De-icing & Snow-melting Systems by SST Group for a Safe Urban Environment

July 2018
1. About SST Group

2. Urban space safety challenges and solutions

3. De-icing & snow-melting systems for roofs and gutters

4. De-icing & snow-melting systems for outdoor areas, ramps, and stairs

5. Corrugated stainless steel tubes IWS

6. Water leakage monitoring system Neptun

7. Our advantages
Europe’s largest manufacturer of electric heating cable systems

Top-3 global heating cable brands

40% of the Russian market of engineering services in architectural and industrial electric heating

Own production of electroconductive plastics and self-regulating heating cables

SST Group products and solutions are exported to 47 countries

Over 25 years of success on the market

10 000 projects completed

45 000 m² of production facilities

13 200 000 electric heating systems manufactured
Our Mission

Our mission is to facilitate safety and security of infrastructure facilities and industrial companies’ production and technological processes by providing the best-in-class electric heating cable and heat tracing solutions.

Our Values

- Innovation
- Quality
- Responsibility
Global Footprint

Headquarters
SST Gmbh
Germany, Frankfurt

SST Group
Middle East
UAE, Dubai

SST Group
Russia, Moscow region

Manufacturing plants
SST Energomontazh

SST Group
China
Shanghai

SST Group
China
Group Structure: Single Point of Responsibility

**Management**
- **SST Invest**
  Financial management & warranties

**Engineering**
- **SST Energomontazh**
  R&D, design engineering, logistics & supply, installation & supervision, start-up & commissioning, after-sales service

**Sales & Support**
- **SST GmbH**
- **SST Group Middle East**
- **SST Group China**

**Manufacturing**
- **OKB Gamma**
  Manufacturing of all components of heat tracing systems
  - Series-Resistance Heating Cables
  - Self-Regulating Heating Cables
  - Ex-proof junction boxes, cable glands
  - Corrugated stainless steel tubes & fittings
  - Electrical cabinets & automation systems
Stable revenue growth over the past 7 years, despite economic crisis in Russia

- CAGR 2010-2017 = 12%
Manufacturing of all components of electric heating cable systems:

- self-regulating heating cables
- series-resistance heating, MI cables
- power & control cables
- junction boxes
- corrugated tubes
- switchboard cabinets

60,000 km/year cable manufacturing capacity

11 extrusion lines  10 twister machines
16 braiding machines  6 drawing machines

…and other specialized cutting-edge equipment: electron-beam machining (EBM), polymer compounders, testing equipment etc.
Our Landmark Projects for Safe Urban Environment

- State Historical Museum
- GUM Department Store
- Bolshoi Theater
- Cathedral of Christ the Savior
- Government House
- Central Bank
- Manezhnaya Square
- Moscow City
- Kazan Kremlin
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2. **Urban space safety challenges and solutions**

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Negative effects of ice on roofs, ramps and stairs:

- Falling icicles is a source of hazard to human life, motor vehicles, building facades
- Increased mechanical load on roofs and gutters reduces their service life
- Blocked gutters and water accumulation causes leakages.
- The need for mechanical cleaning reduces the service life of the roofing.
- Ice on stairways and ramps leads to an increased risk of injury to pedestrians.
- In the absence of a heating system, property maintenance requires dedicated full-time staff members.
- Ice causes significant damage to the road surface during mechanical snow and ice removal, thus shortening the service life of the road paving.
SST Group Solutions for a Safe Urban Environment

De-icing & snow-melting systems based on series-resistance and self-regulating heating cables:

- heating of roofs and gutters
- heating of outdoor areas, ramps, and stairs
- heating of concrete
- solutions for heating outdoor sports grounds
- heating systems for indoor sports facilities
- heating solutions for alpine ski and bobsleigh trails
- soil heating under freezer units
- snow cover height measurement systems

Other solutions for a safe urban environment

- flexible corrugated stainless steel pipes IWS for heating, water supply, fire-fighting and gas supply systems
- water leakage monitoring systems Neptun
Self-regulating cable has two copper conductors embedded in an extruded semiconductor material (matrix). For electrical safety and protection, the matrix is insulated with thermoplastic with a tinned copper braiding on top of it.

A unique property of the cable is that the heating power varies with the ambient temperature. In other words, when it’s cold outside, the heating power adjusts upward, when it gets warmer, it adjusts downward or switches off.

Energy consumption is kept at an optimum level, the system is automatically regulated and there is no need to monitor the system on a daily basis.
Advantages of Electric Heating Systems by SST Group

- **Efficiency**
  - Extended service life of infrastructure
  - Reduced cost of repairs and maintenance
  - Low energy consumption

- **Safety**
  - Eliminated risk of injuries and fatal accidents due to slipping on ice / icicles falling
  - Protection against property damage

- **Ease of use**
  - Simply attach the heating cable and connect to a power source
  - The system operates in an automatic mode

- **Durability**
  - The heating cable has a service life (depending on the cable type) of at least 25 years.
3. De-icing & snow-melting systems for roofs and gutters
Electric heating cable system for roofs and gutters is designed to prevent the ice from blocking water drains and to ensure the removal of melt water in the winter.
Advantages of De-icing Systems by SST Group

• Protect people, motor vehicles and property from falling ice
• Extend the service life of the roof and gutters
• Reduce the roof maintenance costs
• Prevent damage to the building facades
Applications of De-icing Systems (1)

1 - downspouts
2 - gutters
3 - spouting
4 - roof drains
5 - guide chutes
6 - neck gutters
7 - water outlet
8 - cornice
9 - water drip
10 - flat roofing
11 - gutter catchment area
12 - input heating area
13 - roof edge
14 - snow retention
15 - ground drainage chute
16 - drainage well
Applications of De-Icing Systems (2)

- Shopping Centers
- Office Buildings & Hotels
- Glazing Roofs
- Residential Complexes
Applications of De-Icing Systems (3)

Schools & Kindergartens

Stadiums & Swimming Pools

Banks

Hospitals
Components of De-icing Systems for Roofs and Gutters

**Heating cables**

- Heating cables

**Thermostats and sensors**

- TP-140
- PT-330
- PT-610

**Accessories and fasteners**

- Assembly kits for making heating cable sections
- Fasteners

**Precipitation sensors**

- РТМ-2000
- РТ-330
- РТ-610

**Temperature sensors**

- PTM-2000

**Water sensor**
## System Components Used

<table>
<thead>
<tr>
<th>Heated structure</th>
<th>Application</th>
<th>Operating ambient temperature range</th>
<th>Specific nominal heating power, W/m</th>
<th>Heating cable</th>
<th>Thermostats</th>
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</thead>
<tbody>
<tr>
<td>Cornice water drips</td>
<td>Preventing dangerous icicle formation on the drips</td>
<td></td>
<td>90…100</td>
<td>FreezStop KCTM</td>
<td></td>
</tr>
<tr>
<td>Roof edges</td>
<td>Preventing ice and snow accumulation on the edge of the roof</td>
<td>From + 5 °C to -15 °C* * as requested by the customer</td>
<td>250…300</td>
<td>MHT HCKT FreezStop KCTM</td>
<td>TP-140, TP-190, TP-610 PT-330, PTM-2000</td>
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<tr>
<td>Gutters, neck gutters, and downspouts</td>
<td>Preventing blockage of water drains with snow and ice to ensure melt water removal</td>
<td></td>
<td>25…130</td>
<td>MHT HCKT TMФ FreezStop KCTM</td>
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<tr>
<td>Roof drains</td>
<td>Preventing blockage of water drains with snow and ice to ensure melt water removal</td>
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6. Water leakage monitoring system Neptune
7. Our advantages
**Electric heating systems for open outdoor areas** are used to prevent ice formation and to remove snow from outdoor areas, pedestrian crossings, roads, ramps, sidewalks, stairs, garage driveways, entrance units.

Since 2013, electric heating systems by SST Group have been used in the reconstruction of pedestrian crossings in Moscow and the Moscow Region.

Their combined length is more than **400 km**.
Applications of De-Icing & Snow-Melting Systems (1)

Heating of outdoor areas, stairs, and ramps
prevents ice formation in areas with pedestrian and motor vehicle traffic in winter

Heating of helipads
keeps takeoff and landing and maintenance areas free of snow

Heating of floors in process areas
ensures flushing into the drainage with water-based agents in winter

Heating of soccer fields and sports grounds
prolongs the playing season
Soil heating systems for greenhouses, interior gardens, glasshouses, flowerbeds, and seedling beds

Accelerates plant growth and reproduction.

Greenhouses with soil heating systems can be operated from early spring to late fall to achieve an early harvest of the agricultural produce and to extend the growing season.

Soil heating systems for refrigerator and freezer units

Creates a thermal barrier that prevents soil freezing and heaving immediately under the freezer unit floor and prevents damage to the refrigerator unit floor and load-bearing foundations, including support pillars.
Outdoor De-Icing & Snow-Melting Systems Components

**Heating cables**

**Thermostats and sensors**

- TP-140
- PT-330
- PT-610

**Fasteners**

**Temperature sensor**

**Precipitation sensor**

**Water sensor**

- PTM-2000
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Stainless Steel Tubes IWS

OKB Gamma (part of SST Group) is the only Russian manufacturer of flexible corrugated stainless steel tubes.

2013
Mass production launched

3,000 km
Annual production capacity of OKB Gamma

17
Corrugated tube sizes and 20 smooth-wall tube types
Applications of IWS Tubing

Hydronic underfloor heating

Heating and heat supply stations

Cable conduits

Water supply

Firefighting

Gas supply
Advantages of IWS Tubing

• A **universal solution** for utility systems
• Easy to cut and bend for **easy installation**
• Bending **does not alter** the **cross section** — no microcracking and no mechanical stress of the metal
• Annealed pipe has **improved plasticity** and **flexibility** and a significant safety margin for multiple bending
• Resistant to **aggressive environments**
• **Withstands linear extensions and shrinkage** when exposed to cyclic temperature effects
• **High reliability** — the pipe is airtight, resistant to high and low temperatures, fire, sparks, rodents, fungus, mold. High resistance to soil subsidence and earthquakes
• **Environmentally friendly** compared to other materials used in the manufacture of cable conduits and wiring. Does not release harmful substances into the environment.
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Leakage protection systems Neptun ensure timely detection and localization of water leaks.

- Leakage protection systems Neptun are composed of electrically driven ball valves, control module, and water leakage sensors.

- In the event of leakage, the sensors instantly and automatically detect the leak, send an alarm to the control module, and the ball valves immediately shut off the supply of cold and hot water. When a water leak is detected, audible or visual alarm is activated.

- Smart home technologies: Neptun ProW+ with a backup power source supports wired and radio sensors and sends reports to the smartphone app.
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Core Advantages of SST Group Solutions

☑ Own production
☑ The most advanced materials & equipment
☑ Own testing facilities
☑ Strict quality control procedures – 100% of our products pass testing
☑ All products meet international standards and technical requirements (ATEX, IEC, VDE etc.)
☑ Reliable products & systems – operating in the most extreme conditions
☑ Solutions for challenging areas: extremely high and low temperature, ex-proof zones
☑ Turn-key projects with a single point of responsibility
☑ Full engineering support, 100+ design engineers
☑ International sales & project support team
☑ Warranty and after sales services
1. Design of the best-matched and most cost-effective electric heating system considering the facility’s needs
2. Thermal calculations
3. Unified engineering solutions catalogues
4. Simultaneous design of the heating system and auxiliary power network to reduce overall construction costs
5. Engineering economic analysis of the electric heating system
All components of the quality management system are in place.

Compliance with international standards and technical requirements.

Quality testing procedures at every stage of the project implementation process.

**Quality management procedures:**

- Development, coordination, approval and amendment and cancellation of the company standards, controlling & methodology documents, regulations, job descriptions, technical documentation.
- Assignment and duties of quality management representatives and process owners.
- Development, maintenance and usage of sum of process passports.
• All products meet international standards and technical requirements
• ISO 9001 Compliance Certification since 2004
• Customs Union Technical Regulations Certificate (TR CU Certificate)
• IEC Ex certificates
• ATEX certificates
• VDE certificates
• Marine certificates
World-Class Electric Heating Solutions

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