Cable extrusion
Let your production soar

Sampsistemi supplies a complete range of machines and equipment for the wire and cable production. Manufacturing solutions are characterised by top linear speeds and guarantee minimal energy dispersion. The outstanding versatility is based on an extensive range of extruders, designed to process different types of materials including thermoplastic, cross link polyethylene, halogen-free and fluoridated products.

The highly innovative extrusion solutions feature:
+ Chameleon technology
+ G screw for PVC – PE and HFFR/HL0S
+ Quick colour change system
+ Cross linking with catalyst or liquid silane or CV tube;
+ Chemical and physical expansion processes for polyethylene, polypropylene or fluoropolymer

Systems are personalised to meet specific requirements. All our solutions can be easily integrated into your existing production line and control system. Our engineering team is at your disposal to provide you with innovative, highly productive manufacturing solutions.

at a glance
+ Non-stop production during cable type changeover
+ High production speed
+ Energy consumption savings
+ Production savings through optimised process solutions
+ Minimum distance between extruder and extrusion head
+ Extrusion group with heating/cooling systems and drives suitable for all main insulation materials
+ Long-lasting extrusion barrels and screws made by anti-wear material, ensuring top-quality end products
+ Material saving solutions
+ Different versions of auxiliary extruders
+ Quick and easy reel changeover solutions
+ Fast PLC network line management
+ Line supervisor featuring specific software
+ User-friendly HMI (Human Machine Interface)
+ Integration of all main cable quality control instruments
+ Integration of all main cable markers and labellers
Automotive wire insulation lines

High-speed automotive wire insulation lines engineered to produce low voltage automotive cables. It is possible to insulate T3 classification standards using thermoplastic materials and cross linked flame-retardant polyethylene (XLPE and HFFR).

Automatic colour change of insulation, skin and stripe with minimum scrap and at the maximum production speed, without slowdown.

Line types
AI A1: with 2 extruders, for stripe/skin process
AI A3: with 3 extruders, for stripe/skin quick colour change
AI A4: with 4 extruders, for stripe/skin and insulation quick colour change
AI V1: horizontal vulcanization with 2 extruders
AI V3: horizontal vulcanization with stripe/skin quick colour change

at a glance
+ Chameleon technology: Non-stop production during cable type changeover
+ Quick colour change process without scrap
+ Easy and quick extruder group feeding
+ High production quality by extruder group optimization
+ In-line coiling (MD 330) without production speed reduction
**Horizontal extrusion group**

**Cross-head with 2 X-Flow systems**

<table>
<thead>
<tr>
<th>Conductor</th>
<th>Conductor section</th>
<th>Wire Ø, max.</th>
<th>Insulation</th>
<th>Speed, max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bunched (Class 5)</td>
<td>0.13 - 7.0 mm²</td>
<td>5 mm</td>
<td>PVC, PE, XLPE, HFFR, PP, PPE, TPE</td>
<td>1500 m/min</td>
</tr>
</tbody>
</table>

**Quick colour change process**

**Chameleon technology: product changeover at max speed without line stop**
Electronic and Building wire insulation lines

Engineered to insulate low-voltage wire with various thermoplastic materials including flameretardants such as reticulated polyethylene and halogen-free compounds.

The range is completed by THHN cable manufacturing equipment where cables are jacketed with nylon.

### Line types

**Electronic**
- **WI A1**: 1 and 2 extruders for skin/strip process
- **WI A2**: engineered for HFFR materials
- **WI A3**: 3 extruders for stripe/skin quick colour change

**Building**
- **BI A1**: 1 and 2 extruders for skin/strip process
- **BI A2**: 2 extruders, high productivity
- **BI A3**: 3 extruders for stripe/skin quick colour change
- **BI A4**: THHN wire insulation and sheathing
- **BI A4-HS**: THHN wire insulation and sheathing in line with rod break-down machine

### at a glance

+ High productivity line:
  - **Chameleon** technology: Non-stop production during cable type changeover
  - No production speed reduction during reel changeover
  - One extrusion screw for many materials
  - “0” scrap with quick stripe/skin colour change system
+ Flexibility with wide insulation material range
+ Compact design
+ Material saving thanks to accurate dosing process
+ No foundations required
+ One step solution with In-line drawing machine
+ High production quality by extruders group optimization
+ Wide reel range
+ Line compact design
<table>
<thead>
<tr>
<th>Conductor</th>
<th>Conductor section</th>
<th>Wire Ø, max.</th>
<th>Insulation</th>
<th>Jacketing</th>
<th>Speed, max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid (Class 1), Stranded (Class 2), Bunched (Class 5)</td>
<td>Electronic: 0.35 - 6.0 mm² Building: 0.5 - 35.0 mm²</td>
<td>Electronic: 5 mm Building: 12 mm</td>
<td>PVC, PE, XLPE, XLPE Liquid Silane, PF, HFFR, PUR, TPE</td>
<td>PA</td>
<td>* Electronic: 1500 m/min Building: 2400 m/min*</td>
</tr>
</tbody>
</table>

* Tandem with rod breakdown machine

Dual flyer pay-off

Rod breakdown machine

Drawing capstans

Dual automatic take-up with gravity chute
Building wire sheathing lines

<table>
<thead>
<tr>
<th>Pay offs</th>
<th>Extruders</th>
<th>Cooling troughs</th>
<th>Wire dryer</th>
<th>Pulling elements</th>
<th>Accumulators</th>
<th>Take-ups</th>
<th>System supervisors</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV 1250</td>
<td>SAMP 35-25</td>
<td>VR 30</td>
<td>WD 30</td>
<td>MC 800</td>
<td>AC 600 H</td>
<td>AV 1250</td>
<td>SU L</td>
</tr>
<tr>
<td>SV E 1600 DM</td>
<td>SAMP 45-25</td>
<td>VR 30 T</td>
<td></td>
<td>TR 800 C</td>
<td>AC 800 H</td>
<td>AV 1600</td>
<td>SU P</td>
</tr>
<tr>
<td>PT 2240</td>
<td>SAMP 60-25</td>
<td></td>
<td></td>
<td>TR 1200 C</td>
<td>AC 1000 H</td>
<td>AV 1600 D</td>
<td></td>
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<tr>
<td>PT 3000</td>
<td>SAMP 80-25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PT 2240</td>
<td></td>
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<tr>
<td></td>
<td>SAMP 100-25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PT 3000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAMP 120-25</td>
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</tr>
</tbody>
</table>

Process types

**Single-layer**: application of sheathing with one extruder

**Co-extrusion**: simultaneous application of:
- filling and sheathing or
- filling, sheathing and skin

**Tandem extrusion**: two extrusion groups, one for filling and one for sheathing

### Line types

**BS A1**: 1 extrusion group with simple layer process

**BS A2**: 2 extrusion groups for filling and sheathing

### at a glance

+ Wide production range
+ Wide range of insulation materials
+ Production flexibility with different reels sizes
+ Continuous working without line stop during reel changeover

Extruder and cross-head with automatic by-pass
PT 2240 portal pay-off/take-up (10 tons)

<table>
<thead>
<tr>
<th>Conductor</th>
<th>Cable Ø, max.</th>
<th>Sheathing</th>
<th>Speed, max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembled cables</td>
<td>30 mm</td>
<td>PVC, PE, XLPE, HFFR, PP, TPE</td>
<td>500 m/min</td>
</tr>
</tbody>
</table>

Caterpillar
4000 N at 170 m/min
Building wire sheathing lines with SZ process

Sampsistemi has patented a system for the high speed manufacture of flexible cables. Designed with a dedicated extrusion group, cables are practically stranded at the point of extrusion. Conductors and filler are then separated by a fine layer of plastic material, meaning that traditional talc powdering stations are no longer required, with all the obvious environmental advantages that this entails. A submerged torsion locker caterpillar keeps the cabling in place as the plastic sheath cools immediately after the extrusion group. It is therefore possible to keep the pitch and still produce at surprisingly high speed.

Process types
**Co-extrusion:** simultaneously filling and sheathing
**Tandem extrusion:** two extrusion groups, one for filling and one for sheathing

Line types
**BS B1:** SZ group, co-extrusion filling/sheathing system
**BS B2:** SZ group, 2 tandem extruders for tandem filling/sheathing and filling/sheathing/skin
**BS B3:** SZ group with patented system and 2 tandem filling/sheathing extruders

**at a glance**
+ One step production solution (laying-up and sheathing)
+ Flexible wire stranded SZ line at high speed
+ Flexibility in production that allows the use of different materials
+ Full production speed during reel changeover
+ Wide reel range

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**Pay offs | SZ Groups | Extruders | Cooling troughs | Pulling elements | Accumulators | Take-ups | System supervisors**
---
SV 800 | SZ 16 | SAMP 35-25 | VR 30 | MC 600 | AC 600 H | AV 1250 | SU L
SV 1250 | | SAMP 45-25 | VR 30 T | MC 800 | AC 800 H | AV 1600 | SU P
SV E 1600 DM | | SAMP 100-25 | VR 30 CA | TR 800 C | | AV 1600 D
SV 800 CD | | SAMP 120-25 | Wire dryer | | | PT 2240
SV 1000 CD | | SAMP 160-25 | WD 30 | | | 
SV 1250 CD | | | | | | |

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**B B3**
Extrusion group with Sampsistemi patented SZ process

Nose of SZ stranding unit
**Conductor** | **Conductor section** | **Wire Ø, max.** | **No. of wires, max.** | **Filling** | **Sheathing** | **Speed, max.**  
--- | --- | --- | --- | --- | --- | ---  
Solid (Class 1), Stranded (Class 2), Bunched (Class 5) | 0.5 - 16.0 mm² | 30 mm | 7 x 6 mm², 5 x 16 mm² | EPDM, PVC, HFFR | PVC, PE, HFFR | 400 m/min
Engineered for high-speed insulation of power cables. Depending on line composition it is possible to insulate cables with traditional thermoplastic materials, flame-retardant halogen-free compounds or liquid silanes.

**Line types**
- **PI A1**: high-speed insulation line for conductors up to 120 mm²
- **PI A2**: high-speed insulation line using HFFR for conductors up to 120 mm²
- **PI B1**: insulation line for conductors up to 800 mm²
- **PI B2**: insulation line using liquid silanes

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**PI A1**
Extrusion group: 500m/min

**at a glance**
+ High production line
- Non-stop production
- High production speed
- Full line speed during reel changeover thanks to Dual Automatic Take-up for reels diameter up to 1600 mm
+ Wide cable manufacturing range
+ Top quality final products
+ Operator friendly line
+ Excellent wire pulling units
<table>
<thead>
<tr>
<th>Conductor</th>
<th>Conductor section</th>
<th>Wire Ø, max.</th>
<th>Insulation</th>
<th>Speed, max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid (Class 1), Stranded (Class 2), Bunched (Class 5)</td>
<td>1 - 800 mm²</td>
<td>50 mm</td>
<td>PVC, PE, XLPE, XLPE Liquid Silane, HFFR, PP, PUR, TPE</td>
<td>500 m/min</td>
</tr>
</tbody>
</table>

Caterpillar unit 10000 N at 135 m/min
Power cable sheathing lines

Engineered to apply sheath on round and flat assembled cables with various thermoplastic materials.

The biggest line is engineered for HV cable sheathing also and it suitable for working in tandem with different type of protecting cable solutions like to tape applicator, lead extruder and bitumen applicator.

Process types
- Single-layer: sheathing application with one extruder
- Co-extrusion: tandem filling and sheathing
- Tandem extrusion: two extrusion groups, one for filling and one for sheathing

Line types
- **PS A1**: Basic sheathing line up to 60 mm
- **PS A2**: Filling/sheathing line up to 60 mm
- **PS B1**: Basic sheathing line up to 200 mm
- **PS B2**: Filling/sheathing line up to 200 mm

at a glance
- Tandemized solutions for
  - Tape application (smooth & corrugated type)
  - Lead application
  - Bitumen application
- High flexibility line
- Wide cable manufacturing range
- Continuous working during cutting process
- High production speed

**PS B1**
Extruder SAMP 160-25 for 1600 Kg/h of HFFR
**Caterpillar unit**
30000 N at 47 m/min

**Portal take-up drive wheel**
Max reel weight 40 tons

<table>
<thead>
<tr>
<th>Conductor type</th>
<th>Cable Ø, max.</th>
<th>Filling</th>
<th>Sheathing</th>
<th>Speed, max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembled cables</td>
<td>200 mm</td>
<td>PVC, HFFR, EPDM</td>
<td>PVC, PE, HFFR, PP, PUR, TPE</td>
<td>300 m/min</td>
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</tbody>
</table>
### LAN & telephone wire insulation lines

<table>
<thead>
<tr>
<th>Pay-offs</th>
<th>Drawing machines with integrated annealers</th>
<th>Extruders</th>
<th>Cooling troughs</th>
<th>Wire dryer</th>
<th>Take-ups</th>
<th>System supervisors</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV F</td>
<td>MT 250 RC 4AP</td>
<td>SAMP 35-25</td>
<td>VR 7 C</td>
<td>WD 7</td>
<td>AV 560D</td>
<td>SU L</td>
</tr>
<tr>
<td>SV R</td>
<td>MT 250 RC 6AP</td>
<td>SAMP 45-25</td>
<td>VR 7 TC</td>
<td></td>
<td>AV 630 D</td>
<td>SU P</td>
</tr>
<tr>
<td>SV 630 CD</td>
<td></td>
<td>SAMP 60-25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SV 800 CD</td>
<td></td>
<td>SAMP 60-32</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Skin-pass module</td>
<td>SAMP 80-25</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>SP 250</td>
<td>SAMP 35-25 F</td>
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<tr>
<td></td>
<td></td>
<td>SAMP 45-32 F</td>
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<tr>
<td></td>
<td></td>
<td>SAMP 60-32 F</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>SAMP 80-32</td>
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</tr>
</tbody>
</table>

**LAN & telephone cable producers** know the importance of process stability and repeatability very well. With Sampsistemi lines, the setting-up is fast and rejects are minimal due to standardised and harmonised line components; indeed, drawing, annealing and pre-heating are part of an avant-garde global system which includes the extrusion group, ergonomic cooling troughs and reliable dual spoolers. Moreover, customers also benefit from having a single supplier and a single team of engineers who can flexibly work on the whole line during commissioning and service.

**Line types**

- **TI A1**: for telephone cables with solid PVC, solid PE and chemical PE foam
- **LI A1**: for LAN cables with solid PE or physical PE foam
- **LI B1**: for LAN cables with solid FEP or physical FEP foam and solid PE or physical PE foam

**at a glance**

- Top cable specification with single step production process (drawing, annealing and insulation)
- Reduced set-up time
- Low scrap material during start-up
- Excellent wire surface quality with conical drawing cones
- Self-centering extrusion cross-head with by-passes
- Line centralised control with SU P supervisor
- All line components are modularly engineered with the same Sampsistemi criteria
- Highly reliable dual automatic take-up with wire wraps protection during reel change-over
- Wide range of take-up solutions
- Easy maintenance
**Solid PE / Chemical foam PE / Physical foam PE Insulation comparison**

<table>
<thead>
<tr>
<th>Cylinder</th>
<th>Copper</th>
<th>Solid PE + skin</th>
<th>Chemical foam + skin</th>
<th>Skin + Physical foam + skin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>0.51 mm</td>
<td>0.915 mm</td>
<td>0.828 mm</td>
<td>0.780 mm</td>
</tr>
<tr>
<td>Foaming ratio</td>
<td>0.35%</td>
<td>0.80%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production speed</td>
<td>2,500 m/min</td>
<td>1,850 m/min</td>
<td>2,200 m/min</td>
<td></td>
</tr>
<tr>
<td>PE weight kg/km</td>
<td>2.01</td>
<td>1.04</td>
<td>0.596</td>
<td></td>
</tr>
</tbody>
</table>

**TI A1**
Foam/Skin process with chemical expansion

**LI A1 - LI B1**
Foam/Skin and Skin/Foam/Skin processes with physical foam expansion
Striping capability
Special pre-heating up to 200° C (LI B1)
Skin pass module for the production of data cable
Extruder screw designed to reduce and keep melt pressure constant at the gas injection point
Stable automated extrusion process with limited fluctuations in capacitance and diameter
Nitrogen injection unit controlled by line supervisor
Self-centering extrusion head, with fine-tuning device for the best wire concentricity

**LAN cable (Cat 6) with FEP**
- **Process**: Foam/Skin + Stripe
- **Cu Ø**: 0.51 mm
- **O.D Ø**: 0.88 mm
- **Expansion**: 50%
- **Line speed**: 500 m/min

**Table:**

<table>
<thead>
<tr>
<th>Cores insulation</th>
<th>LAN</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>Cat 5 e, 6, 7 and higher</td>
<td>Std. Telecom</td>
</tr>
<tr>
<td>Ø Inlet wire (soft/hard)</td>
<td>3.0 / 2.7 mm</td>
<td>3.0 / 2.7 mm</td>
</tr>
<tr>
<td>Ø conductor</td>
<td>0.32 - 0.90 mm</td>
<td>0.32 - 0.90 mm</td>
</tr>
<tr>
<td>Cable Ø, max.</td>
<td>3.0 mm</td>
<td>3.0 mm</td>
</tr>
<tr>
<td>Insulation materials</td>
<td>PE, PP, FEP</td>
<td>PVC, PE</td>
</tr>
<tr>
<td>Process</td>
<td>Solid and Physical Foam</td>
<td>Solid and Chemical</td>
</tr>
<tr>
<td>Expansion level, max.</td>
<td>50% FEP</td>
<td>50% PE</td>
</tr>
<tr>
<td>Line speed, max.</td>
<td>3000 m/min</td>
<td>3000 m/min</td>
</tr>
<tr>
<td>Ø Tolerance</td>
<td>± 0.01 mm (for insulation thickness &lt; 0.3 mm)</td>
<td>± 0.01 mm (for insulation thickness &lt; 0.3 mm)</td>
</tr>
<tr>
<td></td>
<td>± 1% (for insulation thickness &gt; 0.3 mm)</td>
<td>± 1% (for insulation thickness &gt; 0.3 mm)</td>
</tr>
<tr>
<td>Eccentricity tolerance</td>
<td>F &gt; 0.96</td>
<td>F &gt; 0.95</td>
</tr>
</tbody>
</table>
Coaxial cable insulation lines

<table>
<thead>
<tr>
<th>Pay-offs</th>
<th>Calibrating trough</th>
<th>Extruders</th>
<th>Cooling trough</th>
<th>Pulling element</th>
<th>Take-ups</th>
<th>System supervisors</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV E 500 DM</td>
<td>VT</td>
<td>SAMP 35-25</td>
<td>VR 7 TC</td>
<td>MC 600</td>
<td>AV 560 D</td>
<td>SU L</td>
</tr>
<tr>
<td>SV E 630 DM</td>
<td></td>
<td>SAMP 45-25</td>
<td>VR 7 TCA</td>
<td></td>
<td>AV 630 D</td>
<td>SU P</td>
</tr>
<tr>
<td>SV E 800 DM</td>
<td></td>
<td>SAMP 60-32</td>
<td>VR 12 T</td>
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<td>AV 800</td>
<td></td>
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<td>SAMP 35-25 F</td>
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<td>SAMP 45-32 F</td>
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<tr>
<td></td>
<td></td>
<td>SAMP 60-32 F</td>
<td></td>
<td>Wire dryer</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SAMP 80-32</td>
<td></td>
<td>WD 12</td>
<td></td>
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</tr>
</tbody>
</table>

Mini and micro-coaxial cable insulation lines:
Foam/skin & Skin/Foam/Skin processes

Line types
CI A0: insulation line for micro-coax cables with FEP and PE
CI A1: insulation line for mini-coax cables with SRL frequency up to 1 GHz
CI A2: insulation line for mini-coax cables with SRL frequency up to 3 GHz

at a glance

* High productivity line
* Top cable quality (surface, expansion level and concentricity)
* Fast line set-up
* Low scrap material during start-up
* Striping capability
* Extruder screw designed to reduce and keep melting pressure constant at the gas injection point
* Stable automated extrusion
* Self-centering extrusion cross-head with fine-tuning device and by-passes
* All line components are modularly engineered with the same Sampsistemi criteria
* Line centralised control with SU P supervisor
* Wide range of take-up solutions
* Highly reliable dual automatic take-up with wire wraps protection during reel change-over
* Easy maintenance
CI A0
Cables insulated with fluoropolymers are traditionally used in aerospace, military and nuclear applications, where a high level of fire resistance, good electrical properties and exceptional chemical resistance are a priority. Extrusion process parameters and the extremely high cost of fluoropolymers have been an obstacle to their use in cable insulation. With longstanding experience in fluoropolymer technology, Sampsistemi has engineered a special extrusion process which includes gas injection foaming. With this system insulating wire with fluoropolymers is no more difficult than polyethylene insulation.

at a glance
+ Flexibility with FEP and PE insulation
+ Accurate melt temperature control
+ Extrusion heads made from anti-wear materials

CI A1 - CI A2
Mini-coax cables, CATV cables and radio-frequency cables are primarily characterised by their electrical impedance and the speed with which signals are propagated. The common denominator of both signal propagation and dielectric constants is the cable insulation material. Nowadays, market demand requires very low dielectric constants which can only be achieved by physical foaming extrusion processes. With a wealth of experience in physical foaming by nitrogen injection, Sampsistemi lines can obtain a dielectric constant of 1.2, which corresponds to a polyethylene foaming degree of 81%.

Other important cable parameters, such as low attenuation and structural return loss, require extremely high precision from all extrusion line components, since it is necessary to achieve a line speed stability of 1/10000 without extruder output pulsing: no problem for Sampsistemi lines!

at a glance
+ Structural return lost frequency up to 3 GHz
+ Wire calibrating device
+ Cable tension accuracy
+ Accurate melt flow control

<table>
<thead>
<tr>
<th>Conductor</th>
<th>CI A0</th>
<th>Conductor Ø</th>
<th>0.2 - 3.1 mm</th>
<th>CI A1 - CI A2</th>
<th>Conductor Ø</th>
<th>0.64 - 2.9 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation material</td>
<td>FEP, PE, PP</td>
<td>7 mm</td>
<td>PE, PP</td>
<td>12 mm</td>
<td></td>
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</tr>
<tr>
<td>Expansion level, max.</td>
<td>75% PE</td>
<td>55% FEP</td>
<td>81% PE</td>
<td></td>
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</tr>
<tr>
<td>Line speed, max.</td>
<td>700 m/min</td>
<td>± 0.01 mm (for insulation thickness &lt; 0.3 mm)</td>
<td>± 2.0% (for insulation thickness &lt; 5 mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ø Tolerance</td>
<td>± 1.0% (for insulation thickness &gt; 0.3 mm)</td>
<td>± 1.5% (for insulation thickness &gt; 5 mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eccentricity tolerance</td>
<td>F&gt;0.95</td>
<td>F&gt;0.94</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
High Temperature insulation lines

Automotive, Aerospace and Submersible pump cable applications require insulation materials with temperature resistance of more than 200 °C (approx. 400 °F). The Sampsistemi Extruders are particularly suitable for these materials and allow you to improve your production capacity guaranteeing the highest quality level of your final product. A homogenized insulation with the repeatability of electrical and mechanical cable performance is guaranteed by an accurate line temperature control system that manages the several thermo-regulated zones present in the line as much as the insulation adhesion on conductor.

at a glance

+ Excellent final product quality
+ Concentricity more than 95%
+ Insulation integrity
+ Surface homogeneity
+ Easy line set-up
+ Low material scrap
+ Non-stop production during reel changeover
+ Centralized data process control with accurate manage of all production information

### Line types

- **HT A1**: for max cable dia. 6 mm
- **HT B1**: for max cable dia. 18 mm

### Pay-off

<table>
<thead>
<tr>
<th>Pay-off</th>
<th>Wire pre-heater</th>
<th>Extruder</th>
<th>Cooling Trough</th>
<th>Wire Dryer</th>
<th>Pulling element</th>
<th>Accumulator</th>
<th>Take-up</th>
<th>Line supervisor</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV 630 DM</td>
<td>PH-W</td>
<td>SAMP 35-25F SAMP 45-25F SAMP 60-25F SAMP 80-25F</td>
<td>VR 7 VR 30</td>
<td>WD 12 WD 30</td>
<td>MC 600 MC 800</td>
<td>AC 400 V AC 600 V AC 800 V</td>
<td>AV 2x630 AV 2x800 AV 2x1000 AV 2x1250 AV 2x1600</td>
<td>SU L SU P</td>
</tr>
<tr>
<td>SV 800 DM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>SV 1250 DM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT 1250</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT 1600</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conductor type</td>
<td>Conductor section</td>
<td>Wire Ø Max</td>
<td>Insulation (material)</td>
<td>Speed max</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>----------------------------</td>
<td>------------</td>
<td>----------------------------------------</td>
<td>-----------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tinned – Cu</td>
<td>30 AWG (0.05 mm²)</td>
<td>18 mm</td>
<td>TPE, PEEK, FEP, ETFE, X-ETFE, PFA, MFA</td>
<td>150 m/min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silver – Cu,</td>
<td>to 4/0 AWG (107 mm²)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nickel – Cu</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AV 2x1000**
Medium & high voltage power cable insulation lines

The SAMP MHV line is designed for the continuous production of XLPE (optionally EPR) insulations on medium voltage cable cores.

Well-proven triple-layer crosshead

The insulation process is executed by a well-proven, triple layer crosshead equipped with an independent centering unit for each material flow channel distributors.

The three water cooled extruders, MHV type (see page 27), are designed to process sensitive polymer and elastomeric materials at a low melt temperature.

Each heating/cooling zone is equipped with a separate heating and cooling element, directly applied to the barrel. Proportional valves connect directly to the PID control guaranteeing very tight and stable melt temperature tolerances.

Controlled temperature stability at any time

Cross-linking of the insulation materials is done by an inert gas (Nitrogen) pressurized within a catenary tube and heated-up by 8 independent zones.

The production parameters set-up is automatically adjusted and homogenised by the SAMP MHV-CAL software to reach maximum production speed while maintaining a constant insulation thickness.

The cable is cooled by a water circulation system, optionally also by gas if completely dry processing is required.

MHV lines at a glance

+ High, constant line speed
+ Layer thickness, diameter and concentricity control
+ Cable quality control during ramp-up and ramp-down
+ Stable temperature control for homogenous melt
+ Water-cooled extruders
+ Automatic production parameters set-up

<table>
<thead>
<tr>
<th>Pay-offs</th>
<th>Accumulators</th>
<th>Master capstan</th>
<th>Extruders</th>
<th>Extrusion heads</th>
<th>Cross-linking tube</th>
<th>Cable twister</th>
<th>Pulling elements</th>
<th>Take-ups</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT 2240</td>
<td>AC 1200 H</td>
<td>MC 1800 MHV</td>
<td>MHV 80-20</td>
<td>TX 50 MHV</td>
<td>TU 50 MHV</td>
<td>CT 1200 MHV</td>
<td>TR 1200 C</td>
<td>PT 2240</td>
</tr>
<tr>
<td>PT 3000</td>
<td>AC 1600 H</td>
<td>MC 2600 MHV</td>
<td>MHV 100-20</td>
<td>TX 70 MHV</td>
<td>TU 100 MHV</td>
<td>TR 1800 C</td>
<td>TR 3000</td>
<td>PT 3000</td>
</tr>
<tr>
<td>PT 4500</td>
<td></td>
<td>Pre-heater</td>
<td>MHV 160-25</td>
<td>TX 5 MHV</td>
<td></td>
<td></td>
<td>TR 2800 C</td>
<td>PT 4500</td>
</tr>
<tr>
<td>PT 5000</td>
<td></td>
<td></td>
<td>MHV 200-25</td>
<td>TX 90 MHV</td>
<td></td>
<td></td>
<td>TR 5000</td>
<td>PT 5000</td>
</tr>
</tbody>
</table>

100 kW

Powerpack™ Extruder Drives made by SAMP.
Highly stable processing for non-stop production.

To guarantee the continuous production flow, from the payoff on, the conductor is stored in an entry accumulator with an integrated dancer to assure a constant cable tension before entering the Master Capstan. This unit is the line speed Master and guarantees the line speed stability. A capacitive position sensor controls the speed of the “exit” Caterpillar. A third Helper Caterpillar with a controlled torque is located before the takeup station, maintaining the cable within the pulley and its support rim.

The complete extrusion process is easily controlled by the SAMP line supervision software MHV-SYS™ with a very user-friendly operator interface, guaranteeing consistent high quality cable production.
Extruder technology –
the core of extrusion knowhow

A fundamental part of any high performance line, Sampsistemi extruders are born from the longstanding experience and commitment of our expert team of engineers. Our extruders are renowned for their high levels of productivity and flexibility. Sampsistemi extruders answer to any requirement from high speed cable insulation to skin/stripe processes, automatic colour change systems, sheathing lines.

Top output values at low melt temperatures and high back pressures

Excellent output stability is assured by a forced feeding zone and an accurate screw design. An optimised L/D ratio ensures smooth plasticization of thermoplastic compounds with top output values (up to 1600 kg/h).

Linearity – Perfect output across all screw speed ranges

As output per screw revolution is the same for all screw speed ranges, it suffices to pre-set rpm according to insulation thickness and cable production speed to keep product diameter within tight tolerances, both during acceleration and deceleration.

Reliability
High quality pays off!

We conceive our machines with a view to constantly cutting maintenance costs. We utilise top quality resistant components. Totally reliable reducers and excellent barrel and screw surface finishes are all absolute musts at Sampsistemi and ensure that you produce efficiently over time.

at a glance

+ Barrels with a forced feeding zone
+ Barrels made from nitrited steel to increase hardness and lower wearing
+ Barrel thermoregulation by means of electrical heaters and fans
+ Screws made from nitrited steel
+ Screw profiles optimised to barrels
+ Stable & accurate thermoregulation
+ Fast line set-up thanks to reduced preheating time
+ Efficient & quiet barrel cooling
+ Monitored melt pressure to prevent barrel overpressure
+ Automatic crosshead clamping
+ User-friendly process supervision for quick and simple product changes

CHAMELEON

Chameleon is a revolutionary solution that allows the cable type changeover from a striped cable to a non-striped one and vice versa in just a few seconds, without stopping the production line and disassembling the extrusion head.

This technology is suitable for all SAMP extrusion heads.

at a glance

+ Non-stop production
+ High quality of the final product
+ Wide application range
+ No maintenance for striping process
+ Less cross-head components (no single layer distributor is needed)

average wire cost: 0,50 € / m
production speed: 1000 m/min

CV Line

Standard Insulation Line

Line with Chameleon
Extrusion modules for maximum flexibility in cable production

SAMP Extruder Dosing Unit

at a glance
+ Virtual “0” scrap material
+ Automatic cleaning process
+ Accurate dosing system
+ Operator friendly
+ Huge viewing panels
+ Complete control from SU P/SU L

G SCREW

at a glance
+ Flexibility (many insulation materials with one screw only)
+ High reduction time for insulation material changeover (4 times less than traditional technology)
+ No downtime for screw extraction
+ Only one screw for all materials
+ High productivity (same output compared to dedicated screws)

Work all thermoplastics on a single machine

at a glance
+ A single machine for all thermoplastic materials
+ Liquid silane and HFFR / LS0H materials with the same extruder
+ Maximum flexibility in production with less investment
+ Easy installation
+ Fast material changes
+ Future-safe investments
## Low voltage and telecom extruders

### For thermoplastic compounds

<table>
<thead>
<tr>
<th>Extruder size</th>
<th>Motor type</th>
<th>Number of thermo-regulated zones</th>
<th>Screw max. rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAMP 35-25</td>
<td>AC</td>
<td>3</td>
<td>220</td>
</tr>
<tr>
<td>SAMP 45-25</td>
<td>AC</td>
<td>4</td>
<td>200</td>
</tr>
<tr>
<td>SAMP 60-25</td>
<td>AC</td>
<td>4</td>
<td>150</td>
</tr>
<tr>
<td>SAMP 80-25</td>
<td>AC</td>
<td>5</td>
<td>120</td>
</tr>
<tr>
<td>SAMP 100-25</td>
<td>AC</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>SAMP 120-25</td>
<td>AC</td>
<td>5</td>
<td>80</td>
</tr>
<tr>
<td>SAMP 160-25</td>
<td>AC</td>
<td>5</td>
<td>60</td>
</tr>
</tbody>
</table>

### For liquid silane*

<table>
<thead>
<tr>
<th>Extruder size</th>
<th>Motor type</th>
<th>Number of thermo-regulated zones</th>
<th>Screw max. rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAMP 120-32</td>
<td>AC</td>
<td>6</td>
<td>80</td>
</tr>
<tr>
<td>SAMP 160-32</td>
<td>AC</td>
<td>6</td>
<td>60</td>
</tr>
</tbody>
</table>

* It is possible to extrude liquid silane with 25 Ø extruders by using MULTIFLEX 25

### For physical foaming

<table>
<thead>
<tr>
<th>Extruder size</th>
<th>Motor type</th>
<th>Number of thermo-regulated zones</th>
<th>Screw max. rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAMP 45-32</td>
<td>AC</td>
<td>5</td>
<td>200</td>
</tr>
<tr>
<td>SAMP 60-32</td>
<td>AC</td>
<td>5</td>
<td>150</td>
</tr>
<tr>
<td>SAMP 80-32</td>
<td>AC</td>
<td>6</td>
<td>120</td>
</tr>
</tbody>
</table>

### For fluoropolymer compounds

<table>
<thead>
<tr>
<th>Extruder size</th>
<th>Motor type</th>
<th>Number of thermo-regulated power(kW)</th>
<th>Screw max. rpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAMP 35-25F</td>
<td>AC</td>
<td>3</td>
<td>220</td>
</tr>
<tr>
<td>SAMP 45-25F</td>
<td>AC</td>
<td>5</td>
<td>200</td>
</tr>
<tr>
<td>SAMP 45-32F</td>
<td>AC</td>
<td>5</td>
<td>150</td>
</tr>
<tr>
<td>SAMP 60-32F</td>
<td>AC</td>
<td>5</td>
<td>120</td>
</tr>
<tr>
<td>SAMP 60-25F</td>
<td>AC</td>
<td>6</td>
<td>120</td>
</tr>
<tr>
<td>SAMP 80-25F</td>
<td>AC</td>
<td>6</td>
<td>120</td>
</tr>
</tbody>
</table>

Barrels, screws and cross-head clamps made of corrosion-resistant materials

Special high-performance ceramic heating elements for barrel temperatures up to 500°C
SAMP 120-25

at a glance
+ From 6% up to 33% more productivity than current technology
+ High performance temperature control resulting on shorter ramp-up time
+ Virtual "0" scrap material
+ Accurate dosing system
+ Automatic cleaning capabilities
+ High torque AC drive: SAMP Powerpack™

Medium and high voltage extruders

Extruder size | Motor type    | Number of thermo-regulated zones | Screw max. rpm
---|---|---|---
MHV 60-20 | AC | 4 | 40
MHV 80-20 | Powerpack™ | 4 | 30
MHV 100-20 | Powerpack™ | 4 | 25
MHV 160-25 | Powerpack™ | 5 | 40
MHV 200-25 | Powerpack™ | 6 | 25

Accessories
+ Screw thermoregulation unit
+ Automatic cross-head clamps & by-passes
+ Master-batch colour and catalyst dosing units
+ Gravimetric compound dosing station
+ Compound dryers
+ Various compound loading systems
+ In-line cable quality control systems

for 1200 Kg/h of HFFR

All from a single source
Complete your line with
Sampsistemi unwinding & winding solutions

Sampsistemi offers a wide range of wire & cable unwinding and winding machines. We design our solutions adapted to the specifics of your product and process.

Our pay-offs and take-ups are designed for maximum rigidity and stability to conveniently employ even large reels reliably. Fastest speeds and easy reel change contribute to the profitability of your extrusion line.

A variety of safety features, supported by thorough testing and strict quality protocols during assembly and run-off, guarantee operator’s safety in daily production.

Product range

- High-speed dual flyer pay-off
- Dual automatic take-ups for continuous working without reduction speed
- Self traversing portal pay-offs and take-ups up to 70 tons
- Single motorised pay-offs and take-ups
Dual flyer pay-offs

SV 630 CD

<table>
<thead>
<tr>
<th>Model</th>
<th>Reel flange Ø (mm), max.</th>
<th>Reel flange Ø (mm), min.</th>
<th>Reel weight (kg), max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV 630 CD</td>
<td>630</td>
<td>400</td>
<td>600</td>
</tr>
<tr>
<td>SV 800 CD</td>
<td>800</td>
<td>560</td>
<td>1200</td>
</tr>
<tr>
<td>SV 1000 CD</td>
<td>1000</td>
<td>500</td>
<td>2500</td>
</tr>
<tr>
<td>SV 1250 CD</td>
<td>1250</td>
<td>630</td>
<td>4500</td>
</tr>
</tbody>
</table>

at a glance
+ High speed unwinding
+ Automatic wire change
+ Welded wire detection
+ Easy handling
+ Easy installation
+ Fine tuning cones
+ On board electrical equipment

Single motorised pay-offs & take-ups

SV E 800 DM

at a glance
+ High speed
+ Quick reel handing
+ Low preventive maintenance
+ Easy installation

<table>
<thead>
<tr>
<th>Pay-offs</th>
<th>Take-ups</th>
<th>Reel flange Ø (mm), max.</th>
<th>Reel flange Ø (mm), min.</th>
<th>Reel weight (Kg), max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV E 500 DM</td>
<td>500</td>
<td>255</td>
<td>450</td>
<td></td>
</tr>
<tr>
<td>SV E 630 DM</td>
<td>630</td>
<td>315</td>
<td>650</td>
<td></td>
</tr>
<tr>
<td>SV E 800 DM</td>
<td>AV 800</td>
<td>800</td>
<td>1200</td>
<td></td>
</tr>
<tr>
<td>SV E 1250 DM</td>
<td>AV 1250</td>
<td>1,250</td>
<td>630</td>
<td>2600</td>
</tr>
<tr>
<td>SV E 1600 DM</td>
<td>AV 1600</td>
<td>1,600</td>
<td>800</td>
<td>4000</td>
</tr>
</tbody>
</table>
Self-traversing portals for pay-off & take-up

The new TU and PO series has been designed for a wide range of reels in CV lines, insulation and sheathing extruders, lead extrusion lines, stranding lines as well as rewinding lines.

The sturdy design with telescopic cross beam features high-speed motors. Measuring systems for the winding and unwinding process and the direct motor response guarantee a very precise cable distribution on the reels. The automatic wheel tension control ensures the constant pressure on the reels, independently from surface and material.

Mechanical and optical safety fences guarantee a very safe operation, especially during the loading process. Operators are supported by an intuitive user interface with automated functions.

<table>
<thead>
<tr>
<th>Flange Ø range</th>
<th>PT 1600</th>
<th>PT 2240</th>
<th>PT 2600</th>
<th>PT 3200</th>
<th>PT 3600</th>
<th>PT 4500</th>
<th>PT 5000-50</th>
<th>PT 5000-70</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>800 - 1600</td>
<td>1000 - 2240</td>
<td>1600 - 2600</td>
<td>1600 - 3200</td>
<td>2000 - 3600</td>
<td>2600 - 4500</td>
<td>3000 - 5000</td>
<td>3000 - 5000</td>
</tr>
<tr>
<td>Weight, max kg</td>
<td>6000</td>
<td>10000</td>
<td>15000</td>
<td>20000</td>
<td>30000</td>
<td>40000</td>
<td>50000</td>
<td>70000</td>
</tr>
<tr>
<td>Line speed, max m/min</td>
<td>400</td>
<td>300</td>
<td>200</td>
<td>200</td>
<td>100</td>
<td>40</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>
Dual automatic take-ups for continuous flow

AV 1250 D

at a glance

+ Maximum change-over reliability at full speed
+ Energy consumption saving
+ Easy integration to existing extrusion line
+ Low preventive maintenance
+ Automatic reel loading/unloading system
+ Long inner wire end capability
+ No foundations required

<table>
<thead>
<tr>
<th>Flange Ø, max.</th>
<th>AV 560 D</th>
<th>AV 630 D</th>
<th>AV 800 D</th>
<th>AV 1000 D</th>
<th>AV 1250 D</th>
<th>AV 1600 D</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>560</td>
<td>630</td>
<td>800*</td>
<td>1000**</td>
<td>1250</td>
<td>1600</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flange Ø, min.</th>
<th>mm</th>
<th>400</th>
<th>450</th>
<th>500</th>
<th>560</th>
<th>800</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width, max.</td>
<td>mm</td>
<td>425</td>
<td>475</td>
<td>600</td>
<td>750</td>
<td>950</td>
<td>1180</td>
</tr>
<tr>
<td>Weight, max.</td>
<td>kg</td>
<td>200</td>
<td>350</td>
<td>550</td>
<td>1200</td>
<td>2000</td>
<td>4200</td>
</tr>
<tr>
<td>Speed, max.</td>
<td>m/min</td>
<td>3000</td>
<td>2500</td>
<td>1200</td>
<td>1500</td>
<td>1500</td>
<td>600</td>
</tr>
</tbody>
</table>

* suitable for 36"
** suitable for 42"

Automatic coiler

at a glance

+ In-line coiling
+ Maximum change-over reliability at full speed
+ No reel for delivery
+ Easy integration with existing extrusion line

<table>
<thead>
<tr>
<th>Bunched wire section</th>
<th>mm²</th>
<th>0.22 - 4.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulated wire Ø</td>
<td>mm</td>
<td>0.50 - 3.60</td>
</tr>
<tr>
<td>Coil Ø, max.</td>
<td>mm</td>
<td>330</td>
</tr>
<tr>
<td>Coil inner Ø, min.</td>
<td>mm</td>
<td>100</td>
</tr>
<tr>
<td>Coil outer width, max.</td>
<td>mm</td>
<td>100</td>
</tr>
<tr>
<td>Linear speed, max.</td>
<td>m/min</td>
<td>1200</td>
</tr>
</tbody>
</table>
Software solutions for easy and fast operation, avoiding non-productive auxiliary times

Integration and control

SAMPSYS Software package controls and integrates all single units into our manufacturing line.

Get an overall picture of the line performance by measuring production availability, performance and quality and gaining control of your complete manufacturing process.

Future safety

Our software is modularly built ensuring flexible and fast upgrades of single modules.

System functions

+ Data logging
+ Statistical process control
+ Alarm functions
+ Process parameter memory
+ Scheduler for production timing
+ Reporting with pre-configured templates
+ Monitoring of line status and performance characteristics of each single unit
+ Easy data export
+ Tele-maintenance through phone line and modem for diagnostics upgrades and operational help
+ System recovery
+ Help function
+ User administration matrix
+ Production history
+ Maintenance interval setting and administration

at a glance

SAMPSYS line control concept for quality and production management featuring:

+ Complete line control
+ Process supervision
+ Networking and interfacing with existing lines
+ Wealth of automated process and control functions
Guided user interface for less errors, less downtime and less scrap production

The user-friendly HMI (Human Machine Interface) guides the operator through all necessary steps of the manufacturing process.

All required production and product information is stored by the PLC for future availability. Recalling data becomes child’s play.

Networking your machine or line allows for online trouble shooting realising savings on expensive interventions while avoiding machine downtimes whenever possible.
The key to success: Overall equipment efficiency

Planning and analysis

Sampsistemi analyses your production requirements and recommends solutions for the demanded productivity and quality. Whether you need a single machine or a complete line, we are your one-stop source for your wire and cable manufacturing project.

Service plans

Our scheduled service help you avoid unexpected problems and keep your line productivity and the quality of the finished product at maximum levels.

Technology development programs

When you require specific solutions we listen closely in order to satisfy your needs to even beat your expectations.

Operator training

Trained operators let you exploit your manufacturing lines to the maximum while avoiding down-time and securing carefree manufacturing.

Continuous improvement

Ongoing research and development effect new products but flow also into component design which can enhance existing lines and units.

On-call service

In case of emergencies we stand by to get you back running, if online service is not sufficient.

at a glance

+ Guaranteed OEM quality through the lifecycle of your production equipment
+ Continuous process improvement
+ Complete project responsibility from one supplier
Connect to worldwide service

Stay connected with superior productivity. The closest Sampsistemi service centre supports availability, precision, speed and productivity of your manufacturing line.

Spare parts

Individual component upgrades

Individual winding, cooling and handling equipment

Software updates and upgrades