

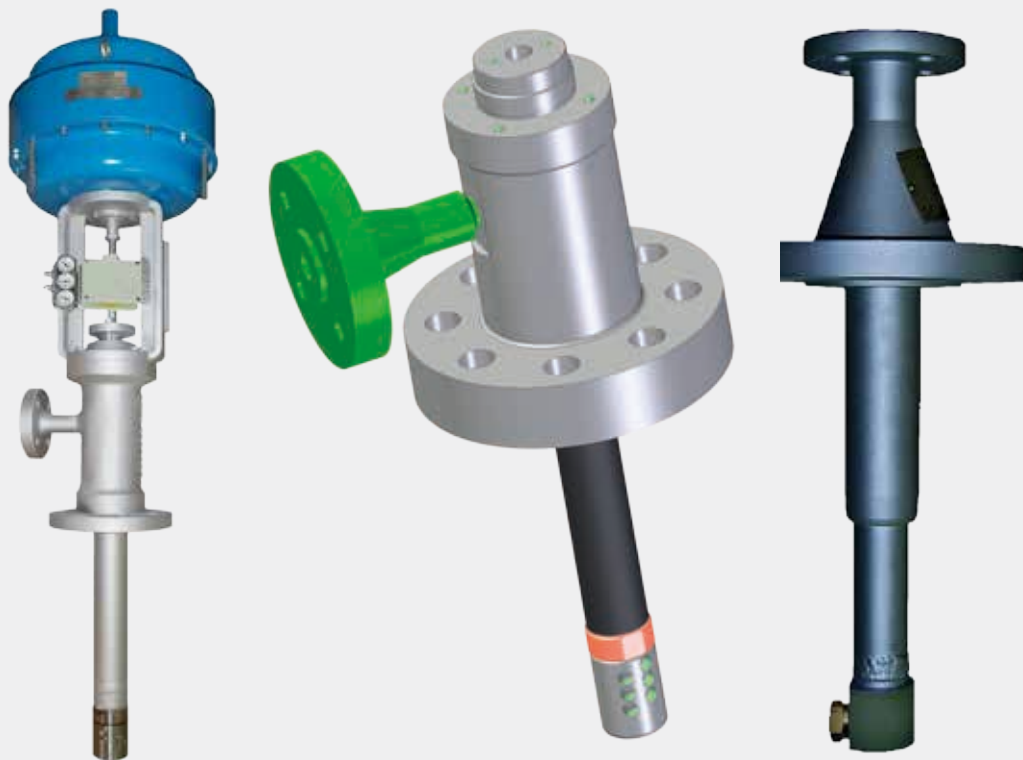
Utmost®

品质与艺术完美结合

## 艾坦姆系列减温器

Utmost Desuperheaters





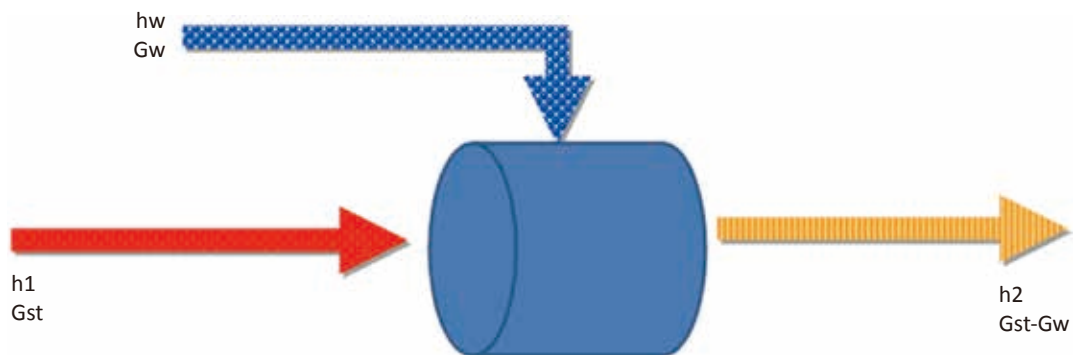
## 目录 Index

- 04 DS71 系列减温器 / DS71 series Desuperheater
- 06 DS72 系列减温器 / DS72 series Desuperheater
- 08 DS73 系列减温器 / DS73 series Desuperheater
- 10 DS74 系列减温器 / DS74 series Desuperheater

艾坦姆公司系列减温器为多喷嘴结构，通过简单的机械喷雾，使喷嘴具备完美的减温水雾化效果，广泛应用于石油、石化、煤化工、化工等行业的自备电厂，将蒸汽机组的高温蒸汽降低为饱和蒸汽供下游使用。

Utmost Desuperheaters are designed to combine excellent water atomization with high range ability, widely used in Oil, Power plant, Coal Chemical & general Industry for steam cooling service, what can make the steam be used under suitable temperature for the downstream process.

产品特点 General features	
材料选择 Material	Materials: A 217 WC6/WC9 - F22 - F91
压力等级 Pressure Rating	最高压力等级可达 2500lbs The Max pressure rate up to 2500lbs
可调比 Range-ability	最高可达 50:1 Up to 50:1
流量特性 Flow characteristic	线性或修正线性 Linear or modified linear
最小压差 Min Δ p	0.5 bar
最大压差 Max Δ p	标准型 60 bar, 2 级阀芯可实现 80 bar. 60 bar for standard design - 80 bar with 2 stages special design
喷嘴数量 Nozzles	减温器喷嘴数量可根据操作工况和调节要求选择单喷嘴、三个、六个或九个； Single type, 3 nozzles , 6 nozzles or 9 nozzles are free to choose based on operation condition & range-ability request.



$$G_w = G_{st} \times \frac{h_1 - h_2}{h_2 - h_w}$$

$G_w$ = 蒸汽减温水流量 Injected water mass flowrate-kg/h

$G_{st}$ = 入口蒸汽流量 Inlet steam mass flowrate-kg/h

$h_1$ = 入口蒸汽焓 Enthalpy of the inlet steam-KJ/kg

$h_2$ = 出口蒸汽焓 Enthalpy of the outlet steam-KJ/kg

$h_w$ = 减温水焓值 Enthalpy of the injected water-KJ/kg



## 艾坦姆 DS71 系列减温器 DS71 Series Desuperheater

艾坦姆 DS71 系列减温器根据用户蒸汽量的变化，可分两种减温水喷嘴结构：DS711 系列固定式喷嘴和 DS712 系列弹簧预紧式喷嘴。

Utmost DS 71 series Desuperheater can be divided into two types DS711 fixed nozzle and DS712 spring loading nozzle according to the customers' operating conditions.

如果现场蒸汽流量稳定、温度范围变化小，DS711 系列减温器作为用户的首选，具有安装维护简单、方便操作等优点、

If the operating steam with stable flow rate and small temperature changes, DS711 series desuperheater is the best choice with simple installation, easy maintenance and operation etc.

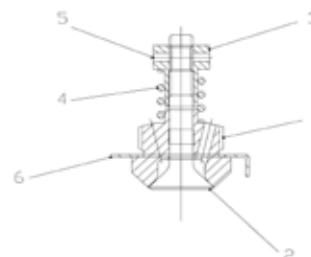
艾坦姆 DS712 系列减温器减温水为喷嘴为弹簧预紧结构式喷嘴（如下图所示），喷嘴弹簧④通过弹簧调节螺母③和喷嘴插头②等主要部件来实现减温水量的调节，当喷嘴内部水压开始上升高于蒸汽压力时， $\Delta p$  超过弹簧预紧的负载力时，喷嘴插头⑤开始逐渐打开。减温水通过特殊设计的流孔到达喷嘴①，并沿旋状表面的喷头向四周喷射并形成锥形雾化区。

Utmost DS 712 series Desuperheater nozzle is spring loading type Figure as below :

The spring ④ is loaded by the nut ③ and keeps the plug ② in the closed position. The nut is locked by the pin ⑤ to avoid any loosening. When water pressure inside the nozzle start to rise, the  $\Delta p$  between steam and water increases till the water action on the plug exceeds the spring load and the plug starts to open.

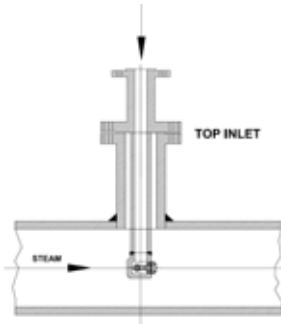
The cooling water starts to blow out from the nozzle the special drilling of the nozzle body ①, which whirls the flow before it gets in contact with the plug conical surface.

型号 / Item	部件名称 / Parts Name	材料 / Material
1	喷嘴 / Nozzle	AISI 422
2	插头 / Plug	17-4 PH H1100
3	螺母 / Nut	AISI 316
4	弹簧 / Spring	INCONEL X750
5	销钉 / Pin	AISI 304/316
6	锁紧垫圈 / Locker washer	AISI 316L



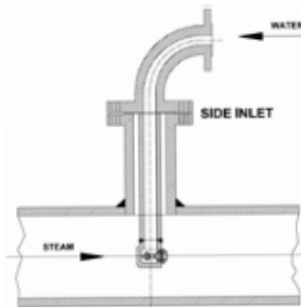
艾坦姆 DS71 系列减温器有多种型号喷嘴以满足用户不同流量和管道尺寸的要求。

Utmost DS 71 series Desuperheater have various types to satisfy customers' different operating condition requirements of the steam flow rate, steam pipe size, cooling water connection size etc .



喷嘴型号 Nozzle Type	DSN4	DSN8	DSN12	DSN25	DSN40	DSN65
减温水接口尺寸 Water Connetion	1"	1"	1 1/2"	2"	2 1/2"	3"
蒸汽管道尺寸 Steam Pipe Connection	2"	3"	4"	4"	6"	8"
最小蒸汽管道尺寸 Min. Steam Pipe Size	4"	6"	8"	8"	12"	14"

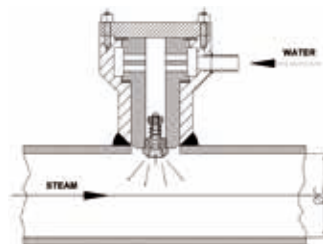
艾坦姆 DS712 系列减温器喷嘴同样可以实现管壁安装：DS712 系列喷嘴通过螺纹固定在喷嘴装置内部，每个喷嘴装置可直接焊接在主蒸汽管壁或分离蒸汽管道上，每个喷嘴装置的顶端都有一个法兰盲板固定，十分便于维修内部喷嘴，这种安装方式通常直接安装在蒸汽减压阀后的延伸段上，将整个扩大管作为一个减温水雾化腔室。

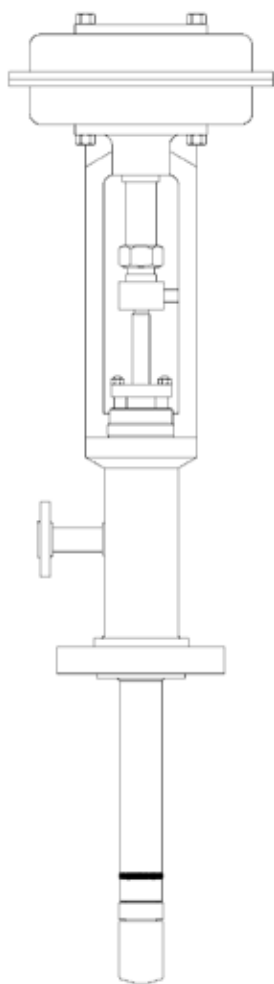


In this rugged and compact design the DS 712 nozzle is threaded inside a drilled cage fitted in a shaped fitting which is directly welded to the main steam pipe or to a separate chamber. A flanged plate at the end of this fitting allows the easy maintenance of internal parts. The single design of this device is normally assembled downstream a valve on an integral extension of the body, which acts as an injection chamber.

艾坦姆 DS712 系列管壁环状焊接式减温器喷嘴可通过选择不同的尺寸和型号以实现减温水和蒸汽的完美雾化，当蒸汽流量需要两个或两个以上减温水喷嘴时，这些喷嘴被均匀的分布焊接在管道上，通过环形减温水管路连接保持每个喷嘴的减温水压力是相同的。

Utmost DS712 serials wall welding desuperheater nozzle have different sizes and models for top performances of desuperheating at various flowrates and to improve turndown as well. When more than two nozzles are used the arrangement of piping accounts for uniform distribuion of pressure losses to keep the same pressure upstream the nozzles.





## 艾坦姆 DS72 系列减温器 DS72 Series Desuperheater

### 产品特点:

#### Features

DS72 系列减温器为一体式结构减温器，减温水可通过减温器本身实现流量调节无需现场安装成套单独的减温水调节阀；

DS72 series desuperheater is called the integrated type, which can control the cooling by itself no need to mount a sperate cooling water control valve.

减温器喷嘴数量可根据操作工况和调节要求选择三个、六个或九个；

Number of Nozzles can select 3, 6 and 9 nozzles is also available depending on application and requested range ability.

DS72 系列减温器同样适用于 LNG 低温领域；

DS72 series desuperheater also can be used for LNG application;

DS72 系列多喷嘴减温器喷嘴可提供 6 个喷嘴或 9 个喷嘴喷头，根据喷嘴的数量不同喷嘴可分为 2 列（6 个喷嘴）列或 3 列（9 个喷嘴）

The Variflow multiple nozzle spray desuperheater can be supplied with 6 or 9 nozzles.

The nozzles are arranged in two (6 nozzles) or 3 (9 nozzles) columns with an overlapping arrangement to give a continuous change of uncovered discharge area within the stroke of the piston.

### 操作原理

#### Principle of operation

艾坦姆 DS72 系列减温器通过本体流道将温水引导至喷嘴端，在喷嘴管道的下端减温器通过活塞结构控制减温水的开启和关闭，无需配备额外的减温水控制阀，平时喷嘴开关处于关闭位置，随着蒸汽流量的变化减温水喷嘴开关通过减温器执行机构随之逐渐打开；

Utmost DS72 series desuperheater can directly lead and control the cooling water by its' internal channel, the nozzle open and close controlled by the stem, usually the nozzle is closed, but according to the steam flow rate changing then open smoothly;

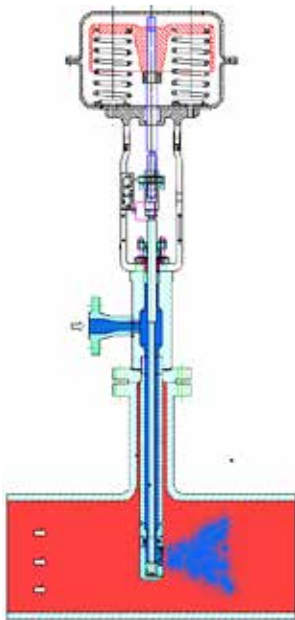
### 材料选择 /Material

Materials: A 217 WC6/WC9 - F22 - F91

### 压力等级 /Pressure Rating

最高压力等级可达 2500lbs





The Max pressure rate up to 2500lbs

**可调比 /Range ability:**

最高可达 50:1

Up to 50:1

**流量特性 /Flow characteristic:**

线性或修正线性

Linear or modified linear

**最小压差 Min  $\Delta p$ :**

0.5 bar

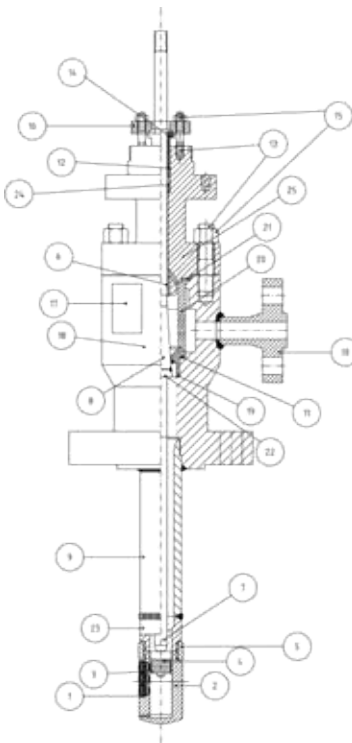
**最大压差 /Max  $\Delta p$ :**

标准型 60 bar, 2 级阀芯可实现 80 bar.

60 bar for standard design - 80 bar with 2 stages special design

材料和部件

Material & Parts



序号 Item	零件名称 Parts Name	材质 Material
1	喷嘴组合 Spray Nozzle Assembly	AISI 410
2	喷嘴头 Spray Head	AISI 410
3	活塞环 Piston Ring	AISI 431 Nitrided
4	活塞 Piston	AISI 420
5	紧固环 Fastener Ring	A 182 F11 / F22/ F91
6	衬套 Bushing	AISI 420
7	阀杆 Stem	AISI 431
8	阀芯 Plug	AISI 431+Stellite 6
9	延伸管 Body Pipe	A106B/A335P11/P22/P91
10	减温水法兰 Water Flange	A 182 F11 / F22/F91
11	垫片 Gasket	AISI316-Graphite
12	填料函 Packing Set	Graphite
13	双头螺栓 Stud	A 193 B7
14	填料压圈 Follower	AISI 431
15	螺母 Nut	A194 2H
16	填料压盖 Packing Flange	AISI 304
17	铭牌 Name Plate	AISI 304
18	本体 Body	A 217 WC6 / WC9 A 182 F22/ F91
19	阀座环 Seat Ring	17-4PH-stellite 6
20	套筒 Cage	17-4PH
21	垫片 Gasket	AISI316-Graphite
22	销钉 Pin	AISI 316
23	伸长段 Extension	A182 F11/F22/F91
24	填料环 Lantern Ring	ANSI 431
25	螺母 Bonnet	A 182 F11 / F22/F91

## 艾坦姆 DS73 系列减温器 DS73 Series Desuperheater

艾坦姆 DS73 系列减温器为固定式喷嘴减温装置，减温水通过文丘里形减温器出口喷出，减温器入口蒸汽的流速促使减温水得到充分的雾化，文丘里轮廓的出口也提高了减温水和蒸汽混合，喷嘴数量可根据蒸汽流量和操作工况可选择一个或多个喷嘴。

Utmost DS73 series desuperheater is a fixed area nozzles spraying devices, by this kind desuperheater the injection cooling water can be excellent and rapid atomizing by the venturi-shaped structure and the steam speed, One or more nozzles are available to fulfill a wide range of flow rates.

### 主要参数:

#### Main characteristics:

蒸汽管道尺寸可选: 3", 4", 6", 8", 10", 12", 14", 16", 18", 20" 或用户其它特殊要求的尺寸;

Steam pipe size: 3", 4", 6", 8", 10", 12", 14", 16", 18", 20" other sizes on request;

减温水接口尺寸:

Water connections: 1/2", 1", 1-1/2", 2";

压力等级: 最高可达 2500lbs

Ratings: up to ANSI 2500 ;

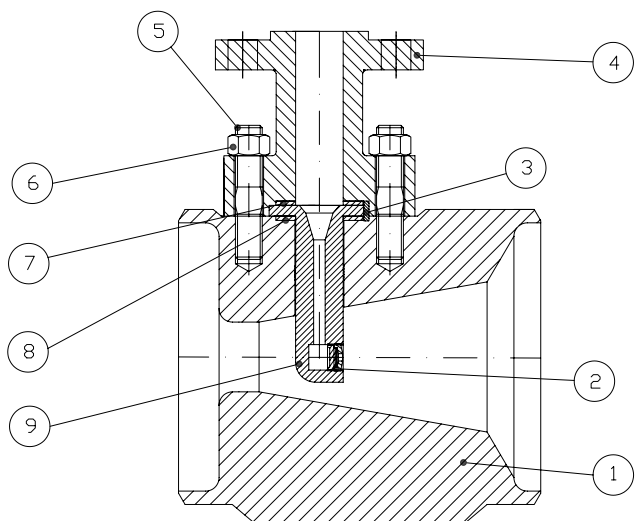
连接形式: 蒸汽: 承插焊、堆焊; 减温水连接方式: 法兰连接或根据用户要求加工

Connection types: steam: SW - BW - RF | water: RF - other on request.

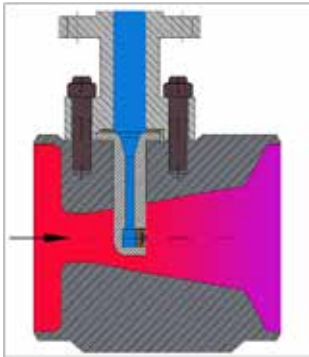
材料和部件

Material & Parts

序号 NO.	部件名称 Parts	材质 Material
1	减温器本体 Body	Carbon, Cr-Mo steels
2	喷嘴 Nozzle	410 SS
3	销钉 Pin	304 SS
4	减温水法兰 Cooling Water Flange	Carbon, Cr-Mo steels
5	双头螺栓 Stud	A194 B7
6	螺母 Nut	A194 2H
7	垫片 Gasket	St.St./Graphite
8	垫片 Gasket	St.St./Graphite
9	喷嘴管 Nozzle Pipe	Carbon, Cr-Mo steels





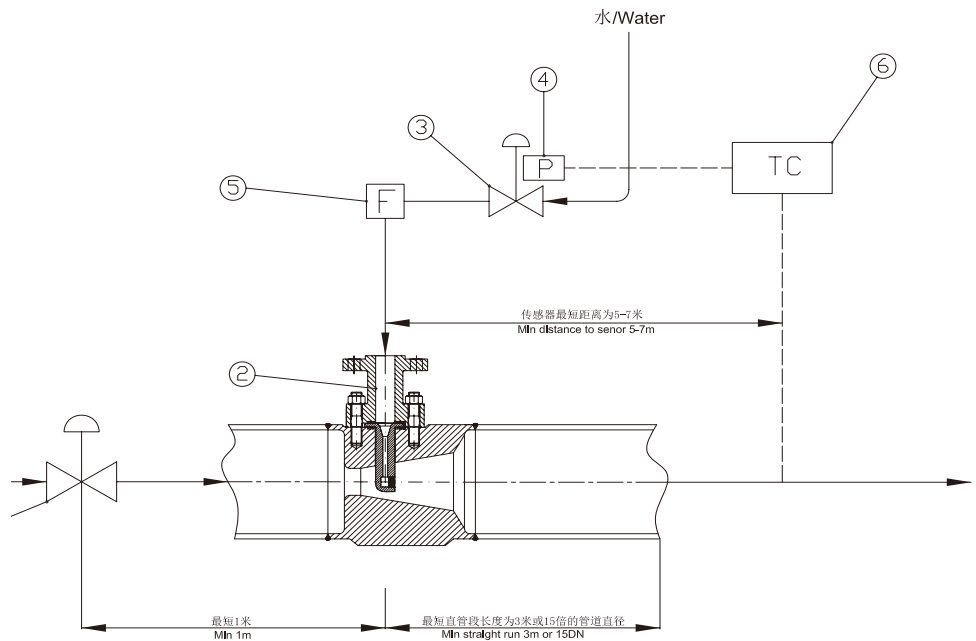


**特点**

**Functional Features:**

- 过饱和蒸汽最低温度: 5°C;
- Approach temperature: min 5°C ;
- 减温水与蒸汽最大压差: 40 bar;
- Max  $\Delta p$  water-to-steam: 40 bar between inlet pressures;
- 减温水与蒸汽最小压差: 0.5 bar;
- Min  $\Delta p$  water-to-steam: 0,5 bar between inlet pressures;
- 蒸汽流量与减温水最大流量比: 20%;
- Max water/steam ratio: 20% - by weight at inlet conditions;
- 最小蒸汽流速: 4 m/s;
- Min inlet steam velocity: 4 m/s;
- 允许最大减温水流量: 40 m<sup>3</sup>/h;
- Max water flow rate: 40 m<sup>3</sup>/h;
- 减温器后最小直管段长度: 3m 或 15 倍的管径长度;
- Min downstream straight run: 3m or 15 DN;
- 可调比: 最高可达 7:1;
- Range ability: up to 7:1 depending on  $\Delta p$  water-to-steam;

**艾坦姆 DS73 系列减温器**  
**Utmost DS73 Series Desuperheater**



Schematic diagram for DS 73 Desuperheater  
DS73 系列减温器示意图

## 艾坦姆 DS74 系列减温器 DS74 Series Desuperheater

艾坦姆 DS74 系列减温器减温水雾化方式与 DS73 系列减温器相似，喷嘴为固定式结构，减温水注入减温器本体后通过环装喷嘴沿文丘里喷嘴装置，迅速旋转喷出并雾化；

DS74 系列减温器可将低流速蒸汽充分减温，最低降温可接近饱和蒸汽 6°C，该系列减温器主要应用于对低负载小流量蒸汽流量的温度控制的场合。

Utmost DS74 series desuperheater's nozzles are fixed area spraying devices which inject water in the outlet with a venturi-shaped section combined with a swirling pattern of nozzles for excellent and rapid atomizing of sprayed water;

By Utmost DS74 series desuperheater low-velocity steam flows can be thoroughly handled as well with a minimum approach temperature of 6°C over saturation. They are primarily intended for very low capacity processes with an accurate temperature control is requirement.

### 主要参数： Main characteristics:

蒸汽管道连接尺寸： 1-1/2", 2", 3", 4"

Steam pipe size: 1-1/2", 2", 3", 4"

减温水管道连接尺寸：

Water connections: 1/2", 3/4", 1"

压力等级：最高可达 ANSI 600

Ratings: up to ANSI 600

连接形式：蒸汽：承插焊、堆焊；减温水连接方式：法兰连接或根据用户要求加工

Connection types: steam: SW-BW-wafer | water: RF - other on request

减温器后最小直管段长度：3m；

Min downstream straight run: 3m;

### 特点 Functional features

过饱和蒸汽最低温度：6° C；

Min approach temperature: 6° C;

减温水与蒸汽最大压差：30 bar；

Max  $\Delta p$  water-to-steam : 30 bar between inlet pressures;

减温水与蒸汽最小压差：1 bar；

Min  $\Delta p$  water-to-steam : 1 bar between inlet pressures;

蒸汽流量与减温水最大流量比：15%；

Max water/steam ratio : 15% - by weight at inlet conditions;

最小蒸汽流速：6 m/s；

Min inlet steam velocity = 6 m/s;

允许最大减温水流量：5 m<sup>3</sup>/h；

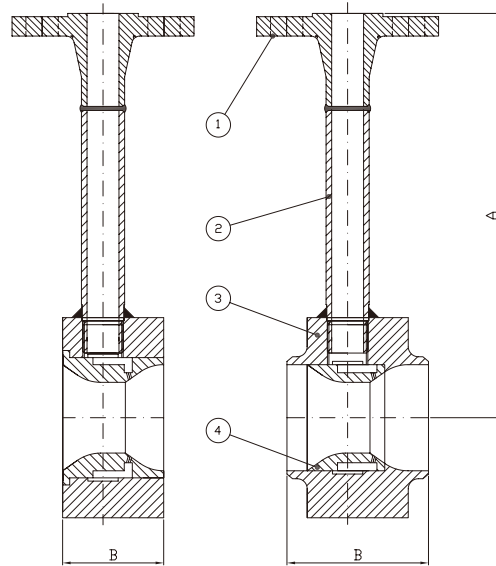
Max water flow rate: 5 m<sup>3</sup> /h;

减温器后最小直管段长度：3m；

Min downstream straight run: 3 m;

可调比：最高可达 10:1（取决与减温水与蒸汽压差）；

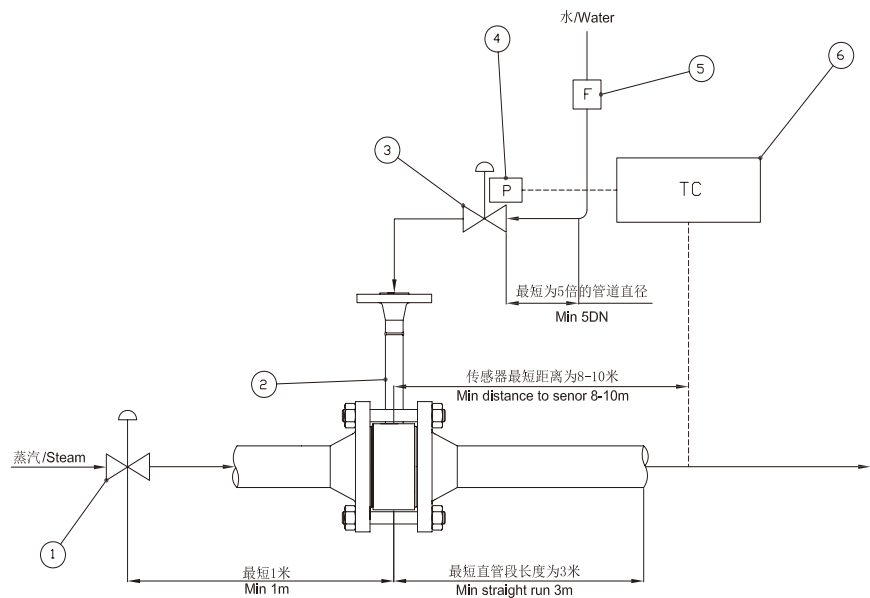
Range ability: up to 10:1 depending on  $\Delta p$  water-to-steam;



材料和部件

Material & Parts

序号 NO.	部件名称 Parts Name	材质 Material
1	减温水法兰 Cooling Water Flange	Carbon, Cr-Mo steels
2	减水管 Cooling Water Pipe	Carbon, Cr-Mo steels
3	减温器本体 Body	Carbon, Cr-Mo steels
4	喷嘴 Nozzle	AISI 422



DS74 系列减温器示意图  
Schematic diagram for DS 74 Desuperheater



品质与艺术完美结合

不仅仅是性能卓越的产品.....  
艾坦姆还通过技术方案和综合的售后服务体系，  
增强产品价值，为您的工厂提供全面支持！

More than just excellent products!  
Utmost also supply technical solution and integrated after service  
system to increase products value and fully support your factory!

声明：本样本所记载的数值为标准阀门理论值及测量值，数值规格  
更新恕不另行通知。  
Announcement: The data of this brochure comes from standard valve in  
theory and measurement, data updates without notice.

## 艾坦姆流体控制技术（北京）有限公司 Utmost Flow Control Tech.(Beijing) Co.,Ltd

地址：北京市顺义区仁和开发区临河前街29号 邮编：101300  
Add: No.29 of Renhe Qianjie, Renhe Industrial Park, Shunyi district, Beijing: 101300  
电话/Tel: 010-80490446/ 80490441  
传真/Fax: 010-61406990/6992  
邮箱/Mail: sales@utmost-valve.com  
网站/Web: www.utmost-valve.com

### 山东快速反应中心

Quick Response Center of Shandong  
地址：山东省枣庄市滕州市腾飞东路1266号 邮编：277500  
Add: No.1266 of Tengfei Road, Zaozhuang City, Tengzhou City, Shandong Province  
电话/Tel: 0632-5656159  
传真/Fax: 0632-5656159

### 大连快速反应中心

Quick Response Center of Dalian  
地址：大连经济开发区红星海世界A区11号楼3公建  
Add: No. 3 of 11 building Shijieguan of the Red Star A area, Economic Development Zone, Dalian  
电话/Tel: 0411-87550166  
传真/Fax: 0411-88175365