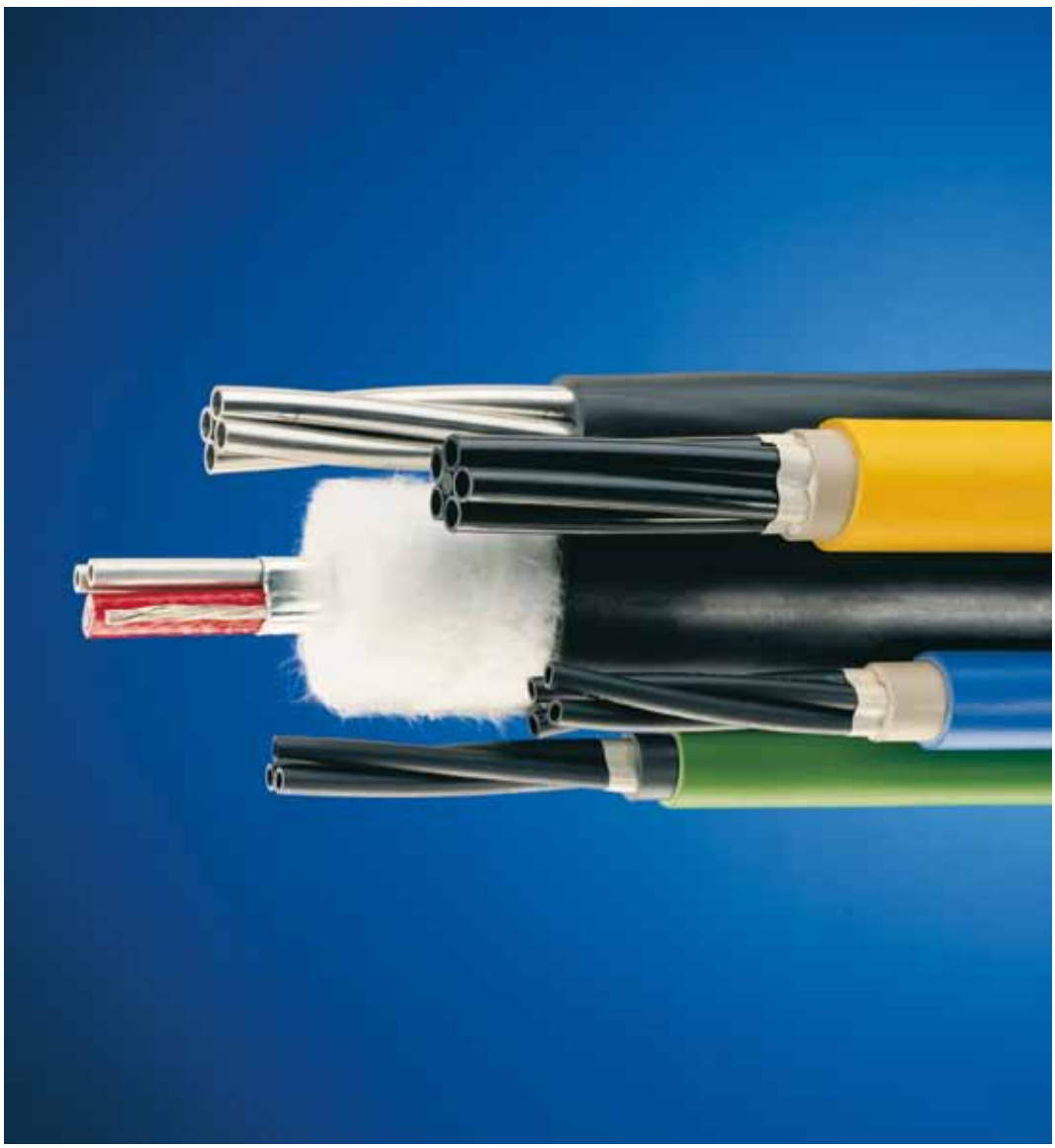
OSNALINE®

KME
THE EVOLUTION OF COPPER

Tubes and tube bundles

KME Germany AG & Co. KG
OSNALINE® [GB]



Member of the KME Group

KME Germany AG & Co. KG

Experts in tube bundles

KME Germany AG & Co. KG is a member of the KME Group S.p.A. - one of the world's most important producer of copper and copper alloy products. The company has production facilities in Germany, France, Italy, Spain, United Kingdom and China, where more than 6,000 people share their expertise in the production of semi-finished, finished and special products. Overall turnover is more than 3 billion EUR.

KME tube bundles

KME's special products division includes a variety of specialised tube bundles known as OSNALINE®. In this field of specialisation KME has been producing tube bundles to individual specifications for almost 50 years. These products are used for many industrial applications, in offshore facilities, in ship-building and in the building industry. This long tradition of tube bundle applications is one example of KME's unique developing and production potential. Experience and know-how that set standards worldwide.

Our customers

Tube bundles in industry
We deliver tube bundles to
- the chemical and petrochemical industries,
- ship-building and offshore industries,
- the building industry and
- plant construction and mechanical engineering

OSNALINE® tube bundles are primarily used in
- pneumatic and hydraulic systems
- measuring and analysing systems
- effective and differential pressure systems

Choice products
OSNALINE® tube bundles are highly economic solutions. Their main advantages are:
- they are easily and quickly laid like an energy cable;
- they need no maintenance and are extremely well protected against mechanical damage, abrasion and corrosion;
- they can be delivered in very long units, thus reducing waste material and the need for tube connections.

Every single OSNALINE® tube bundle is precisionmanufactured to precisely meet customer specifications.

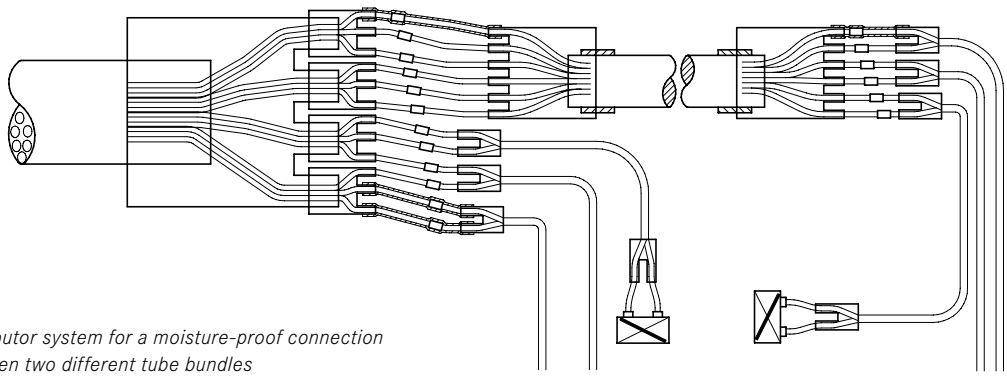
Our products

Product variations

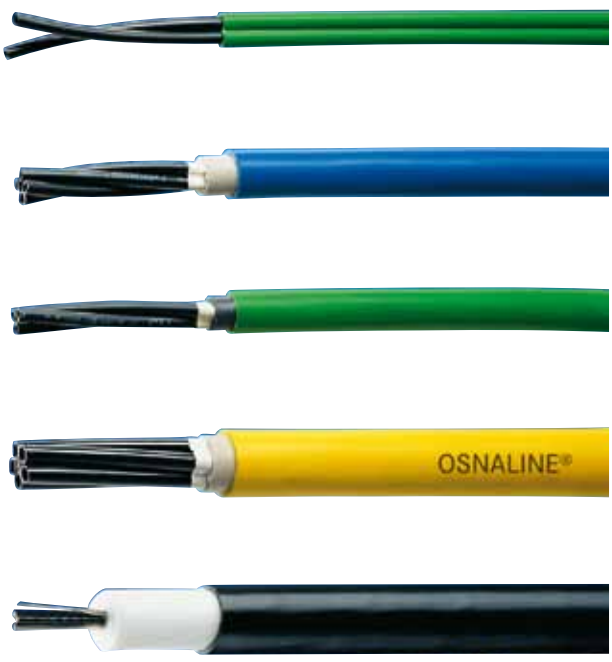
OSNALINE® tube bundles with a plastic casing are also available with an additional heat insulation layer when a steam or electrical tracer is used. Tube bundle designs for special purposes include:

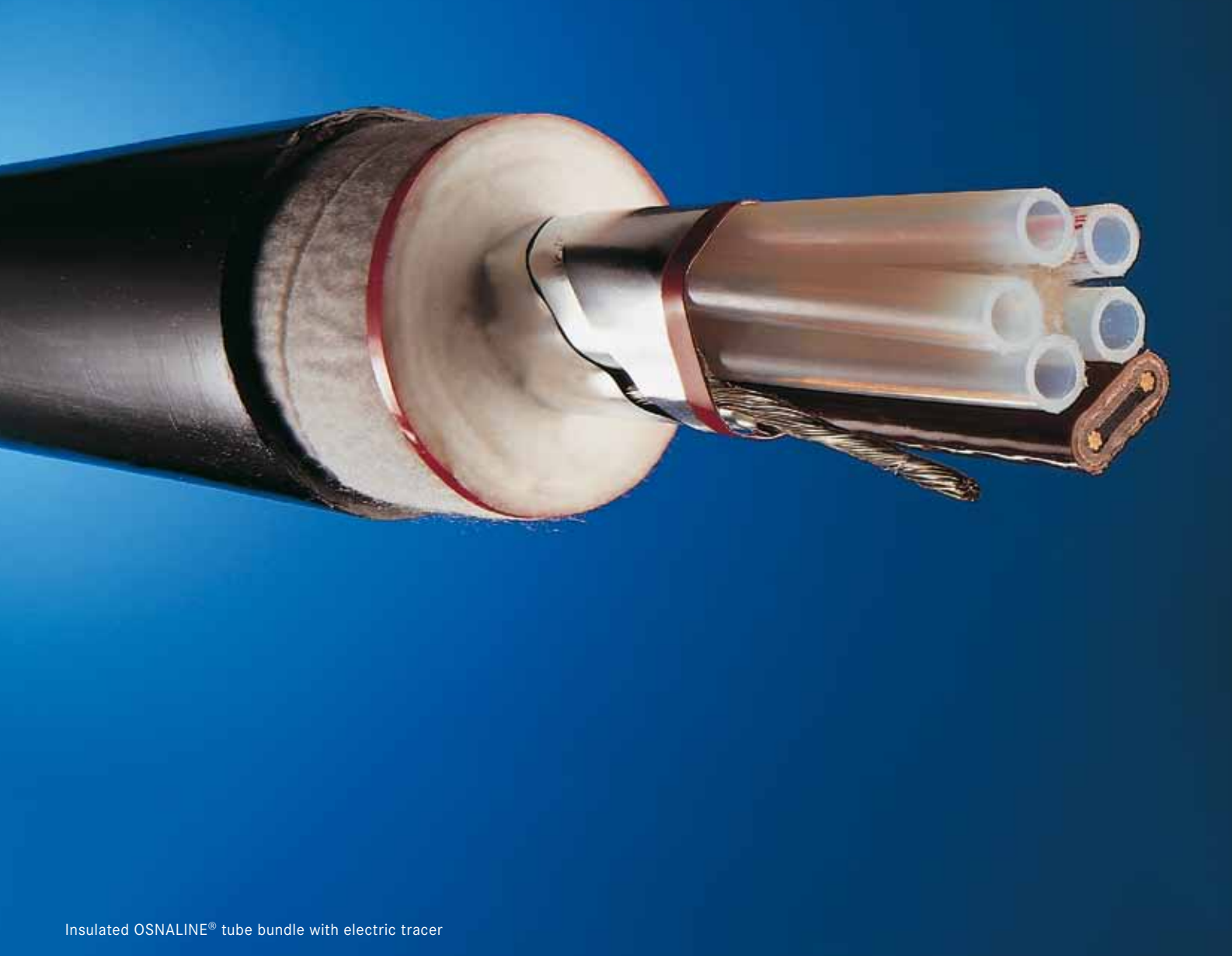
- armoring of the tube bundle with quenched and drawnflat steel wire or with spring wire,
- outer jacket with welding bead protection,
- a variety of tube dimensions and materials,
- pre-insulated individual tubes in the tube bundle,
- integrated electric lines for measuring, control and telephone,
- traction cables.

OSNALINE® – bringing your requirements in line.



Distributor system for a moisture-proof connection between two different tube bundles





Insulated OSNALINE® tube bundle with electric tracer

OSNALINE® tube bundles with electric tracer

Tube materials

- Stainless steel
- Copper
- Monel 400
- PTFE
- Incoloy 825

Applications

Analysing, instrument, sample extraction and process lines

in explosive environments

OSNALINE® tube bundles with steam tracer

Tube materials

- Stainless steel
- Copper
- Monel 400
- PTFE
- PTFE, lead-coated
- Incoloy 825

Applications

Analysing, instrument, sample extraction and process lines, steam lines, condensed water return lines and transport lines for fluid and gaseous substances

in explosive environments

OSNALINE® tube bundles for control technology

Tube materials

- Stainless steel
- Copper
- Copper-nickel

Applications

Measuring, control and monitoring systems in the chemical and petrochemical industries and in other areas of industry; media transport in the chemical and petro-chemical industries and in other areas of industry,

in systems requiring high corrosion resistance against sea water, in ship tanks and in sea water desalinization units

Technology in detail

OSNALINE® insulated tubes with electric tracer

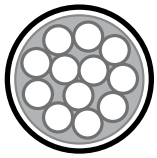
Applications
for measurement and analysing lines
- in the chemical industry
- in refineries
- in power stations and incinerators

Electric tracer
Self-regulating heater lines are generally used for maintaining temperatures of between 20°C (frostprotection) and 100°C. Resistancecable is used for temperatures up to 160°C. The self-regulating heater lines are approved by PTB (PTB98 ATEX ...), BASEEFA and Euronorm for external use.

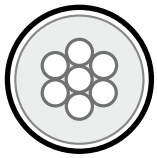
Tube outer diameter
6 - 12 mm (1/4" - 1/2")

Number of tubes
as needed

Packing
up to 500 m on wooden drums



Tube bundle



Insulated tube bundle

Insulated tube bundle with electric tracer

OSNALINE® tube bundles

Applications
pneumatic and hydraulic systems
- in shipbuilding
- in offshore technology
- in plant construction and mechanical engineering

Tube outer diameter
6 - 12 mm (1/4" - 1/2")

Number of tubes
up to 36, depending on dimensions and material used

Packing
in rings or on wooden drums, up to 1000 m

OSNALINE® insulated tubes

Applications
heated measurement and analysing lines for steam and condensed water lines
- in the chemical industry
- in refineries
- in power stations and incinerators
- in solar power units

Tube outer diameter
6 - 12 mm (1/4" - 1/2")

Number of tubes
as needed

Packing
up to 500 m on wooden drums

OSNALINE® tube bundles in pneumatics

Materials
Soft polyethylene
Soft polyethylene, flame-resistant
Hard polyethylene
Polyamide
PTFE

Applications
Measuring, control and monitoring systems
- in the chemical and petrochemical industries, in paper manufacturing, the photographic industry etc.,
- in air conditioning systems and areas exposed to direct sunlight and UV rays.

Technology in detail

Maximum permissible working pressure (bar) of metallic tubes

Tube sizes	Tube material			
	Copper	Copper-nickel	Stainless steel 1.430 (AISI 304) 1.4571 (AISI 316Ti)	
	Working temperature			
	up to 75°C	up to 75°C	up to 100°C	up to 100°C
6 x 0,5	–	–	155	185
6 x 0,8	–	–	265	315
6 x 1	140	240	345	405
8 x 0,5	–	–	115	135
8 x 0,75	–	–	180	210
8 x 1	100	170	245	290
10 x 0,75	–	–	140	165
10 x 1	80	130	190	225
10 x 1,2	100	165	235	280
10 x 1,5	125	210	300	360
12 x 1	65	105	155	185
12 x 1,5	100	170	245	290
1/4“ x 0,030“	–	–	235	280
1/4“ x 0,032“	–	–	252	300
1/4“ x 0,035“	–	–	280	330
1/4“ x 0,040“	140	240	330	385
3/8“ x 0,035“	-	-	180	210
3/8“ x 0,040“	90	150	205	245
3/8“ x 0,062“	150	225	340	400
1/2“ x 0,035“	–	–	130	155
1/2“ x 0,040“	65	110	150	175
1/2“ x 0,062“	110	184	245	290

Temperature limits for plastic jackets

Material	°C		°C	
	during installation		before and after installation	
	min	max	min	max
PVC YM3	- 5	+ 50	- 40	+ 70
PVC YM4	- 15	+ 50	- 45	+100
PVC YM2	- 5	+ 50	- 40	+ 70
PE-LD	- 20	+ 50	- 60	+ 70
PE-HD	- 20	+ 50	- 60	+ 90

Minimum bending radius

Type	Permissable bending radius (nominal)
Bundles Copper	8 x da
Bundles Stainless Steel and Copper-Nickel	10 x da
Tubes Copper	6 x da
Tubes Stainless Steel and Copper-Nickel	6 x da

Technology in detail

Maximum permissible working pressure (bar) of plastic tubes

Tube Sizes*	Material																
	PE-LD			PE-HD				PA 12 w					PTFE				
	Working temperature (°C)																
mm	20	40	60	20	40	60	75	20	40	60	80	100	20	50	100	150	200
4 x 1,0	16	8	4	33	16	8	5	33	24	19	16	13	24	18	13	10	8
6 x 1,0	10	5	2,5	20	10	5	3	20	14	11	9,5	7,5	15	11	8	6	5
8 x 1,0	7	3,5	1,5	14	7	3,5	2	14	10	8	6,5	5,5	11	8,5	6	4,5	3,5
10 x 1,0	5	2,5	1	11	5,5	2,5	1,5	11	8	6	5	4	8	6	4	3	2,5
12 x 1,0	4,5	2	1	9	4,5	2	1	9	6,5	5	4	3,5	6,5	5	3,5	2,5	2
1/4“ x 0,040“	10	5	2,5	20	10	5	3	20	14	11	9,5	7,5	14	11	7,5	5,5	4,5
3/8“ x 0,040“	6	3	1,5	12	6	3	1,5	12	8,5	6,5	5,5	4,5	8,5	6,5	4,5	3,5	2,5
3/8“ x 0,062“	10	5	2,5	20	10	5	3	20	14	11	9,5	7,5	14	11	7,5	5,5	4,5
1/2“ x 0,062“	7	3,5	1,5	14	7	3,5	2	14	10	8	6,5	5,5	10	8	5,5	4	3

**) other sizes by special inquiry*

NOTE: Maximum working pressures given are to be regarded as nominal values primarily for pneumatic systems (safety factor 4 against bursting pressure). Apart from undergoing dimensional in spection every OSNALINE® plastic tube is routine tested throughout its length for unobstructed passage of a steel ball and also tested pneumatically for its ability to withstand the specified systems pressure.

Temperature limits for plastic jackets

Material	°C		°C	
	during installation		before and after installation	
	min	max	min	max
PVC YM3	- 5	+ 50	- 40	+ 70
PVC YM4	- 15	+ 50	- 45	+100
PVC YM2	- 5	+ 50	- 40	+ 70
PE-LD	- 20	+ 50	- 60	+ 70
PE-HD	- 20	+ 50	- 60	+ 90

Minimum bending radius

Type	**Permissable bending radius** (nominal)
Bundles	7 x da
Tubes PE-HD, PA	6 x da
Tubes PE-LD	5 x da
Tubes PTFE	7 x da

Production

The tube bundle is wound onto wooden reels.

Materials for all requirements
Tubes made of copper, copper-nickel, stainless steel and plastic, of various diameters and thicknesses, are stranded together and combined with heater lines, potential equalizing lines, electric or telephone lines to make up an OSNALINE® tube bundle. Up to 36 different tubes and canals can be worked into a single bundle.

Special designs
After stranding, the bundled components are covered several times with plastic or with metal bands for extra protection. Several layers of polyester or fibreglass insulation are added as required before the tube bundle finally receives its extruded plastic jacket.

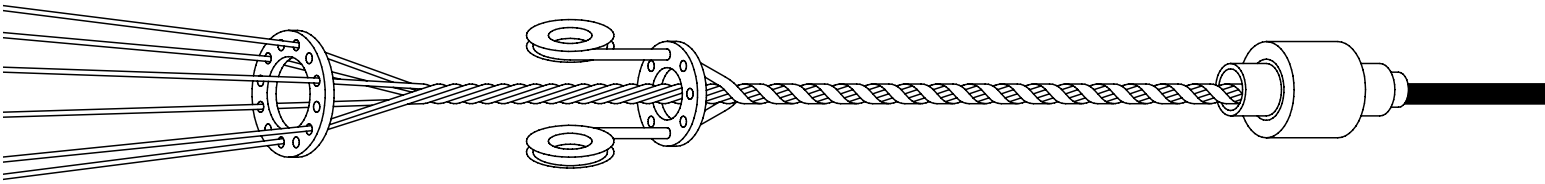
System solutions
The flexibility of OSNALINE® tube bundle design offers a wide variety of customised solutions.

Our tube bundles include reserve lines for later additions or modifications.

The ends of the tube bundles are carefully protected from outside moisture using finely tailored fittings. Individual tubes can be insulated right up to the point of connection with the customer's installations.

The electric heater lines used in heated tube bundles can be installed in explosion hazard zones. Specially developed and tested connections are fitted as required on location.

Safe shipping
OSNALINE® tube bundles are wound onto sturdy wooden reels which are then securely lagged, ready for shipping around the world.



Basic components are, depending on the tube bundle's purpose, copper, copper-nickel, stainless steel or plastic tubes, heating lines, cables and control lines.

Heated granulate is used in the extrusion process to coat the stranded and insulated tube bundle with a plastic jacket.

KME Quality Management

KME Quality Management
Quality Management plays a central part in all of KME's activities. All production locations have been certified by Lloyd's Register Quality Assurance according to the DIN EN 9000 row. KME has received comprehensive approval from:

- Germanischer Lloyd
- Det Norske Veritas
- Bureau Veritas
- British Standards Institution
- ZC-China Classification Society
- AFNOR
- AENOR

and more

Testing
Every OSNALINE® product leaving our production is thoroughly tested for operational security. Final product testing consists of:

- Pressure testing according to specification up to max. 290 bar
- Internal tube diameter consistency testing
- Material conformity testing
- External tube diameter and thickness conformity testing
- Labelling check

Proven process reliability and strict Quality Management at all stages of production are our customer's guarantee of getting the high quality products they have come to associate with OSNALINE®.

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