



# SPRAY NOZZLES FOR INDUSTRIAL APPLICATIONS



**INDUSTRIAL  
TANK WASHING  
SYSTEMS**



# PNR ITALIA

## SPRAY NOZZLES FOR INDUSTRIAL APPLICATIONS

PNR ITALIA manufactures and markets small spraying nozzles for individual use up to spraying systems for large industrial plants and is able to meet every customer's need with targeted solutions.

The wide range of products includes spray nozzles, washing heads and complementary accessories such as filters, guns and hoses for industrial washing, ejectors, blow nozzles, joints and hose clamps.

Located in Voghera, not far from Milan, the Headquarter and production plant is located in a strategic area favored by the proximity to the main motorway networks and important international maritime routes, easily accessible from the port of Genoa.

PNR ITALIA started its activity in 1968 with the trade and production of components and spraying nozzles for fire protection systems and, subsequently, with a range of sprayers for industrial applications. Over time it has grown and consolidated through a commercial policy based on a widespread network of partners present in the main foreign markets and also thanks to a continuous investment in research.

Today PNR ITALIA has at its disposal a technologically advanced production plant for the production of spraying nozzles, washing heads and atomizers with absolute quality machines, many of which work with CNC technology, often internally designed for special machining.

With an annual production of about 9 million pieces, PNR ITALIA is a solid industrial reality oriented to constant growth, driven by high-tech investments and product innovation.



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# TANK WASHING TECHNIQUES

The continuous research for higher efficiency in all kind of industries, and the requirement to assure a constant and higher quality level for their products, highlight the necessity that every step in the production, stocking and transporting processes are performed using adequately clean systems and tanks.

At the same time, as disposing of liquid effluents is becoming more and more costly, it becomes necessary that each cleaning process, while reaching a totally satisfactory result, is performed using the lowest possible volume of cleaning solution.

The two above factors have originated the introduction on the market of an always wider variety of tank cleaning devices, ranging from the classic fixed head to more and more sophisticated models to cope with the most demanding applications.

Our long experience in the field of tank cleaning suggests that the following basic concepts are given proper consideration in order to determine the correct washing cycle for each single application, and consequently the most suitable type of tank cleaning device.

## 1 PROPER FILTERING FOR THE WASHING LIQUID

Small inner passages and precision machined parts are typically found in tank washing equipment. In such cases where the washing cycle is performed by means of a recycled solution the solid particles which may be dispersed into the solution must be characterized for dimension and properties. Since suspended solid particles may affect proper operation of tank washing equipment, or require more frequent cleaning or service of the same, we suggest that a suitable line filter be considered.

## 2 CORRECT CHOICE FOR WASHING CYCLE AND SOLUTION

Based on the type of product which has to be eliminated, each single process has to be examined in order to define such parameters as the appropriate washing fluid, the right temperature, jet pressure and washing time of every phase.

## 3 ADEQUATE MOTIVE MECHANISM

The number of products which need to be removed from the wall of a tank is near to endless, each one showing its own different properties. Washing cycles can range from a quick water rinse at low pressure and ambient temperature, to long lasting cycles using hot water and caustic, sometimes at high pressure. The latter situation requires both a slow motion of the fluid jets, which have to hit the tank wall without breaking into drops and loose their impact, and a properly indexed rotation so that the revolving jets do not hit the same path at each turn.

Our tankwashers range, the most complete on the market, is classified by number of rotation axis and type of motive mechanism.

## 4 CLEANING RADIUS / WETTING RADIUS

It is not possible to define the cleaning radius of any tank washing equipment without making reference to precise conditions as the product to be eliminated, the cleaning fluid, the operating pressure and temperature.

Such value can only be determined by experience, for each single given process. It is instead possible to define a wetting radius, as the radius where the equipment can wet the entire tank inner surface: in this condition it must be expected the fluid to hit the wall with a small fraction of its original impact force.

We are available to put our experience at your service, and advise you in choosing the equipment that best suits your needs.

## EFFICIENCY ASSESSMENT

It is very difficult to assess such value as the efficiency range with reference to a given tank washing device without taking into consideration the various parameters relating to the process conditions, such as the materials you have to remove, working temperature and pressure, the time of every washing cycle.

While choosing a tank washing head, you have to consider if:

- the wetting radius is adequate for the dimension of the tank
- the capacity can provide the whole inner surface with a correct amount of washing solution for square measure;
- the impact force of the jet and the time required to complete a cleaning cycle are adequate for the product and/or process.

While taking in consideration all these elements, PNR Italia can suggest one or more suitable tank washing heads, depending on the specific case.

## CLEANING VALIDATION

This is the process whereby the desired cleaning condition is verified by means of a repeatable technique supplying results easily readable and according to the quality control requirements. There are two main verification you can do, in order to have a correct validation:

### ADEQUATE DISTRIBUTION OF THE SPRAY ON THE SURFACE OF THE TANK

It's common to spray the inner surface of the tank with Riboflavin, then to complete a cleaning cycle, and therefore to examine with an ultraviolet lamp that every trace of Riboflavin has been eliminated. Riboflavin is easily miscible with water at ambient temperature and should be completely eliminated from the surface when the same is satisfactorily covered by the washing jets. Traces of Riboflavine still sticking to the surface are revealed through an ultra-violet long wave light, and indicate areas not properly covered from the washing operation.

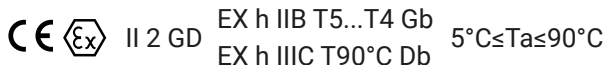
### ABSENCE OF ORGANIC RESIDUE

Cleaning operations tend to eliminate proteins spots of animal/vegetable origin, nourishment for microorganisms that facilitate the development of bacteria and retrain active molecules. The variety of possible cases and of existing regulations is such that the validation methodology is examined on a case-by-case basis. For example, a very common the technique is ATP-metry to count bacteria, which is based on ATP (Adenosine triphosphate, source of energy present in all living cells): the degradation reaction of ATP produces photons, whose intensity it is proportional to the amount of ATP present, and therefore the measurement of luminous intensity with a luminometer gives information on the quantity of cells present, and therefore on the cleaning condition of the tank.

## DEFINITIONS

### ATEX

ATEX, from the French words atmosphères and explosives (in Italian: "explosive atmospheres"), is the conventional name given to the European Union Directive 2014/34/EU for the regulation of equipment intended for use in areas at risk of explosion.



### 3-A

The 3-A Sanitary Standards is an American standard that regulates the design and manufacture of food contact equipment. 3-A aims to protect the individual from risks related to potential food contamination.

### SINGLE AXIS HEADS

It's a device where the moving part is rotating around the vertical axis of the feed pipe. They are more suitable to wash products with low resistance.

### TWIN AXIS HEADS

It's a device where the washing nozzles rotate around an horizontal axis, while the tankwasher body carrying the nozzles rotates at the same time around the vertical axis of the feed pipe. They allow stronger washing actions.

### FDA APPROVED

With this sentence, we confirm that the materials used for manufacturing the products fall within the list of the FDA and CE 1935/2004 approved food grade materials. Among them we have AISI 316L, PTFE, PEEK.

### SPRAY COVERAGE











It is the solid angle covered by the jets, with an origin in the point of the tank washer at the water inlet, and defined as follows:

- the reference direction is the one of the fluid in the inlet connection;
- the direction of the jet is DOWN when it is concurrent to the reference direction;
- the direction of the jet is UP when it is opposite to the reference direction.

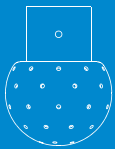
### MOCA

Declaration of Conformity for MOCA (Materials and Objects in Contact with Food) is a certification necessary to ensure compliance with certain requirements, production and raw materials, mandatory in terms of food hygiene and according to CE 1935/2004.

# WASHING HEADS APPLICATIONS

	INDUSTRY	RESIDUES CLEANED
	CHEMICAL, PAINTS & COATINGS	PAINTS PLASTICS RESINS ADHESIVES SEALANTS LATEX ACRYLICS
	FOOD PROCESSING	DAIRY JUICES SAUCES SUGARS SOUPS FROZEN FOOD INGREDIENTS
	PHARMACEUTICAL	MEDICINES POWDERS ACTIVE INGREDIENTS
	PULP & PAPER	PAPER STOCK INKS COLORS
	ETHANOL	YEAST SLURRY CORN MASH
	PERSONAL CARE	SHAMPOO LOTION CRÈMES OILS COSMETICS PERFUMES
	WINERIES	WINE SPICES SUGARS
	BREWERIES	MALT YEAST MASH WORT BEER
	TRANSPORTATION	ORANGE JUICE DAIRY PRODUCTS FOOD INGREDIENTS OIL CHEMICALS
	SHIPBUILDING	ORGANIC SEWAGE SEAWEED

EQUIPMENT TYPES		TANK CLEANING HEADS USED			
MIXERS/BLENDERS REACTORS PROCESS TANKS	STORAGE TANKS TOTES DRUMS	UBB UBT	UKD UKR		
COOKERS/FRYERS STORAGE TANKS RAIL CARS	KETTLES MIXERS/BLENDERS SPRAY DRY TOWERS	UA3 UA0 UBB	UBC UBD	UBF UBT UBX	UKD UKK UKR
BLENDERS FERMENTERS TOTES/DRUMS	STORAGE CONTAINERS SPRAY DRY TOWERS	UA0 UAC UBA	UBB UBC UBD	UBF UBT UBX	UKD UKR
BROKE CHESTS STOCK CHESTS TOTES/CONTAINERS TANK TRAILERS		UBA UBB	UBC UBE	UBT CH	
FERMENTERS YEAST TANKS STORAGE TANKS TANK TRAILERS		UBT			
MIXERS BLENDERS KETTLES	DRYERS VESSELS STORAGE TANKS	UBB UBC UBT	UKD UKR		
FERMENTERS BARRELS KEGS WINE STORAGE		UA3 UBB	UBF UBT	UKD UKK UKR	
FERMENTERS BREW KETTLES MASH TANKS	STORAGE TANKS HOT WORT RECEIVERS	UBT UBX	UKD UKK UKR		
WET/DRY BULK TRANSPORT TRAILERS RAIL CARS TOTES	IBC'S ISO TANKS/CONTAINERS	UBT UBQ	UKD UKR		
BLACK CHAMBER WASHING TANK PURIFICATION TANK SANITATION		UBC			



# FIXED SPRAY HEADS

The most simple tank washing devices, fixed heads or spray balls are the classic equipment used in thousands of tanks for their reliability and since easily kept in perfect hygienic conditions.

Their low impact properties and high volume fluid requirement limit their use to small tank sizes and processes where easily cleaned liquids and non sticking products have to be eliminated.

Our models UA3, UAB and UAC are made out of high quality stainless steel and cover most possible applications, while we are still pleased to quote for special models designed on individual requirements.



## ANGLES COVERAGE

The coverage angles mentioned in this Catalog are intended for fixed or rotating balls mounted on the top of the tank and spraying downwards. Therefore when we speak of UP and DOWN we always mean jets directed towards the upper and lower parts of the tank with the washing device mounted on the upper part of the tank. The letter indicating the coverage angle value is the penultimate of the product code.

## CONNECTIONS SIZE

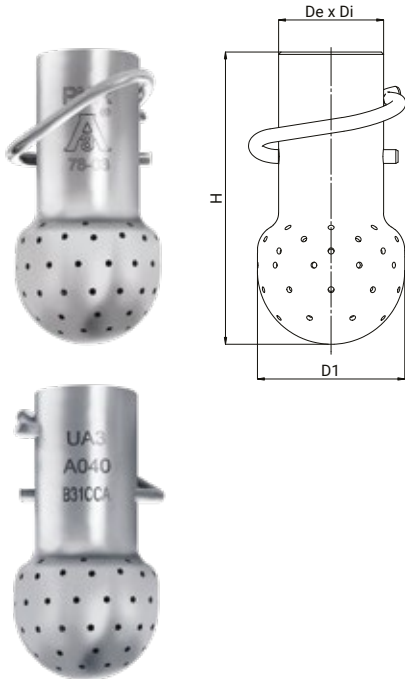
Washing devices are often supplied with clip connections that make disassembly operations quick and easy to clean the component, alternatively they are also available in the version with solder connection.



# UA3

UA3 tank washing heads are the most advanced hygienic devices available for applications in food industry. Designing and realization follow 3-A Sanitary Standard. The electropolishing finish assures a roughness Ra < 0,8 µm required for the devices used in food processing. Used materials follow standard EC 1935/2004 and come under the list of materials indicated by FDA for food application.

MATERIAL: B31 AISI 316L STAINLESS STEEL



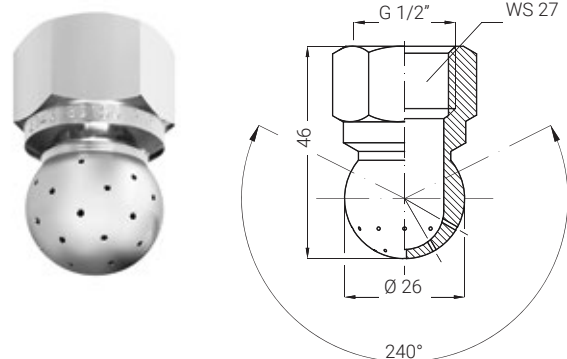
CODE	Connection	Connection pipe	D1	Capacity	Coverage	Dia	H	WR
	De x Di (mm x mm)	Standard DIN 11866						
UA3 A040 B31ACA	22,8 x 19,8	DN 15 File A	32	4,00	180°UP	1,3	63,5	1,7
UA3 C056 B31ACA	32,8 x 29,8	DN 25 File A	50	5,60		2,0	100	2,2
UA3 D098 B31ACA	44,8 x 41,8	DN 40 File A	65	9,80		2,5	117	2,7
UA3 A040 B31BCA	22,8 x 19,8	DN 15 File A	32	4,00	180°DOWN	1,3	63,5	2,0
UA3 C056 B31BCA	32,8 x 29,8	DN 25 File A	50	5,60		2,0	100	2,5
UA3 D098 B31BCA	44,8 x 41,8	DN 40 File A	65	9,80		2,5	117	3,0
UA3 A040 B31CCA	22,8 x 19,8	DN 15 File A	32	4,00	270°UP	1,3	63,5	1,5
UA3 C056 B31CCA	32,8 x 29,8	DN 25 File A	50	5,60		2,0	100	2,0
UA3 D098 B31CCA	44,8 x 41,8	DN 40 File A	65	9,80		2,5	117	2,5
UA3 A026 B31ECA	22,8 x 19,8	DN 15 File A	32	2,60	360°	1,3	63,5	1,0
UA3 C056 B31ECA	32,8 x 29,8	DN 25 File A	50	5,60		2,0	100	1,5
UA3 D193 B31ECA	44,8 x 41,8	DN 40 File A	65	19,3		2,5	117	2,0

Read more about 3-A certification at the end of the catalog.

# UAB

UAB heads are very compact devices, for applications like pipe washing or for cleaning tight spaces. The thick walls of this device, which is machined from solid stainless steel rod, make it also a good choice where the washing process needs to be performed at high pressure values.

MATERIAL: B1 AISI 303 STAINLESS STEEL  
B31 AISI 316L STAINLESS STEEL



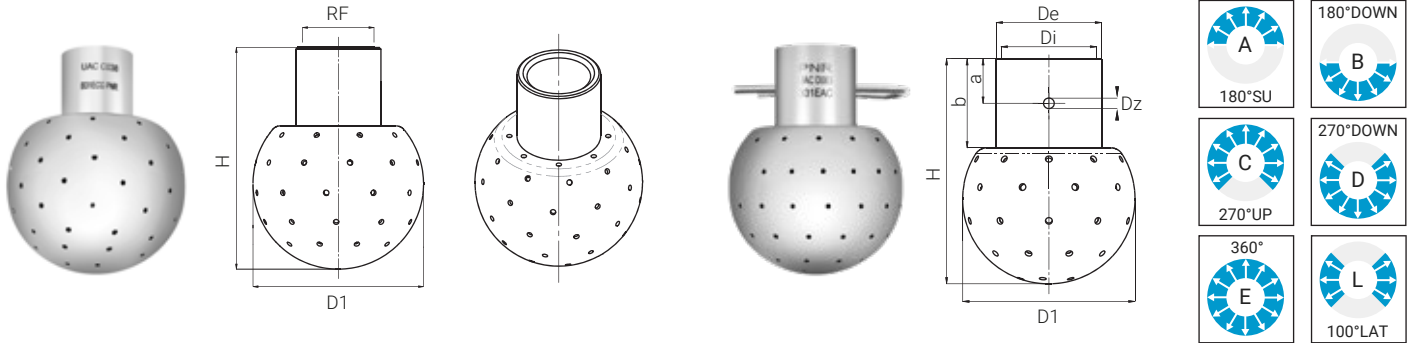
BSP thread

CODE	Dia mm	D mm	Capacity at different pressure values			
			2,0	3,0	4,0	5,0
UAB 2220 xxSG	0,8	26	18,0	22,0	25,3	28,5
UAB 2343 xxSG	1,0		28,0	34,3	39,5	44,3
UAB 2700 xxSG	1,5		57,0	70,0	80,5	90,3
UAB 3110 xxSG	2,0		90,0	110	126	142
UAB 3145 xxSG	2,3		118	145	167	187

# UAC

UAC fixed spray heads are a simple, fast and efficient device for cleaning the inside of small size tanks where a simple rinsing action is required. Because of the relatively high washing fluid flow rate, they are usually operated at low pressures and can achieve a limited impact action on the tank wall. Their simple design allows for the head to be easily cleaned after being operated, which makes it possible to leave the heads permanently in place ready for use. The values for wetting radiuses shown at the right of the table have been obtained operating the heads with a water pressure value of 1 bar. On request, heads with electropolishing  $Ra < 0,8 \mu m$  are available, in order to have roughness for alimentary applications.

MATERIAL: 31 AISI 316L STAINLESS STEEL CONNECTION: FEMALE THREAD (BSPP - NPT);  
 L8 HASTELLOY C267 (ON REQUEST) CLIP-ON; WELDED.  
 H1 TITANIUM GR2 (ON REQUEST)



SERIES	Size available (mm)					Capacity code	Mat.	Coverage					Thread dimension					Connection				Capacity at different pressures (bar)					WR
	D1	A	B	C	D			E	RF	180° up	180° down	270° up	270° down	360°	100° lat	Threaded		Clip-on		0,5	1,0	1,0	2,0	3,0			
																BSPP	NPT	Clip-on	Welded						l/min	m³/h	
UAC						012	B31	A	B	C*	D*	E*	L*					G	N	C	W	14,0	1,20	20,0	28,0	35,0	0,5
UAC		A				014	B31	A	B	C*	D*	E*	L*	A				G	N	C	W	16,0	1,40	23,3	33,0	40,0	0,8
UAC						018	B31	A	B	C*	D*	E*	L*					G	N	C	W	21,0	1,80	30,0	42,0	54,0	0,8
UAC						021	B31	A	B	C*	D*	E*	L*					G	N	C	W	25,0	2,10	35,0	50,0	61,0	1,0
UAC						031	B31	A	B	C	D	E	L					G	N	C	W	37,0	3,10	51,7	73,0	90,0	1,1
UAC						038	B31	A	B	C	D	E	L	B				G	N	C	W	45,0	3,80	63,3	90,0	110	1,2
UAC						047	B31	A	B	C	D	E	L					G	N	C	W	55,0	4,70	78,3	111	136	0,9
UAC						054	B31	A	B	C	D	E	L					G	N	C	W	64,0	5,40	90,0	127	156	1,0
UAC						063	B31	A	B	C	D	E	L					G	N	C	W	74,0	6,30	105	149	182	1,2
UAC						072	B31	A	B	C	D	E	L					G	N	C	W	85,0	7,20	120	170	208	1,3
UAC						078	B31	A	B	C	D	E	L					G	N	C	W	92,0	7,80	130	184	225	1,5
UAC						086	B31	A	B	C	D	E	L					G	N	C	W	101	8,60	143	203	248	1,6
UAC						092	B31	A	B	C	D	E	L					G	N	C	W	108	9,20	153	217	266	1,6
UAC						102	B31	A	B	C	D	E	L					G	N	C	W	120	10,2	170	240	295	1,7
UAC						110	B31	A	B	C	D	E	L					G	N	C	W	130	11,0	183	250	318	1,8
UAC						123	B31	A	B	C	D	E	L					G	N	C	W	145	12,3	205	290	355	1,8
UAC						132	B31	A	B	C	D	E	L					G	N	C	W	155	13,2	220	310	381	1,9
UAC						157	B31	A	B	C	D	E	L					G	N	C	W	185	15,7	262	370	453	2,0
UAC						160	B31	A	B	C	D	E	L					G	N	C	W	190	16,0	267	277	462	2,0
UAC						175	B31	A	B	C	D	E	L					G	N	C	W	207	17,5	292	413	505	2,1
UAC						209	B31	A	B	C	D	E	L					G	N	C	W	246	20,9	348	492	603	2,4
UAC						217	B31	A	B	C	D	E	L					G	N	C	W	256	21,7	362	512	627	2,5
UAC						228	B31	A	B	C	D	E	L					G	N	C	W	270	22,8	380	537	660	2,7
UAC						242	B31	A	B	C	D	E	L					G	N	C	W	285	24,2	403	570	700	2,8
UAC						286	B31	A	B	C	D	E	L					G	N	C	W	337	28,6	477	675	825	3,0
UAC						321	B31	A	B	C	D	E	L					G	N	C	W	380	32,1	535	755	925	3,1
UAC						371	B31	A	B	C	D	E	L					G	N	C	W	437	37,1	618	875	1070	3,2
UAC						431	B31	A	B	C	D	E	L					G	N	C	W	510	43,1	718	1015	1245	3,4
UAC						491	B31	A	B	C	D	E	L					G	N	C	W	580	49,1	818	1160	1412	3,5

Letters marked with \* in "Spray coverage" section state that those models are not available for "Thread Dimension" = 1/8" (letter A)

# UAC

## HOW TO CREATE THE COMPLETE CODE

SERIES	Size available (mm)					Capacity code	Mat.	Spray coverage						Thread dimension					Connection			Capacity at different pressures (bar)					WR		
	A	B	C	D	E			180° up	180° down	270° up	270° down	360°	100° lat	RF					Clip / Welded	Threaded		Clip-on	Welded	0,5	1,0	1,0		2,0	3,0
	(Clip)	a	b	Dz	1/8"			1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	BSP	NPT	l/min	m³/h	l/min		l/min	l/min								
D1	30	40	50	65	90																								
H	40	53	65	85	110																								
a	8	9,5	11,5	15	19																								
b	16	21	23	30	38																								
Dz	2,2	2,5	2,5	2,8	3,3																								

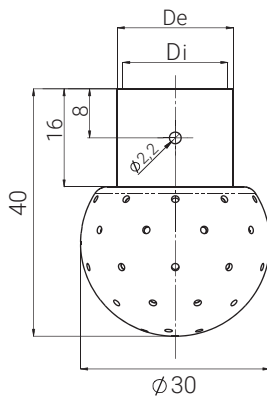
Complete code **UAC C072 B31DEG**

Series	UAC	Fixed spray head
Size	C	Diameter 50 mm
Capacity code	072	7,2 [m³/h] @ 1bar
Material	B31	AISI 316L
Spray coverage	D	270° down
Thread dimension	E	3/4"
Connection	G	BSP

## CLIP-ON AND WELDED CONNECTION SIZE

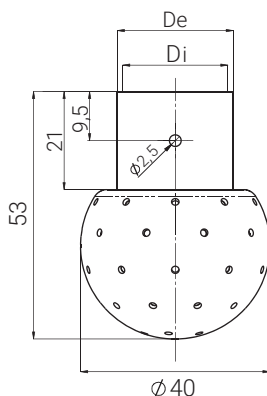
In 2016, Standard DIN 11866 gathered some of the most important standards regarding inox pipes. Some of our products can already couple to pipes respondent to these standards. Pipes with dimensions in compliance with obsolete standards are very common, therefore they are still produced without problems by PNR Italia. We are also available to guarantee the connection with every pipe that has a thickness within the standard values.

In the following table you can find the dimension we can provide.



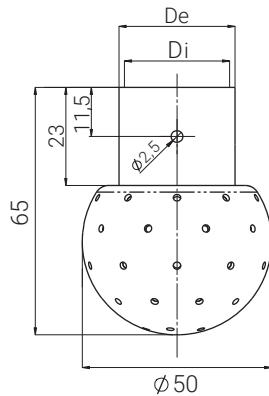
Type A Ø30mm

	CLIP-ON		WELDED	
	(De x Di)	Pipe	(De x Di)	Pipe
A	Ø 20 x 18	/	/	/
B	Ø 22 x 20	/	Ø 13,7 x 9,2	ASTM A 213 1/4" 40S
C	Ø 14,5 x 12,5	DN10 - DIN 11850/1	Ø 17,1 x 12,4	ASTM A 213 3/8" 40S
D	Ø 15,5 x 13,5	DN10 - DIN 11886/A	Ø 12 x 10	DN10 - DIN 11886/1
E	Ø 20,5 x 18,5	/	Ø 13 x 10	DN10 - DIN 11886/A
F	Ø 16,2 x 14,2	ASTM A 213 1/4"	Ø 18 x 16	DN15 - DIN 11850/1
J	Ø 19,6 x 17,6	ASTM A 213 3/8"	Ø 19 x 16	DN15 - DIN 11886/A
H	Ø 12 x 10	DN10 - DIN 11886/C	Ø 6,35 x 4,55	DN8 - DIN 11886/C



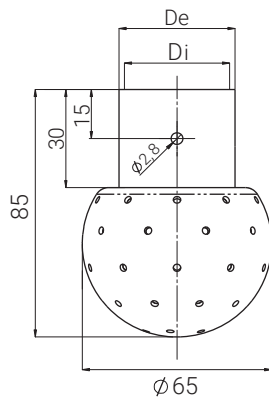
Type B Ø40mm

	CLIP-ON		WELDED	
	(De x Di)	Pipe	(De x Di)	Pipe
A	Ø 20 x 18	/	Ø 18 x 16	DN15 - DIN 11850/1
B	Ø 22 x 20	/	Ø 19 x 17	DN15 - DIN 11886/A
C	Ø 24,5 x 22,5	DN10 - DIN 11850/1	Ø 17,1 x 12,4	ASTM A 213 3/8" 40S
D	Ø 25,5 x 23,5	DN20 - DIN 11886/A	Ø 21,3 x 15,8	ASTM A 213 1/2" 40S
E	Ø 16,2 x 14,2	ASTM A 213 1/4"	Ø 22 x 20	DN20 - DIN 11850/1
F	Ø 19,6 x 17,6	ASTM A 213 3/8"	Ø 23 x 20	DN20 - DIN 11886/A
G	Ø 23,8 x 21,8	DN15 - DIN 11886/B	Ø 25,4 x 22,2	DN25 - DIN 11886/C



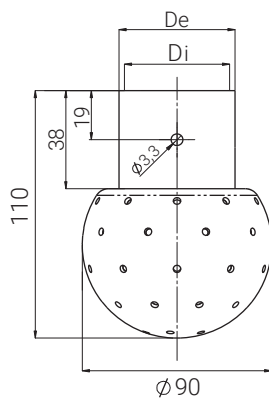
Type C Ø50mm

	CLIP-ON		WELDED	
	(De x Di)	Pipe	(De x Di)	Pipe
A	Ø 24,5 x 22,5	DN15 - DIN 11886/B	Ø 22 x 20	DN20 - DIN 11850/1
B	Ø 25,5 x 23,5	DN20 - DIN 11886/A	Ø 23 x 20	DN20 - DIN 11886/A
C	Ø 23,8 x 21,8	DN15 - DIN 11886/B	Ø 21,3 x 15,8	ASTM A 213 1/2" 40S
D	Ø 28 x 26	DN25 - DIN 11886/C	Ø 26,7 x 20,9	ASTM A 213 3/4" 40S
E	Ø 30,2 x 28,2	DN25 - DIN 11886/B	Ø 29 x 26	DN25 - DIN 11850/1
F	Ø 22 x 20	/	Ø 25,4 x 22,2	DN25 - DIN 11886/A
G			Ø 28 x 26	DN25 - DIN 11886/C



Type D Ø65mm

	CLIP-ON		WELDED	
	De x Di	Pipe	De x Di	Pipe
A	Ø 30,5 x 28,5	DN25 - DIN 11850/1	Ø 28 x 26	DN25 - DIN 11850/1
B	Ø 31,5 x 29,5	DN25 - DIN 11886/A	Ø 29 x 26	DN25 - DIN 11886/A
C	Ø 36,5 x 34,5	DN32 - DIN 11850/1	Ø 34 x 32	DN32 - DIN 11850/1
D	Ø 28 x 26	DN25 - DIN 11886/C	Ø 35 x 32	DN32 - DIN 11886/A
E	Ø 32 x 30	/	Ø 26,7 x 20,9	ASTM A 213 3/4" 40S
F	Ø 38 x 36	/	Ø 33,4 x 26,6	ASTM A 213 1" 40S
G	Ø 37,5 x 35,5	DN32 - DIN 11886/A	Ø 40 x 38	DN40 - DIN 11850/1
H	Ø 42,5 x 40,5	DN40 - DIN 11850/1	Ø 41 x 38	DN40 - DIN 11886/A
I	Ø 29,2 x 27,2	ASTM A 213 3/4"		
J	Ø 35,9 x 33,9	ASTM A 213 1"		



Type E Ø90mm

	CLIP-ON		WELDED	
	De x Di	Pipe	De x Di	Pipe
A	Ø 36,5 x 34,5	DN32 - DIN 11850/1	Ø 34 x 32	DN32 - DIN 11850/1
B	Ø 37,5 x 35,5	DN32 - DIN 11886/A	Ø 35 x 32	DN32 - DIN 11886/A
C	Ø 42,5 x 40,5	DN40 - DIN 11850/1	Ø 40 x 38	DN40 - DIN 11850/1
D	Ø 43,5 x 41,5	DN40 - DIN 11886/A	Ø 41 x 38	DN40 - DIN 11886/A
E	Ø 32 x 30	/	Ø 52 x 50	DN50 - DIN 11850/1
F	Ø 38 x 36	/	Ø 33,4 x 26,6	ASTM A 213 1" 40S
G	Ø 54,5 x 52,5	DN50 - DIN 11850/1	Ø 42,2 x 35	ASTM A 213 1-1/4" 40S
H	Ø 55,5 x 53,5	DN50 - DIN 11886/A	Ø 48,2 x 40,9	ASTM A 213 1-1/2" 40S
I	Ø 35,9 x 33,9	ASTM A 213 1"	Ø 60,3 x 52,5	ASTM A 213 2" 40S
J	Ø 44,7 x 42,7	ASTM A 213 1-1/4"	Ø 53 x 50	DN50 - DIN 11886/A
K	Ø 50,8 x 48,8	ASTM A 213 1-1/2"	Ø 38,1 x 34,9	DN40 - DIN 11886/C
L	Ø 62,8 x 60,8	ASTM A 213 2"		

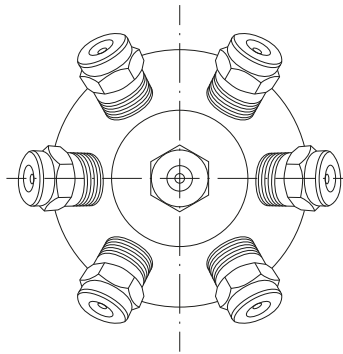
# CH

CH series includes large and small capacities full cone cluster nozzles. They make a cluster spray pattern and are available in 7 and 13 nozzles versions. Several nozzles are assembled on one nipple with small volume and wide spray coverage. The droplets size is 1/3-1/2 compared to those produced by a single nozzle with same capacity. An added value to CH full cone nozzle is their wide spray range.

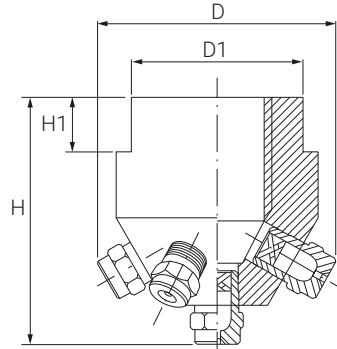
MATERIAL: B1 AISI 303 STAINLESS STEEL      THREAD: STANDARD BSP  
 B31 AISI 316L STAINLESS STEEL      STANDARD NPT  
 T1 BRASS



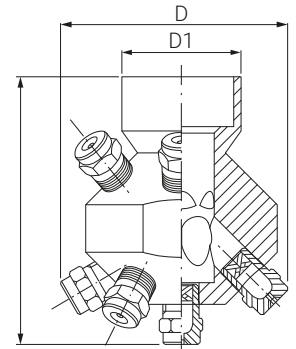
CH



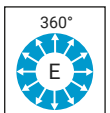
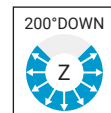
BOTTOM VIEW



MODEL WITH 7 NOZZLES



MODEL WITH 13 NOZZLES



Threaded connections

CODE	Capacity at different pressures l/min bar					Spray coverage deg		RF BSP				Dimensions mm				Number of nozzles
	1,0	2,0	3,0	5,0	10	200	360	3/4"	1"	1-1/2"	2"	D	D1	H	H1	
CHZ 1826 xx	4,77	6,47	8,26	10,7	15,1	•		•				71	40	55	13	7
CHZ 2165 xx	9,53	13,5	16,5	21,3	30,1	•		•				89	46	68	17	
CHZ 2329 xx	19,0	26,9	32,9	42,5	60,1	•			•							
CHZ 2585 xx	33,8	47,8	58,5	75,5	106	•			•							
CHZ 2819 xx	47,3	66,9	81,9	106	150	•			•							
CHZ 3102 xx	59,4	84,0	102	133	188	•				•		128	70	93	20	
CHZ 3131 xx	76,0	107	131	170	240	•				•						
CHZ 3206 xx	119	168	206	267	377	•					•	171	85	122	27	
CHZ 3259 xx	149	211	259	334	473	•					•					
CHZ 3329 xx	190	268	329	425	600	•					•					
CHE 2153 xx	8,83	12,5	15,3	19,8	27,9		•	•				69	39	85	-	13
CHE 2306 xx	17,7	25,0	30,6	39,5	55,9		•	•								
CHE 2611 xx	35,3	49,9	61,1	78,9	111		•		•			86	48	105	-	
CHE 3108 xx	62,7	88,7	108	140	198		•		•							
CHE 3152 xx	87,8	124	152	196	277		•		•							
CHE 3191 xx	110	156	191	246	349		•			•		98	55	120	-	
CHE 3245 xx	141	200	245	316	447		•			•						
CHE 3383 xx	221	313	383	495	700		•				•	129	73	159	-	
CHE 3481 xx	277	392	481	621	878		•				•	169	95	206	-	