



**CONTINUOUS CASTING
COOLING (WATER)**



**CONTINUOUS CASTING
COOLING (AIR/WATER)**



SW22

STEEL WORK NOZZLES



HOT ROLLING



**COOLING / LUBRICATION
ROLLS**





PNR ITALIA

PNR ITALIA, with over 40 years experience, is a world wide leader in spray technology offering general and specialized products for all industrial sectors.

Resulting from our years of success, **PNR** offers a complete range of product directed at the Steel Works Industry. From Continuous Casting, Hot Rolling, Pickling, **PNR** has the products for Dust Suppression, Primary/Secondary Cooling, Pollution Control, Steel Cutting and complete Water Treatment Filtration. (this follows the Index pages 6-7)

PNR support surpasses others and starts at our Corporate Headquarters in Voghera, Italy with manufacturing, technical department, up to date computer software, ISO Certified (the ISO cert could be located on the bottom of this page as well), and laboratory (open to customer visits).

You are also personally supported by **PNR's** commercial branches in many countries in Europe, Asia and North America, as well as, our many distributors world wide.

We encourage you to visit www.pnr.eu to learn more about how **PNR** is your correct choice for Industrial Spray Nozzles.

All PNR catalogues are available for download:

CTG SW	Steelworks nozzles
CTG UG	Spray systems for industrial applications
CTG LS	Tank washing systems
CTG AZ	Air-assisted atomizers
CTG LN	Cooling lances
CTG SP	Spray-dry nozzles
CTG PM	Paper mill nozzles
CTG AC	Assembly parts and complementary products
CTG KL	Cleaning and washing technologies
CTG FF	Fire-fighting products and systems

Our products are constantly reviewed and adapted to the current most modern technical level. Therefore our documentation is updated accordingly and sent to customers registered on our mailing list. To be included in this list you can send us your request with your exact e-mail or physical address.

DNV QUALITY SYSTEM

Our Company qualified its Quality Management System in compliance with the ISO 9001/2000 Norms.



DET NORSKE VERITAS

QUALITY MANAGEMENT SYSTEM CERTIFICATE

Certificato No. / Certificate No. **CERT-04111-99-AQ-MIL-SINCERT**

Si attesta che / This certifies that

Il sistema di gestione per la qualità di / the quality management system of

PNR ITALIA S.r.l.

Via Gandini, 2 - 27058 Voghera (PV) Italy

È conforme ai requisiti della norma per i sistemi di gestione per la qualità
Conforms to the quality management systems standard

UNI EN ISO 9001:2000 (ISO 9001:2000)

Questa certificazione è valida per il seguente campo applicativo:
This certificate is valid for the following products or services:

(Ulteriori chiarimenti riguardanti lo scopo e l'applicabilità dei requisiti della normativa si possono ottenere consultando l'organizzazione certificata)
 (Further clarifications regarding the scope and the applicability of the requirements of the standard(s) may be obtained by consulting the certified organization)

**Progettazione e produzione di spruzzatori ed atomizzatori pneumatici per applicazioni industriali
 e di teste rotanti per lavaggio serbatoi**

*Design and manufacture of spray nozzles and air assisted atomizers for industrial applications
 and tank washing rotating heads*

Data Prima Emissione
First Issue Date
1999-03-09

Luogo e data
Place and date
Agrate Brianza, (MI) 2009-02-06

Settore EA : 17 - 14

Sergio Vannucci
Lead Auditor



ACCREDITAMENTO ORGANISMO DI CERTIFICAZIONE E SPEDIZIONE
 ISO 9001 Registrazione N. 0033A
 ISO 9001 Registrazione N. 0033B
 ISO 9001 Registrazione N. 0033C
 Membro degli Accordi di Mutuo Riconoscimento EA e VAF
 Signatory of EA and VAF Mutual Recognition Agreements

Data di scadenza
Expiry Date
2012-02-03

per l'Organismo di Certificazione
for the Accredited Unit
DET NORSKE VERITAS ITALIA S.R.L.


Vittore Marangon
Management Representative

La validità del presente certificato è subordinata a sorveglianza periodica (ogni 6, 9 o 12 mesi) e al riesame completo del sistema con periodicità triennale
 The validity of this certificate is subject to periodical audits (every 6, 9 or 12 months) and the complete re-assessment of the system every three years
 Le aziende in possesso di un certificato valido sono presenti nella banca dati sul sito www.dnv.it e sul sito Sincert (www.sincert.it). All the companies with a valid certificate are online at the following addresses: www.dnv.it and www.sincert.it

PRODUCT IDENTIFICATION

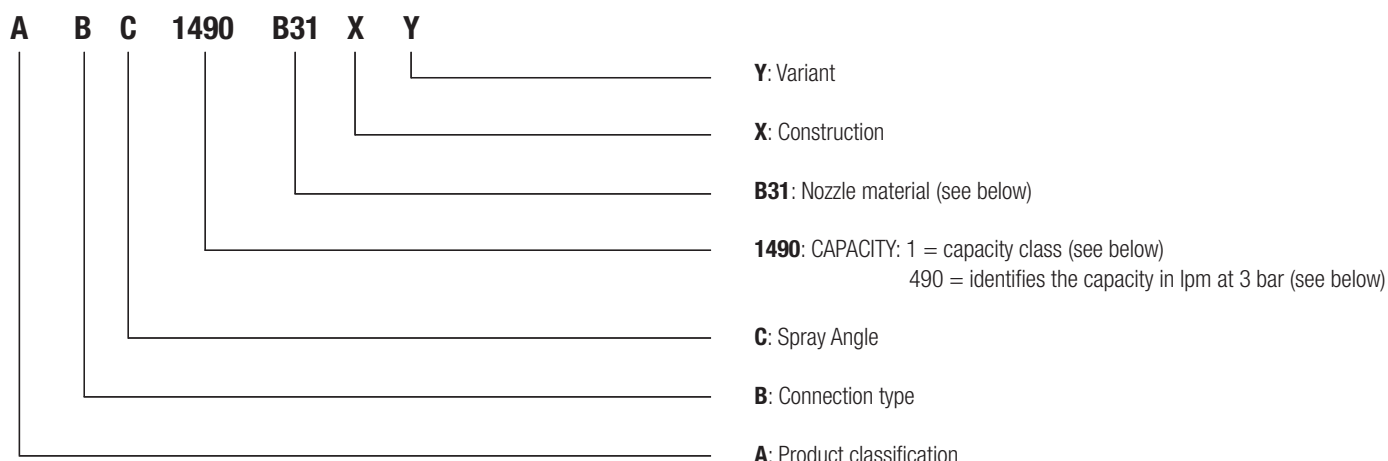
PNR CODING SYSTEM

Every industrial product needs to be identified with a code to avoid mistakes.

PNR product coding system was conceived to meet the following requirements:

- codes are easily listed by a computer in alphabetical order.
- codes fully describe the product, with no need of further information.
- codes immediately provide the main characteristics of each product so to find it in the catalogue easily.

Code Definition is as follows:



Flow rate capacity at 3 bars.

These codes are purely indicative, their meaning may be occasionally different. Please always refer to the numeric indication of the angles beside each table.

CAPACITY CLASS

Class	Numbers	Capacity in lpm
0	0 490	0,49
1	1 490	4,90
2	2 490	49,0
3	3 490	490
4	4 490	4900

COMMON SPRAY ANGLES

A = 0°	L = 40°	T = 80°
B = 15°	M = 45°	U = 90°
C = 20°	N = 50°	J = 110°
D = 25°	Q = 60°	W = 120°
F = 30°	R = 65°	Y = 130°
H = 35°	S = 75°	Z = 180°

PNR PRODUCTS MATERIALS CODES

A1	Carbon steel
A2	High speed steel
A8	Zinc coated steel
A9	Nickel coated steel
B1	Stainless steel AISI 303
B2	Stainless steel AISI 304
B21	Stainless steel AISI 304L
B3	Stainless steel AISI 316
B31	Stainless steel AISI 316L
C1	Stainless steel AISI 420 hardened
C2	Stainless steel AISI 416, hardened
D1	Polyvinylchloride (PVC)
D2	Polypropylene (PP)
D3	Polyamide (PA)

D5	Talcum filled Polypropylene
D6	Glassfibre reinforced PP
D7	High density polyethylene
D8	Polyvinylidene fluoride (PVDF)
E0	EPDM
E1	Polytetrafluorethylene (PTFE)
E2	PTFE (25% glassfibers)
E31	Acetalic resin (POM)
E7	Viton
E8	Synthetic rubber (NBR)
F1	Tungsten carbide
F5	Ceramic
F31	Ruby insert, 303 body
G1	Cast iron

H1	Titanium
L1	Monel 400
L2	Incolloy 825
L8	Hastelloy C276
P6	Acr. But. Styrene (ABS)
P8	EPDM 40 Shore
T1	Brass
T2	Brass, chrome plated
T3	Copper
T5	Bronze
T8	Brass, nickel plated
T81	Brass, electroless nickel plated
V1	Aluminum
V7	Aluminum, electroless n. plated

LIST OF ABBREVIATIONS - LEGENDA

AI	Inlet air capacity	Nmc/min
AO	Outlet air capacity	Nmc/min
CL	Spray jet deflection angle	degrees
D	Nozzle orifice conventional diameter	mm
D1	Minimum internal passage diameter	mm
DE	Supply passage diameter	mm
DF	Flange size	inch
DIA	Outer diameter	mm
DN	Flange nominal size	mm
DU	Outlet orifice diameter	mm
DX	Nipple inside diameter	mm
FF	Flange outer diameter	mm
G	Flange holes centre to centre diameter	mm
H, H1, H2	Height	mm

L, L1	Length	mm
LF	Pipe length	m
LP	Maximum operating pressure	bar
LQ	Maximum capacity	lpm
LT	Maximum operating temperature	°C
NR	Number of orifices	-
QC	Quick coupling connection	-
RA	Range	mm
RF	Cylindrical female thread BSP	inch
RG	Conic male thread BSPT	inch
S	Thickness	mm
SQ	Square bar size	mm
W	Weight	gr, kg
WS	Hexagon key	mm

PRODUCT WARRANTY

PNR products will be replaced or repaired at the option of PNR and free of charges if found defective in manufacturing, labelling or packaging. The above warranty conditions will apply if notice of defect 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.

Our Company Procedure for warranty cases requires the following steps to be performed:

- 1 Contact our Quality manager and obtain from PNR a return authorization number
- 2 Return the products together with our Form 3DA A04 duly completed
- 3 PNR shall issue a test report, send you a copy and return the product repaired or replaced

Our Company scope is to offer full Customer satisfaction, and we are fully aware of the inconvenience which can be originated from a defective product. Please be assured we shall do our best to make available a perfect product in the shortest possible time.

PRODUCT RETURN POLICY

PRODUCTS DELIVERED IN ERROR FROM PNR

- 1 Obtain from PNR a return authorization number.
- 2 Return the products together with our Form 3DA A04 duly completed.
- 3 PNR shall issue a Credit Note for full Product and shipping costs.

PRODUCTS ORDERED INCORRECTLY TO PNR

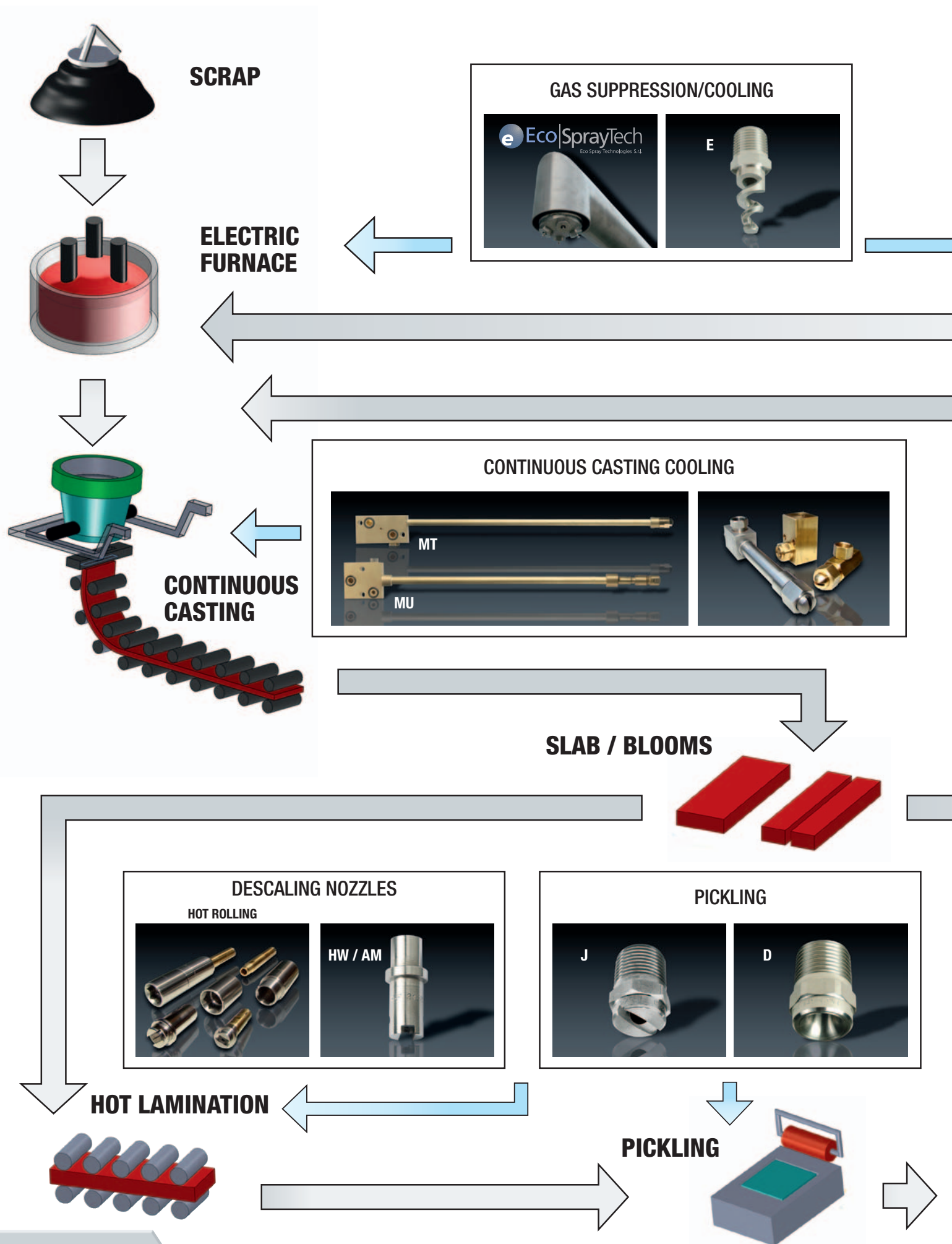
- 1 Obtain from PNR a return authorization number.
- 2 Return the products at your expense together with the form 3DA A04 duly completed.
- 3 Products shall be returned in original condition, inside the original packaging
- 4 A re-stocking change of 15% applies.

NON CATALOG PRODUCTS

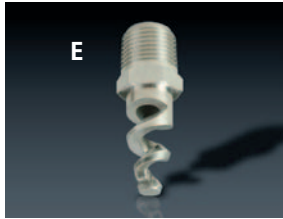
These products can only be returned after a written authorisation from PNR has been obtained.

DISCLAIMER

Our products are manufactured with the best care and according to the latest developments of the technology, but we cannot assure that every one of our products is perfectly fit for any possible specific process. The information in this Catalogue is provided "as is" and we make 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.



DUST SUPPRESSION ON RAW MATERIALS PARK



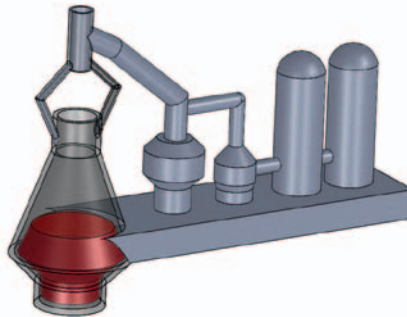
RAW MATERIALS



BASIC OXIGEN CONVERTER



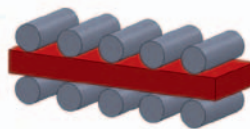
BLAST FURNACE



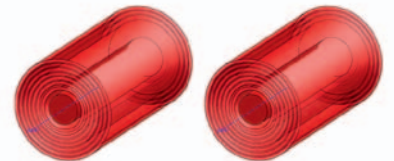
COKE COOLING



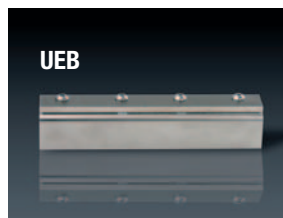
COLD LAMINATION



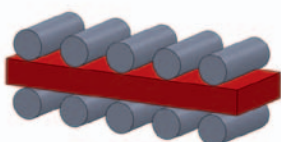
COILS



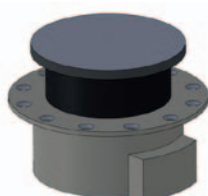
ROLLS COOLING



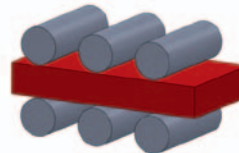
COLD LAMINATION



ANNEALING



TEMPER



COILS



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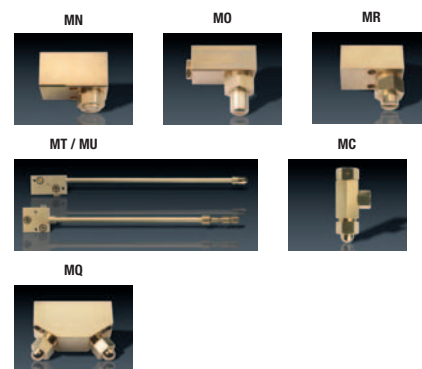
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We regret not being able to update our customers on the continuous improvements to our product range, so please consider the information and product specifications supplied in this catalogue as indicative and not binding for our company. For each application that requires one or more characteristics of one of our catalogue products that must be strictly maintained, please kindly ask for a written confirmation. Any information contained in this Catalogue, codes and product specifications, sketches, drawings and photographs, is the exclusive property of Flowtech Srl and it is forbidden to reproduce it in any medium without express written permission of the same.

All dimensions in this catalogue are in millimetres (mm). All threads to be manufactured according to ISO 228 unless otherwise specified.

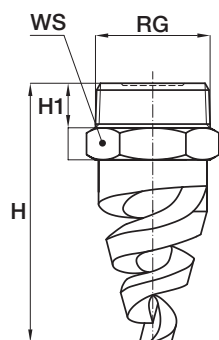
(European Standard BS 2779 - DIN 259 - UNI 338).

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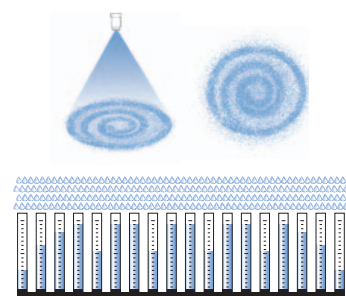
FULL CONE / SPIRAL NOZZLES

Spiral nozzles work on the principle of the jet deflection, diverted from a surface with a spiral profile that determines the desired angle of spray. The value of the spray angle is constant even at low pressures and in case of highly viscous liquids. The distribution of the jet is not comparable to that produced by a traditional full cone nozzle, but the absence of a vane inside makes them, in most cases, not subject to the risk of occlusion.



MATERIALS

B31	Stainless steel AISI 316L
D1	PVC
D2	Polypropylene
D8	PVDF
E1	PTFE
L8	Hastelloy C 276
T1	Brass



HOW TO ORDER PNR PRODUCTS

Model	Thread	Angle	Capacity	Material	Construction	Variation
E	B	Q	1550	XX	Y	Z

Order example: **EBQ 1550 B31SB**


CONSTRUCTION: Y

- **S** standard
- **X** special

VARIATION: Z

- **B** cylindrical gas thread (BSPP)
- **N** conical thread (NPT)


See list of abbreviations - legenda at page 3.

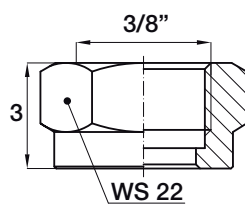
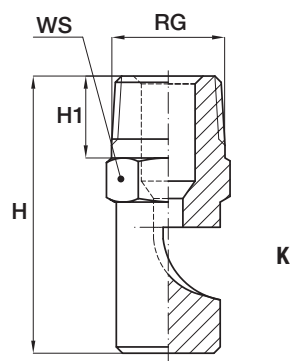
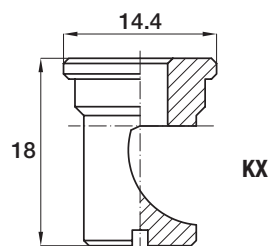
	Code	RG inch	D mm	D1 mm	Capacity - lpm							Dimensions mm		
					Pressure - bar							H	H1	WS
					0.7	1.0	2.0	3.0	5.0	7.0	10			
60°	EBQ 1550 xx	1/4	2.4	2.4	2.66	3.18	4.49	5.50	7.10	8.40	10.0	45	12	14
	EBQ 2156 xx		4.0	3.2	7.54	9.01	12.7	15.6	20.1	23.8	28.5			
	ECQ 2230 xx	3/8	4.8	3.2	11.4	13.6	19.2	23.5	30.3	35.9	42.9	48	14	19
	ECQ 2410 xx		6.4	3.2	20.0	24.0	33.9	41.5	53.6	63.4	75.8			
	ECQ 2640 xx	1/2	7.9	3.2	31.2	37.3	52.7	64.6	83.4	99.0	118	64	18	22
	EDQ 2940 xx		9.5	4.7	45.6	54.5	77.1	94.4	122	144	172			
	EDQ 3128 xx	3/4	11.1	4.7	61.8	73.9	105	128	165	196	234	70	19	27
	EEQ 3165 xx		12.7	4.7	79.7	95.3	135	165	213	252	301			
	EFQ 3260 xx	1	15.9	6.3	126	150	212	260	336	397	475	92	26	34
	EHQ 3507 xx	1 1/2	22.2	7.9	245	293	414	507	655	774	926	111	27	50

CONVERSION TABLE (UE - USA)

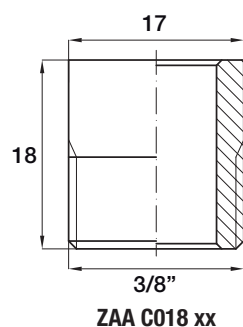
PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm

	Code	RG inch	D mm	D1 mm	Capacity - lpm							Dimensions mm		
					Pressure - bar							H	H1	WS
					0.7	1.0	2.0	3.0	5.0	7.0	10			
90°	EBU 1550 xx	1/4	2.4	2.4	2.66	3.18	4.49	5.50	7.10	8.40	10.0	45	12	14
	EBU 2100 xx		3.2	3.2	4.83	5.77	8.16	10.0	12.9	15.3	18.3			
	EBU 2156 xx		4.0	3.2	7.54	9.01	12.7	15.6	20.1	23.8	28.5			
	ECU 2230 xx	3/8	4.8	3.2	11.4	13.6	19.2	23.5	30.3	35.9	42.9	48	14	19
	ECU 2317 xx		5.6	3.9	15.3	18.3	25.9	31.7	40.9	48.4	57.9			
	ECU 2410 xx		6.4	4.8	20.0	24.0	33.9	41.5	53.6	63.4	75.8			
	ECU 2640 xx	1/2	7.9	5.5	31.2	37.3	52.7	64.6	83.4	99.0	118	64	18	22
	EDU 2940 xx		9.5	3.3	45.6	54.5	77.1	94.4	122	144	172			
	EDU 3128 xx		11.1	3.7	61.8	73.9	105	128	165	196	234			
	EEU 3165 xx	3/4	12.7	4.7	79.7	95.3	135	165	213	252	301	70	19	27
	EFU 3260 xx	1	19.0	6.3	126	150	212	260	336	397	475	92	26	34
	EFU 3372 xx		23.0	6.3	180	215	304	372	480	568	679			
	EKU 4109 xx	2	34.9	11.1	527	629	890	1090	1407	1665	1990	149	31	65
	EMU 4204 xx	3	44.5	14.3	985	1178	1666	2040	2633	3116	3724	219	42	89
	EMU 4267 xx		50.8		1290	1541	2180	2670	3447	4078	4874			
120°	EBW 1550 xx	1/4	2.4	2.4	2.66	3.18	4.49	5.50	7.10	8.40	10.0	45	12	14
	EBW 2100 xx		3.2	3.2	4.83	5.77	8.16	10.0	12.9	15.3	18.3			
	EBW 2156 xx		4.0	3.2	7.54	9.01	12.7	15.6	20.1	23.8	28.5			
	ECW 2156 xx	3/8	4.0	3.2	7.54	9.01	12.7	15.6	20.1	23.8	28.5	48	14	19
	ECW 2230 xx		4.8	3.2	11.4	13.6	19.2	23.5	30.3	35.9	42.9			
	ECW 2317 xx		5.6	4.0	15.3	18.3	25.9	31.7	40.9	48.4	57.9			
	ECW 2410 xx		6.4	4.0	20.0	24.0	33.9	41.5	53.6	63.4	75.8			
	ECW 2640 xx	1/2	7.9	4.0	31.2	37.3	52.7	64.6	83.4	98.7	118	64	18	22
	EDW 2940 xx		9.5	4.8	45.6	54.5	77.1	94.4	122	144	172			
	EDW 3104 xx		9.7	4.8	50.2	60.0	84.9	104	134	159	190			
	EDW 3128 xx	3/4	11.1	4.8	61.8	73.9	105	128	165	196	234	70	19	27
	EEW 3165 xx	1	12.7	4.8	79.7	95.3	135	165	213	252	301	92	26	34
	EFW 3260 xx		15.9	6.3	126	150	212	260	336	397	475			
	EFW 3372 xx	1 1/2	19.0	7.9	180	215	304	372	480	568	679	111	27	50
	EHW 3507 xx		22.2		245	293	414	507	655	774	926			
	EHW 3663 xx		25.4		320	383	541	663	856	1013	1210			
	EHW 3747 xx	2	28.6	11.1	361	431	610	747	964	1141	1364	149	31	65
	EKW 4109 xx		34.9		527	629	890	1090	1407	1665	1990			
	EKW 4139 xx	3	38.1	14.3	671	803	1136	1391	1796	2125	2540	203	35	90
	EMW 4204 xx		44.5		985	1178	1666	2040	2634	3116	3725			
	EMW 4267 xx	4	51.0	15.9	1280	1530	2164	2650	3421	4048	4838	230	40	127
	EPW 4412 xx		63.5		1990	2379	3364	4120	5318	6293	7522			



VAA 0380 xxB



ZAA C018 xx

FLAT JET NOZZLES

The K series nozzles work on the principle of jet deflection, conveying a liquid vein against an accurately machined surface and produce a fan spray with a wide angle, medium size droplets and medium-low impact values. The outlet round orifice and the free internal passage minimizes clogging.

MATERIALS

B1	Stainless steel AISI 303
B31	Stainless steel AISI 316L
T1	Brass

HOW TO ORDER PNR PRODUCTS

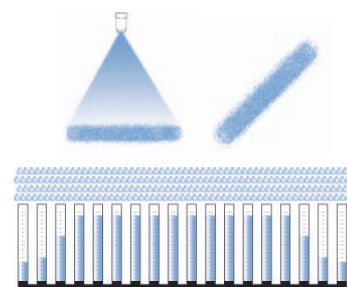
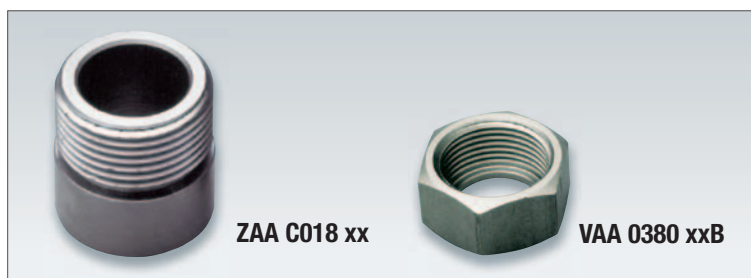
Model	Thread	Angle	Capacity	Material
K	G	W	0390	XX

Order example: **KGW 0390 B31**

THREAD SIZE AND DIMENSIONS

Code	RG inch	H mm	H1 mm	WS mm
KGW	1/8	25	10	14
KHW	1/4	34	12.5	14
KIW	3/8	44	13	17
KJW	1/2	49	17	22
KKW	3/4	65	20	36
KLW	1	92	26	46

With the "KX" series it's possible to order nozzles without thread that are usually installed on a welding nipple (**type ZAA C018 xx**) and fixed by a locknut (**type VAA 0380 xxB**).



See list of abbreviations - legenda at page 3.

KGW	KHW	KIW	KJW	KKW	KLW	KXW	Code	D mm	Capacity - lpm							Angle-degrees	
									Pressure - bar							Pressure - bar	
									0.5	1.0	2.0	3.0	4.0	5.0	7.0	1.5	4.0
•						•	0390	0.6	0.16	0.23	0.32	0.39	0.45	0.50	0.60	90	120
•						•	0590	0.7	0.24	0.34	0.48	0.59	0.68	0.76	0.90	105	120
•						•	0780	0.8	0.32	0.45	0.64	0.78	0.90	1.01	1.19	110	125
•						•	1120	1.0	0.49	0.69	0.98	1.20	1.39	1.55	1.83	105	122
•	•					•	1160	1.1	0.65	0.92	1.31	1.60	1.85	2.07	2.44	110	130
•	•					•	1200	1.3	0.82	1.15	1.63	2.00	2.31	2.58	3.06	120	130
•	•					•	1230	1.4	0.94	1.33	1.88	2.30	2.66	2.97	3.51	110	125
•	•					•	1310	1.6	1.27	1.79	2.53	3.10	3.58	4.00	4.74	120	130
•	•					•	1390	1.8	1.59	2.25	3.18	3.90	4.50	5.03	5.96	130	140
•	•					•	1590	2.3	2.41	3.41	4.82	5.90	6.81	7.62	9.01	120	130
•	•					•	1780	2.6	3.18	4.50	6.37	7.80	9.01	10.1	11.9	130	140
•	•					•	1940	2.9	3.84	5.43	7.68	9.40	10.9	12.1	14.4	140	150
•	•					•	2117	3.3	4.78	6.75	9.55	11.7	13.5	15.1	17.9	110	120
•	•					•	2141	3.6	5.76	8.14	11.5	14.1	16.3	18.2	21.5	120	130
•	•					•	2157	3.8	6.41	9.06	12.8	15.7	18.1	20.3	24.0	120	130
	•					•	2172	4.0	7.02	9.93	14.0	17.2	19.9	22.2	26.3	125	135
	•					•	2188	4.1	7.68	10.9	15.4	18.8	21.7	24.3	28.7	130	140
	•					•	2210	4.4	8.57	12.1	17.1	21.0	24.2	27.1	32.1	135	145
		•				•	2230	4.5	9.39	13.3	18.8	23.0	26.6	29.7	35.1	110	120
		•				•	2270	5.0	11.0	15.6	22.0	27.0	31.2	34.9	41.2	115	125
		•	•			•	2310	5.3	12.7	17.9	25.3	31.0	35.8	40.0	47.4	125	135
		•	•				2350	5.6	14.3	20.2	28.6	35.0	40.4	45.2	53.5	130	140
			•				2390	6.0	15.9	22.5	31.8	39.0	45.0	50.3	59.6	130	140
			•				2470	6.5	19.2	27.1	38.4	47.0	54.3	60.7	71.8	135	140
			•				2550	7.1	22.5	31.8	44.9	55.0	63.5	71.0	84.0	135	145
			•				2630	7.5	25.7	36.4	51.4	63.0	72.7	81.3	96.2	140	150
				•			2700	8.0	28.6	40.4	57.2	70.0	80.8	90.4	107	130	140
				•			2780	8.4	31.8	45.0	63.7	78.0	90.1	101	119	135	145
				•			2860	8.7	35.1	49.7	70.2	86.0	99.3	111	131	135	145
				•			2940	9.3	38.4	54.3	76.8	94.0	109	121	144	140	150
				•			3110	10.3	44.9	63.5	89.8	110	127	142	168	125	135
				•			3125	11.0	51.0	72.2	102	125	144	161	191	130	135
				•			3141	11.4	57.6	81.4	115	141	163	182	215	130	135
				•			3164	12.2	67.0	94.7	134	164	189	212	251	135	145
					•		3235	14.6	95.9	136	192	235	271	303	359	130	135
					•		3350	17.9	143	202	286	350	404	452	535	130	135

CONVERSION TABLE (UE - USA)

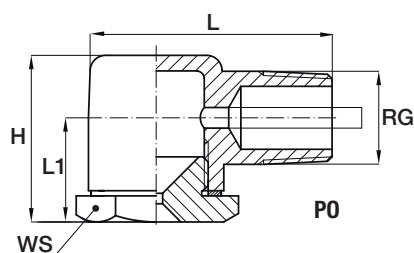
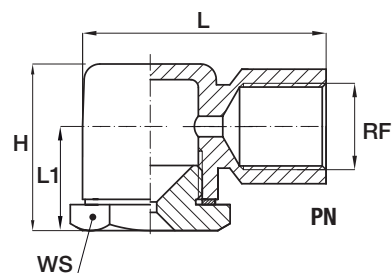
PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm



HOLLOW CONE NOZZLES

These hollow cone nozzles are made by plastic moulding, with top quality fibreglass reinforced with propylene which offers good mechanic strength and dimensional stability. They produce small droplets, a uniform spray distribution and are corrosion resistant. They are not expensive and ideal for applications like air humidification, intensive cooling and gas washing. Together with our pipe clamps, they are the best solution in all cases where large quantities of nozzles must be easily assembled onto pipe manifolds. Maximum operating temperature: 75°C.



MATERIALS

D6 Glassfibre reinforced PP

HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material	Construction	Variation
PN	U	1390	XX	Y	Z

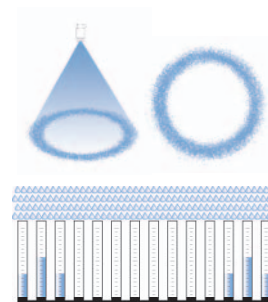
Order example: **PNU 1390 D6**

CONSTRUCTION: Y

- **S** standard

VARIATION: Z

- **G** cylindrical gas thread (BSPP)
- **N** conical thread (NPT)




PO - NOZZLES WITH MALE THREAD


PO nozzles 3/8" only can also be supplied with a 3/8" BSP male thread.


PN Nozzle with ZPN Pipe Clamp.




See list of abbreviations - legenda at page 3.

	PNS	POS	Code	RF inch	DE mm	DU mm	Capacity - lpm								Dimensions mm			
							Pressure - bar								H	L	L1	WS
							0.5	0.7	1.0	2.0	3.0	5.0	7.0	10				
70°	•	•	1170	3/8	2.0	2.9	0.69	0.82	0.98	1.39	1.70	2.19	2.60	3.10	31	44	20	22

	PNT	POT	Code	RF inch	DE mm	DU mm	Capacity - lpm								Dimensions mm			
							Pressure - bar								H	L	L1	WS
							0.5	0.7	1.0	2.0	3.0	5.0	7.0	10				
80°	•	•	1260	3/8	2.7	3.5	1.06	1.26	1.50	2.12	2.60	3.36	3.97	4.75	31	44	20	22

	PNU	POU	Code	RF inch	DE mm	DU mm	Capacity - lpm								Dimensions mm			
							Pressure - bar								H	L	L1	WS
							0.5	0.7	1.0	2.0	3.0	5.0	7.0	10				
90°	•		1390	3/8	3.7	3.8	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12	31	44	20	22
	•		1670		4.4	5.2	2.74	3.24	3.87	5.47	6.70	8.65	10.2	12.2				
	•		1850		5.2	5.6	3.47	4.11	4.91	6.94	8.50	11.0	13.0	15.5				
	•		2115		6.1	6.3	4.69	5.56	6.64	9.39	11.5	14.8	17.6	21.0				
	•		2220		7.2	9.2	8.98	10.6	12.7	18.0	22.0	28.4	33.6	40.2				
		•	2320	1/2	9.5	10.5	13.1	15.5	18.5	26.1	32.0	41.3	48.9	58.4	42	55	35	30
		•	2398		8.5	14.0	16.2	19.2	23.0	32.5	39.8	51.4	60.8	72.7				

	PNY	POY	Code	RF inch	DE mm	DU mm	Capacity - lpm								Dimensions mm			
							Pressure - bar								H	L	L1	WS
							0.5	0.7	1.0	2.0	3.0	5.0	7.0	10				
130°	•	•	1170	3/8	1.7	3.5	0.69	0.82	0.98	1.39	1.70	2.19	2.60	3.10	31	44	20	22
	•	•	1260		1.9	5.0	1.06	1.26	1.50	2.12	2.60	3.36	3.97	4.75				
	•	•	1390		2.7	5.0	1.59	1.88	2.25	3.18	3.90	5.03	5.96	7.12				
	•	•	1460		3.1	5.0	1.88	2.22	2.66	3.76	4.60	5.94	7.03	8.40				
	•	•	1570		3.0	7.5	2.33	2.75	3.29	4.65	5.70	7.36	8.71	10.4				
	•	•	1670		3.4	7.5	2.74	3.24	3.87	5.47	6.70	8.65	10.2	12.2				
	•	•	1850		4.1	7.5	3.47	4.11	4.91	6.94	8.50	11.0	13.0	15.5				
	•	•	1980		3.6	12	4.00	4.73	5.66	8.00	9.80	12.7	15.0	17.9				
	•	•	2128		4.2	12	5.23	6.18	7.39	10.5	12.8	16.5	19.6	23.4				
	•	•	2208		6.0	12	8.49	10.0	12.0	17.0	20.8	26.9	31.8	38.0				
	•	•	2220		6.4	12	8.98	10.6	12.7	18.0	22.0	28.4	33.6	40.2				
	•		2129	1/2	4.3	14	5.23	6.18	7.39	10.5	12.8	16.5	19.6	23.4	42	55	35	30
	•		2209		5.8	14	8.49	10.0	12.0	17.0	20.8	26.9	31.8	38.0				
	•		2221		6.3	14	8.98	10.6	12.7	18.0	22.0	28.4	33.6	40.2				
	•		2320		7.6	14	13.1	15.5	18.5	26.1	32.0	41.3	48.9	58.4				
	•		2420		9.0	14	17.1	20.3	24.2	34.3	42.0	54.2	64.2	76.7				

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm

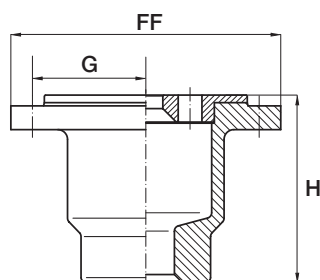


FULL CONE NOZZLES

DISC VANE / HIGH FLOW RATES

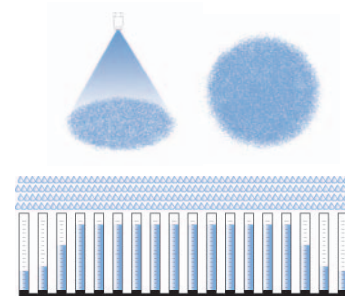
The AE series nozzles are designed for very high capacities using an internal profile carefully designed and machined which allows to obtain a uniform spray distribution also at very low feed pressures. The nozzle, depending on its size, is machined from a casting or welded body. Connection flange typically DIN ND 16.

Typical applications of this nozzle are coke suppression and efficient cooling of large surfaces with considerable volumes of water.



MATERIALS

A1	Carbon steel
B3	AISI 316 Stainless steel
G1	Cast iron



HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material	Construction	Variation
AE	U	3940	XX	Y	Z

CONSTRUCTION: Y

- **S** casting model (PN10)
- **W** rod model (PN10)
- **R** casting model (PN16)
- **V** rod model (PN16)

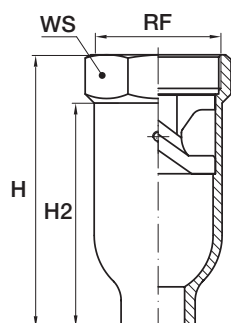
VARIATION: Z

- **E** EN (UNI) flange
- **F** ANSI flange

Order example: **AEU 3940 B31WA**

	Code	DN	D mm	D1 mm	Capacity - lpm								Dimensions mm		
					Pressure - bar								FF	G	H
					0.25	0.35	0.5	0.7	1.0	2.0	3.0	5.0			
90°	AEU 3940 xx	80	37	12	340	405	442	520	599	788	940	1195	200	160	140
	AEU 4118 xx		39	14	425	505	568	670	740	987	1180	1480			
	AEU 4147 xx	100	43	13	535	630	700	830	940	1230	1470	1825	220	180	156
	AEU 4188 xx	125	53	16	680	810	900	1060	1180	1595	1880	2340	250	210	177
	AEU 4235 xx		56	16	845	1010	1128	1335	1495	1975	2350	2590			
	AEU 4294 xx	150	59	21	1065	1265	1398	1650	1880	2490	2940	3630	285	240	188
	AEU 4370 xx		66	24	1345	1593	1795	2120	2320	3140	3700	4610			
	AEU 4470 xx	200	72	28	1710	2020	2180	2565	2995	3930	4700	5860	340	295	250
	AEU 4588 xx		81	32	2135	2530	2760	3300	3635	4940	5880	7310			
	AEU 4741 xx	250	88	39	2650	3185	3590	4245	4690	6150	7410	9120	395	350	291
	AEU 4941 xx		99	37	3410	4050	4520	5350	5980	7880	9410	11650			
120°	AEW 3940 xx	80	36	15	340	405	442	520	599	788	940	1195	200	160	140
	AEW 4118 xx		40.5	14.5	425	505	568	670	740	987	1180	1480			
	AEW 4147 xx	100	43	18.5	535	630	700	830	940	1230	1470	1825	220	180	156
	AEW 4188 xx	125	53	22	680	810	900	1060	1180	1595	1880	2340	250	210	177
	AEW 4235 xx		55	24	845	1010	1128	1335	1495	1975	2350	2590			
	AEW 4294 xx	150	59	28	1065	1265	1398	1650	1880	2490	2940	3630	285	240	188
	AEW 4370 xx		66	32	1345	1593	1795	2120	2320	3140	3700	4610			
	AEW 4470 xx	200	75	35	1710	2020	2180	2565	2995	3930	4700	5860	340	295	250
	AEW 4588 xx		81	40	2135	2530	2760	3300	3635	4940	5880	7310			
	AEW 4741 xx	250	86	37	2650	3185	3590	4245	4690	6150	7410	9120	395	350	291
	AEW 4941 xx	14.3	96	42	3410	4050	4520	5350	5980	7880	9410	11650			

See list of abbreviations legenda at page 3.



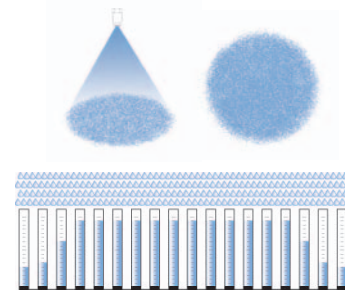
FULL CONE NOZZLES

X-VANE / LARGE CAPACITIES

The BE/BL nozzles produce a full cone spray evenly distributed over a circular area of impact and are used for applications requiring high flow rates, up to 11,300 l/min.

Whether produced with standard or large spray angles, they provide a high density of spray per square meter.

The bodies are obtained by casting and can be supplied both with female thread (BE series) or with ANSI flange (BL series).



MATERIALS

B31	Stainless steel AISI 316L
G1	Cast iron

HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material	Construction	Variation
BE	U	4139	XX	Y	Z

Order example: **BEU 4139 B31**

CONSTRUCTION: Y

- **S** standard

VARIATION: Z

- **G** cylindrical gas thread (BSPP)
- **N** conical thread (NPT)

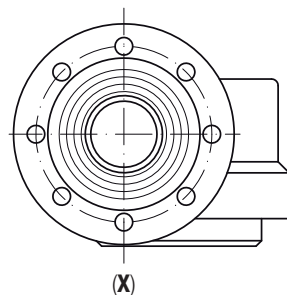
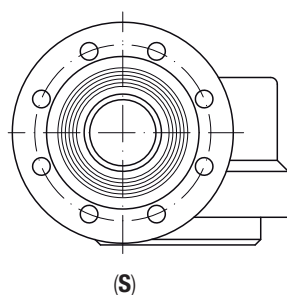
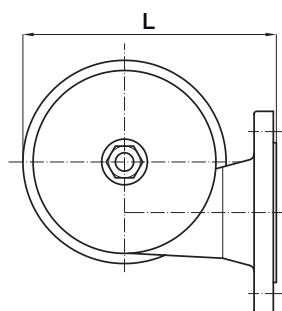
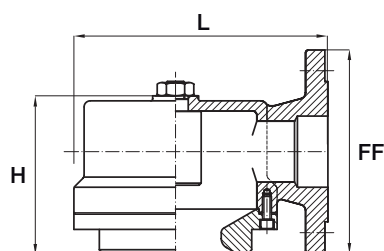
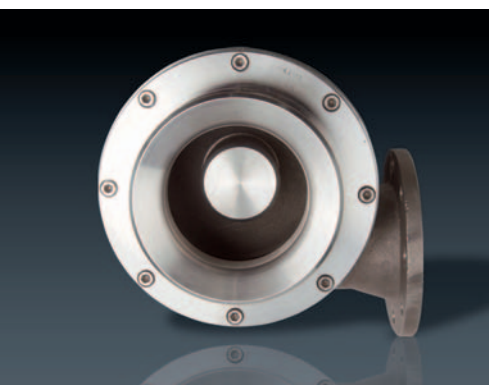
See list of abbreviations - legenda at page 3.

	BEU	Code	RF DF inch	D mm	D1 mm	Capacity - lpm							Dimensions mm		
						Pressure- bar							H	H2	WS
						0.7	1.0	2.0	3.0	5.0	7.0	10			
90°	•	4139 xx	4	43	19	671	803	1135	1390	1794	2123	2538	251	207	130
	•	4157 xx		47	22	758	906	1282	1570	2027	2398	2866			
	•	4174 xx		51	25	840	1005	1421	1740	2246	2658	3177			
	•	4183 xx		54	25	884	1057	1494	1830	2363	2795	3341			
	•	4218 xx	5	48	29	1053	1259	1780	2180	2814	3330	3980	311	269	170
	•	4244 xx		53	29	1179	1409	1992	2440	3150	3727	4455			
	•	4279 xx		68	35	1348	1611	2278	2790	3602	4262	5094			
	•	4287 xx		73	35	1386	1657	2343	2870	3705	4384	5240			
	•	4305 xx	6	61	41	1473	1761	2490	3050	3938	4659	5569	366	321	200
	•	4348 xx		70	41	1681	2009	2841	3480	4493	5316	6354			
	•	4392 xx		77	44	1894	2263	3201	3920	5061	5988	7157			
	•	4418 xx		82	44	2019	2413	3413	4180	5396	6385	7632			
	•	4435 xx	8	70	48	2101	2511	3552	4350	5616	6645	7942	470	423	240
	•	4520 xx		80	47	2512	3002	4246	5200	6713	7943	9494			
	•	4610 xx		91	47	2947	3522	4981	6100	7875	9318	11137			
	•	4694 xx		102	57	3352	4007	5666	6940	8960	10601	12671			
	•	4785 xx		124	57	3792	4532	6409	7850	10134	11991	14332			

CONVERSION TABLE (UE - USA)

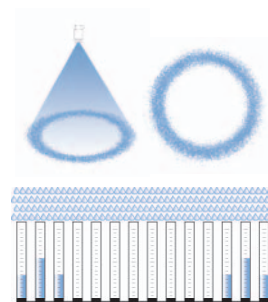
PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm



HOLLOW CONE NOZZLES

PRY nozzles produce a hollow cone spray based on the principle of the tangential jet with an offset spray angle of 130°. These nozzles offer a considerable resistance to clogging thus reducing costly shutdowns for maintenance. They are machined from semi-worked materials from casting.



MATERIALS

A1	Carbon steel
B31	Stainless steel AISI 316L
G1	Cast iron

HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material	Construction	Variation
PR	Y	3612	B31	Y	Z

Order example: **PRY 3612 B31SE**

CONSTRUCTION: Y

- **S** standard flange assembly (PN10)
- **X** special flange assembly (PN10)
- **R** standard flange assembly (PN16)
- **Y** special flange assembly (PN16)

VARIATION: Z

- **E** EN (UNI) flange
- **F** ANSI flange

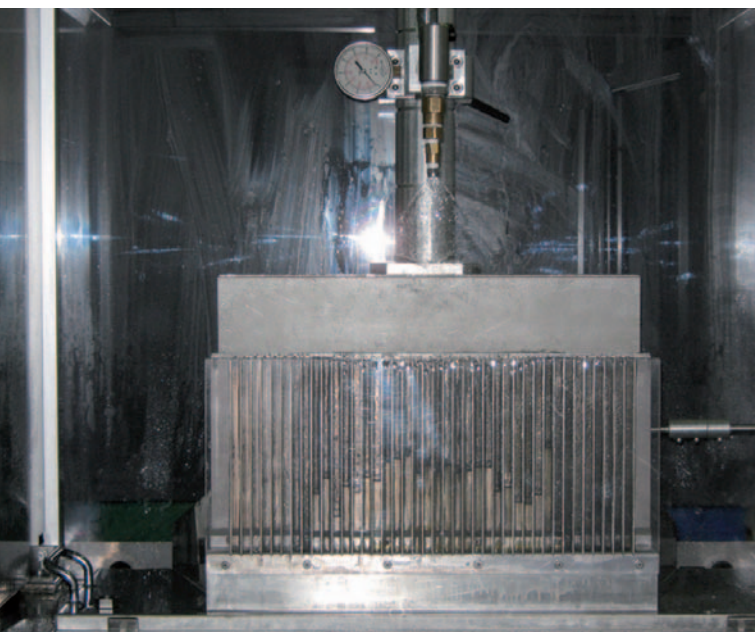
See list of abbreviations - legenda at page 3.

	PR	Code	RF DF inch	Capacity - lpm					Dimensions mm		
				Pressure - bar					L	FF	H
				0.7	1.0	2.0	3.0	5.0			
130°	•	3612 xx	3	296	353	499	612	790	250	200	160
	•	3869 xx	3	420	501	709	869	1121	250	200	160
	•	3979 xx	3	473	565	799	979	1264	250	200	160
	•	4195 xx	4	942	1125	1592	1950	2517	353	220	275
	•	4244 xx	4	1179	1408	1992	2440	3150	353	220	275
	•	4306 xx	4	1478	1767	2498	3060	3950	353	220	275
	•	4385 xx	4	1860	2222	3143	3850	4970	353	220	275

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm



One of the most important processes in steel production is the solidification of the continuous casting which occurs through the use of sprayers specially designed and installed. Over recent years the casting speed has increased considerably, thus the installed nozzles are essential to ensure an even and very cooling. Over the years, PNR has developed several test instruments to evaluate and ensure both capacity and angle of its nozzles, the distribution of their water jets and the size of the droplets.

Here below is a short description of our testing machines:

PATTERNATOR / DISTRIBUTION

We can evaluate the distribution of the spray jets both with a single fluid (water) or double fluid (air/water). The sprayer will work for a prefixed time filling in the various columns of the patternator. Then the patternator water columns are weighed by digital load cell and the data automatically transferred to a computer.

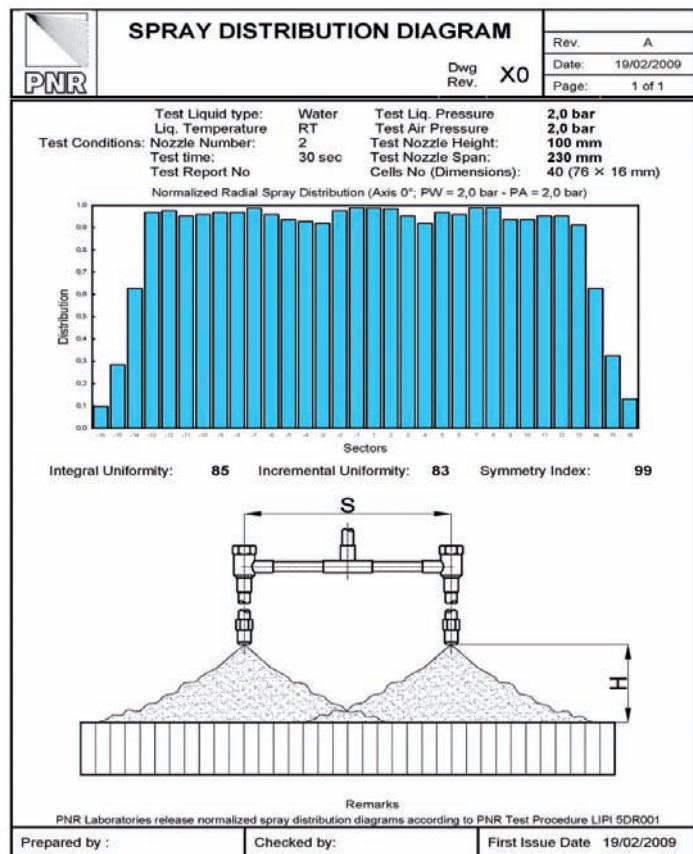
Here are some examples:

Graphic (A)

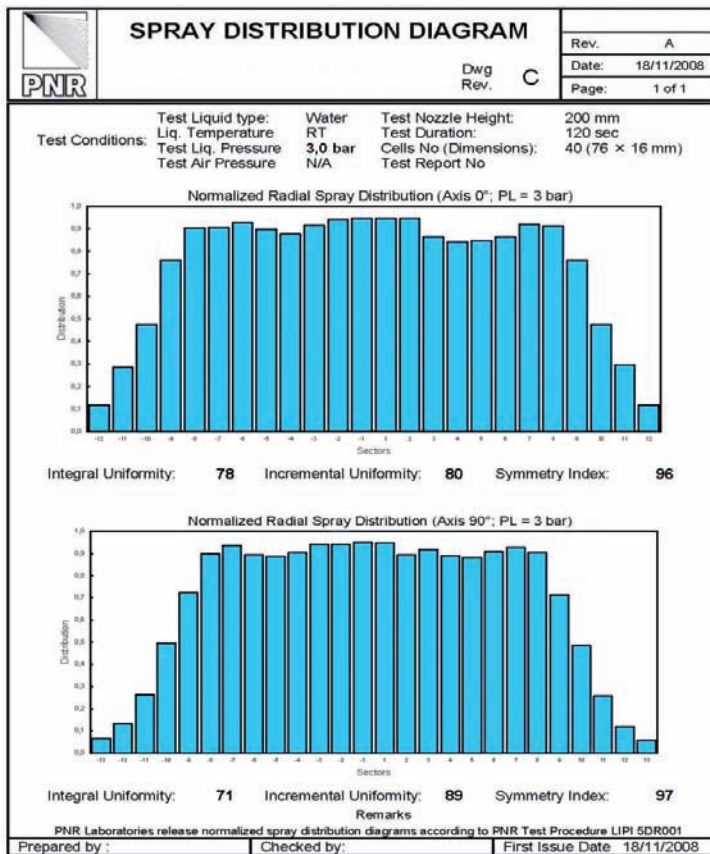
show the test of two air/water flat jet atomizers placed at an inter-axis of 230 mm, useful to evaluate the jets overlap too.

Graphic (B)

concerns the distribution test carried out on a full cone nozzle for water only. In case of full and hollow cones, the test is repeated at least two times rotating the nozzle of 90° to check the exact distribution of the spray on all the areas covered by the jet.



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MOD TD9E A4V01A



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Many industrial processes require the availability of very fine atomized droplets and years of technology to produce atomized jets are very advanced in recent years. Moreover, increasingly sophisticated process techniques have increased the need to have precise definitions of the characteristics of a spray that are now available to design engineers. For many years, **PNR** has provided on request a complete documentation of the reports on the most important application trials performed, described here below, and additional information for all the products in its range.

LASER INTERFEROMETER TEST (BY PDPA)

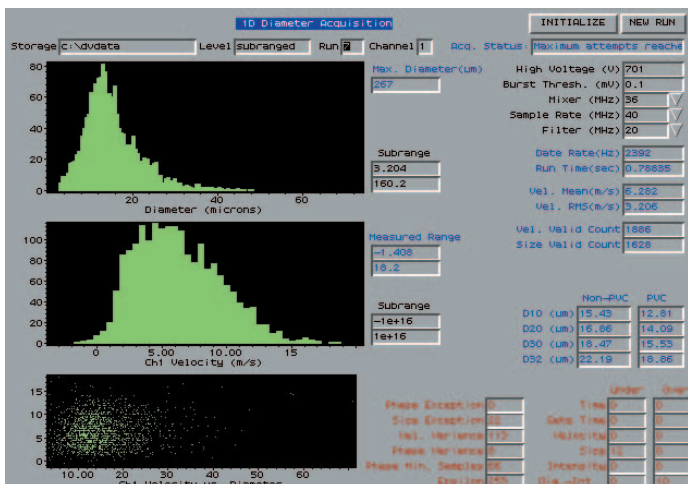
PNR droplets size tests are performed by means of a Pdpa (Phase Doppler Particle Analyzer) Laser Interferometer, an instrument where two laser beams meet at a given point of the spray and define a test probe area. The droplets crossing this probe area cause a light scatter which is detected by the instrument receiver and processed through a computer, in order to obtain the relevant information about the spray characteristics.

TEST REPORT INFORMATION

The report of the tests outcomes is made of data printed on three pages, where the first page contains the most interesting data which make possible to base all process calculations upon precise data in relation to the spray angles, process efficiency and jet behavior in an operating phase. These pages contain the Sauter Average Diameter value which is fundamental to know to make the heat exchange calculations in evaporative gas cooling processes, since it gives the possibility of evaluating the exchange surface obtained by atomizing for a given liquid volume.

The picture, which refers water atomization through compressed air, show the two following bar charts:

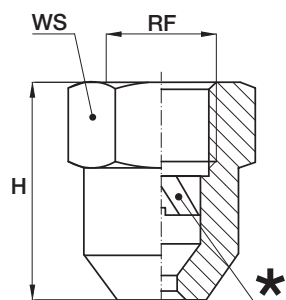
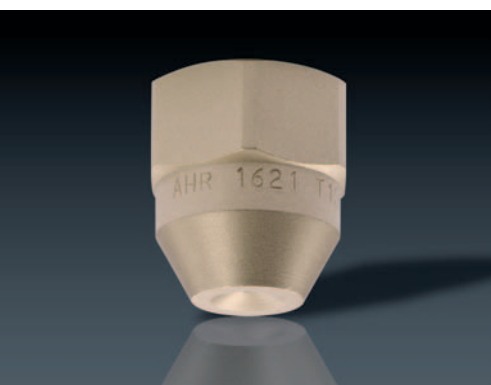
- Distribution curve droplets diameter (micron)
- Distribution curve droplets speed (mps)
- and the values described here below:
- Arithmetic Average Diameter (D_{10})
- Surface Average Diameter (D_{20})
- Volume Average Diameter (D_{30})
- Sauter Average Diameter (D_{32})



***PNR** can supply on request the complete technical literature containing the test reports about the parameters shown here above as well as other information on all **PNR** atomizing nozzles.*

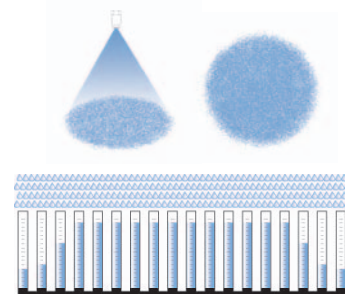
DIAMETERS

AVERAGE DIAMETER ARITHMETIC D_{10}	$D_{10} = \sqrt{\frac{\sum_i n_i d_i}{\sum_i n_i}}$	Diameter value which, multiplied by the number of droplets contained in the sample, is equal to the sum of all droplets diameters.
AVERAGE DIAMETER SURFACE D_{20}	$D_{20} = \sqrt{\frac{\sum_i n_i d_i^2}{\sum_i n_i}}$	Diameter of a droplet whose surface, multiplied by the total number of droplets, is equal to the sum of the surfaces of all droplets.
AVERAGE DIAMETER VOLUME D_{30}	$D_{30} = \sqrt{\frac{\sum_i n_i d_i^3}{\sum_i n_i}}$	Diameter of a droplet whose volume, multiplied by the total number of droplets, is equal to the sum of the volumes of all droplets.
AVERAGE DIAMETER SAUTER D_{32}	$D_{32} = \sqrt{\frac{\sum_i n_i d_i^3}{\sum_i n_i d_i^2}}$	Diameter of a droplet whose volume/area ratio is equal to the ratio between the sum of all droplets volume divided by the sum of all droplets surfaces.



FULL CONE NOZZLES / DISC VANE (UNIFORM DISTRIBUTION)

The AH type nozzles produce a full cone spray pattern with a very uniform distribution on the entire spray surface. Thanks to the special design of their disc vane they can produce a full cone jet with no central hole, thus offering the nozzle orifice a very high resistance to clogging even in hard operating conditions.



MATERIALS

T1	Brass
B31	AISI 316L Stainless steel

HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material	Construction	Variation
AH	R	1309	XX	Y	Z

CONSTRUCTION: Y

- **S** standard
- **A** with SIEGER ring

VARIATION: Z

- **G** cylindrical gas thread (BSPP)
- **N** conical thread (NPT)

Order example: **AHR 1309 B31 T1 SB**



* DISC VANE

This special vane uses a series of peripheral passages to create a swirling motion of the liquid inside the spray chamber.

A set of superficial millings on the lower side of the disc act as a brake on the fluid rotation at the centre so to obtain a full cone jet with a very even distribution, avoiding to use a small central hole which may get easily clogged.

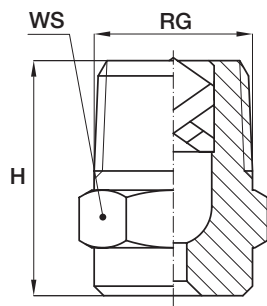
All our full cone nozzles have vanes locked in place, to prevent their loss due to thermal expansion or sudden vacuum conditions in the supply pipes, a useful feature in nozzles spraying upwards on casting machines.

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm

	Code	RF inch	D mm	Capacity - lpm					Dimensions mm	
				Pressure - bar					H	WS
				1.0	2.0	3.0	4.0	5.0		
65°	AHR 1309 xx	1/4	1.9	1.8	2.5	3.1	3.6	4.1	27.5	19
	AHR 1362 xx		2.0	2.3	3.0	3.6	4.2	4.7		
	AHR 1409 xx		2.2	2.4	3.3	4.1	5.9	6.7		
	AHR 1207 xx	3/8	1.0	1.2	1.7	2.1	2.4	2.7	25.0	22
	AHR 1310 xx		1.9	1.8	2.5	3.1	3.6	4.1		
	AHR 1340 xx		2.0	1.9	2.8	3.4	3.9	4.4		
	AHR 1363 xx		2.1	2.1	2.9	3.6	4.2	4.7		
	AHR 1415 xx		2.2	2.4	3.4	4.1	4.8	5.3		
	AHR 1470 xx		1.5	2.7	3.8	4.7	5.4	6.0		
	AHR 1518 xx		2.6	3.0	4.2	5.2	6.0	6.7		
	AHR 1621 xx		2.7	3.5	5.0	6.2	7.2	8.0		
	AHR 1780 xx		2.9	4.5	6.4	7.8	9.0	10.0		
	AHR 1828 xx		3.1	4.8	6.8	8.3	9.6	10.7		
	AHR 2110 xx	1/2	4.2	6.5	9.1	11.0	12.7	14.2	36.0	27
	AHR 2144 xx		4.2	8.0	11.7	14.4	16.6	18.5		
80°	AHT 1309 xx	1/4	2.2	1.8	2.5	3.1	3.6	4.1	27.5	19
	AHT 1362 xx		2.2	2.3	3.0	3.6	4.2	4.7		
	AHT 1409 xx		2.2	2.4	3.3	4.1	4.7	5.3		
	AHT 1310 xx	3/8	2.0	1.8	2.5	3.1	3.6	4.1	25.0	22
	AHT 1363 xx		2.1	2.1	2.9	3.6	4.2	4.7		
	AHT 1415 xx		2.2	2.4	3.4	4.1	4.8	5.3		
	AHT 1518 xx		2.6	3.0	4.2	5.2	6.0	6.7		
	AHT 1621 xx		2.7	3.5	5.0	6.2	7.2	8.0		
	AHT 1780 xx		2.9	4.5	6.4	7.8	9.0	10.0		
	AHT 1828 xx		3.1	4.8	6.8	8.3	9.6	10.7		
	AHT 2110 xx	1/2	4.2	6.5	9.1	11.0	12.7	14.2	36.0	27
	AHT 2144 xx		4.2	8.0	11.7	14.4	16.6	18.5		



FULL CONE NOZZLES

The D series full cone nozzles offer a simple yet efficient design which consists of a body with male thread and an X-vane with large passage. The insert is locked into place for all sizes up to 3/8" included which allows the nozzle assembly in any desired orientation without danger.

Normally available from stock in the below listed materials.

MATERIALS

B1	Stainless steel AISI 303
B31	Stainless steel AISI 316L
T1	Brass

HOW TO ORDER PNR PRODUCTS

Model	Thread	Angle	Capacity	Material	Construction	Variant
D	A	M	1118	XX	Y	Z

Order example: **DAM 1118 B31SB**

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm

CONSTRUCTION: Y

- **S** standard
- **A** with SIEGER ring

VARIATION:


- **B** cylindrical gas thread (BSPP)
- **N** conical thread (NPT)


See list of abbreviations - legenda at page 3.

	DAM	DBM	DCM	DDM	Code	D	D1	Capacity - lpm						
								Pressure - bar						
								0.7	1.0	2.0	3.0	5.0	7.0	10
45°	•				1118 xx	1.1	1.0	0.57	0.68	0.96	1.18	1.52	1.80	2.15
	•				1147 xx	1.2	1.1	0.71	0.85	1.20	1.47	1.90	2.25	2.68
	•				1188 xx	1.3	1.2	0.91	1.09	1.54	1.88	2.43	2.87	3.43
	•				1212 xx	1.4	1.2	1.02	1.22	1.73	2.12	2.74	3.24	3.87
	•				1235 xx	1.5	1.3	1.14	1.36	1.92	2.35	3.03	3.59	4.29
	•				1294 xx	1.7	1.5	1.42	1.70	2.40	2.94	3.80	4.49	5.37
		•	•		1370 xx	2.0	1.8	1.79	2.14	3.02	3.70	4.78	5.65	6.76
		•	•		1470 xx	2.1	2.0	2.27	2.71	3.84	4.70	6.07	7.18	8.58
		•	•		1588 xx	2.3	2.0	2.84	3.39	4.80	5.88	7.59	8.98	10.7
		•	•		1659 xx	2.5	2.2	3.18	3.80	5.38	6.59	8.51	10.1	12.0
			•	•	1740 xx	2.7	2.3	3.57	4.27	6.04	7.40	9.55	11.3	13.5
				•	1835 xx	2.8	2.6	4.03	4.82	6.82	8.35	10.8	12.8	15.2
				•	1940 xx	3.0	3.0	4.54	5.43	7.68	9.40	12.1	14.4	17.2
				•	2105 xx	3.2	3.2	5.07	6.06	8.57	10.5	13.5	16.0	19.2
				•	2117 xx	3.4	3.3	5.65	6.75	9.55	11.7	15.1	17.9	21.4
				•	2147 xx	3.8	3.7	7.10	8.49	12.0	14.7	19.0	22.5	26.8
				•	2188 xx	4.3	4.3	9.08	10.9	15.4	18.8	24.3	28.7	34.3
				•	2235 xx	5.0	4.5	11.4	13.6	19.2	23.5	30.3	35.9	42.9


THREADED CONNECTIONS CODING TABLE

Code	RG inch	H mm	WS mm
DA	1/8	19.5	12.0
DB	1/4	22.0	14.0
DC	3/8	25.0	17.0
DD	1/2	33.0	22.0

	DAQ	DBQ	DCQ	DDQ	Code	D mm	D1 mm	Capacity - lpm						
								Pressure - bar						
								0.7	1.0	2.0	3.0	5.0	7.0	10
60°	•				1118 xx	1.2	0.8	0.57	0.68	0.96	1.18	1.52	1.80	2.15
	•				1147 xx	1.3	1.0	0.71	0.85	1.20	1.47	1.90	2.25	2.68
	•				1188 xx	1.4	1.1	0.91	1.09	1.54	1.88	2.43	2.87	3.43
	•				1212 xx	1.5	1.2	1.02	1.22	1.73	2.12	2.74	3.24	3.87
	•				1235 xx	1.6	1.2	1.14	1.36	1.92	2.35	3.03	3.59	4.29
	•	•			1294 xx	1.8	1.3	1.42	1.70	2.40	2.94	3.80	4.49	5.37
	•	•			1370 xx	2.0	1.4	1.79	2.14	3.02	3.70	4.78	5.65	6.76
		•	•		1470 xx	2.4	1.9	2.27	2.71	3.84	4.70	6.07	7.18	8.58
		•	•		1588 xx	2.6	2.0	2.84	3.39	4.80	5.88	7.59	8.98	10.7
		•	•		1659 xx	2.7	2.0	3.18	3.80	5.38	6.59	8.51	10.1	12.0
		•	•		1740 xx	2.9	2.0	3.57	4.27	6.04	7.40	9.55	11.3	13.5
		•	•		1835 xx	3.2	2.8	4.03	4.82	6.82	8.35	10.8	12.8	15.2
		•	•		1940 xx	3.2	2.8	4.54	5.43	7.68	9.40	12.1	14.4	17.2
		•	•		2100 xx	3.4	3.0	5.07	6.06	8.57	10.5	13.5	16.0	19.2
			•		2117 xx	3.6	3.0	5.65	6.75	9.55	11.7	15.1	17.9	21.4
				•	2147 xx	4.0	3.3	7.10	8.49	12.0	14.7	19.0	22.5	26.8
				•	2188 xx	4.5	3.7	9.08	10.9	15.4	18.8	24.3	28.7	34.3
				•	2235 xx	5.2	4.5	11.4	13.6	19.2	23.5	30.3	35.9	42.9
				•	2294 xx	5.8	4.7	14.2	17.0	24.0	29.4	38.0	44.9	53.7

	DAU	DBU	DCU	DDU	Code	D mm	D1 mm	Capacity - lpm						
								Pressure - bar						
								0.7	1.0	2.0	3.0	5.0	7.0	10
90°	•				1118 xx	1.2	0.8	0.57	0.68	0.96	1.18	1.52	1.80	2.15
	•				1147 xx	1.3	1.0	0.71	0.85	1.20	1.47	1.90	2.25	2.68
	•				1188 xx	1.4	1.2	0.91	1.09	1.54	1.88	2.43	2.87	3.43
	•				1212 xx	1.5	1.2	1.02	1.22	1.73	2.12	2.74	3.24	3.87
	•				1235 xx	1.6	1.3	1.14	1.36	1.92	2.35	3.03	3.59	4.29
	•	•			1294 xx	1.8	1.3	1.42	1.70	2.40	2.94	3.80	4.49	5.37
	•	•			1370 xx	2.0	1.4	1.79	2.14	3.02	3.70	4.78	5.65	6.76
		•	•		1470 xx	2.3	1.8	2.27	2.71	3.84	4.70	6.07	7.18	8.58
		•	•		1588 xx	2.6	1.8	2.84	3.39	4.80	5.88	7.59	8.98	10.7
		•	•		1659 xx	2.7	2.0	3.18	3.80	5.38	6.59	8.51	10.1	12.0
		•	•		1740 xx	2.9	2.0	3.57	4.27	6.04	7.40	9.55	11.3	13.5
		•	•		1835 xx	3.3	2.0	4.03	4.82	6.82	8.35	10.8	12.8	15.2
		•	•		1940 xx	3.3	2.4	4.54	5.43	7.68	9.40	12.1	14.4	17.2
		•	•		2105 xx	3.5	2.6	5.07	6.06	8.57	10.5	13.5	16.0	19.2
			•		2117 xx	3.7	2.7	5.65	6.75	9.55	11.7	15.1	17.9	21.4
			•		2147 xx	4.0	3.2	7.10	8.49	12.0	14.7	19.0	22.5	26.8
			•		2164 xx	4.1	3.2	7.92	9.47	13.4	16.4	21.2	25.1	29.9
				•	2188 xx	4.7	3.2	9.08	10.9	15.4	18.8	24.3	28.7	34.3
				•	2235 xx	5.2	3.8	11.4	13.6	19.2	23.5	30.3	35.9	42.9
				•	2294 xx	5.8	3.8	14.2	17.0	24.0	29.4	38.0	44.9	53.7
				•	2370 xx	6.4	3.8	17.9	21.4	30.2	37.0	47.8	56.5	67.6

▷ continued on page 22

	DAW	DBW	DCW	DDW	Code	D mm	D1 mm	Capacity - lpm						
								Pressure - bar						
								0.7	1.0	2.0	3.0	5.0	7.0	10
120°	•				1118 xx	1.2	0.8	0.57	0.68	0.96	1.18	1.52	1.80	2.15
	•				1147 xx	1.3	0.9	0.71	0.85	1.20	1.47	1.90	2.25	2.68
	•				1188 xx	1.5	1.0	0.91	1.09	1.54	1.88	2.43	2.87	3.43
	•				1212 xx	1.6	1.1	1.02	1.22	1.73	2.12	2.74	3.24	3.87
	•				1235 xx	1.6	1.2	1.14	1.36	1.92	2.35	3.03	3.59	4.29
	•				1294 xx	1.9	1.3	1.42	1.70	2.40	2.94	3.80	4.49	5.37
	•				1370 xx	2.1	1.4	1.79	2.14	3.02	3.70	4.78	5.65	6.76
		•	•		1470 xx	2.4	1.6	2.27	2.71	3.84	4.70	6.07	7.18	8.58
		•	•		1588 xx	2.7	1.8	2.84	3.39	4.80	5.88	7.59	8.98	10.7
		•	•		1659 xx	3.0	1.8	3.18	3.80	5.38	6.59	8.51	10.1	12.0
		•	•		1740 xx	3.1	1.9	3.57	4.27	6.04	7.40	9.55	11.3	13.5
		•	•		1835 xx	3.3	1.9	4.03	4.82	6.82	8.35	10.8	12.8	15.2
		•	•		1940 xx	3.5	1.9	4.54	5.43	7.68	9.40	12.1	14.4	17.2
		•	•		2105 xx	3.7	2.3	5.07	6.06	8.57	10.5	13.5	16.0	19.2
			•		2117 xx	3.8	2.4	5.65	6.75	9.55	11.7	15.1	17.9	21.4
			•		2147 xx	4.2	2.7	7.10	8.49	12.0	14.7	19.0	22.5	26.8
			•		2164 xx	4.4	2.7	7.92	9.47	13.4	16.4	21.2	25.1	29.9
			•	•	2188 xx	4.6	3.1	9.08	10.9	15.4	18.8	24.3	28.7	34.3
				•	2235 xx	5.3	3.3	11.4	13.6	19.2	23.5	30.3	35.9	42.9
				•	2294 xx	5.9	4.1	14.2	17.0	24.0	29.4	38.0	44.9	53.7
				•	2370 xx	6.6	4.7	17.9	21.4	30.2	37.0	47.8	56.5	67.6

CONVERSION TABLE (UE - USA)

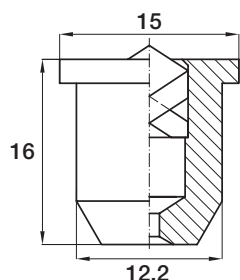
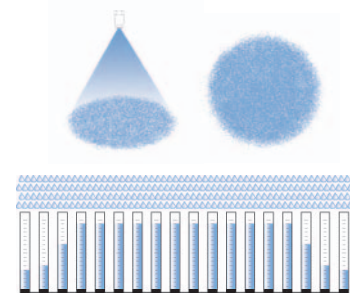
PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm

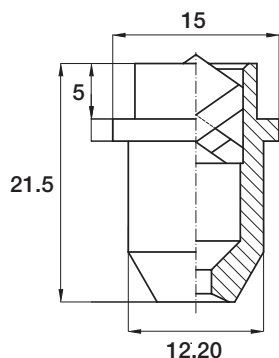


FULL CONE NOZZLE TIPS

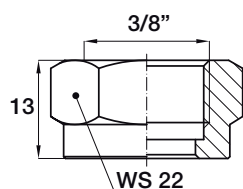
These nozzle produce a full cone spray pattern with a circular impact area. The complete nozzle is made of tip, nipple and ring and this type of construction allows to disassemble the tip quickly and easily for maintenance in case of clogging.



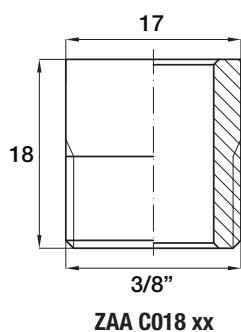
**BX
1149
1372**



**BX
1508
1743**



VAA 0380 xxB



ZAA C018 xx

MATERIALS

B31	AISI 316L Stainless steel
T1	Brass

HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material
BX	Q	1149	XX

Order example: **BXQ 1149 T1**



Under certain conditions, for example nozzles that spray upward at high temperatures, or in case of sudden vacuum conditions in the pipes, the nozzle vane may exit from its housing and impair the functionality of the nozzle itself. Our nozzles with X-vanes, wire size at thread dimension of 3/8", have the vane safety scored in places.



MOUNTING ACCESSORIES:

BX nozzles are secured by using a Weld Nipple (ZAA) with a Lock Nut (VAA).

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm

See list of abbreviations - legenda at page 3.

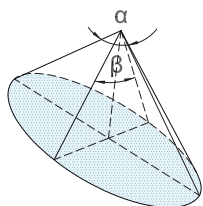
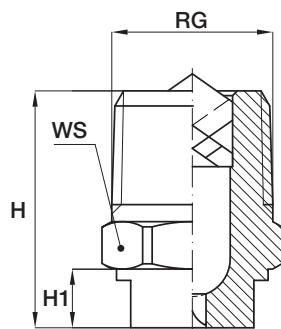
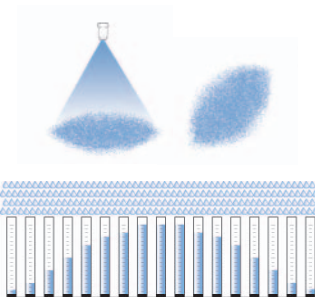
	Code	D mm	Capacity - lpm					Spray angles at different pressures		
			Pressure - bar							
			1.0	2.0	3.0	5.0	10	1.5	3.0	5.0
60°	BXQ 1149 xx	1.3	0.86	1.22	1.49	1.92	2.72	50	50	45
	BXQ 1223 xx	1.7	1.35	1.90	2.33	3.01	4.25	65	65	49
	BXQ 1262 xx	1.7	1.51	2.14	2.62	3.38	4.78	50	50	46
	BXQ 1372 xx	2.1	2.15	3.04	3.72	4.80	6.79	65	65	59
	BXQ 1508 xx	2.4	2.93	4.15	5.08	6.56	9.30	50	50	46
	BXQ 1626 xx	2.9	3.61	5.11	6.26	8.08	11.4	60	60	55
	BXQ 1743 xx	2.9	4.29	6.07	7.43	10.0	14.0	67	67	61



OVAL JET NOZZLES

These D..OB full cone nozzles with oval spray pattern are used for continuous casting cooling. Their jets, covering an oblong surface, can be easily positioned to ensure a very uniform cooling action.

Their construction in two pieces, body and X-vane, offers the same benefits of the normal full cone nozzles in terms of resistance to clogging and a secure vane.



MATERIALS

B1	AISI 303 Stainless steel
T1	Brass

HOW TO ORDER PNR PRODUCTS

Model	Thread	Angle	Capacity	Material	Construction	Variation
D	B	U (90°/60°)	1330	XX	Y	Z

Order example: **DBU 1330 T10B**


CONSTRUCTION: Y

- **O** oval 90°/60°

VARIATION: Z

- **B** conic gas thread (BSPT)
- **G** cylindrical gas thread (BSPP)
- **N** conic thread (NPT)

See list of abbreviations - legenda at page 3.

	Code	RG	D1	Capacity - lpm								Dimensions mm		
				Pressure - bar								H	H1	WS
α	β	inch	mm	0.7	1.5	2.0	3.0	4.0	6.0	7.0	10			
90°	60°	1/4	1.2	1.60	2.34	2.69	3.32	3.81	4.65	5.07	6.06	22	5	14
			1.4	2.03	2.97	3.42	4.21	4.85	5.92	6.43	7.68	22	5	14
			1.7	2.62	3.83	4.41	5.44	6.23	7.63	8.31	9.93	22	5	14
			1.9	3.48	5.09	5.87	7.22	8.31	10.2	11.0	13.2	22	5	14
			2.1	3.67	5.37	6.22	7.61	8.78	10.8	11.6	13.9	22	5	14
			2.2	4.05	5.92	6.85	8.39	9.69	11.9	12.8	15.3	22	5	14
90°	60°	3/8	1.1	1.55	2.26	2.61	3.20	3.70	4.53	4.89	5.84	25	5	17
			1.3	1.93	2.83	3.27	4.00	4.62	5.66	6.11	7.30	25	5	17
			1.6	2.52	3.68	4.25	5.20	6.00	7.35	7.94	9.49	25	5	17
			1.6	3.28	4.81	5.55	6.80	7.85	9.62	10.4	12.4	25	5	17
			2.0	3.86	5.66	6.53	8.00	9.24	11.3	12.2	14.6	25	5	17

CONVERSION TABLE (UE - USA)

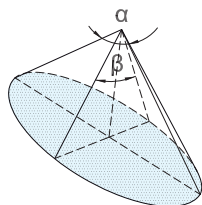
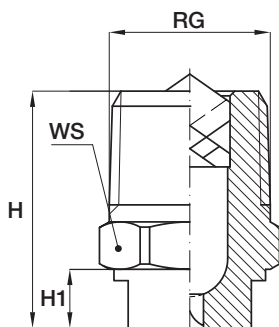
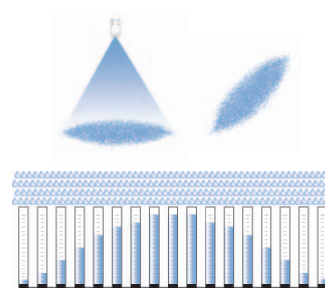
PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm



OVAL JET NOZZLES

The full cone nozzles with oval spray pattern D..PB series have the same characteristics and features of the D..OB series nozzles, but with opening angles at 30° and 90°.



MATERIALS

B1	Stainless steel AISI 303
T1	Brass

HOW TO ORDER PNR PRODUCTS

Model	Thread	Angle	Capacity	Material	Construction	Variation
D	B	Q (90°/30°)	1330	XX	Y	Z

Order example: **DBU 1330 T1PB**


CONSTRUCTION: Y

- **P** oval 90°/30°

VARIATION: Z

- **B** conic gas thread (BSPT)
- **G** cylindrical gas thread (BSPP)
- **N** conic thread (NPT)

See list of abbreviations - legenda at page 3.

		Code	RG	D1	Capacity - lpm								Dimensions mm		
α	β				Pressure - bar								H	H1	WS
					0.7	1.5	2.0	3.0	4.0	6.0	7.0	10			
90°	30°	DBU 1330xx PB	1/4	1.2	1.60	2.34	2.69	3.32	3.81	4.65	5.07	6.06	22	5	14
		DBU 1420xx PB		1.4	2.03	2.97	3.42	4.21	4.85	5.92	6.43	7.68	22	5	14
		DBU 1540xx PB		1.7	2.62	3.83	4.41	5.44	6.23	7.63	8.31	9.93	22	5	14
		DBU 1720xx PB		1.9	3.48	5.09	5.87	7.22	8.31	10.2	11.0	13.2	22	5	14
		DBU 1780xx PB		2.1	3.67	5.37	6.22	7.61	8.78	10.8	11.6	13.9	22	5	14
		DBU 1840xx PB		2.2	4.05	5.92	6.85	8.39	9.69	11.9	12.8	15.3	22	5	14
90°	30°	DCU 1240xx PB	3/8	0.9	1.16	1.70	1.96	2.40	2.77	3.40	3.67	4.38	25	5	17
		DCU 1320xx PB		1.1	1.55	2.26	2.61	3.20	3.70	4.53	4.89	5.84	25	5	17
		DCU 1410xx PB		1.3	1.98	2.90	3.35	4.10	4.73	5.80	6.26	7.49	25	5	17
		DCU 1540xx PB		1.6	2.60	3.82	4.40	5.40	6.24	7.64	8.25	9.90	25	5	17
		DCU 1680xx PB		1.7	3.28	4.81	5.55	6.80	7.85	9.62	10.40	12.40	25	5	17
		DCU 1840xx PB		2.0	4.06	5.94	6.86	8.40	9.70	11.88	12.83	15.34	25	5	17

CONVERSION TABLE (UE - USA)

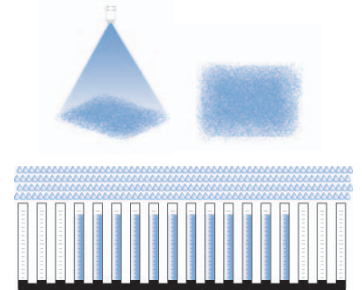
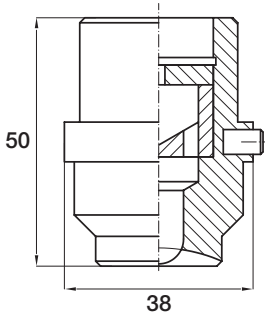
PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm

RECTANGULAR JET NOZZLE TIPS

The 926 series nozzles produce a rectangular spray section, ideal for continuous castings coverage. They can be supplied as tips with welding nipple and locknut or, on request, with female or male thread.

For any requirements about 926 series please contact our offices.



MATERIALS


T1 Brass

HOW TO ORDER PNR PRODUCTS

Model	Capacity	Material	Construction	Variation
926	L01A	XX	Y	Z

Order example: **926 L01A T1ST**

See list of abbreviations - legenda at page 3.

	Code		Capacity - lpm							
			Pressure - bar							
α	β		1.0	2.0	3.0	4.0	5.0	6.0	7.0	10
90°	30°	926 L01A T1ST	3.64	5.15	6.30	7.27	8.13	8.91	9.63	11.50
		926 L02A T1ST	9.24	13.00	16.10	18.47	20.65	22.63	24.44	29.21
		926 L03A T1ST	10.39	14.70	18.00	20.78	23.24	25.45	27.50	32.90
		926 L04A T1ST	12.41	17.55	21.50	24.82	27.75	30.4	32.8	39.3

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi

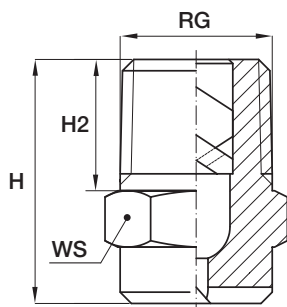
CAPACITY: 1 lpm = 0,264 gpm



FULL CONE NOZZLES

X-VANE / SQUARE SPRAY PATTERN / 2 PIECES

Depending on their size, these nozzles are produced from bars or castings (see drawings on the page), size and weight as per below table. They are the convenient choice when the coverage of an area should be as uniform as possible. It's worth noting that the sides of the square section of the jet are not in line with the grooves of the nozzle orifice, the deviation angle is between 10° and 15° depending on the working pressure and distance. The proper alignment should be obtained at the time of installation or maintenance.



MATERIALS

B1	Stainless steel AISI 303
B31	Stainless steel AISI 316L
T1	Brass

HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material
BH	Q	1270	XX

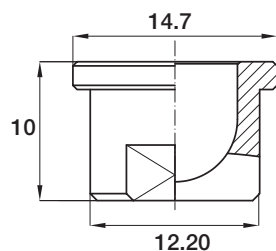
Order example: **BHQ 1270 B31**

DIMENSIONS

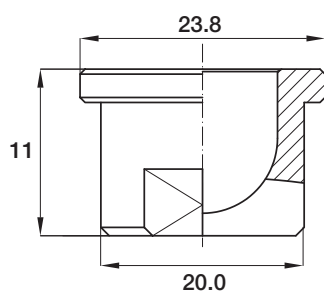
Thread inch	1/8	1/4	3/8	1/2	3/4
H mm	22	23	30	39	55
WS mm	12	14	17	21	27

See list of abbreviations - legenda at page 3.

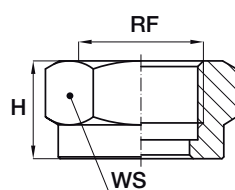
	Code	RG inch	D mm	D1 mm	Capacity - lpm							Angle-degrees		
					Pressure - bar							Pressure - bar		
					0.7	1.0	2.0	3.0	5.0	7.0	10	0.7	3.0	5.0
60°	BHQ 1270xx	1/8	1.7	1.3	1.30	1.56	2.20	2.70	3.49	4.12	4.93	52	60	58
	BHQ 1350xx		1.9	1.3	1.74	2.08	2.94	3.60	4.65	5.50	6.57	58	60	60
	BHQ 1440xx		2.2	1.3	2.13	2.54	3.59	4.40	5.68	6.72	8.03	60	65	60
	BHQ 1740xx	1/4	2.8	1.6	3.57	4.27	6.04	7.40	9.55	11.3	13.5	62	65	60
	BHQ 1890xx		3.2	1.6	4.30	5.14	7.27	8.90	11.5	13.6	16.2	62	65	60
	BHQ 2107xx		3.8	1.6	5.17	6.18	8.74	10.7	13.8	16.3	19.5	65	65	60
	BHQ 2133xx	3/8	4.0	2.4	6.42	7.68	10.9	13.3	17.2	20.3	24.3	60	62	60
	BHQ 2210xx	1/2	5.5	3.2	10.1	12.1	17.2	21.0	27.1	32.1	38.3	62	64	60
	BHQ 2270xx		6.4	3.2	13.0	15.6	22.0	27.0	34.8	41.2	49.2	62	65	60
	BHQ 2370xx	3/4	6.7	4.4	17.8	22.0	31.0	37.0	47.8	56.5	67.5	60	64	62
120°	BHW 2100xx	1/4	3.2	1.6	4.83	5.77	8.16	10.0	12.9	15.3	18.3	106	115	100
	BHW 2122xx	3/8	3.9	1.6	5.89	7.04	9.96	12.2	15.8	18.6	22.3	105	120	110
	BHW 2144xx		4.0	2.4	6.96	8.31	11.8	14.4	18.6	22.0	26.3	105	120	110
	BHW 2172xx		4.6	2.4	8.31	9.93	14.0	17.2	22.2	26.3	31.4	105	120	105
	BHW 2194xx		5.4	2.4	9.37	11.2	15.8	19.4	25.0	29.6	35.4	105	120	106
	BHW 2220xx	1/2	4.8	3.0	10.6	12.7	18.0	22.0	28.4	33.6	40.2	105	110	105
	BHW 2250xx		5.1	3.0	12.1	14.4	20.4	25.0	32.3	38.2	45.6	105	110	105
	BHW 2290xx		5.7	3.0	14.0	16.7	23.7	29.0	37.4	44.3	53.0	105	110	105
	BHW 2320xx		7.0	3.0	15.4	18.5	26.1	32.0	41.3	48.9	58.4	105	110	105
	BHW 2360xx		8.0	3.0	17.4	20.8	29.4	36.0	46.5	55.0	65.7	105	110	105
	BHW 2500xx	3/4	8.5	4.5	24.2	28.9	40.8	50.0	64.5	76.4	91.3	105	115	103



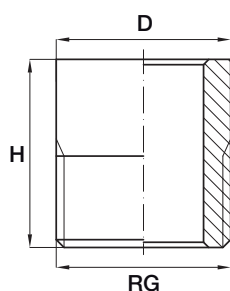
3/8" size



3/4" size



VAA



ZAA

FLAT JET NOZZLE TIPS

SIZE 3/8" AND 3/4"

These flat jet nozzle tips are usually assembled onto a manifold through a welding nipple or a clamp and secured tight with a locknut. Therefore they can be easily replaced and their jet easily oriented in the desired direction. The tips shown on this page have the most common capacity values. The precisely machined orifice can be protected from clogging through a filter housed inside the nipples and the clamps specifically designed for this purpose.

The high capacity nozzle tips, see table below, do not require a filter as they have a large orifice and are assembled with a 3/4" welding nipple. Tips with higher capacities and bigger size than those shown in this catalogue, as well as their related nipples and locknuts, can be produced on request.

MATERIALS

B1	Stainless steel AISI 303
B31	Stainless steel AISI 316L
T1	Brass

HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material
GX	F	1190	XX

Order example: **GXF 1190 B31**

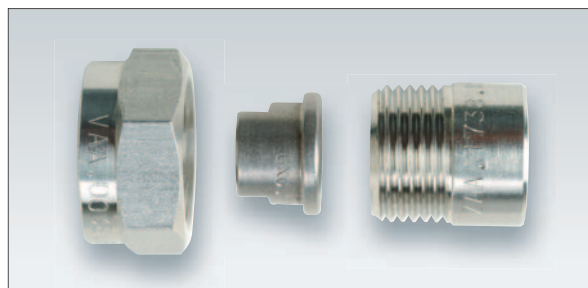
SPRAY ANGLE CODES

GXA	GXF	GXM	GXQ	GXU	GXW
0°	30°	45°	60°	90°	120°

ASSEMBLY FITTING CODING

Size inch	Locknut	Welding nipple	Male nipple	Seal
3/8"	VAA 0380 xxB	ZAA C018 xx	ZLA 3838 xxB	VDA 13A1 P7
3/4"	VAA 0750 xxB	ZAA E027 xx	ZLA 7575 xxB	VDA 26A1 P7

Typical combination of a nozzle tip with nipple and locknut.



DIMENSIONS

Code	RG/RF inch	D mm	H mm	WS mm
VAA 0380 xxB	3/8	-	13	22
VAA 0750 xxB	3/4	-	16	32
ZAA C018 xx	3/8	17	18	-
ZAA E027 xx	3/4	27	27	-

3/8" size nozzle tips

See list of abbreviations - legenda at page 3.

GXF	GXM	GXQ	GXU	GXW	Code	Capacity - lpm								
						Pressure - bar								
						0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10
•	•	•	•	•	1190	0.78	1.10	1.34	1.55	1.90	2.19	2.45	2.90	3.47
•	•	•	•	•	1233	0.95	1.35	1.65	1.90	2.33	2.69	3.01	3.56	4.25
•	•	•	•	•	1310	1.27	1.79	2.19	2.53	3.10	3.58	4.00	4.74	5.66
•	•	•	•	•	1385	1.57	2.22	2.72	3.14	3.85	4.45	4.97	5.88	7.03
•	•	•	•	•	1490	2.00	2.83	3.46	4.00	4.90	5.66	6.33	7.48	8.95
•	•	•	•	•	1581	2.37	3.35	4.11	4.74	5.81	6.71	7.50	8.87	10.6
•	•	•	•	•	1780	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2
•	•	•	•	•	1980	4.00	5.66	6.93	8.00	9.80	11.3	12.7	15.0	17.9
•	•	•	•	•	2124	5.06	5.85	8.77	10.1	12.4	14.3	16.0	18.9	22.6
•	•	•	•	•	2153	6.25	7.20	10.8	12.5	15.3	17.7	19.8	23.4	27.9
•	•	•	•	•	2194	7.96	9.20	13.8	15.9	19.5	22.5	25.2	29.8	35.6
•	•	•	•	•	2245	10.0	11.5	17.3	20.0	24.5	28.3	31.6	37.4	44.7

3/4" size nozzle tips

GXF	GXM	GXQ	GXU	GXW	Code	Capacity - lpm								
						Pressure - bar								
						0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10
•	•	•	•	•	1781	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2
•	•	•	•	•	1981	4.00	5.66	6.93	8.00	9.80	11.3	12.7	15.0	17.9
•	•	•	•	•	2125	5.06	7.16	8.77	10.1	12.4	14.3	16.0	18.9	22.6
•	•	•	•	•	2154	6.25	8.83	10.8	12.5	15.3	17.7	19.8	23.4	27.9
•	•	•	•	•	2195	7.92	11.2	13.7	15.8	19.4	22.4	25.0	29.6	35.4
•	•	•	•	•	2246	10.0	14.1	17.3	20.0	24.5	28.3	31.6	37.4	44.7
•	•	•	•	•	2311	12.7	17.9	21.9	25.3	31.0	35.8	40.0	47.4	56.6
•	•	•	•	•	2490	20.0	28.3	34.6	40.0	49.0	56.6	63.3	74.8	89.5
•	•	•	•	•	2610	24.9	35.2	43.1	49.8	61.0	70.4	78.8	93.2	111
•	•	•	•	•	2760	31.0	43.9	53.7	62.1	76.0	87.8	98.1	116	139
•	•	•	•	•	3122	49.8	70.4	86.3	99.6	122	141	158	186	223

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi

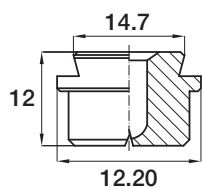
CAPACITY: 1 lpm = 0,264 gpm

FLAT JET NOZZLE TIPS WITH DOVE TAIL

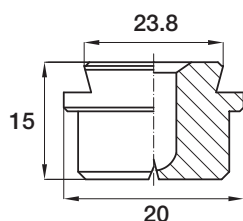
SIZE 3/8" AND 3/4"

The flat jet nozzle tips are normally mounted onto a pipe through a welded nipple and blocked with a locknut. The dove tail design ensures correct assembly with respect to proper nozzle orientation. The nozzle tips pictured on this page are those with the most common capacity values. Higher capacity values and bigger sizes can be produced on request and delivered with their respective nipples and locknuts.

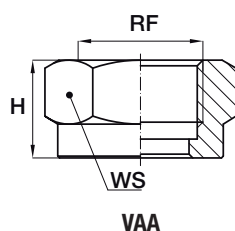
The two sizes shown on this page require 3/8" and 3/4" nipples whose codes, as well as those of the respective locknuts, are indicated in the tables on the following page.



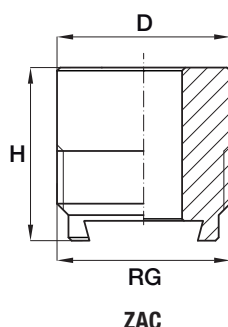
3/8" size



3/4" size



VAA



ZAC

MATERIALS

B1	Stainless steel AISI 303
B31	Stainless steel AISI 316L
T1	Brass

HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material
GY	F	1190	XX

Order example: **GYF 1190 B31**

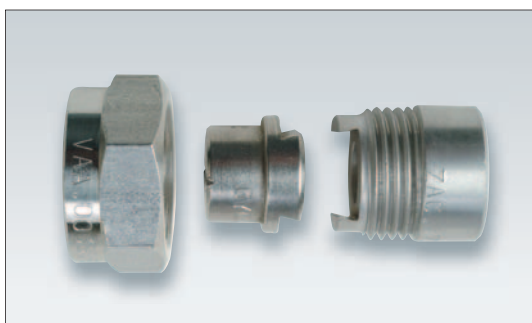
SPRAY ANGLE CODES

GYF	GYM	GYQ	GYU	GYW
30°	45°	60°	90°	120°

ASSEMBLY FITTING CODING

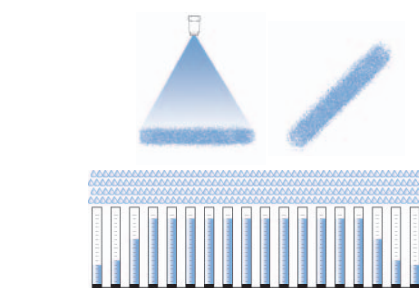
Size inch	Locknut	Welding nipple
3/8"	VAA 0381 xxB	ZAC C018 xx
3/4"	VAA 0750 xxB	ZAC E027 xx

Typical set of dove tail nozzle tip with nipple and locknut.



DIMENSIONS

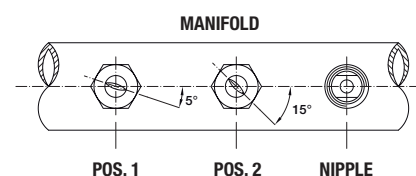
Code	RG/RF inch	D mm	H mm	WS mm
VAA 0380 xxB	3/8	-	13	22
VAA 0750 xxB	3/4	-	16	32
ZAC C018 xx	3/8	17	18	-
ZAC E027 xx	3/4	27	27	-



WELDING NIPPLES



See the deviation angle values beside the capacity tables on the following page.

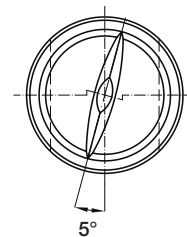


3/8" size nozzle tips

See list of abbreviations - legenda at page 3.

GYF	GYM	GYQ	GYU	GYW	Code	Capacity - lpm								
						Pressure - bar								
						0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10
•	•	•	•	•	1190	0.78	1.10	1.34	1.55	1.90	2.19	2.45	2.90	3.47
•	•	•	•	•	1233	0.95	1.35	1.65	1.90	2.33	2.69	3.01	3.56	4.25
•	•	•	•	•	1310	1.27	1.79	2.19	2.53	3.10	3.58	4.00	4.74	5.66
•	•	•	•	•	1385	1.57	2.22	2.72	3.14	3.85	4.45	4.97	5.88	7.03
•	•	•	•	•	1490	2.00	2.83	3.46	4.00	4.90	5.66	6.33	7.48	8.95
•	•	•	•	•	1581	2.37	3.35	4.11	4.74	5.81	6.71	7.50	8.87	10.6
•	•	•	•	•	1780	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2
•	•	•	•	•	1980	4.00	5.66	6.93	8.00	9.80	11.3	12.7	15.0	17.9
•	•	•	•	•	2124	5.06	5.85	8.77	10.1	12.4	14.3	16.0	18.9	22.6
•	•	•	•	•	2153	6.25	7.20	10.8	12.5	15.3	17.7	19.8	23.4	27.9
•	•	•	•	•	2194	7.96	9.20	13.8	15.9	19.5	22.5	25.2	29.8	35.6

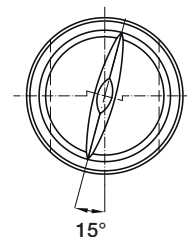
OFFSET ANGLE



3/4" size nozzle tips

GYF	GYM	GYQ	GYU	GYW	Code	Capacity - lpm								
						Pressure - bar								
						0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10
•	•	•	•	•	1781	3.18	4.50	5.52	6.37	7.80	9.01	10.1	11.9	14.2
•	•	•	•	•	1981	4.00	5.66	6.93	8.00	9.80	11.3	12.7	15.0	17.9
•	•	•	•	•	2125	5.06	7.16	8.77	10.1	12.4	14.3	16.0	18.9	22.6
•	•	•	•	•	2154	6.25	8.83	10.8	12.5	15.3	17.7	19.8	23.4	27.9
•	•	•	•	•	2195	7.92	11.2	13.7	15.8	19.4	22.4	25.0	29.6	35.4
•	•	•	•	•	2246	10.0	14.1	17.3	20.0	24.5	28.3	31.6	37.4	44.7
•	•	•	•	•	2311	12.7	17.9	21.9	25.3	31.0	35.8	40.0	47.4	56.6
•	•	•	•	•	2490	20.0	28.3	34.6	40.0	49.0	56.6	63.3	74.8	89.5
•	•	•	•	•	2610	24.9	35.2	43.1	49.8	61.0	70.4	78.8	93.2	111
	•	•			2760	31.0	43.9	53.7	62.1	76.0	87.8	98.1	116	139
	•	•			3122	49.8	70.4	86.3	99.6	122	141	158	186	223

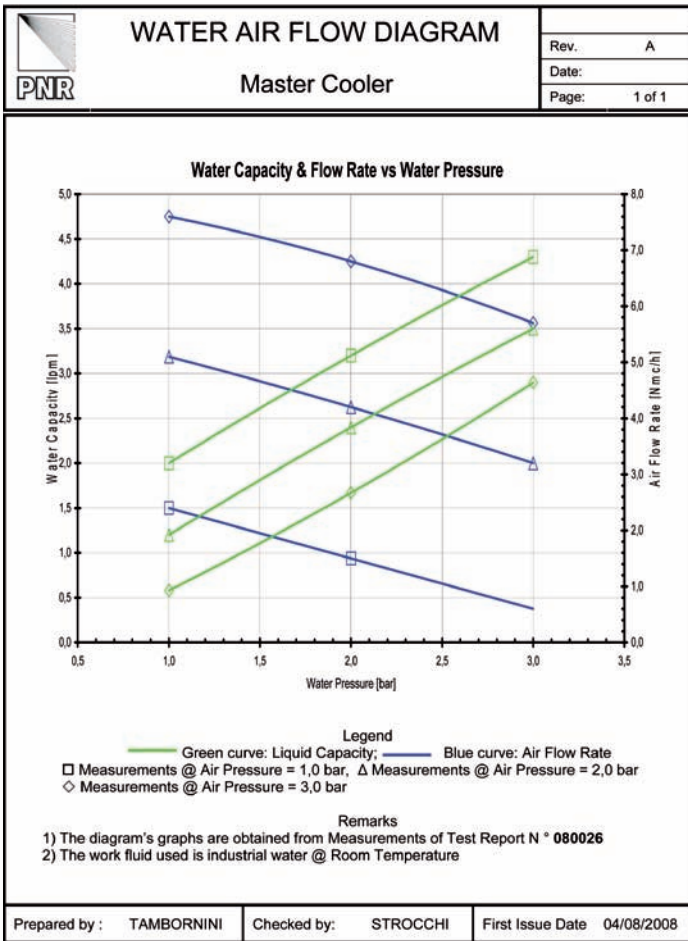
OFFSET ANGLE



CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm



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Form: MOD TD9E A4V01A

The secondary cooling is a key process for a good solidification in continuous castings.

A secondary cooling can be performed in two ways:

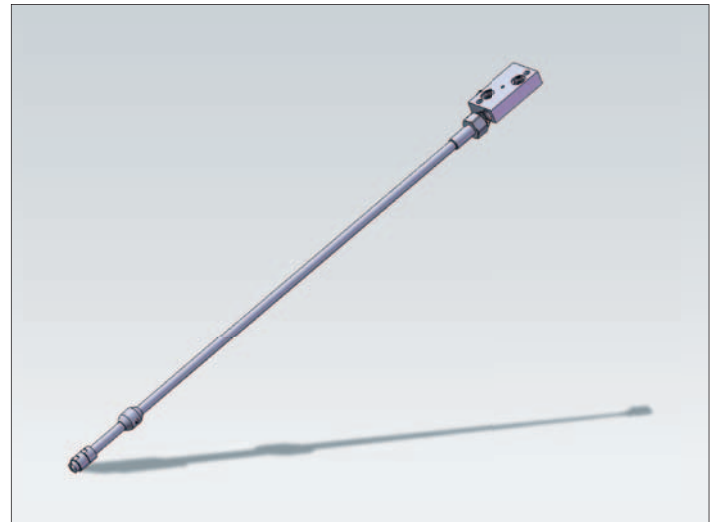
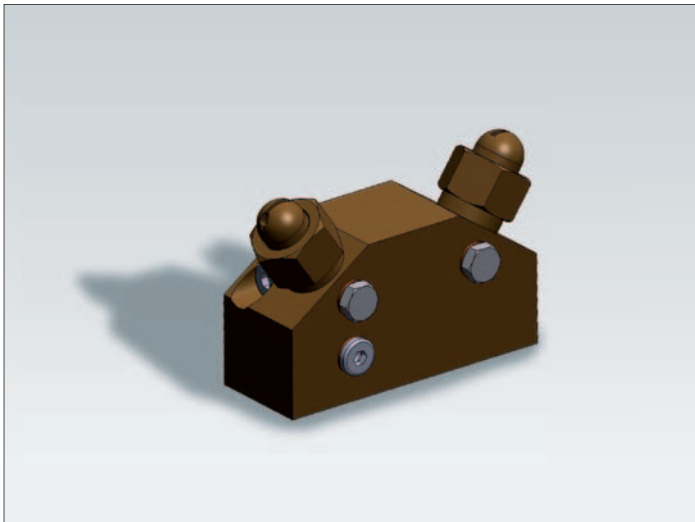
- 1) using nozzles spraying a single fluid (water)
- 2) using two-phase atomizers spraying two fluids (air and water)

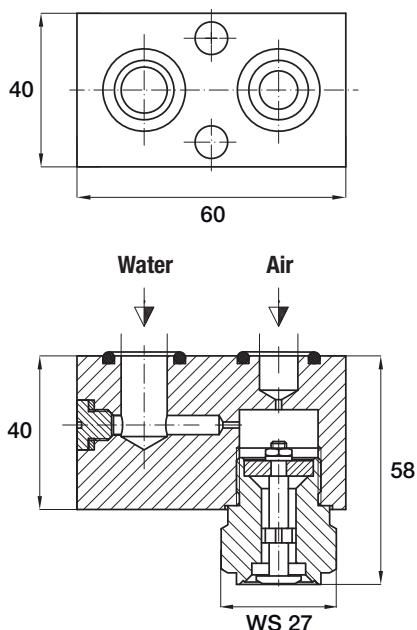
The second solution is more and more widely used in recent years as it offers various advantages:

- 1) Lower water consumption
- 2) Lower "steam density" forming on hot steel
- 3) More cooling power
- 4) Larger sections for the water flow (less risk of occlusions)
- 5) Less wear of the rolling rolls for the lower water consumption and quick evaporation of the water droplets, due to the small dimensions of the same.

For each atomizer we can supply: a laser test to assess the size and the speed of the droplets (page 18), a distribution test (page 17) and a table with capacity/pressure curves to assess the changing of the two fluids capacities along with the changing of the respective capacities (a table of primary importance to adjust the plant to the changing of the continuous casting sections). Here below an example of the capacity/pressure curve.

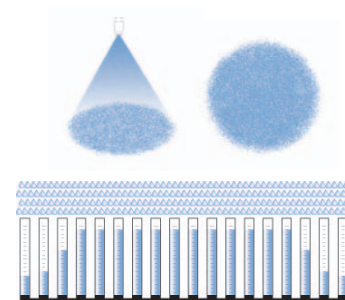
In the following pages please find all the atomizers models designed and produced by PNR thanks to studies and tests carried out with engineering companies and the technical departments of steelworks plants manufacturers.





FULL CONE ATOMIZERS

The MN series atomizers are normally used to cool blooms and billets. They have a full cone spray pattern and a mounting system to the support plates through two pins and O-rings in Viton. They can be supplied with 1/4" or 3/8" female liquid/air connections upon request. All MN atomizers are supplied with a capacity/pressure chart so to be able to adjust the pumps to the capacities required by the plant.



MATERIALS

B1	Stainless steel AISI 303
B31	Stainless steel AISI 316L
T1	Brass

HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material	Construction
MN	U	1200	XX	Y


Order example: **MNU 1200 T1A**

SOME SPRAY ANGLES (DEGREES)

F = 30°	N = 50°	T = 80°
H = 35°	Q = 60°	U = 90°
L = 40°	R = 65°	J = 110°
M = 45°	S = 75°	W = 120°

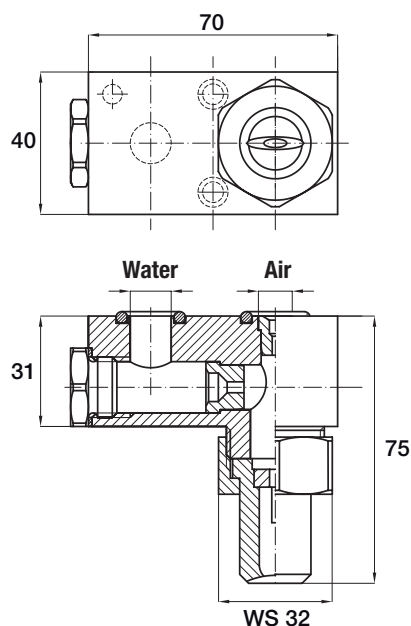
CONSTRUCTION: Y

- **A** plug-in connection (plate)
- **G** threaded connections (gas)
- **N** threaded connections (NPT)

Model	Spray angle 		Pair = 3 bar costant						Connection	
			P _L = 1 bar		P _L = 2 bar		P _L = 3 bar			
			Water	Air	Water	Air	Water	Air	Water	Air
MNF	30°	min	0.28	10.5	1.3	6.6	1.8	5.9	Plate 1/4" BSP 1/4" NPT	Plate 1/4" BSP 1/4" NPT
MNQ	60°		max	1.50	23.4	3.9	15.8	5.8	11	3/8" NPT 3/8" BSP
MNU	90°									

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi
CAPACITY: 1 lpm = 0,264 gpm



OVAL JET ATOMIZERS

The MO atomizers with oval spray coverage are normally used to cool blooms and billets. They have a fastening system to lock them on the supporting plates through two pins and O-ring in Viton. On request they can be supplied with 1/4" or 3/8" female liquid/air connections upon request.

All MO atomizers are supplied with a capacity/pressure chart in order to adjust the pumps to the capacities required for the plant.

MATERIALS

B1	Stainless steel AISI 303
B31	Stainless steel AISI 316L
T1	Brass

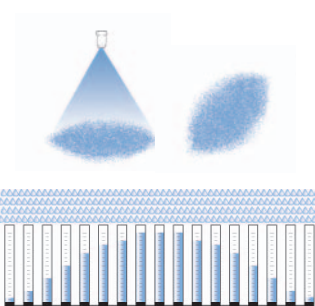
HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material	Construction
MO	U (90°/60°)	1200	XX	Y

Order example: **MOU 1200 T1A**

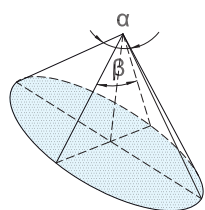
SOME SPRAY ANGLES (DEGREES)

F = 30°	N = 50°	T = 80°
H = 35°	Q = 60°	U = 90°
L = 40°	R = 65°	J = 110°
M = 45°	S = 75°	W = 120°



CONSTRUCTION: Y

- **A** plug-in connection (plate)
- **G** threaded connections (gas)
- **N** threaded connections (NPT)

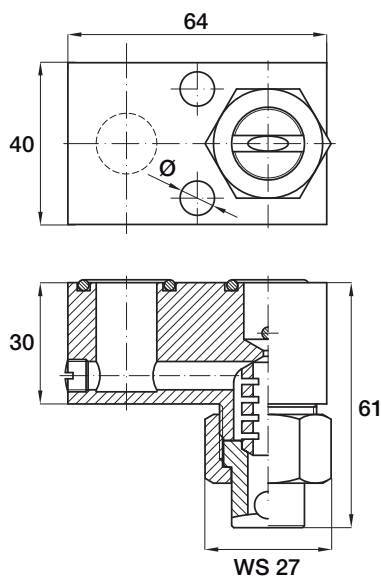
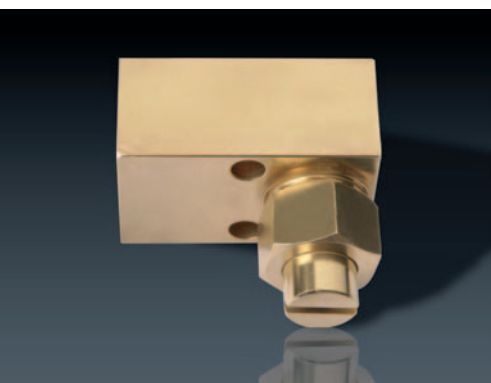


Model	Spray angle			Pair = 3 bar constant						Connection	
				P _L = 1 bar		P _L = 2 bar		P _L = 3 bar			
	α	β		Water	Air	Water	Air	Water	Air	Water	Air
MOQ	60°	30°	min	0.35	11	1	4.9	1.5	4.2	Plate 1/4" BSP 1/4" NPT	Plate 1/4" BSP 1/4" NPT
MOU	90°	60°	max	1.60	24.5	4.2	16.3	4.9	14.7	3/8" NPT 3/8" BSP	3/8" NPT 3/8" BSP

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm



FLAT JET ATOMIZERS

The MR series atomizers, normally used to cool blooms, billets, sheets and round bars, have a flat jet spray section and a clamping system to block them on the support sheets through two pins and O-ring in Viton. On request they can be supplied with 1/4" or 3/8" female liquid/air connections upon request.

All MR atomizers are supplied with a capacity/pressure chart in order to adjust the pumps to the capacities required for the plant.

MATERIALS

B1	Stainless steel AISI 303
B31	Stainless steel AISI 316L
T1	Brass

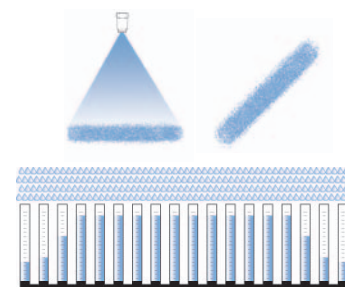
HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material	Construction
MR	U	1200	XX	Y

Order example: **MRU 1200 T1A**


SOME SPRAY ANGLES (DEGREES)

F = 30°	N = 50°	T = 80°
H = 35°	Q = 60°	U = 90°
L = 40°	R = 65°	J = 110°
M = 45°	S = 75°	W = 120°



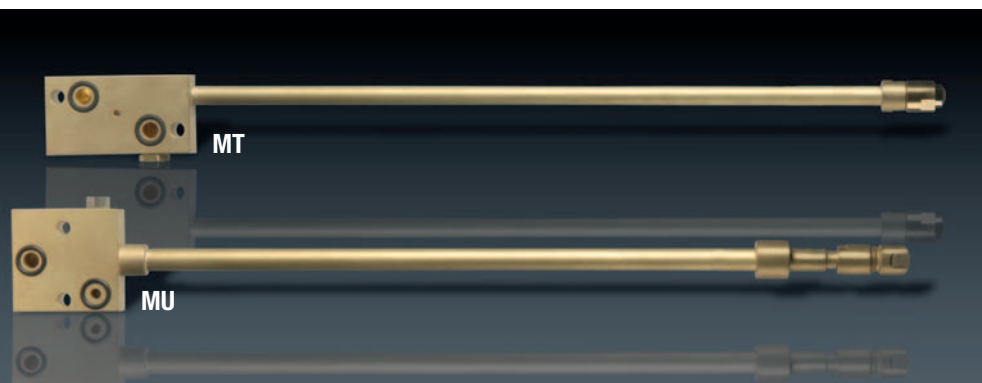
CONSTRUCTION: Y

- **A** plug-in connection (plate)
- **G** threaded connections (gas)
- **N** threaded connections (NPT)

Model	Spray angle		Pair = 3 bar costant						Connection	
			P _L = 1 bar		P _L = 2 bar		P _L = 3 bar			
			Water	Air	Water	Air	Water	Air	Water	Air
MRF	30°	min	0.3	16.5	0.6	15.2	1.25	12.8	Plate 1/4" BSP 1/4" NPT	Plate 1/4" BSP 1/4" NPT
MRQ	60°									
MRU	90°		max	2.20	35.4	2.9	30	5.1	23.7	3/8" NPT 3/8" BSP

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi
CAPACITY: 1 lpm = 0,264 gpm

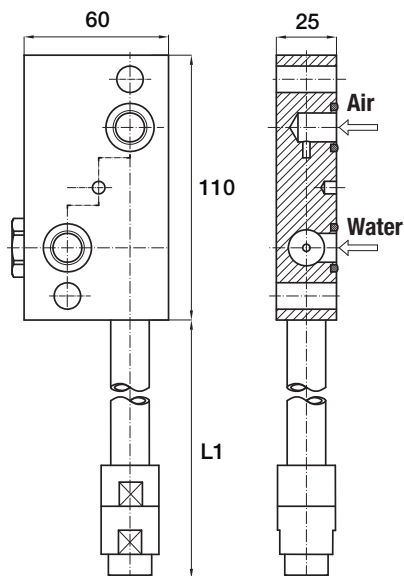


FLAT JET ATOMIZERS

The MU/MT series flat jet atomizers are normally used to cool plates, rarely blooms and billets.

They connect with the support plate through two pins and O-ring in Viton. All MU/MT atomizers are supplied with a capacity/pressure chart to adjust the pumps to the capacities required for the plant.

The atomizer tip is made of nickel plated brass to ensure a minor wear and tear of the most consumable parts.



MT

MATERIALS

T1	Brass
----	-------

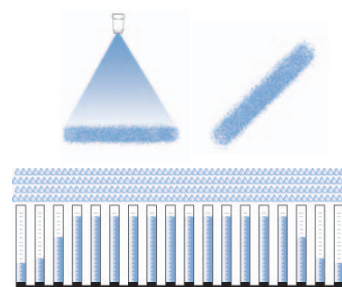
HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material	Construction
MT/MU	U	1200	XX	Y

Order example: MTU 1200 T1 (100)

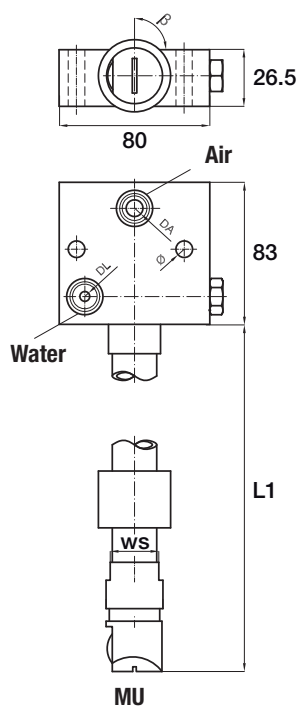
SOME SPRAY ANGLES (DEGREES)

F = 30°	N = 50°	T = 80°
H = 35°	Q = 60°	U = 90°
L = 40°	R = 65°	J = 110°
M = 45°	S = 75°	W = 120°




CONSTRUCTION: Y

- pipe length (mm)
from 100 mm to 1500 mm



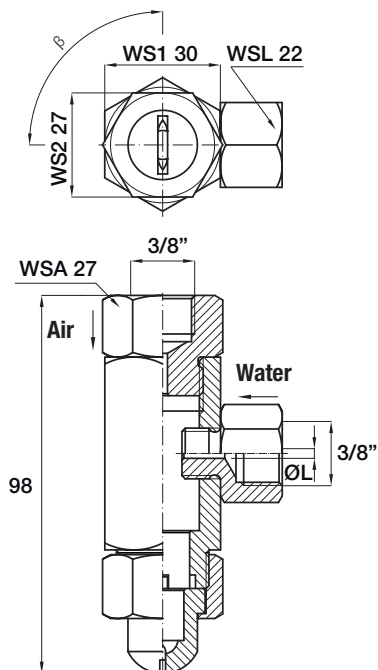
MU

Model	Spray angle		Pair = 3 bar constant						Connection		Pipe length (mm)
			P _L = 1 bar		P _L = 2 bar		P _L = 3 bar				
			Water	Air	Water	Air	Water	Air	Water	Air	L1
MTF MUF	30°	min	0.3	4.2	0.9	3.9	1.25	3.4	Plate	Plate	100 (min.)
MTQ MUQ	60°										
MTU MUU	90°	max	5.60	12.8	8.9	11.6	15.13	10.1			

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi

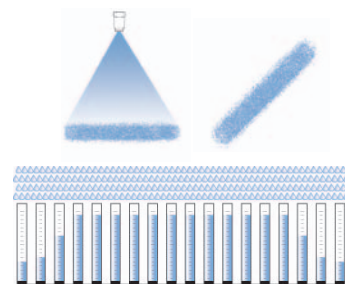
CAPACITY: 1 lpm = 0,264 gpm



FLAT JET ATOMIZERS

The MC series atomizers are normally used to cool plates, rarely to cool blooms and billets. They have a flat jet spray pattern, 3/8" female connection for water and air.

All MC atomizers are supplied with a capacity/pressure chart in order to adjust the pumps to the capacities required for the plant. The atomizer tip can be supplied in brass nickel plated on request to ensure a minor nozzle wear and tear.



MATERIALS

T1	Brass
B31	Stainless steel AISI 316L

HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material	Construction
MC	U	1200	XX	Y


Order example: **MCU 1200 T1G**

SOME SPRAY ANGLES (DEGREES)

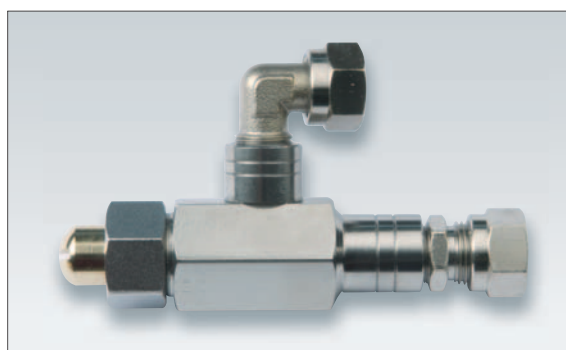
F = 30°	N = 50°	T = 80°
H = 35°	Q = 60°	U = 90°
L = 40°	R = 65°	J = 110°
M = 45°	S = 75°	W = 120°

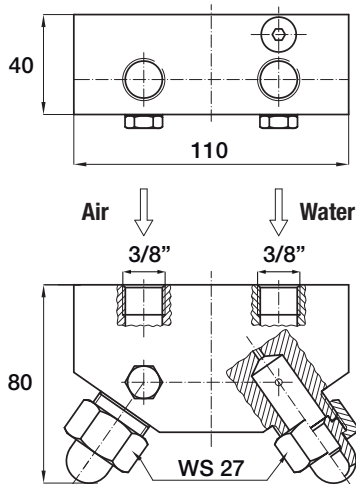
CONSTRUCTION: Y

- **G** connections (BSP)
- **N** connections (NPT)

Model	Spray angle 		Pair = 3 bar costant						Connection	
			P _L = 1 bar		P _L = 2 bar		P _L = 3 bar			
			Water	Air	Water	Air	Water	Air	Water	Air
MCF	30°	min	1.1	15.7	2	12.10	3.32	9.5	1/4" BSP 1/4" NPT	1/4" BSP 1/4" NPT
MCQ	60°									
MCU	90°		max	4.4	41	7.3	31.2	12	24.5	3/8" NPT 3/8" BSP

Special model with " quick connection nipples"





FLAT JET ATOMIZERS

The MQ series atomizers are normally used to cool plates, rarely blooms and billets. They provide a flat jet and a tightening system to the support plates through two pins and O-rings in Viton.

All MQ atomizers are supplied with a capacity/pressure chart to adjust the pumps to the capacities required for the plant. On request they can be supplied with 3/8" female threaded connections.

MATERIALS

T1	Brass
B31	Stainless steel AISI 316L

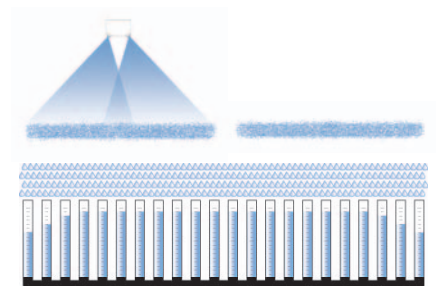
HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material	Construction
MQ	U	1200	XX	Y

Order example: **MQU 1200 T1G**


SOME SPRAY ANGLES (DEGREES)

F = 30°	N = 50°	T = 80°
H = 35°	Q = 60°	U = 90°
L = 40°	R = 65°	J = 110°
M = 45°	S = 75°	W = 120°



CONSTRUCTION: Y

- **G** connections (BSP)
- **N** connections (NPT)

Model	Spray angle 		Pair = 3 bar costant						Connection	
			P _L = 1 bar		P _L = 2 bar		P _L = 3 bar			
			Water	Air	Water	Air	Water	Air	Water	Air
MQQ	60°	min	2.0	33.4	5.9	26.2	8.0	19	3/8" BSP 3/8" NPT	3/8" BSP 3/8" NPT
MQV	90°	max	4.4	41	7.3	31.2	12	24.5		

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi
CAPACITY: 1 lpm = 0,264 gpm

IMPACT FORCE

The descaling nozzles are used to remove the scale that creates during the hot rolling.

Descaling is an extremely important process as it greatly improves the quality of the finished product.

The best method to eliminate the scale is hydraulic, that is, spraying water at a pressure of 200-500 bar (2900 – 7250 psi).

The impact of the water jet on the product produces a force of impact which, combined with the thermal action due to the temperature difference between the two elements, generates the descaling effect.

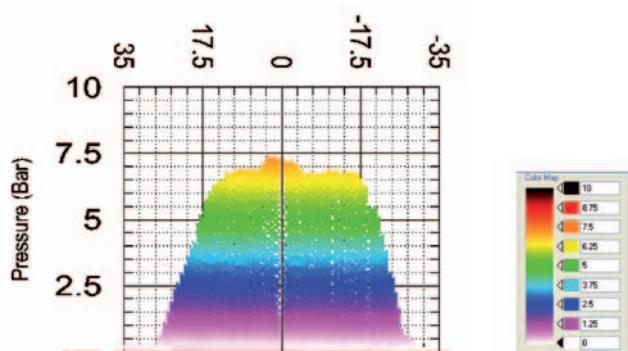
It is evident that the quality of the nozzles is crucial to the quality of the final product.

Optimum descaling requires the use of nozzles designed and made specifically to obtain an optimal internal profile able to achieve high impact values and a jet as constant as possible all along their fingerprint.

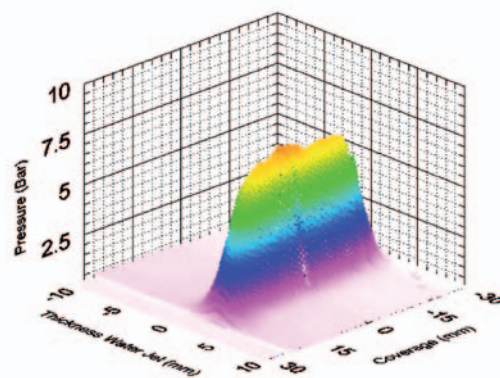
For this reason we test our descaling nozzles at an independent certified laboratory through a test machine capable of assessing the impact of a jet in three dimensions. A load cell placed beneath the nozzle while in operation moves along the jet covering stretch evaluating its force of impact millimetre by millimetre.

The values of pressure height with respect to the floor to be descaled, inclination angle and offset angle, can be varied according to the technical specifications required by customers.

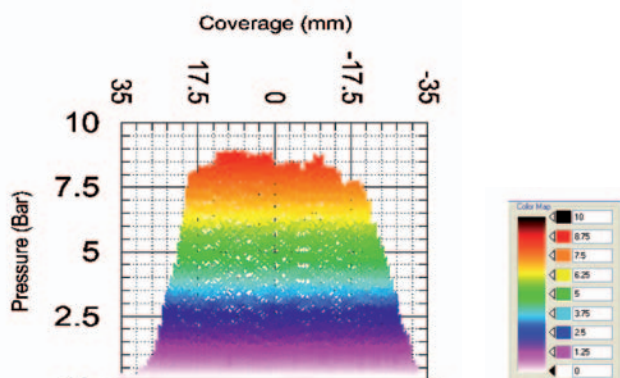
TEST "A"



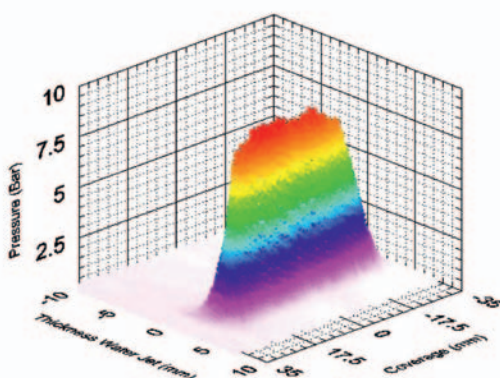
TEST "A"



TEST "B"



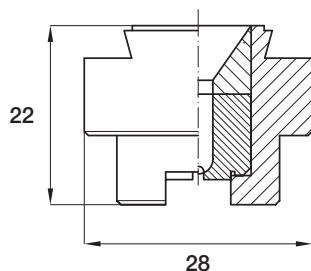
TEST "B"





DOVE TAIL NOZZLE TIPS

The dove tail design of these nozzles allows for proper jet orientation onto the surface to be descaled. Welding nipples of various lengths allow for proper header manifold design.



MATERIALS

B1	Body	Stainless steel AISI 303
C1	Insert	Stainless steel AISI 420 hardened
F1	Insert	Tungsten carbide

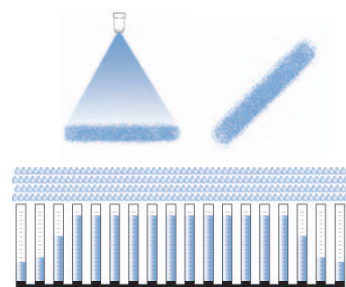
HOW TO ORDER PNR PRODUCTS

Model	Thread	Capacity	Material
GW	C	2162	XX

Order example: **GWC 2162 C1**

SPRAY ANGLE CODES

GWC	GWE	GWF	GWL
22°	26°	30°	40°

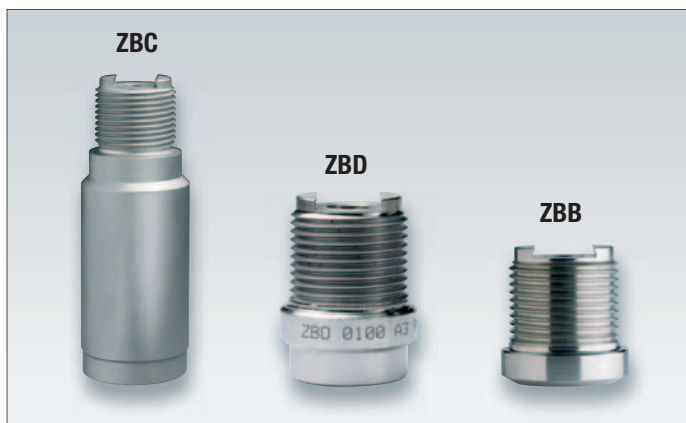


See list of abbreviations - legenda at page 3.

Code	D mm	D1 mm	Capacity - lpm							
			Pressure - bar							
			80	90	100	120	140	160	180	200
2162xx	2.0	1.5	16.2	17.1	18.0	19.5	21.3	22.8	24.0	25.0
2208xx	2.1	1.8	20.8	21.8	23.0	25.2	27.2	29.1	30.8	35.5
2250xx	2.5	1.9	25.0	26.5	28.0	31.0	33.0	35.4	37.5	39.0
2320xx	2.8	2.4	32.0	34.2	36.0	39.4	42.6	45.5	48.3	50.9
2402xx	3.0	2.5	40.2	42.7	45.0	49.0	53.0	57.0	60.0	63.0
2520xx	3.5	2.7	52.0	55.0	58.0	63.5	68.6	73.3	77.8	82.0
2642xx	3.8	3.2	64.2	68.3	72.0	78.0	85.0	91.0	96.0	101
2798xx	4.3	3.6	79.8	84.4	89.0	98.0	105	112	119	126
2996xx	4.7	4.0	99.6	106	112	122	132	141	150	158
3112xx	5.0	4.2	112	119	125	137	148	158	168	177
3120xx	5.2	4.4	120	127	134	147	158	169	180	189

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi
CAPACITY: 1 lpm = 0,264 gpm

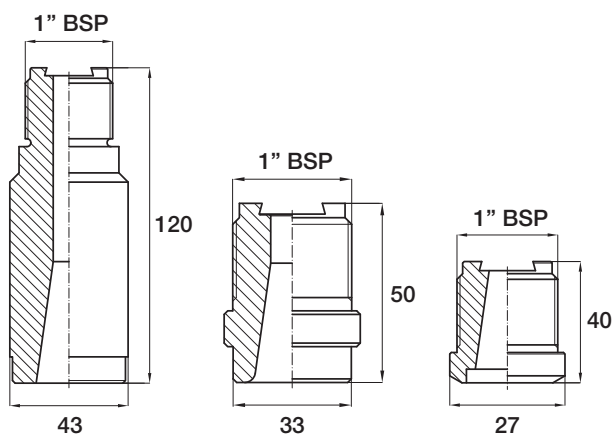
**ZB NIPPLES**

The ZB series welding nipples are designed to assemble the descaling nozzle tips type GW on the main header manifolds.

Their dove tail coupling, machined with high precision, ensures the perfect alignment of the tip and therefore of the spray according to the manifold project design.

The contact surface between the tip collar and the nipple is machined with a high level of finish to prevent losses under pressure.

The ZB nipples are produced in three different lengths to allow various distances between nipple and sheet.

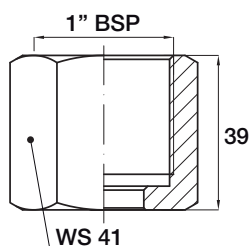
**MATERIALS**

B31 Stainless steel AISI 316L

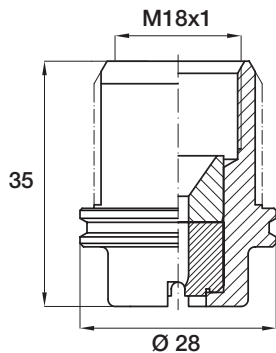
Code	RG inch	L mm	Weight kg
ZBB 0100 B3	1	40	0.18
ZBC 0100 B3	1	120	0.90
ZBD 0100 B3	1	50	0.22

**VAA 1001 B1B**

The lock nut VAA 1001 B1B cap is specifically designed to obtain a safe coupling between the descaling tips type GW and the ZB series nipples at the high working pressures.

**MATERIALS**

B1 Stainless steel AISI 303



NOZZLE TIPS / SHORT, STANDARD-SIZED

The cutting-edge design of these nozzles allows a more rational positioning and the use of a copper gasket between the nozzle tip and the nipple for a perfect water-tightness.

The tip is outfitted to mount a flow stabilizer and a filter which help to reduce energy losses due to turbulence and avoid that the orifice gets clogged by foreign bodies.

MATERIALS

B1	Body	Stainless steel AISI 303
C1	Insert	Stainless steel AISI 420 hardened
F1	Insert	Tungsten carbide

HOW TO ORDER PNR PRODUCTS

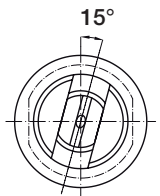
Model	Angle	Capacity	Material
HW/AH	C	2045	XX

Order example: **HWC 2045 F1AH**

SPRAY ANGLE CODES

HWC	HWE	HWF	HWL
22°	26°	30°	40°

OFFSET ANGLE



DISASSEMBLY TOOL FOR NOZZLE TIPS

Because of the strong tightening, the extraction of the tips from the nipple is not always easy and can cause damage to either party.

The disassembly tool HWZ 05B0 B1 allows a safe grip on the nozzle and makes it easier to apply the tensile force required for its extraction.

The kit is sold separately.



ALIGNMENT NOZZLES

The blind nozzle tip HWZ 01C1 B1 allows to position the nipples onto the manifold very precisely during the welding phase through a bar which keeps the millings in line.

Ask for the technical data sheet to select the correct tip for the required alignment angle.

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi **CAPACITY:** 1 lpm = 0,264 gpm

See list of abbreviations - legenda at page 3.

Code	D mm	D1 mm	Capacity - lpm									
			Pressure - bar									
			80	100	140	200	240	280	300	340	380	400
2045 xxAH	0.7	0.6	4.5	5	5.9	7.2	7.8	8.5	8.7	9.3	9.8	10
2063 xxAH	1	0.8	6.3	7	8.3	10	10.9	11.8	12.2	13	13.7	14.1
2106 xxAH	1.5	1.2	10.6	11.9	14.2	16.8	18.4	19.8	20.5	21.8	23.1	23.7
2134 xxAH	1.8	1.4	13.4	15.0	17.7	21.2	23.2	25.0	25.9	27.6	29.2	29.9
2162 xxAH	2.0	1.5	16.2	18.1	21.4	25.6	28.0	30.3	31.4	33.4	35.3	36.2
2208 xxAH	2.1	1.8	20.8	23.3	27.5	32.9	36.0	38.9	40.2	42.9	45.3	46.5
2250 xxAH	2.5	1.9	25.0	28.0	33.0	39.5	43.3	46.8	48.4	51.6	54.5	55.9
2320 xxAH	2.8	2.4	32.0	35.8	42.3	50.6	55.4	59.9	62.0	66.0	69.7	71.6
2402 xxAH	3.0	2.5	40.2	45.0	53.2	63.6	69.6	75.2	77.8	82.9	87.6	89.9
2520 xxAH	3.5	2.7	52.0	58.1	68.8	82.2	90.0	97.3	100.7	107.2	113.3	116.3
2642 xxAH	3.8	3.2	64.2	71.8	84.9	101.5	111.2	120.1	124.3	132.3	140.0	143.6
2798 xxAH	4.3	3.6	79.8	89.2	105.6	126.0	138.2	149.3	154.5	164.5	174.0	178.4
2996 xxAH	4.7	4.0	99.6	111.3	131.8	157.5	172.5	186.3	192.8	205.3	217.0	222.7
3112 xxAH	5.0	4.2	112.0	125.2	148.2	177.0	194.0	209.5	216.9	231.0	244.0	250.4
3120 xxAH	5.2	4.4	120.0	134.2	158.7	189.7	207.8	224.5	232.4	247.4	261.5	268.3

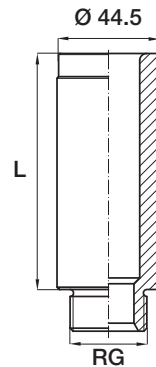
ZWB



WELDING NIPPLES

The HW nozzle can be assembled on a series of nipples with same inlet and three different lengths.

The nipple inlet profile, machined with high precision, allows An easy and precise positioning of the nozzle at the normally used offset angle value of 15° from the main manifold axis.



MATERIALS

B2	Stainless steel AISI 304
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Code	RG inch	L mm	Weight kg
ZWB 0073 B2	1	73	0.49
ZWB 0100 B2	1	100	0.71
ZWB 0120 B2	1	120	0.85

XHW

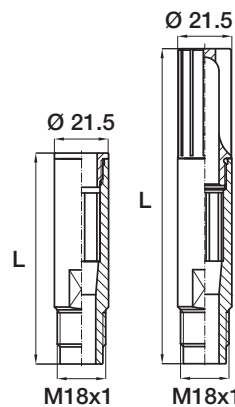


FLOW STABILIZER

Highly important in a descaling process as it reduces the losses caused by flow internal turbulence and allows a higher percentage of the liquid vein energy for a stronger impact on the steel surface.

It's made of a cylindrical body in brass, accurately finished, containing a flow stabilizer with tabs in stainless steel to stabilize the liquid path.

Available in three different lengths, all suitable to house a filter.



MATERIALS

T1	Body	Brass
T1	Filter	Brass
B3	Flow Stabilizer	Stainless steel AISI 316

Code	L mm	Weight kg	Notes
XHW CG10 T1	74	0.08	without filter
XHW CG20 T1	110.5	0.11	with filter
XHW CG21 T1	130.5	0.14	with filter

VAW B100 B1



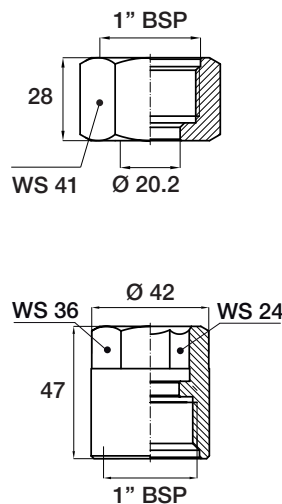
VAW D100 B1



LOCKNUTS

The VAW B100 B1 and VAW D100 B1 locknuts for the ZWB series nozzle tips encompass our long experience in this sector.

Their robust design and generous dimensions offer the maximum protection to the tip and to the nipple thread.



MATERIALS

B1	Stainless steel AISI 303
-----------	--------------------------

Code	Notes
VAW B100 B1	with hexagon on the outside
VAW D100 B1	with built in hexagon

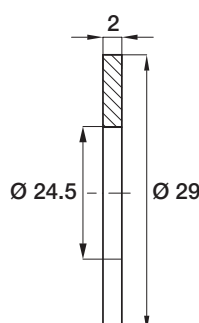
VDA 24C1 T3



GASKET

The VDA 24C1 T3 gasket ensures a tight fitting between nozzle and nipple.

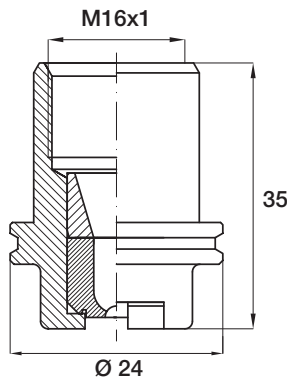
It can be mounted on all mini nipples of all lengths.



MATERIALS

T3	Copper
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Code
VDA 24C1 T3



NOZZLE TIPS, MINI-SIZED

The modern design of these nozzles allows a more rational alignment in position and the use of a copper gasket between the nozzle and the nipple, for a perfect water-tightness.

The nozzle tip is outfitted to mount a flow stabilizer and a filter which allow to reduce losses of energy due to turbulence and avoid that the tip orifice gets clogged by foreign bodies.

MATERIALS

B1	Body	Stainless steel AISI 303
C1	Insert	Stainless steel AISI 420 hardened
F1	Insert	Tungsten carbide

HOW TO ORDER PNR PRODUCTS

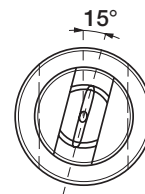
Model	Angle	Capacity	Material
HW/AA	C	2045	XX

Order example: **HWC 2045 F1AA**

SPRAY ANGLE CODES

HWC	HWE	HWF	HWL
22°	26°	30°	40°

OFFSET ANGLE



DISASSEMBLY KIT

This kit allows to extract a nozzle out of a nipple much more easily, for replacement or inspection.

The clamp tip (HWZ 03C0 B1) and the handle (HWZ 04A0 B1) are sold and must be ordered separately.



ALIGNMENT NOZZLE

The alignment nozzle HWZ 01A1 B1 allows a quick and safe positioning of the nipples onto the manifold before welding. The nipples are aligned in place by means of a straight rod and then welded to ensure the correct spray direction.

Please ask for the TFI HWACC3 Technical Data Sheet to identify the part suitable to your needs.

CONVERSION TABLE (UE - USA)

See list of abbreviations - legenda at page 3.

PRESSURE: 1 bar = 14,5 psi **CAPACITY: 1 lpm = 0,264 gpm**

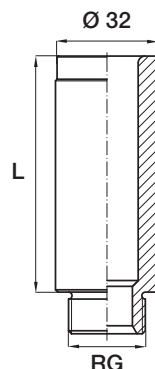
Code	D mm	D1 mm	Capacity - lpm									
			Pressure - bar									
			80	100	140	200	240	280	300	340	380	400
2045 xxAA	0.7	0.6	4.5	5	5.9	7.2	7.8	8.5	8.7	9.3	9.8	10
2063 xxAA	1	0.8	6.3	7	8.3	10	10.9	11.8	12.2	13	13.7	14.1
2106 xxAA	1.5	1.2	10.6	11.9	14.2	16.8	18.4	19.8	20.5	21.8	23.1	23.7
2134 xxAA	1.8	1.4	13.4	15.0	17.7	21.2	23.2	25.0	25.9	27.6	29.2	29.9
2162 xxAA	2.0	1.5	16.2	18.1	21.4	25.6	28.0	30.3	31.4	33.4	35.3	36.2
2208 xxAA	2.1	1.8	20.8	23.3	27.5	32.9	36.0	38.9	40.2	42.9	45.3	46.5
2250 xxAA	2.5	1.9	25.0	28.0	33.0	39.5	43.3	46.8	48.4	51.6	54.5	55.9
2320 xxAA	2.8	2.4	32.0	35.8	42.3	50.6	55.4	59.9	62.0	66.0	69.7	71.6
2402 xxAA	3.0	2.5	40.2	45.0	53.2	63.6	69.6	75.2	77.8	82.9	87.6	89.9
2520 xxAA	3.5	2.7	52.0	58.1	68.8	82.2	90.0	97.3	100.7	107.2	113.3	116.3
2642 xxAA	3.8	3.2	64.2	71.8	84.9	101.5	111.2	120.1	124.3	132.3	140.0	143.6
2798 xxAA	4.3	3.6	79.8	89.2	105.6	126.0	138.2	149.3	154.5	164.5	174.0	178.4
2996 xxAA	4.7	4.0	99.6	111.3	131.8	157.5	172.5	186.3	192.8	205.3	217.0	222.7
3112 xxAA	5.0	4.2	112.0	125.2	148.2	177.0	194.0	209.5	216.9	231.0	244.0	250.4
3120 xxAA	5.2	4.4	120.0	134.2	158.7	189.7	207.8	224.5	232.4	247.4	261.5	268.3

ZWA**WELDING NIPPLES**

The HW nozzles can be mounted on a series of nipples with same inlet and three different lengths.

The nipple inlet profile, precisely machined, allows a precise and easy positioning of the nozzle tip at the normally used offset angle value of 15° from the main manifold axis.

The precise orientation of the spray jets, kept even after replacements, ensures constant performances.

**MATERIALS**

B2	Stainless steel AISI 304
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Code	RG inch	L mm	Weight kg
ZWA 0032 B2	3/4	32	0.08
ZWA 0039 B2	3/4	39	0.10
ZWA 0080 B2	3/4	80	0.23

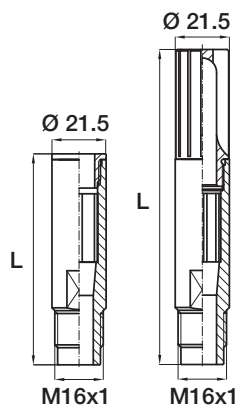
XHW**FLOW STABILIZER**

Highly important in descaling processes as it reduces the losses caused by internal flow turbulence and allows a higher percentage of the liquid vein energy for a stronger impact on the sheet surface.

It's made of a cylindrical body in brass, accurately finished, containing a flow stabilizer with tabs in stainless steel which serves to stabilize the liquid path.

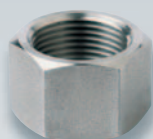
Available in three different lengths, all suitable to house a filter.

All below mentioned items contain a flow stabilizer with tabs ZHW AL00 B3.

**MATERIALS**

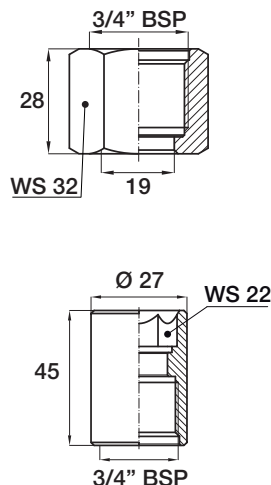
T1	Body	Brass
T1	Filter	Brass
B3	Flow Stabilizer	Stainless steel AISI 316

Code	L mm	Weight kg	Notes
XHW AG 10 T1	74.0	0.08	without filter
XHW AG 20 T1	110.5	0.12	with filter
XHW AG 21 T1	130.5	0.15	with filter

VAW A075 B1**VAW C075 B1****LOCKNUTS**

The VAW A075 B1 and VAW C075 B1 locknuts for the ZWA series nozzle tips encompass our long experience in this sector.

Their robust design and generous dimensions offer the maximum protection to the tip and to the nipple thread.

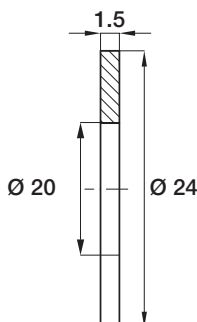
**MATERIALS**

B1	Stainless steel AISI 303
-----------	--------------------------

Code	Notes
VAW A075 B1	with hexagon on the outside
VAW C075 B1	with built in hexagon

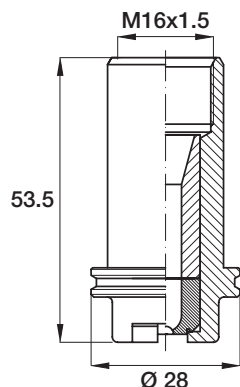
VDA 20C1 T3**GASKET**

The VDA 20C1 T3 gasket ensure a safe water tightness between nozzle tip and nipple and can be assembled on mini nipples of all lengths.

**MATERIALS**

T3	Copper
-----------	--------

Code
VDA 20C1 T3



HIGH IMPACT NOZZLE TIPS, STANDARD-SIZED

The internal profile leading to the outlet has been completely redesigned: all the sharp variations of the flow passage section were eliminated to reduce to a minimum the losses due to turbulence and get the maximum exit speed. This special design, with the flow stabilizer already mounted on the tip, allows to obtain excellent results. It's also possible to mount a filter onto the inlet of the flow stabilizer.

MATERIALS

B1	Body	Stainless steel AISI 303
C1	Insert	Stainless steel AISI 420 hardened
F1	Insert	Tungsten carbide

HOW TO ORDER PNR PRODUCTS

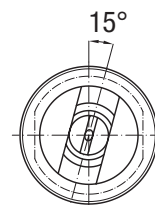
Model	Angle	Capacity	Material
HW/AK	C	2045	XX

Order example: **HWC 2045 F1AK**

SPRAY ANGLE CODES

HWC	HWE	HWF	HWL
22°	26°	30°	40°

OFFSET ANGLE



DISASSEMBLY KIT FOR NOZZLE TIPS

Because of the strong tightening, the extraction of the tips from the nipple is not always easy and can cause damage to either party.

The disassembly kit HWZ 05B0 B1 allows a safe grip on the nozzle and makes it easier to apply the tensile force required for its extraction.



ALIGNMENT NOZZLES

The blind nozzle tip HWZ 01 C1 allows to position the nipples onto the manifold very precisely during the welding phase through a bar which keeps the millings in line.

Ask for the technical data sheet to select the correct tip for the required alignment angle.

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi **CAPACITY:** 1 lpm = 0,264 gpm

See list of abbreviations - legenda at page 3.

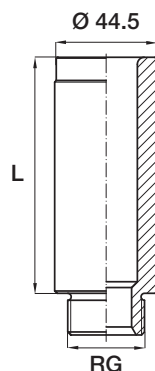
Code	D mm	D1 mm	Capacity - lpm									
			Pressure - bar									
			80	100	140	200	240	280	300	340	380	400
2045 xxAK	0.7	0.6	4.5	5	5.9	7.2	7.8	8.5	8.7	9.3	9.8	10
2063 xxAK	1	0.8	6.3	7	8.3	10	10.9	11.8	12.2	13	13.7	14.1
2106 xxAK	1.5	1.2	10.6	11.9	14.2	16.8	18.4	19.8	20.5	21.8	23.1	23.7
2134 xxAK	1.8	1.4	13.4	15.0	17.7	21.2	23.2	25.0	25.9	27.6	29.2	29.9
2162 xxAK	2.0	1.5	16.2	18.1	21.4	25.6	28.0	30.3	31.4	33.4	35.3	36.2
2208 xxAK	2.1	1.8	20.8	23.3	27.5	32.9	36.0	38.9	40.2	42.9	45.3	46.5
2250 xxAK	2.5	1.9	25.0	28.0	33.0	39.5	43.3	46.8	48.4	51.6	54.5	55.9
2320 xxAK	2.8	2.4	32.0	35.8	42.3	50.6	55.4	59.9	62.0	66.0	69.7	71.6
2402 xxAK	3.0	2.5	40.2	45.0	53.2	63.6	69.6	75.2	77.8	82.9	87.6	89.9
2520 xxAK	3.5	2.7	52.0	58.1	68.8	82.2	90.0	97.3	100.7	107.2	113.3	116.3
2642 xxAK	3.8	3.2	64.2	71.8	84.9	101.5	111.2	120.1	124.3	132.3	140.0	143.6
2798 xxAK	4.3	3.6	79.8	89.2	105.6	126.0	138.2	149.3	154.5	164.5	174.0	178.4
2996 xxAK	4.7	4.0	99.6	111.3	131.8	157.5	172.5	186.3	192.8	205.3	217.0	222.7
3112 xxAK	5.0	4.2	112.0	125.2	148.2	177.0	194.0	209.5	216.9	231.0	244.0	250.4
3120 xxAK	5.2	4.4	120.0	134.2	158.7	189.7	207.8	224.5	232.4	247.4	261.5	268.3

ZWB



WELDING NIPPLES

The HW nozzles can be mounted on a series of nipples with the same nozzle connection and three different lengths. The nipple inlet profile, machined with high precision, allows an easy and precise positioning of the nozzle at the normally used offset angle value of 15° from the main manifold axis.



MATERIALS

B2 Stainless steel AISI 304

Code	RG inch	L mm	Weight kg
ZWB 0073 B2	1	73	0.49
ZWB 0100 B2	1	100	0.71
ZWB 0120 B2	1	120	0.85

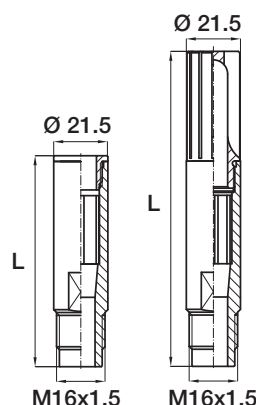
XHW



FLOW STABILIZER

Highly important in a descaling process as it reduces the losses caused by internal flow turbulence and allows a higher percentage of the liquid vein energy for a stronger impact on the steel surface. It's made of a cylindrical body in brass, accurately finished, containing a flow stabilizer with tabs in stainless steel to stabilize the liquid path.

Available in three different lengths, all suitable to house a filter.

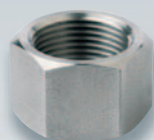


MATERIALS

T1	Body	Brass
T1	Filter	Brass
B3	Flow Stabilizer	Stainless steel AISI 316

Code	L mm	Weight kg	Notes
XHW DG 10 T1	76	0.08	without filter
XHW DG 11 T1	96	0.10	without filter
XHW DG 20 T1	110	0.11	with filter
XHW DG 21 T1	130	0.14	with filter
XHW DG 22 T1	150	0.16	with filter

VAW B100 B1



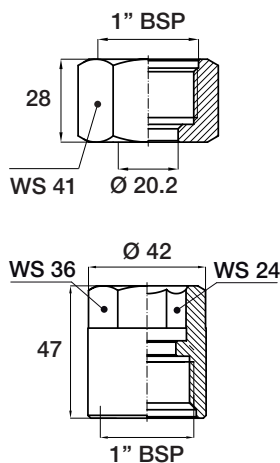
VAW D100 B1



LOCKNUTS

The VAW B100 B1 and VAW D100 B1 locknuts for the ZWB series nozzle tips encompass our long experience in this sector.

Their robust design and generous dimensions offer the maximum protection to the tip and to the nipple thread.



MATERIALS

B1 Stainless steel AISI 303

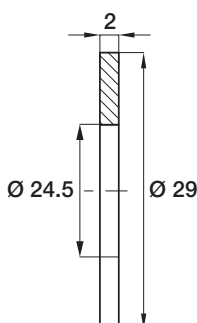
Code	Notes
VAW B100 B1	with hexagon on the outside
VAW D100 B1	with built in hexagon

VDA 24C1 T3



GASKET

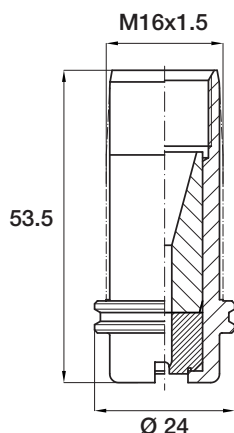
The VDA 24C1 T3 gasket ensures a tight fitting between nozzle and nipple. It can be mounted on all standard size ZWB nipples.



MATERIALS

T3 Copper

Code
VDA 24C1 T3



HIGH IMPACT NOZZLE TIPS, MINI-SIZED

The internal profile leading to the outlet has been completely redesigned: all the sharp variations of the flow passage section have been eliminated to reduce to a minimum the losses for turbulence and to get the maximum exit speed. This special design, with the flow stabilizer already mounted on the tip, allows to obtain excellent results.

MATERIALS

B1	Body	Stainless steel AISI 303
C1	Insert	Stainless steel AISI 420 hardened
F1	Insert	Tungsten carbide

HOW TO ORDER PNR PRODUCTS

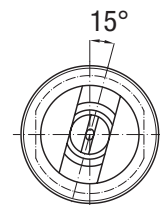
Model	Angle	Capacity	Material
HW/AB	C	2045	XX

Order example: **HWC 2045 F1AB**

SPRAY ANGLE CODES

HWC	HWE	HWF	HWL
22°	26°	30°	40°

OFFSET ANGLE



DISASSEMBLY TOOL FOR NOZZLE TIPS

Because of the strong tightening, the extraction of the tip from a nipple is not always easy and may cause damage to either parts. The disassembly kit HWZ 05A0 B1 allows a safe grip on the nozzle and makes it easier to apply the tensile force required for its extraction. The kit, clamping tip and handle, is sold separately.



ALIGNMENT NOZZLES

The HWZ 01Ax B1 blind nozzle tip allows to position the nipples onto the manifold very precisely during the welding phase through a bar which keeps the millings in line.

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi **CAPACITY:** 1 lpm = 0,264 gpm

See list of abbreviations - legenda at page 3.

Code	D mm	D1 mm	Capacity - lpm									
			Pressure - bar									
			80	100	140	200	240	280	300	340	380	400
2045 xxAB	0.7	0.6	4.5	5	5.9	7.2	7.8	8.5	8.7	9.3	9.8	10
2063 xxAB	1	0.8	6.3	7	8.3	10	10.9	11.8	12.2	13	13.7	14.1
2106 xxAB	1.5	1.2	10.6	11.9	14.2	16.8	18.4	19.8	20.5	21.8	23.1	23.7
2134 xxAB	1.8	1.4	13.4	15.0	17.7	21.2	23.2	25.0	25.9	27.6	29.2	29.9
2162 xxAB	2.0	1.5	16.2	18.1	21.4	25.6	28.0	30.3	31.4	33.4	35.3	36.2
2208 xxAB	2.1	1.8	20.8	23.3	27.5	32.9	36.0	38.9	40.2	42.9	45.3	46.5
2250 xxAB	2.5	1.9	25.0	28.0	33.0	39.5	43.3	46.8	48.4	51.6	54.5	55.9
2320 xxAB	2.8	2.4	32.0	35.8	42.3	50.6	55.4	59.9	62.0	66.0	69.7	71.6
2402 xxAB	3.0	2.5	40.2	45.0	53.2	63.6	69.6	75.2	77.8	82.9	87.6	89.9
2520 xxAB	3.5	2.7	52.0	58.1	68.8	82.2	90.0	97.3	100.7	107.2	113.3	116.3
2642 xxAB	3.8	3.2	64.2	71.8	84.9	101.5	111.2	120.1	124.3	132.3	140.0	143.6
2798 xxAB	4.3	3.6	79.8	89.2	105.6	126.0	138.2	149.3	154.5	164.5	174.0	178.4
2996 xxAB	4.7	4.0	99.6	111.3	131.8	157.5	172.5	186.3	192.8	205.3	217.0	222.7
3112 xxAB	5.0	4.2	112.0	125.2	148.2	177.0	194.0	209.5	216.9	231.0	244.0	250.4
3120 xxAB	5.2	4.4	120.0	134.2	158.7	189.7	207.8	224.5	232.4	247.4	261.5	268.3

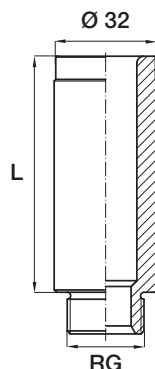
ZWA



WELDING NIPPLES

The HW nozzles can be assembled on a series of nipples with same inlet and three different lengths.

The nipple inlet profile, machined with high precision, allows a precise and easy positioning of the nozzle at the normally used offset angle value of 15° from the main manifold axis.



MATERIALS

B2	Stainless steel AISI 304
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Code	RG inch	L mm	Weight kg
ZWA 0032 B2	3/4	32	0.08
ZWA 0039 B2	3/4	39	0.10
ZWA 0080 B2	3/4	80	0.23

XHW



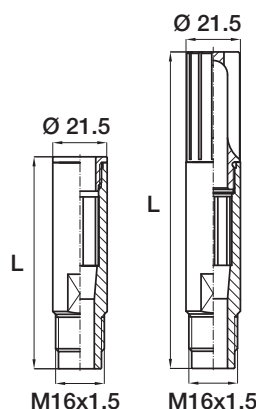
FLOW STABILIZER

Highly important in a descaling process as it reduces the losses due to flow internal turbulence and allows to use a higher percentage of the liquid vein energy for a stronger impact on the sheet surface.

It's made of a cylindrical body in brass, accurately finished, containing a flow stabilizer with tabs in stainless steel to stabilize the liquid path.

Available in three different lengths, all suitable to house a filter.

All below listed items contain a flow stabilizer with tabs ZHW AL00 B3

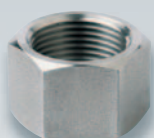


MATERIALS

T1	Body	Brass
T1	Filter	Brass
B3	Flow Stabilizer	Stainless steel AISI 316

Code	L mm	Weight kg	Notes
XHW DG 10 T1	76	0.08	without filter
XHW DG 11 T1	96	0.10	without filter
XHW DG 20 T1	110	0.11	with filter
XHW DG 21 T1	130	0.14	with filter
XHW DG 22 T1	150	0.16	with filter

VAW A075 B1



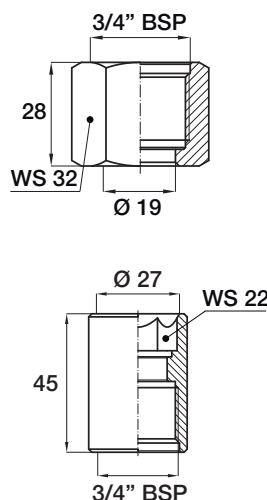
VAW C075 B1



LOCKNUTS

The VAW A075 B1 and VAW D100 B1 locknuts for the ZWB series nozzle tips encompass our long experience in this sector.

Their robust design and generous dimensions offer the maximum protection to the tip and to the nipple thread.



MATERIALS

B1	Stainless steel AISI 303
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Code	Notes
VAW A075 B1	with hexagon on the outside
VAW C075 B1	with built in hexagon

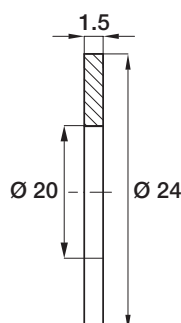
VDA 20C1 T3



GASKET

The VDA 20C1 T3 gasket ensures a tight fitting between nozzle and nipple.

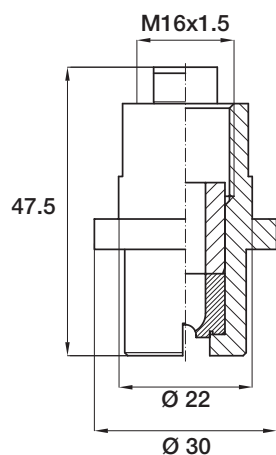
They can be mounted on all ZWB mini nipples.



MATERIALS

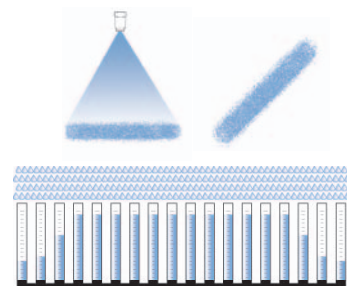
T3	Copper
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Code
VDA 20C1 T3



HIGH IMPACT NOZZLE TIP, SPECIAL-SIZED

Positioning and the use of a copper gasket between tip and nipple, for a perfect pressure water tightness. The tip is made for the assembling of a flow stabilizer and a filter which allow to reduce energy losses due to turbulence and avoid the orifice gets clogged by foreign bodies.



MATERIALS

B1	Body	Stainless steel AISI 303
C1	Insert	Stainless steel AISI 420 hardened
F1	Insert	Tungsten carbide

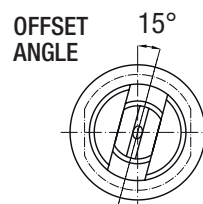
HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material
HV/AH	C	2045	XX

Order example: **HVC 2045 F1AH**

SPRAY ANGLE CODES

HVC	HVE	HVF	HVL
22°	26°	30°	40°



See list of abbreviations - legenda at page 3.

Code	D mm	D1 mm	Capacity - lpm									
			Pressure - bar									
			80	100	140	200	240	280	300	340	380	400
2045 xxAH	0.7	0.6	4.5	5	5.9	7.2	7.8	8.5	8.7	9.3	9.8	10
2063 xxAH	1	0.8	6.3	7	8.3	10	10.9	11.8	12.2	13	13.7	14.1
2106 xxAH	1.5	1.2	10.6	11.9	14.2	16.8	18.4	19.8	20.5	21.8	23.1	23.7
2134 xxAH	1.8	1.4	13.4	15.0	17.7	21.2	23.2	25.0	25.9	27.6	29.2	29.9
2162 xxAH	2.0	1.5	16.2	18.1	21.4	25.6	28.0	30.3	31.4	33.4	35.3	36.2
2208 xxAH	2.1	1.8	20.8	23.3	27.5	32.9	36.0	38.9	40.2	42.9	45.3	46.5
2250 xxAH	2.5	1.9	25.0	28.0	33.0	39.5	43.3	46.8	48.4	51.6	54.5	55.9
2320 xxAH	2.8	2.4	32.0	35.8	42.3	50.6	55.4	59.9	62.0	66.0	69.7	71.6
2402 xxAH	3.0	2.5	40.2	45.0	53.2	63.6	69.6	75.2	77.8	82.9	87.6	89.9
2520 xxAH	3.5	2.7	52.0	58.1	68.8	82.2	90.0	97.3	100.7	107.2	113.3	116.3
2642 xxAH	3.8	3.2	64.2	71.8	84.9	101.5	111.2	120.1	124.3	132.3	140.0	143.6
2798 xxAH	4.3	3.6	79.8	89.2	105.6	126.0	138.2	149.3	154.5	164.5	174.0	178.4
2996 xxAH	4.7	4.0	99.6	111.3	131.8	157.5	172.5	186.3	192.8	205.3	217.0	222.7
3112 xxAH	5.0	4.2	112.0	125.2	148.2	177.0	194.0	209.5	216.9	231.0	244.0	250.4
3120 xxAH	5.2	4.4	120.0	134.2	158.7	189.7	207.8	224.5	232.4	247.4	261.5	268.3

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi **CAPACITY:** 1 lpm = 0,264 gpm

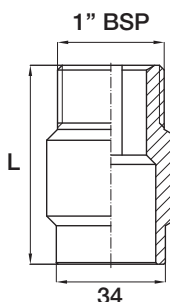
ZWC



WELDING NIPPLES

The HV nozzle tips can be mounted on a series of nipples with same inlet and three different lengths.

The nipple inlet profile, precisely machined, allows an easy and precise positioning of the tip at the normally used offset angle value of 15° from the main manifold axis.



MATERIALS

B2	Stainless steel AISI 304
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Code	RG inch	L mm	Weight kg
ZWC 0062 B2	1	62	0.65
ZWC 0066 B2	1	66	0.70

XHW

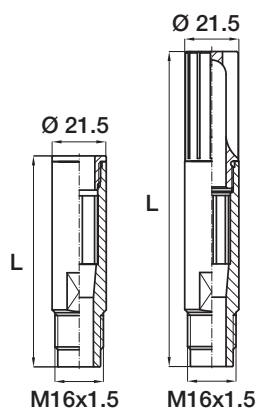


FLOW STABILIZER

Highly important in the descaling process as it reduces losses caused by internal turbulence and allows to use a higher percentage of the liquid vein energy for a stronger impact on the sheet surface.

It's are made of a cylindrical body in brass, accurately finished, containing a flow stabilizer in stainless steel with tabs to stabilize the liquid path.

Available in three different lengths, all suitable to house a filter.

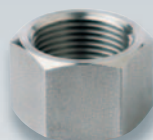


MATERIALS

T1	Body	Brass
T1	Filter	Brass
B3	Flow Stabilizer	Stainless steel AISI 316

Code	L mm	Weight kg	Notes
XHW DG 10 T1	76	0.08	without filter
XHW DG 11 T1	96	0.10	without filter
XHW DG 20 T1	110	0.11	with filter
XHW DG 21 T1	130	0.14	with filter
XHW DG 22 T1	150	0.16	with filter

VAW B100 B1



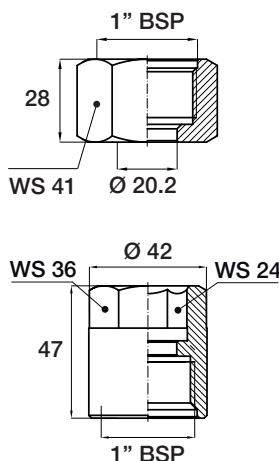
VAW D100 B1



LOCKNUTS

The VAW B100 B1 and VAW D100 B1 locknuts for the ZWB series nozzle tips encompass our long experience in this sector.

Their robust design and generous dimensions offer the maximum protection to the tip and to the nipple thread.



MATERIALS

B1	Stainless steel AISI 303
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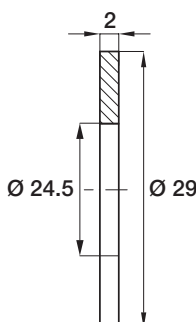
Code	Notes
VAW B100 B1	with hexagon on the outside
VAW D100 B1	with built in hexagon

VDA 24C1 T3



GASKET

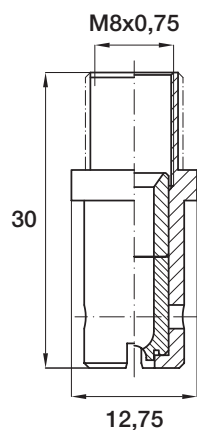
The VDA 24C1 T3 gasket ensures a tight and safe assembly between nozzle tip and nipple and can be mounted on all mini nipples.



MATERIALS

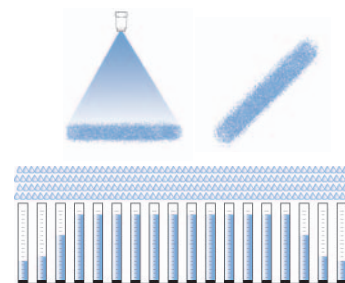
T3	Copper
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Code
VDA 24C1 T3



HIGH IMPACT NOZZLE TIPS, MICRO-SIZED

In some plants there may be a very small centre-to-centre distance between descaling nozzles. In these cases the use of micro-descaling tips avoids the installation of nipples and nozzles in intake manifolds or descaling rings which would be highly difficult if not impossible with standard size nozzles.



MATERIALS

B1	Body	Stainless steel AISI 303
F1	Insert	Tungsten carbide

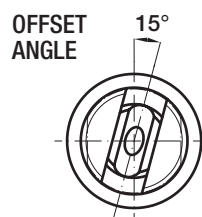
HOW TO ORDER PNR PRODUCTS

Model	Angle	Capacity	Material
HW/AM	C	2045	XX

Order example: **HWC 2045 F1AM**

SPRAY ANGLE CODES

HWC	HWE	HWF	HWL
22°	26°	30°	40°



See list of abbreviations - legenda at page 3.

Code	D	D1	Capacity - lpm									
			Pressure - bar									
	mm	mm	80	100	140	200	240	280	300	340	380	400
2045 xxAM	0.7	0.6	4.5	5	5.9	7.2	7.8	8.5	8.7	9.3	9.8	10
2063 xxAM	1	0.8	6.3	7	8.3	10	10.9	11.8	12.2	13	13.7	14.1
2106 xxAM	1.5	1.2	10.6	11.9	14.2	16.8	18.4	19.8	20.5	21.8	23.1	23.7
2134 xxAM	1.8	1.4	13.4	15.0	17.7	21.2	23.2	25.0	25.9	27.6	29.2	29.9
2162 xxAM	2.0	1.5	16.2	18.1	21.4	25.6	28.0	30.3	31.4	33.4	35.3	36.2
2208 xxAM	2.1	1.8	20.8	23.3	27.5	32.9	36.0	38.9	40.2	42.9	45.3	46.5
2250 xxAM	2.5	1.9	25.0	28.0	33.0	39.5	43.3	46.8	48.4	51.6	54.5	55.9

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm

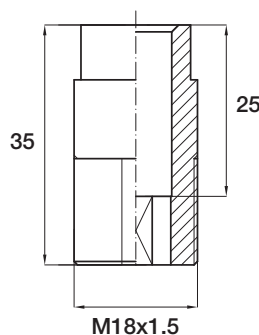
ZWM 0035 B2



NIPPLE

The micro descaling nozzles are usually installed on the ZWM 0035 B2 nipple 35 mm in length.

PNR can supply on request nipples in different lengths. The nipple inlet profile, accurately machined, allows an easy positioning of the nozzle tip at the offset angle value of 15° normally used in descaling processes.



MATERIALS

B2	Stainless steel AISI 304
-----------	--------------------------

Code	RG inch	L mm	Weight kg
ZWM 0035 B2	1.5	35	0.20

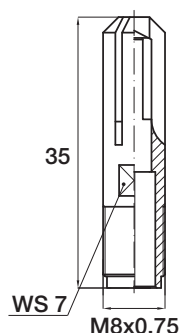
XHW MG20 T1



FLOW STABILIZER

Highly important in a descaling process as it reduces the losses due to flow internal turbulence and allows to use a higher percentage of the liquid vein energy for a higher impact on the sheet surface.

It's made of a cylindrical body in brass containing a flow stabilizer with tabs in stainless steel to stabilize the liquid path.



MATERIALS

T1	Brass
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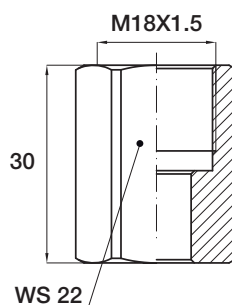
Code	L mm	Weight kg	Notes
XHW MG20 T1	35	0.04	with filter

VAW MM18 B1



LOCKNUT

Its robust design and generous dimensions (compared to the nozzle) offer the maximum protection to the nozzle tip and to the nipple thread.



MATERIALS

B1	Stainless steel AISI 303
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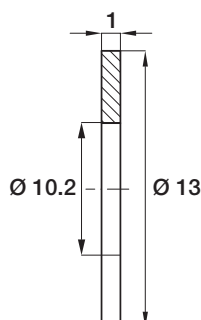
Code
VAW MM18 B1

VDA 10A5 T3



GASKET

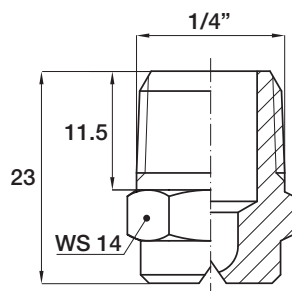
The VDA 10A5 T3 gasket provides a secure seal between nozzle tip and nipple.



MATERIALS

T3	Copper
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Code
VDA 10A5 T3



FLAT JET NOZZLES

The J series flat jet nozzles are used in the pickling process to remove the surface layers of oxides formed during the hot metalwork.

They are available in a wide range of different capacities, spray angles and materials. Their threaded connection is conic to allow both an easy tightening and a correct jet orientation.

In case of "NPT" connection the model changes from "J" to "H", provides that all other parts of the product code (thread, spray angle, material) remain unvaried.

MATERIALS

B1	Stainless steel AISI 303
B31	Stainless steel AISI 316L
T1	Brass
D8	PVDF

HOW TO ORDER PNR PRODUCTS

Model	Thread	Angle	Capacity	Material
J	A	C	1190	XX


Order example: **JAC 1190 B31**


DIMENSIONS AND WEIGHTS

Code	RG inch	H mm	H1 mm	WS mm	W g
JA	1/8	19.5	11.5	12	9
JB	1/4	22	12	14	18
JC	3/8	25	14	17	34

See list of abbreviations
legenda at page 3.

	JAF	JBF	JCF	Code	Capacity - lpm								
					Pressure - bar								
					0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
30°	•			1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•			1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•		1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6
	•	•		1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
		•		1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
		•		1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
		•		2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
		•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
			•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
			•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
			•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100
			•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121

	JAM	JBM	JCM	Code	Capacity - lpm								
					Pressure - bar								
					0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
45°	•			1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•			1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•		1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6
	•	•		1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
		•		1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
		•	•	1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
		•	•	2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
		•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
			•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
			•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
			•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100
			•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121


	JAQ	JBQ	JCQ	Code	Capacity - lpm								
					Pressure - bar								
					0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
60°	•	•		1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•	•		1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•	•	1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6
	•	•	•	1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
		•	•	1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
		•	•	1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
		•	•	2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
		•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
		•	•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
			•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
			•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100
			•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121


CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm

▷ continued on page 56

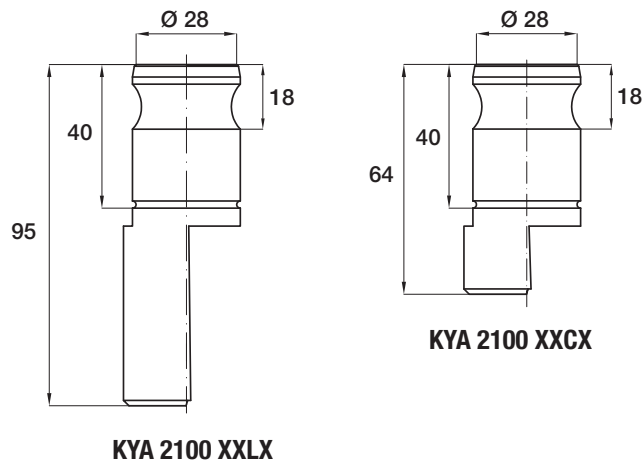
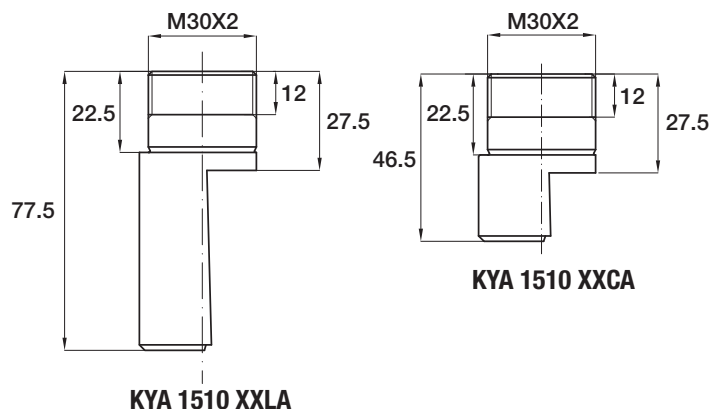
	JAU	JBU	JCU	Code	Capacity - lpm								
					Pressure - bar								
					0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
90°	•			1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•			1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•		1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•		1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6
	•	•	•	1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
	•	•	•	1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
		•	•	1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
		•	•	2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
		•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
		•	•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
			•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
			•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100
			•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121

	JAW	JBW	JCW	Code	Capacity - lpm								
					Pressure - bar								
					0.5	1.0	2.0	3.0	4.0	5.0	7.0	10	20
120°	•			1190	0.78	1.10	1.55	1.90	2.19	2.45	2.90	3.47	4.91
	•	•		1233	0.95	1.35	1.90	2.33	2.69	3.01	3.56	4.25	6.02
	•	•		1310	1.27	1.79	2.53	3.10	3.58	4.00	4.74	5.66	8.00
	•	•	•	1385	1.57	2.22	3.14	3.85	4.45	4.97	5.88	7.03	9.94
	•	•	•	1490	2.00	2.83	4.00	4.90	5.66	6.33	7.48	8.95	12.6
	•	•	•	1581	2.37	3.35	4.74	5.81	6.71	7.50	8.87	10.6	15.0
	•	•	•	1780	3.18	4.50	6.37	7.80	9.01	10.1	11.9	14.2	20.1
	•	•	•	1980	4.00	5.66	8.00	9.80	11.3	12.7	15.0	17.9	25.3
		•	•	2124	5.06	7.16	10.1	12.4	14.3	16.0	18.9	22.6	32.0
		•	•	2153	6.25	8.83	12.5	15.3	17.7	19.8	23.4	27.9	39.5
		•	•	2195	7.96	11.3	15.9	19.5	22.5	25.2	29.8	35.6	50.3
		•	•	2245	10.0	14.1	20.0	24.5	28.3	31.6	37.4	44.7	63.3
			•	2274	11.2	15.8	22.4	27.4	31.6	35.4	41.9	50.0	70.7
			•	2310	12.7	17.9	25.3	31.0	35.8	40.0	47.4	56.6	80.0
			•	2390	15.9	22.5	31.8	39.0	45.0	50.3	59.6	71.2	100
			•	2470	19.2	27.1	38.4	47.0	54.3	60.7	71.8	85.8	121

CONVERSION TABLE (UE - USA)

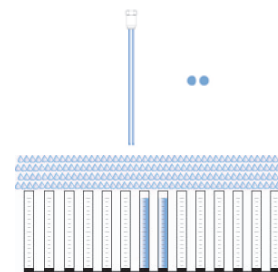
PRESSURE: 1 bar = 14,5 psi

CAPACITY: 1 lpm = 0,264 gpm



ROLLS COOLING NOZZLES

These special nozzles are used to obtain a satisfactory cooling of the rolls on casting machines with high values of width. The direction of the two jets is designed to achieve the maximum cooling efficiency over long distances.



MATERIALS

T1	Brass
B31	Stainless steel AISI 316L

HOW TO ORDER PNR PRODUCTS

Model	Capacity	Material	Construction	Variation
KYA	1510	XX	Y	Z

Order example: **KYA 1510 B31 Lx**

CONSTRUCTION: Y

- **C** short body
- **L** long body

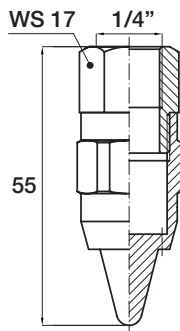
VARIATION: Z

- **A** metric thread M30x2
- **X** quick coupling

Code	Capacity - lpm							
	Pressure - bar							
	1.0	2.0	3.0	4.0	5.0	6.0	7.0	10.0
KYA 1510 xx	2.94	4.16	5.10	5.89	6.58	7.21	7.79	9.31
KYA 1790 xx	4.56	6.45	7.90	9.12	10.2	11.2	12.1	14.4
KYA 2107 xx	6.18	8.74	10.7	12.4	13.8	15.1	16.3	19.5

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi
CAPACITY: 1 lpm = 0,264 gpm



COMPRESSED AIR BLOWERS

These nozzles produce a concentrated air jet with a powerful force of impact directed on a well defined point. Their profile conveys a small quantity of compressed air in a flat outlet flow which drags outdoor air giving it part of its energy. The resulting air flow has a greater mass and lower speed, with a very low turbulence and, consequently, a highly reduced noise level. The blowing nozzle body is made of aluminium protected by a chemical nickel-plating for applications requiring a reduced weight, or else in stainless steel 316L for heavy working. The below table gives the values of the air consumption at different operating pressures, whereas the graphic shows the noise level produced both head-on and sideways at the commonly used pressure of 2 bar.

MATERIALS

V7	Aluminium, chemical nickel-plating LT 95° C - LP 15 bar
B31	Stainless steel AISI 316L LT 110° C - LP 15 bar

HOW TO ORDER PNR PRODUCTS

Model	Length	Material	Construction	Variation
UEA	150	XX	Y	Z

Order example: **UEA D020 V7SG**

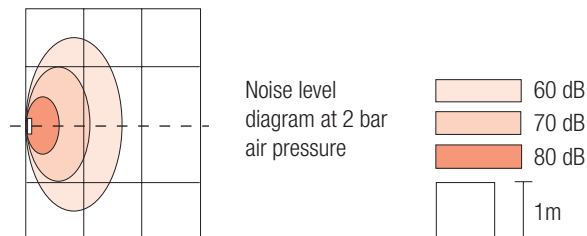
CONSTRUCTION: Y

- **S** standard

VARIATION: Z

- **G** cylindrical gas thread (BSPP)
- **N** conic gas thread (NPT)

These air blowers meet the requirements of American OSHA regulations

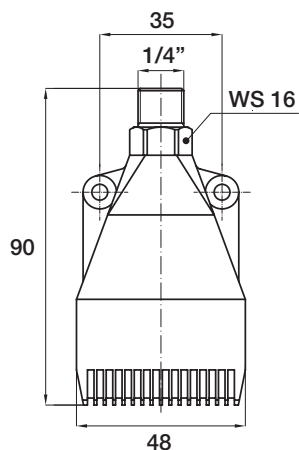


See list of abbreviations - legenda at page 3.

Code	RF inch	Capacity Air - Nm³/h					Dimensions mm	
		Pressure - bar					H	L
UEA D020 B31xx	1/4	15	20	25	31	35	55	17
UEA D020 V7xx		15	20	25	31	35	55	17

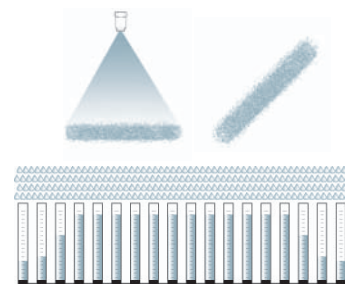
CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi



COMPRESSED AIR BLOWERS

These nozzles produce a laminar air jet with a low noise level and strong impact and are normally used to treat moving objects on a conveyor belt. Their working principle is based on the mix of a low quantity of air with a laminar flow which drags room-air to obtain a jet with greater mass, low turbulence and limited noise level.



MATERIALS

E31	Poly-acetic resin (POM) LT 80° C - LP 5 bar
V7	Aluminium, chemical nickel-plating LT 95° C - LP 15 bar

HOW TO ORDER PNR PRODUCTS

Model	Length	Material	Construction	Variation
UEA	150	XX	Y	Z

Order example: **UEA L022 V7SG**

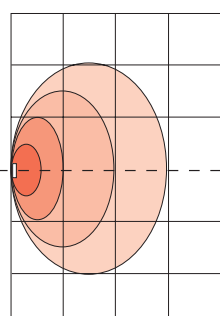
CONSTRUCTION: Y

- **S** standard

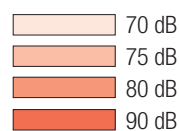
VARIATION: Z

- **G** cylindrical gas thread (BSPP)
- **N** conic gas thread (NPT)

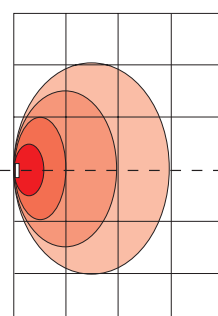
These air blowers meet the requirements of American OSHA regulations



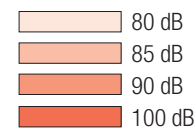
Noise level
diagram at 3 bar
air pressure



1m



Noise level
diagram at 8 bar
air pressure



1m

See list of abbreviations - legenda at page 3.

Code	RG	Capacity Air - Nm³/h					Dimensions mm				
	inch	Pressure - bar									
		1.0	2.0	3.0	4.0	5.0	H	L	L1	L2	WS
UEA L022 E31xx	1/4	10	17	22	28	33	90	48	35	6,5	16
UEA L022 V7xx		10	17	22	28	33	90	48	35	6,5	16

CONVERSION TABLE (UE - USA)

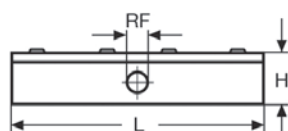
PRESSURE: 1 bar = 14,5 psi

COMPRESSED AIR BAR BLOWERS

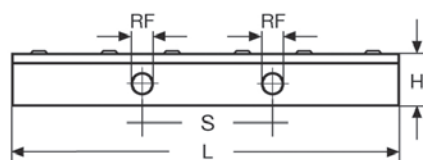
The UEB bar blowers produce a laminar air jet with high impact, low speed and reduced noise level.

Their particular design, based on the Coanda effect, allows to place the outlet orifice in a safe position to protect it from possible damage, for example, when used sideways on hanging conveyor belts.

The UEB bar air blowers are produced in four different standard lengths and are modular so they can be composed together to obtain the air barriers of any length.



UEB 0150 / UEB 0300



UEB 0450 / UEB 0600

MATERIALS

V7	Body	Aluminium, chemical nickel-plating
A9	Upper plate	Nickel plated steel LT 95° C - LP 7 bar

HOW TO ORDER PNR PRODUCTS

Model	Length	Material	Construction	Variation
UEB	150	XX	Y	Z

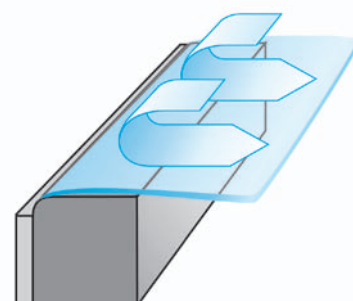
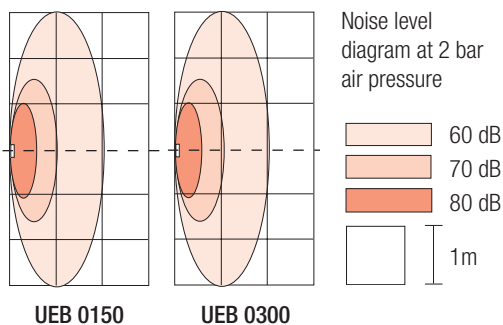
Order example: **UEB 0150 V7SG**

CONSTRUCTION: Y

- **S** standard

VARIATION: Z

- **G** cylindrical gas thread (BSPP)
- **N** conic gas thread (NPT)



The air blade coming out through the side slot follows the radiused profile and leaves the body with an angle of 90° from the original direction, as shown in the drawing. This remarkable feature, based on the Coanda effect, enables to have the air outlet orifice in a totally protected position, a very interesting advantage, for instance, when products oscillating on a chain conveyor could damage conventional air blowers.

The table shows air capacity as a function of air pressure, while the below graphs show the noise level as a function of the front and side distances from the nozzle, operating at an air pressure of 2 bar. As the air leaving the nozzle orifice drags along ambient air, the air blade produced by the nozzle (AIR OUT) has a larger flow rate which is a multiple of the feed air flow (AIR IN).

See list of abbreviations - legenda at page 3.

Code	RF	Capacity Air - Nm³/h										Dimensions mm			Weight kg
	inch	Pressure - bar													
		2.0		3.0		4.0		5.0		6.0		H	L	S	
		AI	AO	AI	AO	AI	AO	AI	AO	AI	AO				
UEB 0150 V7xx	1/4	0.26	4.7	0.34	6	0.42	7.1	0.51	8.6	0.6	10.6	30	150	-	0.3
UEB 0300 V7xx		0.52	9.4	0.68	12	0.84	14.2	1.02	17.2	1.2	21.2		300	-	0.7
UEB 0450 V7xx		0.78	14.1	1.03	18	12.6	21.3	1.53	25.8	1.8	31.8		450	270	0.9
UEB 0600 V7xx		1.03	18.7	1.4	24	1.68	28.4	2.04	34.4	2.4	42.4		600	300	1.4

CONVERSION TABLE (UE - USA)

PRESSURE: 1 bar = 14,5 psi



ECOSPRAY TECHNOLOGIES

Eco Spray in recent years has designed and successfully supplied more than 15 quenching towers.

Typical design features of a tower:

Gas temperature: 500 - 900 °C

Fumes capacity: 120.000 - 180.000 Nm³/h



Each tower is designed from a fluid dynamics point of view by means of a CFD to optimize the gas flow and avoid scales on the tower walls. Moreover, the adjustment system, controlled by a PLC, keeps all variables under control (fumes temperature, water capacity, fluids pressure) to ensure a high quality spray in all conditions.

The nozzles we specially designed for this application are studied to ensure the minimum power consumption and the maximum quality in terms of adjustment and droplets size.

Eco Spray is the only company able to design and supply cooling towers for steelworks that use both compressed air nozzles and Spill Air nozzles patented by Eco Spray that do not need compressors. This systems saves energy by 35-40% compared to systems using compressed air nozzles.

To ensure the best production quality and allow a full testing of all parts and components at the mill, all pumping and control systems are skid mounted preassembled and prewired.

The skid is equipped with a control and power panel driven by a PLC. The PLC is normally equipped with a communication card for the transmission of all variables and alarms in the control room.

The atomizing lances are equipped with all the necessary accessories to ensure a proper maintenance and inspections of the same.

moreover, the lances do not work all in parallel but are controlled by the PLC in sequence to ensure a high adjustability, preserve the nozzles as much as possible and reduce considerably the consumption of compressed air during the adjustments.



www.ecospray.eu



CONTESSI

CONTESSI

As PNR we are also dealers of products by CONTESSI, equipment for manual and automated oxygen cutting for heavy duty operations in steel mills, foundries and scrap-cutting facilities.

CUTTING TECHNOLOGY

CONTESSI boasts a long experience in the development of oxy-cutting technologies and can satisfy several and various customers' requirements for cutting, welding and heating ferrous and non-ferrous materials. A specific department of CONTESSI called "Engineering Applications" is dedicated to the design and manufacture of specialized cutting equipment.

OXYGEN BLOWING

The CONTESSI equipment to blow and inject oxygen and other gases is up to the most recent safety standards. All products are manufactured according to the highest quality standards. CONTESSI equipments are suitable for frontline steelmaking and casting as well as for market and mini-size steel mill activities.

CONTESSI equipments are commonly used for:

- Furnace tap-hole opening
- Oxygen blowing/injection for carbon reduction
- Oxy-fuel burners for extra energy supply in arc furnaces
- BOF pouring-hole cleaning
- Secondary steelmaking vessels operations
- Ladle slide gate opening and cleaning
- Continuous casting cut-off automations
- Continuous casting tundish nozzle/slide gate opening and cleaning
- Cast stage operations
- Breakout cleanup operations
- Cast strand emergency intervention
- Post-cast ladle and tundish washing

CONTESSI product range also includes:

- Oxygen lance-holders, safety devices and valves
- Continuous casting torches, tips and automations
- Quick intervention torches
- Tuyères for AOD converters
- Supersonic lances
- Oxy-fuel burners for arc furnaces
- Thermal lance oxygen cutting, piercing and cleaning
- Oxy-cutting for heavy applications, machinery break-up and other special activities
- Oxy-cutting equipment using iron powder for high alloy steels
- Portable machines for manual cutting
- Self-extinguishing flexible hoses
- Pressure regulators
- Modular plate systems and tap posts to feed, regulate and measure gases

....and many other items and equipments



PNR ITALIA IS A DEALER OF INOXIHP PRODUCTS.

INOXIHP can provide turnkey systems for the following areas:

HYDRAULIC DESCALING IN ROLLING MILLS

INOXIHP systems are successfully operating in some of the most important iron-working plants and its know-how ensures professional performances in any specific job. Its descaling systems feature for the in-house production of all parts and their turnkey installation.

FORGING, EXTRUSION AND MOULDING PRESSES

Hydraulic press operations require top performances in terms of productivity and precision and inoxihip can supply a widely tested and top quality range of products for:

- *Hydraulic stations with central accumulator or direct pump operation*
- *Press control distributors with proportional valves*
- *Pre-filling valves and multipliers*
- *Integrated automation press/manipulator control*

COAL MINING

Pumps & systems for:

- *Flexible pipes*
- *API pipes and coupled ends*
- *Valves*
- *Tanks and vessels in general*

HYDRAULIC TESTS AND INDUSTRIAL WASHING

Hydrostatic and/or burst tests for:

- *Flexible pipes*
- *API pipes and coupled ends*
- *Valves*
- *Tanks and vessels in general*

INDUSTRIAL WASHING

- *Washing of coke oven doors, ingots molds, etc.*
- *Cleaning of heat exchangers, coils, etc.*
- *Washing of carburettors, gearboxes, during the post machining phases, etc.*



PNR ITALIA can supply plastic filter nozzles by ILMAP for the following industrial sectors:

- DRINKING WATER
- DEMINERALIZATION PLANTS
- RAW WATER FOR INDUSTRIAL PROCESSES
- RIVER OR WELL WATER FOR IRRIGATION

FILTER NOZZLES

Filter nozzles are placed at the bottom of filtering vats and serve the purpose of conveying the filtered water, keeping the solid matters from being flushed down by the water, to ensure an even distribution of air and water during backwash operations in sand or GAC filters and the best distribution of the regenerating solution in ion column exchangers. Filter nozzles have a head which performs the filtering action and a stem to lock the head in place. Both parts can be manufactured in different materials according to the operating conditions of each filter.

A WIDE CHOICE OF MATERIALS

All parts are available in a wide choice of materials for any customer's requirement, operating temperature and corrosion resistance for instance.

CONTESSI product range includes:

- *Polypropylene*
- *Polypropylene reinforced with chemically bound fibreglass*
- *PVDF*
- *Stainless steel AISI 316*

STANDARD PRODUCT RANGE

The standard range includes the mostly requested items that are normally available from stock. However, as filtering plants vary a lot in terms of dimensions and types, a remarkable number of parts is produced on customer's specifications, on special request or with non-standard threads. The capability to supply large nozzles quantities in a short time is typical of CONTESSI and drives the development of its structure which is always kept flexible and highly reactive to comply with all types of requests.

ASSEMBLY ACCESSORIES

Available is also a range of accessories and complementary parts for a quick and professional assembly of CONTESSI products. Nuts, sleeves in EVC for plates and pipes, sleeves for concrete bottoms and many other accessories which perfectly complete the range.





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