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.

SINGLE AXIS HEADS

REACTION DRIVE

The washing action is obtained through water jets coming from a rotating head, where the head motion is obtained purely through reaction force originated by the fluid jets being ejected.
The operating pressure influences the head rotation speed, which must be limited to avoid the water jets being broken into minute droplets and loosing part of their impact force.
These devices perform very satisfactorily in a great number of general applications, where the products to be washed away do not originate severe problems and with limited size tanks.
To cope with the large variety of industrial applications we offer heads made out completely of stainless steel, out of PTFE, PVDF or a mix of those materials.
Connections are obtained through female thread or easy to clean clip fix slip-on pipe.

Page 10

MOTOR DRIVE

A further step in performance with one axis heads performance is obtained with a design where a very simple friction motor provides for low speed rotating head.
This design offers a remarkable advantage because of the lower rotation velocity: the jets remain coherent without being broken into droplets by centrifugal force and all of their impact energy can be transferred to the tank surface.

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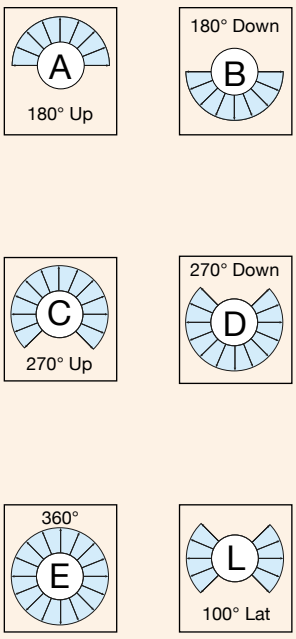
SPRAY ANGLES

All the spray angle values given in this catalog are to be understood for heads hanging from the tank top and spraying downwards.
Therefore the definitions of Up and Down assigned to a given spray angle of a tankwasher always refer to the same direction as the upper and lower part of the tank, when the tankwasher is located at the tank top.
See the diagrams beside for reference.



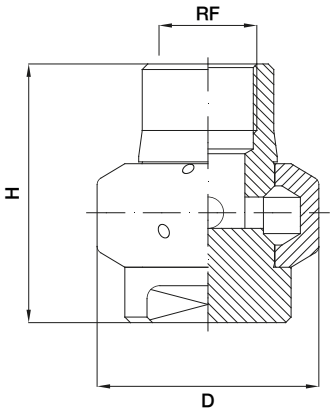
CONNECTION DIMENSIONS

Tankwashers are often requested with a clip connection for quick disassembly and for easy cleaning of the components. They are also available with a weld connection.
Our standard dimensions for these two popular designs are given at page 24.

SINGLE AXIS HEADS

REACTION DRIVE

UBB

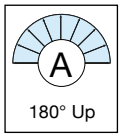


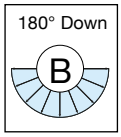
UBB heads are specially designed for applications where chemical attack from strong acids is to be expected, or when contamination to the product being handled is to be excluded, and are therefore entirely made out of PTFE.
Their rotary motion is produced from the reaction forces of their solid stream water jets , which are arranged in such a way that the inner tank surface is thoroughly covered when the head rotor is in motion.
The simple design, a two-piece construction, assures for long, maintenance free service.
The wide range of capacities and the choice among several spray patterns makes it easy to find the right product to suite a variety of different applications.
The codes shown in the capacity table refer to BSP threads. Our offices can supply coding for products designed with NPT threads.

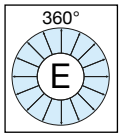
Materials	**E1 PTFE (FDA approved)**
LT	95° C
LP	4.0 bar

BSP Thread Connection

Code	RF BSP	Capacity at different pressures l/min bar					Size mm	
		1,5	2,0	2,5	3,0	3,5	H	D
UBB 0003 E1xG	1/2”	21,5	24,7	27,5	30,0	32,3	60	50
UBB 0004 E1xG	3/4”	22,9	26,3	29,3	32,0	34,5	70	60
UBB 0007 E1xG		50,2	57,6	64,1	70,0	75,4		
UBB 0012 E1xG		86,0	98,8	110	120	129		
UBB 0018 E1xG		130	150	167	182	196		
UBB 0020 E1xG	1”	143	165	183	200	215	75	70
UBB 0027 E1xG		197	225	252	275	296		
UBB 0035 E1xG		255	292	325	355	382		
UBB 0039 E1xG	2”	283	325	362	395	425	110	125
UBB 0049 E1xG		355	407	454	495	533		
UBB 0059 E1xG		423	486	541	590	635		
UBB 0069 E1xG		495	568	632	690	743		
UBB 0098 E1xG	3”	706	811	902	985	1061	150	175
UBB 0118 E1xG		846	971	1081	1180	1271		
UBB 0138 E1xG		989	1136	1264	1380	1486		





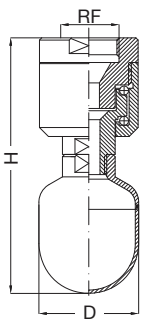


In order to obtain the complet code of the tank washing head, you need to change the “x” letter, in second to last position, with the corresponding letter concerning the spray coverage, among the ones available.

UBC

REACTION DRIVE

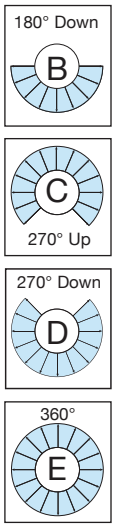
UBC series heads are completely made out of stainless steel, with the rotating sphere rolling on two ball bearing rows, to make operation possible in any position.
Inner and outer surfaces are carefully machined, deburred, cleaned and polished to a precisely defined roughness grade to avoid contamination from bacterial growth.
UBC series heads are available with different connection designs, that is a female thread and a clip-on connection as standard, a weld-on or a tri-clamp connection on request.
The robust and simple design, the high quality construction, long trouble-free service and remarkable efficiency have made them very popular for general purpose applications, in thousands of applications all over the world.



Materials B31 AISI 316L s.s.

Female BSP Thread

Code	Capacity at different pressures l/min bar				Spray coverage				RF BSP					Size mm	
	2,0	3,0	5,0	7,0	360	270U	270D	180D	3/8"	1/2"	3/4"	1"	1-1/4"	H	D
UBC 2100 B31xG	8,16	10,0	12,9	15,3	•	•	•	•	•					55	25
UBC 2300 B31xG	24,5	30,0	38,7	45,8	•	•	•	•	•						
UBC 2480 B31xG	39,2	48,0	62,0	73,3	•	•	•	•	•						
UBC 2629 B31xG	51,4	63,0	81,3	96,2	•	•	•	•		•				115	45
UBC 2899 B31xG	73,5	90,0	116	137	•	•	•	•		•					
UBC 2630 B31xG	51,4	63,0	81,3	96,2	•	•	•	•			•				
UBC 2900 B31xG	73,5	90,0	116	137	•	•	•	•			•				
UBC 3135 B31xG	110	135	174	206	•	•	•	•			•				
UBC 3120 B31xG	98,0	120	155	183	•	•	•	•				•			
UBC 3215 B31xG	176	215	278	328	•	•	•	•					•	131	65
UBC 3300 B31xG	245	300	387	458	•	•	•	•					•		
Male BSPT Thread									RG BSPT						
UBC 2230 B31EGZ	18,9	23,0	29,4	34,5	•					•				46	22



Clip-on connection

Available on request with American pin. Last letter of the code: D insted of C.

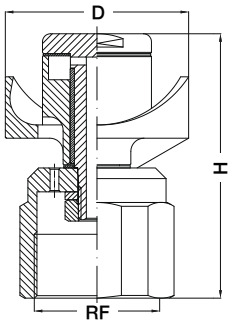
Code	Capacity at different pressures l/min bar				Spray coverage				Pipe Connection De x Di (mm)	Clip-on Pipe	Standard	Size mm	
	2,0	3,0	5,0	7,0	360	270U	270D	180D				H	D
UBC 2480 B31xC	39,2	48,0	62,0	73,3	•	•	•	•	22 x 20	3/4"	ASTM A240	70	25
UBC 2630 B31xC	51,4	63,0	81,3	96,2	•	•	•	•	29 x 25,3	DN 25	SMS 3008	135	45
UBC 2900 B31xC	73,5	90,0	116	137	•	•	•	•	29 x 25,3	DN 25	SMS 3008	137	45
UBC 3120 B31xC	98,0	120	154	183	•	•	•	•	29 x 25,3	DN 25	SMS 3008	135	45
UBC 3135 B31xC	110	135	174	206	•	•	•	•	29 x 25,3	DN 25	SMS 3008	137	45
UBC 3178 B31xC	145	178	230	272	•	•	•	•	29 x 25,3	DN 25	SMS 3008	137	44,5
UBC 3300 B31xC	245	300	387	458	•	•	•	•	44 x 38,4	DN 40	SMS 3008	159	65

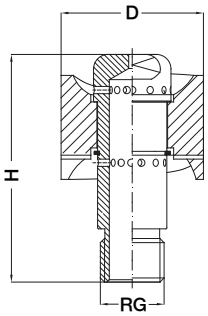
Welded connection

Code	Capacity at different pressures l/min bar				Spray coverage				Pipe Connection De x Di (mm)	DN	Standard	Size mm	
	2,0	3,0	5,0	7,0	360	270U	270D	180D				H	D
UBC 2200 B31xS	16,3	20,0	25,8	30,6	•	•	•	•	12,7 x 1,65	DN 10	DIN 11866/C	69	25
UBC 2300 B31xW	24,5	30,0	38,7	45,8	•	•	•	•	19,05 x 1,65	DN 15	DIN 11866/C	78	25
UBC 2630 B31xW	51,4	63,0	81,3	96,2	•	•	•	•	25 x 2	DN 25	DIN 11866/C	250	45
UBC 2900 B31xW	73,5	90,0	116	137	•	•	•	•	25 x 2	DN 25	DIN 11866/C	250	45
UBC 3120 B31xS	98,0	120	155	183	•	•	•	•	25 x 2	DN 25	DIN 11866/C	250	45
UBC 3135 B31xV	110	135	174	206	•	•	•	•	29 x 1,5	DN 25	DIN 11866/A	250	45
UBC 3300 B31xW	245	300	387	458	•	•	•	•	38 x 34	DN 40	DIN 11866/C	250	65

SINGLE AXIS HEADS

REACTION DRIVE





UBD

UBD rotary heads can profit from the special design of their rotary head, which allows for a very even water distribution, assuring optimum surface coverage. They assure therefore very short washing cycles, using lower quantities of water, with a definite advantage in those applications where recycled water is not allowed as a washing medium, and the volumes sent to disposal must be kept to a minimum. UBD heads work using Teflon slide bearings floating at high speed over a thin water film, the only wear part being an easily replaceable Teflon washer. Only a fraction of the liquid energy is then used to power the washing head, while the high speed of the rotating disc produces instantly a cloud of high energy droplets all over the inside surface of the tank. The clever design of this device results in no maintenance at all being necessary. Large inside passages are not easily subject to plugging while an extremely simple design with only one moving part avoids any internal jamming. All inside and outside surface are carefully polished, for fast and easy sanitizing. The two following tables give data about types with threaded connection and clip-on types.

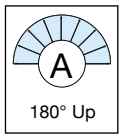
Materials

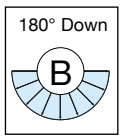
Body, shaft and rotary head B31 AISI 316L s.s.
L61 Hastelloy C22

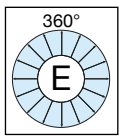
Bearings E1 PTFE

Thread connection

Code	Capacity at different pressures l/min bar					Spray coverage			RG BSPT	RF BSP			Size mm	
	2,0	3,0	4,0	5,0	7,0	180°U	180°D	360°	1/4"	3/4"	1"	1-1/2"	H	D
UBD 0035 B31AG	29,0	35,0	40,0	45,0	53,0	•			•				45	28
UBD 0035 B31BG	29,0	35,0	40,0	45,0	53,0		•		•					
UBD 0035 B31EG	29,0	35,0	40,0	45,0	53,0			•	•					
UBD 0050 B31AG	41,0	50,0	58,0	64,0	76,0	•			•					
UBD 0050 B31BG	41,0	50,0	58,0	64,0	76,0		•		•					
UBD 0050 B31EG	41,0	50,0	58,0	64,0	76,0			•	•					
UBD 0051 B31AG	41,0	50,0	58,0	64,0	76,0	•				•			55	38
UBD 0051 B31BG	41,0	50,0	58,0	64,0	76,0		•			•				
UBD 0051 B31EG	41,0	50,0	58,0	64,0	76,0			•		•				
UBD 0090 B31AG	73,0	90,0	104	116	137	•				•				
UBD 0090 B31BG	73,0	90,0	104	116	137		•			•				
UBD 0090 B31EG	73,0	90,0	104	116	137			•		•				
UBD 0091 B31AG	73,0	90,0	104	116	137	•					•		75	50
UBD 0091 B31BG	73,0	90,0	104	116	137		•				•			
UBD 0091 B31EG	73,0	90,0	104	116	137			•			•			
UBD 0140 B31AG	114	140	162	181	214	•					•			
UBD 0140 B31BG	114	140	162	181	214		•				•			
UBD 0140 B31EG	114	140	162	181	214			•			•			
UBD 0141 B31AG	114	140	162	181	214	•						•	100	70
UBD 0141 B31BG	114	140	162	181	214		•					•		
UBD 0141 B31EG	114	140	162	181	214			•				•		
UBD 0210 B31AG	171	210	242	271	321	•						•		
UBD 0210 B31BG	171	210	242	271	321		•					•		
UBD 0210 B31EG	171	210	242	271	321			•				•		







The rotor of 1/4" BSPT model is made of Teflon.

Models with 3/4", 1", 1-1/2" connections can be provided also with NPT thread: in this case, H can be slightly different.

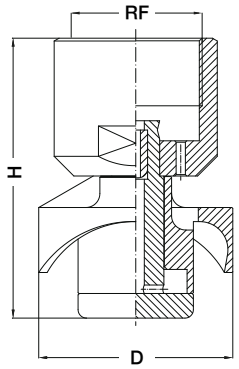
Models with clip-on connection are available on request. See page 24 for the size of UBD clip connections.

SINGLE AXIS HEADS

UBD A

REACTION DRIVE

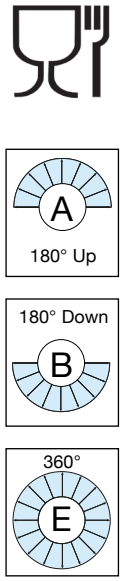
UBD A rotary heads are a simple but very efficient device for the inside cleaning of tanks. The rotary disk is rotated through the action of the cleaning fluid and produces a very dense spray which reaches all parts of the inside surface, it is the only mobile part of the unit and requires no servicing at all. No lubrication is required, and therefore no risk exists of contaminating your product with oil or grease. The device is not easily clogged tanks to a minimum internal passage of 2 mm dia, and will continue to operate even when feed holes are partially closed. Ideally suited for aggressive environments, it operates efficiently with all detergents and chemical solutions, in both closed and open tanks because available with 360 or 180 degrees spray patterns. UBD A models find their application in pharmaceutical, chemical and food industries, where pure PTFE complies with the requirements of FDA CFR21. Models made out of Graphite-filled PTFE do not allow for the build up static electricity and can be employed in atmospheres where an explosion risk occurs.



Materials E1 PTFE pure (FDA approved) — **LT** 95° C
E11 PTFE + 25% graphite
D9 PEEK (FDA approved)

Thread connection

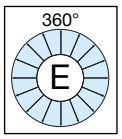
Code	Capacity at different pressures l/min bar					Spray coverage			RF BSP				Size mm	
	2,0	3,0	4,0	5,0	6,0	360	180U	180D	1/4”	3/4”	1”	1-1/2”	H	D
UBD A035 xxEG	28,6	35,0	40,5	45,2	49,5	•			•				47	30
UBD A051 xxEG	41,2	50,0	57,4	63,9	69,7	•				•			55	40
UBD A090 xxEG	73,5	90,0	104	116	127	•				•				
UBD A090 xxAG	73,5	90,0	104	116	127		•			•			49	40
UBD A090 xxBG	73,5	90,0	104	116	127			•		•				
UBD A140 xxEG	114	140	162	180	198	•					•			
UBD A140 xxAG	114	140	162	180	198		•				•		75	50
UBD A140 xxBG	114	140	162	180	198			•			•			
UBD A210 xxEG	171	210	243	271	296	•						•		
UBD A210 xxAG	171	210	243	271	296		•					•	100	70
UBD A210 xxBG	171	210	243	271	296			•				•		

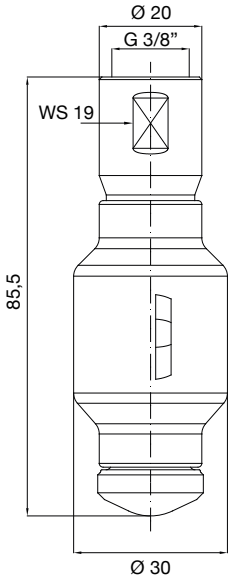


UBD S

Reaction drive mono-axial head UBD S035 B31EG is totally realized in AISI 316L stainless steel. Moreover, no lubrication is needed, therefore there is no risk of contamination with oils: this product is suitable in applications in food, pharmaceutical and chemical industries.
It has a low capacity and low angular velocity, so it is perfect for washing small and medium size tanks that require longer washing cycles. The easy and strong design, and high quality structure assure a long service and a high efficiency.

Materials B31 AISI 316L s.s.
Connection 3/8” Female BSP
LT 95°C



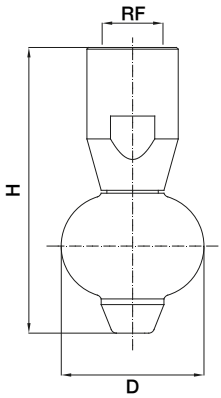


Code	Capacity at different pressures l/min bar								
	2,0	3,0	4,0	5,0	6,0	7,0	10	15	20
UBD S035 B31EG	29	35	40	45	50	53	63	76	88

SINGLE AXIS HEADS

REACTION DRIVE

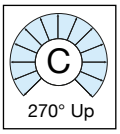
UBX

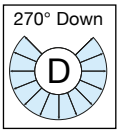


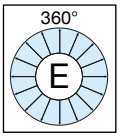
UBX is a very compact product whose design provides for a specially accurate cleaning of the upper area of he tank around the inlet pipe, which is accomplished by a larger rotating head and straight jets with a well studied and appropriate orientation.
Because of the low flow values, the simple design and the high quality surface finish UBX tankwashers are preferred in such application as washing small volume tanks in pharmaceutical processes.
The rotation is obtained by liquid reaction forces, while the head rotates over a thin liquid film which is self-cleaning.
Connection can be threaded or with standard PNR clip for easy disassembly and cleaning.

Materials Body B31 AISI 316L s.s.
Rotor E1 PTFE
E13 PTFE + Carbon
D9 PEEK (on request)

Thread connection







Code	Capacity at different pressures l/min bar					Spray coverage			RF BSP				Size mm	
	2,0	3,0	4,0	5,0	6,0	360	270U	270D	1/4"	3/8"	1/2"	3/4"	H	D
UBX A10S B31EG	8,20	10,0	11,6	12,9	14,1	•			•					
UBX A10A B31DG	8,20	10,0	11,6	12,9	14,1			•	•					
UBX A15S B31EG	12,2	15,0	17,3	19,4	21,2	•			•					
UBX A20C B31CG	16,3	20,0	23,1	25,8	28,3		•		•				50	25
UBX A20S B31EG	16,3	20,0	23,1	25,8	28,3	•			•					
UBX A20S B31CG	16,3	20,0	23,1	25,8	28,3		•		•					
UBX A20S B31 DG	16,3	20,0	23,1	25,8	28,3			•	•					
UBX A30A B31EG	24,5	30,0	34,6	38,7	42,4	•				•				
UBX A30A B31DG	24,5	30,0	34,6	38,7	42,4			•		•				
UBX A30S B31EG	24,5	30,0	34,6	38,7	42,4	•				•			60	30
UBX A30S B31CG	24,5	30,0	34,6	38,7	42,4		•			•				
UBX A30S B31DG	24,5	30,0	34,6	38,7	42,4			•		•				
UBX A40A B31EG	32,7	40,0	46,2	51,6	56,6	•					•			
UBX A40S B31EG	32,7	40,0	46,2	51,6	56,6	•					•			
UBX A40S B31CG	32,7	40,0	46,2	51,6	56,6		•				•		75	40
UBX A40S B31DG	32,7	40,0	46,2	51,6	56,6			•			•			
UBX A50S B31EG	40,8	50,0	57,7	64,5	70,7	•						•		
UBX A70A B31EG	57,1	70,0	80,8	90,4	99,0	•						•		
UBX A70S B31EG	57,1	70,0	80,8	90,4	99,0	•						•	100	50
UBX A70A B31CG	57,1	70,0	80,8	90,4	99,0		•					•		
UBX A70A B31DG	57,1	70,0	80,8	90,4	99,0			•				•		

UBF - SMALL DIMENSION WASHING HEADS

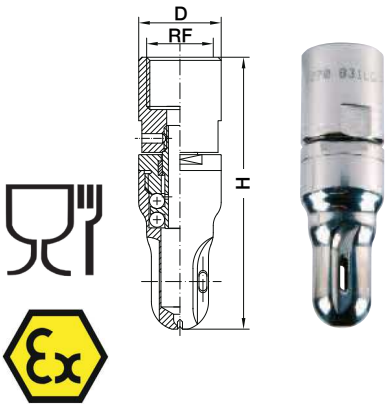
REACTION DRIVE

UBF range heads have been designed as small dimensions devices to be operated through small dimension openings and perform such processes as the inside cleaning of any other container where standard washing heads cannot be used. Typically used for cleaning beer kegs, containers for soft drinks or small bore pipes.

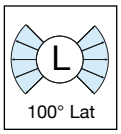
Materials B31 AISI 316L s.s.

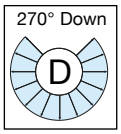
EXCLUSIVE TRUMPET ORIFICE

The new trumpet design of the side orifices allows to obtain a more efficient fan shaped jet, with a well defined spray angle, improving considerably the washing action. Italian and International Patents applied for.



Code	RF BSP	Capacity at different pressures l/min bar					Spray coverage		Size mm	
		2,0	3,0	5,0	10	12	100L	270D	H	D
UBF 2270 B31LG	1/2"	20,0	27,0	36,4	51,5	56,4	•		85	26
UBF 2270 B31DG		22,0	27,0	36,4	51,5	56,4		•		
UBF 2380 B31DG		31,0	38,0	49,2	69,3	76,0		•		

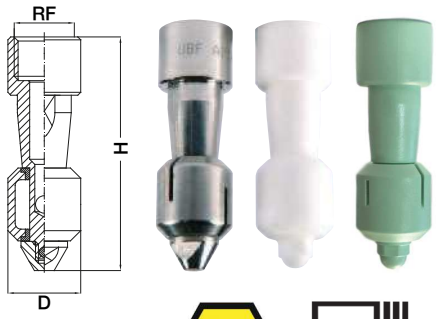




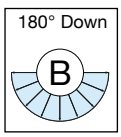
UBF A

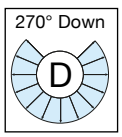
Designed for cleaning processes in small bore piping or small size containers and available in a range of different plastic materials and special alloys, as well as with several spray angles.

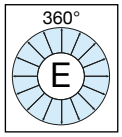
Materials D82 PVDF (molded)
B31 AISI 316L s.s.
E1 PTFE (FDA approved)
L61 Hastelloy C22



Code	RF BSP	Capacity at diff. pressures l/min bar			Spray coverage			Size mm	
		2,0	3,0	4,0	180D	270D	360	H	D
UBF A250 xxBG	1/2"	20,0	25,0	28,8	•			80	25
UBF A250 xxDG		20,0	25,0	28,8		•			
UBF A250 xxEG		20,0	25,0	28,8			•		



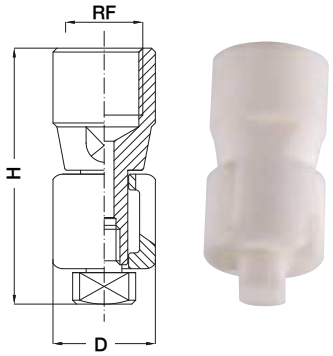




UBF S

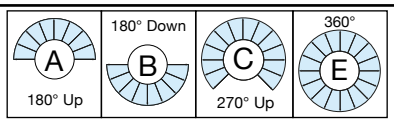
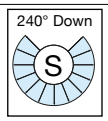
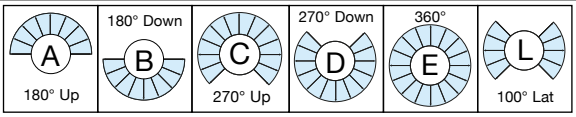
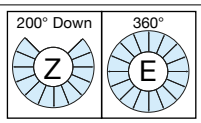
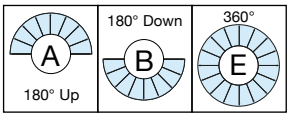
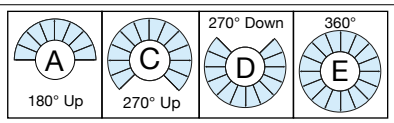
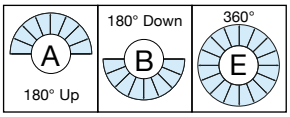
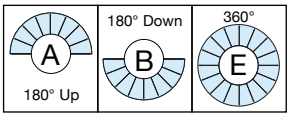
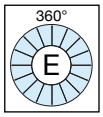
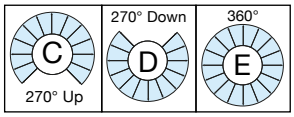
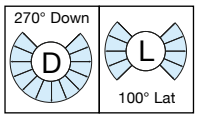
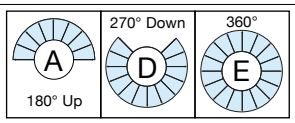
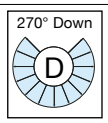
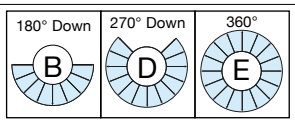
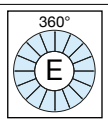
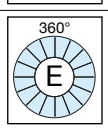
Designed for cleaning processes in very small bore piping or containers, down to 13 mm diameter. The device is available in different materials as well as spray angles.

Materials B31 AISI 316L s.s.
E1 PTFE (FDA approved)



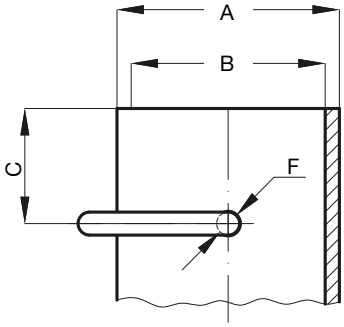
Code	RF BSP	Capacity at diff. pressures l/min bar			Spray coverage	Size mm	
		2,0	3,0	4,0	270D	H	D
UBF S055 xxDG	1/8"	4,50	5,50	6,40	•	32	13

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).

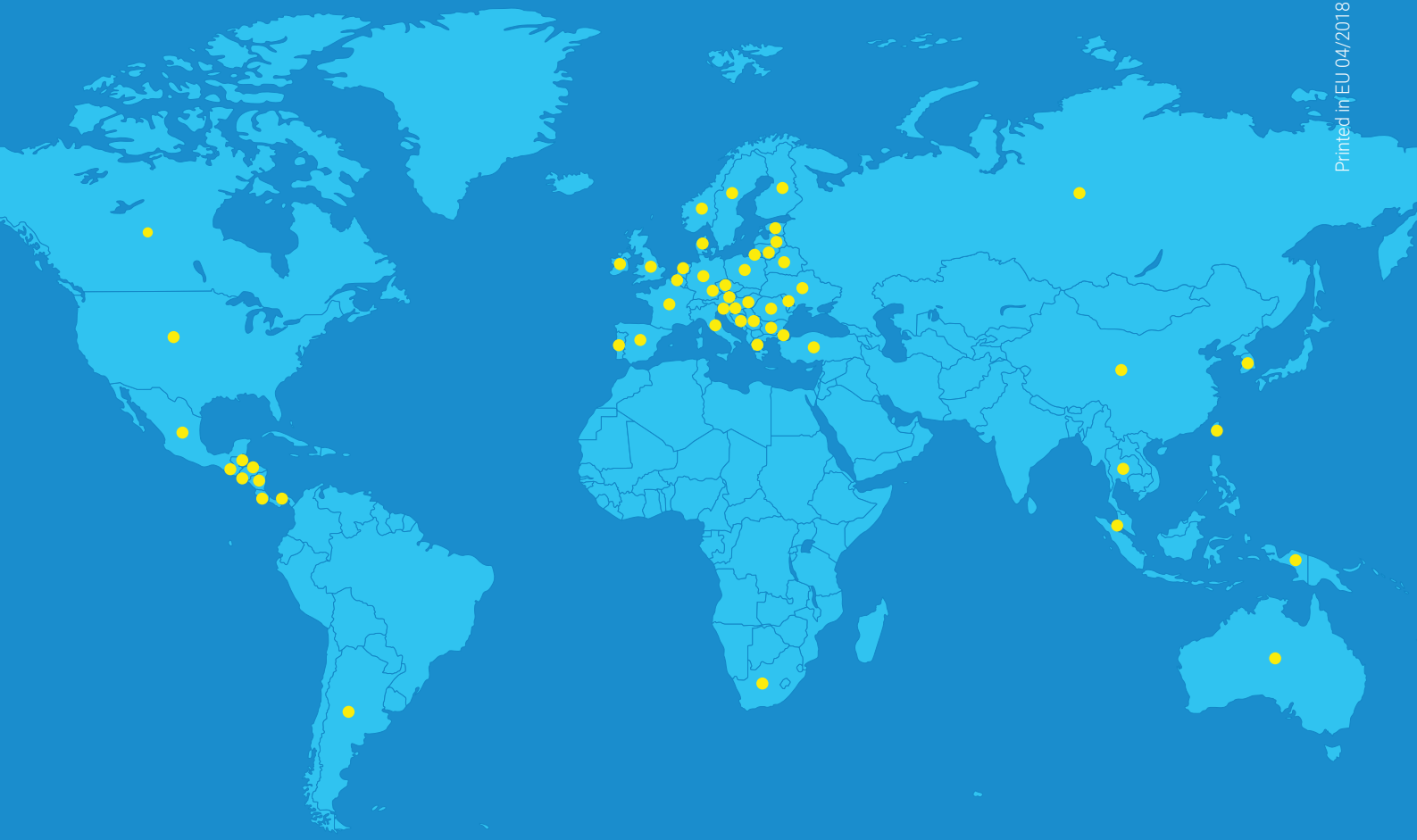
Single-axis rotary spray balls UBA, UBC, UBD, UBF, UBF-A, UBF-S are available in ATEX ("Atmosphères explosibles") version, in confomity with European Community Directive 2014/34/EU that determine compliance with the essential safety requirements for equipment and protection systems intended for use in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