

HG

CHEMICAL INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HG/T 21629-2021

Replacing HG/T 21629-1999

Standard drawings of pipe racks

管架标准图

(English Translation)

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Table of Contents

Foreword i

1 General provisions

2 Materials

3 Design

4 Manufacture and installation

5 Piping support numbering

6 Index of piping support standard drawings

7 Piping support standard drawings

Annex A Adjustment method of piping support for outside diameter of series II pipes

Annex B Example of piping support marking

Annex C Piping support standard drawings

Explanation of wording in this standard

List of quoted standards

1.0.1

This standard is developed in order to improve the level of piping design and facilitate the selection of piping supports.

1.0.2

This standard is applicable to process pipings, utility pipings and flue gas pipings of industrial devices used in chemical industry and petrochemical industry.

1.0.3

This standard is prepared according to the current national standard GB/T 28708 Specification for size selection of seamless and welded steel pipe used in piping engineering, which specifies the outer diameter series I of pipes. The piping supports used for pipe series II shall be adjusted accordingly according to the requirements of Annex A.

1.0.4

In addition to this standard, the selection of piping supports shall also comply with the requirements of the current relevant standards of the nation.

2.0.1

The allowable stress of steel used for piping supports shall comply with the requirements of Annex A of the current national standard GB/T 17116.1-2018 Pipe supports and hangers - Part 1: Technical specification.

2.0.2

The material of the piping support shall comply with the corresponding standard drawing of the piping support, and the material of the components in direct contact with the pipeline shall be selected according to the design temperature of the pipings.

2.0.3

In case there is no material specification in the standard drawing of piping support, the material of piping support shall meet those specified in Tables 2.0.3-1 to 2.0.3-3.

Table 2.0.3-1 Selection of materials for pipe clamp and pipe clamp type gasket

Pipe material	Design temperature of pipe/°C	Steel plate material	Material or grade of bolts and nuts
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Low temperature carbon steel (LTCS)	-40 to -21	Q345R	35CrMo/30CrMo
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Carbon steel/Cr-Mo steel/Stainless steel	-20 to 300	Q235B	≥Grade 4.8/Grade 4
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Carbon steel/Cr-Mo steel/Stainless steel	301 to 425	Q345R	35CrMo/30CrMo
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Cr-Mo steel/Stainless steel	426 to 500	15CrMoR	35CrMo/30CrMo
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Cr-Mo steel/Stainless steel	501 to 550	12Cr1MoVR	25Cr2MoV
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Stainless steel	551 to 700	06Cr19Ni10	06Cr19Ni10
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Table 2.0.3-2 Selection of materials for components welded with pipes

Pipe material	Design temperature of pipe/°C	Lifting lugs, reinforcing plates and welded pipe gasket materials	Trunnion material
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Low temperature carbon steel (LTCS)	-40 to -21	Q345R or same material as pipe	Q345E or same material as pipe
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Carbon steel	-20 to 300	Q235B or same material as pipe	Q235B or same material as pipe
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	301 to 425	Q345R or same material as pipe	20 or same material as pipe
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Cr-Mo steel	≤500	15CrMoR or same material as pipe	15CrMoG or same material as pipe
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	501 to 550	12Cr1MoVR or same material as pipe	12Cr1MoVG or same material as pipe
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Stainless steel	-196 to 700	06Cr19Ni10 or same material as pipe	06Cr19Ni10 or same
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material as pipe

Table 2.0.3-3 Selection of materials for suspenders, connectors and auxiliary steel structure components

Matching suspender diameter Component materials Auxiliary steel structure materials (section steel and steel plate, etc.)

Suspender Forged piece Non forged piece Bolt/nut grade

$\leq M30$ Q235B or 20 Q235B or 20 Q235B $\geq$ Grade 4.8/Grade 4 Q235B

$> M30$ Q355B or 20 Q355B or 20 Q235B $\geq$ Grade 4.8/Grade 4 2.0.4 When replacing materials, in addition to ensuring that the performance indexes of the substitute material are not lower than those of the replaced material, the requirements of the corresponding piping support structure and its usage conditions for the material shall also be comprehensively considered.

3.1.1

The design and selection of piping supports shall comply with the current national standard GB/T 17116.1 Pipe supports and hangers - Part 1: Technical specification.

3.1.2

The selection of expansion bolts and U-shaped bolts shall comply with the following requirements:

- 1 Expansion bolts shall not be used for fixing pipes with large load and vibration;
- 2 Insulated pipes shall not be fixed with U-shaped bolts.

3.1.3

The piping supports and polytetrafluoroethylene (PTFE) slide plates shall be set up in accordance with the following requirements:

- 1 For pipings with a slope greater than 1/100, special piping supports matching with the slope of the piping shall be selected;
- 2 Cold insulation piping support with nominal size greater than DN600 and high temperature insulation piping support with nominal size greater than DN200 shall be used in combination with PTFE slide plate;
- 3 Sliding supports with horizontal displacement greater than 75 mm and vertical load greater than 15 kN shall be used in combination with PTFE sliding plates.

3.1.4

When there is horizontal displacement at the lifting point of the hanger, the hanger shall meet the following requirements:

- 1 The two ends of the suspender shall be hinged;
- 2 The spacing between two hinge points of rigid hanger suspender shall be set to ensure that the included angle between suspender and vertical line does not exceed 3° ;
- 3 The spacing between two hinge points of elastic hanger suspender shall be set to ensure that the included angle between hanger and vertical line does not exceed 4° .

3.1.5

The markings on the drawings for piping supports shall be clear. See Annex B for relevant examples.

3.2.1

The load combination of the piping support shall comply with the requirements of the current national standard GB 50316 Design code for industrial metallic piping.

3.2.2

The service load of the piping support shall not be greater than the allowable load of the piping support.

3.2.3

The allowable load of piping support at different temperatures shall be corrected by load correction coefficient, and the allowable load at intermediate temperatures shall be obtained by interpolation method.

3.2.4

The allowable load of piping support under hydrostatic test may be estimated according to 1.5 times of the allowable load at normal temperature.