

**WITZENMANN**  
managing flexibility

Flexible heat trace system



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**HYDRA**

Quality by Witzenmann



## THE COMPETENCE OF A TECHNOLOGY LEADER



### Worldwide

The Pforzheim-based Witzenmann Group, with 23 locations in 17 countries and approximately 3,000 employees, established the metal hose and expansion joint industry over 120 years ago.

Witzenmann has the world's largest product range of flexible metallic elements for industry. In addition to standard production series we also develop and manufacture product solutions tailored to customer requirements. We are the only provider that can offer comprehensive all-in-one solutions: metal hoses and expansion joints, metal bellows, pipe supports and bearings.

Our leading engineering and production know-how forms the basis for optimum solutions for decoupling vibrations and absorbing movements in pipes.

Today, the Witzenmann Group is one of the world's leading manufacturers of flexible metallic components. Of course this also includes an effective network of development, production, service and sales.

This network forms the basis for ensuring maximum proximity to our customers, allowing us to increase the availability of machines, facilities and equipment assemblies across the entire globe: Europe, China, Korea, India, Brazil and the US.

## DIVERSITY AND VERSATILITY AS A STANDARD



- Metal hoses
- Expansion joints
- Metal bellows
- Hangers and supports
- Bearings



### Solution competence

Witzenmann is the European market leader with the world's largest range of flexible metallic elements. As the technology leader and development partner to the industry, Witzenmann has considerable know-how as well as the resources required to continually set new trends in its markets.

A pool of highly-qualified engineers, a comprehensive testing environment and the in-house production of tools and samples are essential success factors.

New and innovative ideas perfectly implemented on a technical level in the form of well-engineered products - just one of the Witzenmann trademarks.

### Metal hoses

can be used for a large variety of applications. Pressure-tight annular-corrugated hoses can be used with extreme operating pressures and temperatures. Protective hoses with interlocked or engaged profiles are used to protect cables or optical fibres. Suction and fan hoses combine maximum flexibility with low weight and simple installation.

### Expansion joints

are manufactured into high-performance standard production series - axial, angular or lateral, with diameters ranges of up to DN 12000. Furthermore, we also offer special versions and special solutions. Round, oval or rectangular - for all applications in pipeline and plant engineering.

### Hangers and supports

for every application. Our product range includes spring and constant hangers, spring and constant supports, plus accessories including pipe clamps - everything you need to build complete load chains. All components are absolutely maintenance-free and have undergone German TÜV and VGB performance testing.

### Bearings

guarantee secure support and positioning of resting pipes. Our fixed, movement and guide bearings are absolutely maintenance-free and can also be supplied with the patented uplift restraint. Roll bearings provide permanently minimal frictional resistance. And thanks to a new type of fixing technology, clamp bearings are now even easier to install.



### The system

- Flexible stainless steel heat trace hose
  - + insulated feed line from main supply to heat trace
  - + service / engineering
  - + accessories and fixings
- 
- = HYDRA Heat Trace System

## THE HYDRA HEAT TRACE SYSTEM



The Hydra heat trace system adds up to a coordinated solution for all applications. Easily adapted quality engineering. No troublesome assembling of individual components. No risk of incompatibility between components. All the parts of the Hydra system solution are based on a standardised, proven method of connection. The flexible heat trace system is not only superior to rigid piping in terms of its easier handling, but is also significantly more cost-effective, as shown by the example below:

**Example of costs for a vessel:**  
 For our example let us assume a vessel with a capacity of 10 m<sup>3</sup>, a circumference of 8 m and 30 windings for the trace heating.

<b>Flexible HYDRA heat tracing system:</b>	
Material cost	2,900.- €
Installation time (approx. 30 hours)	1,100.- €
<b>Total costs approx.</b>	<b>4,000.- €</b>

<b>Conventional piping as double jacket heating system:</b>	
<b>Total costs approx.</b>	<b>8,100.- €</b>

According to information supplied by operators, the savings that can be expected as compared to conventional heat trace systems are in the region of 40 to 50 %. There is potential for further savings in the feed lines. Pre-insulated systems can cut installation time by up to 60 %.

## THE HEAT TRACE HOSE



### Advantages

- Excellent heat exchange capacity due to corrugated surface
- Cost savings thanks to simple and easy installation
- No need to measure the pipes, no need for isometric drawings
- No buckling, no decrease in cross-section
- High pressure resistance
- No welding necessary – also suitable for installation in hazardous areas
- Hoses can be cut to any length
- Reduction in weight
- Major savings in materials
- DN 12 – DN 25



### Less work, more efficiency

The flexible heat trace hose heats the pipe below the insulation to a maximum temperature of 200 °C, using steam or hot water. Higher temperatures are possible with superheated steam. The large corrugated surface ensures optimum heat transfer. The easy-to-bend annular corrugated hose means trouble-free installation.

The hose can be installed in the smallest of bending radii (20 - 35 mm). It is temperature and corrosion resistant, flame resistant and diffusion-tight as well as resistant to aging. The elements are connected by means of loose screw couplings.

The stainless steel hose is available by the meter complete with loose screw couplings of stainless steel or brass. The hose is fixed to the pipe by means of quick-fix clips and tape, or directly with metal tape. Fixing to walls is by means of quick-fix clips. The hose can be conveniently shortened or extended on site.

### Applications:

Steam, hot or cold water. Generally, heat traces are useful wherever constant temperatures have to be maintained.

### Application examples:

- Heating of product lines
- Heating of manifolds, fittings and pump housings
- Engine cooling
- Vessel heating
- Heating for emergency showers
- Pipe bridges
- Cooling
- Feed lines with pre-insulated annular corrugated hose from main supply to heat trace system



## PRE-INSULATED FEED LINE

### Advantages

- Faster installation as compared to conventional rigid copper/stainless steel pipes.
- Flexible routing with 250 mm bending radius
- Larger nominal diameters feasible than with rigid pipes
- No need to coordinate the workflow with the insulation contractor
- No manual, follow-up insulation work
- Temperature range: -40 °C outside to +200 °C inside
- Considerable cost savings
- No additional planning of anchor points necessary
- Reduction and connection fittings suitable for DN 12 and DN 20

**The pre-insulated feed hose: simply clever.**  
The installation of the feed line from the steam or hot water supply to the location of the heat trace system often causes difficulties. Frequently, pipes must be welded, bent or reworked to guarantee a reliable connection. A pre-insulated hose represents a cost-effective alternative that requires no subsequent insulation.

The hose is supplied in lengths of 100 m on non-returnable wooden drums and is therefore very easily cut to length without wastage and unnecessary joints. The advantage of the pre-insulated solution is that the entire installation can be carried out in one operation. The feed hose can be easily fixed to trays, brackets and sections with hose clamps. The pre-insulated feed line has been designed and proven for connecting directly to the Hydra heat trace system with the same method of connection. The nominal diameters DN 16 and

DN 25 can also be reduced to DN 12 and DN 20 respectively by using reducing fittings. (Standard DN 25)

#### **Termination set FAK-7 B**

for waterproof sealing of hose ends by means of a roll of a self-vulcanising silicone rubber band and RTV sealing compound. There is adequate material to install approximately 2-4 water-tight connections.

#### **Terminal caps**

as an alternative for projects with standard nominal diameters of DN 25. With a silicone cap and RTV sealing compounds. No special tools required.

#### **Self-sealing joint set FAK-8 I**

for weatherproof sealing, with insulating material and rubber mat for joints or repairs to the outer jacket of the line.



Design

**Heat trace hose**

Annular corrugated stainless steel hose fabricated from butt-welded pipe, with wide corrugations. For installation conditions with an especially high risk of corrosion, we can also provide Hastelloy C-276 / 2.4819 material in size DN 16.

**Order text**

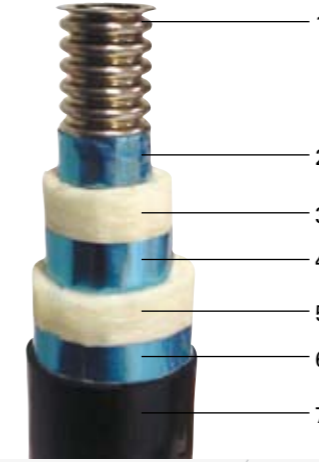
Hydra annular corrugated hose, stainless steel 1.4404

- Type RS 341S00
- DN .....
- Length ..... m

- Manufactured in lengths of up to 300 m
- Practical 50 m length
- On non-returnable wooden drum with 50 m for uncoiling trolley

**Heat trace hose**

DN	Hose diameter		ID/Order No. in coil	ID/Order No. on drum	Min. bending radius $r_{min}$ mm	Permissible operating pressure at 20 °C bar	Weight kg/m	Reduction factors	
	$d_1$ mm	$d_2$ mm						t °C	1.4404
12	12.5	16.5	378 243	402 176	20	20	0.102	50	0.9
16	16.3	21.4	378 244	402 177	25	20	0.153	100	0.73
20	20.7	26.5	378 245	402 178	30	20	0.311	150	0.67
25	25.8	31.7	378 246	402 179	35	20	0.388	200	0.61



Design

**Insulated feed hose**

- 1 Annular corrugated hose
- 2 Heat-reflecting aluminium foil
- 3 Non-hygroscopic glass-fibre insulation, 5 mm
- 4 Heat-reflecting aluminium foil
- 5 Non-hygroscopic glass-fibre insulation, 5 mm
- 6 Heat-reflecting aluminium foil
- 7 Polymer outer jacket, 2 mm

**Order text**

HYDRA pre-insulated feed line

- Type RS 341S00 - ATPVC
- DN .....
- Length: 100 m on non-returnable wooden drum
- Special lengths on request

**Pre-insulated annular corrugated hose: 100 m on wooden drum**

DN	Hose diameter		ID/Order No. on drum	Min. bending radius $r_{min}$ mm	Permissible operating pressure at 20 °C bar	Weight kg/m
	$d_1$ mm	$d_2$ mm				
16	16.3	46	426 859	250	20	1.0
25	25.8	57	426 860	250	20	1.7

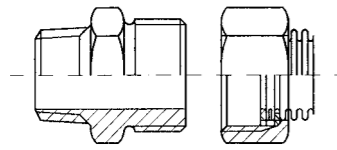


Fig. ①

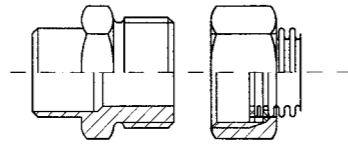


Fig. ②

Connections at a glance

**Screw coupling Fig. ①**

- Male connector
- With external thread
- Union nut
- Gasket: graphite
- Closable clamping washer, captive

DN	ID/Order No.	
	Stainless steel 1.4301	Brass
12	340 287	294 708
16	340 210	294 709
20	340 211	295 004
25	340 212	295 005

**Screw coupling Fig. ②**

- Male connector with ISO weld end
- Male connector with precision socket piece for solive and Swagelok screw coupling
- Union nut
- Gasket: graphite
- Closable clamping washer, captive

DN	ID/Order No.	
	Weld end	Precision pipe
12	340 289	461 807 (1)* 393 001 (2)*
16	340 213	393 000
20	340 215	393 002
25	340 216	393 003

\* (1) and (2) see precision socket piece

**Connection fitting reduction Fig. ④**

- 2 union nuts
- 2 gaskets: Sigraflex graphite
- 1 reduction double nipple
- 2 closable clamping washers, captive

DN	ID/Order No.	
	Stainless steel 1.4301	
12 / 16	426 120	
20 / 25	426 122	

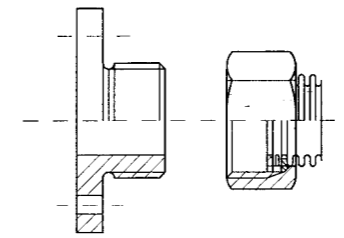


Fig. ③

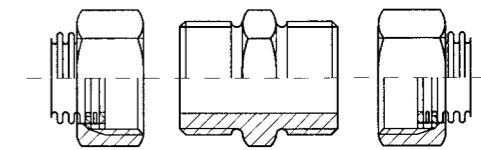


Fig. ④

Connections at a glance

**Connection fitting Fig. ④**

- 2 union nuts
- 2 gaskets: Sigraflex graphite high pressure or AFM 34 (MS)
- 1 double nipple
- 2 closable clamping washers, captive

DN	ID/Order No.	
	Stainless steel 1.4301	Brass
12	340 286	319 947
16	340 207	319 948
20	340 208	319 949
25	340 209	319 950

**Screw coupling Fig. ③**

- Male connector with threaded flange PN 20-1.4301
- Union nut
- Gasket: graphite
- Closable clamping washer, captive

DN	ID/Order No.	
	Stainless steel 1.4301/1.4541	
12	-	
16	340 203	
20	340 204	
25	340 206	

**Dimensions for connections**

DN	Union nut	AF size S	Male connector		Precision pipe section mm	AF size S
			External thread	Weld end mm		
12	G 1/2	24	R 1/2	17.2 x 1.8	12 x 1.5 x 32 (1) 15 x 2.0 x 32 (2)	22
16	G 3/4	30	R 1/2	21.3 x 2.0	18 x 1.5 x 32	27
20	G 1	41	R 3/4	26.9 x 2.3	22 x 2.0 x 36	36
25	G 1 1/4	46	R 1	33.7 x 2.6	28 x 2.0 x 40	46

Stainless steel threads should be coated with a lubricant (e.g. Molykote)

Easy  
Fast  
Reliable

**Connection - Installation**



Cut hose to the desired length in a groove of a corrugation using a pipe cutter.



Slip union nut over hose



Open clamping jaw after pulling back the striking pin. Place the groove of the second corrugation in the clamping jaw.



Close clamping jaw and use the striking pin to compress the corrugation into the form of a rim.



Press the burrs inwards with the rimming rod.



Fit clamp ring into first corrugation groove and compress it to form a closed ring. Insert gasket. Place threaded male connector in end of hose and tighten with two open-end spanners.

Ready to install  
Pre-insulated  
100% sealed

**End termination FAK-7 B**



Remove approx. 6 cm of the insulation in three steps



Fit the required screw coupling



Generously apply silicone adhesive to the end of the insulation. Wrap silicone self-adhesive tape with a 50% overlap around the end up to the screw coupling.

**End termination DN 25 - with silicone cap**



Remove approx. 6 cm of the insulation. Generously apply silicone adhesive to the end of the insulation.



Slide the silicone cap as far as it will go onto the annular corrugated hose.



Fit the required screw coupling.

**Sealing the join fitting FAK-8 I**



Remove approx. 6 cm of the insulation. Fit the connection fitting. Generously apply silicone adhesive to the end of the insulation.



Wrap the self-adhesive glass-fibre tape around the hose and the fitting only. Then wrap the heat-reflective, self-adhesive tape, allowing a 25% overlap.



Wrap the rubber mat around the assembly. It should overlap the taped assembly by approx. 2.5 cm on each side.

Easy  
and  
reliable

Installation  
examples

Installation on pipe transverse to hose



Installation on vessel parallel with hose



Pliers for hose clamp



Tightening strap with turnbuckle



**Easy and fast installation of Hydra heat trace hoses by means of the new SMC quick-fix clip (registered design).**

#### 1. Self-locking stainless steel hose clamp

- Select hose clamp according to diameter of pipe.
- Fix hose clamp directly to stainless steel pipe with quick-fix clip. On steel pipes insert chloride-free insulation (glass fibre) to prevent galvanic corrosion.
- Insert hose clamp into quick-fix clip, place around pipe and push end of strap through locking head. Pull in the strap manually. Insert protruding end of strap sideways into the pliers, tighten the strap and cut off the excess by turning the pliers through 90°, taking care to avoid leaving a sharp edge.

#### 2. Retrofitting of trace heating to product vessels with various diameters (e.g. 500 - 10 000 mm).

- Easy installation
- Fit tightening strap with turnbuckle around vessel
- Insert SMC quick-fix clip with internal groove
- Tighten the strap with the turnbuckle

#### Tightening strap with turnbuckle

- Cut off a piece of strap approx. 10 cm longer than required.
- Loosen the turnbuckle.
- Push end of strap through slot in turnbuckle from above, then bend back a section approx. 3 cm long below the main part of the strap.
- Place the strap in the quick-fix clip and bend it around the pipe.
- Push the free end into the other side of the turnbuckle and engage it with the two locking hook.
- Tighten the strap with a screwdriver.
- This assembly is reusable and can be tightened by means of the turnbuckle.

#### 3. Heating of pump housings, fittings and manifolds.

- SMC quick-fix clips, DN 25, with holes for fixing to walls with 5 mm countersunk screws.

The range  
at a glance

**Cutter for annular corrugated hose**

For cutting the hose to the required length in a corrugation groove

DN	ID/Order No.
12 – 25	346 685



**Rimming tool**

For compressing two corrugations of the annular corrugated hose when attaching an end fitting

DN	ID/Order No.
12	319 603
16	319 604
20	319 605
25	319 606



**Quick-fix clip**

For preliminary installation of the hose and as a spacer between the corrugated hose and the pipe/vessel to prevent galvanic corrosion and excessive local heating. Material: Ultrason PES (polyethersulfone). Resistant up to 200 °C. DN 25 with 5 mm hole for wallfixing; hole in size DN 12-20 on request. Supplied in boxes of 50 pieces.

DN	ID/Order No.
12	358 194
16	358 193
20	358 192
25	358 191



**Clip with screw**

e.g. for installation on fittings, pump housings

The range  
at a glance

**Hose clamp**

For fixing to pipes  
Material: stainless steel  
Supplied in boxes of 50 pieces

up to DN	Length	ID/Order No.
40	259 mm	392 971
65	362 mm	392 973
125	521 mm	392 974
150	679 mm	392 975
200	838 mm	392 976
-	-	392 977



Pliers for hose clamp

**Turnbuckle**

For tightening strap  
Material: 1.4301  
Supplied in boxes of 50 pieces

ID/Order No.
348 871



**Tightening strap**

For connecting hoses to pipes and vessels.  
Material: 1.4301  
Width: 10 mm  
Supplied in lengths of 20 m

ID/Order No.
348 865



The range  
at a glance

**Termination cap for DN 25**

- Silicone material 8.2110
- Black
- Resistant up to 200 °C
- RTV sealing compound

ID/Order No.
486 499



**Connection set FAK-7 B for DN 16 and DN 25**

- Self-vulcanising silicone rubber band
- RTV sealing compounds for 2 – 4 ends

ID/Order No.
427 252



**Self-sealing connection set FAK 8 I**

- 200 x 350 mm self-adhesive rubber mat
- Glass-fibre insulation material
- Heat-reflecting aluminium foil

ID/Order No.
449 142



The range  
at a glance

**Trolley for hose drum**

Holder for hose drum, device for measuring length and tool tray. All in one, directly at the place of installation. For easy uncoiling of the hose.

ID/Order No.
449 231



**Replacement parts**



DN	Clamping washers Supplied in packages of 50 pieces	Gaskets AFM34 Supplied in packages of 100 pieces	Graphite gaskets Supplied in packages of 100 pieces
12	Order No. 925 372	Order No. 925 377	Order No. 925 381
16	Order No. 925 374	Order No. 925 378	Order No. 925 382
20	Order No. 925 375	Order No. 925 379	Order No. 925 383
25	Order No. 925 376	Order No. 925 380	Order No. 925 384