SPRAY NOZZLES FOR INDUSTRIAL APPLICATIONS

INDUSTRIAL TANK WASHING SYSTEM

INTRODUCTION

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TECHNICAL PUBLICATIONS

TECHNICAL PUBLICATIONS

PNR manufactures a complete range of spray nozzles for industrial applications, as well as products and systems specially designed for specific industries. Information about our Company and our product range is available through the following publications

SPRAY NOZZLES & ASSEMBLY FITTINGS	CTG GN
INDUSTRIAL TANK WASHING SYSTEMS	CTG LS
AIR ASSISTED ATOMIZERS	CTG AZ
SPRAY ENGINEERING HANDBOOK	CTG SH
STEELWORK NOZZLES	CTG SW
SOLUTIONS FOR THE PULP AND PAPER INDUSTRY	CTG PN

As a result of continuous product improvement our documentation is regularly updated: please visit our website www.pnr.eu to be always updated.

NOTES

NOTES

Our products are continuously being reviewed and modified to keep up with the latest state of technology. As a result the technical information provided in this catalogue is for guidance only and is not binding. We regret not being able to provide our customers with notification of such changes all of the time. Should you have an application that requires some special features such as specific flow rates or spray angles for example, then please issue a written request before sending your order and we'll do our best to meet your requirements. All information contained in this catalogue, including product data, product codes, diagrams and photographs are the exclusive property of Flowtech. It is forbidden to reproduce any part of this catalogue without having obtained written permission from Flowtech first.

Dimensions in this catalogue are given in millimetres (mm). All threads are made according to the ISO 228 standards (European norms BS 2779 – DIN 259 – UNI 338).
Explanations about the abbreviations used in the catalogue are given on page 24.

Our Company has qualified its quality system with DNV, following ISO 9001/2015 standard.

COMPANY WITH QUALITY SYSTEM CERTIFIED BY DNV GL
= ISO 9001:2015 =

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: you can check pag. 20 of this catalogue, while the catalogue “Spray nozzles & assembly fittings” presents a wide range of filters, for every application.

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.
The maximum wetting radius for each one of our product is stated in the table at page 23 of this catalogue.

INTRODUCTION

TANK WASHING TECHNIQUES

CONSTRUCTION MATERIALS

Because of their application in the chemical, food and pharmaceutical processes tankwashers are manufactured as a rule out of high quality materials, offering in various combinations high resistance to corrosion and ability to withstand high temperatures.
Metal parts are usually made of austenitic stainless steel, mostly AISI 316L and AISI 316Ti grades, while some special applications may require high grade alloys like Hastelloy, in a variety of types. Parts in plastic materials are normally made out Teflon, Graphite-filled Teflon or PEEK.

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 considerations 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 (check the wetting radius at page 23 of this Catalogue)
• 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:
1) 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.
2) 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

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.

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 manufactoring 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.

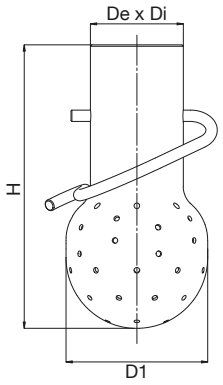
FIXED SPRAY HEADS

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.

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 electopolishing 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.

Materials **B31 AISI 316L s.s.**



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Code	Connection De x Di (mm x mm)	Connection Pipe Standard DIN 11866	D1 mm	Capacity m3/h 1 bar	Spray Coverage	Dia mm	H mm	WR m
UA3 A040 B31ACA	22,8 x 19,8	DN 15 File A	32	1,90	A 180° Up	1,3	63,5	1,7
UA3 C056 B31ACA	32,8 x 29,8	DN 25 File A	50	3,10		2,0	100	2,2
UA3 D098 B31ACA	44,8 x 41,8	DN 40 File A	65	6,20		2,5	117	2,7
UA3 A040 B31BCA	22,8 x 19,8	DN 15 File A	32	2,10	180° Down B	1,3	63,5	2,0
UA3 C056 B31BCA	32,8 x 29,8	DN 25 File A	50	3,20		2,0	100	2,5
UA3 D098 B31BCA	44,8 x 41,8	DN 40 File A	65	6,40		2,5	117	3,0
UA3 A040 B31CCA	22,8 x 19,8	DN 15 File A	32	3,30	C 270° Up	1,3	63,5	1,5
UA3 C056 B31CCA	32,8 x 29,8	DN 25 File A	50	5,10		2,0	100	2,0
UA3 D098 B31CCA	44,8 x 41,8	DN 40 File A	65	10,4		2,5	117	2,5
UA3 A026 B31ECA	22,8 x 19,8	DN 15 File A	32	2,60	360° E	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	11,0		2,5	117	2,0

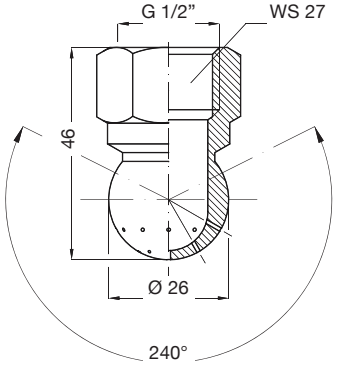
UAB

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.

BSP thread

Code	Dia mm	D mm	Capacity at different pressures l/min bar 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

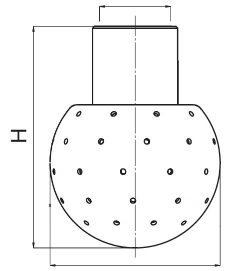
240° Down S

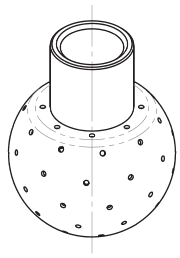


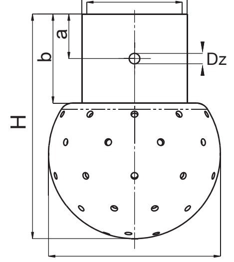
Materials **B1 AISI 303 s.s.**
B31 AISI 316L s.s.

FIXED SPRAY HEADS

FIXED SPRAY HEADS



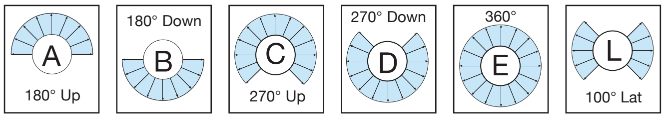




UAC

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 μm are available, in order to have roughness for alimentary applications.

Materials B31 AISI 316L s.s.
L8 Hastelloy C267 (on request)
H1 Titanium Gr2 (on request)
Connection female thread (BSPP - NPT);
clip-on; welded.



Size available (mm)

	A	B	C	D	E
D1	30	40	50	65	90
H	40	53	65	85	110
(Clip) a	8	9,5	11,5	15	19
(Clip) b	16	21	23	30	38
(Clip) Dz	2,2	2,5	2,5	2,8	3,3

Code

Series	Size available (mm)	Capacity code	Mat. AISI 316L	Spray coverage 180° up	180° down	270° up	270° down	360°	100° lat	Thread dimension RF (A = 1/8", B = 1/4", C = 3/8", D = 1/2", E = 3/4", F = 1", G = 1-1/4")	Connection Threaded BSPP	NPT	Clip-on	Welded	Capacity 0,5 bar l/min	1,0 bar m³/h	1,0 bar l/min	2,0 bar l/min	3,0 bar l/min	WR m
UAC	A	012	B31	A	B	C*	D*	E*	L*	A	G	N	C	W	14,0	1,20	20,0	28,0	35,0	0,5
UAC	A, B	014	B31	A	B	C*	D*	E*	L*	A, B	G	N	C	W	16,0	1,40	23,3	33,0	40,0	0,8
UAC	A, B	018	B31	A	B	C*	D*	E*	L*	A, B	G	N	C	W	21,0	1,80	30,0	42,0	54,0	0,8
UAC	A, B	021	B31	A	B	C*	D*	E*	L*	A, B	G	N	C	W	25,0	2,10	35,0	50,0	61,0	1,0
UAC	B	031	B31	A	B	C	D	E	L	B	G	N	C	W	37,0	3,10	51,7	73,0	90,0	1,1
UAC	B, C	038	B31	A	B	C	D	E	L	B, C, D, E	G	N	C	W	45,0	3,80	63,3	90,0	110	1,2
UAC	B, C, D	047	B31	A	B	C	D	E	L	B, C, D, E, F	G	N	C	W	55,0	4,70	78,3	111	136	0,9
UAC	B, C, D	054	B31	A	B	C	D	E	L	B, C, D, E, F	G	N	C	W	64,0	5,40	90,0	127	156	1,0
UAC	B, C, D	063	B31	A	B	C	D	E	L	B, C, D, E, F	G	N	C	W	74,0	6,30	105	149	182	1,2
UAC	B, C, D	072	B31	A	B	C	D	E	L	B, C, D, E, F	G	N	C	W	85,0	7,20	120	170	208	1,3
UAC	B, C, D	078	B31	A	B	C	D	E	L	B, C, D, E, F	G	N	C	W	92,0	7,80	130	184	225	1,5
UAC	C, D	086	B31	A	B	C	D	E	L	C, D, E, F	G	N	C	W	101	8,60	143	203	248	1,6
UAC	C, D	092	B31	A	B	C	D	E	L	C, D, E, F	G	N	C	W	108	9,20	153	217	266	1,6
UAC	C, D	102	B31	A	B	C	D	E	L	C, D, E, F	G	N	C	W	120	10,2	170	240	295	1,7
UAC	D	110	B31	A	B	C	D	E	L	D, E, F	G	N	C	W	130	11,0	183	250	318	1,8
UAC	D	123	B31	A	B	C	D	E	L	D, E, F	G	N	C	W	145	12,3	205	290	355	1,8
UAC	D, E	132	B31	A	B	C	D	E	L	D, E, F, G	G	N	C	W	155	13,2	220	310	381	1,9
UAC	D, E	157	B31	A	B	C	D	E	L	E, F, G	G	N	C	W	185	15,7	262	370	453	2,0
UAC	D, E	160	B31	A	B	C	D	E	L	E, F, G	G	N	C	W	190	16,0	267	277	462	2,0
UAC	D, E	175	B31	A	B	C	D	E	L	E, F, G	G	N	C	W	207	17,5	292	413	505	2,1
UAC	E	209	B31	A	B	C	D	E	L	F, G	G	N	C	W	246	20,9	348	492	603	2,4
UAC	E	217	B31	A	B	C	D	E	L	F, G	G	N	C	W	256	21,7	362	512	627	2,5
UAC	E	228	B31	A	B	C	D	E	L	F, G	G	N	C	W	270	22,8	380	537	660	2,7
UAC	E	242	B31	A	B	C	D	E	L	F, G	G	N	C	W	285	24,2	403	570	700	2,8
UAC	E	286	B31	A	B	C	D	E	L	F, G	G	N	C	W	337	28,6	477	675	825	3,0
UAC	E	321	B31	A	B	C	D	E	L	F, G	G	N	C	W	380	32,1	535	755	925	3,1
UAC	E	371	B31	A	B	C	D	E	L	F, G	G	N	C	W	437	37,1	618	875	1070	3,2
UAC	E	431	B31	A	B	C	D	E	L	F, G	G	N	C	W	510	43,1	718	1015	1245	3,4
UAC	E	491	B31	A	B	C	D	E	L	F, G	G	N	C	W	580	49,1	818	1160	1412	3,5

Clip / Welded: See tables **“Clip-on and welded connection size”** for **De x Di (mm)** size available.

Lettters marked with * in “Spray coverage” section state that those models are not available for “Thread Dimension” = 1/8” (letter A).

UAC

FIXED SPRAY HEADS

HOW TO CREATE THE COMPLETE CODE

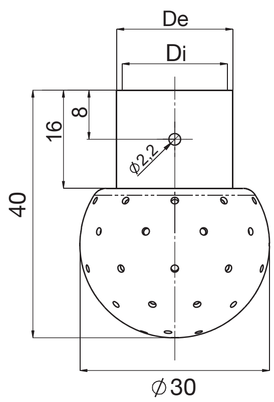
Code																											Capacity at different pressures (bar)					WR
Series	Size available (mm)						Capacity code	Mat.	Spray coverage						Thread dimension RF								Connection									
		A	B	C	D	E																	Threaded									
	D1	30	40	50	65	90		AISI 316L	180° up	180° down	270° up	270° down	360°	100° lat	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	Clip / Welded	BSPP	NPT	Clip-on	Welded	0,5	1,0	1,0	2,0	3,0	
	H	40	53	65	85	110																					l/min	m³/h	l/min	l/min	l/min	m
	(Clip) a	8	9,5	11,5	15	19																										
	(Clip) b	16	21	23	30	38																										
	(Clip) Dz	2,2	2,5	2,5	2,8	3,3																										
UAC							063	B31	A	B	C	D	E	L									G	N	C	W	74,0	6,30	105	149	182	1,2
UAC				C			072	B31	A	B	C	D	E	L					E				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

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**	BSPP

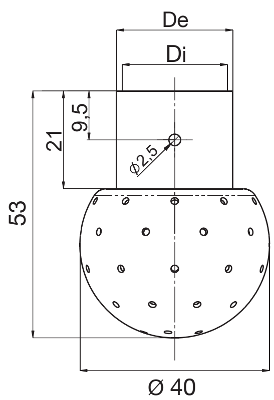
Clip-on and welded connection size

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 - Ø 30 mm

	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
G	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



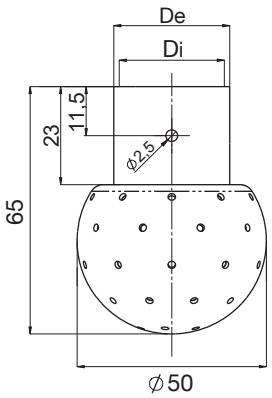
Type B - Ø 40 mm

	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

FIXED SPRAY HEADS

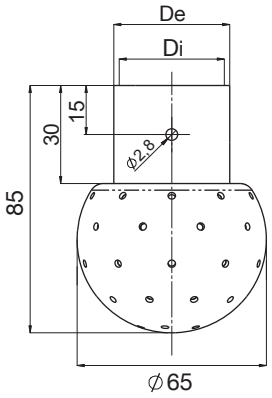
FIXED SPRAY HEADS

UAC



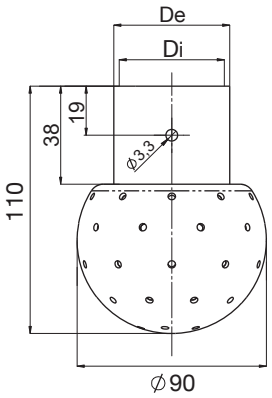
Type C - Ø 50 mm

	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 - Ø 65 mm

	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 - Ø 90 mm

	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"		

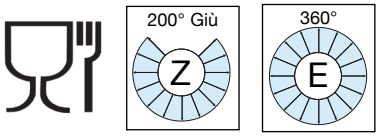
CH

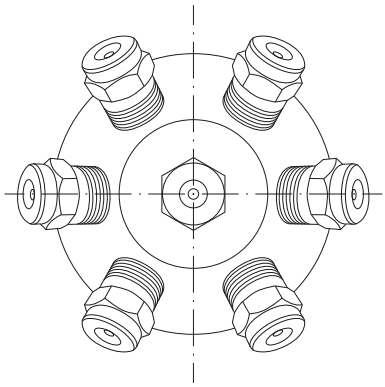
FIXED SPRAY HEADS

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.

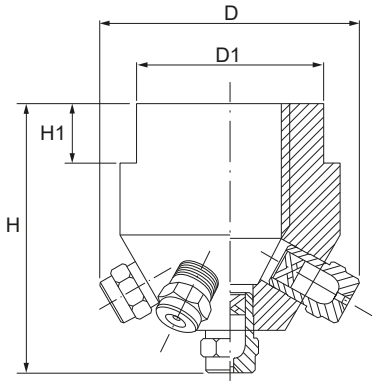
Materials
B1 AISI 303 s.s.
B31 AISI 316L s.s.
T1 Brass

Thread
Standard BSP
Standard NSP

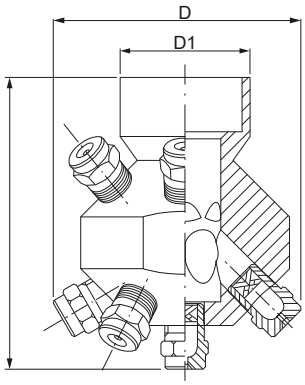




Bottom view



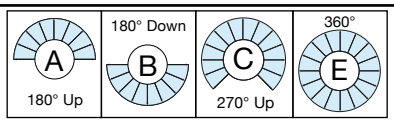
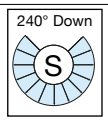
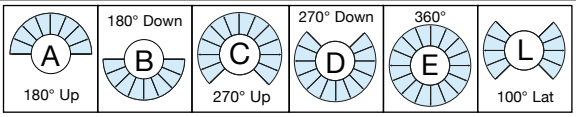
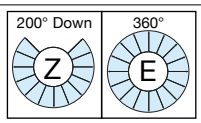
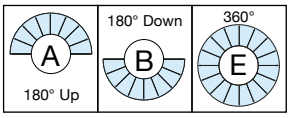
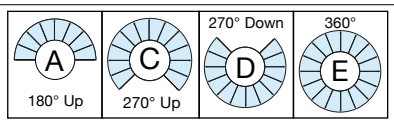
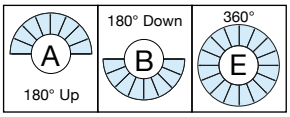
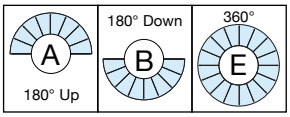
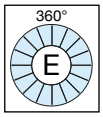
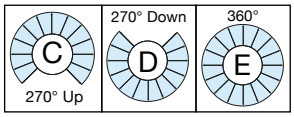
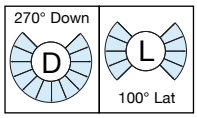
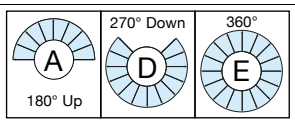
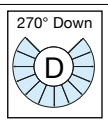
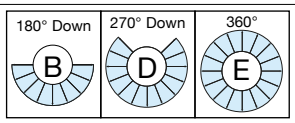
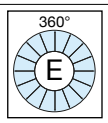
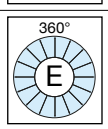
CH tank washer
with 7 nozzles



CH tank washer
with 13 nozzles

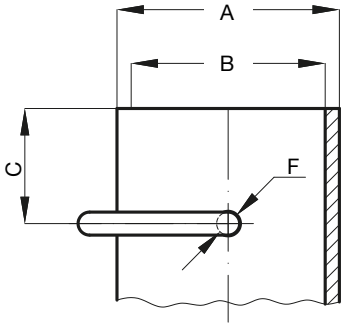
Code	Capacity at different pressures l/min bar					Spray coverage		RF BSP				Dimensions mm				Number of nozzles
	1,0	2,0	3,0	5,0	10	200	360	3/4"	1"	1-1/2"	2"	D	D1	H	H1	
CHZ 1826 xx	4,77	6,47	8,26	10,7	15,1	•		•				71	40	55	13	7
CHZ 2165 xx	9,53	13,5	16,5	21,3	30,1	•		•								
CHZ 2329 xx	19,0	26,9	32,9	42,5	60,1	•			•			89	46	68	17	
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	-	

TECHNICAL INFORMATION

Series	Type	Connection	Capacity (lpm)	Max WR (m)	Spray coverage
UA3	FIXED	clip-on	31,6 ÷ 183	3,5	
UAB	FIXED	threaded (1/2”)	18,0 ÷ 187	3,5	
UAC	FIXED	threaded (1/8” ÷ 1-1/4”), clip-on, welded	14,0 ÷ 1412	3,5	
CH	FIXED Multi nozzles	threaded (3/4” ÷ 2”)	8,26 ÷ 481	8,0	
UBB	REACTION DRIVE Single axis	threaded (1/2” ÷ 3”)	21,5 ÷ 1486	4,0	
UBC	REACTION DRIVE Single axis	threaded (3/8” ÷ 1-1/4”), clip-on, welded	8,16 ÷ 458	3,2	
UBD	REACTION DRIVE Single axis	threaded (1/4” ÷ 1-1/2”)	29,0 ÷ 321	4,8	
UBD A	REACTION DRIVE Single axis	threaded (1/4” ÷ 1-1/2”)	28,6 ÷ 296	3,0	
UBD S	REACTION DRIVE Single axis	threaded (3/8”)	29,0 ÷ 88,0	3,0	
UBX	REACTION DRIVE Single axis	threaded (1/4” ÷ 3/4”)	16,3 ÷ 99,0	3,5	
UBF	REACTION DRIVE Single axis	threaded (1/2”)	20,0 ÷ 76,0	1,5	
UBF A	REACTION DRIVE Single axis	threaded (1/2”)	20,0 ÷ 28,8	2,5	
UBF S	REACTION DRIVE Single axis	threaded (1/8”)	4,50 ÷ 6,40	0,8	
UBA	MOTOR DRIVE Single axis	threaded (3/4” or 1-1/2”)	50,0 ÷ 273	5,0	
UBE	MOTOR DRIVE Single axis	threaded (1/2”)	12,9 ÷ 43,1	8,0	
UBT	TURBINE DRIVE Twin axis	threaded (1”)	88,0 ÷ 162	11,0	

TECHNICAL INFORMATION

CLIP CONNECTION SIZE



	A	B	C	F
UBC ϕ25 (UBC xxxx MMxC)	22,0	20,0	9,0	2,5
UBC ϕ45 (UBC xxxx MMxC)	29,0	25,3	15,0	3,2
UBC ϕ65 (UBC xxxx MMxD)	44,0	38,4	15,0	3,2
UBD xxxx MMxC	33,0	25,5	9,0	2,5
UBD xxxx MMxD	33,0	25,7	9,0	2,5

There is a number of different dimensions standards relating to clip-on connections on different markets, and between Europe and America. We have therefore identified with our Customers the most commonly requested types and have standardized as follows.

UAC, fixed spray heads
Drawings and sizes are available at pages 5 and 6: these will be the future sizes for every PNR device with clip-on connection, and they are based on DN (nominal diameter), as defined by European standars.

UBC and UBD, reaction drive heads
For the two above product types clip-on connections will maintain specifications used until present time. The diagram and the table showing the dimensions for the two product types an the different markets is shown below, and covers both European pipe dimensions (last letter of the code: C) and American (last letter of the code: D).

The variety of applications of stainless steel pipes/tubes, welded or seamless, generated several Regulations related to diameters, thicknesses, methods of production and finishing, surface quality, acceptance criteria. Recently, the authorities in charge tried to simplify such regulatory vastness with Standard DIN 11866 dated June 2016 which we report here below for what concerns the dimensional part. The norm is divided into three Ranges:
• Range A: pipe dimensions according to DIN EN 10357 extended by DN6 and DN8 (includes also previous standard DIN 11850);
• Range B: pipe dimensions according to DIN EN ISO 1127 (includes also previous standards DIN 2642 for seamless pipes and DIN 2643 for welded pipes);
• Range C: pipe dimensions according to ASME-BPE 2009.

Note
For the dimensioning of its tank washing heads, PNR adopts and uses DIN 11866:2016 as a reference standard, unless otherwise specifically requested by Customers. Standard DIN 11866:2016 does not include all previous Norms and measurement standards. Therefore, in this catalogue, it is possible to find references to dimensions of standards that are not included.

DIN 11866 Range A / 304L - 316L		
De (mm)	Thickness	DN
8,00	1,00	DN6
10,0	1,00	DN8
13,0	1,50	DN10
19,0	1,50	DN15
23,0	1,50	DN20
29,0	1,50	DN25
35,0	1,50	DN32
41,0	1,50	DN40
53,0	1,50	DN50
70,0	1,50	DN65
85,0	2,00	DN80

DIN 11866 Range B / 304L - 316L		
De (mm)	Thickness	DN
10,2	1,60	DN6
13,5	1,60	DN8
17,2	1,60	DN10
21,3	1,60	DN15
26,9	1,60	DN20
33,7	2,00	DN25
42,4	2,00	DN32
48,3	2,00	DN40
60,3	2,00	DN50
76,1	2,00	DN65
88,9	2,30	DN80

DIN 11866 Range C / 304L - 316L			
De (mm)	Thickness	DN	Ref.
6,35	0,89	DN8	1/4”
9,53	0,89	DN10	3/8”
12,7	1,65	DN15	1/2”
19,05	1,65	DN20	3/4”
25,4	1,65	DN25	1”
38,1	1,65	DN40	1-1/2”
50,8	1,65	DN50	2”
63,5	1,65	DN65	2-1/2”
76,2	1,65	DN80	3”

ABBREVIATIONS

De	EXTERNAL DIAMETER	mm
Di	INNER DIAMETER	mm
Dia	ORIFICE DIAMETER	mm
DN	NOMINAL DIAMETER	--
H, H1	HEIGHT	mm

L, L1	WIDHT	mm
LP	MAX WORKING PRESSURE	bar
LT	MAX WORKING TEMP.	°C
Q	CAPACITY	l/min

RF	CYLINDRICAL FEM BSP THREAD	inch
RG	CONICAL MALE BSPT THREAD	inch
W	WEIGHT	kg
WR	WETTING RADIUS	m

PRODUCT WARRANTY

PNR products will be replaced or repaired at the option of PNR and free of charges if found defective in manufacturing, labelling and packaging. The above conditions will apply if notice of defects is received by PNR within 30 days from date of product installations or one year from date of shipment.

The cost of above said replacement or repair shall be the exclusive remedy for any breach of any warranty, and PNR shall not be held liable for any damage due to personal injuries or commercial losses coming from product malfunction. It is self-understood that no warranty may apply in case our products have been operated under nonacceptable conditions, like for example (but not limited to):
- Operation at pressures exceeding those shown in catalogue performance table
- Operation with or exposure to liquids containing abrasive particles
- Operation with or exposure to liquids producing a chemical attack on the nozzle material
- Mechanical damages to nozzle orifices, nozzle spray edge or body due to careless handling or assembling.

In all above cases, the costumer must accept a nozzle life reduction below life expected, or performance parameters below the values in the catalogue. The guarantee may be exercised as follows:
- By sending a precautionary report to PNR on the detected damages. This report can also be sent by email to this address: quality@pnr.it
- If PNR ascertains that the manufacturing faults are actually subject to the warranty, the product shall have be returned to the manufacturer in its original packaging prior request of authorization to the manufacturer and receipt of manufacturer's written authorization.
- The rejected goods shall have be returned by the means that PNR will communicate to the customer and the transportation costs of returned merchandise will be entirely borne by the manufacturer.

Our products are manufactured with the best care and according to the latest developments of the technology available. However we cannot assure that every one of our products is perfectly fit for every specific application. The information in this catalogue is provided "as seen" and so we offer no warranty of any kind with respect to the subject matter or accuracy of the information contained herein. This publication may include technical inaccuracies or typographical errors and changes may be periodically made to the information herein without prior notice.

CERTIFICATIONS

78-01

PNR Italia srl is authorized to use the 3-A Symbol to the tank washing head code UA3 xxxx B31 xCx, conforming to 3-A Sanitary Standard 78-01 (Spray Cleaning Devices Intended to Remain In Place).

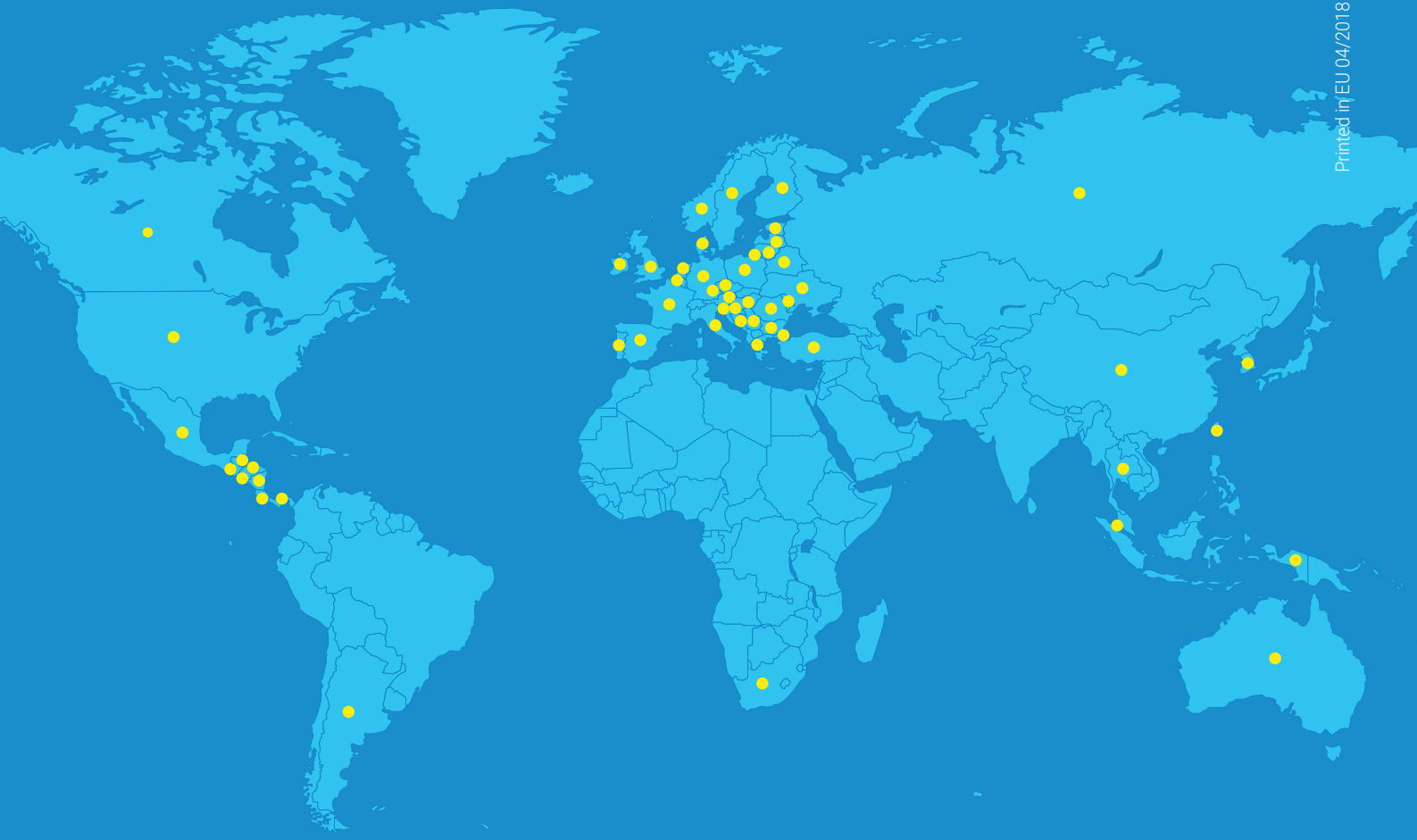
Single-axis rotary spray balls UBA, UBC, UBD, UBF, UBF-A, UBF-S are available in ATEX ("Atmosphères explosibles") version, in confomity with European Community Directive 2014/34/EU that determine compliance with the essential safety requirements for equipment and protection systems intended for use in potentially explosive atmospheres.

ATEX version is available, on request, for tank washing heads made of AISI 316L s.s. or Hastelloy C22.

Tank washing heads produced exclusively in AISI 316L s.s. and / or pure PTFE are available in MOCA version ("Materials and objects in contact with food"), in accordance with the Framework Regulation 1935/2004 and Regulation 2023/2006, which establish the criteria of traceability and processing of materials.

The MOCA version is available on customer's request for the washing heads produced in AISI 316L s.s., pure PTFE or with both materials.

A GLOBAL PRESENCE ALL OVER THE WORLD.



PNR

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