

02 - 03.7
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Desuperheater CHPF



CHPF

**Desuperheater
DN 50 to 200
PN 16 to 400**



Description

The CHPF desuperheater (further CHPF only) is device designed for the process steam temperature control. CHPF is equipped with one or more nozzles (according the desuperheater size and cooling capacity) with fixed geometry, which works on mechanical principle of water atomizing. There are used two types of nozzles. The H type serves for injection of higher water quantities; a full cone of relatively big droplets of cooling water is created. The M type utilizes pressure drop across the nozzle for very fine spraying of the injected water.

Quantity of cooling water is controlled by separated control valve. Regarding to used technology of water atomizing, the CHPF is not recommended for control ranges higher than 1 : 4.

The CHPF body is designed for installation between the flanges of steam pipeline; the cooling water pipe is connected through flange or butt-welded.

Application

The CHPF serves for precise and economical steam temperature control by a direct injection of cooling water into flow of steam. The CHPF is primary designed for industrial application, as low-pressure steam in district heating, steam circuits in power plants or steam for technological processes.

Process media

The water without mechanical impurities is intended as process medium, other medias - please advice with CHPF manufacturer. Regarding the impurities, the filter prior the cooling water control valve or other provision for impurities removal is strongly recommended.

Installation

The CHPF must be installed into pipeline in the way the arrow indicated in the body coincides with steam flow direction. The free space for desuperheater dismantling must be considered.

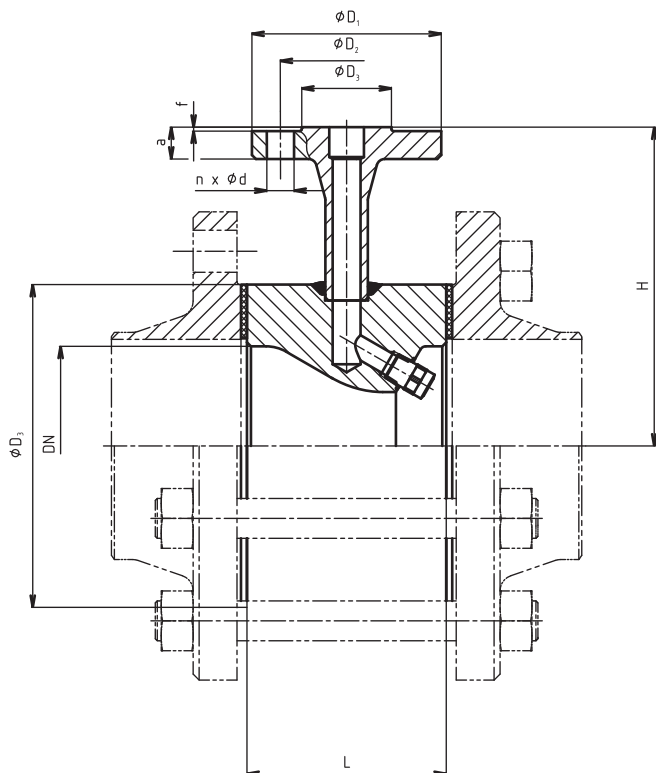
The CHPF can be installed in horizontal, vertical or inclined pipeline in any position.

The detailed instruction for installation, operation and maintenance see leaflet PM 220 and desuperheater calculation, which are accompanying documentation of quotation.

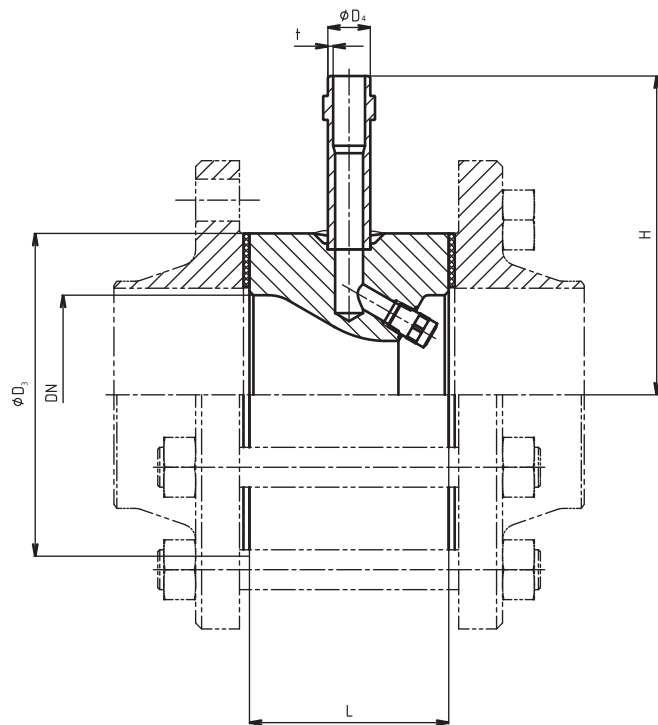
Technical data

| | | | |
|---|----------------------------------|-------------|--|
| Series | CHPF | | |
| Execution | installation between the flanges | | |
| Nominal size DN (steam pipeline) | 50 to 200 | | |
| Nominal size DN (cooling water) | 15 to 25 | | |
| Nominal pressure PN | 16 to 400 | | |
| Material of body (including flange / weld end) | 1.0426 (P 280 GH) | 20 to 500°C | |
| | 1.7335 (13CrMo4-5) | 20 to 550°C | |
| | 1.7383 (11CrMo9-10) | 20 to 600°C | |
| | 1.4922 (X20CrMoV11-1) | 20 to 600°C | |
| Flanges | Acc. to EN 1092-1 (07/2013) | | |
| Weld ends | Acc. to EN 12627 (08/2000) | | |
| Maximal permissible working pressures | Acc. to EN 12516-1 (08/2015) | | |

Execution with cooling water flange connection



Execution with cooling water butt-weld connection



Note: The bolts, nuts and flange sealings for connection into steam pipeline are scope of delivery. The flanges can be delivered as option.

CHPF dimensions

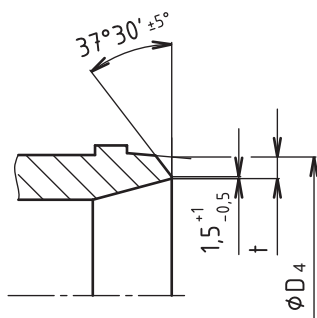
| DN | L | H | | D_3 |
|------|-----|----------|-----------|-------|
| | | PN16-160 | PN250-400 | |
| [mm] | | | | |
| 50 | 100 | 170 | 210 | 102 |
| 65 | | 180 | 220 | 122 |
| 80 | | 188 | 228 | 138 |
| 100 | | 238 | 307 | 162 |
| 125 | | 251 | 320 | 188 |
| 150 | | 266 | 335 | 218 |
| 200 | | 300 | 368 | 285 |

Cooling water flange dimensions

| DN | PN 16-40 | | | | | PN 63-100 | | | | | PN 160 | | | | | PN 250 | | | | | | |
|------|----------|----|----|----|---|-----------|-----|----|----|---|--------|-----|-----|-----|-----|--------|-----|-----|-----|-----|-----|-----|
| | D1 | D2 | a | d | n | D1 | D2 | a | d | n | D1 | D2 | a | d | n | D1 | D2 | a | d | n | | |
| [mm] | | | | | | | | | | | | | | | | | | | | | | |
| 15 | 95 | 65 | 16 | 14 | 4 | 105 | 75 | 20 | 14 | 4 | 105 | 75 | 20 | 14 | 4 | 130 | 90 | 26 | 18 | 4 | | |
| 20 | 105 | 75 | 18 | | | 130 | 90 | 22 | 18 | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 25 | 115 | 85 | | | | 140 | 100 | 24 | 18 | | 4 | 150 | 105 | 28 | 22 | 4 | | | | | | |

| DN | PN 320 | | | | | PN 400 | | | | | PN16-400 | |
|------|--------|-----|----|----|---|--------|-----|----|----|---|----------|---|
| | D1 | D2 | a | d | n | D1 | D2 | a | d | n | D_3 | f |
| [mm] | | | | | | | | | | | | |
| 15 | 130 | 90 | 26 | 18 | 4 | 145 | 100 | 30 | 22 | 4 | 45 | 2 |
| 20 | --- | | | | | --- | | | | | 58 | |
| 25 | 160 | 115 | 34 | 22 | 4 | 180 | 130 | 38 | 26 | 4 | 68 | |

Weld-end shape according to EN 12627



Nozzle data

| Type | Size | Kvs | Δp_{MAX} [bar] |
|------|------|-------|---------------------------|
| M | 1 | 0,002 | 70 |
| | 2 | 0,004 | |
| | 3 | 0,007 | |
| | 4 | 0,009 | |
| | 6 | 0,014 | |
| | 8 | 0,018 | |
| | 10 | 0,023 | |
| | 12 | 0,027 | |
| | 14 | 0,032 | |
| | 18 | 0,041 | |
| | 20 | 0,045 | |
| | 22 | 0,050 | |
| H | 3 | 0,076 | 10 |
| | 5 | 0,125 | |
| | 6 | 0,164 | |
| | 10 | 0,250 | |
| | 15 | 0,377 | |
| | 22 | 0,563 | |

Cooling water weld-end dimensions

| DN | PN | | | | | | | | | | | | |
|----|------|----|----|-----|-----|-----|-----|------|----------------|----------|-----|------|-----|
| | 16 | 25 | 40 | 63 | 100 | 160 | 250 | 320 | 400 | 16 - 160 | 250 | 320 | 400 |
| | t | | | | | | | | D ₄ | | | | |
| | [mm] | | | | | | | | | | | | |
| 15 | 2 | | | | 2.6 | 3.2 | 5 | 21.3 | | | | 26.9 | |
| 20 | 2.3 | | | --- | | | | 26.9 | | --- | | | |
| 25 | 2.6 | | | | 2.9 | 3.6 | 5 | 7.1 | 33.7 | | | 42.4 | |

The shape and dimension of weld end can be modified according to customers demand.

CHPF type number specification

| | XXXX | X | XXX | / | XXX | - | XXX | / | XXX | X | X | X | X | XX |
|-----------------------------|--------------------------------------|------|-----|-----|-----|---|-----|-----|-----|---|---|---|---|----|
| Series | Desuperheater | CHPF | | | | | | | | | | | | |
| No. of nozzles | According to water quantity | X | | | | | | | | | | | | |
| DN steam | DN50 to 200 | | XXX | | | | | | | | | | | |
| DN cooling water | DN15 to 25 | | | XXX | | | | | | | | | | |
| PN steam | PN16 to 400 | | | | XXX | | | | | | | | | |
| PN cooling water | PN16 to 400 | | | | | | | XXX | | | | | | |
| Connection - steam pipeline | Flange with raised face (type B1) | | | | | | | | | | 1 | | | |
| | Flange with recess (type F) | | | | | | | | | | 2 | | | |
| | Flange with raised face (type B2) | | | | | | | | | | 3 | | | |
| Connection - water pipeline | Flange with raised face (type B1) | | | | | | | | | | | 1 | | |
| | Flange with recess (type F) | | | | | | | | | | | 2 | | |
| | Flange with raised face (type B2) | | | | | | | | | | | 3 | | |
| Material | Weld-end | | | | | | | | | | | 4 | | |
| | Carbon steel 1.0426 (20 to 500°C) | | | | | | | | | | | | 1 | |
| | Alloy steel 1.7335 (20 to 550°C) | | | | | | | | | | | | 2 | |
| | Alloy steel 1.7383 (20 to 600°C) | | | | | | | | | | | | 6 | |
| | Stainless steel 1.4922 (20 to 600°C) | | | | | | | | | | | | 7 | |
| Other material (on demand) | | | | | | | | | | | | 9 | | |
| Nozzle type | Type H or M | | | | | | | | | | | | | X |
| Nozzle size | According to table „Nozzle data“ | | | | | | | | | | | | | XX |

Order example: Desuperheater CHPF with one H type nozzle, dimension of nozzle 3; connection to steam pipeline DN150, PN100; flanged connection of cooling water, flange DN25, PN16, type B1; body material alloy steel 1.7335; is marked CHPF 150/025-100/160 112 H03

Maximal permissible operating pressures [MPa]

| Material | PN | Temperature [°C] | | | | | | | | | | |
|---------------------------|-----|--------------------|------|------|------|------|------|------|------|------|------|------|
| | | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 |
| Carbon steel 1.0426 | 16 | 1,6 | 1,6 | 1,6 | 1,55 | 1,42 | 1,31 | 1,19 | 7,3 | 0,35 | --- | --- |
| | 25 | 2,5 | 2,5 | 2,5 | 2,42 | 2,22 | 2,04 | 1,86 | 1,13 | 0,55 | --- | --- |
| | 40 | 4,0 | 4,0 | 4,0 | 3,88 | 3,55 | 3,26 | 2,98 | 1,81 | 0,87 | --- | --- |
| | 63 | 6,3 | 6,3 | 6,3 | 6,11 | 5,59 | 5,14 | 4,69 | 2,86 | 1,38 | --- | --- |
| | 100 | 10,0 | 10,0 | 10,0 | 9,70 | 8,88 | 8,16 | 7,44 | 4,53 | 2,19 | --- | --- |
| | 160 | 16,0 | 16,0 | 16,0 | 15,5 | 14,2 | 13,0 | 11,9 | 72,6 | 3,50 | --- | --- |
| | 250 | 25,0 | 25,0 | 25,0 | 24,2 | 22,2 | 20,4 | 18,6 | 11,3 | 5,47 | --- | --- |
| | 320 | 32,0 | 32,0 | 32,0 | 31,0 | 28,4 | 26,1 | 23,8 | 14,5 | 7,0 | --- | --- |
| | 400 | 40,0 | 40,0 | 40,0 | 38,8 | 35,5 | 32,6 | 29,7 | 18,1 | 8,75 | --- | --- |
| Alloy steel 1.7335 | 16 | 1,6 | 1,6 | 1,6 | 1,6 | 1,6 | 1,49 | 1,37 | 1,26 | 1,0 | 0,47 | --- |
| | 25 | 2,5 | 2,5 | 2,5 | 2,5 | 2,5 | 2,33 | 2,13 | 1,97 | 1,56 | 0,73 | --- |
| | 40 | 4,0 | 4,0 | 4,0 | 4,0 | 4,0 | 3,73 | 3,41 | 3,15 | 2,5 | 1,17 | --- |
| | 63 | 6,3 | 6,3 | 6,3 | 6,3 | 6,3 | 5,87 | 5,38 | 4,97 | 3,93 | 1,85 | --- |
| | 100 | 10,0 | 10,0 | 10,0 | 10,0 | 10,0 | 9,31 | 8,53 | 7,89 | 6,24 | 2,93 | --- |
| | 160 | 16,0 | 16,0 | 16,0 | 16,0 | 16,0 | 14,9 | 13,6 | 12,6 | 9,99 | 4,70 | --- |
| | 250 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 23,2 | 21,3 | 19,7 | 15,6 | 7,34 | --- |
| | 320 | 32,0 | 32,0 | 32,0 | 32,0 | 32,0 | 29,8 | 27,3 | 25,2 | 19,9 | 9,39 | --- |
| | 400 | 40,0 | 40,0 | 40,0 | 40,0 | 40,0 | 37,2 | 34,1 | 31,5 | 24,9 | 11,7 | --- |
| Alloy steel 1.7383 | 16 | 1,6 | 1,6 | 1,6 | 1,6 | 1,6 | 1,5 | 1,37 | 1,26 | 1,05 | 0,56 | 0,24 |
| | 25 | 2,5 | 2,5 | 2,5 | 2,5 | 2,5 | 2,35 | 2,13 | 1,97 | 1,65 | 0,88 | 0,37 |
| | 40 | 4,0 | 4,0 | 4,0 | 4,0 | 4,0 | 3,75 | 3,41 | 3,15 | 2,63 | 1,41 | 0,6 |
| | 63 | 6,3 | 6,3 | 6,3 | 6,3 | 6,3 | 5,91 | 5,38 | 4,97 | 4,15 | 2,22 | 0,94 |
| | 100 | 10,0 | 10,0 | 10,0 | 10,0 | 10,0 | 9,38 | 8,53 | 7,89 | 6,58 | 3,52 | 1,49 |
| | 160 | 16,0 | 16,0 | 16,0 | 16,0 | 16,0 | 15,0 | 13,6 | 12,6 | 10,5 | 5,63 | 2,39 |
| | 250 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 23,4 | 21,3 | 19,7 | 16,4 | 8,80 | 3,73 |
| | 320 | 32,0 | 32,0 | 32,0 | 32,0 | 32,0 | 30,0 | 27,3 | 25,2 | 21,0 | 11,2 | 4,78 |
| | 400 | 40,0 | 40,0 | 40,0 | 40,0 | 40,0 | 37,5 | 34,1 | 31,5 | 26,3 | 14,0 | 5,98 |
| Stainless steel 1.4922 | 16 | 1,6 | 1,6 | 1,6 | 1,6 | 1,6 | 1,5 | 1,37 | 1,26 | 1,05 | 0,9 | 0,42 |
| | 25 | 2,5 | 2,5 | 2,5 | 2,5 | 2,5 | 2,35 | 2,13 | 1,97 | 1,65 | 1,46 | 0,65 |
| | 40 | 4,0 | 4,0 | 4,0 | 4,0 | 4,0 | 3,75 | 3,41 | 3,15 | 2,63 | 2,33 | 1,05 |
| | 63 | 6,3 | 6,3 | 6,3 | 6,3 | 6,3 | 5,91 | 5,38 | 4,97 | 4,15 | 3,67 | 1,65 |
| | 100 | 10,0 | 10,0 | 10,0 | 10,0 | 10,0 | 9,38 | 8,53 | 7,89 | 6,58 | 5,82 | 2,61 |
| | 160 | 16,0 | 16,0 | 16,0 | 16,0 | 16,0 | 15,0 | 13,6 | 12,6 | 10,5 | 9,32 | 4,18 |
| | 250 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 23,4 | 21,3 | 19,7 | 16,4 | 14,5 | 6,54 |
| | 320 | 32,0 | 32,0 | 32,0 | 32,0 | 32,0 | 30,0 | 27,3 | 25,2 | 21,0 | 18,6 | 8,37 |
| | 400 | 40,0 | 40,0 | 40,0 | 40,0 | 40,0 | 37,5 | 34,1 | 31,5 | 26,3 | 23,3 | 10,4 |



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