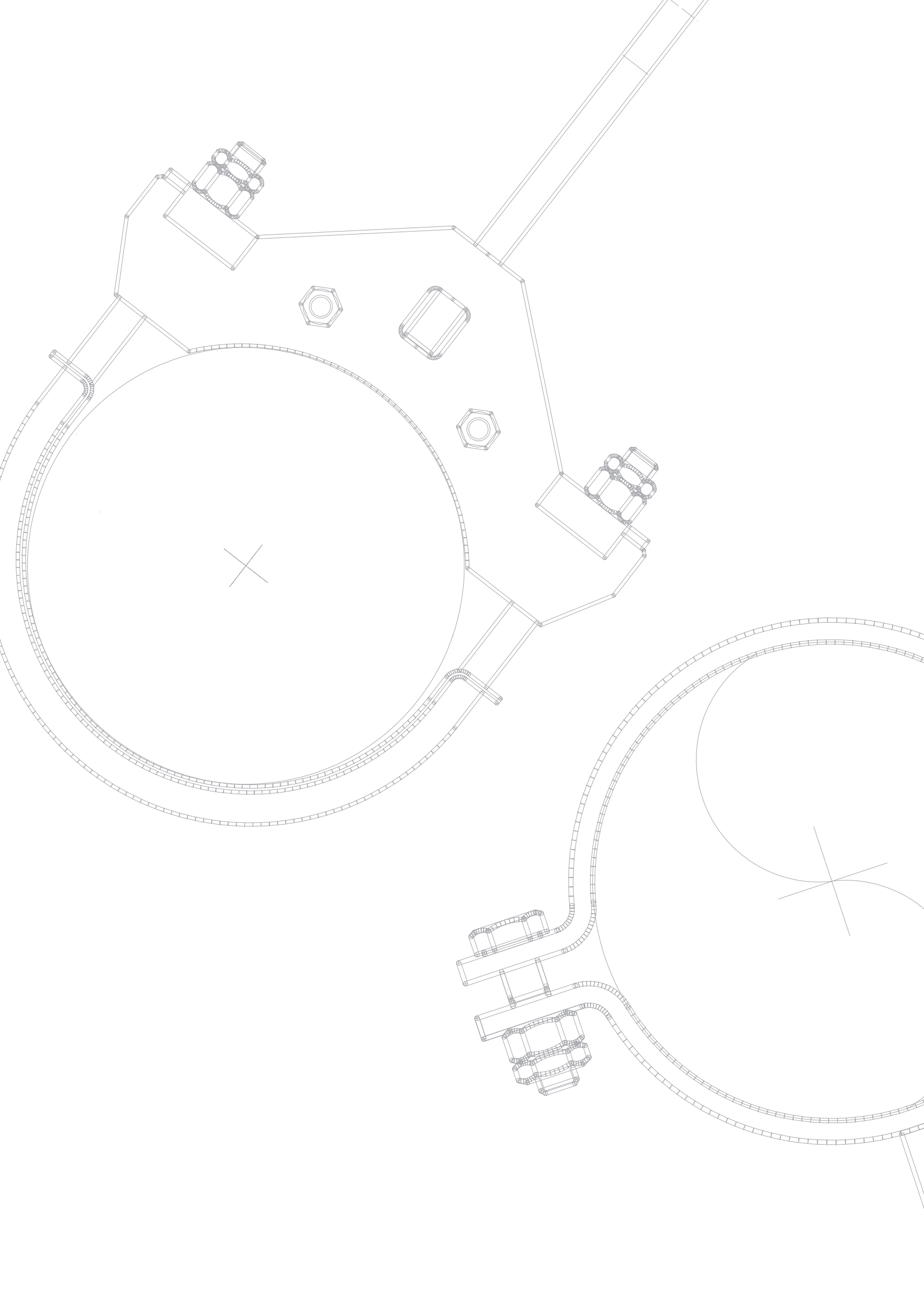
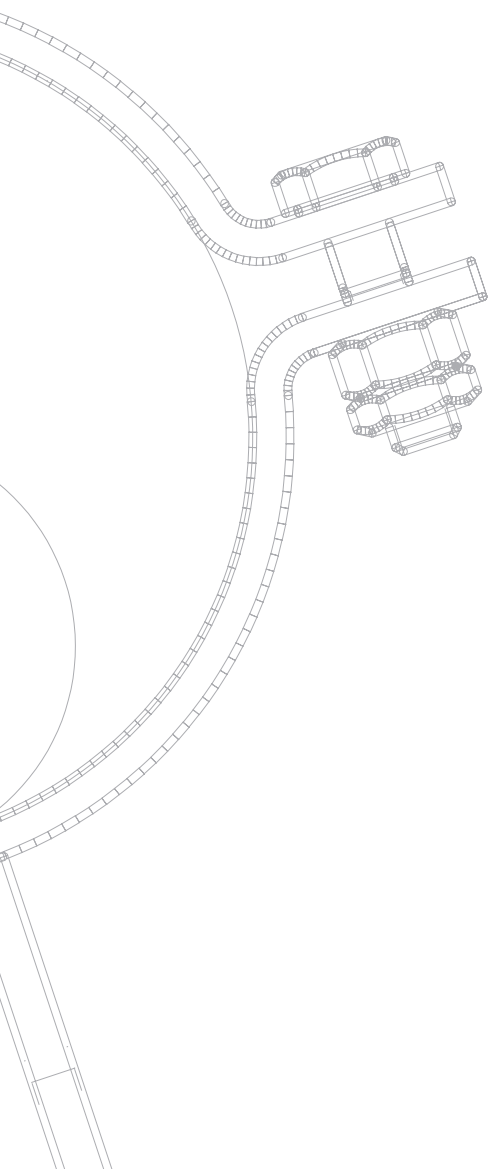


PRODUCTION OF PIPE SUPPORTS AND HANGERS





CONTENTS

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Manufacturing of pipe supports and hangers	4
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ABOUT US



The company Moravia Systems a.s. is a member of the strong investment group KKCG.

Our path on the Czech market started in 1992 when Karel Komárek founded our company as a wholesale of industrial valves for distribution systems of gas or water.

Now we supply valves and accessories, pipes, flanges, fittings and pipe parts to our customers in various industrial domains, e.g. power, petrochemical or chemical industries.

Based on our own development and according to our own drawing documentation we have started to manufacture and supply components of pipe supports, especially supports and hangers, complete sets of pipe hangers or special support designs for pre-insulated or for cryogenic pipes.

ASSORTMENT OF COMPONENTS, WHICH YOU CAN FIND IN OUR CATALOGUE OF PIPE SUPPORTS AND HANGERS:

1. Supports
2. Guides
3. Pipe attachments – clamps and U-bolts
4. Hanger rods – threaded connecting elements
5. Structural attachment elements
6. Support plates, trapezes
7. Rigid struts
8. Supports for non-metal pipelines



SCOPE OF ENGINEERING SERVICES AND CONSULTING AVAILABLE

We benefit from our in-house team staffed with professional piping engineers based in Brno, gathering experienced masters with highly positive references in the field of designing and engineering.

They focus on further development of the product range encompassing pipe fittings, analyses of pipe projects, engineering of pipelines, designs of pressure vessels and containers, drafts and drawings of pipe fitting applications.

1 STRUCTURAL AND RESILIENCE ANALYSES OF PIPING SYSTEMS

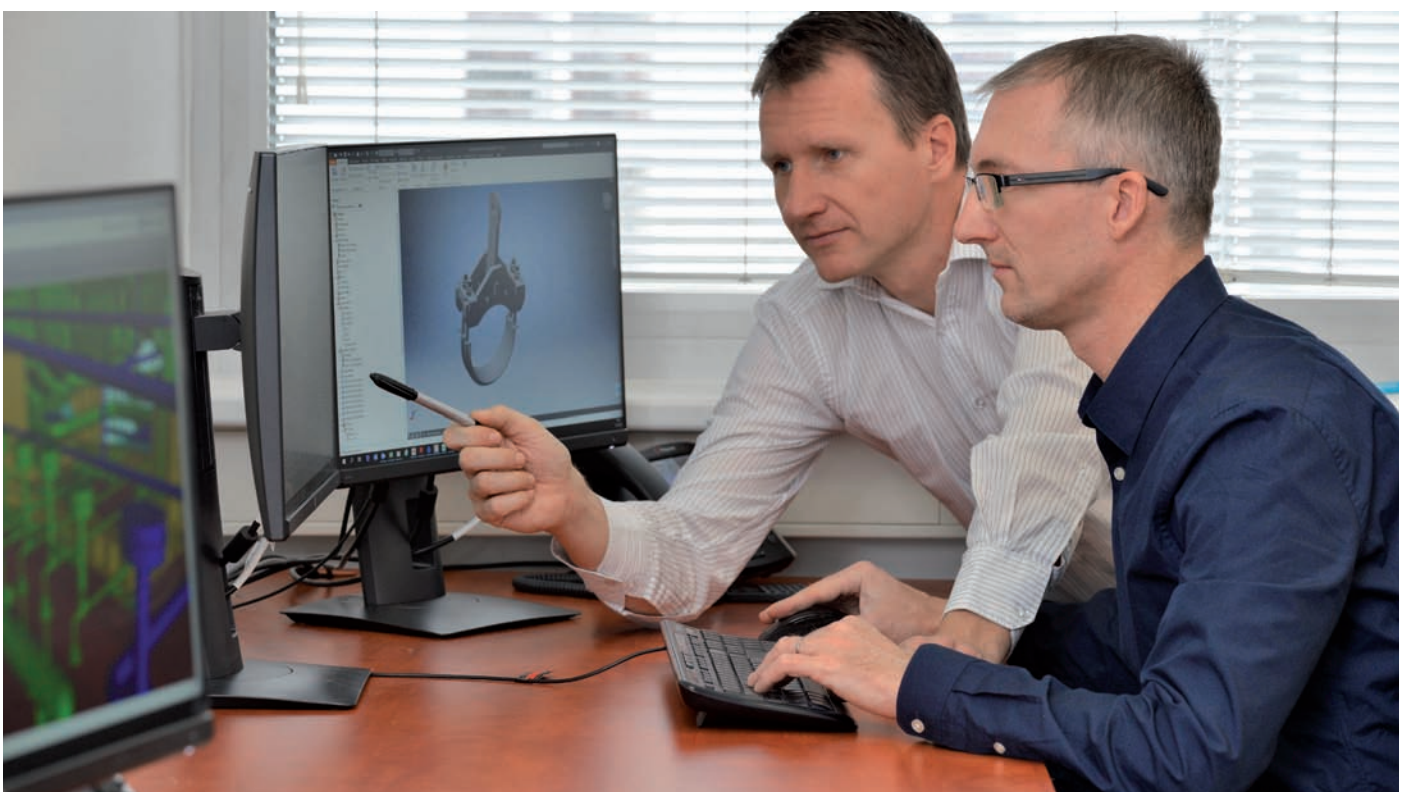
- duct optimisation with respect to thermal expansions and loads on connected equipment (turbines, pumps, compressors, pressure vessels necks etc.)
- static and dynamic analyses, oscillation and vibration analyses, two-phase flow piping
- analyses for both metal and non-metal piping (GRP, HDPE, PP)

2 PROCESSING OF PIPE PRODUCTION DOCUMENTS

- processing of isometric drawings for piping
- material specifications, specifications of supports and hangers

3 PROCESSING OF DESIGNS AND DRAWING DOCUMENTS FOR PIPING SUPPORT AND HANGERS ASSEMBLIES

- efficient processing of documentation using DWG from component libraries
- analyses for auxiliary structures in compliance with EN 1993



MANUFACTURING OF PIPE SUPPORTS AND HANGERS

The supports and hangers range by Moravia Systems has been designed pursuant **twenty-years of experience with pipe engineering**, complemented with thorough knowledge of process reliability issues.

The products are based on the well-known and proven structures, subject to later re-engineering and optimisation as a whole with diligent attention to details.

Our products are made from materials compliant with EN and ASTM – carbon-, alloy- and corrosion-resistant steel. Surface finishing methods employed at our facilities include coating and galvanizing in order to meet the corrosive environment specifications up to the level C5 identified by EN ISO 12944.



MODERN MACHINERY

The manufacturing plant of Moravia Systems situated in Vra-cov is equipped with facilities for forming, splitting, welding and assembly of various materials.

The production and storage premises amount to approx. 4,500 m². The production process has integrated the quality control systems compliant with EN ISO3834-2, EN 1090-2, MSS-SP 58.

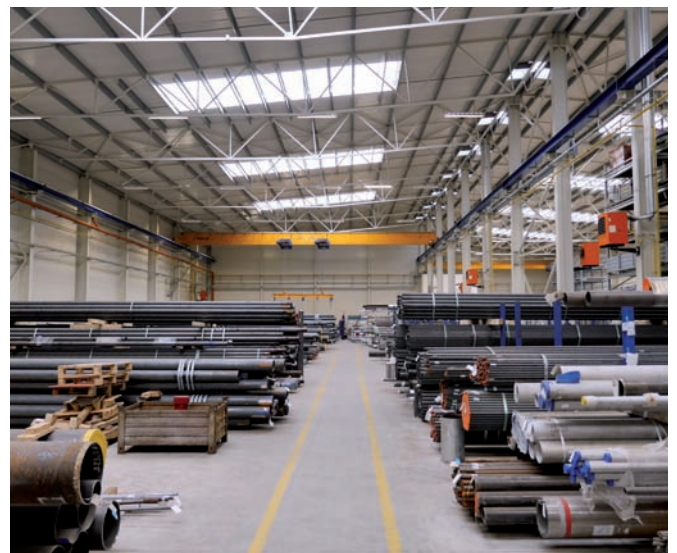
The company Moravia Systems holds certifications required for steel structure welding, as specified by EN ISO 3834-2.



PROFESSIONAL PACKAGING, LABELLING AND OWN STOCK

Packaging of pipe supports for transport purposes meets the necessary specifications, including any overseas shipping standards that involve crates provided with corrosion protection and coating corruption due to jolts in transport. Labels reflect the wishes of our customers.

Every item within any shipment is fitted with a nameplate containing the relevant codes to facilitate assembly.



SUMMARY OF PRODUCTS MADE BY MORAVIA SYSTEMS

1. SPRING TYPE PIPE HANGERS

Fully assembled sets delivered with springs of variable or constant force manufactured by Lisega. Hanger rods, clamps, U-bolts and supports supplied from our own product range.

2. FIXED HANGERS

Fully assembled sets delivered from our own product range.

3. SUPPORTS AND GUIDES

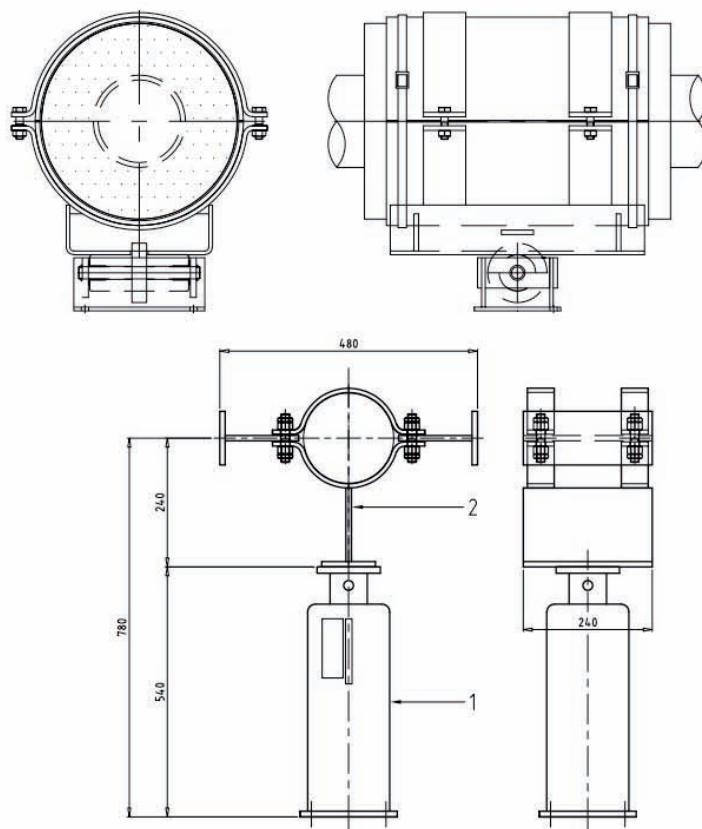
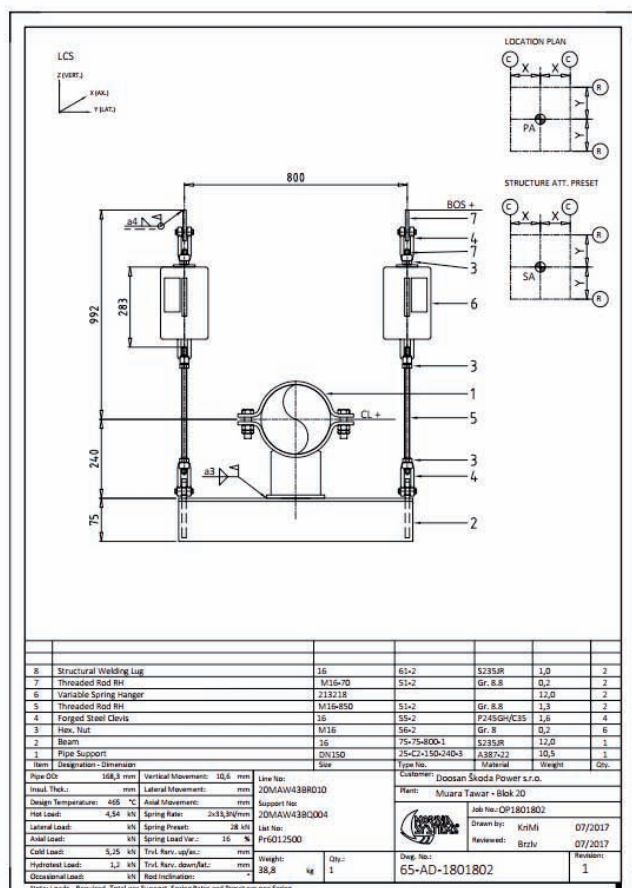
Large variety of standard structures available from our own product range.

4. STRUCTURAL ATTACHMENT ELEMENTS

Large variety of standard elements available from our own product range.

5. SUPPORTS FOR PLASTIC, PRE-INSULATED AND CRYOGENIC PIPES

Sets with sliding or roller supports.



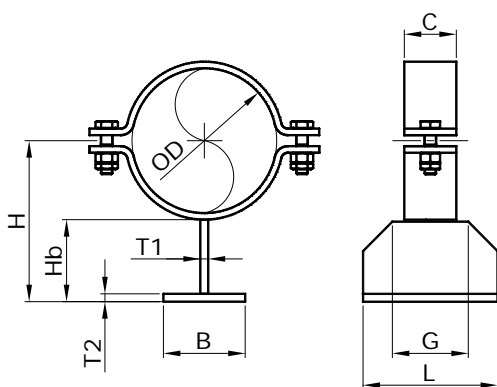
SUPPORTS

- Sliding support
- Sliding support with a guide
- Spring support
- Clamped support (single/double clamp designs)
- Weld-neck support
- Anchor



21-3

Short support of standard or optional length. Support length optional within the interval from $0.5 \times H$ to $1 \times H$.



LABELLING

21-3 MS-DNK-H-KP

Labelling example: 21-34-073-170

- DNK – pipe external diameter specification
- H – required support height
- MS – material category specification
- KP – sliding surface specification

ASSEMBLY

Support assembly involves screwing the sleeves down and tightening of their bolts by 180° once touching down on sleeve surface.

DIMENSIONS AND SPECIFICATIONS

OD	DNK	H	B	C	L	Hb	T1	T2	G	Fp	m
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kN	kg
21,3	015	100	40	30	100	82	6	6	80	1,1	0,88
26,9	020	100	40	30	100	79	6	6	80	1,1	0,89
31,8	025	100	40	30	100	77	6	6	80	1,2	0,90
33,7	025	100	40	30	100	76	6	6	80	1,2	0,90
38	038	120	40	30	100	94	6	6	80	1,0	1,05
42,4	032	120	40	30	100	91	6	6	80	1,0	1,05
48,3	040	120	40	30	100	88	6	6	80	1,0	1,05
57	057	155	50	40	150	117	8	8	100	1,9	2,2
60,3	050	155	50	40	150	115	8	8	100	1,9	2,2
73	073	165	50	40	150	119	8	8	100	1,8	2,3
76,1	065	165	50	40	150	117	8	8	100	1,8	2,4
88,9	080	170	50	40	150	116	8	8	100	1,8	2,4
108	108	200	60	50	200	135	10	10	130	2,5	4,2
114,3	100	200	60	50	200	131	10	10	130	2,5	4,2
127	127	220	80	50	200	145	10	10	130	2,4	4,7
133	133	220	80	50	200	142	10	10	130	2,4	4,7
139,7	125	220	80	50	200	139	10	10	130	2,4	4,8
141,3	141	220	80	50	200	138	10	10	130	2,4	4,8
159	159	240	80	50	200	149	10	10	130	2,3	5,1
168,3	150	240	80	50	200	144	10	10	130	2,3	5,1

MATERIAL CATEGORIES

MS No.	1	2	3	4	5	6	7
Tmax (°C)	350	500	580	400	500	620	350
Material	S235JR	16Mo3	10CrMo910	1.4301	1.4571	1.4948	P275NH

WORKING LOADS

The resultant external force loads must comply with the total load condition specified as $1.5 \times F_x / F_p + 3.0 \times F_y / F_p + F_z / F_p \leq 1$, where F_x refers to pipe axial force and F_y refers to the horizontal force perpendicular to the pipe axial force. Elements F_x and F_y do not include friction forces generated by the effect of F_z . Checks of load capacity at higher temperatures and other materials are performed using the formulas below: $F_{p,t,M}^G = k_{t,M} \times F_{p,r}$ with the correction factor defined using the chart 1.1.

PRODUCT STYLES

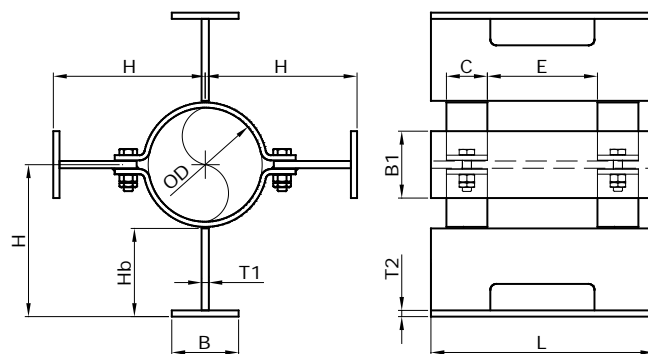
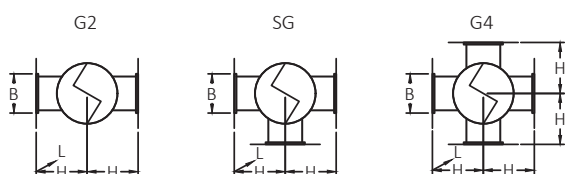
Sliding surfaces (KP):

- S – steel
- T – PTFE pipe with the diameter $D_t = B - 5 \text{ mm}$ (see 2.10.)

GUIDES

Large variety of standard structures from our own product range

- Two/three- and four-pad ducts
- Guides with skid plates
- Clamped or weld-neck design



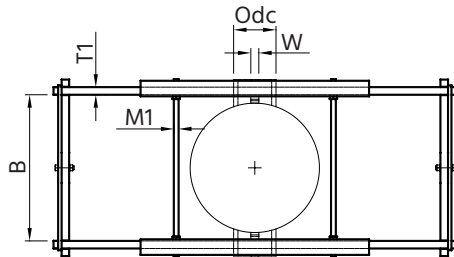
MATERIAL CATEGORIES

MS No.	1	2	4	5	7
Tmax (°C)	350	500	400	500	350
Material	S235JR	16Mo3	1.4301	1.4571	P275NH

PIPING ATTACHMENTS – CLAMPS, LUGS AND U-BOLTS

Large variety of standard structures available from our own product range.

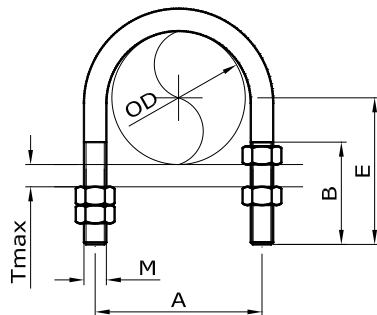
Riser clamp for vertical pipe hangers



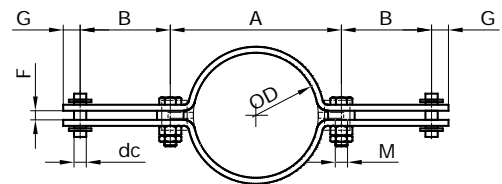
Two-hole clamps



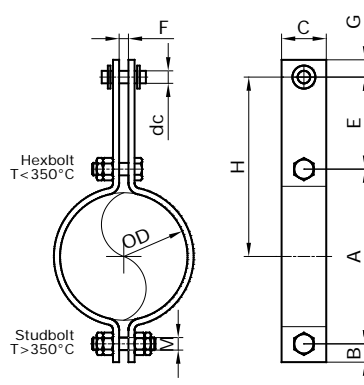
Ring U-bolts



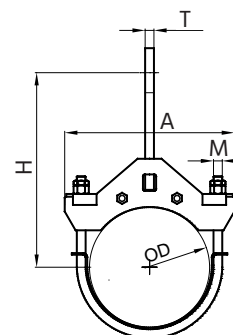
Clamps for vertical pipe hangers



Clamps for horizontal pipe hangers

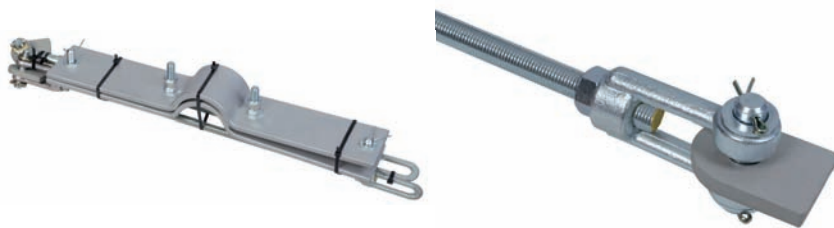
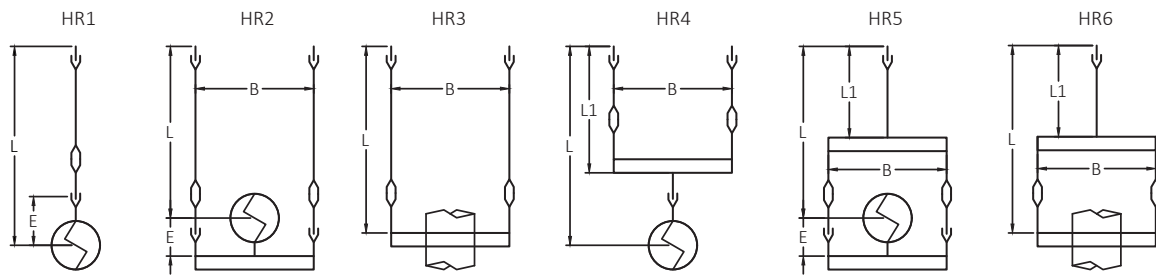


Pipe clamps with U-bolts for fixing of horizontal pipes



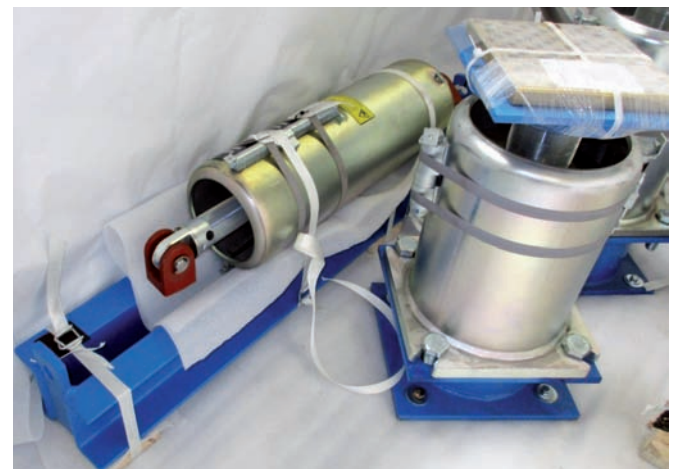
FIXED HANGERS

Fixed hanger categories

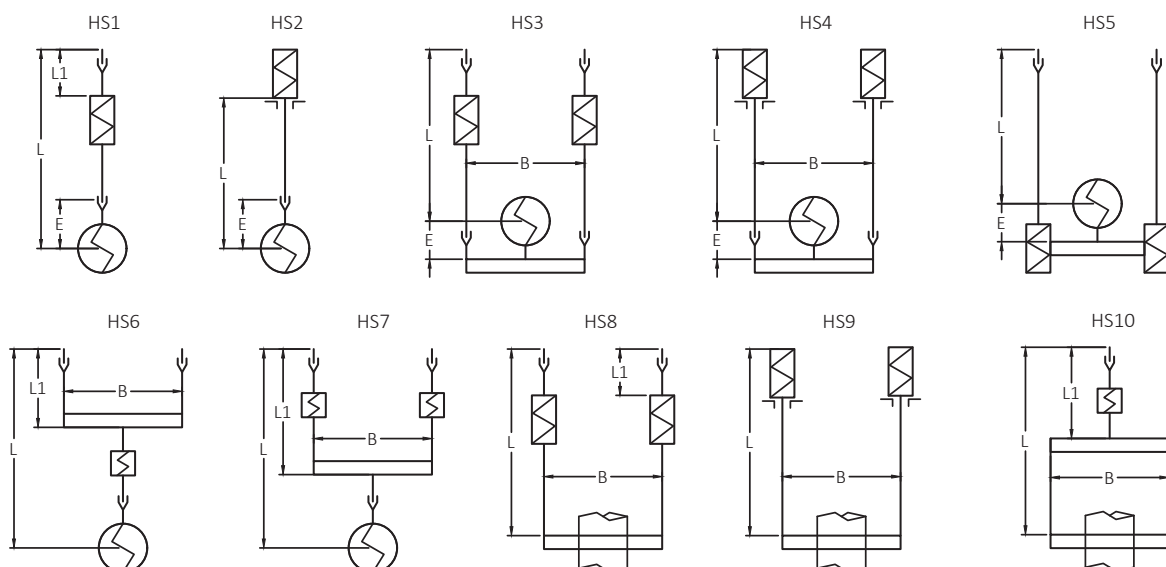


SPRING TYPE HANGERS AND SUPPORTS

Spring type hangers and supports are delivered fitted with variable or constant strength springs supplied by the German manufacturer Lisega. Hanger rods, U-bolts, cclamps and supports delivered originate from our own product range.

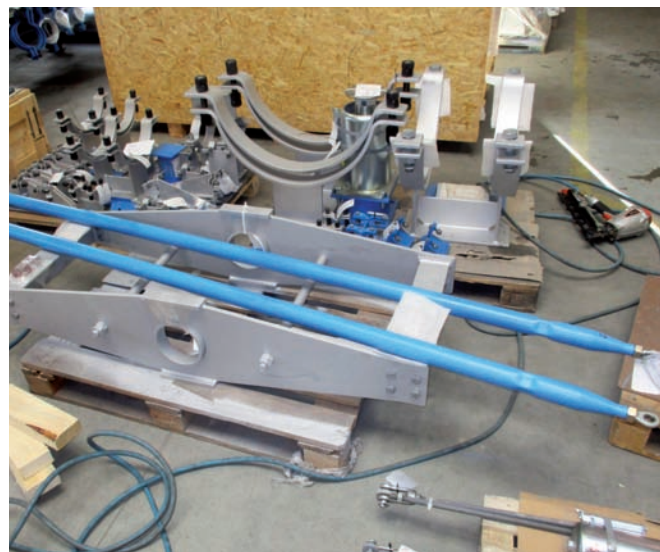
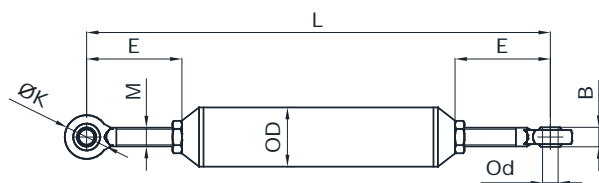


Types of spring hangers manufactured by Moravia Systems:



RIGID STRUTS

Mount sets with joint struts are designed for reduction of pipe displacement by interception of tension/compression forces along the strut axis.



Overview of rigid strut components:

Description	Type	Use
Rigid strut of fixed length	81	Rigid strut with ball bushing joint for transfer of tension (compression loads, no gap allowed)
Rigid strut with gap	82	Rigid strut with ball bushing joint for transfer of tension (compression loads, with a gap)
Pipe clamp for cyclic load	83	Pipe clamp for DN ≤ 80 for connection to strut
Dynamic pipe clamp	84	Pipe clamp for connection to strut, used for restraining forces perpendicular to the direction of pipe axis
Pipe clamp for double strut assembly	85	Pipe clamp for connection of two struts, used for restraining forces in the direction of pipe axis
Clevis with pin for cyclic or dynamic	86	Weld-on clevis with pin for connection of rigid strut to steel structure

SUPPORTS FOR NON-METAL PIPING

Supports are of lightweight design to reduce the assembly weight and load on steel frames due to dead weight. These are made using thin-walled section steel.

Clamp for hangers of horizontal insulated PE/PP pipes.

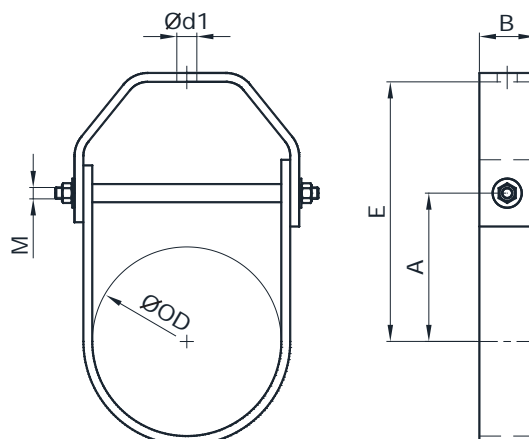
P23

Clamp for hangers of horizontal insulated PE/PP pipes or insulated PE/PP pipes with saddle type P13. Connection to threaded rod. The clamp is lined with rubber pasted inside each semi-circle from the factory.

LABELLING

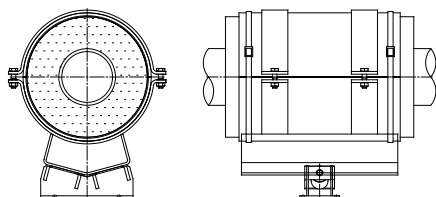
P23-OD-M

- OD – external diameter of pipe or saddle
- M – material category specification

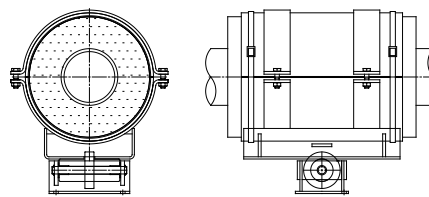


ASSEMBLY TYPES

Guided support with V-roller

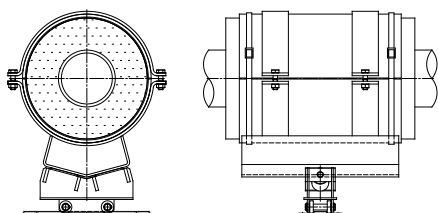


Guided support on a roller

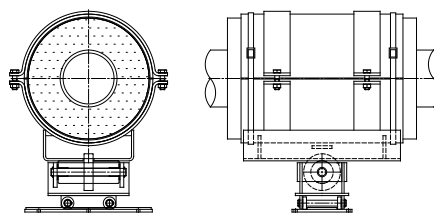


Guided pipe shoe assembly. If rollers with a tongue are used, a gap of ± 2 mm to ± 10 mm can be specified.

With two-way V-roller

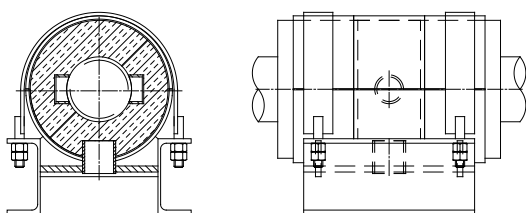


With two-way stopped roller



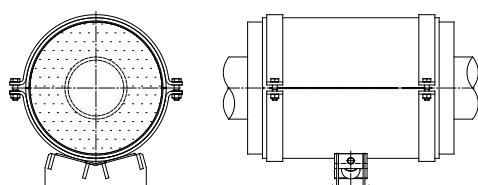
Roller support assembly for slides in both direction at a horizontal plane.

Anchor

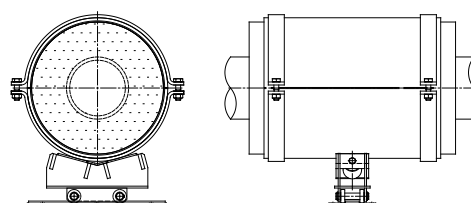


Assembly for fixed pipe support

Guide with V-roller



Support with V-roller



Roller guide for saddles

Roller support allowing movement in both horizontal directions

PRODUCTION AND SUPPLY OF CUSTOMISED PIPE EQUIPMENT

Our in-house team of design and process engineers deals with projecting and facilitates production of special engineering equipment or pipe components for any equipment complex.

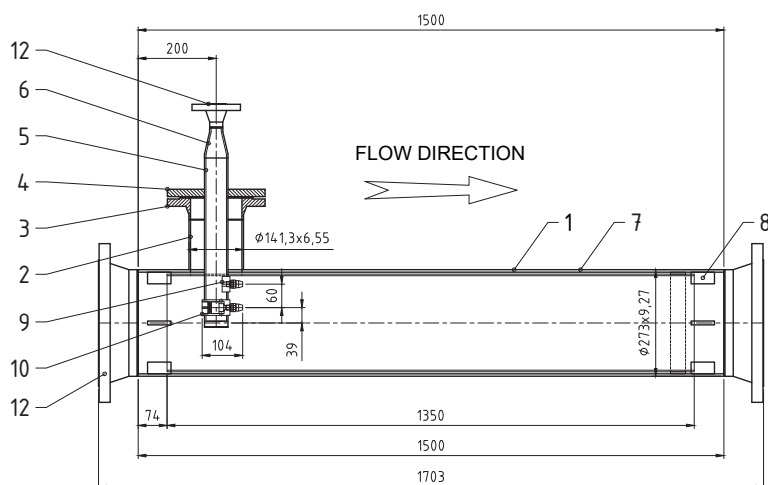
SPECIAL DISK GATE VALVE AMOS

A brand of new fitting, developed and manufactured by MORAVIA SYSTEMS a.s. for facilities operated by ČEZ

Amos disk gate valve, developed as a special component to ensure safe and confirmative measurement of biofouling within industrial water systems at any power facilities using water from natural resources as rivers, lakes, etc., i.e. water containing any live organisms.

STEAM COOLERS

Our own engineering of the cooler and development of nozzle heads.



STEAM MESH SCREENS

Designed per requirements for size, operating temperature and screen working pressure.



Prefabrication of piping and steel frames



Factory installation and assembly of piping systems



REFERENCES

1

Testimonial:

Investor:

Location:

Refurbishment of steam line into hot water pipe

Veolia Energie ČR, a.s.

Přerov, Czech Republic

Project details:

The job involved manufacturing of sliding pipe support and anchors for DN500 pre-insulated hot water pipe. Components manufactured per our own drawings and design. Galvanized surface finish. Engineering solutions for struts made by Moravia Systems applied on pre-insulated piping addresses an entire range of engineering issues developing due to wrong designs or inappropriate applications supplied by competitors - see uneven distribution of forces shown in the picture below.

Our new achievement brought the following improvements:

- Enhancement of even load onto the casing, especially for pipes with spiral-weld PE stripes
- Increased friction coefficient between the pipe casing and the saddle
- Casing protection against saddle chafing (mainly its edges)



Point contact between the casing and clamp

8 mm gap

Engineering solution by Moravia Systems:





Testimonial:

Investor:

Location:

Spring hangers for boiler K6 U.S. Steel Košice

U.S. Steel Košice

Košice, Slovakia

Project details:

Production and delivery of hangers for steam boiler K6 and suspension of boiler diaphragm walls for U.S. Steel Košice. The boiler operating temperature reaches up to 540 °C, the pressure reaches up to 10 MPa.





Testimonial:

Investor:

Location:

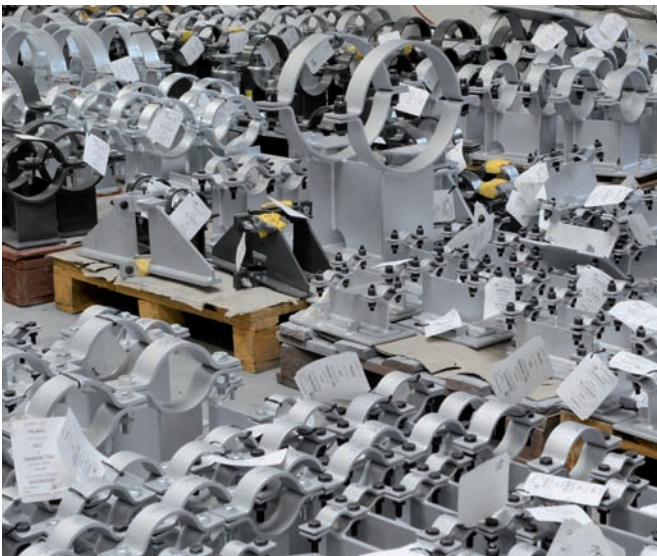
Delivery of hangers and supports for power plant turbine piping

Asnæs Power Station

Kalundborg, Denmark

Project details:

Delivery of pipe mounts and hangers for Danish cogeneration power plant Asnaes in Kalundborg. The delivery includes hangers and ducts for 540° C steam line, oil pipe and cooling water and condensate lines to the turbine generating 25 MW.





Testimonial:

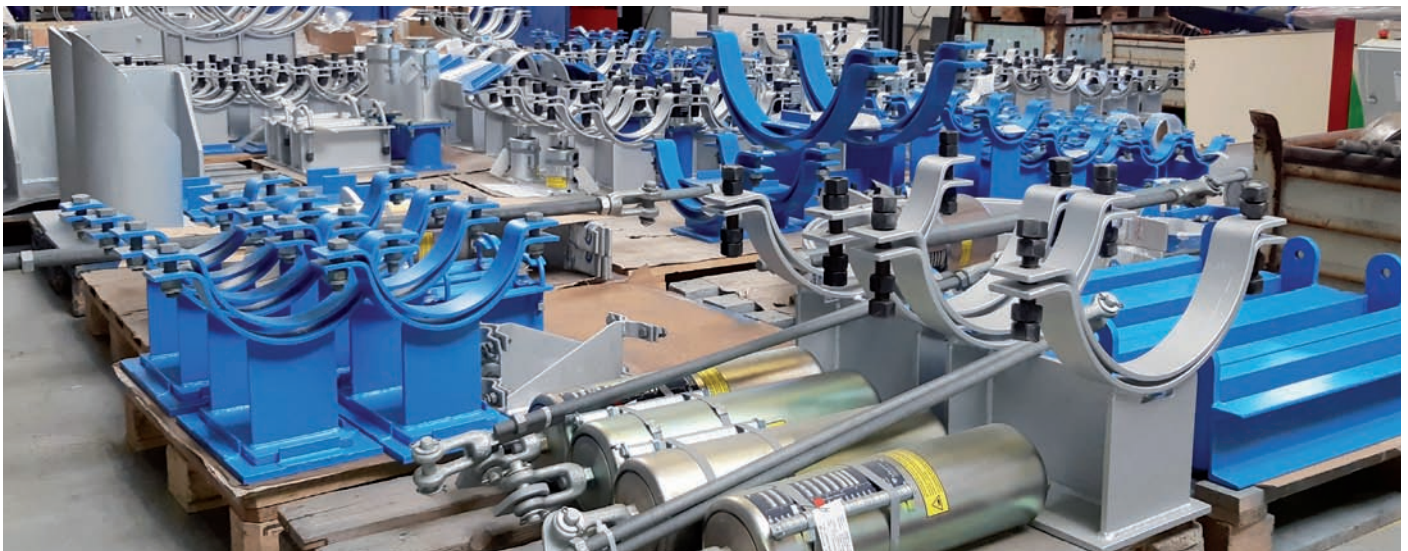
Investor:

Location:

Delivery of pipe supports and hangers at Muara Tawar
Muara Tawar Power Plant
Bekasi, Indonesia

Project details:

Production and delivery of supports and hangers for turbine room of the Muara Tawar power plant in Indonesia.





Testimonial:

Investor:

Location:

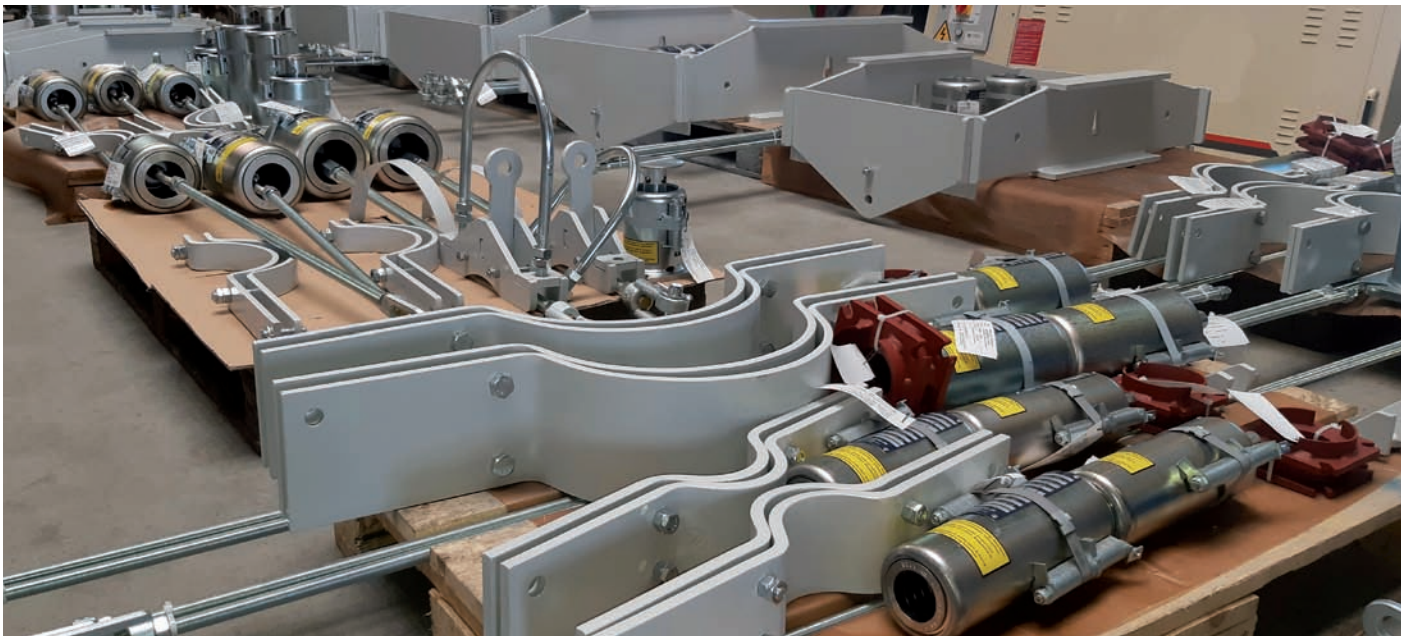
Pipe supports and hangers

South Refineries Company, Republic of Iraq, Basrah

Basrah, Iraq

Project details:

Production and delivery and spring hangers and supports for isomerization unit lines at an Iraqi oil refinery in Basrah, using our own production documents.



**Testimonial:****Investor:****Location:**

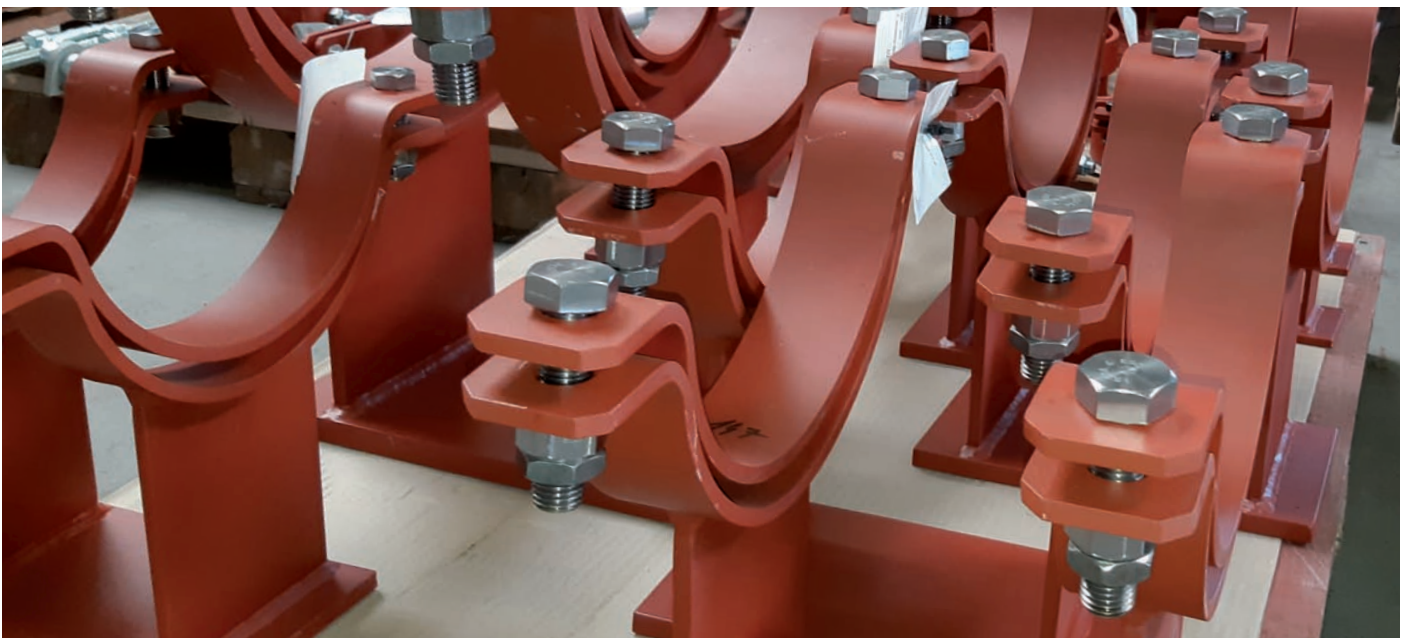
Production and delivery of pipe supports for turbine room

Etihad Food Industries Co. Ltd.

Iraq

Project details:

Production and delivery of pipe mounts for turbine room at the manufacturing company Etihad Food Industries Co. Ltd. In Iraq was split into two stages. The total deliverables included almost a tonne of supports and pipe hangers. In spite of the initial issues with design conceptions of certain steam junctions, our brilliant team of engineering experts and professional attitude of our customer still helped to proceed with immediate production launch and dispatch of the first stage batch within 3 weeks only.



**Testimonial:****Investor:****Location:**

Production and supply of pipe supports and hangers

Mondi SCP

Mondi SCP, Ružomberok/ Slovakia

Project details:

60 ton of pipe supports and hangers for the largest investment project in the history of Mondi SCP, Ružomberok. The investment project ECO Plus includes the construction of a new paper machine PS19. Moravia Systems produced pipeline supports in the dimensions from DN 15 to DN 900 for the most operational technological units of the new paper machine.





Testimonial:

Customer:

Location:

Production and delivery of steam mesh screen

Doosan Skoda Power

Lansing Power Plant, Michigan/ USA

Project details:

Steam mesh screen manufactured on the basis of our design and technical documentation.



NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



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