HYDRA®
Quality by Witzenmann

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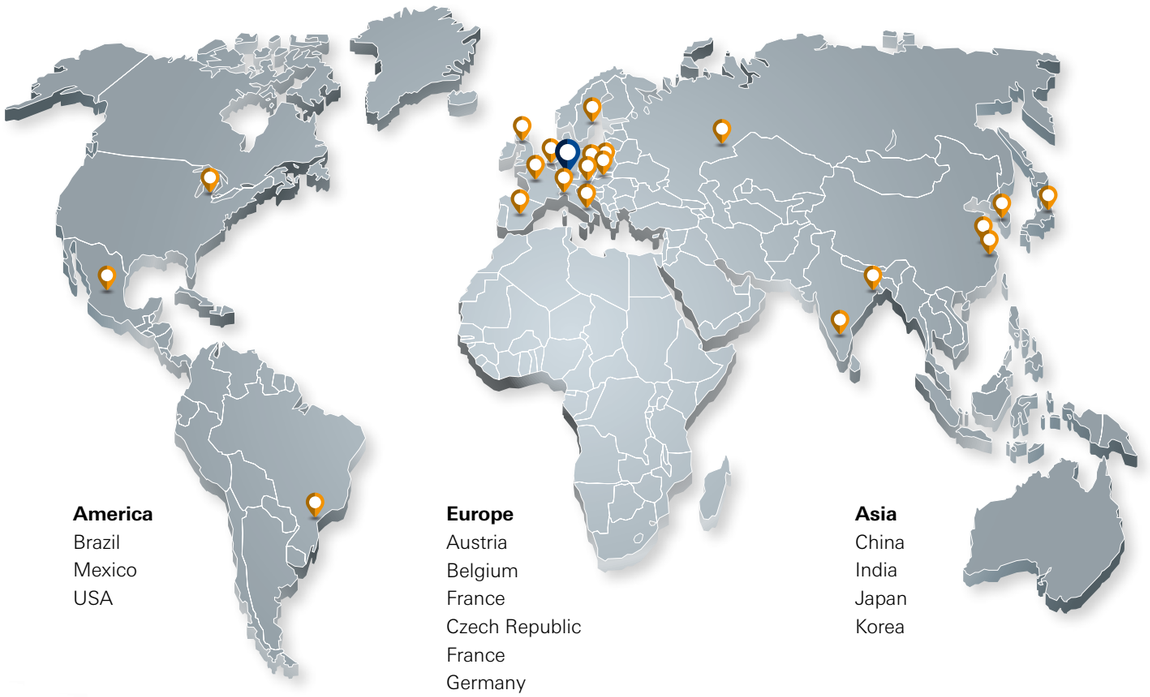
WITZENMANN
managing flexibility

FLEXIBLE CONNECTIONS

For gas and heat conducting piping
in building technology

OUR FLEXIBLE NETWORK



America
Brazil
Mexico
USA

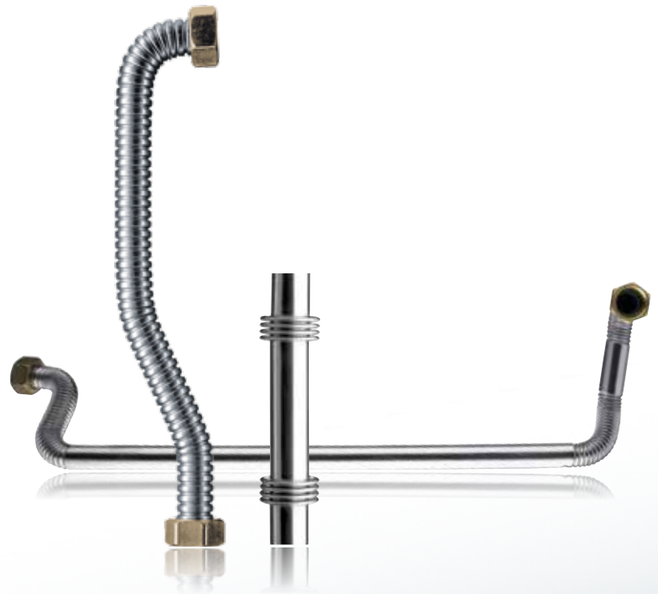
Europe
Austria
Belgium
France
Czech Republic
France
Germany
Italy
Poland
Russia
Slovakia
Spain
Sweden
United Kingdom

Asia
China
India
Japan
Korea

The group's international technology network in Europe, Asia and America produces benefits in terms of operating efficiency and innovative strength.

Always close to the customer
One of our corporate principles is to manufacture our products close to our markets. In practice, this entails establishing extensive local knowledge both in production and engineering. To ensure this, we apply comprehensive qualification measures at our Competence Centre in Pforzheim and provide the respective subsidiaries with the appropriate Witzenmann technology. The strong technology network within the group allows us to address global trends and develop the corresponding solutions. This has made us an innovative leader in our industry.

Fast service, economical production
Our proximity to our customers enables us to react fast and competently to new requirements. Furthermore, we have comprehensive testing equipment that permits to develop and optimise products quickly and reliably before they go into series production. Our flexible network provides each company in the group with direct access to additional engineering capacities, like the testing and development resources of the head office in Germany. Naturally, we not only condense our "internal" processes to the maximum;
the concept we adopt also enables an economical and fast logistics chain to our customer.



FROM THE CELLAR TO THE ROOF

Our flexible elements can be optimised for a wide variety of applications to match the particular requirements. A basic distinction is made between the equipment pipework and "regenerative energies".

Equipment pipework
These include supply lines for the connection of a variety of equipment. These pipework elements carry process or drinking water, as well as gas (or in exceptional cases even special media such as oil) to the relevant devices. The prerequisite for this is that the geometry of the pipes can be easily adapted to the prevailing conditions and that the connection technology is not complicated. In addition to the external piping, specially corrugated hoses are also used for the piping inside the device.

The installation of internal piping is generally carried out in very confined spaces. The flexibility of the conduits offer enhanced convenience for installation. Similarly, the absolute and permanent diffusion integrity of the metallic hoses is an advantage. This prevents any odours or media vapours (for example, heating oil) escaping to the outside.

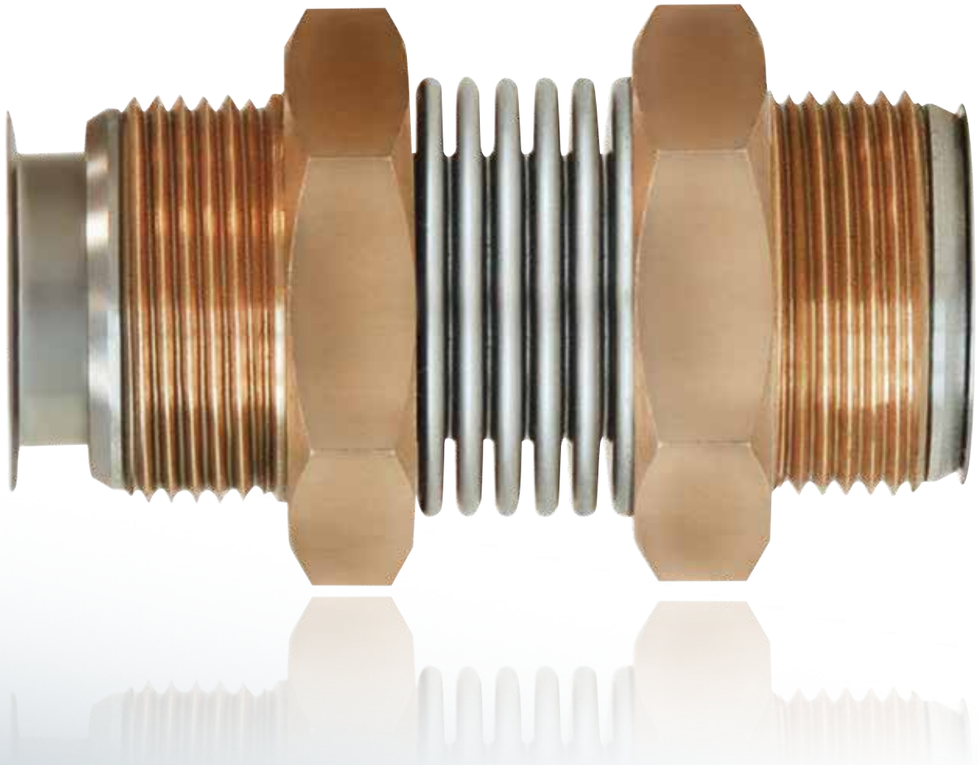
Examples of equipment pipework for
- Gas and oil heat generators
  such as gas-fired boiler or oil-fired condensing boiler
- Stratified tanks
- Mini CHPU
- Fuel cells

Regenerative energies
High temperature resistance, high-volume throughputs, straightforward connections, ability to accommodate movements and tensions, also extremely long service life are the features that make flexible HYDRA heating elements predestined for this application field. This compensates for inaccuracies during installation, makes for easy connection of solar-thermal plants to the line supply or enables straightforward connection of flexible pressure-resistant pipework elements to Stirling motors. Robust, reliable and inexpensive are the further essential characteristics of our pipework elements for this field.

Application examples
- Solar heat plants
- Pellets plant
- Heat pump
- Chipping plant
- Stirling motors

ONE FOR ALL

The quality of engineering solutions is demonstrated in day-to-day handling. Sophisticated products not only make for easy installation, they also integrate the macroeconomic consideration into the design.



A small component that makes a big impact
Only companies who succeed in generating product solutions with a performance spectrum that goes beyond merely serving a function can become innovation drivers and market leaders. Look at our compression ring coupling, for example

It is a metal-seated connection. This patented sealing element can be used universally in the field of hot and process water circuits. An absolutely leak-proof seal that is long-living and easy to fit.

The commercial advantages
Only one single sealing concept is required for the entire pipework chain from the roof to the cellar. All components match and therefore achieve an identical leak-tightness. This brings enormous benefits. It also makes work easier on site. Only one component is required for the numerous connections and joints **because the seal is already integrated in the component**. An important argument, particularly when installing on the roof, or other locations that are difficult to access.

Example application for solar-thermal plants

Collector joint (roof)
The thin-walled bellows of the compression ring connection allow for movements caused by thermal expansion as well as installation inaccuracies, and are designed for a high number of load cycles. Without any need for use of a special tool, the connections can be assembled quickly and absolutely leak-proof, even in confined spaces.

Dummy plugs made of brass (roof)
The dummy plugs tightly and permanently seal the collector series at the end. The upper dummy plug can be designed as a venting unit.

Conduit as roof exit
A flexible conduit enables the seal to be used for fast, straightforward connection of the solar system to the piping system.

Riser and down pipes
Metal-seated compression ring connections are used to produce the reliable connections to the insulated twin-pipe systems within the building.

Equipment pipework (cellar)
All heating, hot water and solar technology units are piped by means of the metal-seated, flexible pipelines.

SOLAR PIPING

Flexible joining elements for collectors in solar thermal energy

Applications

The components (delivered as a 'perfect fit' and ready for installation) are easy-to-install, low-maintenance products that ensure moderate installation costs and extremely low operating costs. This makes the reliable HYDRA solar connectors the preferred choice for OEMs and the installation trade in this market segment.

Areas of Use

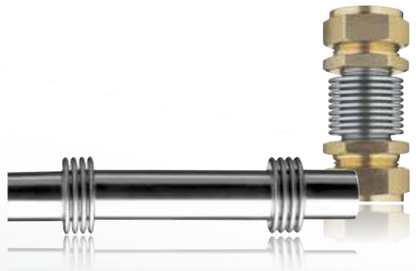
Flexible connections between the individual solar panels and the solar equipment piping.

Versions

- Temperature range -20 °C to +250 °C
- Absorption of movement in all directions (axial, lateral and angular)
- Guaranteed alternation of load (min. 10,000 stress cycles)
- Compensation of installation inaccuracies
- Suitable for any application (pressurised and un-pressurised systems, major installations, individual panels)
- Connections on standard copper piping

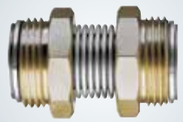
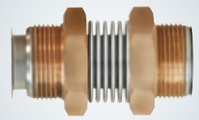
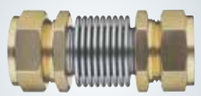
Advantages

- Easy installation without the need for specific knowledge or special tools
- Pre-finished and ready-to-install
- Long-living and extensively maintenance-free operation
- Collectors suitable for close, upright installation
- Compact and inexpensive design
- Fewer sealing points



SOLAR PIPING

HYDRA® collector joints

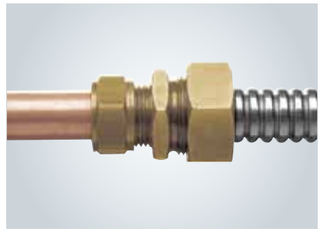
Type: Threaded Connexion 01	Technical details
	■ Inner diameter: 15 mm, overall length: 49 mm* ■ On both sides, retaining screw made of brass G ¾" ■ Flat sealing with hard fibre seal, for radial installation ■ Temperature range -40 °C to +250 °C ■ Max. operating pressure 10 bar
Type: Screw Connexion 02	**Technical details**
	■ Inner diameter: 18 mm, overall length: 63 mm* ■ On one side, union nut made of brass G1" ■ On the other side, retaining screw made of brass G1" ■ Flat sealing with hard fibre seal, for radial installation ■ Temperature range -40 °C to +250 °C ■ Max. operating pressure 10 bar
Type: Pressure Ring	**Technical details**
	■ Inner diameter: 15 mm, overall length: 60 mm * ■ On both sides, retaining screw made of brass M28 x 1.5 ■ With integrated pressure ring, metal-seated, for radial installation ■ Temperature range -40 °C to +250 °C ■ Max. operating pressure 10 bar
Type: Smooth Pipe Ends	**Technical details**
	■ Inner diameter: 18 mm, overall length: 75 mm* ■ On both sides, smooth pipe ends with support sleeve made of brass ■ For threaded clamping ring fitting Ø 18 (EN1254-2) ■ Temperature range -40 °C to +250 °C ■ Max. operating pressure 10 bar
Type: Clamping Ring	**Technical details**
	■ Inner diameter: 18 mm, overall length: 66 mm* ■ On both sides, integrated threaded clamping ring fitting for copper pipe Ø18 ■ Metal-seated ■ Temperature range -40 °C to +250 °C ■ Max. operating pressure 10 bar
Type: "Plug and Play"	**Technical details**
	■ Inner diameter: 15 mm, overall length: 86 mm* ■ On both sides, connection technology with O-rings made of EPDM ■ Temperature range -40 °C to +190 °C ■ Max. operating pressure 10 bar
Type: Omega Bow	**Technical details**
	■ Inner diameter: 16 mm, overall length: according to customer requirements ■ On both sides, integrated threaded clamping ring fitting for copper pipe Ø18 / Ø22 ■ Omega bow for absorbing very large deflections ■ Temperature range -40 °C to +250 °C ■ Max. operating pressure 10 bar

**Other lengths are available on request*

SOLAR PIPING

HYDRAQUICK®, the straightforward, modular quick connection

Product example



High connection quality

HYDRAQUICK is the simple connection system for fast installation by customer. It interconnects rigid pipework connections to flexible connecting hoses by means of threaded connexions or hoses. This robust technology produces metallic connections that are stronger than metallic laminate seals, plastic or elastomer solutions. Even reliably tight connections of stainless-steel hoses on copper piping are possible without any problem at all.

HYDRAQUICK: Simple, fast and economical

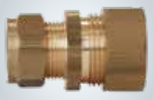
- Quick and easy to install
- In just three steps
- Only standard tools are used
- Without waste since no overtightening of the screws is possible

Characteristics

- Temperature range: -20 °C to + 200 °C system temperature
- Metal-seated and durable

Advantages

- Installation without special tools
- Easy to detach and reusable
- Considerable time and cost savings

Version	Threaded part with external thread		Threaded part with internal thread		Hose to hose connection		Clamping ring connection for copper pipe		Brass pipe connecting pieces for clamping ring connection		T-piece with clamping ring screw connection	
												
DN	16	20	16	20	16	20	16	20	16	20	16	20
Connection	Thread sizes		Connection		Connection		Clamping ring		Pipe socket		Connection	
	G ½", G ¾", G 1"	G ¾", G 1	Rp ½", G ½", G ¾", G 1"	Rp ¾", G ¾", G 1"	to DN 16, DN 20	to DN 20	18, 22 mm	22 mm	15, 18, 22 mm	18, 22 mm	DN 16 x DN 16	DN 20 x DN 20

SOLAR PIPING

The flexible roof exit

Roof exit

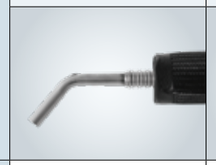
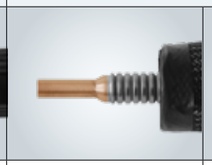
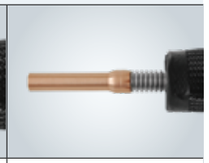
Stainless steel corrugated pipe 1.4404 / AISI 316L

- Type RS 341 / RS 351
- Medium design, wide corrugations and extra-wide corrugations
- Temperature range 270 °C to max. 600 °C.
- Type testing: tested acc. to DIN EN ISO 10380
- Test pressure: 10 bar

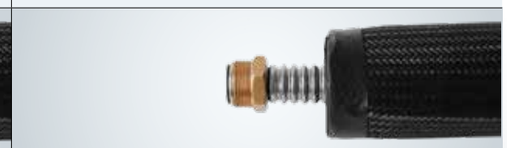
Technical features

- EPDM insulation over the entire length, optional pick protection
- 100 % tested pipelines
- Immediate installation
- Available from stock in several cases

Roof exit

Design	with stainless steel pipe bend	with stainless steel sensor sleeve	with square threaded connexion	with copper supports	
					
DN	16 NL 1300	16 NL 1300	12 NL 840	12 NL 840	16 NL 1300
Technical details	■ On the one side, straight pipe sockets made of stainless steel ■ On the other, 50° pipe bends made of stainless steel ■ Each with mounted clamping ring fitting 15	■ On the one side, straight pipe sockets made of stainless steel ■ On the other, 50° pipe bends with sensor sleeve made of stainless steel ■ Each with mounted clamping ring fitting 15	■ On the one side, soldered elbow joint made of brass for copper pipe 12 ■ On the other, soldered Cu element 12x1	■ Soldered Cu elements 12x1 on both sides	■ Crimped Cu elements on both sides 18x1x100 with integrated O-ring

Universal piping

Design	with stainless steel connecting piece	with compression ring screw connexion
		
DN	16 NL 1000	16 NL 1500 mm
Technical details	■ Straight pipe sockets made of stainless steel on both sides 15x1 mm welded ■ Each with mounted clamping ring fitting 15	■ Brass compression ring connection with M26x1.5 male thread

EQUIPMENT PIPEWORK

Overview of HYDRA® hose assemblies – connection technology

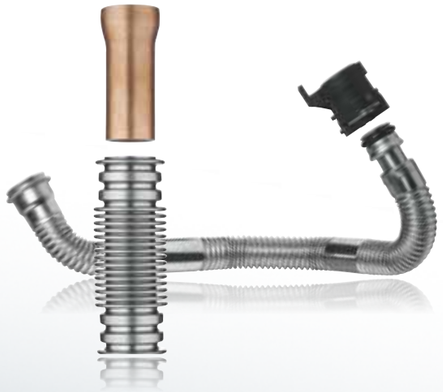
Product requirements that go beyond the standard series can be covered with the aid of the customisable hoses.
General technical data are provided in the following table.

Hose type Standard	DN	Inside diameter	Min. bending radius	Max. pressure (20 °C) SF3	Connection technology				
					Soldering	Welding	Threaded connexion	Connection technology	HydraQuick
	mm	mm							
RS 331 normal corrugation	12	12.2	R 20	12	✔	✔	✔ (G 1/2")		
	16	16.2	R 28	8	✔	✔	✔ (G 3/4")		
	20	20.2	R 32	5	✔	✔	✔ (G 1")		
	25	25.5	R 40	4	✔	✔	✔ (G 1 1/8")		

Hose type Standard	DN	Inside diameter	Min. bending-radius	Max. pressure (20 °C) SF3	Connection technology				
					Soldering	Welding	Threaded connexion	Connection technology	HydraQuick
	mm	mm							
RS 341 wide corrugation	12	12.5	R 20	18	✔	✔	✔ (G 1/2")	on request	
	16	16.3	R 25	13	✔	✔	✔ (G 3/4")	on request	
	20	20.7	R 30	20	✔	✔	✔ (G 1")	on request	
	25	25.8	R 35	16	✔	✔	✔ (G 1 1/8")	✔	

Hose type Standard	DN	Inside diameter	Min. bending radius	Max. pressure (20 °C) SF3	Connection technology				
					Soldering	Welding	Threaded connexion	Connection technology	HydraQuick
	mm	mm							
RS 351 extra wide corrugation	12	12.6	R 20	18	✔	✔	✔ (G 1/2")	on request	
	16	16.5	R 25	17	✔	✔	✔ (G 3/4")	✔	
	20	20.5	R 30	9	✔	✔	✔ (G 1")	✔	
	25	25.7	R 35	5	✔	✔	✔ (G 1 1/8")	on request	

Hose type Standard	DN	Inside diameter	Min. bending radius	Max. pressure (20 °C) SF3	Connection technology				
					Soldering	Welding	Threaded connexion	Connection technology	HydraQuick
	mm	mm							
IX 331	16	16.5	R 40	18	✔		✔ (G 3/4")		✔
	20	20.6	R 50	18	✔		✔ (G 1")		✔
	25	25.6	R 60	16	✔		✔ (G 1 1/8")		✔



EQUIPMENT PIPEWORK

Boilers

Application

Connection pipelines in flexible and semi-flexible designs that enable fast and straightforward pipework for heating, hot water and boiler equipment are a versatile alternative to copper piping. The standard series available ex-stock in two different designs covers all conventional applications.

For Pipework On
- Loading pumps
- Fired boilers
- Gas heaters / boilers
- Pressure expansion vessels
- Stratified tanks
- Roof exits and solar double containment pipes

Characteristics
- Nominal diameter with minimum pressure loss
- Aging resistant and resistant to diffusion
- Pre-bent ex works according to customer requirements
- Also available optionally without sheathing from PE or EPDM
- O-ring seal – design of the ends according to customer requirements

Advantages
- For a wide range of applications
- Uncomplicated to detach and reusable
- No pressure drop due to cross-sectional constriction
- Integrated, metal-seated sealing concept

Type HX

Type HX

Easily bendable annularly corrugated hose. Ideal for narrow and multiple bending radii. Ensures simple and problem-free assembly.

Designs

Type	Nominal length from rim to rim	DN	Connections Union nut retaining screw
HX 511	300, 500, 750, 1,000	12	½" HX DN 12
		16	¾" HX DN 16
HX 811 insulated with EPDM		20	1" HX DN 20

Type IX

Type IX

Semi-flexible pipeline. The patented corrugation shape ensures high flexural stiffness so that the hose remains in the bent position.

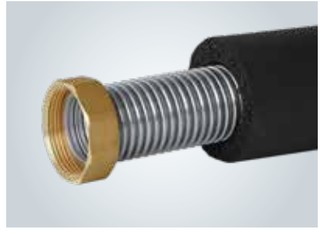
Designs

Type	Nominal length from rim to rim	DN	Connections Union nut retaining screw
IX 331 L0	300, 500, 750, 1,000	12	½" IX DN 12
		15	¾" IX DN 15
IX 331 L1 insulated with EPDM		16	¾" IX DN16
		20	1" IX DN 20

EQUIPMENT PIPEWORK

For heat pumps and stratified tanks

Product example



Electro-compression heat pumps are mostly used for heating buildings. Vaporised liquid is compressed with an electric motor so that it continues to heat up. The heated gas transfers its heat to the hot water via heat exchangers. The heat pump normally requires electrical energy to compress the vaporised liquid.

The flexible annularly corrugated HYDRA hoses allow easy and fast connection of heat pumps to heating water connection pipes. The range covers air/heat pumps installed outdoors, brine/compact heat pumps as well as brine and water heat pumps. The hoses are also used as a connection between two or more buffer cylinders.

Designs

- HYDRA ring corrugated conduits made of stainless steel (1.444) type RS 341LO1, mid range model, wide-corrugated
- Provided with brass union nuts G 1½" and an EPDM insulation over the entire length
- DN 32 obtainable in different lengths – Standard 500 mm and 1000 mm

Technical features

- Cold and heat insulated pipeline
- Test pressure: 6 bar
- Optimised corrugation geometry
- Suitable for high flow rates
- Pipeline can be shorted easily without any special tool – can therefore be used universally

EQUIPMENT PIPEWORK

For gas pipework in CHPUs

Product example

Combined heating and power units work according to the principle of combined heat and power. An engine drives the generator, which produces electrical energy. The heat contained in the cooling water and in the exhaust gases of the engine is used for heating. Combustion engines driven by diesel, petrol or gas serve as drive units. Owing to the additional use of the thermal energy, the CHPUs achieve a utilisation level of 80 – 90% of the primary energy used.

The gas connection pipeline according to DIN 3384 ensures the gas supply of the combustion engine in mini combined heating and power units. At the same time, it compensates for constant vibrations with almost constant, small amplitudes in normal operation as well as the intensive, self-motion with high amplitude produced on all sides when starting and stopping the combustion engine.

Designs

The HYDRA hose is designed for two basic types of application:

- Internal installation in the device for connecting a fixed supply line to the drive unit (installation by production staff)
- Freely running gas connection hose for connecting a wall gas connection to the device connection (installation by heating/sanitary specialist staff)
- Heat shrink tubing over the entire length
- Prevents the transmission of vibrations
- Sound absorbent

Technical features

- Available in nominal diameters from DN 6 to DN 80
- Normally in the nominal diameters DN 12 to DN 20 in the gas area
- High corrosion resistance with great ageing resistance.
- Resistant to constant vibrations and gas-tight
- With DIN DVGW approval
- Can be fitted free of stress or torsion even in confined installation conditions
- No special tool required

Advantages

- Resistant to constant vibrations
- Precisely according to specifications
- Pre-assembly capability