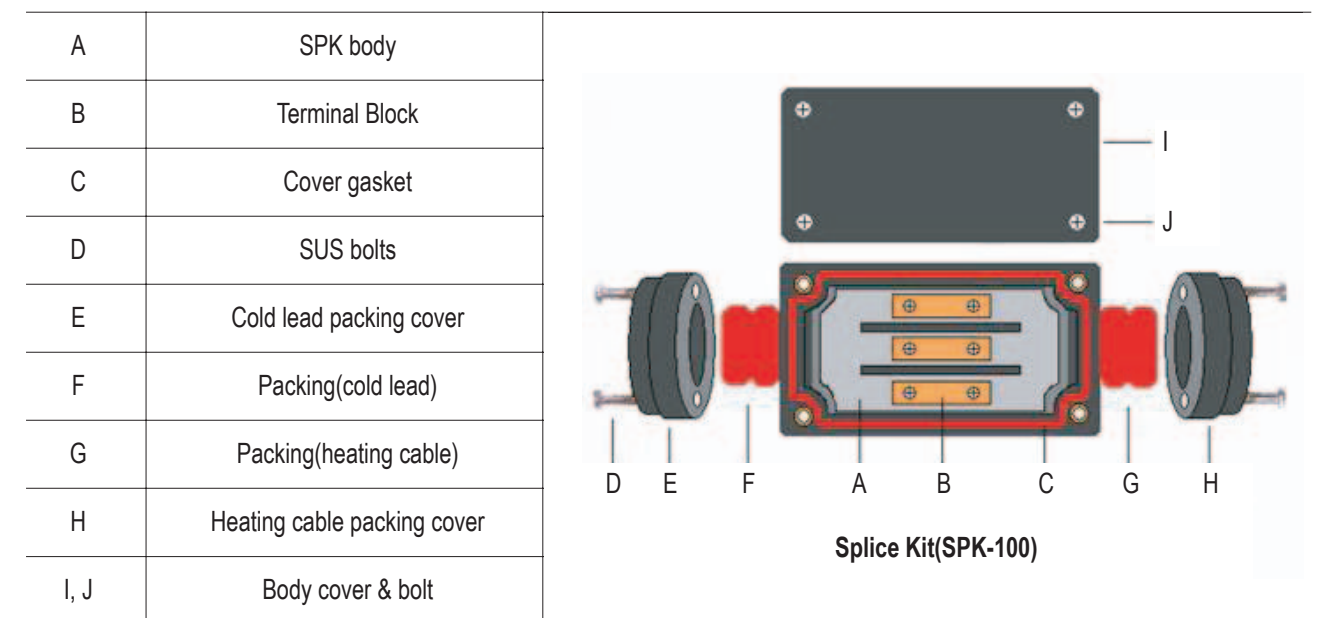
1. SCW Technical Parameter

1-1. Single Core (1 conductor) / Rated Voltage 600V

Model No.	Resistance (Ω /m)	O.D (mm)	Heating Wire	Temperature Coefficient (1 / 100K)
SCW-1C-00117-SBP	0.0117	5.0	Stranded	1.43
SCW-1C-00263-SBP	0.0263	5.2	Stranded	1.43
SCW-1C-00340-SBP	0.0340	5.0	Stranded	1.43
SCW-1C-00500-SBP	0.0500	4.8	Stranded	1.30
SCW-1C-00650-SBP	0.0650	5.0	Stranded	1.30
SCW-1C-00800-SBP	0.0800	4.9	Stranded	1.30
SCW-1C-01000-SBP	0.1000	4.8	Stranded	1.04
SCW-1C-01400-SBP	0.1400	4.8	Stranded	1.04
SCW-1C-01600-SBP	0.1600	4.7	Stranded	1.04
SCW-1C-02000-SBP	0.2000	5.0	Stranded	1.04
SCW-1C-02600-SBP	0.2600	4.8	Stranded	1.04
SCW-1C-03400-SBP	0.3400	4.6	Stranded	1.04
SCW-1C-04300-SBP	0.4300	4.8	Stranded	1.0018
SCW-1C-05100-SBP	0.5100	4.7	Stranded	1.0018
SCW-1C-06800-SBP	0.6800	5.1	Stranded	1.0018
SCW-1C-08500-SBP	0.8500	4.6	Stranded	1.0018
SCW-1C-10000-SBP	1.0000	4.4	Stranded	1.0
SCW-1C-12500-SBP	1.2500	4.4	Stranded	1.0
SCW-1C-14400-SBP	1.4400	4.6	Stranded	1.0
SCW-1C-17500-SBP	1.7500	4.4	Stranded	1.0
SCW-1C-20600-SBP	2.0600	4.5	Stranded	1.029
SCW-1C-25000-SBP	2.5000	4.4	Stranded	1.029
SCW-1C-31000-SBP	3.1000	4.4	Stranded	1.04
SCW-1C-40000-SBP	4.0000	4.4	Stranded	1.04
SCW-1C-44000-SBP	4.4000	4.3	Stranded	1.018
SCW-1C-47000-SBP	4.7000	4.3	Stranded	1.018
SCW-1C-57000-SBP	5.7000	4.2	Stranded	1.018
SCW-1C-0007K-SBP	7.0000	3.7	Spirally wound	1.018

SCW-1C-0009K-SBP	9.00	3.7	Spirally wound	1.018
SCW-1C-0011K-SBP	11.00	3.6	Spirally wound	1.018
SCW-1C-0013K-SBP	13.00	3.6	Spirally wound	1.0
SCW-1C-0015K-SBP	15.00	3.6	Spirally wound	1.0
SCW-1C-0020K-SBP	20.00	3.6	Spirally wound	1.0
SCW-1C-0025K-SBP	25.00	3.6	Spirally wound	1.0
SCW-1C-0030K-SBP	30.00	3.6	Spirally wound	1.0
SCW-1C-0040K-SBP	40.00	3.6	Spirally wound	1.0
SCW-1C-0050K-SBP	50.00	3.6	Spirally wound	1.0
SCW-1C-0060K-SBP	60.00	3.6	Spirally wound	1.0
SCW-1C-0080K-SBP	80.00	3.6	Spirally wound	1.0
SCW-1C-0100K-SBP	100.00	3.6	Spirally wound	1.006
SCW-1C-0117K-SBP	117.00	3.6	Spirally wound	1.029
SCW-1C-0160K-SBP	160.00	3.6	Spirally wound	1.029
SCW-1C-0200K-SBP	200.00	3.6	Spirally wound	1.006
SCW-1C-0300K-SBP	300.00	3.6	Spirally wound	1.006
SCW-1C-0450K-SBP	450.00	3.6	Spirally wound	1.006
SCW-1C-0600K-SBP	600.00	3.6	Spirally wound	1.006
SCW-1C-1500K-SBP	1500.00	3.6	Spirally wound	1.002

Connection SPK (for installation of cold lead cable)



Series Resistance Heating Cables

SCWL Heating Cable Construction

1-2. Single Core (1 conductor)

Type	Structure of Core	Rated Voltage	Section mm ²	Resistance @20°C Ω/km
SCWL-1C-3.0	19*0.45	600V 50-60HZ	3	5.83
SCWL-1C-4.0	19*0.52		4	4.37
SCWL-1C-5.0	19*0.58		5	3.52
SCWL-1C-6.0	19*0.64		6	2.93
SCWL-1C-7.0	19*0.69		7	2.51
SCWL-1C-8.0	19*0.74		8	2.20
SCWL-1C-9.0	19*0.78		9	1.95
SCWL-1C-10.0	19*0.82		10	1.75

* Special order should be placed from the conductor size of 12mm²(1.31 Ω/km) to 70mm²(0.258 Ω/km).

1-3. Double Core (2 conductor)

Type	Structure of Core	Rated Voltage	Section mm ²	Resistance @20°C (single core) Ω/km	Resistance @20°C (the cable) Ω/km
SCWL-2C-3.0	19*0.45	600V 50-60HZ	3	5.83	11.66
SCWL-2C-4.0	19*0.52		4	4.37	8.74
SCWL-2C-5.0	19*0.58		5	3.52	7.04
SCWL-2C-6.0	19*0.64		6	2.93	5.86
SCWL-2C-7.0	19*0.69		7	2.51	5.02
SCWL-2C-8.0	19*0.74		8	2.20	4.40
SCWL-2C-9.0	19*0.78		9	1.95	3.90
SCWL-2C-10.0	19*0.82		10	1.75	3.50

1-4. Triple Core (3 conductor)

Type	Structure of Core	Rated Voltage	Section mm ²	Resistance @20°C (the cable) Ω/km	Resistance @20°C (the cable) Ω/km
SCWL-3C-3.0	19*0.45	600V 50-60HZ	3	0.00583	5.83
SCWL-3C-4.0	19*0.52		4	0.00437	4.37
SCWL-3C-5.0	19*0.58		5	0.00352	3.52
SCWL-3C-6.0	19*0.64		6	0.00293	2.93
SCWL-3C-7.0	19*0.69		7	0.00251	2.51
SCWL-3C-8.0	19*0.74		8	0.00220	2.20
SCWL-3C-9.0	19*0.78		9	0.00195	1.95
SCWL-3C-10.0	19*0.82		10	0.00175	1.75

Series Resistance Heating Cables

SCW Heating Cable Construction

- ➔ Resistance (M.Ω/KM) ≥ 750
- ➔ Max. Exposure Temp' 205°C(Fluoropolymer), 250°C(PFA), 105°C(PVC), 200°C(Silicone)
- ➔ Min. Installation Temp' -50°C(Fluoropolymer), -20°C(PVC, Silicone)
- ➔ Min. bend radius :
 - @-15°F/-5°C ----- 22mm
 - @-76°F/-60°C ----- 32mm
- ➔ Protection grade : IP56
- ➔ Voltage test : 2500VAC/50HZ/1min

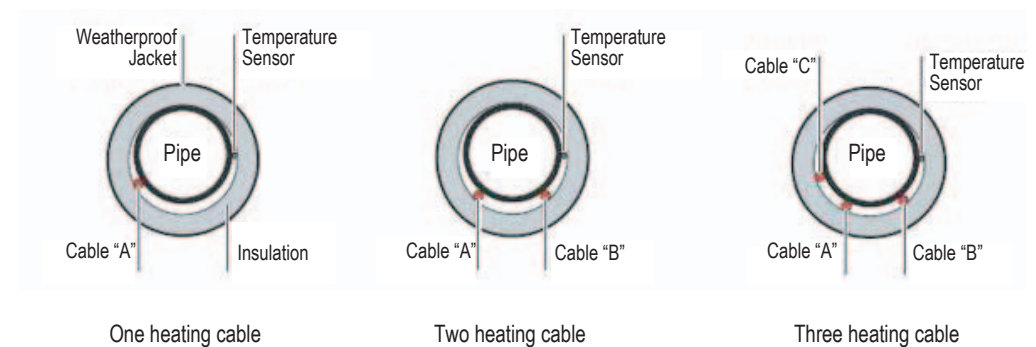
2. Application

This type of heating cable is mainly used in the heat preservation for long pipe, the max. length of one circuit can be 5km by one power supplier.

3. Connection Method of Cold-Lead

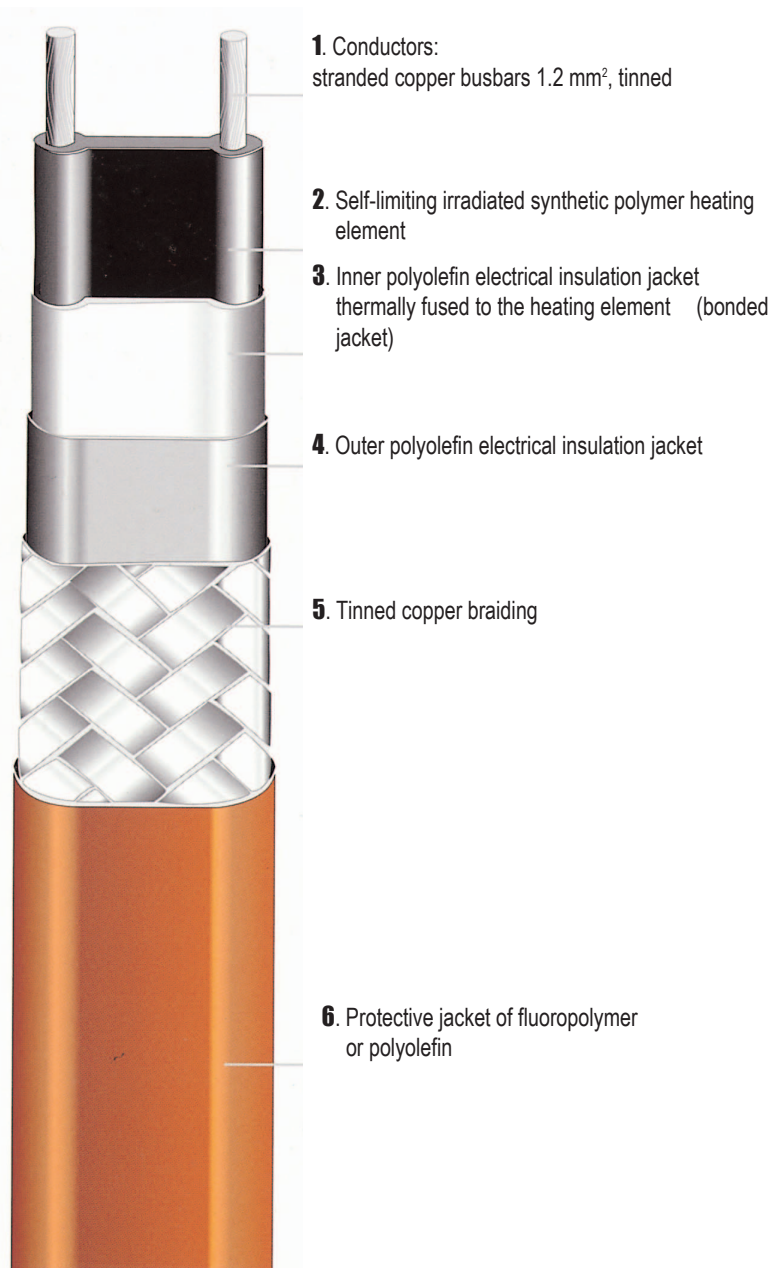
In order to improve the longevity of the heating cable, remove the insulation layer of power box, splice-kit and terminal end kit, pressure and connect the copper connector and cold-lead of the cable, then wrap with 3M high temperature tape.

Section mm ²	Rated current load	Section of heating cable(mm ²)
5.0	40A	SCWL-1C
10.0	60A	SCWL-1C,2C,3C * 3.0, 4.0, 5.0
16.0	100A	SCWL-1C,2C,3C * 6.0, 7.0, 8.0
25.0	150A	SCWL-1C,2C,3C * 9.0, 10.0





Self-limiting parallel heating cable PSB



Features

- Self-limiting
- Can be used in explosive atmospheres without temperature limiter (subject to 'T' class)
- Can be cut at random length thanks to its parallel circuit configuration
- Corrosion-proof and resistant to effects of chemicals thanks to its protective outer sheath
- Electrically and mechanically protected by a tinned copper braid
- Simple installation thanks to its high flexibility and favourable dimensions
- Easy on-site cutting and terminating, even in Ex areas

Description

A temperature-dependant resistive element between two parallel copper conductors regulates and limits the heat output of the heating cable according to the ambient temperature. If the ambient temperature rises, the heat output of the heating cable is reduced. This self-limiting property prevents overheating even when the cables are overlapped. A temperature limiter is not generally necessary not even for Ex areas (also not in explosion hazard zones).

Thanks to the parallel power-supply over the entire heating circuit the heating cable can be cut and installed to any required length. BARTEC selflimiting heating cable is available with different power output range and protective insulation. The protective outer jacket of either fluoropolymer or polyolefin protects the inner copper braiding from corrosion and chemical attack.

The copper braiding serves as an earth conductor in accordance with VDE 0100 and also increases the mechanical stability of the cable. Under the protective braiding are two synthetic jackets providing electrical insulation. The inner of the two jackets is thermally fused to the heating element (bonded jacket).

Areas of application

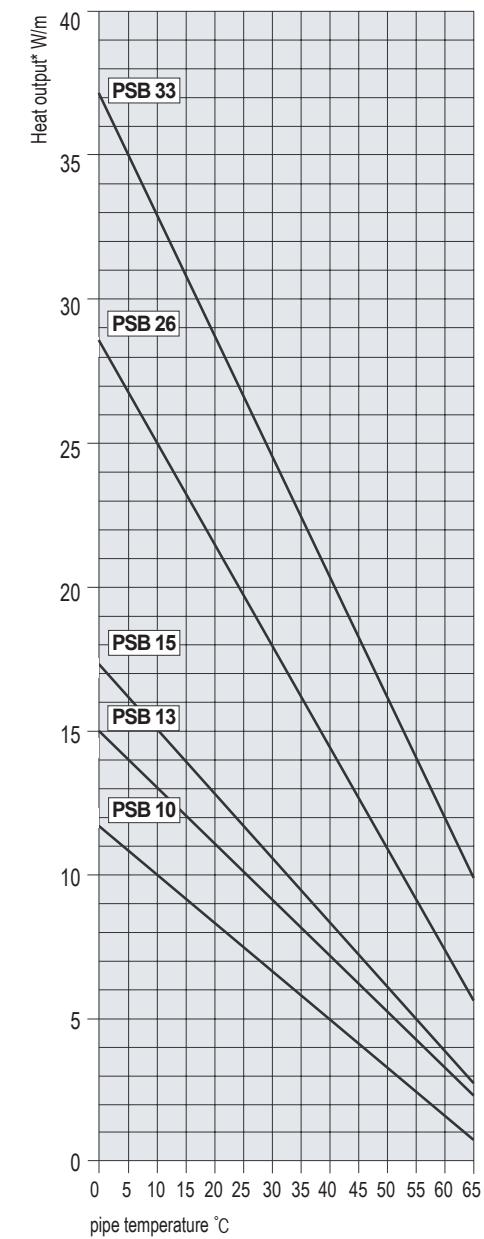
PSBL with polyolefin insulation jacket

- if the heating cable is exposed to aqueous, inorganic chemicals.
- if high mechanical requirements are set for the cable.

PSBL with fluoropolymer protective jacket

- if the heating cable is exposed to high levels of humidity organic chemicals such as hydrocarbons or solvents.
- where the cable must meet high mechanical requirements.

PSB characteristics



* Heat output on insulated steel pipes at 230V under nominal conditions.

Explosion protection

Ex protection type
 Ex II 2G Ex e II T5, T6
 Ex II 2D Ex tD A21 T 95°C, T 80°C

Certification
 KEMA 02 ATEX 2326 U
 KEMA 08 ATEX 0111
 IECEx KEM 07.0047 U
 CSA 1862457

Max. resistance of protective braid
 < 18.2 Ω/km

Dimensions
 with protective braid and protective outer jacket of fluoropolymer
 11.6 x 5.6 mm
 with protective braid and protective outer jacket of polyolefin
 11.8 x 5.8 mm

Min. bending radius
 25 mm

Self Regulating Cable



Technical data

Nominal voltage AC 208 V to 254 V AC 110 V to 120 V

Power setting at +10°C					
Heating output	PSB 10	PSB 13	PSB 15	PSB 26	PSB 33
at AC 230 V	10 W/m	13 W/m	15 W/m	25 W/m	33 W/m
at AC 120 V	10.6 W/m	13.7 W/m	15.8 W/m	25.8 W/m	33.6 W/m

Permissible ambient temperature
 Cut-in heating cable +65°C
 Cut-off heating cable (cumulative 1000 h) +85°C
Minimum installation temperature -55°C
Minimum cut-in temperature -40°C

Max. length of heating circuit at 254 V (for automatic circuit-breakers with C characteristic)					
Fuse	PSB 10	PSB 13	PSB 15	PSB 26	PSB 33
16 A, cut-in temperature +10°C	205m	169m	145m	88m	70m
16 A, cut-in temperature -15°C	139m	111m	93m	58m	49m
16 A, cut-in temperature -30°C	120m	94m	77m	45m	43m
20 A, cut-in temperature +10°C	205m	179m	162m	117m	90m
20 A, cut-in temperature -15°C	186m	149m	125m	75m	64m
20 A, cut-in temperature -30°C	150m	124m	106m	74m	52m
32 A, cut-in temperature +10°C	195m	174m	160m	126m	108m
32 A, cut-in temperature -15°C	195m	174m	160m	117m	95m
32 A, cut-in temperature -30°C	195m	174m	160m	100m	82m

Max. length of heating circuit at 120 V (for automatic circuit-breakers with C characteristic)					
Fuse	PSB 10	PSB 13	PSB 15	PSB 26	PSB 33
16 A, cut-in temperature +10°C	95m	78m	67m	43m	33m
16 A, cut-in temperature -15°C	69m	55m	45m	30m	25m
16 A, cut-in temperature -30°C	58m	47m	39m	26m	21m
20 A, cut-in temperature +10°C	95m	86m	80m	58m	45m
20 A, cut-in temperature -15°C	90m	72m	60m	38m	32m
20 A, cut-in temperature -30°C	75m	59m	49m	31m	26m
32 A, cut-in temperature +10°C	95m	86m	80m	63m	54m
32 A, cut-in temperature -15°C	95m	86m	80m	55m	45m
32 A, cut-in temperature -30°C	95m	86m	80m	53m	43m

Self-limiting parallel heating cable HSB



Features

- Steam cleaning possible
- Self-limiting
- Can be used in explosive atmospheres without temperature limiter
- Can be cut to length at random thanks to its parallel circuit configuration
- Simple installation thanks to its high flexibility and favourable dimensions
- Easy on-site cutting and terminating, even in Ex areas
- Corrosion-proof and resistant to chemical attack thanks to its protective outer jacket

Description

A temperature-dependant resistive element between two parallel copper conductors regulates and limits the heat output of the heating cable.

This output regulation is carried out automatically along the entire length of the heating cable according to the prevailing ambient temperature. As the ambient temperature rises, the heat output of the cable is reduced. This self-limiting property prevents overheating even when the cable are overlapped. A temperature limiter is not required (not even in explosion hazard zones).

Thanks to the parallel power supply the heating cable can be cut to any required length. This feature considerably simplifies project planning and installation. The heating cable is cut and terminated in accordance with the local requirements directly on the construction site. In cases where the cable may become damaged, it is not necessary to replace the whole circuit but only the affected part.

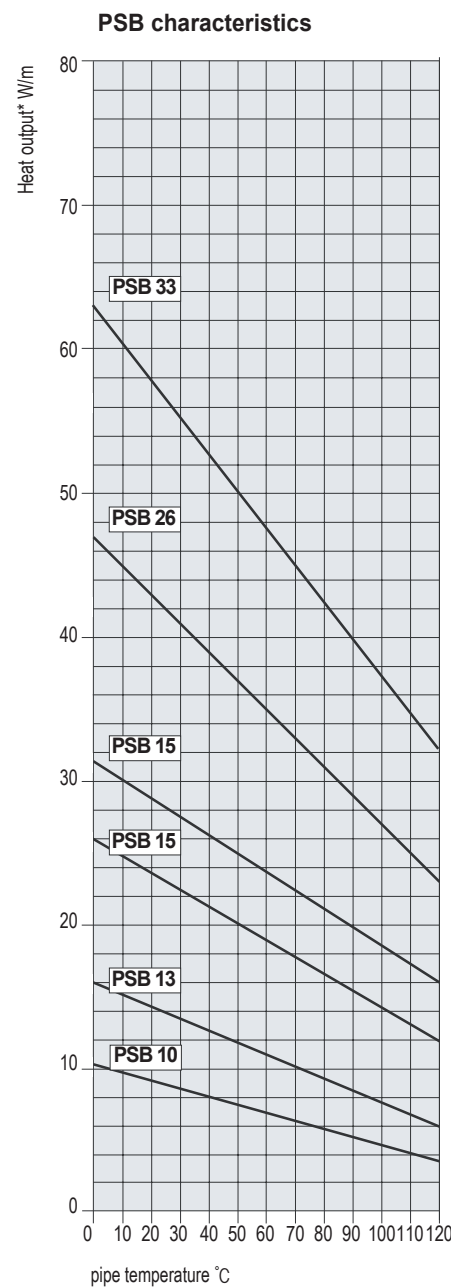
BARTEC-HEAT HSB is available in different versions and with different power outputs.



Areas of application

HSB with fluoropolymer protective jacket

- if the heating cable is exposed to high levels of humidity organic chemicals such as hydrocarbons or solvents.
- where the cable must meet high mechanical requirements.



* Heat output on insulated steel pipes at 230V under nominal conditions.

Explosion protection

Ex protection type

- Ex II 2G Ex e II 200°C (T2), T3, T4
- Ex II 2D Ex tD A21 IP 65 T 200°C, T 195°C, T 130°C

Certification

- KEMA 02 ATEX 2327 U
- KEMA 08 ATEX 0110
- IECEX KEM 07.0048 U
- CSA 1862457

Max. resistance of protective braid

< 18.2 Ω/km

Dimensions

with protective braid and protective outer jacket of fluoropolymer 10.2 x 4.8 mm

Min. bending radius

25 mm

Technical data

Nominal voltage AC 208 V to 254 V
AC 110 V to 120 V

Power setting at +10°C

Heating output	HSB 10	HSB 15	HSB 25	HSB 30	HSB 45	HSB 60
at AC 230 V	10 W/m	15 W/m	25 W/m	30 W/m	45 W/m	60 W/m
at AC 120 V	10.8 W/m	16.1 W/m	26.6 W/m	31.8 W/m	47.1 W/m	62.0 W/m

Permissible ambient temperature

- Cut-in heating cable +120°C
- Cut-off heating cable (cumulative 1000 h) +190°C

Minimum installation temperature -60°C

Minimum storage temperature -60°C

Minimum cut-in temperature -60°C

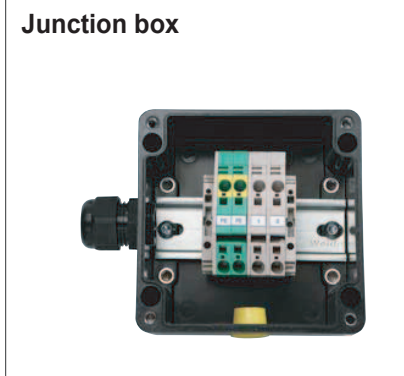
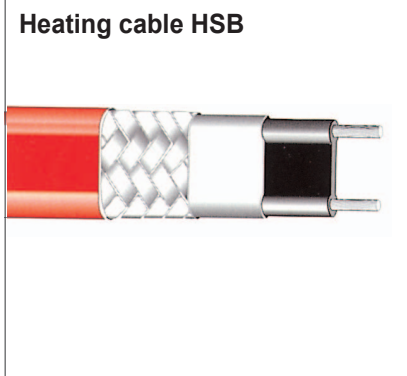
Max. length of heating circuit at 254 V (for automatic circuit-breakers with C characteristic)

Fuse	HSB 10	HSB 15	HSB 25	HSB 30	HSB 45	HSB 60
16 A, cut-in temperature +10°C	200m	165m	110m	85m	70m	50m
16 A, cut-in temperature -25°C	175m	117m	88m	69m	49m	38m
16 A, cut-in temperature -60°C	165m	110m	80m	65m	45m	35m
20 A, cut-in temperature +10°C	235m	189m	140m	114m	82m	64m
20 A, cut-in temperature -25°C	235m	152m	120m	92m	66m	52m
20 A, cut-in temperature -60°C	225m	144m	114m	86m	62m	48m
32 A, cut-in temperature +10°C	235m	189m	189m	114m	82m	64m
32 A, cut-in temperature -25°C	235m	189m	189m	114m	82m	64m
32 A, cut-in temperature -60°C	235m	189m	189m	110m	78m	60m

Max. length of heating circuit at 120 V (for automatic circuit-breakers with C characteristic)

Fuse	HSB 10	HSB 15	HSB 25	HSB 30	HSB 45	HSB 60
16 A, cut-in temperature +10°C	100m	80m	60m	44m	35m	25m
16 A, cut-in temperature -25°C	89m	56m	44m	35m	24m	20m
16 A, cut-in temperature -60°C	82m	52m	40m	32m	22m	17m
20 A, cut-in temperature +10°C	120m	95m	69m	58m	41m	32m
20 A, cut-in temperature -25°C	120m	75m	59m	45m	33m	25m
20 A, cut-in temperature -60°C	120m	75m	55m	41m	26m	21m
32 A, cut-in temperature +10°C	120m	95m	69m	58m	41m	32m
32 A, cut-in temperature -25°C	120m	95m	69m	58m	41m	32m
32 A, cut-in temperature -60°C	120m	95m	69m	58m	41m	32m

Self Regulating Cable



System overview HSB

Features

- Simple project planning
- BARTEC HELOC calculation and design - Software - Free Download
- Safe, self-limiting, without overheating while overlapping, thermostat not mandatory
- Easy installation, cutting and terminating on-site, random length possible and use of up-to-date connection technology
- Installation also in Ex-area, maximum admissible work-piece temperature of +120°C (power ON) and +190°C (power OFF, cumulative 1000 h)
- Certificate for complete system EN 60079-30 und CSA C22.2 No.130-3
- Hard environment conditions, junction boxes made of polyester, stainless steel and aluminium available

Description

Typical applications are frost protection, maintaining temperature and heat-up in pipes, tanks, vessels or at surfaces in non-ex areas and in explosive atmospheres for process industry. The BARTEC electric trace heating system type HSB offers the optimum solution for requirements following Ex II 2G Ex e II 200°C (T2), T3, T4 and Ex II 2 D Ex tD A21 IP 65 T 200°C, T 195 °C, T 130°C.

The self-limiting heating cable Type HSB is available with various nominal power ratings from 10 W/m to 60 W/m at 10 °C (maximum admissible work-piece temperature of +120°C, power ON and +190°C power OFF, cumulative 1000 h). The standard outer insulation jacket is made of fluorine polymer plastic for special applications which require chemical resistance and mechanical strength. Dependant on the cut-in temperature and respectively the cut-in current and the supplied voltages a maximum heating circuit length about 200 m is possible.

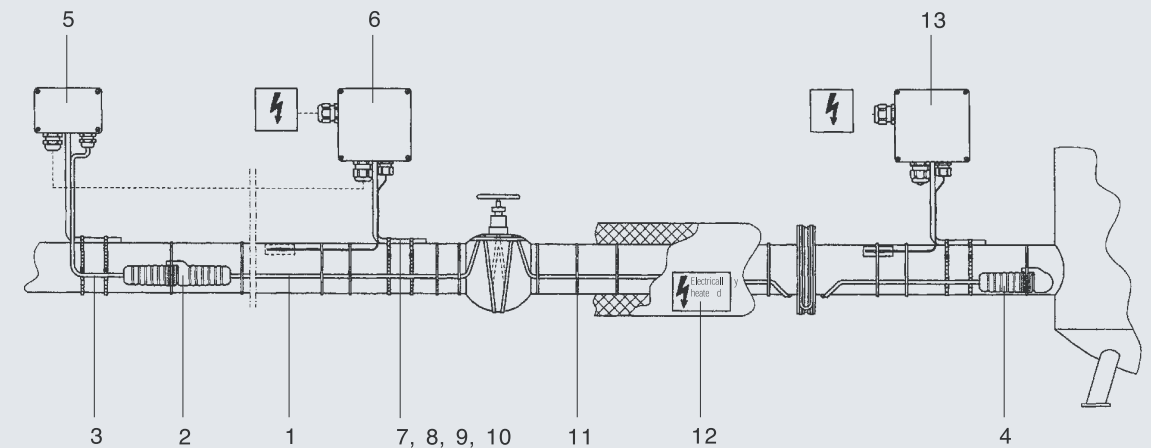
System overview

- Self-limiting parallel heating cable type HSB (AC 110 to 120 V, AC 208 to 254 V)
- Heat shrink technology or silicone cold applied technology or plug & socket for connection and terminating (ambient temperature -50°C up to +55°C, IP 65)
- Junction box made of polyester, stainless steel and aluminium
- Option: mechanical or electronic control systems
- Flexible connection by using a cold lead into the junction box (indirect) made of PLEXO plug & socket technology
- Direct connection of the heating cable into a junction box with heat shrink technology
- Direct connection of the heating cable into a junction box with silicone cold applied technology
- Connection with PLEXO plug & socket technology

Explosion protection

Certification
KEMA 08 ATEX 0110
CSA 1862457

HSB heating circuit with system PLEXO-H in an Ex area (typical example)



- | | | |
|--------------------------------------|-----------------------------------|---|
| 1 Parallel circuit HSB heating cable | 5 Ex e junction box | 9 Fixing strap for mounting bracket |
| 2 PLEXO-H plug and socket connection | 6 BSTW Safety temperature monitor | 10 Buckles for fixing strap |
| 3 Silicone-sheathed cable | 7 Mounting bracket | 11 Self adhesive glass-fibre fixing tape |
| 4 PLEXO-H remote end termination | 8 Mounting plate | 12 "Electrically Heated" caution label |
| | | 13 BSTW Safety temperature monitor as an extra alarm (optional) |

Self Regulating Cable



Self-limiting parallel heating cable HTSB



- 1. Conductors: stranded copper busbars 1.8 mm², nickel plated
- 2. Self-limiting irradiated synthetic polymer heating element
- 3. Fluoropolymer electrical insulation jacket
- 4. Tinned copper braiding
- 5. Protective jacket of fluoropolymer or alternatively polyolefin

Applications

Construction

Order no. 07-5809-...W
The cable is used with Cu braiding and an insulation jacket made of fluoropolymer if it is exposed to excessive humidity, aggressive chemical influences or additional mechanical stresses.

Chemical resistance

with insulation fluoropolymer jacket resistant to: acids, alkalis, salts, seawater, oils and other hydrocarbon liquids.

Features

- High level of steam cleaning is possible
- Self-limiting
- Can be used in explosive atmospheres without temperature limiter (subject to 'T' class)
- Can be cut to length at random thanks to its parallel circuit configuration
- Simple installation thanks to its high flexibility
- Easy on-site cutting and terminating
- Corrosion-proof and resistant to effects of chemicals thanks to its protective outer sheath

Description

A temperature-dependent resistive element between the parallel copper conductors regulates and limits the heating cable's heat output. This power setting occurs automatically at every point of the heating cable depending on the ambient temperature prevailing there. If the ambient temperature increases, the cable's heating output is reduced. This self-limitation prevents the heating cables overheating even where cables overlap.

There is no need for a temperature limiter. The parallel supply of power allows the heating cable to be cut to any length. This makes planning and installation easier. The heating cable is cut from the roll on the construction site according to the local conditions. If the cable gets damaged, only the part concerned has to be replaced, not the entire heating cable.

BARTEC HTSB is available in various power ratings and versions.

Technical data

Available outputs

with 230 V 16, 49, 65, 98 W/m
with 120 V 16, 49, 65, 98 W/m

Supply voltage

AC 208 V up to AC 254 V
AC 110 V up to AC 120 V

Permissible ambient temperature

Cut-in heating cable +190°C
intermittently turned off +232°C

Min. Installationstempertur

-40°C

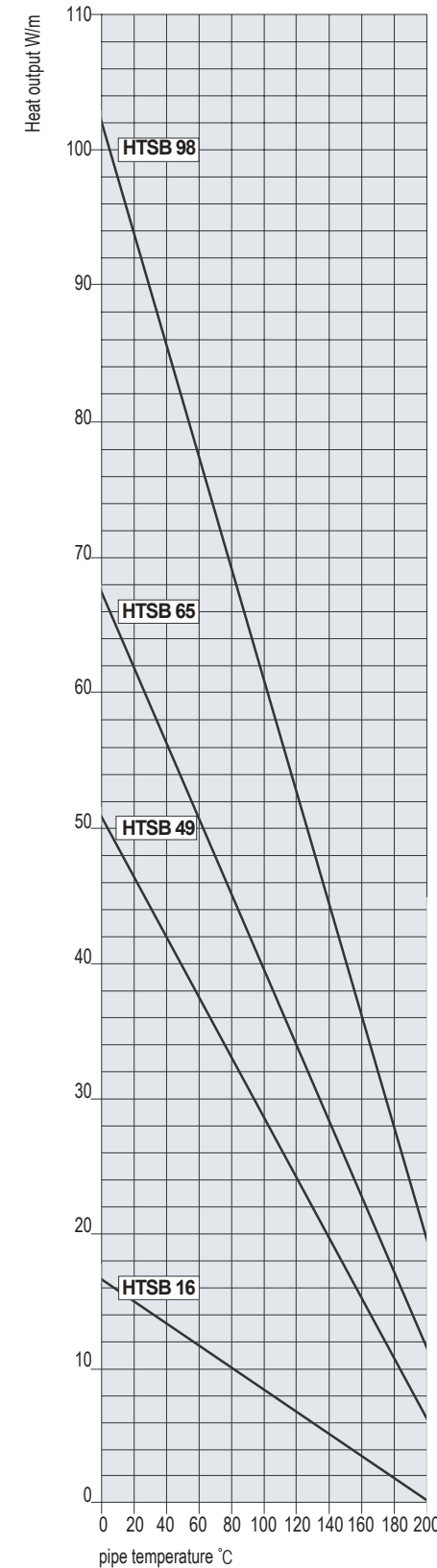
Dimension

12.3mm x 5.0mm

Minimum bend radius

25mm

HTSB-characteristics



Max. length of heating circuit at 230 V (for automatic circuit-breakers with C characteristic)				
Type of heating cable	HTSB 16	HTSB 49	HTSB 65	HTSB 98
16 A, cut-in temperature +10°C	109m	50m	36m	24m
16 A, cut-in temperature -20°C	98m	44m	34m	22m
16 A, cut-in temperature -40°C	88m	37m	33m	22m
25 A, cut-in temperature +10°C	158m	76m	55m	35m
25 A, cut-in temperature -20°C	152m	76m	53m	35m
25 A, cut-in temperature -40°C	137m	58m	51m	35m
32 A, cut-in temperature +10°C	163m	84m	72m	44m
32 A, cut-in temperature -20°C	163m	84m	69m	44m
32 A, cut-in temperature -40°C	163m	75m	66m	44m

Max. length of heating circuit at 120 V (for automatic circuit-breakers with C characteristic)				
Type of heating cable	HTSB 16	HTSB 49	HTSB 65	HTSB 98
16 A, cut-in temperature +10°C	59m	26m	20m	13m
16 A, cut-in temperature -20°C	54m	23m	18m	11m
16 A, cut-in temperature -40°C	49m	20m	16m	11m
25 A, cut-in temperature +10°C	92m	40m	34m	19m
25 A, cut-in temperature -20°C	84m	34m	27m	17m
25 A, cut-in temperature -40°C	76m	31m	25m	17m
32 A, cut-in temperature +10°C	109m	44m	39m	23m
32 A, cut-in temperature -20°C	107m	44m	36m	23m
32 A, cut-in temperature -40°C	98m	39m	33m	23m

Selection chart heating cable HTSB 230 V	
Type	Order no.
HTSB 16	07-5809-216W
HTSB 49	07-5809-249W
HTSB 65	07-5809-265W
HTSB 98	07-5809-298W

Selection chart heating cable HTSB 120 V	
Type	Order no.
HTSB 16	07-5809-116W
HTSB 49	07-5809-149W
HTSB 65	07-5809-165W
HTSB 98	07-5809-198W

Self Regulating Cable

SKIN-SYSTEM

SAFE AND RELIABLE HEATING SYSTEM FOR PIPELINES OF AN UNLIMITED LENGTH DESIGNED FOR ABOVE-GROUND, BURIED AND UNDERWATER PIPELINING, INCLUDING ONES IN EXPLOSION HAZARDOUS ZONES

induction-resistive heating system for long-distance pipelines



- The only way to heat pipelines with the length up to 30 km without parallel supply network
- The most efficient way to heat any trunk pipelines of an unlimited length
- Inherent strength and reliability of system design
- Up to 120 W/m power output of the heating element
- Certificate of conformity GOST R (State Standard) and Permit of Federal Service for Ecological, Technological and Atomic Inspection for application in explosion hazardous zones
- Operating temperature up to 200°C
- Zero electrical potential on outer surfaces of heating elements. After earthing and heating elements do not require any electrical insulation

APPLICATION FIELD

Induction-resistive heating system (IRHS) or SKIN-system is designed to maintain the product temperature, protect long trunk pipelines against freezing and ensure their start heating. SKIN-system is the only one, which is capable to heat a pipeline run of up to 30 km long with power supply from one point (without any parallel network); it is as well the most efficient and cost-effective solution for heating trunk pipelines of an unlimited length with parallel supply network.

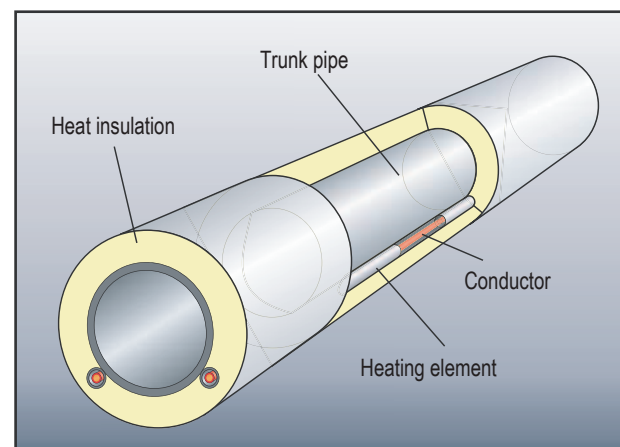
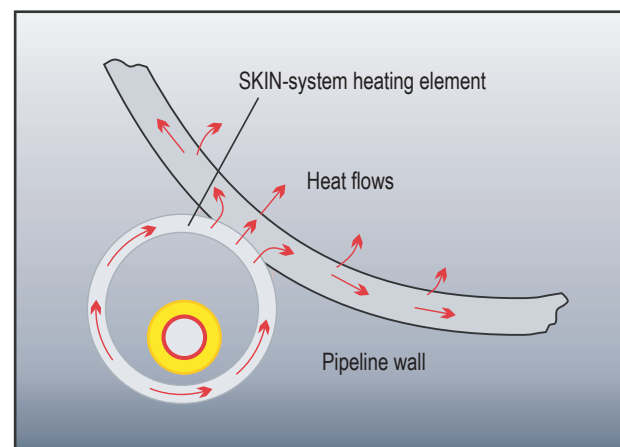
PRINCIPLE OF OPERATION

Heating element of the system consists of a ferro-magnetic steel tube with the outer diameter of 20-60 mm and the wall thickness of at least 3.0 mm; there is an insulated copper or aluminum conductor with cross section of 10-50 mm² placed inside the tube.

The conductor is electrically connected to the tube at the end of a heating run while AC voltage is supplied between the conductor and the pipe at the run head; the voltage value is calculated basing on the required heat output and the heated run length.

Currents of the conductor and the tube have opposite directions and thus skin and proximity effects originate in the system. As a result the tube current flows in the inner layer close to the inner surface of the tube and there is no voltage available on the outer surface of the tube.

The conductor is non-magnetic (made of copper, aluminum), thus, it does not feature any noticeable skin effect and AC flows throughout the whole section of the conductor. The main heat producing element of IRHS is the tube, which produces up to 80% of the system output.

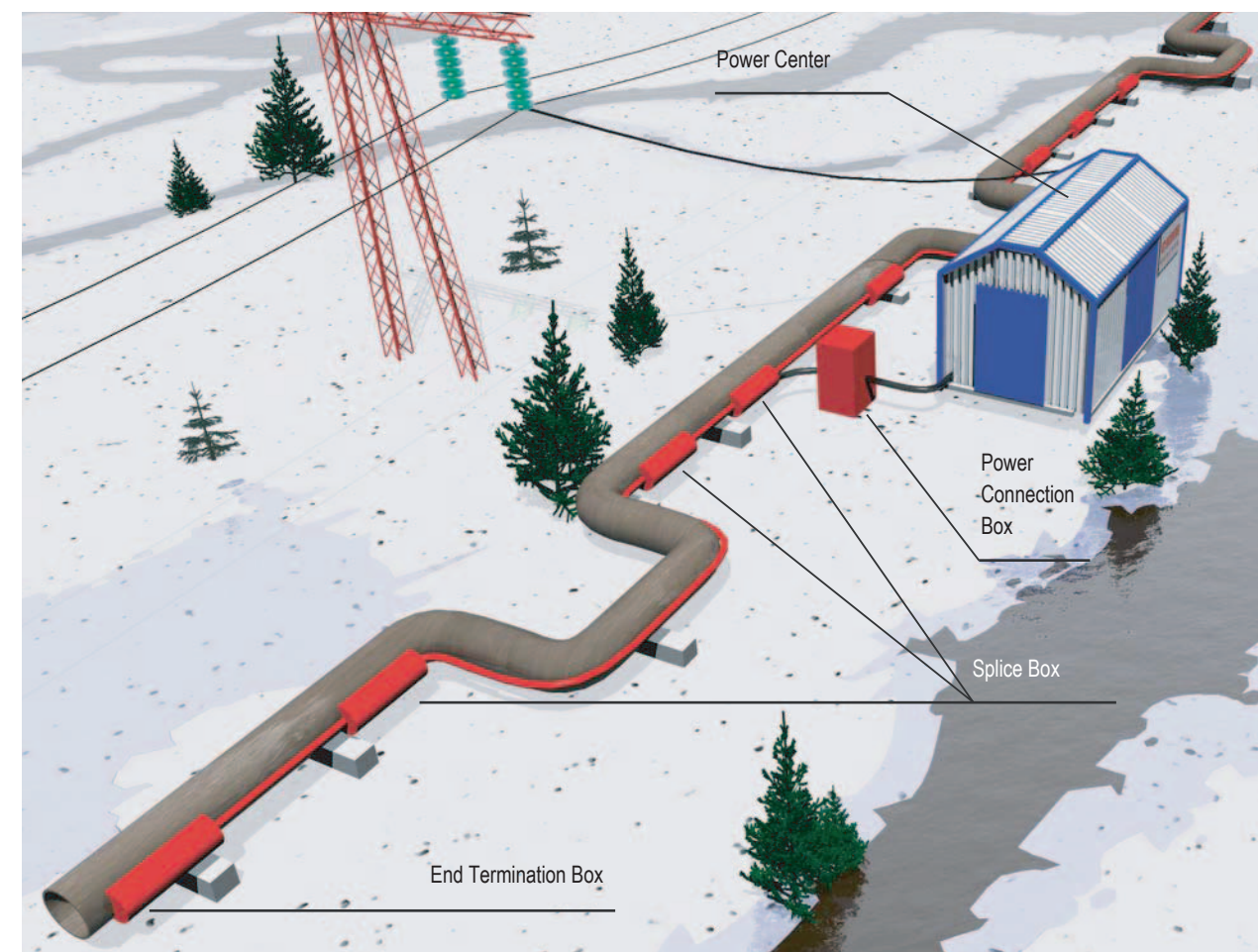


ADVANTAGES

1. Long range of a pipeline heated run. The system low resistance per a meter of length along with its high supply voltage makes possible to feed heated runs of up to 30km long from a single source.
2. One end powering. The SKIN-system inherently is designed to be electrically supplied from one end of a heated run.
3. Electrical safety. Outer surface of the heating element is earthed and its voltage potential relative to the earth is zero.
4. Good thermal contact. Metal heating element is welded directly to the pipeline or is fixed to it with special fasteners. In order to improve the thermal contact a special heat conducting paste is applied.
5. Easy installation. Heat producing elements have not any outer electric insulation which may be damaged during installation works.
6. Reliability. The steel heating tube ensures mechanical stability of the conductor and protects it against damages. This fact is especially important for buried and underwater pipelines.

One, two or three heating elements can be fitted on a trunk pipe depending on the required heating power and pipeline length. SST designs and supplies IRHS-system as a full set including a special integrated transformer substation, all elements belonging to the heating system itself, monitoring and control systems.

ELECTRIC SUPPLY OF A PIPELINE RUN HEATED BY SKIN-SYSTEM



Electric power supply system is performed as an integrated transformer substation including distributing cells of the HV and LV sides, specialized ba-

lancing transformer, monitoring and control system. The integrated power center is located in a hermetically sealed and heated container.

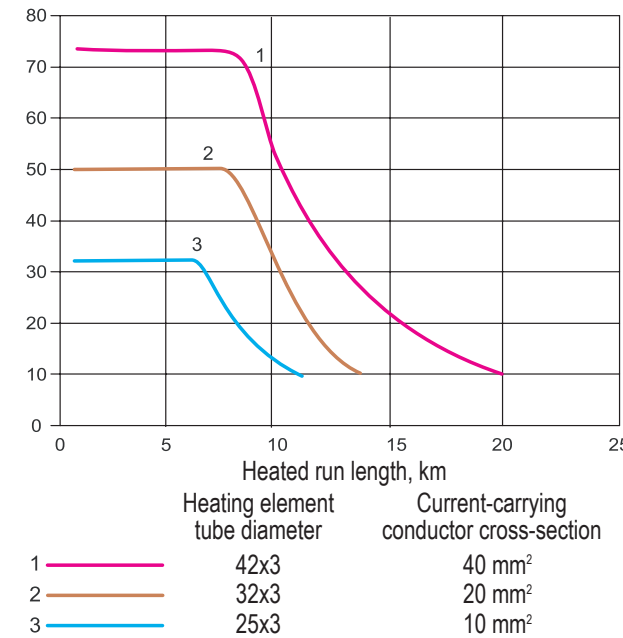
Skin Effect System

TECHNICAL SPECIFICATION

Operating temperature range -50°C ... +200°C
 Power supply up to 5 kV~ 50 Hz

POWER OUTPUT

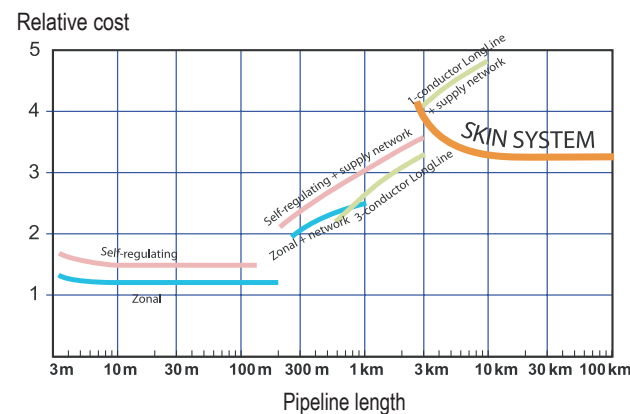
Rated power output of one heating element, W/m



CONSTRUCTION

Heat producing element Low carbon steel tube with diameter of 20-60mm and wall thickness of 3-4mm
 Current carrying conductor Special conductor resistive to high voltage (up to 5kV), high temperature (up to 200°C) and mechanical stress at installation
 Anticorrosion protection (at Customer request) epoxy coating of a SKIN heater

EFFICIENCY OF SKIN SYSTEM IN COMPARISON WITH HEATERS OF OTHER TYPES



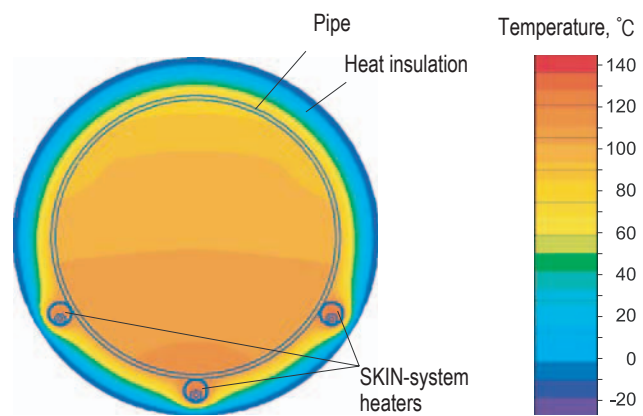
CONTROL SYSTEM

In order to improve its efficiency SKIN-system is provided with a control system, which decreases heating power in response to rise of ambient temperature.

Control system ensures reliable monitoring of the system status and revealing of emergency conditions.

ESTIMATED TEMPERATURE DISTRIBUTION

Rated power output of one heating element, W/m



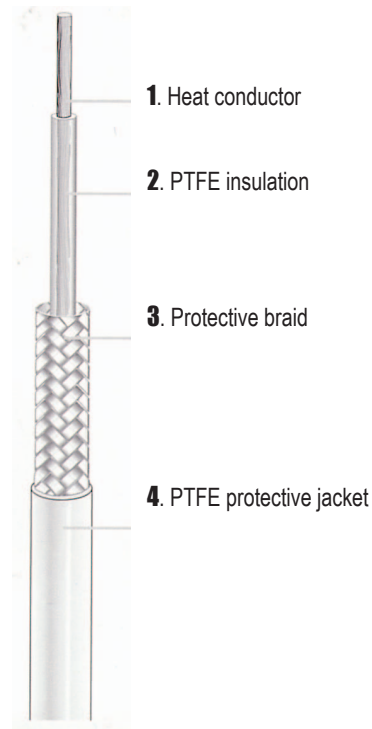
Example of heat insulated pipeline heating by three heating elements of SKIN-system with the total output of 130 W/m. Pipe diameter is 530 mm, ambient air. = -20°C

APPROVAL DETAILS

Certificate of conformity with GOST R (State Standard) system issued for heating systems with explosion protection marking 2ExellT3...T6 X.



Flexible single-core heating cable EKL light



Features

- Stable heat output per metre
- Resistant to steam purging
- Easy installation
- Highly resistant to chemicals
- Simple tailoring on site
- Optimum price/performance ratio

Description

EKL light is an extremely flexible heating cable with a fixed specific resistance. Thanks to its small outer dimensions, the EKL light can be easily installed even on uneven objects such as pumps, valves and flanges.

The heating cable can be easily tailored on construction sites. The electrical connection of the EKL light heating cable is realized via the tried-and-tested CONPAC EKL system.

Technical data

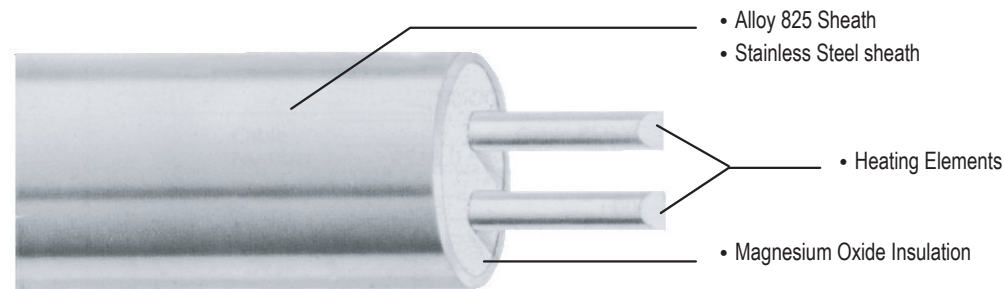
- Nominal voltage 300 V/500 V
- Test voltage 2.5 kV (core/braiding)
- Diameter of Cu wires > 0.15 mm
- Protective braid resistance < 18.2 Ω/km
- Working temperature max. +260°C (permanent, switched off)
- Min. installation temperature -60°C
- Bending radius min. 5 x external diameter
- Resistance values from 2.9 Ω/km to 8000 Ω/km

Selection chart EKL light

Designation	Resistance in Ω/km	Outside diameter in mm	Order no.
EKL light 01R8	1.8	6.50	27-5821-586401R8
EKL light 02R9	2.9	5.70	27-5821-586402R9
EKL light 04R4	4.4	5.10	27-5821-586404R4
EKL light 07R0	7	4.60	27-5821-58640007
EKL light 0010	10	4.20	27-5821-58640010
EKL light 0015	15	3.90	27-5821-58640015
EKL light 0025	25	3.60	27-5821-58640025
EKL light 31R5	31.5	3.50	27-5821-586431R5
EKL light 0050	50	3.30	27-5821-58640050
EKL light 0068	68	3.20	27-5821-58640068
EKL light 0100	100	3.40	27-5822-58640100
EKL light 0150	150	3.60	27-5825-58640150
EKL light 0240	240	3.60	27-5822-58640240
EKL light 0370	370	3.70	27-5826-58640370
EKL light 0500	500	3.50	27-5826-58640500
EKL light 1000	1000	3.40	27-5822-58641000
EKL light 1440	1440	3.30	27-5822-58641440
EKL light 2160	2160	3.10	27-5822-58642160
EKL light 3000	3000	3.30	27-5824-58643000
EKL light 4000	4000	3.20	27-5824-58644000
EKL light 8000	8000	3.00	27-5824-58648000

MINERAL INSULATED CABLE

specification / application information



Custom Fabricated

Description

Mineral insulated cable is a metal sheathed cable that uses a metallic conductor as the heating element. The conductor is electrically insulated from the metal sheath with magnesium oxide (MgO). Mineral insulated cable is a series resistance heater that generates heat by passing current through the electrical conductor. Power output per unit length of the cable therefore varies with the applied voltage and the resistance of the conductor.

Mineral Insulated Cables are available with either one or two conductors. The one conductor cable is available in the E Form where a cold splice is provided at both cable ends for electrical connection. The two-conductor cable is available in two forms. The A Form provides an out-and-back circuit with a single cold splice connection at one end. The E Form provides cold splices at both ends of the cable.

Outer sheath construction is Alloy 825, a high temperature corrosion resistant alloy with superior flexibility. Two cable diameters are available. The K cable diameter is 0.1875" (4.76mm) and the B cable diameter is 0.3125" (7.94mm). A unique manufacturing process provides for a thin wall construction which improves flexibility and ease of installation. This process also allows the use of high performance alloy conductors for high temperature applications.

Principle of Operation:

The series conductor generates heat when voltage is applied as a result of current passing through the conductor. Power output per unit length varies with the applied voltage and circuit resistance. The circuit resistance, in turn, varies with cable length. MI cables are available with a wide selection of conductor resistances. Based on voltage and desired cable length, a specific conductor is selected with a cable resistance that provides the desired power output.

Application:

Nelson MI Cable is a high performance, industrial grade heat tracing cable used for applications requiring:

- High Temperature Exposure
- High Maintain Temperature
- High Power Output
- Rugged Cable Construction
- Extended Heater Life
- Immunity to Stress Corrosion
- Undertank Heating (Cryogenic Tanks)
- Constant Power Output Over Entire

MI Cable is custom designed and fabricated for specific applications.

MINERAL INSULATED CABLE

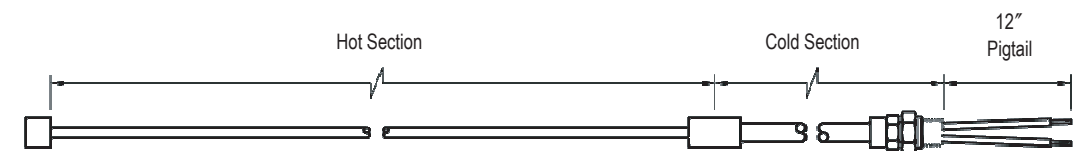
specification / application information

Cable Ratings:

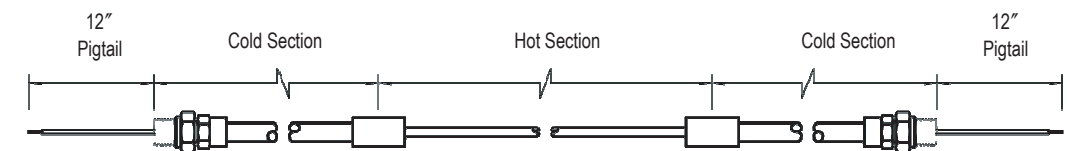
MI Cable

CABLE TYPE	K1	K2	B2
SHEATH MATERIAL	ALLOY 825, Stainless Steel		
CABLE DIAMETER	0.1875" (4.76mm)	0.1875" (4.76mm)	0.3125" (7.94mm)
NUMBER OF CONDUCTORS	1	2	2
MAXIMUM VOLTAGE	600VAC	300VAC	600VAC
MAXIMUM EXPOSURE	1100°F (593°C)		
MAXIMUM POWER	62 w/ft (204 w/m)	62 w/ft (204 w/m)	88 w/ft (289 w/m)
WEIGHT	0.07 lbs/ft (0.104 kg/m)	0.07 lbs/ft (0.104 kg/m)	0.22 lbs/ft (0.327 kg/m)
FORMS	E	A and E	A and E
STANDARD COLD LEAD	7.0 Feet (2.1 Meters)		

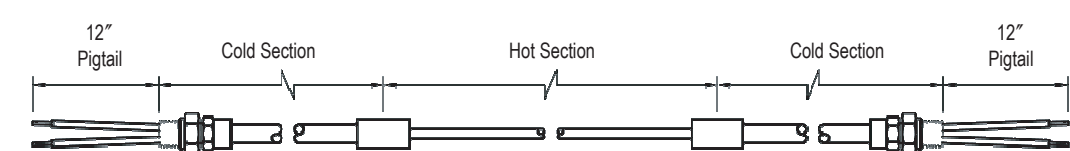
Form A (2 Conductor)



Form E (1 Conductor)



Form E (2 Conductor)



Mineral Insulated Cable

MINERAL INSULATED CABLE

specification / application information

Custom Cable

Resistance Characteristics:

2-CONDUCTOR CABLE, 0.1875" DIAMETER ALLOY 825, Stainless Steel 300 VOLTS				
Cable Number	Resistance @ 68°F (20°C)		Maximum Exposure Temperature Rating	Resistance Curve
	Ohms/Meter	Ohms/Foot		
556K	.0430	.1411	600°F (316°C)	1
658K	.0581	.1906		1
674K	.0742	.2434		1
693K	.0926	.3038		1
712K	.1170	.3839		1
715K	.1470	.4823		1
721K	.2130	.6988		3
732K	.3190	1.0466	1100°F (593°C)	N/A
742K	.4160	1.3648		
752K	.5200	1.7060		
766K	.6600	2.1654		
774K	.7400	2.4278		
810K	1.0000	3.2808		
813K	1.3000	4.2651		
818K	1.8000	5.9055		
824K	2.3400	7.6772		
830K	2.9600	9.7113		
838K	3.7000	12.1391		
846K	4.7200	15.4856		
860K	5.6000	18.3727		
866K	6.6000	21.6535		
894K	9.0000	29.5276		
919K	18.0000	59.0551		

2-CONDUCTOR CABLE, 0.1875" DIAMETER ALLOY 825, Stainless Steel 600 VOLTS				
Cable Number	Resistance @ 68°F (20°C)		Maximum Exposure Temperature Rating	Resistance Curve
	Ohms/Meter	Ohms/Foot		
588B	.0071	.0233	600°F (316°C)	1
614B	.0149	.0489		1
627B	.0270	.0886		2
640B	.0400	.1312		3
670B	.0650	.2133	1100°F (593°C)	N/A
710B	.1040	.3412		
715B	.1620	.5315		
720B	.2050	.6726		
732B	.3250	1.0663		
750B	.5000	1.6404		
774B	.7350	2.4114		
810B	1.1620	3.8123		
819B	1.8700	6.1352		
830B	2.9700	9.7441		
840B	4.3000	14.1076		
859B	5.9800	19.6194		

MINERAL INSULATED CABLE

specification / application information

Custom Cable

Resistance Characteristics:

1-CONDUCTOR CABLE, 0.1875" DIAMETER ALLOY 825, Stainless Steel 600 VOLTS				
Cable Number	Resistance @ 68°F (20°C)		Maximum Exposure Temperature Rating	Resistance Curve
	Ohms/Meter	Ohms/Foot		
145K	.0046	.0151	600°F (316°C)	1
189K	.0090	.0295		1
216K	.0165	.0541		2
239K	.0390	.1280	1100°F (593°C)	N/A
250K	.0500	.1640		
279K	.0790	.2592		
310K	.0950	.3117		
316K	.1570	.5151		
326K	.2600	.8530		
333K	.3300	1.0827		
346K	.4570	1.4993		
372K	.7300	2.3950		
412K	1.1700	3.8386		
415K	1.4800	4.8556		
423K	2.3600	7.7428		
430K	2.8000	9.1864		
447K	4.5000	14.7638		

Note: Factory design required for the following applications:
 1. Exposure temperature greater than 1100°F (593°C).
 2. Maintain temperature greater than 400°F (204°C).

Mineral Insulated Cable

MINERAL INSULATED CABLE

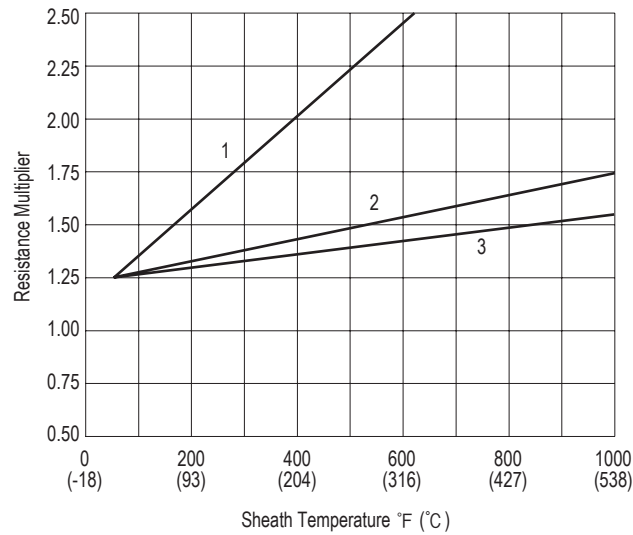
specification / application information

MINERAL INSULATED CABLE

specification / application information

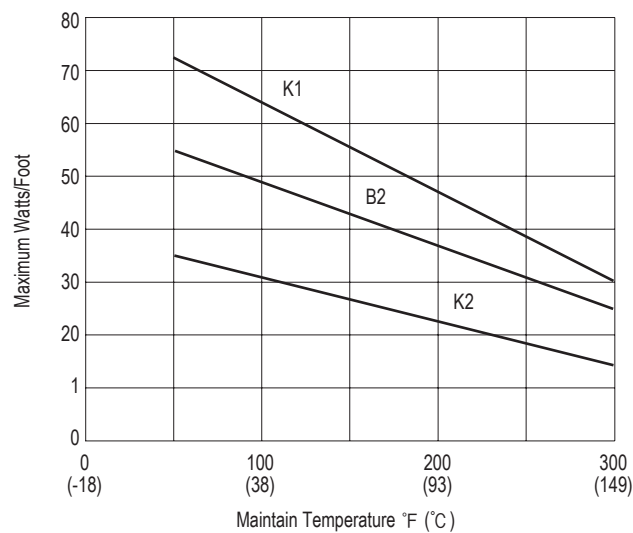
GRAPH-1

CABLE RESISTANCE VS TEMPERATURE MULTIPLIER



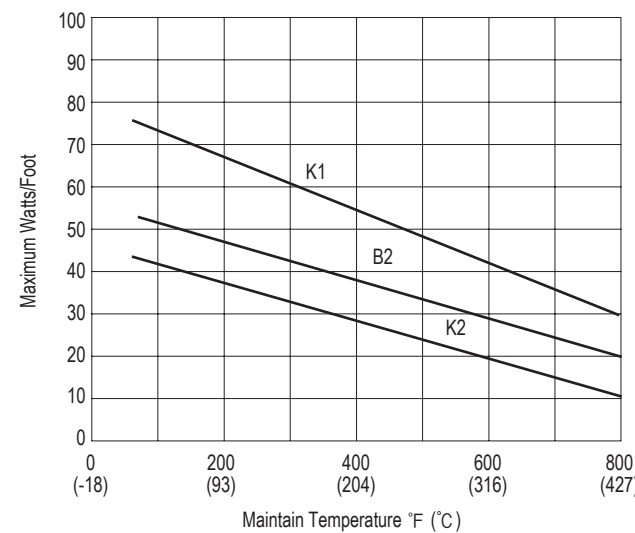
GRAPH-2

MAXIMUM WATTAGES-ALL CABLES
WITH HOT / COLD JUNCTION UNDER THERMAL INSULATION



GRAPH-3

MAXIMUM WATTAGES-ALL CABLES
WITH HOT / COLD JUNCTION OUTSIDE THERMAL INSULATION



Approvals:

Note: Cable voltage, amps and watts must be provided for approval tags. Calculated sheath temperature must also be provided for hazardous (classified) approval tags.

FM

Ordinary Locations Hazardous (Classified) Locations
(FH Suffix)
Class I, Division 1 and 2
Groups A, B, C, D
Class II, Divisions 1 and 2
Groups E, F, G
Class III, Divisions 1 and 2



UL

Ordinary Locations Hazardous (Classified) Locations
(UH Suffix)
Class I, Division 1 and 2
Groups B, C, D
Class II, Divisions 1 and 2
Groups E, F, G
Class I, Zone 1 and 2
Group IIB + H2



CSA

Ordinary Locations Hazardous (Classified) Locations
(CH Suffix)
Class I, Division 1 and 2
Groups B, C, D
Class II, Divisions 1 and 2
Groups E, F, G
Class III, Divisions 1 and 2
Class I, Zone 1 and 2
Group IIB + H2
Zone 1, Ex de IIB + H2 T1-T6



KEMA

MI Series heating cables are approved for use in Zone 1 and Zone 2 hazardous areas by KEMA. The product type has been tested in accordance with the European Standard EN 50014:1997 and EN 50019:2000.
 (EEx Suffix)
 II 2 G EEx de IIB + H2 T1-T6
 KEMA04ATEX2049X



Self Regulating Heating Cable

HEATRACE 16ASH2-CR은 PTC(Positive Temperature Coefficient) 특성을 가진 제품으로 기존의 금속발열 방식이 아닌 카본이 함유된 플라스틱 반도체(semi-conductor)에 의하여 발열하는 자기제어형 히팅솔루션입니다. 주변온도 변화에 따라 PTC소재가 자율 반응하여 발열량이 자동적으로 증감하는 특징으로 인하여 사용자의 제어 및 운용이 용이하며 전기 소모량을 최소화 할 수 있는 장점을 지니고 있습니다. 당사의 제품은 FM인증을 통하여 제품의 안전성 및 신뢰성을 확보하였습니다.

Certification



FM Approved
Class I , Division 2, Group B, C & D hazardous (classified) locations.
Class II , Division 2, Group F & G hazardous (classified) locations.
AEx e, Zone 2, Group II A



UL Approved: File No. : E120271
AWM 20152 (90°C-300V, VW-1)

Application

This product is designed for use on hazardous areas, and is intended for freeze protection and low process temperature maintenance. Self-regulation cables are parallel circuit, low watt density electric heaters regulating heat output in response to changes in surface and ambient temperatures. It is constructed of a conductive polymer core extruded over main wires. The heat output of the irradiated self-regulating core increases when the temperature falls, and decreases when temperature rises. Thus, the cable can be safely overlapped without creating hot spots or causing burnout.



Structure

No.	CONSTRUCTION	MATERIAL
1	Bus wire	Nickel/Tin plated copper conductor bus wire
2	Heating Element	Semi-conductive Heating Element
3	Insulation	1st Insulation Frame Retardant Polyolefin
4	Option	Tinned Copper Braid (Option type -C)
5	Out Sheath	Sheath, RR-polyolefin (Option type -CR)

Code Info.

16 ASH 2 - CR

Voltage Range
1: 110v ac
2: 220v ac

Heating Cable Type Designation

출력 Thermal Output (W/m)

선택사양(편조/시즈) Option C: Tinned Copper (Metallic Braid)
효과적인 접지를 갖추지 않은 곳(플라스틱, 스테인레스 스틸, 또는 페인트된 표면) 및 부식성에 노출될 우려가 없는 일반지역에 설치
Use in ordinary areas, where corrosive is not expected
Especially for the installation on the surface of plastic pipe and painted objects that do not provide an effective ground path

CR : Polyolefin (Outer Jacket)
효과적인 접지를 갖추지 않은 곳 및 부식성에 노출될 우려가 있는 일반지역이나 기계적 보호를 요구하는 곳
Use in ordinary areas, where exposure to aqueous inorganic chemicals is expected.

Product Information

Technical

Wattage (at 10°C condition)	전력 (상온 10°C)	16W/m
Maximum temperature	최고온도	65°C
Max Permissible Temperature de-energised 1,000 hrs cumulative	최고 허용온도	85°C
minium installation Temperature	최저 온도	-20°C
T-Rating	T-Rating	85°C

Physical

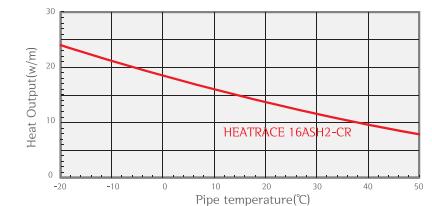
Cable Dimension (w×h) 1st Insulation	1차 절연 두께 (너비 × 폭)	8,1mm × 3,5mm
Cable Dimension (w×h) Out sheath	자켓 절연 두께 (너비 × 폭)	10,9mm × 6,1mm
Packing Unit	포장단위	300m/보빈(Bobbin)
Weight (g/m)	중량	107,22 g/m

Electric

Power Supply	사용전압	220 ~ 240 Vac
Maximum Resistance of Protective Braiding	보호 쉬즈의 최대저항	18.2 Ohm/km

Maximum Length(m) vs Circuit Breaker Size

Start Up Temperature	220V		
	15A	20A	30A
10°C	108	124	124
0°C	86	116	124
-20°C	62	82	124



Constant Wattage Heating Cable

병렬구조로 길이나 온도에 관계없이 최초 설계된 일정한 단위전력 제공.
 강한 내후성과 유연성, 내약품성 보유하고 있으며 시공 및 취급 간편.
 온수배관 설치 시 적은 소비전력으로 동파 방지 효과.
 품질, 공정 관리 시스템으로 온도 편차 거의 없으며 다양한 구조 및 설계 가능.
 자율 제어 방식이 아닌 정전력 방식으로 별도의 Control sensor 필요.

It has parallel circuit construction and provides uniform wattage regardless of temperature of length.
 With strong weather resistant, chemical resistance and flexibility, this cable applied easily where you need.
 Possible to use outside braid and additional sheath as optimal for explosive area or where needs strong outside mechanical strength and consecutive earth.
 Possible to design various structure and wattage upon request of clients.

Silicone Type



- ①
- ②
- ③
- ④
- ⑤
- ⑥

Application

산업용 파이프 라인 시스템, 탱크의 동파 방지
 가정용 수도관 또는 기타 파이프의 동파 방지
 고압의 Steam cleaning과 같은 파이프의 온도변화 방지

Freeze protection and temperature maintenance of industrial pipe line system or tank
 Freeze protection of home water pipe or others
 Supply uniform heat for protection of temperature change such as high voltage steam cleaning



Structure

No.	CONSTRUCTION	MATERIAL
1	Bus wire	Tinned Copper or Nickel coated Copper
2	Insulation	Silicone Rubber
3	Heating Element	Nickel-chrome Alloy
4	Inner Sheath	Silicone Rubber
5	Braiding	Tinned coated Copper (Option)
6	Out Sheath	Silicone Rubber or Teflon Resin (Option)

Teflon Type



- ①
- ②
- ③
- ④
- ⑤
- ⑥

Technical Spec

Item / 항목		TEFLON TYPE	SILICONE TYPE
Lengh Unit	발열기본단위	50cm, 100cm	100cm
Temp. range	사용온도범위	-90℃ ~ 250℃	-60℃ ~ 200℃
Input Voltage	Input 전압	110V or 220V	110V or 220V
Max. output	최대설계용량	40W/Mor 50W/Mor 60W/M	Max. 30W/M
Color	기본색상 (Optional)	Red	Blue
Bus wire	Bus wire	3.05SQ	1.25SQ
Package Unit	기본포장단위	100M/ROLL	100M/ROLL

- 설계는 당사에 의해 설계된 기준에 따를 것.

Production Range

Classification	TEFLON TYPE	SILICONE TYPE
Basic Type	YFH-201	YKH-101
Basic Type + Braiding	YFH-202	YKH-102
Basic Type + Silicone Sheath		YKH-103
Basic Type + Teflon Sheath	YFH-203	YKH-104
Basic Type + Glass Braiding +Silicon coating		YKH-105

Structure

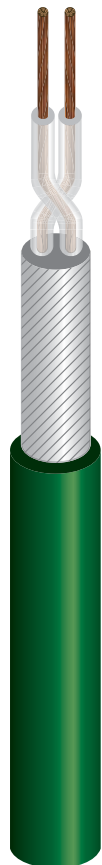
No.	CONSTRUCTION	MATERIAL
1	Bus wire	Nickel coated Copper
2	Insulation	Teflon
3	Inner Sheath	Teflon
4	Heating Element	Nickel-chrome Alloy
5	Braiding	Heat-Treated glass fiber
6	Out Sheath	Teflon

Under Floor Heating Cable

시공이 간편하고 유지보수가 필요없어 효과적인 난방 제공.
 보일러실이 없어 공간 활용이 가능하고 동파가 되지 않아 반영구적.
 기존 온수보일러대비 최대 70%비용 절감으로 경제적.
 급속 난방이 가능하고 마감재 선택의 폭이 넓다.
 자동제어(중앙제어)가 가능하며 필요 부분만 독립 난방이 가능.
 Single Ended Type의 경우 단일 cold 형태로 사용이 간편하다.

Semi-permanent, economical(Max. 70% cost down compared with hot water boiler) and space-saving heating system.
 Possible automatic control(central) and independent heating in necessity part.
 Rapid heating performance and wide selection of closing material.
 Only one cold connection (Single Ended Type): easy to install.

Single Ended Type



- ①
- ②
- ③
- ④

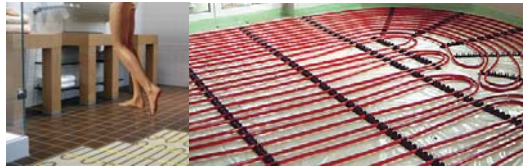
Certification

인체에 무해한 기능성 전자기 차폐 발열선 자체 실용신안 보유
 특허청 출원번호 : 2020030004214 (등록완료)
 전기, 자기파 발생 수치 국제 허용기준 만족

Application

호텔, 모텔, 오피스텔, 펜션 등 신축 또는 보수
 유치원, 기도원, 식당, 찜질방, 목욕탕 등의 바닥 난방 및 습기 제거

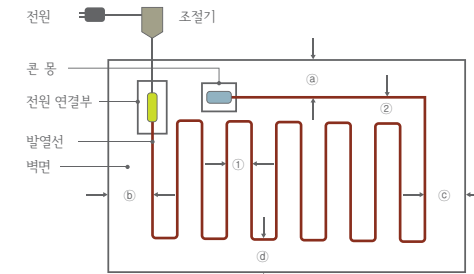
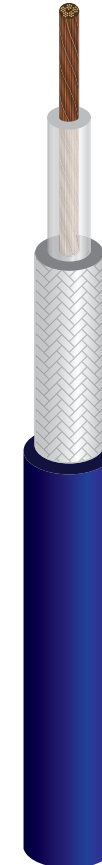
Condominium pension, Villa, Resort, Church, Temple and so on
 Removing of water and moisture



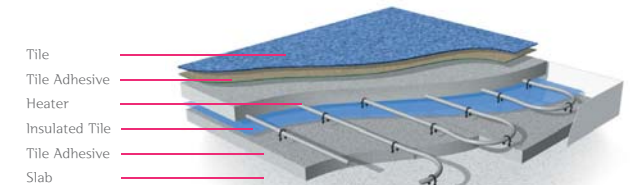
Structure

No.	CONSTRUCTION	MATERIAL
1	Heating Element	Metal or Nickel Alloy, etc
2	Insulation	Teflon Resin (FEP, ETFE)
3	Earth Braid	Tinned Copper
4	Out Sheath	Teflon, Silicone, PVC

General Type



-벽면과 발열선 간의 간격 ①, ②, ③, ④는 15-20cm로 합니다.
 -발열선 간의 모든 간격 ①, ②는 10cm로 합니다.



Technical Spec

Voltage rating	정격전압	AC 220V (110/380V available)
Watt/m ²	Watt/m ²	150W ~ 200W
Temperature	Heater 내열온도	105°C
Durability	내구성	over 10 years
Floor heating temp.	바닥 발열온도	5°C ~ 40°C
Heating area	발열면적	0.5m ² ~ 24.0m ²

-설계는 당사에 의해 설계된 기준에 따를 것.

Snow Melting Heating Cable

겨울철 또는 강설로 인한 도로 결빙사고 지역의 안전을 확보하기 위한 제설 설비.
 발열선을 포장면 아래 매설하여 자동 감지.
 금속합금의 도체 저항을 응용.
 사전 설계를 통한 손쉬운 현장 설치.
 전기를 사용하여 조작, 보수가 간단하고 자동제어 용이.
 기계적 충격이나 진동에 대한 내성이 우수.
 사용자 요구에 따른 다양한 설계 및 설치가 가능.

A electric snow-melting system for assurance of safety for freeze protection on the road in winter or in case of snowfall.
 Convenient installation with a preliminary design and suitable for client's needs in various products' design.

Reinforced Type
for concrete

강화형
(콘크리트 매설 전용)



Application

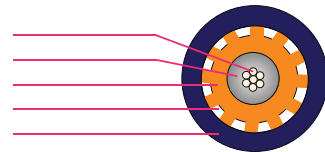
도로/도보 및 주차장 램프, 활주로, 아파트 진입로
 옥외 적설/결빙 지역
 골프장 등 레저 시설

Asphalt road, Concrete road,
 Entrance & Exit of tunnel
 Outside parking lot of APT and Building, Amusement park, etc.



Structure

Heating Wire(Nickel Alloy)
 Insulation(Silicone)
 Inner Sheath (PVC)
 Out Sheath (PVC)
 Air space



No.	CONSTRUCTION	MATERIAL
1	Heating Element	Nickel-Chrome Alloy, Nickel-Copper Alloy
2	Insulation	Silicone Rubber
3	Inner Sheath	Heat resistant PVC (105°C)
4	Braiding	Tinned Copper
5	Out Sheath	Heat resistant PVC (105°C)
6	Option	Inner or Out Shield

General Type
for asphalt, concrete

일반형
(콘크리트, 아스팔트 매설용)



Technical Spec

Standard voltage	공급전원	220V ~ 440V (60Hz)			
Temp. rating	사용온도등급	Max 105°C in continuous use			
Wattage	Cable 설계 용량	170W ~ 350W/m ² depending on condition			
Insulation pitch	Cable 설치 간격	75mm ~ 125mm			
Caution	설치 시 주의사항	케이블을 겹쳐서 매설하지 않으며 외부 충격에 의한 손상에 유의 Do not lay a set of cables overlapping under the ground and avoid damage from outside shock			
Wattage according to temp. & snowfall	온도 및 강설량에 따른 설계 용량	Average temp.	Snow fall	Crosswalk, road	Bridge
		평균온도 (1월 ~ 2월)	강설량 (cm/H)	보도 및 도로 (W/m ²)	교량 (W/m ²)
		-2°C	1.7	170	200
		-6°C	2.0	200	250
		-10°C	2.5	250	300
-15°C	3.0	300	350		
Wattage according to where to use	설치 장소별 용설 시스템 설계 용량	Purpose	Place	Capacity	
		용도	설치장소	설계용량 (W/m ²)	
		제설/계빙 Snow/Ice removing	도로 및 주차장 Road and parking lot	300~350	
			주거 지역내 인도 및 계단 Side walk and stairway	250~300	
항만 및 교량 Port & bridge	300~350				
발전소 주변 Nearby plant	170~220				

- 설계는 당시에 의해 설계된 기준에 따를 것.

Structure

No.	CONSTRUCTION	MATERIAL
		Concrete Asphalt
1	Heating Element	Nickel-Chrome Alloy, Nickel-Copper Alloy
2	Insulation	Teflon Resin (Max 260°C)
3	Inner Sheath	Thermoplastic Polyolefin
4	Inner Shield	Tinned Copper
5	Out Sheath	Heat resistant PVC Heat resistant Rubber(for high temp.)
6	Option	Stainless steel or Zn-coated steel

Standard Accessories

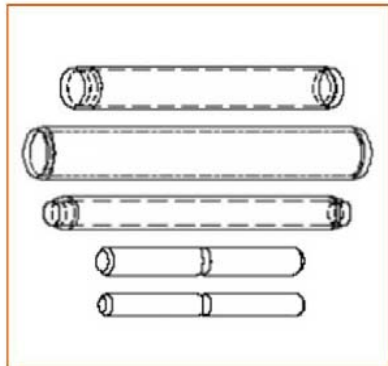


Power Connection Kit

TM-PCK-WP
(Weather-proof)

Aluminum enclosure
Hub 22mm x 3way
Cable entry up to 3 cables
Terminal block 30A, 4P

TM-PCK-EP(HACC-PK-P)
(Explosion-proof)

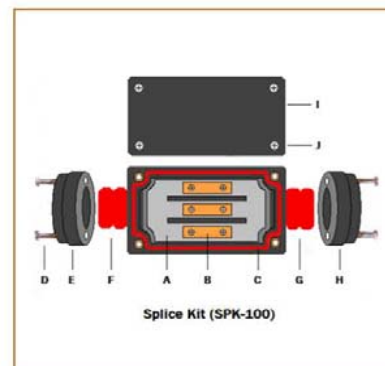


SCW Splice Kit

SPST
(Low temperature)

Weather-proof heat shrink sleeves
3~20 Φ (L=140~170mm)
Fluoropolymer heat shrink sleeves
6~15 Φ (L=40mm)
Crimp(Sleeve) connectors
1.5mm²~30.0mm²

SPK-100
(High temperature)



Line Sensing Thermostat

TM-TSK-WP
(Weather-proof)

Aluminum enclosure
Hub 22mm x 4way
Cable entry up to 3 cables
20A/250V, AC

TM-TSK-EP(HACC-TSK-P)
(Explosion-proof)



End Seal Kit

Self regulating & constant cable

TM-ESK-WP
(Weather-proof)

57x16mm diameter
Heat-silicone cap
55.5x28.2mm diameter
Glass fiber reinforced polyamide inside
silicone rubber packing

TM-ESK-EP
(Explosion-proof)



Standard Accessories

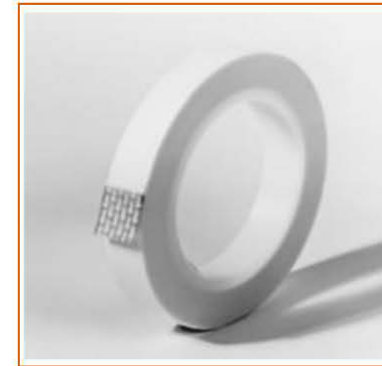
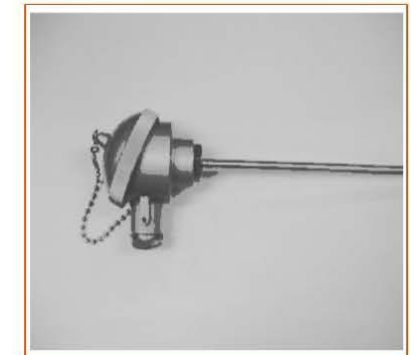


RTD Sensor (PT-100 Ω)

TM-PTC-WP

Stainless steel capillary tube
 Φ 6mm x 100mm long
Stainless steel sheath
Moisture resistance head
3/4" or 1/2" PT threaded
3-wire connection
Protection class IP-54

TM-RTD-EP
(Explosion-proof)



Fixing Tape

TM-GT-30
(Glass fiber tape)
30m roll glass cloth tape with
pressure-sensitive thermosetting silicone
adhesive 12mm wide.

TM-AT-30
(Aluminum tape)
30m roll aluminum foil installation tape
with pressure-sensitive acrylic adhesive.
50mm wide.



Y-Boots & Pipe Strap

TM-YB
(Power joint kit)
126x16mm diameter
2-way heat silicone caps

TM-PS
(Metal pipe strap)
PS-1 : 1/2" to 3/4" pipe
PS-2 : 1" to 3-1/2" pipe
PS-3 : 2-1/2" to 9" pipe



Label & Connector

TM-CL
(Caution label)
Electric tracing caution labels, weather
resistant.

TM-GC
(Ground connector)
Corrosion resistant for 3/4" conduit.
Fit opening in RTPC.
Includes a ground connector



Bundle Tube Trace (ST/DT)

Electric heated instrument tubing with HLT self regulating heat tracing

Application

Freeze Protection or Process Temperature Maintenance

Range : 40°F (5°C) to 250°F (121°C)

Tubing bundle, with "cut-to-length" self regulating heat tracing is designed to provide freeze protection or temperature maintenance for tubing where high temperature exposure capability is possible. HLT self regulating heating cable withstands temperature exposures of 375°F (191°C).

Self regulating HLT heating cable

- Varies in response to the surrounding conditions along the entire length of a circuit.
- Lower risk of overheating the tube or product.
- Installed cost is lower because "cut-to-length" HLT makes end connections easy with minimal waste.
- Is approved for use in Class-1, Division-1, Groups B, C and D Hazardous areas.

Ratings / Specifications

HLT	Ratings
Available watt densities	3,5,8,10,12,15,18,20W/ft@50°F (10,16,26,33,40,50,60,65W/m@10°C)
Supply voltage	110-120 or 208-277 Vac
Tube temperature range	40°F to 250°F (5°C to 121°C)
Max. exposure temperature Intermittent power - off	375°F / 191°C
T-rating	T3 (375°F/191°C) T2D (419°F/215°C)



Construction

- 1 Process tube
- 2 Heat reflective tape
- 3 Non-hygroscopic glass fiber insulation
- 4 Polymer outer jacket
- 5 HLT Self regulating heating cable

HLT Heating cable product features

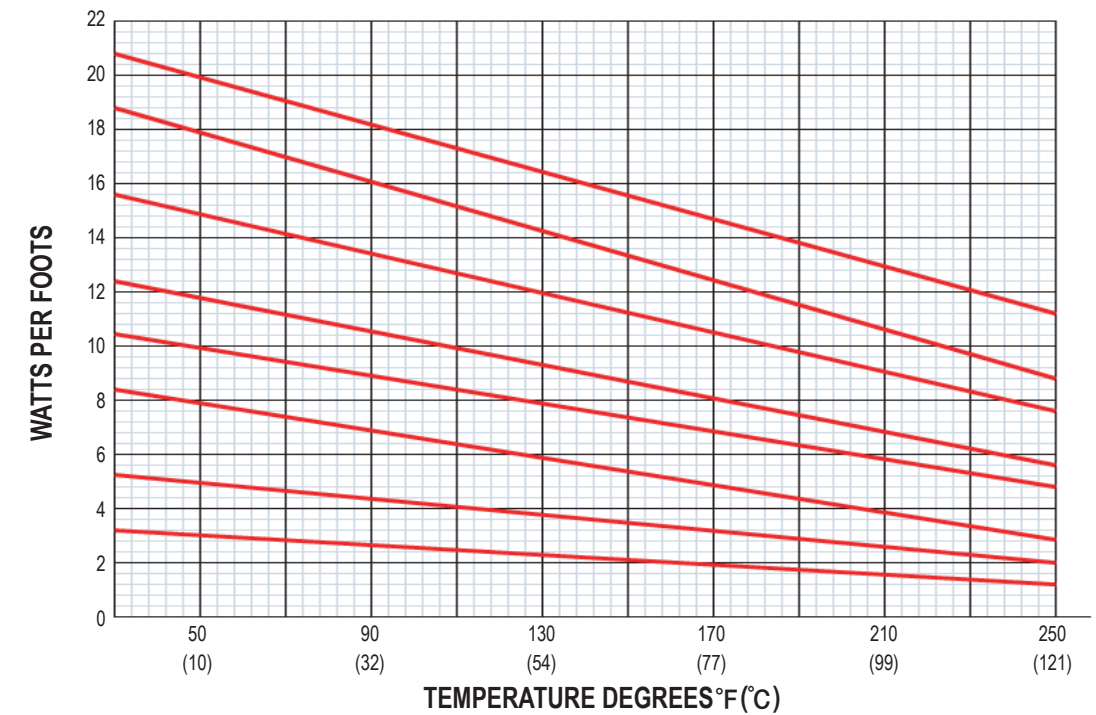
- Self regulating
- Low inrush current
- "Cut-to-length"
- Hazardous area approvals

Bundle Tube Trace (ST/DT)

Electric heated instrument tubing with HLT self regulating heat tracing

HLT Power output curves

The power outputs shown apply to HLT heat tracing installed on insulated metallic pipe (using the procedures outlined in IEEE standard 515-2004). Power output may be slightly higher due to the thermal efficiency of Bundle Tube Trace.



How to Specify :

ST - 4 A 1 - 205 - F - ATP - 040
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- ① **Bundle Tube** : ST = Single Tube, DT = Double Tube
- ② **Process Tube O.D** : 1 = 1/8", 2 = 1/4", 3 = 3/8", 4 = 1/2", 5 = 5/8", 6 = 3/4", 7 = 1"
- ③ **Process Tube Material** : A = 316SS Welded, B = #122 Copper, C = PFA Teflon, D = Monel, E = Titanium, F = 316SS Seamless, G = 304SS Welded, H = 304SS Seamless, J = Alloy C276, K = Alloy825, L = Alloy20, M = Fep Teflon, N = Nylon, P = Polyethylene, T = TEF Teflon, X = Special
- ④ **Number of Tubes** : 1, 2, 3, 4
- ⑤ **Heating Cable** : 203 = 3W/ft, 240V 205 = 5W/ft, 240V 208 = 8W/ft, 240V 210 = 10W/ft, 240V 212 = 10W/ft 240V, 215 = 15W/ft, 240V 218 = 18W/ft, 240V 220 = 20W/ft, 240V
- ⑥ **Heat trace Option** : F = J/Fluoropolymer Jacket, N = Division 1 Approved
- ⑦ **Bundle Jacket** : ATP, TPU
- ⑧ **Process Tube Wall Thickness** : 030=0.030", 032=0.032"(Copper Only) 035=0.035" 040=0.040"(Plastic Only) 047=0.047"(Plastic Only) 049=0.049" 062=0.062"(Plastic Only) 065=0.065" 083=0.083(SS Only)

Bundle Tube Trace

Industrial Heater

당사에서 공급하는 HEATER의 HEATING ELEMENT는 STRIP과 WIRE가 있으며, 각종 HEATER의 구조와 형태에 따라 여러 가지로 주문에 의하여 제작 공급 됩니다.

HEATING ELEMENT는 세계 최고의 발열체를 공급하는 독일 칸탈(KANTHAL) 제품의 STRIP & WIRE로서 제작되며, 최고 1400°C까지 사용이 가능하고 900°C이상의 온도로 가열하면 강하고 질긴 산화막을 형성하여 유연성이 좋아집니다. 아울러 1200°C에서 1000시간 이상을 사용한 이후에도 퇴각아 사용할 수 있을 정도로 내구성이 뛰어나며, 칸탈(KANTHAL)의 열선은 특히, 내산성이 좋아 기존의 열선보다 30% 이상의 긴 수명을 갖고 있습니다.



MANUFACTURE	• WIRE & STRIP HEATER	<ul style="list-style-type: none"> • RADIANT HEATER • SPIRAL HEATER • FORMING HEATER • PORCUPINE HEATER
	• CEBER HEATER	<ul style="list-style-type: none"> • PLATE HEATER • 원통형 HEATER • 원통 분할형 HEATER • MOLDING HEATER • ARD HEATER • FIBER BLOCK HEATER
	• SHEATH HEATER	<ul style="list-style-type: none"> • PIPE HEATER • IMMERSION HEATER • FIN HEATER • FLANGE HEATER • 주물 HEATER • UNIT HEATER
	• SIC HEATER	
	• AIR & GAS HEATING PRE HEATER	

Wireless Data Transmission

당사에서 공급하는 무선데이터 통신시스템은 산업 현장의 다양한 분야에서 응용되어 사용되고 있습니다. 무선통신 기술의 핵심인 RF MODULE을 자체 개발 및 생산하고 있으며, 플랜트 현장에서 계장 및 제어의 센서(4~20mA, 탱크유량, 수위레벨 등)자동화, 무선통신, 대기 및 수질 환경 측정, 기상관측 및 재난방지 사업 부분, 소방보조설비 등에 이르기 까지 광범위하게 응용되어 사용되고 있습니다. 무선통신에 대한 궁금하신 내용을 당사 무선데이터 사업부로 문의 하시면 상세히 안내 해 드리겠습니다.



Innovation! See your plant in a whole wireless system

