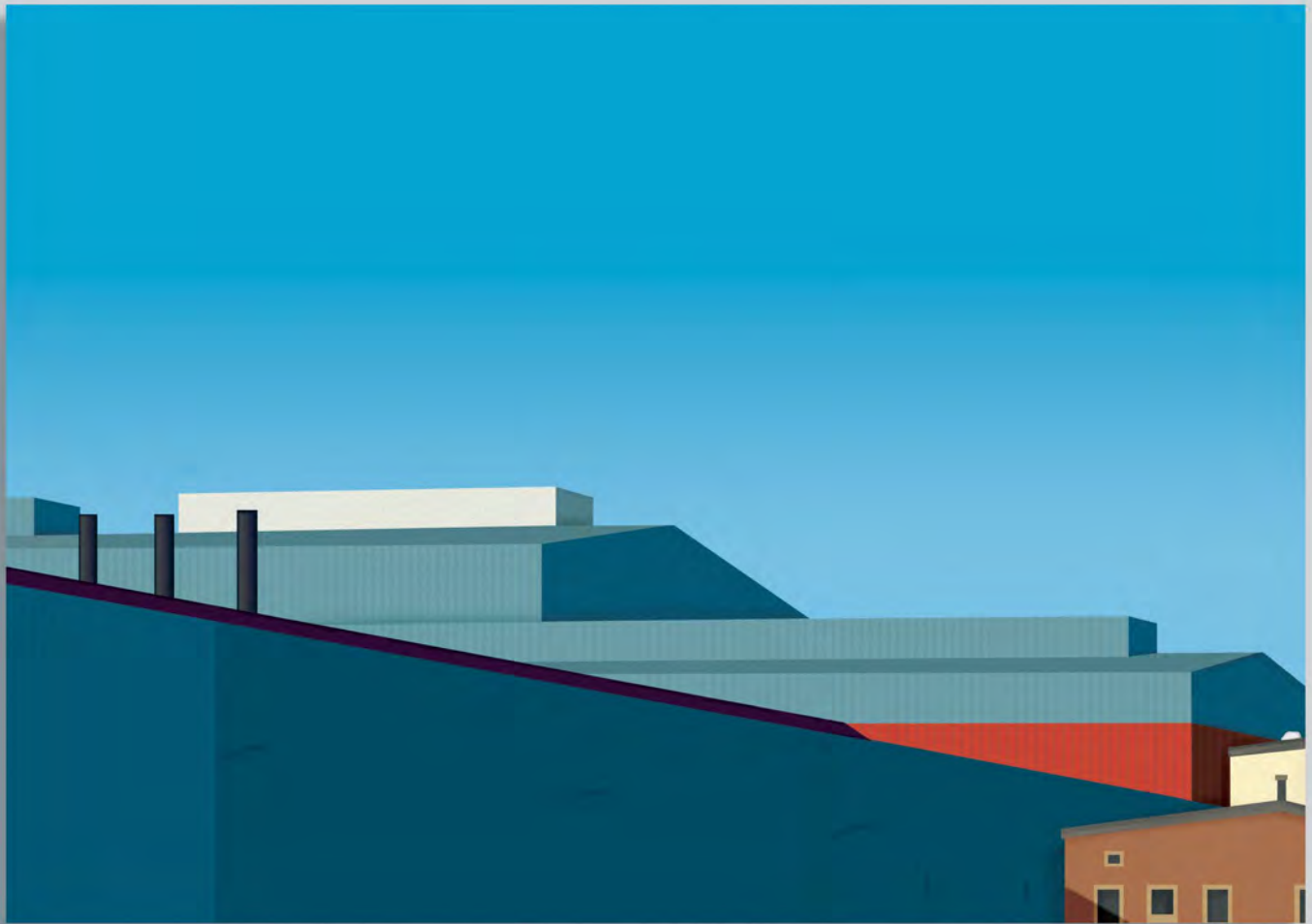


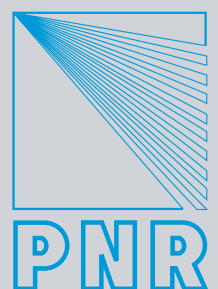


STEEL WORK NOZZLES

CTG SW20 BR



Courtesy from Danielli & C.



INTRODUCTION

INDEX

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TECHNICAL PUBLICATIONS

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

PRODUCT RANGE	CTG TV11
GENERAL PURPOSE SPRAY NOZZLES	CTG UG20
AIR ASSISTED ATOMIZERS	CTG AZ18
COMPLEMENTARY PRODUCTS AND ASSEMBLY FITTINGS	CTG AC18
INDUSTRIAL TANK WASHING SYSTEMS	CTG LS15
EVAPORATIVE COOLING LANCES	CTG LN16
FIRE FIGHTING PRODUCTS	CTG FF10
PAPERMILL PRODUCTS	CTG PM10
STEELWORK NOZZLES	CTG SW20
SPRAYDRY NOZZLES	CTG SP10

As a result of continuous product improvement, our documentation is regularly updated and mailed to Customers whose name and address are registered into our Catalogue Mailing List. We shall gladly register your name, if you mail to the nearest PNR office or Distributor the form on page 25.

NOTES

NOTES

Our products and their performances are continuously reconsidered and modified to keep up with the latest state of technology. We regret not to be able to give our Customers previous advice about these modifications: data and product specifications given in this catalogue are always to be understood as indicative, and do not firmly engage our Company. Should your application imperatively require one or more characteristics of one of our products, as given by this Catalogue, to be strictly adhered to we ask you to obtain a written confirmation before ordering.

All information contained into this catalogue, including product data, product codes, diagrams and photographs are the exclusive property of Flowtech Srl. It is forbidden to reproduce any part of this catalogue without having obtained a permission in writing.

Dimensions in this catalogue are given in millimeters (mm).

All threads manufactured according to the ISO 228 standards except where indicated. (European norms BS 2779 - DIN 259 - UNI 338).

Explanations about the abbreviations used in the catalogue and warranty conditions are given at page 25.

All Trademarks mentioned in this Catalogue are the property of their respective owners.

The images of actual plants on the front cover, and on page 2 and page 10 have been obtained as a courtesy from Danieli & C.

Our Company has qualified its Quality Management System according to the ISO 9001/2000 Norms.

DNV
Cert. 04111-99-AQ
MIL SINCERT

PRODUCT IDENTIFICATION CODES

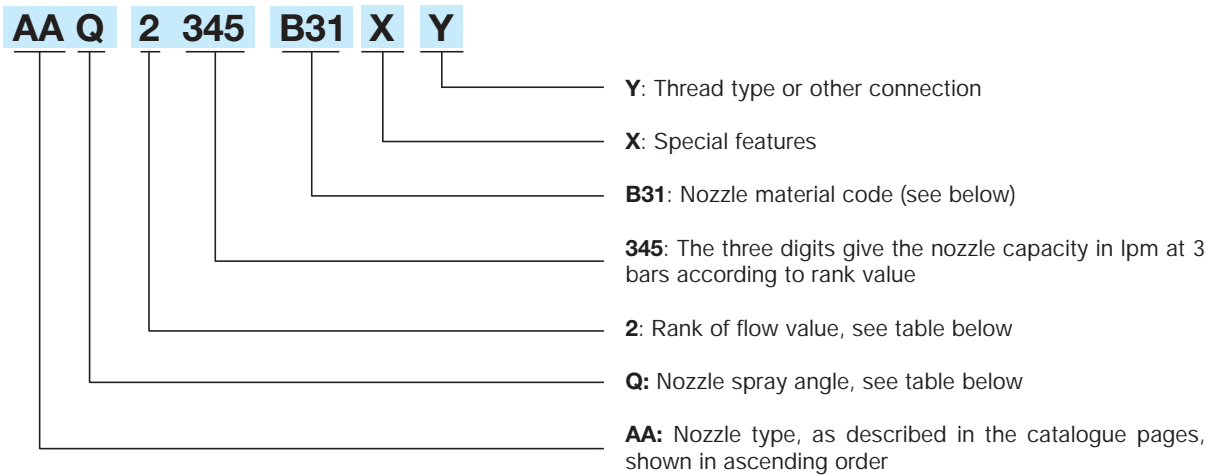
PNR CODING SYSTEM

As an industrial product, spray nozzles need to be identified by means of a code in order to avoid mistakes.

PNR coding system has been designed with the following requirements in mind:

- Codes must be easily processed by a computer, in ascending order.
- Codes must describe completely the product without any need for additional description.
- Codes must show to the user the basic specifications of the nozzle in order to ease the search in the catalogue.

We have then determined our coding system as described in the following:



Nozzle tables report on a blue background the nominal flow value, measured at 3,0 bar. Flow values at different pressures have been calculated.

These codes serve as an indication only. Based on different types of nozzles, their significance can be occasionally different.

Capacity rank

Rank	Flow digits	Actual flow (lpm)
0	0 490	0,49
1	1 490	4,90
2	2 490	49,0
3	3 490	490
4	4 490	4900

Some spray angle codes (degrees)

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

NOZZLE MATERIAL CODES

A1	Carbon steel	D6	Glassfibre reinforced PP	L2	Incoloy® 825
A2	High speed steel	D7	High density polyethylene	L8	Hastelloy® C276
A8	Zinc coated steel	D8	Polyvinylidene fluoride (PVDF)	P6	Acr. But. Styrene (ABS)
A9	Nickel coated steel	E0	EPDM	P8	EPDM 40 Shore
B1	AISI 303 Stainless steel	E1	Polytetrafluorethylene (PTFE)	T1	Brass
B2	AISI 304 Stainless steel	E2	PTFE (25% glassfibers)	T2	Brass, chrome plated
B21	AISI 304 L Stainless steel	E31	Acetalic resin (POM)	T3	Copper
B3	AISI 316 Stainless steel	E7	Viton®	T5	Bronze
B31	AISI 316 L Stainless steel	E8	Synthetic rubber (NBR)	T8	Brass, nickel plated
C2	AISI 416 Stainless steel, hardened	F5	Ceramic	T81	Brass, electroless nickel plated
D1	Polyvinylchloride (PVC)	F31	Ruby insert, 303 body	V1	Aluminium
D2	Polypropylene (PP)	G1	Cast iron	V7	Aluminium, electroless n. plated
D3	Polyamide (PA)	H1	Titanium		
D5	Talcum filled Polypropylene	L1	Monel 400		

CONTINUOUS CASTING



Courtesy from Danieli & C.

PRODUCT RANGE

The products shown in this Catalogue are those commonly in use for most continuous casting applications. Additional types, however, are shown in our Catalogue CTG UG18 BR where general purpose spray nozzles for industrial processes are shown.

We manufacture a wide additional variety of nozzles which are not included in our standard range and can replace nozzles supplied by other manufacturers. We shall gladly quote to you nozzles not included in this Catalogue, after receiving proper information about the product you need.



HYDRAULIC NOZZLES

Male thread full cone nozzles, X-vane type
DB (1/4) and DC (3/8) style, offer wide internal passages and optimum performances at competitive prices. All sizes and spray angles are normally available, in brass, from stock or with very short delivery times.

Female thread full cone nozzles, disc vane type
AH type nozzles are very well known in the industry for simple design, enhanced resistance to clogging and excellent water spray distribution, assuring very uniform cooling processes.

Standard and slit type flat jet tips

With their limited spray thickness flat jet tips are ideal to assure proper cooling in such places like foot rollers or in the bending and straightening sections.

The wide range of water capacities makes available the proper nozzle for any installation.



PRODUCT QUALITY

We keep tight control on our manufacturing process in order to deliver quality products, but the care we put into our work does not stop here: we want our products to give the best possible performance at the time they are assembled into your machine.

For this reason we have selected and designed our packing materials so that our products reach their destination without damage due to handling or transportation and can be stocked for long time while remaining in perfect condition.

CONTINUOUS CASTING

AH

FULL CONE NOZZLES / DISC VANE

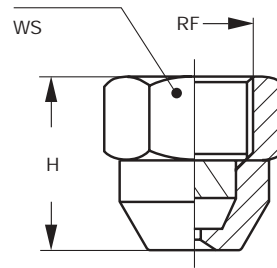
AH nozzles produce a full cone spray pattern, with a very uniform liquid distribution over the entire coverage area.

The special design of the internal vane, which do not show any small dimension center passage, assures for an excellent resistance to clogging.

Based on the above two features, AH series nozzles are widely used in continuous casting plants all over the world and have supplied years of trouble-free service.

Connection 3/8" female BSP

Material T1 Brass only



Tip Code	RF inch	D mm	Nozzle flow values at different pressure values (lpm) (bar)					H mm	WS mm
			1	2	3	4	5		
65°	1/4	1,9	1,8	2,5	3,1	3,6	4,1	27,5	19
		2,0	2,3	3,0	3,6	4,2	4,7		
		2,2	2,4	3,3	4,1	5,9	6,7		
		2,6	3,0	4,3	5,2	5,9	6,7		
	3/8	1,0	1,2	1,7	2,1	2,4	2,7	25,0	22
		1,9	1,8	2,5	3,1	3,6	4,1		
		2,0	1,9	2,8	3,4	3,9	4,4		
		2,1	2,1	2,9	3,6	4,2	4,7		
		2,2	2,4	3,4	4,1	4,8	5,3		
		1,5	2,7	3,8	4,7	5,4	6,0		
		2,6	3,0	4,2	5,2	6,0	6,7		
		2,7	3,5	5,0	6,2	7,2	8,0		
		2,9	4,5	6,4	7,8	9,0	10,0		
		3,1	4,8	6,8	8,3	9,6	10,7		
	3,3	5,0	7,2	8,7	10,2	11,4			
	1/2	4,2	6,5	9,1	11,0	12,7	14,2	36,0	27
		4,2	8,0	11,7	14,4	16,6	18,5		
		5,0	8,8	12,6	15,4	18,0	20,0		
80°	1/4	2,2	1,8	2,5	3,1	3,6	4,1	27,5	19
		2,2	2,3	3,0	3,6	4,2	4,7		
		2,2	2,4	3,3	4,1	4,7	5,3		
		2,6	3,0	4,3	5,2	5,9	6,7		
	3/8	2,0	1,8	2,5	3,1	3,6	4,1	25,0	22
		2,0	1,9	2,8	3,4	3,9	4,4		
		2,1	2,1	2,9	3,6	4,2	4,7		
		2,2	2,4	3,4	4,1	4,8	5,3		
		2,6	3,0	4,2	5,2	6,0	6,7		
		2,7	3,5	5,0	6,2	7,2	8,0		
		2,9	4,5	6,4	7,8	9,0	10,0		
		3,1	4,8	6,8	8,3	9,6	10,7		
		3,3	5,0	7,2	8,7	10,2	11,4		
		1/2	4,2	6,5	9,1	11,0	12,7		
	4,2		8,0	11,7	14,4	16,6	18,5		

DISC VANE

The special design of this vane uses a series of peripheral passages to create the whirl action into the water stream flowing through the nozzle.

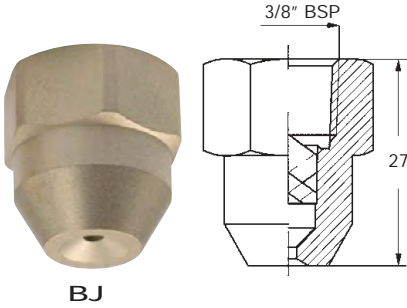
A series of milled grooves on the lower side of the vane, facing the inside of the whirl chamber, acts as an hydrodynamic brake over the fluid whirling at the center of the chamber, and provides for the water exiting the nozzle to be arranged into an evenly distributed full cone spray pattern.

As a safety feature all our nozzles have their vanes secured in place, so as not to exit from the nozzle body in case of dimensional change by high temperature or a sudden vacuum condition in the feed pipes.

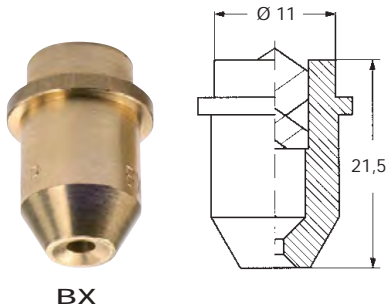


CONTINUOUS CASTING

BX / BJ



BJ



BX

FULL CONE NOZZLES / X- VANE

A typical continuous casting nozzle, available as a nozzle tip for ease of replacement or with a female thread connection if assembly on a damaged nipple is required. They offer the same design based on an X type vane as the DB series nozzles. BJ nozzles are also available, on request, in a variety of spray angles and flow rates and in different materials.

Materials T1 Brass
B1 AISI 303 Stainless steel on request

Tip Code	D mm	Nozzle capacity at different pressure values (lpm) (bar)						Spray angle (deg) at pressure (bar) values		
		1	2	3	4	5	6	1	3	6
● 1149 xx	1.2	0.91	1.25	1.49	1.72	1.90	2.11	50	50	46
● 1223 xx	1.5	1.36	1.85	2.23	2.57	2.80	3.15	65	65	49
● 1262 xx	1.6	1.59	2.14	2.62	3.02	3.30	3.70	50	50	46
● 1372 xx	2.0	2.27	3.03	3.72	4.30	4.70	5.26	65	65	59
● 1508 xx	2.3	2.95	4.07	5.08	5.86	6.10	7.18	50	50	46
● 1626 xx	2.9	4.14	5.30	6.26	7.23	8.17	8.85	60	60	55
● 1743 xx	2.9	4.91	6.29	7.43	8.60	9.70	10.5	66	67	61



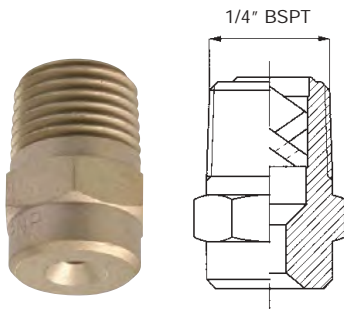
X VANE

X vanes are a very popular design in steelworks as well as in many other industrial processes.

Their simple design is based on two sloping flats which induce a whirl action into the fluid going through the nozzle, and on two small slots cut into each flat to allow the full cone pattern to form.

All vanes are secured in place, so as not to leave the nozzle body in case of dimensional change by high temperature or sudden vacuum condition in the feed pipe.

DB



DB series hydraulic nozzles are widely used in the first cooling zone of continuous casting machines, with overlapping patterns to minimize temperature gradients and reduce the risk of crack formation.

Their simple two-piece construction, body and internal vane, good resistance to clogging, competitive price and short delivery times make them an excellent choice for the steelwork engineer.

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

The range of DB nozzle shown here includes the types sold more frequently in steelworks. Our range of DB full cone nozzles is much wider and is fully listed in our General Purpose Nozzles Catalog.

CODE	ANGLE
DBQ	60°
DBU	90°
DBW	120°

Tip Code	D mm	D1 mm	Nozzle flow values at different pressure values (lpm) (bar)					
			0,5	1	2	3	4	5
● 1294xx	1,8	1,3	1,2	1,7	2,4	2,9	3,4	3,8
● 1370xx	2,05	1,4	1,5	2,1	3,0	3,7	4,3	4,8
● 1470xx	2,4	1,9	1,9	2,7	3,8	4,7	5,4	6,1
● 1588xx	2,6	2,0	2,4	3,4	4,8	5,9	6,8	7,6
● 1659xx	2,7	2,0	2,7	3,8	5,4	6,6	7,6	8,5
● 1740xx	2,9	2,0	3,0	4,3	6,0	7,4	8,5	9,6
● 1835xx	3,3	1,9	3,4	4,8	6,8	8,4	9,6	10,8
● 1940xx	3,3	1,9	3,8	5,4	7,7	9,4	10,9	12,1
● 2105xx	3,6	2,3	4,3	6,1	8,6	10,6	12,2	13,7

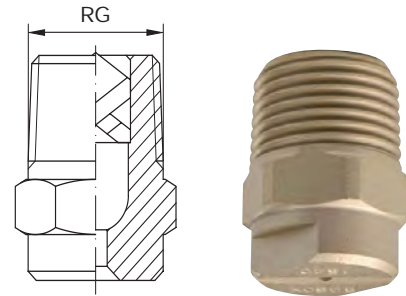
CONTINUOUS CASTING

D..OB

OVAL SPRAY NOZZLE / FLAT JET TIPS

Full cone nozzles with oval spray are used as secondary cooling nozzles. Their spray pattern produces an a oval impact surface, which allows a better overlapping of the sprays with an improved evenness of the cooling action. Their round orifice and X-vanes design offer the reliability of standard full cone nozzles, vanes are permanently locked in place to avoid vane loss when piping pressure falls while the system drains.

Material T1 Brass



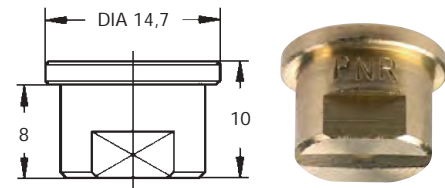
Tip Code	RG inch	D1 mm	Nozzle capacity at pressure values (lpm) (bar)							
			0.7	1.5	2	3	4	6	7	10
DBQ 1330 T1OB	1/4	1.2	1.60	2.34	2.69	3.32	3.81	4.65	5.07	6.06
DBQ 1420 T1OB		1.4	2.03	2.97	3.42	4.21	4.85	5.92	6.43	7.68
DBQ 1540 T1OB		1.7	2.62	3.83	4.41	5.44	6.23	7.63	8.31	9.93
DBQ 1720 T1OB		1.9	3.48	5.09	5.87	7.22	8.31	10.2	11.0	13.2
DBQ 1780 T1OB		2.1	3.67	5.37	6.22	7.61	8.78	10.8	11.6	13.9
DBQ 1840 T1OB		2.2	4.05	5.92	6.85	8.39	9.69	11.9	12.8	15.3
DCU 1320 T1OB	3/8	1.1	1.55	2.26	2.61	3.20	3.70	4.53	4.89	5.84
DCU 1400 T1OB		1.3	1.93	2.83	3.27	4.00	4.62	5.66	6.11	7.30
DCU 1520 T1OB		1.6	2.52	3.68	4.25	5.20	6.00	7.35	7.94	9.49
DCU 1680 T1OB		1.6	3.28	4.81	5.55	6.80	7.85	9.62	10.4	12.4
DCU 1800 T1OB		2.0	3.86	5.66	6.53	8.00	9.24	11.3	12.2	14.6

GX

FLAT JET NOZZLE TIPS / SMALL SIZE

These flat jet tips are the choice for those continuous casting machine sections where only limited space is available between two rollers. They offer a finely atomized spray and a parabolic distribution which allows producing uniform coverage when the jets are properly spaced on the manifold.

Materials T1 Brass
B1 AISI 303 Stainless steel



Tip Code	D mm	Nozzle flow values at different pressure values (lpm) (bar)							
		1,0	1,5	2,0	3,0	4,0	5,0	7,0	10,0
1190xx	1,5	1,10	1,34	1,55	1,90	2,19	2,45	2,90	3,47
1233xx	1,65	1,35	1,65	1,90	2,33	2,69	3,01	3,56	4,25
1310xx	2,0	1,79	2,19	2,53	3,10	3,58	4,00	4,74	5,66
1385xx	2,2	2,11	2,58	2,98	3,65	4,21	4,71	5,58	6,66
1490xx	2,5	2,83	3,46	4,00	4,90	5,66	6,33	7,48	8,95
1581xx	2,7	3,35	4,11	4,74	5,81	6,71	7,50	8,87	10,6
1780xx	3,0	4,50	5,52	6,37	7,80	9,01	10,1	11,9	14,2
1980xx	3,5	5,66	6,93	8,00	9,80	11,3	12,7	15,0	17,9
2124xx	4,0	7,16	8,77	10,1	12,4	14,3	16,0	18,9	22,6
2153xx	4,5	8,83	10,8	12,5	15,3	17,7	19,8	23,4	27,9
2194xx	5,0	11,2	13,7	15,8	19,4	22,4	25,0	29,6	35,4
2245xx	5,5	14,1	17,3	20,0	24,5	28,3	31,6	37,4	44,7

HOW TO COMPOSE THE NOZZLE CODE

The nozzle tips shown on this page can be supplied with different spray angles, whose value is indicated by the third digit in the nozzle code. Therefore the tip code has to be specified as in the following.

GXQ **1780** **B31**
↓
60° deg spray

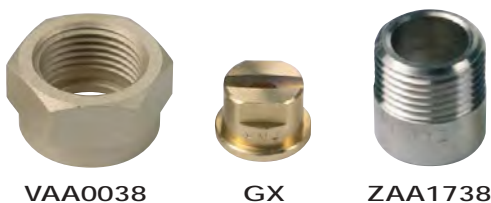
The available codes for the different spray angles are indicated in the table beside.

CODE	ANGLE
GXQ	60°
GXU	90°
GXW	120°

ACCESSORIES

A wide range of accessories for assembling GX tips is shown in our Catalogue CTG AC18 BR.

For continuous casting applications we recommend ZAA welding nipples and VAA series locknuts.



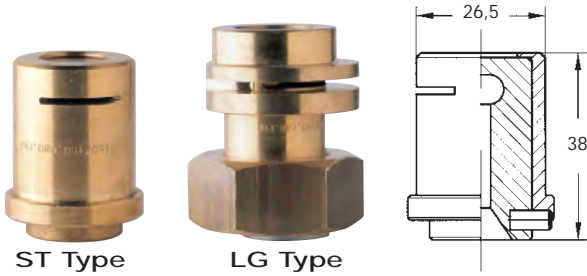
VAA0038

GX

ZAA1738

CONTINUOUS CASTING

GV



FLAT JET NOZZLES / SLIT TYPE

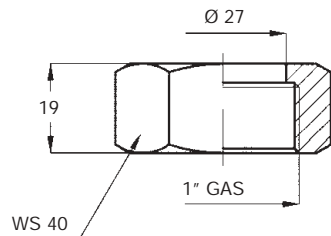
The slit type flat jet offer a very wide coverage, and a very thin flat spray which can be used in machines with limited space between rollers. The jet produces a remarkably even distribution and it is obtained by means of an inside profile which greatly reduces the danger of clogging, and the finely atomized spray provides for uniform coverage through the narrow gaps between rollers. These nozzles are locked in place by means of a specific locknut. Nozzles with capacity codes equal or higher than 2300 are fitted with an additional body lip, which makes it impossible to slip the nozzle inside the locknut. They are therefore delivered with a locknut which is pre-assembled at the factory.

Connection 1" BSP female cap & nipple
Material T1 Brass

	GVV	GVU	GVT	Tip Code	Capacities at different pressure values (lpm) (bar)								W (kg)	
					1.0	1.5	2.0	2.8	3.0	3.5	4.0	4.5		5.0
ST Type	•	•	•	1500 T1	2.90	3.70	4.20	5.00	5.18	5.59	6.00	6.36	6.70	0,15
	•	•	•	1750 T1	4.50	5.50	6.30	7.50	7.80	8.40	9.00	9.54	10.0	
	•	•	•	2100 T1	6.00	7.30	8.40	10.0	10.3	11.2	12.0	12.7	13.4	
	•	•	•	2120 T1	7.20	8.80	10.1	12.0	12.4	13.4	14.4	15.3	16.0	
	•	•	•	2150 T1	9.00	11.0	12.7	15.0	15.6	16.8	17.9	19.0	20.0	
	•	•	•	2200 T1	11.9	14.6	16.9	20.0	20.7	22.4	23.9	25.3	26.7	
LG Type	•	•	•	2300 T1	17.9	22.0	25.3	30.0	31.1	33.5	35.9	37.1	40.1	0,36
	•	•	•	2350 T1	20.9	25.6	29.6	35.0	36.2	39.1	41.9	44.4	46.8	
	•	•	•	2450 T1	26.9	32.9	38.0	45.0	46.6	50.3	53.8	57.1	60.2	
	•	•	•	2450 T1	26.9	32.9	38.0	45.0	46.6	50.3	53.8	57.1	60.2	
	•	•	•	2500 T1	29.9	36.6	42.3	50.0	51.8	55.8	59.8	63.4	66.8	



VAA 0100 T1



LOCKNUT

GV style nozzles are fixed by means of their specific locknut VAC 0100 T1 to the nipple onto main manifold. The nut can be ordered separately as a spare part. Connection 1" BSP female.

Weight 0,1 kg

KYA



ROLL COOLING NOZZLES

These special nozzles have been designed to achieve satisfactory roller cooling in continuous casting machines with large casting width. The direction of the two water jets is designed so as to obtain the optimum coverage on the roller length.

Table shows typical nozzles, while capacity, connection and outside dimensions can be made as requested.

Connection Metric thread 30x2
Material T1 Brass

Tip Code	Nozzle capacity at pressure values (lpm) (bar)							
	1.0	2.0	3.0	4.0	5.0	6.0	7.0	10.0
KYA 1510 T1	2.94	4.16	5.10	5.89	6.58	7.21	7.79	9.31
KYA 1790 T1	4.56	6.45	7.90	9.12	10.2	11.2	12.1	14.4
KYA 2107 T1	6.18	8.74	10.7	12.4	13.8	15.1	16.3	19.5

CONTINUOUS CASTING

AIR ASSISTED ATOMIZERS

A development in recent years air assisted atomizers have found wide acceptance in the continuous casting machines because of their advantages, which make them the best choice in some applications.

High resistance to clogging

An air assisted atomizer can deliver low water capacities at low fluid pressure values with large inside passages. The result is a reduced risk of clogging the nozzle and a reduced nozzle wear.

Higher heat transfer rates

By producing a finely atomized air-water mixture excellent heat transfer can be achieved with lower water volumes per unit weight of steel.

Even cooling at different machine speeds

Even cooling means better surface and edge quality, less cracks and less scrap.

And this is possible for a wide range of dimensions and alloys, because of the wider turndown ratio of an air atomizer as compared to an hydraulic nozzle.

Longer roll life

Water is sprayed in lower quantity, easily evaporated because of lower droplet dimensions, and in addition the small water quantity not immediately evaporated is also easily driven away from the slab, which extends roll life.

ATOMIZER COMPOSITION

Air atomizers are composed by a choice of different set-ups, which determine the spray pattern, the spray angle and the nozzle capacity, and different assembly bodies which allow connecting the atomizer to the water and air feed manifolds.

ASSEMBLY BODIES

There is a variety of possible designs for assembly bodies, depending upon the atomizer connections and the design of feed manifolds in the single continuous casting machines. Most current designs are shown at page 9, while we deliver any possible assembly body according to customer requirement.

Atomizer body families are available for different spray patterns.

Full cone spray pattern / MP

Flat jet atomizers / MR

Long nose flat jet atomizers / MS (quoted on request)

SET-UP CODING

Since set-ups are available as spare parts, they are identified by their own coding, which is shown in the tables at page 8, where the set-up operating specification is given.

The set-up coding consists of two first digit (SA / Full cone spray, SB / Flat jet spray) which identify the product as a set-up, followed by other alphanumeric coding which identifies the spray angle and capacity.

As an example the set-up code SAU 3276 identifies:

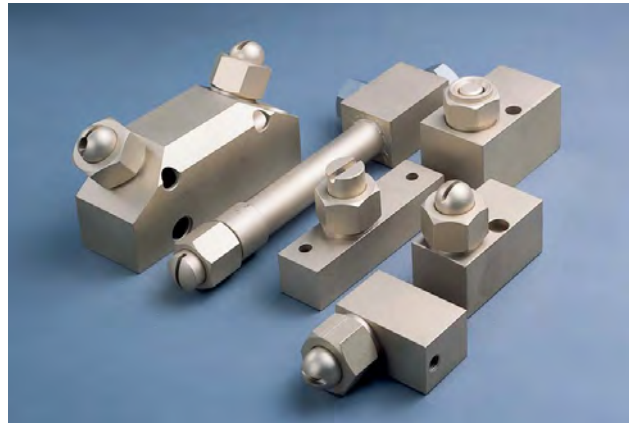
- a full cone set-up SA
- a spray angle of 90° U
- a capacity figure 3276

COMPLETE ATOMIZER CODE

The complete code for an atomizer is then obtained by addition of the atomizer type, of the set-up code without the first two digits, and of the specific body style suffix.

Hence a flat jet atomizer (MR), assembled with a set-up SAU 3248 T1 and with a B body style, will be then identified by the code

MR U 3276 T1 B
Flat jet body set-up code Body style

**OPERATING DIAGRAMS**

Since the typical regulation of these atomizers is made by means of water pressure changes, while the air pressure is kept at a fixed value, all diagrams are obtained for a given value of air pressure.

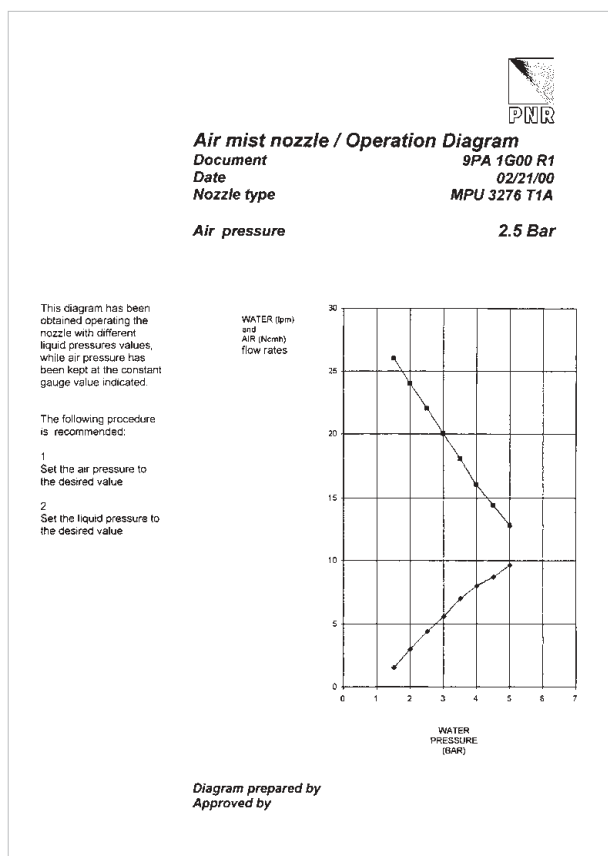
CAPACITY

The capacity tables serve as a guidance only, to define the basic operation range.

Each atomizer is supplied with a set of operation diagrams, which allow for precise definition of all the conditions for any desired operation point in the atomizer range.

SPRAY COVERAGE

In addition to capacity diagrams we supply diagrams showing the width of the spray coverage at different water pressure values and for fixed air pressure values.



CONTINUOUS CASTING

SA



A = Air flow (Ncm/h)
W = water flow (lpm)

ATOMIZER SET-UPS

The atomizer set-ups determines the basic performances of the atomizer, that is spray angle, water capacity and air capacity.

The assembly of a given set-up onto one of the different body style available makes a complete atomizer.

Material

Normally delivered in brass, both body and set-up can be quoted in Aisi 303 and 316 stainless steel.

AIR ATOMIZERS / SET-UP TABLES

FULL CONE SET-UPS

Full cone atomizers are preferably used for machines casting billets and show therefore a range of low water capacities, with spray angles between 30 and 90 degrees.

Tip Code	Air pressures (bar)								
	2.0		2.5		3.0				
	W	A	W	A	W	A			
SAF 3276	2.0	4.20	16.0	2.0	5.20	15.0	2.0	6.50	14.0
	2.5	3.50	22.0	2.5	4.80	21.0	2.5	5.80	19.0
	3.0	2.60	30.0	3.0	3.60	26.0	3.0	4.80	26.0
SAQ 3276	2.0	4.20	17.8	2.0	5.20	15.0	2.0	6.50	14.0
	2.5	3.50	22.0	2.5	4.80	21.0	2.5	5.70	19.0
	3.0	2.60	30.0	3.0	3.60	26.0	3.0	4.80	27.0
SAU 3156	2.0	2.00	11.9	2.0	2.80	10.0	2.0	3.50	8.50
	2.5	1.50	16.0	2.5	2.20	12.0	2.5	3.00	10.5
	3.0	1.00	18.0	3.0	1.70	17.0	3.0	2.40	14.8
SAU 3276	2.0	4.10	17.8	2.0	5.10	15.0	2.0	6.40	14.0
	2.5	3.40	22.0	2.5	4.80	21.0	2.5	5.70	19.0
	3.0	2.50	30.0	3.0	3.60	26.5	3.0	4.80	28.0

SB



A = Air flow (Ncm/h)
W = water flow (lpm)

FLAT JET SET-UPS

Flat jet set-ups can offer a wider spray coverage, and therefore they can be used in several applications ranging from billets to blooms and slabs production.

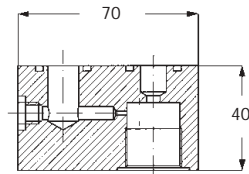
For the widest coverage requirement, double atomizer bodies are available.

Tip Code	Air pressures (bar)								
	2.0		2.5		3.0				
	W	A	W	A	W	A			
SBQ 3114	2.0	1.60	12.7	2.0	2.10	12.0	2.0	2.45	11.0
	2.5	1.00	16.5	2.5	1.40	15.0	2.5	1.90	14.0
	3.0	0.60	19.0	3.0	0.90	17.5	3.0	1.25	16.5
SBQ 3120	2.0	1.70	9.70	2.0	2.15	8.50	2.0	2.95	7.80
	2.5	1.10	13.0	2.5	1.80	11.8	2.5	2.22	10.5
	3.0	0.70	16.5	3.0	1.50	14.5	3.0	2.00	13.8
SBQ 3132	2.0	2.30	9.50	2.0	2.80	8.00	2.0	3.40	7.00
	2.5	1.40	12.5	2.5	2.40	11.3	2.5	3.00	10.0
	3.0	0.65	15.2	3.0	1.40	14.0	3.0	2.20	12.8
SBU 3132	2.0	2.30	9.50	2.0	2.80	8.00	2.0	3.40	7.00
	2.5	1.40	12.5	2.5	2.40	11.3	2.5	3.00	10.0
	3.0	0.65	15.2	3.0	1.40	14.0	3.0	2.20	12.8
SBU 3276	2.0	3.80	14.5	2.0	6.00	11.8	2.0	7.40	10.0
	2.5	2.60	20.0	2.5	4.60	16.0	2.5	6.50	14.0
	3.0	1.10	26.0	3.0	2.80	22.0	3.0	4.60	19.0
SBU 3450	2.0	4.10	17.8	2.0	5.10	15.0	2.0	6.40	14.0
	2.5	3.40	22.0	2.5	4.80	21.0	2.5	5.70	19.0
	3.0	2.50	30.0	3.0	3.60	26.5	3.0	4.80	28.0
SBW 3132	2.0	2.30	9.50	2.0	2.80	8.00	2.0	3.40	7.00
	2.5	1.40	12.5	2.5	2.40	11.3	2.5	3.00	10.0
	3.0	0.65	15.2	3.0	1.40	14.0	3.0	2.20	12.8
SBW 3276	2.0	3.80	14.5	2.0	6.00	11.8	2.0	7.40	10.0
	2.5	2.60	20.0	2.5	4.60	16.0	2.5	6.50	14.0
	3.0	1.10	26.0	3.0	2.80	22.0	3.0	4.60	19.0
SBW 3450	2.0	4.10	17.8	2.0	5.10	15.0	2.0	6.40	14.0
	2.5	3.40	22.0	2.5	4.80	21.0	2.5	5.70	19.0
	3.0	2.50	30.0	3.0	3.60	26.5	3.0	4.80	28.0

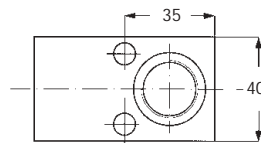
ATOMIZER BODIES

Several different atomizers bodies are available for the assembly of atomizer set-ups.

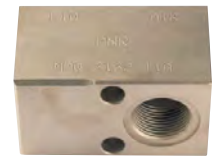
In the following the most current body styles are shown, we can however manufacture any kind of atomizer bodies to suit specific application cases, including double jet atomizer bodies.



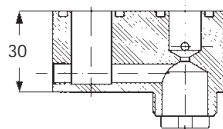
Body type XMP1A



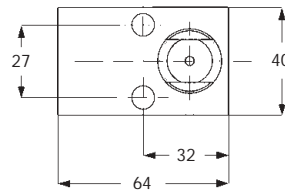
FULL CONE ATOMIZERS - XMP



XMP 1A00 T1



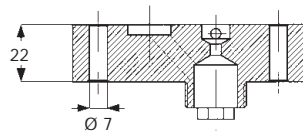
Body type XMR1B



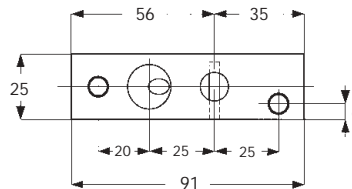
FLAT JET ATOMIZERS - XMR



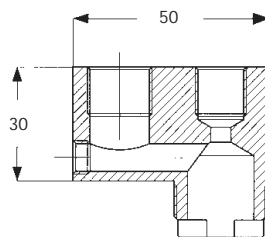
XMR 1B00 T1



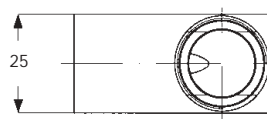
Body type XMR1D



XMR 1D00 T1



Body type XMR1G



XMR 1G00 T1

ROLLING MILL



Courtesy from Danieli & C.



GW SERIES

GW series nozzles have been the European standard for many years in the field of hot descaling mills.

The introduction of the hard metal insert and the nozzle orientation assured by the dove-tail coupling between nozzle tip and nipple have allowed for increased efficiency in the descaling process and higher steel quality, while careful studies on the nozzle inner profile have assured improved results for jet impact and evenness of water jet distribution

HW SERIES

Our HW series, manufactured both in the HW...AH standard and in the HW...AA mini size, offer easier mounting operation and watertight assembly between nipple and nozzle, while the two different diameter sizes allow different spray densities per meter of manifold.

HW...AK standard size and HW...AB small size type nozzles offer in addition an again higher efficiency thanks to a streamlined inside profile, and take advantage from lower energy losses due to turbulence.

This results in higher impact values on the steel surface.

RETROFITS

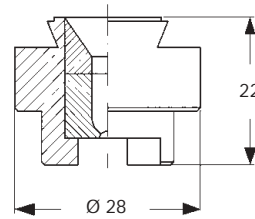
Nozzle bodies fitted with our own design of high quality Tungsten Carbide tip, but designed to fit nipples from any different manufacturers as well as nipples, nuts or special products designed for a specific project can be quoted on request.

ROLLING MILL

GW

NOZZLE TIPS / CLASSIC DESIGN

For a long time the worldwide standard in hot descaling of steel strips, they have undergone sensible improvements specially on the inner orifice profile which produces a very even distribution of the water jet impact onto the steel surface. Their typical design with a dove-tail coupling between nipple and nozzle tip assures for correct alignment of the nozzles onto the spray manifold. Several nipples length values and a specific locknut allow a wide choice of different assembly dimensions.



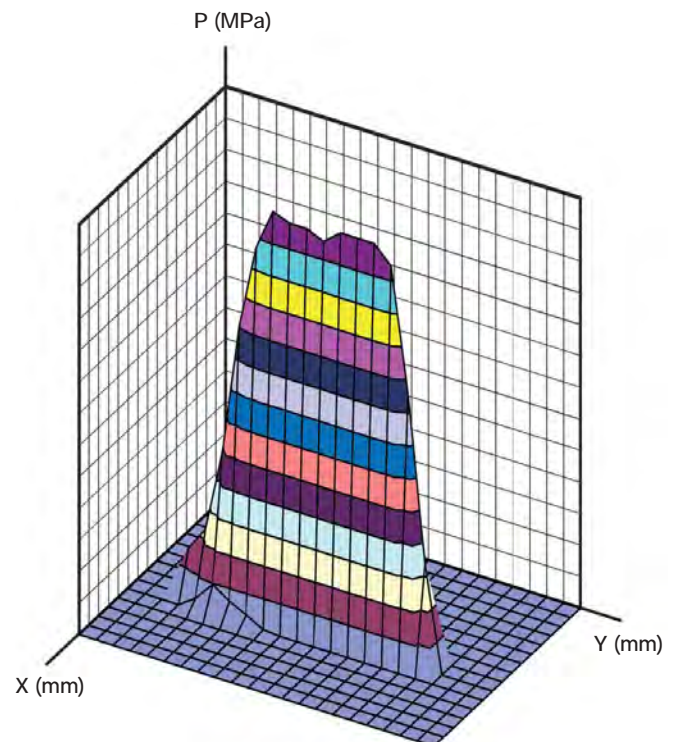
Materials	Body	B1	AISI 303 Stainless Steel
	Tip	C1	AISI 420 Hardened Stainless Steel
		F1	Tungsten Carbide

GWL	GWF	GWL	Tip Code	D mm	D1 mm	Capacity at different pressure values (lpm) (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

CODE	ANGLE
GWE	26°
GWF	30°
GWL	40°

IMPACT DISTRIBUTION DIAGRAMS

Optimum performance in any descaling operation can only be obtained using proper nozzle design. A precise nozzle capacity value, kept under tight tolerances, assures process uniformity on the steel strip width. A properly designed inside nozzle profile assures the high impact value required. High precision manufacturing maintains the impact value uniform all along the spray width. PNR descaling nozzle inserts, used to fit all our models of descaling nozzles, are systematically tested to assure their high performance level is maintained.

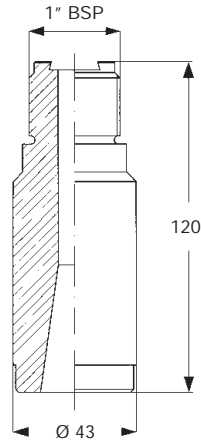


ROLLING MILL

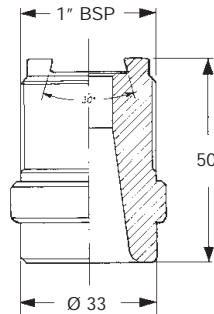
ASSEMBLY PARTS / CLASSIC DESIGN



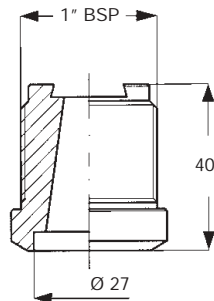
ZBC



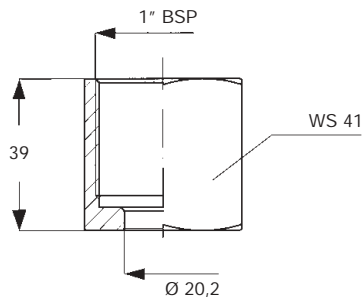
ZBD



ZBB



VAA 0100 B1



ZB NIPPLES

ZB series welding nipples have been designed for the assembling of GW descaling tips onto main manifolds.

The accurately machined dove-tail profile assures for precise alignment of the nozzle tip with respect to the axis of the spray manifold.

The contact area with the nozzle tip shows a surface machined to an accurate finish to prevent leakage between nipple and nozzle tip.

ZB nipples are available in three length values to match different dimensional requirements.

Material B31 AISI 316L Stainless steel

Tip Code	L mm	RG inch	W kg
ZBB 0100 B3	40	1	0,18
ZBC 0100 B3	120	1	0,90
ZBD 0100 B3	50	1	0,22

VAA 0100 B1

The VAA 0100 B1 cap is designed for the proper assembly between ZB nipples and GW descaling nozzle tips.

The strong design assures for a safe operation under the high pressure values typically used in hot descaling mill systems.

Material B1 AISI 303 Stainless steel

CUSTOMER DESIGNS

In addition to the three standard nipple sizes always available from stock, we can quote and supply special dimensions on ZB nipples according to customer design.

Material B1 AISI 303 Stainless steel

ROLLING MILL

HW / AH

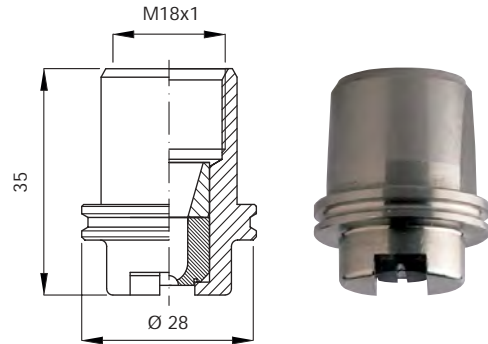
DESCALING TIPS / BROACH FIT, STANDARD, SHORT

The modern design of these nozzles offers the convenience of a more rational alignment system which allows a copper seal to be used between nipple and nozzle tip.

The nozzle efficiency is enhanced by means of a carefully designed flow stabilizer, which minimizes turbulence due to sharp direction change at the inlet from the main manifold.

Provision is also made for a filter to be mounted at the nozzle inlet, to avoid nozzle orifice to be clogged or damaged by foreign particles.

Materials Body B1 AISI 303 Stainless Steel
 Tip C1 Aisi 420 hardened
 F1 Tungsten Carbide



Tip Code	D mm	D1 mm	Capacity at different pressure values (lpm) (bar)							
			80	90	100	120	140	160	180	200
• • • 2106 xx AH	1.5	1.2	10.6	11.4	12.0	13.1	14.2	15.2	16.1	17.0
• • • 2134 xx AH	1.8	1.4	13.4	14.2	15.0	16.4	17.7	19.0	20.1	21.2
• • • 2162 xx AH	2.0	1.5	16.2	17.1	18.0	19.5	21.3	22.8	24.0	25.0
• • • 2208 xx AH	2.1	1.8	20.8	21.8	23.0	25.2	27.2	29.1	30.8	35.5
• • • 2250 xx AH	2.5	1.9	25.0	26.5	28.0	31.0	33.0	35.4	37.5	39.0
• • • 2320 xx AH	2.8	2.4	32.0	34.2	36.0	39.4	42.6	45.5	48.3	50.9
• • • 2402 xx AH	3.0	2.5	40.2	42.7	45.0	49.0	53.0	57.0	60.0	63.0
• • • 2520 xx AH	3.5	2.7	52.0	55.0	58.0	63.5	68.6	73.3	77.8	82.0
• • • 2642 xx AH	3.8	3.2	64.2	68.3	72.0	78.0	85.0	91.0	96.0	101
• • • 2798 xx AH	4.3	3.6	79.8	84.4	89.0	98.0	105	112	119	126
• • • 2996 xx AH	4.7	4.0	99.6	106	112	122	132	141	150	158
• • • 3112 xx AH	5.0	4.2	112	119	125	137	148	158	168	177
• • • 3120 xx AH	5.2	4.4	120	127	134	147	158	169	180	189

CODE	ANGLE
HWE	26°
HWF	30°
HWL	40°

COMPLETE CODE

HW nozzle tips and tip accessories can be ordered separately or with a group code as shown in the table below.

Codes including the several options available as follows.

Tip Code	Assembly
HWX 1234 XX AH	nozzle, no accessories
HWX 1234 XX BH	nozzle with flow stabilizer L=74.0
HWX 1234 XX DH	nozzle with filter & flow stabilizer L=110.5
HWX 1234 XX EH	nozzle with filter & flow stabilizer L=130.5

ALIGNMENT NOZZLE

Alignment nozzle HWZ 01Cx B1 allows for fast and safe positioning of the nipples onto the manifold prior to welding.

Please ask for Data Sheet TFTI HWACC3 to identify the precise part you need.

The nipples are aligned in place by means of a straight rod and welded to assure the right jet direction.



DISASSEMBLING TOOL

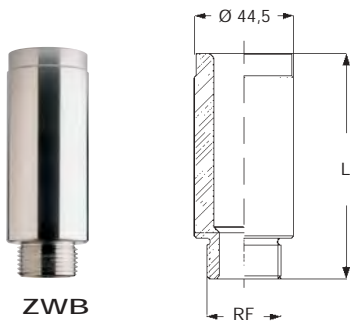
The disassembling tool makes it easier to extract a nozzle from inside the nipple, for replacement or inspection.

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



ROLLING MILL

ASSEMBLY PARTS / STANDARD, SHORT



ZWB

WELDING NIPPLES

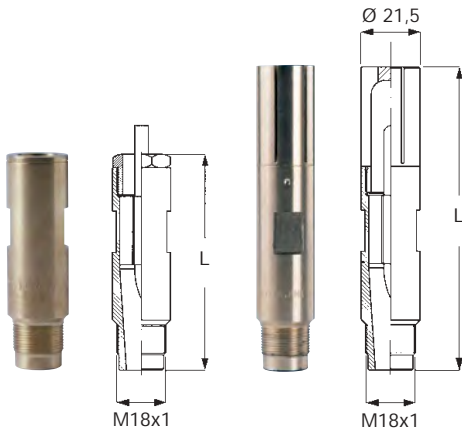
HW nozzles can be assembled on a series of three different nipples, with the same inlet and three different lengths.

The precision machined nipple inlet port assures precise positioning of the nozzle flat jet to the specified offset angle value of 15° with regard to the manifold center line.

This makes it possible to obtain uniform impact distribution and better descaling results.

Material B2 AISI 304 Stainless steel

Tip Code	RF inch	L mm	W kg
ZWB 0073 B2	1	73	0,49
ZWB 0100 B2	1	100	0,71
ZWB 0120 B2	1	120	0,85



FLOW STABILIZER

The flow stabilizer is a critical component for a good descaling job, since by reducing flow turbulence losses, a larger fraction of the water flow energy can be used for generating impact on the surface to be descaled.

The design consist of a cylindrical body in brass with polished inner surface, housing a cast stainless steel flow stabilizer which straightens the liquid path to minimize turbulence.

Different length nipples are available, with or without inlet filter.

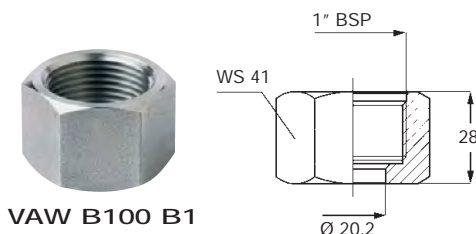
The codes beside always include the multifin flow straightener (XHW DL00 B3).

Materials Nozzle inlet T1 Brass
Filter T1 Brass
Flow stabilizer B3 AISI 316 Stainless steel

Code	L mm	Weight kg	Notes
XHW CG10 T1	74.0	0.08	without filter
XHW CG20 T1	110.5	0.11	with filter
XHW CG21 T1	130.5	0.14	with filter



XHW CL00 B3

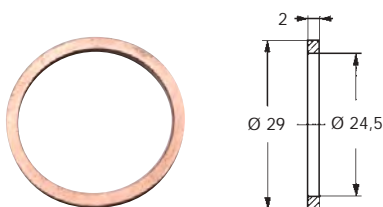


VAW B100 B1

LOCKNUT

The locknut for ZWB series descaling nipples has been designed profiting from a long experience on the field. The sturdy design and the generous dimensions give the maximum protection to the nozzle and the nipple thread. One locknut size fits all standard size ZWB series nipples of any length. See page 21 for special models allowing very tight nozzle pitch.

Material B1 AISI 303 Stainless steel



VDA 24C1 T3

SEAL

The round seal provides proper assembly between nozzle and nipple. One size fits all standard size ZWB nipple types.

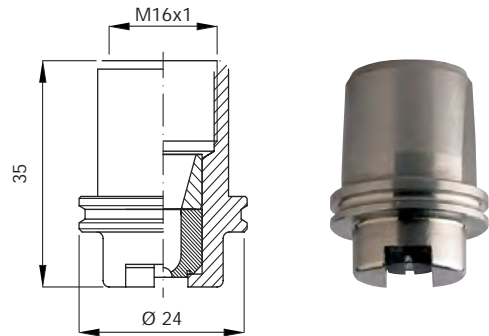
Material T3 Copper

ROLLING MILL

HW / AA

DESCALING TIPS / BROACH FIT, MINI, SHORT

The modern design of these nozzles offers the same advantages as the full size HW tips, and in addition it makes possible to use a smaller pitch between the nozzles allowing an higher impact value per unit length. The nozzle efficiency is enhanced by means of a carefully designed flow stabilizer, which minimizes turbulence due to sharp direction change at the inlet from the main manifold. Provision is also made for a filter to be mounted at the nozzle inlet, to avoid nozzle orifice to be clogged or damaged by foreign particles.



Materials Body B1 AISI 303 Stainless Steel
 Tip C1 Aisi 420 hardened
 F1 Tungsten Carbide

Tip Code	D mm	D1 mm	Capacity at different pressure values (lpm) (bar)											
			80	90	100	120	140	160	180	200				
• • • 2106 xx AA	1.5	1.2	10.6	11.4	12.0	13.1	14.2	15.2	16.1	17.0				
• • • 2134 xx AA	1.8	1.4	13.4	14.2	15.0	16.4	17.7	19.0	20.1	21.2				
• • • 2162 xx AA	2.0	1.5	16.2	17.1	18.0	19.5	21.3	22.8	24.0	25.0				
• • • 2208 xx AA	2.1	1.8	20.8	21.8	23.0	25.2	27.2	29.1	30.8	35.5				
• • • 2250 xx AA	2.5	1.9	25.0	26.5	28.0	31.0	33.0	35.4	37.5	39.0				
• • • 2320 xx AA	2.8	2.4	32.0	34.2	36.0	39.4	42.6	45.5	48.3	50.9				
• • • 2402 xx AA	3.0	2.5	40.2	42.7	45.0	49.0	53.0	57.0	60.0	63.0				
• • • 2520 xx AA	3.5	2.7	52.0	55.0	58.0	63.5	68.6	73.3	77.8	82.0				
• • • 2642 xx AA	3.8	3.2	64.2	68.3	72.0	78.0	85.0	91.0	96.0	101				
• • • 2798 xx AA	4.3	3.6	79.8	84.4	89.0	98.0	105	112	119	126				
• • • 2996 xx AA	4.7	4.0	99.6	106	112	122	132	141	150	158				
• • • 3112 xx AA	5.0	4.2	112	119	125	137	148	158	168	177				
• • • 3120 xx AA	5.2	4.4	120	127	134	147	158	169	180	189				

CODE	ANGLE
HWE	26°
HWF	30°
HWL	40°

COMPLETE CODE

Codes including the several options available as follows.

Tip Code	Assembly
HWX 1234 XX AA	nozzle, no accessories
HWX 1234 XX BA	nozzle with flow stabilizer L=74.0
HWX 1234 XX DA	nozzle with filter & flow stabilizer L=110.5
HWX 1234 XX EA	nozzle with filter & flow stabilizer L=130.5

ALIGNMENT NOZZLE

Alignment nozzle HWZ 01Ax B1 allows for fast and safe positioning of the nipples onto the manifold prior to welding. Please ask for Data Sheet TFTI HWACC3 to identify the precise part you need since nozzles with different offset angles are available. The nipples are aligned in place by means of a straight rod and welded to assure the right jet direction.



DISASSEMBLING TOOL

The disassembling tool makes it easier to extract a nozzle from inside the nipple, for replacement or inspection. The clamping tip (HWZ 03A0 B1) and the handle (HWZ 04A0 B1) are sold and must be ordered separately.

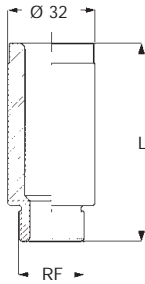


ROLLING MILL

ASSEMBLY PARTS / MINI, SHORT



ZWB



WELDING NIPPLES

Small size nozzles can be assembled on a three different nipples, with the same inlet and three different lengths.

The precision machined nipple inlet port assures precise positioning of the nozzle flat jet to the specified offset angle value of 15° with regard to the manifold center line.

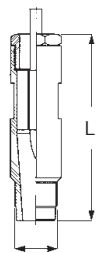
This makes it possible to obtain uniform impact distribution and better descaling results.

Material B2 AISI 304 Stainless Steel

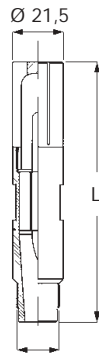
Tip Code	RF inch	L mm	W kg
ZWB 0032 B2	3/4	32	0,08
ZWB 0039 B2	3/4	39	0,10
ZWB 0080 B2	3/4	80	0,23



M16x1



M16x1



FLOW STABILIZER

The flow stabilizer is the critical component for a perfect descaling job, since it maximizes the impact force on the surface to be descaled, for a given condition.

The codes beside always include the multifin flow improver XHW AL00 B3.

Materials Nozzle inlet T1 Brass
 Filter T1 Brass
 Flow stabilizer B3 AISI 316 Stainless steel

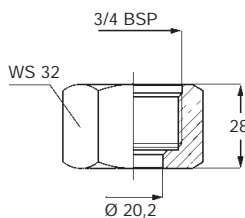
Tip Code	L mm	Weight kg	Notes
XHW AG 10 T1	74.0	0.08	without filter
XHW AG 20 T1	110.5	0.12	with filter
XHW AG 21 T1	130.5	0.15	with filter



XHW AL00 B3



VAW A075 B1



LOCKNUT

The locknut for ZWB series descaling nipples has been designed profiting from a long experience on the field.

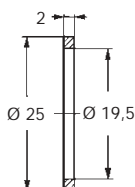
The sturdy design and the generous dimensions give the maximum protection to the nozzle and the nipple thread, so as to avoid such abrasion wear who often occur in the rolling mill.

One locknut size fits all small size ZWB series nipples, for any length.

Material B1 AISI 303 Stainless steel



VDA 20C1 T3



SEAL

The round seal provides proper assembly between nozzle and nipple. One size fits all small size nipple types.

Material T3 Copper

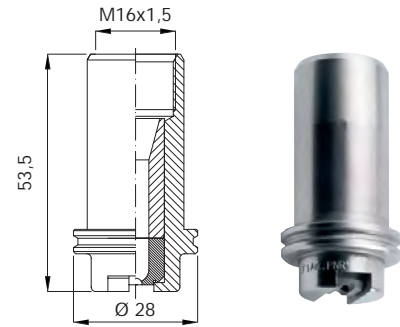
ROLLING MILL

HW / AK

DESCALING TIPS / BROACH FIT, STANDARD, LONG

The water path leading to the nozzle orifice has been completely redesigned in order to keep turbulent losses as low as possible, all sharp cross section changes have been eliminated with the result of a significant increase in water velocity at the nozzle orifice. The nozzle efficiency is further enhanced by a carefully designed flow stabilizer, which minimizes turbulence due to sharp flow direction change at the feed inlet from the main manifold. Finally a filter can be mounted at the nipple inlet, to avoid nozzle orifice to be clogged / damaged by foreign particles.

- Materials B1 AISI 303 Stainless steel
- C1 AISI 420 (hardened)
- F1 Tungsten carbide tip & 303 Stainless steel body



Tip Code	D mm	D1 mm	Capacity at different pressure values (lpm)							
			80 (bar)	90 (bar)	100 (bar)	120 (bar)	140 (bar)	160 (bar)	180 (bar)	200 (bar)
• • • 2106 xx AK	1.5	1.2	10.6	11.4	12.0	13.1	14.2	15.2	16.1	17.0
• • • 2134 xx AK	1.8	1.4	13.4	14.2	15.0	16.4	17.7	19.0	20.1	21.2
• • • 2162 xx AK	2.0	1.5	16.2	17.1	18.0	19.5	21.3	22.8	24.0	25.0
• • • 2208 xx AK	2.1	1.8	20.8	21.8	23.0	25.2	27.2	29.1	30.8	35.5
• • • 2250 xx AK	2.5	1.9	25.0	26.5	28.0	31.0	33.0	35.4	37.5	39.0
• • • 2320 xx AK	2.8	2.4	32.0	34.2	36.0	39.4	42.6	45.5	48.3	50.9
• • • 2402 xx AK	3.0	2.5	40.2	42.7	45.0	49.0	53.0	57.0	60.0	63.0
• • • 2520 xx AK	3.5	2.7	52.0	55.0	58.0	63.5	68.6	73.3	77.8	82.0
• • • 2642 xx AK	3.8	3.2	64.2	68.3	72.0	78.0	85.0	91.0	96.0	101
• • • 2798 xx AK	4.3	3.6	79.8	84.4	89.0	98.0	105	112	119	126
• • • 2996 xx AK	4.7	4.0	99.6	106	112	122	132	141	150	158
• • • 3112 xx AK	5.0	4.2	112	119	125	137	148	158	168	177
• • • 3120 xx AK	5.2	4.4	120	127	134	147	158	169	180	189

CODE	ANGLE
HWE	26°
HWF	30°
HWL	40°

COMPLETE CODE

Codes including the several options available as follows.

Tip Code	Assembly
HWX 1234 XX AK	bare nozzle
HWX 1234 XX BK	nozzle with flow stabilizer L = 76
HWX 1234 XX CK	nozzle with flow stabilizer L = 96
HWX 1234 XX DK	nozzle with filter & flow stabilizer L = 110
HWX 1234 XX EK	nozzle with filter & flow stabilizer L = 130
HWX 1234 XX GK	nozzle with filter & flow stabilizer L = 150

ALIGNMENT NOZZLE

Alignment nozzle HWZ 01Cx B1 allows for fast and safe positioning of the nipples onto the manifold prior to welding. Please ask for Data Sheet TFTI HWACC3 to identify the precise part you need since nozzles with different offset angles are available. The nipples are aligned in place by means of a straight rod and welded to assure the right jet direction.

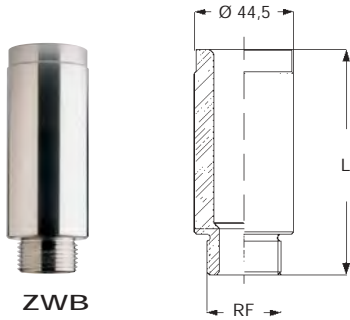
DISASSEMBLING TOOL

The disassembling tool makes it easier to extract a nozzle from inside the nipple, for replacement or inspection. The clamping tip (HWZ 03C0 B1) and the handle (HWZ 04A0 B1) are sold and must be ordered separately.



ROLLING MILL

ASSEMBLY PARTS / STANDARD, LONG



WELDING NIPPLES

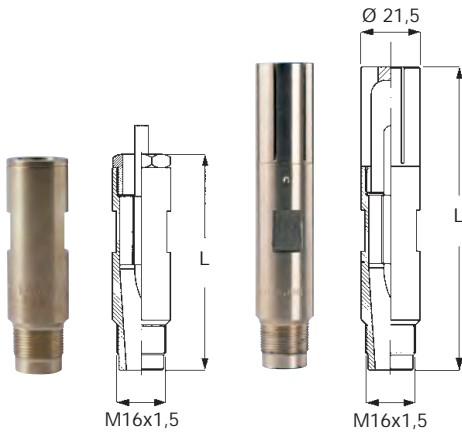
HW nozzles can be assembled on a series of three different nipples, with the same inlet and three different lengths.

The precision machined nipple inlet port assures precise positioning of the nozzle flat jet to the specified offset angle value of 15° with regard to the manifold center line.

This makes it possible to obtain uniform impact distribution and better descaling results.

Material B2 AISI 304 Stainless steel

Tip Code	RF inch	L mm	W kg
ZWB 0073 B2	1	73	0,49
ZWB 0100 B2	1	100	0,71
ZWB 0120 B2	1	120	0,85



FLOW STABILIZER

The flow stabilizer is the critical component for a perfect descaling job since it maximizes the impact force on the surface to be descaled, for any given condition.

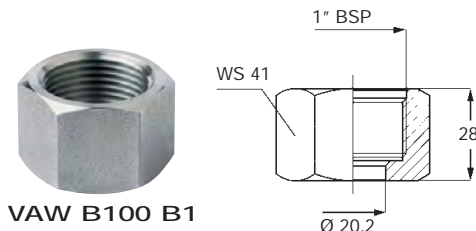
The codes beside always include the multifin flow improver (XHW DL00 B3).

Materials
 Nozzle inlet T1 Brass
 Filter T1 Brass
 Flow stabilizer B3 AISI 316 Stainless steel

Tip 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



XHW DL00 B3



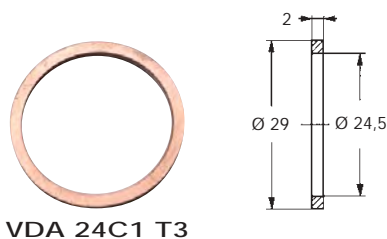
LOCKNUT

The locknut for ZWB series descaling nipples has been designed profiting from a long experience on the field.

The sturdy design and the generous dimensions give the maximum protection to the nozzle and the nipple thread, so as to avoid such abrasion wear who often occur in the rolling mill.

One locknut size fits all standard size ZWB series nipples, for any length.

Material B1 AISI 303 Stainless steel



SEAL

The round seal provides proper and leak proof assembly between nozzle and nipple. One size fits all standard size nipple types.

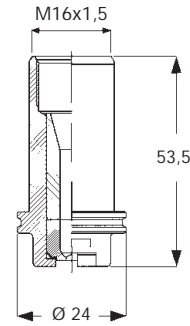
Material T3 Copper

ROLLING MILL

HW / AB

DESCALING TIPS / BROACH FIT, MINI, LONG

Small size nozzle tips also feature a new inside profile completely redesigned in order to keep turbulent losses as low as possible: all sharp cross section changes have been eliminated with the result of is significantly higher water velocity at the orifice. The performances are further enhanced by a flow stabilizer, abating turbulence inducted by the sharp change of flow direction when the water flow leaves the main manifold to enter the nipple. Finally a filter can be mounted at the nipple inlet, to avoid nozzle orifice to be clogged / damaged by foreign particles.



Materials Body B1 AISI 303 Stainless Steel
 Tip C1 AISI 420 hardened
 F1 Tungsten Carbide

Tip Code	D mm	D1 mm	Capacity at different pressure values (lpm) (bar)									
			80	90	100	120	140	160	180	200		
• • •	1.5	1.2	10.6	11.4	12.0	13.1	14.2	15.2	16.1	17.0		
• • •	1.8	1.4	13.4	14.2	15.0	16.4	17.7	19.0	20.1	21.2		
• • •	2.0	1.5	16.2	17.1	18.0	19.5	21.3	22.8	24.0	25.0		
• • •	2.1	1.8	20.8	21.8	23.0	25.2	27.2	29.1	30.8	35.5		
• • •	2.5	1.9	25.0	26.5	28.0	31.0	33.0	35.4	37.5	39.0		
• • •	2.8	2.4	32.0	34.2	36.0	39.4	42.6	45.5	48.3	50.9		
• • •	3.0	2.5	40.2	42.7	45.0	49.0	53.0	57.0	60.0	63.0		
• • •	3.5	2.7	52.0	55.0	58.0	63.5	68.6	73.3	77.8	82.0		
• • •	3.8	3.2	64.2	68.3	72.0	78.0	85.0	91.0	96.0	101		
• • •	4.3	3.6	79.8	84.4	89.0	98.0	105	112	119	126		
• • •	4.7	4.0	99.6	106	112	122	132	141	150	158		
• • •	5.0	4.2	112	119	125	137	148	158	168	177		
• • •	5.2	4.4	120	127	134	147	158	169	180	189		

CODE	ANGLE
HWE	26°
HWF	30°
HWL	40°

COMPLETE CODE

Codes including the several options available as follows.

Tip Code	Assembly
HWX 1234 XX AB	bare nozzle
HWX 1234 XX BB	nozzle with flow stabilizer L= 76
HWX 1234 XX CB	nozzle with flow stabilizer L= 96
HWX 1234 XX DB	nozzle with filter & flow stabilizer L = 110
HWX 1234 XX EB	nozzle with filter & flow stabilizer L = 130
HWX 1234 XX GB	nozzle with filter & flow stabilizer L = 150

ALIGNMENT NOZZLE

Alignment nozzle HWZ 01Ax B1 allows for fast and safe positioning of the nipples onto the manifold prior to welding. Please ask for Data Sheet TFTI HWACC3 to identify the precise part you need since nozzles with different offset angles are available. The nipples are aligned in place by means of a straight rod and welded to assure the right jet direction.



DISASSEMBLING TOOL

The disassembling tool makes it easier to extract a nozzle from inside the nipple, for replacement or inspection. The clamping tip (HWZ 03C0 B1) and the handle (HWZ 04A0 B1) are sold and must be ordered separately.

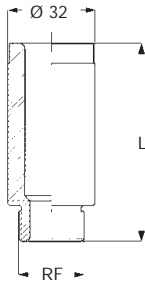


ROLLING MILL

ASSEMBLY PARTS / MINI, LONG



ZWB



WELDING NIPPLES

Small size nozzles can be assembled on a three different nipples, with the same inlet and three different lengths.

The precision machined nipple inlet port assures precise positioning of the nozzle flat jet to the specified offset angle value of 15° with regard to the manifold center line.

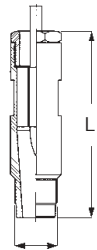
This makes it possible to obtain uniform impact distribution and better descaling results.

Material B2 AISI 304 Stainless steel

Tip Code	RF inch	L mm	W kg
ZWB 0032 B2	3/4	32	0,08
ZWB 0039 B2	3/4	39	0,10
ZWB 0080 B2	3/4	80	0,23



M16x1,5



M16x1,5

FLOW STABILIZER

The flow stabilizer is the critical component for a perfect descaling job, since it maximizes the impact force on the surface to be descaled, for any given condition.

The codes beside always include the multifin flow improver (XHW DL00 B3).

Materials
 Nozzle inlet T1 Brass
 Filter T1 Brass
 Flow stabilizer B3 AISI 316 Stainless steel

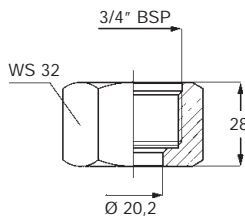
Tip Code	L mm	Weight kg	Notes
XHW DG 10 T1	76	0.08	without filter
XHW DG 11 T1	96	0.10	without filter
XHW DG 20 T1	110	0.11	with filter
XHW DG 21 T1	130	0.14	with filter
XHW DG 22 T1	150	0.16	with filter



XHW DL00 B3



VAW A075 B1



LOCKNUT

The locknut for ZWB series descaling nipples has been designed profiting from a long experience on the field.

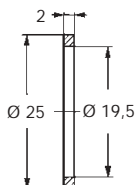
The sturdy design and the generous dimensions give the maximum protection to the nozzle and the nipple thread, so as to avoid such abrasion wear who often occur in the rolling mill.

One locknut size fits all the ZWB series nipples, for any length.

Material B1 AISI 303 Stainless steel



VDA 20C1 T3



SEAL

The round seal provides proper assembly between nozzle and nipple. One size fits all small size nipple types.

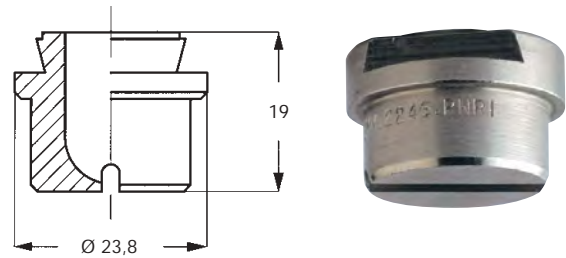
Material T3 Copper

ROLLING MILL

GY

ROLL COOLING NOZZLES

Proper roll cooling assures uniform strip thickness, and requires even water coverage. The even spray distribution of the GY series tips avoids sudden temperature changes and consequent expansion or contraction, which results in the need for roll re-grinding. The final result of a proper roll cooling is then a more even roll wear, longer life, longer production runs with more consistent steel quality.



Material B1 AISI 303 Stainless steel
T1 Brass

Tip Code	Capacity at different pressure values							(lpm)
	1.0	2.0	3.0	4.0	5.0	7.0	10	(bar)
• GYC	•	•	•	•	•	•	•	•
• GYF	•	•	•	•	•	•	•	•
• GYM	•	•	•	•	•	•	•	•
• GYQ	•	•	•	•	•	•	•	•
• 1781xx	4.50	6.30	7.80	9.00	10.0	11.8	14.1	
• 1981xx	5.70	8.00	9.80	11.3	12.6	15.0	17.9	
• 2125xx	7.20	10.1	12.4	14.3	16.0	18.9	22.4	
• 2154xx	8.80	12.5	15.3	17.7	19.8	23.4	28.0	
• 2195xx	11.2	15.8	19.4	22.4	25.0	29.6	35.4	
• 2246xx	14.2	20.0	24.5	28.3	31.5	37.4	44.8	
• 2311xx	17.8	25.0	31.0	35.8	40.0	47.4	56.6	
• 2490xx	28.0	40.0	49.0	56.0	63.0	75.0	90.0	
• 2610xx	35.3	50.0	61.0	70.7	79.1	93.5	112	
• 2760xx	45.0	63.0	76.0	90.0	100	118	141	

CODE	ANGLE
GYC	20°
GYF	30°
GYM	45°
GYQ	60°

ASSEMBLY PARTS

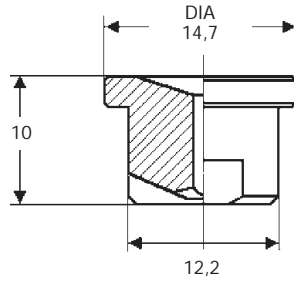
See our catalogue CTG AC18 BR for welding nipples and locknuts.



ZAC NIPPLES

ROLLING MILL

GX



COLD ROLLING MILL LUBRICATION

Lubrication of steel strip after cold rolling must be performed by the spray of very low quantities of lubricant, with an outstanding uniform spray distribution.

PNR low-flow flat jet tips, manufactured by high precision machine tools, assure very small tolerance on nozzle capacity and perfect spray pattern.

Material B1 Aisi 303 Stainless steel
 B31 Aisi 316L Stainless steel
 T1 Brass

CODICE	ANGOLO
GXS	75°
GXT	80°
GXV	95°
GXJ	110°

Tip Code	Nozzle flow values at different pressure values (lpm) (bar)									
	0.5	1.0	1.5	2.0	3.0	4.0	5.0	7.0	10	
GXS	•	•	•	•	•	•	•	•	•	•
GXT	•	•	•	•	•	•	•	•	•	•
GXV	•	•	•	•	•	•	•	•	•	•
GXJ	•	•	•	•	•	•	•	•	•	•
0060xx	—	—	—	0.05	0.06	0.07	0.08	0.09	0.11	
0100xx	—	—	—	0.08	0.10	0.12	0.13	0.15	0.18	
0130xx	—	—	—	0.11	0.13	0.15	0.17	0.20	0.24	
0150xx	—	—	—	0.13	0.15	0.17	0.20	0.25	0.28	
0200xx	—	0.12	0.14	0.16	0.20	0.23	0.26	0.31	0.37	
0260xx	—	0.15	0.18	0.21	0.26	0.30	0.34	0.40	0.47	
0390xx	—	0.23	0.28	0.32	0.39	0.45	0.50	0.60	0.71	
0590xx	0.24	0.34	0.42	0.48	0.59	0.68	0.76	0.90	1.08	
0780xx	0.32	0.45	0.55	0.64	0.78	0.90	1.01	1.19	1.42	
1120xx	0.49	0.69	0.85	0.98	1.20	1.39	1.55	1.83	2.19	
1160xx	0.65	0.92	1.13	1.31	1.60	1.85	2.07	2.44	2.92	

MATERIAL	0060	0100	0130	0150	0200	0260	0390	0590	0780	1120	1160
BRASS	•	•	•	•	•	•	•	•	•	•	•
AISI 303	—	—	—	—	—	—	•	•	•	•	•
AISI 316	—	—	—	—	—	—	—	•	•	•	•

ASSEMBLY PARTS

Small capacity GX flat jet tips can be easily assembled by means of our standard welding nipples in the ZAA series and matching VAA 0038 caps.

See our Accessories Catalogue CTG AC18 BR.



ZLA NIPPLES



VAA 0038 XX

GENERAL APPLICATIONS

AF

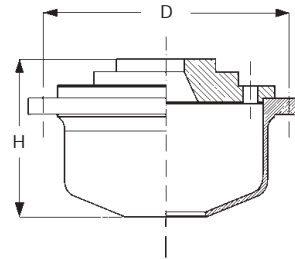
COKE OVEN NOZZLES

AF are designed for coke quenching processes.

Thanks to their very uniform spray distribution, a rapid quench is obtained without hot spots.

Their wide chamber and multi-orifice disc shaped vane provide excellent velocity distribution inside the nozzle, which results in a fast and uniform cooling: low values for process water and coke moisture percentage are easily obtained.

The wide inside passages exclude the possibility of any clogging danger.



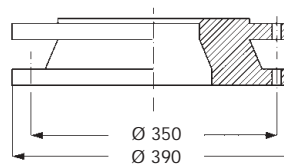
Materials	A1	Carbon steel
	B31	AISI 316L Stainless steel
	G1	Cast Iron
Spray angle	90°	

Tip Code	D1 mm	Nozzle capacity at pressure values							Spray Coverage (mm) at pressure values (bar)		
		0.3	0.4	0.5	1.0	1.5	2.0	3.0	0.5	1.0	1.5
AFU 3520 xx	6.0	165	190	213	301	368	425	520	2900	3200	3350
AFU 3820 xx	7.5	260	300	335	474	580	670	820	3100	3300	3450
AFU 4110 xx	9.5	348	400	450	636	780	900	1100	3300	3500	3650
AFU 4171 xx	11.9	542	626	700	985	1210	1400	1715	3350	3550	3700
AFU 4275 xx	13.1	870	1000	1120	1580	1940	2240	2745	3500	3700	2800
AFU 4435 xx	13.5	1380	1590	1770	2500	3070	3550	4350	3700	3800	3750
AFU 4686 xx	16.9	2170	2500	2800	3960	4850	5600	6860	3700	3800	3750

ADAPTING FLANGES

AE nozzles can be supplied complete with an adapting flange for connection to the plant existing piping.

Our offices will quote these flanges on request.



NOZZLE DIMENSIONS

Tip Code	D	H
AFU 4110 xx	180	100
AFU 4171 xx	210	121
AFU 4275 xx	240	150
AFU 4435 xx	295	190
AFU 4686 xx	350	240

GENERAL APPLICATIONS

GAS COOLING LANCES



e Eco|SprayTech

GAS COOLING LANCES

Gas cooling lances serve the purpose of cooling furnace gases prior to their inlet inside the ESP (Electrostatic Precipitator).

Our Catalogue CTG LN16 BR gives complete information about the gas cooling process and the several types of gas cooling lances. Our offices will be glad to supply any further information and to assist you in the choice of the proper product.

ECO Spraytech is a new Company profiting from many years of experience in the steel industry.

The Company belongs to the Flowtech group of Companies, as all PNR Companies, and specializes in designing, manufacturing and commissioning complete systems for oven smoke cooling in steelworks. We can deliver lances, pump skids and fully programmed PLC and put the system in service at your plant or retrofit any of these parts in your existing system.



ADDITIONAL INFORMATION

LIST OF ABBREVIATIONS

AE	Air capacity, inlet	Ncm/min	FF	Flange nominal dia	inch	RA	Radius	mm
AU	Air capacity, outlet	Ncm/min	H, H1	Height	mm	RF	Female thread size	inch
D	Equivalent orifice dia	mm	L	Length	mm	RFS	Inlet thread, steam	inch
DE	Depth	mm	LF	Hose length	m	RFW	Inlet thread, water	inch
DI	Inner dia	mm	LP	Max operation pressure	bar	RG	Male thread	inch
D1	Smallest inside passage	mm	LQ	Max capacity	lpm	S	Thickness	mm
DI1	Diameter	mm	LT	Max operation temperature	°C	U	Outlet thread size	inch
DI2	Diameter	mm	M	Wire net mesh size	mesh	UF	Outlet fem. Thread size	inch
DX	Nipple inner dia	mm	MF	Flexible hose size	inch	W	Weight	g/kg
E	Inner thread size	inch	PD	Pipe outer diameter	inch	WS	Wrench size	mm
EF	Inlet female thread	inch	Q	Capacity	lpm			

PRODUCT WARRANTY

PNR products will be replaced or repaired at the option of PNR and free of charge if defective in manufacture, labeling or packaging. The above warranty conditions will apply if notice of defect is received by PNR within 30 days from date of product installation or one year from date of shipment. The cost of above said replacement or repair shall be the final solution for any breach of any warranty, and PNR shall not be held liable for any damages due to personal injuries or commercial losses caused by product malfunction.

OTHER PRODUCT RETURNS

Receiving returned products not precisely identified can originate delays in handling the single cases and even some product losses. In order to avoid such problems please follow the PNR procedures as described below.

PRODUCTS DELIVERED ERRONEOUSLY BY PNR

- 1 Obtain from PNR a RIN (Return ident number) and a DOC VRMI Form.
- 2 Return products to PNR including the DOC VRMI Form properly filled including RIN number.
- 3 PNR shall issue a Credit Note payable to you including product and all transport cost.

PRODUCTS ORDERED ERRONEOUSLY TO PNR

- 1 Returned products will only be accepted if in new original condition and properly packed.
- 2 Obtain from PNR a RIN (Return ident number) and a DOC VRMI Form.
- 3 Return products to PNR including the DOC VRMI Form properly filled including RIN number.
- 4 A 10% inspection and re-stocking charge and all transport cost are at charge of Customer.
- 5 A Credit note for the proper amount shall be issued and paid.

SPECIAL NON CATALOG PRODUCTS

The return of these products is only possible after PNR has issued an offer for purchase.

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 provided in this Catalog is provided "as it 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 previous notice.

SENDING LIST

In order to automatically receive updates of our technical Documentation please photocopy this card and send it to us inside a sealed envelope, your details shall be kept on our Permanent Mailing List.

CTG SW20 BR

01	COMPANY		PNR PRODUCT RANGE		PAPERMILL PRODUCTS	
02	NAME		GENERAL PURPOSE SPRAY NOZZLES		STEELWORK NOZZLES	
03	FUNCTION		AIR ASSISTED ATOMIZERS		SPRAYDRY NOZZLES	
04	ADRESS		COMPLEMENTARY PRODUCTS AND ASSEMBLY FITTINGS		FIRE FIGHTING COMPONENTS	
05	PHONE	FAX	TANK WASHING SYSTEMS			
06	WEB SITE	E-MAIL	EVAPORATIVE COOLING SYSTEMS			



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CTG SW20 BR

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PNR Deutschland
PNR China

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