SPRAY NOZZLES FOR INDUSTRIAL APPLICATIONS

STEEL NOZZLES

SOLUTIONS FOR THE STEEL AND METAL INDUSTRY

PNR ITALIA

SPRAY NOZZLES FOR INDUSTRIAL APPLICATIONS

PNR ITALIA manufactures and markets small spraying nozzles for individual use up to spraying systems for large industrial plants and is able to meet every customer's need with targeted solutions.
The wide range of products includes spray nozzles, washing heads and complementary accessories such as filters, guns and hoses for industrial washing, ejectors, blow nozzles, joints and hose clamps.

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

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

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

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

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PNR Italia - Headquarters in Voghera (Italy)

DUST SUPPRESSION ON RAW MATERIALS

E
Standard spiral nozzle

11

K Large
Flat fan nozzle

13

PN / PO
Hollow cone nozzle

15

COKE SUPPRESSION/COOLING

AE
Full cone nozzle

17

BE
Full cone nozzle

19

PR
Hollow cone nozzle

20

CONTINUOUS CASTING COOLING *WATER*

AH
Full cone nozzle

22

BA / BC
Full cone nozzles

23

BH
Full cone nozzle

25

CONTINUOUS CASTING COOLING *WATER*

BX
Full cone nozzle

26

D
Full cone nozzle

27

D plus
Full cone nozzle

31

D..OB
Full cone nozzle

33

D..PB
Full cone nozzle

34

CONTINUOUS CASTING COOLING *WATER COLD LAMINATION*

GX
Flat fan nozzle

36

GY
Flat fan nozzle tip with dove tail

38

CONTINUOUS CASTING COOLING *AIR/WATER*

MC
Flat fan air atomizer

41

MN
Full cone air atomizer

42

MO
Oval jet air atomizer

43

MR
Flat fan atomizer

44

MB
Lance atomizer

46

MT
Lance atomizer

47

DESCALING *HOT ROLLING*

EXTRA HX/GB
High-impact nozzle
Mini size

50

EXTRA HX/GK
High-impact nozzle
Standard size

52

GW
Dove-tail nozzle

54

DESCALING

HOT ROLLING

HW/AA
Short nozzle
Mini size

56

HW/AB
High-impact nozzle
Mini size

58

HW/AH
Short nozzle
Standard size

60

HW/AK
High-impact nozzle
Standard size

62

HV/AX
High-impact nozzle
Special size

64

HW/AM
High-impact nozzle
micro size

66

ROLL COOLING

KZA
Flat fan nozzle

69

GY
Flat fan nozzle

38

PICKLING

J
Flat fan nozzle

71

K High
High-impact flat fan nozzle

75

STEEL WORK NOZZLES

PNR ITALIA FOR THE STEEL AND METALLURGICAL INDUSTRY

The steel industry is among the most demanding production environments in the world: extreme temperatures, aggressive environments, dust, scale, and continuous production cycles test every component of the plant.
Nozzles and atomizers are no exception — in fact, they are often critical elements for production efficiency, final product quality, and the safety of the entire process.

PNR Italia has been designing and manufacturing nozzles, atomizers, and accessories for the main processes of the steel industry for over fifty years.
Our consolidated presence in steel mills worldwide is built on the ability to respond with precision to the specific needs of every application: from *cooling in continuous casting* to *descaling in hot rolling*, from *dust suppression on raw material* yards to strip *pickling*.

Every PNR Italia product results from a rigorous development process that combines application experience, laboratory testing, and CFD simulations.
The goal is always the same: to provide the right amount of fluid, in the right place, with maximum energy efficiency and minimum wear over time.

This catalogue is organized by production process, following the steel mill flow from raw material management to the surface treatments of the finished product.
Recommended products, reference parameters, and the most relevant selection criteria are indicated for each application.

MAIN PROCESSES IN A STEEL PLANT

DUST SUPPRESSION IN RAW MATERIAL YARDS

The storage and handling of minerals and coal generate fine dust that poses risks to health and the environment.
Effective control requires matching droplet size to dust particles: droplets must be large enough to avoid evaporation but fine enough to intercept airborne particles.
The goal is to dampen surfaces using the minimum amount of water to prevent the formation of mud.

1

COKE QUENCHING

Incandescent coke must be rapidly cooled before storage through high-volume water injection.
This process involves extreme thermal stress, steam, and radiant heat.
It is critical to achieve uniform cooling across the entire mass to prevent re-ignition while carefully controlling water volume to maintain the quality of the final product.

2

CONTINUOUS CASTING COOLING (WATER)

As semi-finished steel is extracted from the mold, it requires high-precision cooling to manage solidification. Non-uniform cooling can lead to internal cracks or surface deformations.
This stage demands stable spray patterns and well-defined flow-to-pressure ratios to ensure the steel remains structurally sound as it moves along the guiding line.

3

CONTINUOUS CASTING COOLING (AIR/WATER)

When a production line handles various steel grades, a wide “turn-down ratio” is required to adjust cooling intensity. Air/Water atomization is used to achieve this flexibility, as it allows for real-time adjustments to the cooling curve.
This method ensures fine fragmentation of droplets even when water flow rates are significantly reduced.

4

COLD ROLLING

During room-temperature thickness reduction, the primary focus is the uniform application of coolants and lubricants.
Consistent distribution across the entire width of the steel strip is vital; any variation can cause flatness defects, thickness irregularities, or damage to the rolling surfaces.

5

HOT ROLLING — DESCALING

To prevent surface defects like pitting, the oxide layer (scale) must be removed using high-pressure water jets (50–400 bar).
This process relies on a combination of mechanical impact and thermal shock. The effectiveness of the removal depends entirely on the impact force and the precision of the jet geometry.

6

ROLL COOLING

Rolling cylinders are subjected to intense heat cycles during contact with hot metal.
Continuous cooling is necessary to maintain their dimensional stability and mechanical properties.
This extends the service life of the equipment and ensures that the surface finish of the rolled steel remains consistent and high-quality.

7

PICKLING

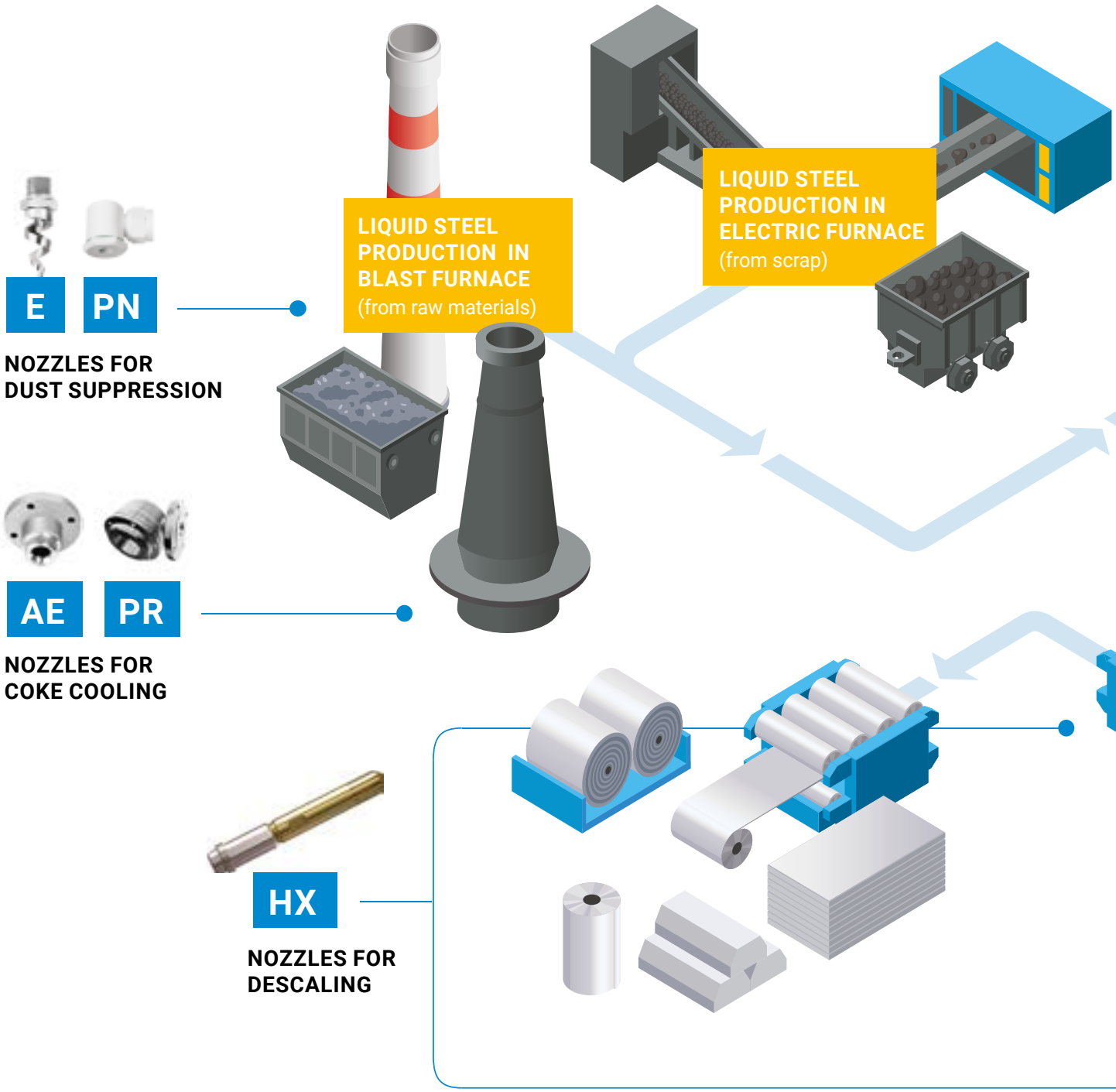
Pickling uses acid solutions to strip away remaining oxides and prepare the steel for coating or galvanizing. Because the fluids are chemically aggressive, the delivery systems must be made of highly corrosion-resistant materials.
Uniform distribution is essential to ensure the entire surface is cleaned consistently before rinsing.

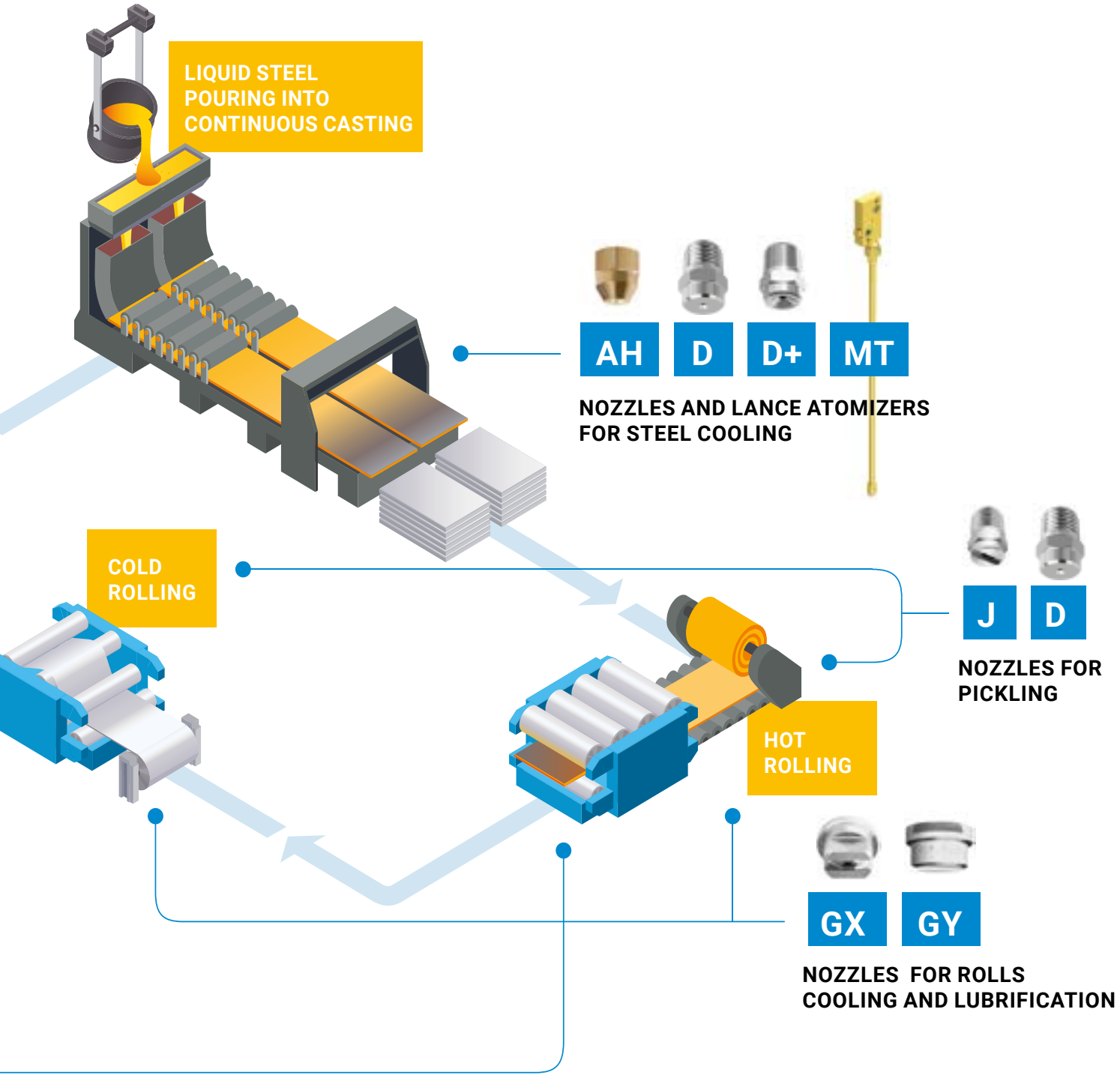
8

NOZZLES IN THE STEEL INDUSTRY

The steelworks processes are many, as well as the tools required for the various stages of production.

In the following diagram, we have highlighted some phases of steel production in which PNR Italia spray nozzles and atomizers are involved.




LIQUID STEEL POURING INTO CONTINUOUS CASTING
AH
D
D+
MT
NOZZLES AND LANCE ATOMIZERS FOR STEEL COOLING
COLD ROLLING
J
D
NOZZLES FOR PICKLING
HOT ROLLING
GX
GY
NOZZLES FOR ROLLS COOLING AND LUBRIFICATION

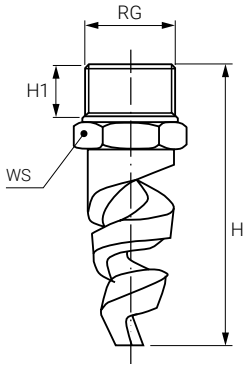
DUST SUPPRESSION IN RAW MATERIAL YARDS

In steel mill raw material yards, minerals, coal, and other bulk materials are continuously stored, handled, and transferred.
These operations generate significant amounts of fine dust, which, if not controlled, disperse into the air, compromising the quality of the working environment, operator health, and compliance with emission regulations.

For effective suppression, it is essential to know the particle size of the dust to be treated: drops that are too large do not intercept the finest particles, while drops that are too small evaporate before reaching the target.

For this application, PNR Italia proposes **E-series full-cone nozzles**, **K-series flat-fan nozzles**, and **PN/PO-series hollow-cone nozzles**, which can be selected based on projection distance, required flow rate, and available connection type.
The goal is to cover the surface with the minimum necessary water, thereby limiting mud formation in the treated areas.

E



STANDARD SPIRAL NOZZLES

E-type full cone nozzle works on the impact principle, by the deflection of a water stream that impacts onto a spiral profiled surface which provides the desired spray angle. These are one-piece nozzles with no internal vane and a more comprehensive free passage. The liquid inlet has nearly the same size as the outlet orifice diameter. Their unique design makes them virtually clog-free and produces a wider spray coverage than other nozzles for a given flow and pressure.
The capacity values on darker backgrounds can be obtained with metal nozzles only, plastic materials being too weak to assure structural nozzle resistance in harsh operating conditions. If the capacity values you are looking for are those on darker background, we recommend to chose metal nozzles for their longer operating life.

MATERIAL

AISI 303 Stainless Steel, Brass, PVC, PP, PVDF, PTFE, Hastelloy C22

THREAD SPECIFICATION

BSPT, NPT
from 1/4" to 4"

HOW TO ORDER THE PRODUCT

NOZZLE TYPE — **E B Q 1550 xx y z** — **CONNECTION** **B** - BSPT **N** - NPT

- **THREAD SIZE CODE**
- **CAPACITY**
- **VARIANT** **S** - Standard **T** - Wide spry angle **W** - 180° spray angle
- **SPRAY ANGLE** **Q** - 60° **U** - 90° **W** - 120° **X** - 150° **Z** - 180°
- **MATERIAL** **B31** - AISI 316L s.s. **T1** - Brass **D1** - PVC **D2** - PP **D8** - PVDF **E1** - PTFE **L61** - Hastelloy C22

	CODE	RG	D	D1	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							H	H1	WS
		inch	mm	mm	0,7	1	2	3	5	7	10	mm	mm	mm
60°	**EBQ 1550 xx Sz**	1/4"	2,4	2,4	2,66	3,18	4,49	5,5	7,1	8,4	10	45	12	14
	EBQ 2156 xx Sz		4	3,2	7,54	9,01	12,7	15,6	20,1	23,8	28,5			
	ECQ 2230 xx Sz	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 Sz		6,4	3,2	20	24	33,9	41,5	53,6	63,4	75,8			
	ECQ 2640 xx Sz		7,9	3,2	31,2	37,3	52,7	64,6	83,4	99	118			
	EDQ 2940 xx Sz	1/2"	9,5	4,7	45,6	54,5	77,1	94,4	122	144	172	64	18	22
	EDQ 3128 xx Sz		11,1	4,7	61,8	73,9	105	128	165	196	234			
	EEQ 3165 xx Sz	3/4"	12,7	4,7	79,7	95,3	135	165	213	252	301	70	19	27
	EFQ 3260 xx Sz	1"	15,9	6,3	126	150	212	260	336	397	475	92	26	34
	EHQ 3507 xx Sz	1-1/2"	22,2	7,9	245	293	414	507	655	774	926	111	27	50
90°	**EBU 1550 xx Sz**	1/4"	2,4	2,4	2,66	3,18	4,49	5,5	7,1	8,4	10	45	12	14
	EBU 2100 xx Sz		3,2	3,2	4,83	5,77	8,16	10	12,9	15,3	18,3			
	EBU 2156 xx Sz		4	3,2	7,54	9,01	12,7	15,6	20,1	23,8	28,5			
	ECU 2230 xx Sz	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 Sz		5,6	3,9	15,3	18,3	25,9	31,7	40,9	48,4	57,9			
	ECU 2410 xx Sz		6,4	4,8	20	24	33,9	41,5	53,6	63,4	75,8			
	ECU 2640 xx Sz		7,9	5,5	31,2	37,3	52,7	64,6	83,4	99	118			
	EDU 2940 xx Sz	1/2"	9,5	3,3	45,6	54,5	77,1	94,4	122	144	172	64	18	22
	EDU 3128 xx Sz		11,1	3,7	61,8	73,9	105	128	165	196	234			
	EEU 3165 xx Sz	3/4"	12,7	4,7	79,7	95,3	135	165	213	252	301	70	19	27
	EFU 3260 xx Sz	1"	19	6,3	126	150	212	260	336	397	475	92	26	34
	EFU 3372 xx Sz		23	6,3	180	215	304	372	480	568	679			
	EKU 4109 xx Sz	2"	34,9	11,1	527	629	890	1090	1407	1665	1990	149	31	65
	EMU 4204 xx Sz	3"	44,5	14,3	985	1178	1666	2040	2633	3116	3724	203	35	90
	EMU 4267 xx Sz		50,8	14,3	1290	1541	2180	2670	3447	4078	4874			

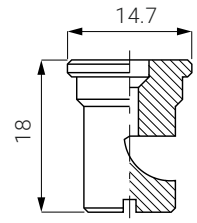
E

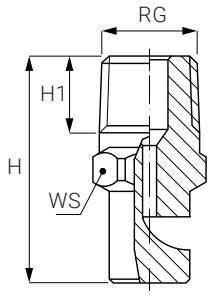
	CODE	RG	D	D1	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							H	H1	WS
		inch	mm	mm	0,7	1	2	3	5	7	10	mm	mm	mm
120°	**EBW 1550 xx Sz**	1/4"	2,4	2,4	2,66	3,18	4,49	5,5	7,1	8,4	10	45	12	14
	EBW 2100 xx Sz		3,2	3,2	4,83	5,77	8,16	10	12,9	15,3	18,3			
	EBW 2156 xx Sz		4	3,2	7,54	9,01	12,7	15,6	20,1	23,8	28,5			
	ECW 2156 xx Sz	3/8"	4	3,2	7,54	9,01	12,7	15,6	20,1	23,8	28,5	48	14	19
	ECW 2230 xx Sz		4,8	3,2	11,4	13,6	19,2	23,5	30,3	35,9	42,9			
	ECW 2317 xx Sz		5,6	4	15,3	18,3	25,9	31,7	40,9	48,4	57,9			
	ECW 2410 xx Sz		6,4	4	20	24	33,9	41,5	53,6	63,4	75,8			
	ECW 2640 xx Sz		7,9	4	31,2	37,3	52,7	64,6	83,4	98,7	118			
	EDW 2940 xx Sz	1/2"	9,5	4,8	45,6	54,5	77,1	94,4	122	144	172	64	18	22
	EDW 3104 xx Sz		9,7	4,8	50,2	60	84,9	104	134	159	190			
	EDW 3128 xx Sz		11,1	4,8	61,8	73,9	105	128	165	196	234			
	EEW 3165 xx Sz	3/4"	12,7	4,8	79,7	95,3	135	165	213	252	301	70	19	27
	EFW 3260 xx Sz	1"	15,9	6,3	126	150	212	260	336	397	475	92	26	34
	EFW 3372 xx Sz		19	6,3	180	215	304	372	480	568	679			
	EHW 3507 xx Sz	1-1/2"	22,2	7,9	245	293	414	507	655	774	926	111	27	50
	EHW 3663 xx Sz		25,4	7,9	320	383	541	663	856	1013	1210			
	EHW 3747 xx Sz		28,6	7,9	361	431	610	747	964	1141	1364			
	EKW 4109 xx Sz	2"	34,9	11,1	527	629	890	1090	1407	1665	1990	149	31	65
	EKW 4139 xx Sz		38,1	11,1	671	803	1136	1391	1796	2125	2540			
	EMW 4204 xx Sz	3"	44,5	14,3	985	1178	1666	2040	2634	3116	3725	203	35	90
	EMW 4267 xx Sz		51	14,3	1280	1530	2164	2650	3421	4048	4838			
	EPW 4412 xx Sz	4"	63,5	15,9	1990	2379	3364	4120	5318	6293	7522	230	40	127
150°	**ECX 2230 xx Tz**	3/8"	4,8	3,2	11,4	13,6	19,2	23,5	30,3	35,9	42,9	60	14	19
	ECX 2317 xx Tz		5,6	4	15,3	18,3	25,9	31,7	40,9	48,4	57,9			
	ECX 2410 xx Tz		6,4	4	20	24	33,9	41,5	53,6	63,4	75,8			
	ECX 2640 xx Tz		7,9	4	31,2	37,3	52,7	64,6	83,4	98,7	118			
	EDX 2940 xx Tz	1/2"	9,5	4,8	45,6	54,5	77,1	94,4	122	144	172	78	18	22
	EDX 3128 xx Tz		11,1	4,8	61,8	73,9	105	128	165	196	234			
	EEX 3165 xx Tz	3/4"	12,7	4,8	79,7	95,3	135	165	213	252	301	90	19	27
	EFX 3260 xx Tz	1"	15,9	6,3	126	150	212	260	336	397	475	111	26	34
	EFX 3372 xx Tz		19	6,3	180	215	304	372	480	568	679			
	EHX 3507 xx Tz	1-1/2"	22,2	7,9	245	293	414	507	655	774	926	137	27	50
	EHX 3663 xx Tz		25,4	7,9	320	383	541	663	856	1013	1210			
	EHX 3747 xx Tz		28,6	7,9	361	431	610	747	964	1141	1364			
	EKX 4109 xx Tz	2"	34,9	11,1	527	629	890	1090	1407	1665	1990	175	31	65
	EKX 4139 xx Tz		38,1	11,1	671	803	1136	1391	1796	2125	2540			
180°	**EBZ 2156 xx Wz**	1/4"	4	2,5	7,54	9,01	12,7	15,6	20,1	23,8	28,5	45	12	14
	ECZ 2230 xx Wz	3/8"	4,8	3,2	11,4	13,6	19,2	23,5	30,3	35,9	42,9	48	14	19
	ECZ 2317 xx Wz		5,6	4	15,3	18,3	25,9	31,7	40,9	48,4	57,9			
	ECZ 2410 xx Wz		6,4	4	20	24	33,9	41,5	53,6	63,4	75,8			
	ECZ 2640 xx Wz		7,9	4	31,2	37,3	52,7	64,6	83,4	99	118			
	EDZ 2940 xx Wz	1/2"	9,5	3,3	45,6	54,5	77,1	94,4	122	144	172	68	18	22
	EDZ 3128 xx Wz		11,1	4,8	61,8	73,9	105	128	165	196	234			
	EEZ 3165 xx Wz	3/4"	12,7	4,7	79,7	95,3	135	165	213	252	301	76	19	27
	EFZ 3260 xx Wz	1"	15,9	6,3	126	150	212	260	336	397	475	111	25	36
	EFZ 3372 xx Wz		19	6,3	180	215	304	372	480	568	679			
	EHZ 3507 xx Wz	1-1/2"	22,2	7,9	245	293	414	507	655	774	926	111	27	50
	EHZ 3663 xx Wz		25,4	7,9	320	383	541	663	856	1013	1210			
	EHZ 3747 xx Wz		28,6	7,9	361	431	610	747	964	1141	1364			
	EKZ 4109 xx Wz	2"	34,9	11,1	527	629	890	1090	1407	1665	1990	149	31	63
	EKZ 4139 xx Wz		38,1	11,1	671	803	1136	1391	1796	2125	2540			

THREAD SIZE CODE (RG)

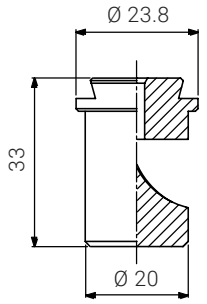
EB	EC	ED	EE	EF	EH	EK	EM	EP
1/4"	3/8"	2,66	3/4"	4,49	1-1/2"	2"	3"	4"

K LARGE





KX



KY

FLAT FAN NOZZLES, LARGE SPRAY ANGLE

K flat fan nozzles work on the deflection principle conveying a water vein onto a machined deflection surface, and produce a jet with a wide angle flat spray pattern, medium impact value and medium size droplets. Between their inlet orifice and spray orientation there is a 75° angle.
Their round outlet orifice and free inside passage minimize the risk of clogging. In addition, compared to standard flat fan nozzles working with a limited operating pressure, the K series models with large spray angles produce an excellent mist effect.
These K nozzles are available with threaded connections, for capacities from 0390 and 3350, and also as tips to be assembled onto a nipple by means of a retaining nut. Alternative options are KX types, and KY types.

MATERIAL

AISI 303 Stainless Steel
AISI 316L Stainless Steel
Brass

THREAD SPECIFICATION

BSPT, NPT
Nipple / Plastic pipe clamp + Locknut
From 1/8" to 1"

HOW TO ORDER THE PRODUCT

NOZZLE TYPE — **K G W 0390 xx Sx**

CONNECTION
G - 1/8" **J** - 1/2 **X** - Ø14.7
H - 1/4" **K** - 3/4"
I - 3/8" **L** - 1"

CAPACITY

SPRAY NOZZLE
W - 120°

MATERIAL
B1 - AISI 303 s.s.
B31 - AISI 316L s.s.
T1 - Brass

CONNECTION
SB - BSPT
SN - NPT

NOZZLE TYPE — **K X W 0390 xx Sx**

CONNECTION
X - No conn.
Y - Dove-tail conn.

CAPACITY

SPRAY NOZZLE
W - 120°

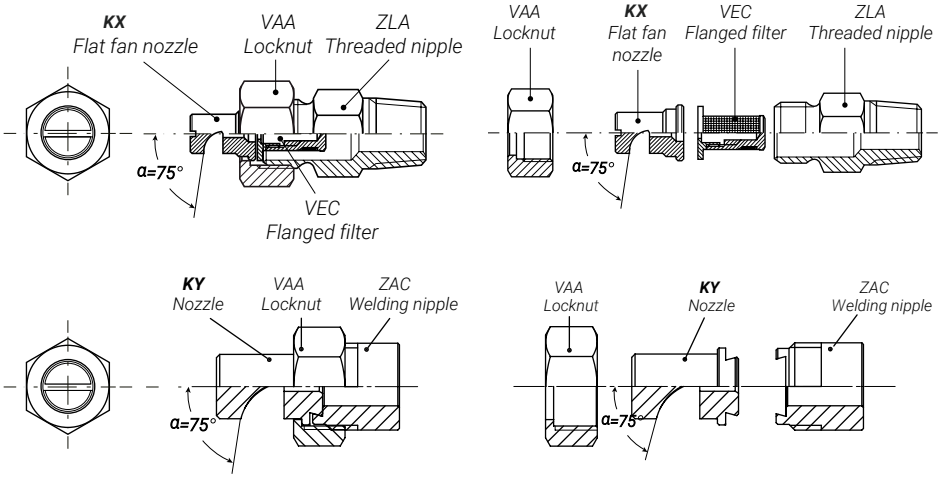
MATERIAL
B1 - AISI 303 s.s.
B31 - AISI 316L s.s.
T1 - Brass

OFFSET (only for KY)
SO - 0°
SA - 5°
SB - 10°

ASSEMBLY FITTINGS

KX series are assembled with pipe clamps/welding nipple/threaded nipple and locknut.
KY series are assembled with welding nipple/threaded nipple and locknut.

ZAA/ZAB	VEC / VED (optional)	**KX**	VAA
ZLA	VEC / VED (optional)	**KX**	VAA
ZPB	VEC / VED (optional)	**KX**	VAA



K LARGE

THREAD SIZE AND DIMENSIONS

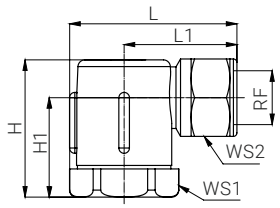
CODE	RG	H	H1	WS
	inch	mm	mm	mm
KGW	1/8"	24,0 (from 0390 to 1120)	8,5	12
		25,0 (from 1160 to 1940)	9	
		31,0 (from 2117 to 2157)	10	14
KHW	1/4"	31,0 (from 1160 to 1940)	12,5	14
		34,0 (from 2117 to 2210)		
KIW	3/8"	44,0 (all codes)	13	17
KJW	1/2"	49,0 (all codes)	17	22
KKW	3/4"	56,0 (from 2700 to 2940)	20	27
		65,0 (from 3110 to 3164)		36
KLW	1"	92,0 (all codes)	26	46

ASSEMBLY FITTINGS

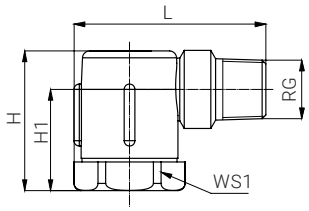
PRODUCT	MATERIAL CODE	3/8" Standard size	3/4" Large size
Locknut	B1 - AISI 303 B31 - AISI 316L T1 - Brass D6 - Fiberglass reinforced PP	VAA 0380 xxB	VAA 0750 xxB
Welding nipple	B1 - AISI 303 B31 - AISI 316L	ZAA C0xx xxG (KX)	ZAA E0xx xxG (KX) ZAC E0xx xx (KY)
Threaded nipple	B1 - AISI 303 B31 - AISI 316L T1 - Brass	ZLA 38xx xxB (KX)	ZLA 75xx xxB (KX) ZLP 75xx xx (KY)
Metal pipe clamp	B1 - AISI 303 T1 - Brass	ZPM (KX)	-
Plastic pipe clamp	D6 - Fiberglass reinforced PP	ZPB 0050 D6 (KX)	-

KGW	KHW	KIW	KJW	KKW	KLW	KXW	KYW	CODE	D	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							SPRAY ANGLE (degrees) AT PRESSURE (bar)	
									mm	0,5	1	2	3	4	5	7	1,5	4
•						•	•	**390**	0,6	0,16	0,23	0,32	0,39	0,45	0,5	0,6	90	120
•						•	•	**590**	0,7	0,24	0,34	0,48	0,59	0,68	0,76	0,9	105	120
•						•	•	**780**	0,8	0,32	0,45	0,64	0,78	0,9	1,01	1,19	110	125
•						•	•	**1120**	1	0,49	0,69	0,98	1,2	1,39	1,55	1,83	105	122
•	•					•	•	**1160**	1,1	0,65	0,92	1,31	1,6	1,85	2,07	2,44	110	130
•	•					•	•	**1200**	1,3	0,82	1,15	1,63	2	2,31	2,58	3,06	120	130
•	•					•	•	**1230**	1,4	0,94	1,33	1,88	2,3	2,66	2,97	3,51	110	125
•	•					•	•	**1310**	1,6	1,27	1,79	2,53	3,1	3,58	4	4,74	120	130
•	•					•	•	**1390**	1,8	1,59	2,25	3,18	3,9	4,5	5,03	5,96	130	140
•	•					•	•	**1590**	2,3	2,41	3,41	4,82	5,9	6,81	7,62	9,01	120	130
•	•					•	•	**1780**	2,6	3,18	4,5	6,37	7,8	9,01	10,1	11,9	130	140
•	•					•	•	**1940**	2,9	3,84	5,43	7,68	9,4	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	120	130
	•					•	•	**2172**	4	7,02	9,93	14	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	24,2	27,1	32,1	135	145
		•				•	•	**2230**	4,5	9,39	13,3	18,8	23	26,6	29,7	35,1	110	120
		•				•	•	**2270**	5	11	15,6	22	27	31,2	34,9	41,2	115	125
		•	•			•	•	**2310**	5,3	12,7	17,9	25,3	31	35,8	40	47,4	125	135
		•	•					**2350**	5,6	14,3	20,2	28,6	35	40,4	45,2	53,5	130	140
			•					**2390**	6	15,9	22,5	31,8	39	45	50,3	59,6	130	140
			•					**2470**	6,5	19,2	27,1	38,4	47	54,3	60,7	71,8	135	140
			•					**2550**	7,1	22,5	31,8	44,9	55	63,5	71	84	135	145
			•					**2630**	7,5	25,7	36,4	51,4	63	72,7	81,3	96,2	140	150
				•				**2700**	8	28,6	40,4	57,2	70	80,8	90,4	107	140	150
				•				**2780**	8,4	31,8	45	63,7	78	90,1	101	119	135	145
				•				**2860**	8,7	35,1	49,7	70,2	86	99,3	111	131	135	145
				•				**2940**	9,3	38,4	54,3	76,8	94	109	121	144	140	150
				•				**3110**	10,3	44,9	63,5	89,8	110	127	142	168	125	135
				•				**3125**	11	51	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	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	145	145

PN / PO



PN - Female



PO - Male

HOLLOW CONE, MOULDED PLASTIC NOZZLES

PN/PO hollow cone nozzle are made by plastic moulding, offer a high chemical resistance and low prices. They are tangential nozzles and produce a hollow cone spray of atomized droplets.
They have a significant free passage and no swirling vane inside their body, so they are highly clog-resistant.
PN/PO hollow cone nozzle is efficient, cost-effective and widely used in many processing lines. Moreover, they can be easily assembled in large quantities onto pipe manifolds.

MATERIAL

Polypropylene + 30% fiberglass

THREAD SPECIFICATION

PO: Male BSPT, NPT
PN: Female BSP, NPT
3/8”

HOW TO ORDER THE PRODUCT

SPRAY ANGLE
Q - 60° **S** - 70° **T** - 80°
U - 90° **Y** - 130°

MATERIAL
D6 - PP chemicallybonded fiberglass

NOZZLE TYPE
PN - Female
PO - Male

Px S 1170 xx y z

CONNECTION
B - BSPT
G - BSP
N - NPT

CAPACITY

VERSION
S - Standard

CODE	CONNECTION TYPE	L	L1	H	H1	WS1	WS2
		mm	mm	mm	mm		
PN	F 3/8"	47,5	32	37,5	26,8	28	22
PO	M 3/8"	53,5	38	37,5	26,8	28	–

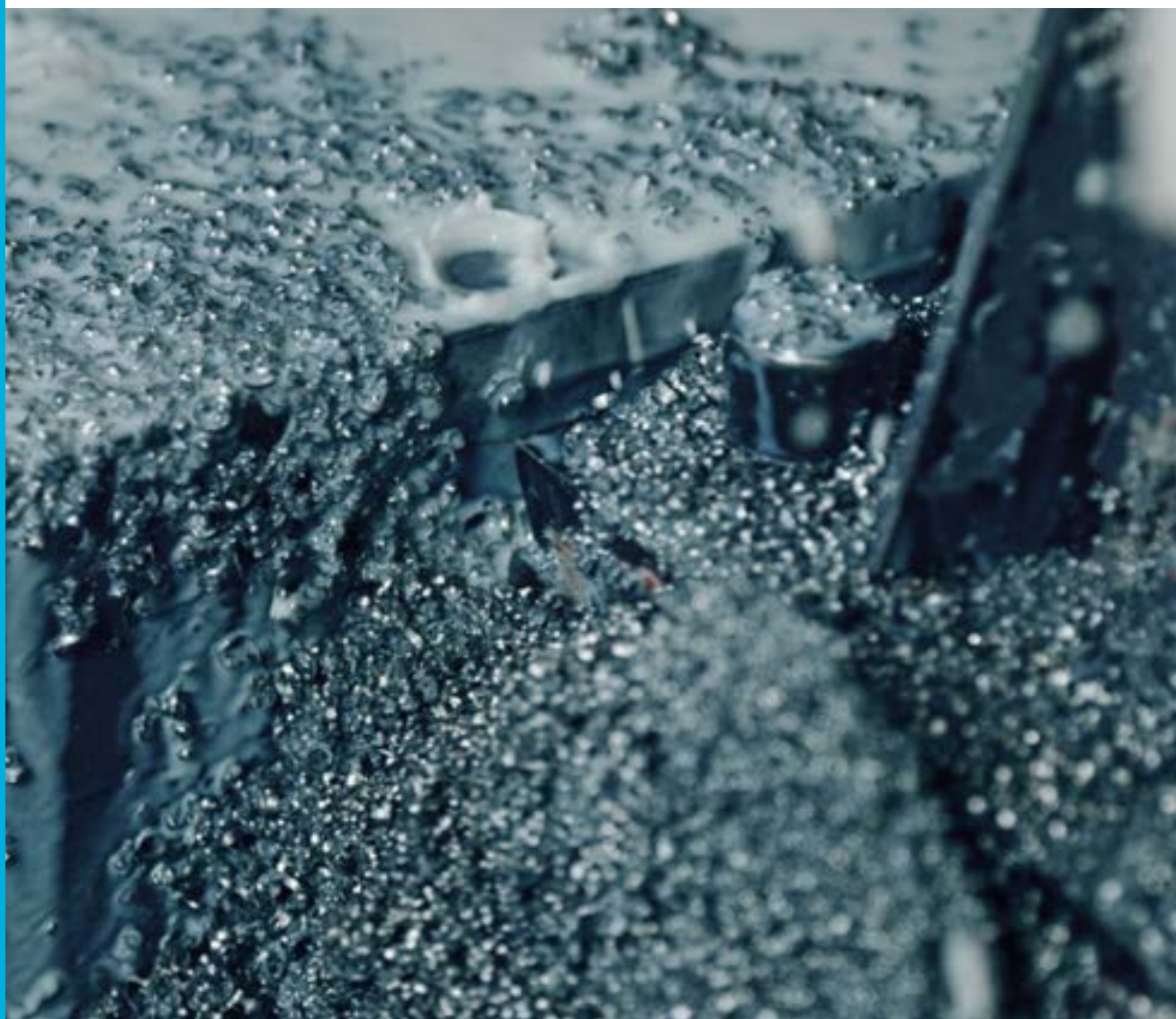
PNx Female	POx Male	CODE	RF RG	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							
			inch	0,5	0,7	1	2	3	5	7	10
•	•	**1170**	3/8"	0,69	0,82	0,98	1,39	1,7	2,19	2,6	3,1
•	•	**1390**		1,59	1,88	2,25	3,18	3,9	5,03	5,96	7,12
•	•	**1460**		1,88	2,22	2,66	3,76	4,6	5,94	7,03	8,4
•	•	**1570**		2,33	2,75	3,29	4,65	5,7	7,36	8,71	10,4
•	•	**1670**		2,74	3,24	3,87	5,47	6,7	8,65	10,2	12,2
•	•	**1850**		3,47	4,11	4,91	6,94	8,5	11	13	15,5
•	•	**1980**		4	4,73	5,66	8	9,8	12,7	15	17,9
•	•	**2115**		4,69	5,56	6,64	9,39	11,5	14,8	17,6	21
•	•	**2128**		5,23	6,18	7,39	10,5	12,8	16,5	19,6	23,4
•	•	**2208**		8,49	10	12	17	20,8	26,9	31,8	38
•	•	**2220**		8,98	10,6	12,7	18	22	28,4	33,6	40,2
•	•	**2319**		13,1	15,5	18,5	26,1	32	41,3	48,9	58,4

COKE SUPPRESSION / COOLING

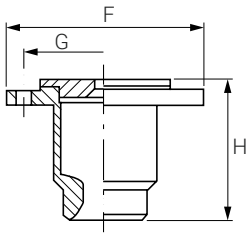
The coke produced in coke ovens must be rapidly quenched before being handled and stored.
This operation — commonly called *"quenching"* — involves direct water injection onto the incandescent material and requires nozzles capable of handling high flow rates under high thermal stress, including steam, radiant heat, and possible pressure peaks.

The main critical issue is ensuring uniform cooling across the entire coke mass, avoiding uncooled zones that can cause re-ignition while simultaneously limiting excess water that compromises product quality.

For this application, PNR Italia proposes **AE and BE series full-cone nozzles** and **PR series hollow-cone nozzles**, available in the most corrosion- and high-temperature-resistant materials.



AE



FULL CONE NOZZLES, SLOTTED VANE

AE full cone nozzle is designed to deliver large and very large capacity values from 384 l/min to 3842 l/min at 0.5 bar.
The carefully designed slotted vane offers uniform spray distribution and perfect performance even with very low inlet pressure values.
Compared to other large nozzles, the upper flange reduces the length of nozzles and offers fast and safe ways to install.

MATERIAL

Carbon steel
AISI 316L Stainless Steel

FLANGE SPECIFICATION

UNI EN/ASA Standard
JIS Standard (optional)

HOW TO ORDER THE PRODUCT

NOZZLE TYPE — **AE U 3940 xx W E** — **FLANGE STANDARD**
E - UNI EN
F - ASA

SPRAY ANGLE
U - 90° **W** - 120°

MATERIAL
A1 - Carbon steel
B31 - AISI 3161 Stainless Steel

CAPACITY

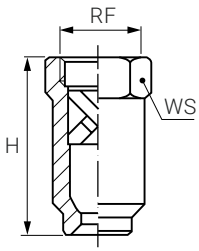
VARIANT
W - PN 10 / ANSI 150
V - PN 16 / ANSI 300

	CODE	DN	D	D1	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							
		mm	mm	mm	0,25	0,35	0,5	0,7	1	2	3	5
90°	**AEU 3940 xx**	80/3"	37	12	271	321	384	454	543	768	940	1214
	AEU 4118 xx		39	14	341	403	482	570	681	963	1180	1523
	AEU 4147 xx	100/4"	43	13	424	502	600	710	849	1200	1470	1898
	AEU 4188 xx	125/5"	53	16	543	642	768	908	1085	1535	1880	2427
	AEU 4235 xx		56	16	678	803	959	1135	1357	1919	2350	3034
	AEU 4294 xx	150/6"	59	21	859	1004	1200	1420	1697	2400	2940	3796
	AEU 4370 xx		66	24	1068	1264	1511	1787	2136	3021	3700	4777
	AEU 4470 xx	200/8"	72	28	1357	1605	1919	2270	2714	3838	4700	6068
	AEU 4588 xx		81	32	1697	2008	2400	2840	3395	4801	5880	7591
	AEU 4741 xx	250/10"	88	39	2139	2531	3025	3579	4278	6050	7410	9566
	AEU 4941 xx		99	37	2716	3214	3842	4545	5433	7683	9410	12148
120°	**AEW 3940 xx**	80/3"	36	15	271	321	384	454	543	768	940	1214
	AEW 4118 xx		40,5	14,5	341	403	482	570	681	963	1180	1523
	AEW 4147 xx	100/4"	43	18,5	424	502	600	710	849	1200	1470	1898
	AEW 4188 xx	125/5"	53	22	543	642	768	908	1085	1535	1880	2427
	AEW 4235 xx		55	24	678	803	959	1135	1357	1919	2350	3034
	AEW 4294 xx	150/6"	59	28	859	1004	1200	1420	1697	2400	2940	3796
	AEW 4370 xx		66	32	1068	1264	1511	1787	2136	3021	3700	4777
	AEW 4470 xx	200/8"	75	35	1357	1605	1919	2270	2714	3838	4700	6068
	AEW 4588 xx		81	40	1697	2008	2400	2840	3395	4801	5880	7591
	AEW 4741 xx	250/10"	86	37	2139	2531	3025	3579	4278	6050	7410	9566
	AEW 4941 xx		96	42	2716	3214	3842	4545	5433	7683	9410	12148

AE

	CODE	DN	D	D1	UNI EN Standard						ASA Standard					
					PN 10			PN 16			ANSI 150			ANSI 300		
					F	G	H	F	G	H	F	G	H	F	G	H
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
90°	**AEU 3940 xx**	80/3"	37	12	200	160	140	200	160	140	190,5	152,4	140	209,5	168,3	140
	AEU 4118 xx		39	14												
	AEU 4147 xx	100/4"	43	13	220	180	160	220	180	160	228,6	190,5	160	254	200	160
	AEU 4188 xx	125/5"	53	16	250	210	180	250	210	180	254	215,9	180	279,4	234,9	180
	AEU 4235 xx		56	16												
	AEU 4294 xx	150/6"	59	21	285	240	190	285	240	190	279,4	241,3	190	317,5	269,9	190
	AEU 4370 xx		66	24												
	AEU 4470 xx	200/8"	72	28	340	295	250	340	295	250	342,9	298,4	250	381	330,2	250
	AEU 4588 xx		81	32												
	AEU 4741 xx	250/10"	88	39	395	350	290	395	350	290	406,4	361,9	290	444,5	387,3	290
	AEU 4941 xx		99	37												
120°	**AEW 3940 xx**	80/3"	36	15	200	160	140	200	160	140	190,5	152,4	140	209,5	168,3	140
	AEW 4118 xx		40,5	14,5												
	AEW 4147 xx	100/4"	43	18,5	220	180	156	220	180	156	228,6	190,5	160	254	200	160
	AEW 4188 xx	125/5"	53	22	250	210	177	250	210	177	254	215,9	180	279,4	234,9	180
	AEW 4235 xx		55	24												
	AEW 4294 xx	150/6"	59	28	285	240	188	285	240	188	279,4	241,3	190	317,5	269,9	190
	AEW 4370 xx		66	32												
	AEW 4470 xx	200/8"	75	35	340	295	250	340	295	250	342,9	298,4	250	381	330,2	250
	AEW 4588 xx		81	40												
	AEW 4741 xx	250/10"	86	37	395	350	291	395	350	291	406,4	361,9	290	444,5	387,3	290
	AEW 4941 xx		96	42												

BE



X-VANE, LARGE CAPACITIES

BE series large capacity nozzles feature a full cone spray pattern with uniform distribution over a round impact area of 90° and for applications where a very large capacity is required.
The bodies are machined from a casting, and can be finished either with a female thread connection.

MATERIAL

AISI 316L Stainless Steel
Cast iron

THREAD SPECIFICATION

Female BSP, NPT
from 4" to 10"

HOW TO ORDER THE PRODUCT

NOZZLE TYPE — **BE** **U** **4139** **xx** **Sx** — **CONNECTION**

SPRAY ANGLE
U - 90°

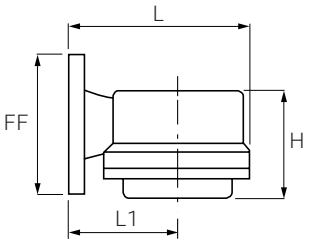
MATERIAL
B31 - AISI 316L Stainless Steel
G1 - Cast iron

CAPACITY

CONNECTION
SG - BSPP
SB - BSPT
SN - NPT

	CODE	RF	D	D1	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							H	WS
		inch	mm	mm	0,7	1	2	3	5	7	10	mm	mm
90°	**BEU 4139 xx**	4"	43	19	671	803	1135	1390	1794	2123	2538	251	130
	BEU 4157 xx		47	22	758	906	1282	1570	2027	2398	2866		
	BEU 4174 xx		51	25	840	1005	1421	1740	2246	2658	3177		
	BEU 4183 xx		54	25	884	1057	1494	1830	2363	2795	3341		
	BEU 4218 xx	5"	48	29	1053	1259	1780	2180	2814	3330	3980	311	170
	BEU 4244 xx		53	29	1179	1409	1992	2440	3150	3727	4455		
	BEU 4279 xx		68	35	1348	1611	2278	2790	3602	4262	5094		
	BEU 4287 xx		73	35	1386	1657	2343	2870	3705	4384	5240		
	BEU 4305 xx	6"	61	41	1473	1761	2490	3050	3938	4659	5569	366	200
	BEU 4348 xx		70	41	1681	2009	2841	3480	4493	5316	6354		
	BEU 4392 xx		77	44	1894	2263	3201	3920	5061	5988	7157		
	BEU 4418 xx		82	44	2019	2413	3413	4180	5396	6385	7632		
	BEU 4435 xx	8"	70	48	2101	2511	3552	4350	5616	6645	7942	470	240
	BEU 4520 xx		80	47	2512	3002	4246	5200	6713	7943	9494		
	BEU 4610 xx		91	47	2947	3522	4981	6100	7875	9318	11137		
	BEU 4694 xx		102	57	3352	4007	5666	6940	8960	10601	12671		
	BEU 4785 xx		124	57	3792	4532	6409	7850	10134	11991	14332		

PR



TANGENTIAL NOZZLE, LARGE FLOW RATE

PR hollow cone nozzle produces a hollow cone spray pattern based on the tangential jet principle, generating atomized flows with significant flow rates. They have a vaneless and significant free inside passage and offer considerable resistance to clogging and high performances.

MATERIAL

AISI 316L Stainless Steel
Mild steel

FLANGE SPECIFICATION

DIN 2633-ND 16, JIS
from 3" to 4"

HOW TO ORDER THE PRODUCT

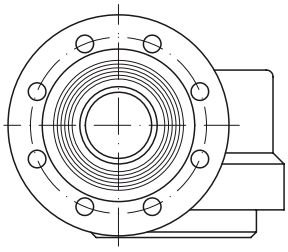
NOZZLE TYPE — **PR** **Y** **3612** **xx** **zz**

SPRAY ANGLE
Y - 130°

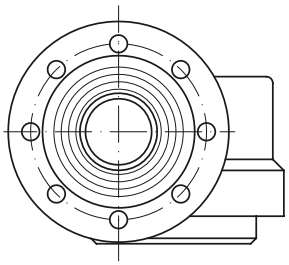
MATERIAL
B31 - AISI 316L Stainless Steel
A1 - Mild steel

CAPACITY

CONNECTION
S - standard flange assembly
X - special flange assembly
E - EN (UNI) flange (PN16) DIN 2639
F - ANSI flange B16.5 150lb



S MODEL



X MODEL

	CODE	CONNECTION	DE	DU	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)					FF	H	L	L1
			mm	mm	0,5	1	2	3	5	mm	mm	mm	mm
130°	**PRY 3612 xx**	DN 80 inch 3"	31	90	250	353	500	612	790	200	157	260	160
	PRY 3685 xx		34	90	280	395	559	685	884				
	PRY 3771 xx		36,5	90	315	445	630	771	995				
	PRY 3869 xx		39,5	90	355	502	710	869	1122				
	PRY 3979 xx		40	90	400	565	799	979	1264				
	PRY 4110 xx		43	90	449	635	898	1100	1420				
	PRY 4122 xx		50	90	498	704	996	1220	1575				
	PRY 4153 xx		57	90	625	883	1249	1530	1975				
	PRY 4195 xx	DN 100 inch 4"	60	145	796	1126	1592	1950	2517	220	250	367,5	215
	PRY 4244 xx		70	145	996	1409	1992	2440	3150				
	PRY 4306 xx		79	145	1249	1767	2498	3060	3950				
	PRY 4385 xx		87	145	1572	2223	3144	3850	4970				

CONTINUOUS CASTING COOLING (WATER)

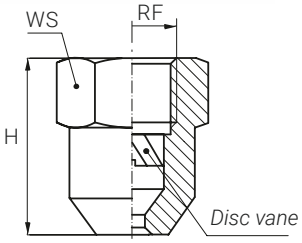
Cooling in continuous casting is one of the most critical applications in the entire steel mill. After primary solidification in the mold, the semi-finished product — *billets, blooms, or slabs* — is extracted while still partially liquid and must be cooled with extreme precision along the entire guiding line.

Insufficient or non-uniform cooling can lead to internal defects, such as cracks and deformations. Excessive cooling can generate surface stresses and increase the risk of breakage.

Spraying parameters vary continuously along the path, depending on casting speed, the semi-finished product format, and steel grade.

For water cooling, PNR Italia offers full-cone nozzles from the **AH, BA/BC, BH, BX, D, D Plus, D..OB, and D..PB series**, designed to ensure uniform distribution and well-characterized flow/pressure curves. Where operational variability requires greater flexibility in adjustment, the use of air/water atomizers described in the following section is recommended.

AH



FULL CONE NOZZLES, IN-LINE, DISC VANE

AH full cone nozzle is made of a body and a disc vane and provides a very uniform spray distribution onto the entire coverage area. AH nozzles have been widely used in continuous casting plants for many years. The special design of their vane produces a fine atomization of the liquid and highly improves its distribution.
Its innovative vane is crafted with high precision. The smooth surface reduces pressure losses and prevents turbulence. Its stabilizer acts as a hydrodynamic brake on the fluid rotating at high speed inside the chamber.

MATERIAL

AISI 303 Stainless Steel
Brass
AISI 316L Stainless Steel (on request)

THREAD SPECIFICATION

BSP, NPT

DISC VANE

The AH vane is machined with high precision; its smooth surface reduces pressure loss and avoids turbolence. Its stabilizer acts as a hydrodynamic brake on the fluid, rotating at high speed inside the whirl chamber.

HOW TO ORDER THE PRODUCT

NOZZLE TYPE — **AH** **R** **1309** **xx** **y** **z**

SPRAY ANGLE
R - 65°
T - 80°

MATERIAL
B1 - AISI 303 Stainless Steel
T1 - Brass **B31** - AISI 316L Stainless Steel (on request)

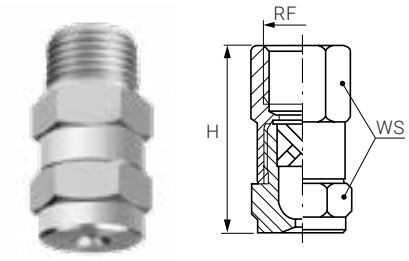
VERSION
G - BSPP
N - NPT

CAPACITY

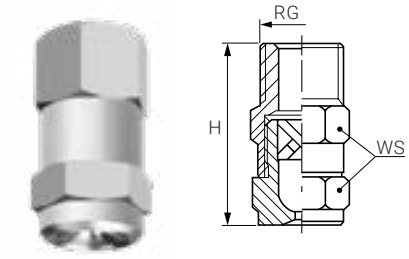
CONSTRUCTION
S - Standard
C - H=26,5 mm **A** - Safety ring

	CODE	RF	D	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)					H	WS
		inch	mm	1	2	3	4	5	mm	mm
65°	**AHR 1309 xx**	1/4"	1,9	1,78	2,52	3,09	3,57	3,99	27,5	19
	AHR 1362 xx		2	2,09	2,96	3,62	4,18	4,67		
	AHR 1409 xx		2,2	2,36	3,34	4,09	4,72	5,28		
	AHR 1517 xx		2,6	2,98	4,22	5,17	5,97	6,67		
	AHR 1207 xx	3/8"	1	1,2	1,69	2,07	2,39	2,67	25	22
	AHR 1258 xx		1	1,49	2,11	2,58	2,98	3,33		
	AHR 1310 xx		1,9	1,79	2,53	3,1	3,58	4		
	AHR 1340 xx		2	1,96	2,78	3,4	3,93	4,39		
	AHR 1363 xx		2,1	2,1	2,96	3,63	4,19	4,69		
	AHR 1415 xx		2,2	2,4	3,39	4,15	4,79	5,36		
	AHR 1470 xx		2,5	2,71	3,84	4,7	5,43	6,07		
	AHR 1518 xx		2,6	2,99	4,23	5,18	5,98	6,69		
	AHR 1621 xx		2,7	3,59	5,07	6,21	7,17	8,02		
	AHR 1780 xx		2,9	4,5	6,37	7,8	9,01	10,1		
	AHR 1828 xx		3,1	4,78	6,76	8,28	9,56	10,7		
	AHR 1873 xx		3,3	5,04	7,13	8,73	10,1	11,3		
	AHR 2110 xx	1/2"	4,2	6,35	8,98	11	12,7	14,2	36	27
	AHR 2144 xx		4,2	8,31	11,8	14,4	16,6	18,6		
	AHR 2154 xx		5	8,89	12,6	15,4	17,8	19,9		
80°	**AHT 1309 xx**	1/4"	2,2	1,78	2,52	3,09	3,57	3,99	27,5	19
	AHT 1362 xx		2,2	2,09	2,96	3,62	4,18	4,67		
	AHT 1409 xx		2,2	2,36	3,34	4,09	4,72	5,28		
	AHT 1517 xx		2,6	2,98	4,22	5,17	5,97	6,67		
	AHT 1258 xx	3/8"	2	1,49	2,11	2,58	2,98	3,33	25	22
	AHT 1310 xx		2	1,79	2,53	3,1	3,58	4		
	AHT 1340 xx		2	1,96	2,78	3,4	3,93	4,39		
	AHT 1363 xx		2,1	2,1	2,96	3,63	4,19	4,69		
	AHT 1415 xx		2,2	2,4	3,39	4,15	4,79	5,36		
	AHT 1518 xx		2,6	2,99	4,23	5,18	5,98	6,69		
	AHT 1621 xx		2,7	3,59	5,07	6,21	7,17	8,02		
	AHT 1780 xx		2,9	4,5	6,37	7,8	9,01	10,1		
	AHT 1828 xx		3,1	4,78	6,76	8,28	9,56	10,7		
	AHT 1873 xx		3,1	5,04	7,13	8,73	10,1	11,3		
	AHT 2110 xx	1/2"	4,2	6,35	8,98	11	12,7	14,2	36	27
	AHT 2144 xx		4,2	8,31	11,8	14,4	16,6	18,6		

BA / BC



BA - Female



BC - Male

X-VANE, ROUND SPRAY, THREE PIECES DESIGN, EASY CLEAN

BA BC full cone nozzles have a three-piece design made of body, X-vane and nipple. Their X-vane design combines resistance to clogging with the convenience of an easy and fast inside cleaning as they can be easily disassembled for maintenance. When these nozzles are mounted to spray upwards, the design of the nipple avoids loosing the vane.
BA BC full cone nozzles are available with a female (BA) or male (BC) inlet thread nipple.

MATERIAL

AISI 303 Stainless Steel
AISI 316L Stainless Steel
Brass
PTFE
Hastelloy C22

THREAD SPECIFICATION

BA: Female BSP, NPT
BC: Male BSPT, NPT

HOW TO ORDER THE PRODUCT

MATERIAL
B1 - AISI 303 Stainless Steel
B31 - AISI 316L Stainless Steel
T1 - Brass
E1 - PTFE
L61 - Hastelloy C22

SPRAY ANGLE
Q - 60° **W** - 120°

NOZZLE TYPE — **BA** **Q** **0740** **xx** **Sx** — **CONNECTION**
SG - BSPP
SB - BSPT
SN - NPT

CAPACITY

STANDARD SPRAY

BAQ Female	BCQ Male	CODE	RF RG	D	D1	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)						
			inch	mm	mm	0,7	1	2	3	5	7	10
•	•	**740**	1/8"	1	0,5	0,36	0,43	0,6	0,74	0,93	1,13	1,35
•	•	**1110**		1,2	0,5	0,53	0,64	0,9	1,1	1,42	1,68	2,01
•	•	**1150**		1,4	1	0,72	0,87	1,22	1,5	1,94	2,29	2,74
•	•	**1220**		1,6	1	1,06	1,27	1,8	2,2	2,84	3,36	4,02
•	•	**1260**		1,6	1,3	1,26	1,5	2,12	2,6	3,36	3,97	4,75
•	•	**1370**		2	1,3	1,79	2,14	3,02	3,7	4,78	5,7	6,76
•	•	**1480**	1/4"	2,4	1,7	2,32	2,77	3,92	4,8	6,2	7,3	8,76
•	•	**1740**		2,9	1,7	3,57	4,27	6,04	7,4	9,6	11,3	13,5
•	•	**1930**		3,2	1,7	4,49	5,37	7,59	9,3	12	14,2	17
•	•	**1700**	3/8"	3	2	3,38	4,04	5,71	7	9,03	10,7	12,7
•	•	**2111**		3,4	2,4	5,36	6,4	9,1	11,1	14,3	17	20,3
•	•	**2163**		4,5	2,4	7,87	9,4	13,3	16,3	21	24,9	29,8
•	•	**2118**	1/2"	3,4	3	5,7	6,8	9,6	11,8	15,2	18	21,5
•	•	**2185**		4,4	3	8,94	10,7	15,1	18,5	23,9	28,3	33,8
•	•	**2240**		5	3	11,6	13,9	19,6	24	31	36,7	43,8
•	•	**2300**		5,6	3	14,5	17,3	24,5	30	38,7	45,8	54,8

BA / BC

WIDE SPRAY

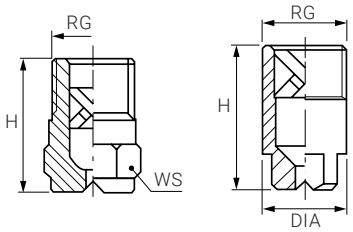
BAW Female	BCW Male	CODE	RF RG	D	D1	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)						
			inch	mm	mm	0,7	1	2	3	5	7	10
•	•	**1200**	1/8"	1,5	1	0,97	1,15	1,63	2	2,58	3,06	3,65
•	•	**1310**		1,8	1	1,5	1,79	2,53	3,1	4	4,74	5,66
•	•	**1400**		2,3	1	1,93	2,31	3,27	4	5,16	6,11	7,3
•	•	**1570**		2,5	1,1	2,75	3,29	4,65	5,7	7,36	8,71	10,4
•	•	**1720**	1/4"	3,3	1,7	3,48	4,16	5,88	7,2	9,3	11	13,1
•	•	**1860**		3,4	1,3	4,15	4,97	7,02	8,6	11,1	13,1	15,7
•	•	**2100**		3,6	1,6	4,83	5,77	8,16	10	12,9	15,3	18,3
•	•	**2122**	3/8"	3,9	1,6	5,89	7,04	9,96	12,2	15,8	18,6	22,3
•	•	**2144**		4,3	2,4	6,96	8,3	11,8	14,4	18,6	22	26,3
•	•	**2172**		4,9	2,4	8,31	9,9	14	17,2	22,2	26,3	31,4
•	•	**2194**		5,3	2,5	9,37	11,2	15,8	19,4	25	29,6	35,4
•	•	**2220**	1/2"	5	3	10,6	12,7	18	22	28,4	33,6	40,2
•	•	**2250**		5,3	3	12,1	14,4	20,4	25	32,3	38,2	45,6
•	•	**2290**		5,6	3	14	16,7	23,7	29	37,4	44,3	52,9
•	•	**2320**		6,7	3,5	15,5	18,5	26,1	32	41,3	48,9	58,4
•	•	**2360**		7,6	4	17,4	20,8	29,4	36	46,5	55	65,7

DIMENSIONS

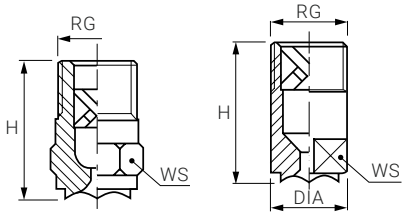
NOZZLE TYPE	RF	H	WS
	inch	mm	mm
BA	1/8"	30	14
	1/4"	39	17
	3/8"	40,5	22
	1/2"	48	24

NOZZLE TYPE	RG	H	WS
	inch	mm	mm
BC	1/8"	31,5	14
	1/4"	39	17
	3/8"	40,5	22
	1/2"	48	24

BH



STANDARD SPRAY ANGLE



WIDE SPRAY ANGLE

X-VANE, SQUARE SPRAY PATTERN, TWO-PIECE DESIGN

BH full cone nozzle has a simple two-piece design producing a square section spray pattern. Depending on their size, they are made from rods or castings. They are the convenient choice where the coverage of a surface is required to be as even as possible. Their X-vane ensures uniform spray distribution and resistance to clogging, also when working with large capacities.
The sides of the square spray section are not aligned with the grooves of the nozzle orifice and the offset angle is between 10° and 15° depending on working pressure and distance from the impact surface. Therefore, utmost attention must be paid during the nozzles overlay setting. They must be carefully aligned and adjusted according to the operating situation.

MATERIAL

AISI 303 Stainless Steel
AISI 316L Stainless Steel
Brass

THREAD SPECIFICATION

Male BSP, NPT

HOW TO ORDER THE PRODUCT

NOZZLE TYPE — **BH** **Q** **1270** **xx** **Sx**

SPRAY ANGLE
Q - 60° **W** - 120°

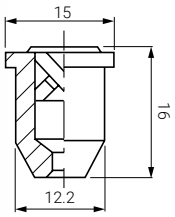
CAPACITY

MATERIAL
B1 - AISI 303 Stainless Steel
B31 - AISI 316L Stainless Steel
T1 - Brass

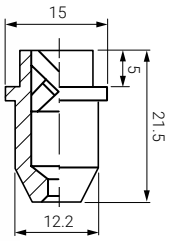
CONNECTION
SG - BSPP
SB - BSPT
SN - NPT

CODE	RF RG	D	D1	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							H	WS	DIA
	inch	mm	mm	0,7	1	2	3	5	7	10	mm	mm	mm
BHQ 1270		1,7	1,3	1,3	1,56	2,2	2,7	3,49	4,12	4,93			
BHQ 1350	1/8"	1,9	1,3	1,74	2,08	2,94	3,6	4,65	5,5	6,57	22	12	
BHQ 1440		2,2	1,3	2,13	2,54	3,59	4,4	5,68	6,72	8,03			
BHQ 1740		2,8	1,6	3,57	4,27	6,04	7,4	9,55	11,3	13,5			
BHQ 1890	1/4"	3,2	1,6	4,3	5,14	7,27	8,9	11,5	14	16,2	23	14	
BHQ 2107		3,8	1,6	5,17	6,18	8,74	10,7	13,8	16,3	19,5			
BHQ 2133	3/8"	4	2,4	6,42	7,68	10,9	13,3	17,2	20,3	24,3	30	17	
BHQ 2210	1/2"	5,5	3,2	10,1	12,1	17,2	21	27,1	32,1	38,3	39	21	
BHQ 2270		6,4	3,2	13	15,6	22	27	34,8	41,2	49,2			
BHQ 2370	3/4"	6,7	4,4	17,8	22	31	37	47,8	56,5	67,5	55	27	32
BHW 2100	1/4"	3,2	1,6	4,83	5,77	8,16	10	12,9	15,3	18,3	23	14	
BHW 2122		3,9	1,6	5,89	7,04	9,96	12,2	15,8	18,6	22,3			
BHW 2144	3/8"	4	2,4	6,96	8,31	11,8	14,4	18,6	22	26,3	30	17	
BHW 2172		4,6	2,4	8,31	9,93	14	17,2	22,2	26,3	31,4			
BHW 2194		5,4	2,4	9,37	11,2	15,8	19,4	25	29,6	35,4			
BHW 2220		4,8	3	10,6	12,7	18	22	28,4	33,6	40,2			
BHW 2250		5,1	3	12,1	14,4	20,4	25	32,3	38,2	45,6			
BHW 2290	1/2"	5,7	3	14	16,7	23,7	29	37,4	44,3	53	39	21	
BHW 2320		7	3	15,4	18,5	26,1	32	41,3	48,9	58,4			
BHW 2360		8	3	17,4	20,8	29,4	36	46,5	55	65,7			
BHW 2500	3/4"	8,5	4,5	24,2	28,9	40,8	50	64,5	76,4	91,3	55	27	32
BHW 2930	1"	11,6	5,6	44,9	53,7	75,9	93	120	142	170	70	32	38

BX



BX 1149 | BX1372



BX 1508 | BX 1743

FULL CONE NOZZLE, NOZZLE TIPS

BX full cone nozzles produce a uniform full cone-shaped spray with a round impact area. Thanks to their design, they can be easily disassembled and cleaned in case of clogging. These nozzles have an X-vane safely secured inside their body up to 3/8" thread size.
As for the BX full cone nozzle, sister products with a 3/8" female thread are also available. In the steel industry, spraying nozzles fixed on water pipes can easily be damaged during the manufacturing process.

MATERIAL

AISI 303 Stainless Steel
Brass
AISI 316L Stainless Steel (on request)

THREAD SPECIFICATION

BSP, NPT

HOW TO ORDER THE PRODUCT

SPRAY ANGLE
Q - 60°

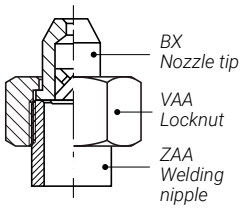
NOZZLE TYPE — **BX Q 1149 xx** — **MATERIAL**
B1 - AISI 303 Stainless Steel
T1 - Brass
B31 - AISI 316L Stainless Steel (on request)

CAPACITY

ASSEMBLY FITTINGS

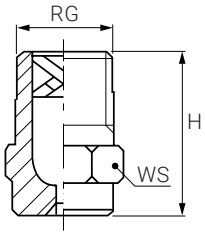
In most steelworks applications, BX series nozzles are provided with a welding nipple and locknut for the assembly of related accessories.

ZAA/ ZAB	VEC / VED (optional)	**BX**	VAA
ZLA	VEC / VED (optional)	**BX**	VAA
ZPB	VEC / VED (optional)	**BX**	VAA



	CODE	D	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)				
		mm	1	2	3	5	10
60°	**BXQ 1149 xx**	1,3	0,86	1,22	1,49	1,92	2,72
	BXQ 1223 xx	1,7	1,29	1,82	2,23	2,88	4,07
	BXQ 1262 xx	1,7	1,51	2,14	2,62	3,38	4,78
	BXQ 1372 xx	2,1	2,15	3,04	3,72	4,8	6,79
	BXQ 1508 xx	2,4	2,93	4,15	5,08	6,56	9,27
	BXQ 1626 xx	2,9	3,61	5,11	6,26	8,08	11,4
	BXQ 1743 xx	2,9	4,29	6,07	7,43	9,59	13,6

D



FULL CONE NOZZLES, X VANE, TWO-PIECE DESIGN

D full cone nozzle with wide passage X-vanes offers a full choice of spray angles, capacities ranging from 1.18 and 1.420 l/min and connections from 1/8" to 4". In continuous casting cooling and other specific applications, they spray upwards and operate at very high temperatures.
The X-vane is safely locked into place for all dimensions up to 3/8" to prevent it from escaping from the nozzle body in case of size changes due to temperature variations. It also allows the nozzle to be assembled with any desired orientation. Excellent mist effect and a wide variety of applications make D full cone nozzle an optimal choice.

MATERIAL

AISI 303 Stainless Steel
AISI 316L Stainless Steel
Brass
Other materials on request

THREAD SPECIFICATION

BSPT
NPT
from 1/8" to 1/2"

THREAD SIZE CODING TABLE

CODE	RG	H	WS
	inch	mm	mm
DA	1/8"	19	12
DB	1/4"	22	14
DC	3/8"	24,5	17
DD	1/2"	32,5	22

HOW TO ORDER THE PRODUCT

NOZZLE TYPE — **D A U 1118 xx Sx** — **CONNECTION** SB - BSPT, SN - NPT

SPRAY ANGLE (U): M - 45° U - 90° Q - 60° W - 120°

MATERIAL (xx): B1 - AISI 303 Stainless Steel, B31 - AISI 316L Stainless Steel, T1 - Brass

CONNECTION (A): A - 1/8" C - 3/8" B - 1/4" D - 1/2"

CAPACITY (1118)

STANDARD CAPACITY

	DAM	DBM	DCM	DDM	CODE	D	D1	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)						
						mm	mm	0,7	1	2	3	5	7	10
	•				**0740 xx**	1	0,5	0,36	0,43	0,6	0,74	0,96	1,13	1,35
	•	•			**1118 xx**	1,1	1	0,57	0,68	0,96	1,18	1,52	1,8	2,15
	•	•			**1147 xx**	1,2	1,1	0,71	0,85	1,2	1,47	1,9	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	1,7	2,4	2,94	3,8	4,49	5,37
	•	•	•		**1370 xx**	2	1,8	1,79	2,14	3,02	3,7	4,78	5,65	6,76
	•	•	•	•	**1470 xx**	2,1	2	2,27	2,71	3,84	4,7	6,07	7,18	8,58
45°	•	•	•	•	**1588 xx**	2,3	2	2,84	3,39	4,8	5,88	7,59	8,98	10,7
		•	•	•	**1659 xx**	2,5	2,2	3,18	3,8	5,38	6,59	8,51	10,1	12
			•	•	**1740 xx**	2,7	2,3	3,57	4,27	6,04	7,4	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	3	4,54	5,43	7,68	9,4	12,1	14,4	17,2
			•	•	**2105 xx**	3,2	3,2	5,07	6,06	8,57	10,5	13,6	16	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	7,1	8,49	12	14,7	19	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	4,5	11,4	13,6	19,2	23,5	30,3	35,9	42,9

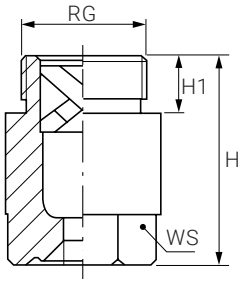
D

	DAQ	DBQ	DCQ	DDQ	CODE	D	D1	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)						
						mm	mm	0,7	1	2	3	5	7	10
60°	•				**0740 xx**	1	0,5	0,36	0,43	0,6	0,74	0,96	1,13	1,35
	•	•			**1118 xx**	1,2	0,8	0,57	0,68	0,96	1,18	1,52	1,8	2,15
	•	•			**1147 xx**	1,3	1	0,71	0,85	1,2	1,47	1,9	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	1,7	2,4	2,94	3,8	4,49	5,37
	•	•	•		**1370 xx**	2	1,4	1,79	2,14	3,02	3,7	4,78	5,65	6,76
	•	•	•		**1470 xx**	2,4	1,9	2,27	2,71	3,84	4,7	6,07	7,18	8,58
		•	•		**1588 xx**	2,6	2	2,84	3,39	4,8	5,88	7,59	8,98	10,7
		•	•		**1659 xx**	2,7	2	3,18	3,8	5,38	6,59	8,51	10,1	12
		•	•	•	**1740 xx**	2,9	2	3,57	4,27	6,04	7,4	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	9,4	12,1	14,4	17,2
		•	•	•	**2105 xx**	3,4	3	5,07	6,06	8,57	10,5	13,6	16	19,2
		•	•	•	**2117 xx**	3,6	3	5,65	6,75	9,55	11,7	15,1	17,9	21,4
			•	•	**2147 xx**	4	3,3	7,1	8,49	12	14,7	19	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	24	29,4	38	44,9	53,7

	DAU	DBU	DCU	DDU	CODE	D	D1	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)						
						mm	mm	0,7	1	2	3	5	7	10
90°	•				**0740 xx**	1	0,5	0,36	0,43	0,6	0,74	0,96	1,13	1,35
	•				**1118 xx**	1,2	0,8	0,57	0,68	0,96	1,18	1,52	1,8	2,15
	•	•			**1147 xx**	1,3	1	0,71	0,85	1,2	1,47	1,9	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	1,7	2,4	2,94	3,8	4,49	5,37
	•	•	•		**1370 xx**	2	1,4	1,79	2,14	3,02	3,7	4,78	5,65	6,76
		•	•		**1470 xx**	2,3	1,8	2,27	2,71	3,84	4,7	6,07	7,18	8,58
		•	•		**1588 xx**	2,6	1,8	2,84	3,39	4,8	5,88	7,59	8,98	10,7
		•	•		**1659 xx**	2,7	2	3,18	3,8	5,38	6,59	8,51	10,1	12
		•	•		**1740 xx**	2,9	2	3,57	4,27	6,04	7,4	9,55	11,3	13,5
		•	•		**1835 xx**	3,3	2	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	9,4	12,1	14,4	17,2
		•	•		**2105 xx**	3,5	2,6	5,07	6,06	8,57	10,5	13,6	16	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	3,2	7,1	8,49	12	14,7	19	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	24	29,4	38	44,9	53,7
				•	**2370 xx**	6,4	3,8	17,9	21,4	30,2	37	47,8	56,5	67,6

	DAW	DBW	DCW	DDW	CODE	D	D1	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)						
						mm	mm	0,7	1	2	3	5	7	10
120°	•				**0740 xx**	1	0,5	0,36	0,43	0,6	0,74	0,96	1,13	1,35
	•	•			**1118 xx**	1,2	0,8	0,57	0,68	0,96	1,18	1,52	1,8	2,15
	•	•			**1147 xx**	1,3	0,9	0,71	0,85	1,2	1,47	1,9	2,25	2,68
	•	•			**1188 xx**	1,5	1	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	1,7	2,4	2,94	3,8	4,49	5,37
	•	•			**1370 xx**	2,1	1,4	1,79	2,14	3,02	3,7	4,78	5,65	6,76
		•	•		**1470 xx**	2,4	1,6	2,27	2,71	3,84	4,7	6,07	7,18	8,58
		•	•		**1588 xx**	2,7	1,8	2,84	3,39	4,8	5,88	7,59	8,98	10,7
		•	•		**1659 xx**	3	1,8	3,18	3,8	5,38	6,59	8,51	10,1	12
		•	•		**1740 xx**	3,1	1,9	3,57	4,27	6,04	7,4	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	9,4	12,1	14,4	17,2
		•	•		**2105 xx**	3,7	2,3	5,07	6,06	8,57	10,5	13,6	16	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	7,1	8,49	12	14,7	19	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	24	29,4	38	44,9	53,7
				•	**2370 xx**	6,6	4,7	17,9	21,4	30,2	37	47,8	56,5	67,6

D



FULL CONE NOZZLES, X VANE, TWO-PIECE DESIGN, LARGE CAPACITY

D full cone nozzle with large capacity is widely used in industry.
They provide uniform spray coverage and are available in various thread sizes, spray angles, and capacities to comply with environmental requirements.
Their X-vane offers the largest free passage available in a nozzle, allowing easier handling of the suspended particles and a higher resistance to clogging.

MATERIAL

AISI 303 Stainless Steel
AISI 316L Stainless Steel
Brass
Other materials on request

THREAD SPECIFICATION

BSPP
BSPT
NPT
from 3/4" to 4"

HOW TO ORDER THE PRODUCT

NOZZLE TYPE — **D E Q 2235 xx Sx**

SPRAY ANGLE
Q - 60° **W** - 120°
U - 90°

MATERIAL
B1 - AISI 303 Stainless Steel
B31 - AISI 316L Stainless Steel
T1 - Brass

CONNECTION
A - 1/8" **C** - 3/8"
B - 1/4" **D** - 1/2"

CAPACITY

CONNECTION
SB - BSPT
SG - BSPP
SN - NPT

LARGE CAPACITY

	CODE	RG	D	D1	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							H	H1	WS
		inch	mm	mm	0,7	1	2	3	5	7	10	mm	mm	mm
60°	**DEQ 2235 xx**	3/4"	4,8	3,5	11,4	13,6	19,2	23,5	30,3	35,9	42,9	42,5	15,5	27
	DEQ 2295 xx		5,5	4,5	14,2	17	24,1	29,5	38,1	45,1	53,9			
	DEQ 2370 xx		6	4,5	17,9	21,4	30,2	37	47,8	56,5	67,6			
	DEQ 2470 xx		7	4,5	22,7	27,1	38,4	47	60,7	71,8	85,8			
	DFQ 2470 xx	1"	7	5,6	22,7	27,1	38,4	47	60,7	71,8	85,8	58	18	36
	DFQ 2590 xx		7,8	5,6	28,5	34,1	48,2	59	76,2	90,1	108			
	DFQ 2740 xx		9,5	5,6	35,7	42,7	60,4	74	95,5	113	135			
	DGQ 2740 xx	1-1/4"	9,5	5,6	35,7	42,7	60,4	74	95,5	113	135	74	19	41
	DGQ 3118 xx		12,5	6	57	68,1	96,3	118	152	180	215			
	DGQ 3147 xx		16,7	6	71	84,9	120	147	190	225	268			
	DHQ 3147 xx	1-1/2"	13	9	71	84,9	120	147	190	225	268	85	19	50
	DKQ 3188 xx	2"	15	9	90,8	109	154	188	243	287	343	106	24	60
	DKQ 3235 xx		16	11	114	136	192	235	303	359	429			
	DKQ 3294 xx		17	11,1	142	170	240	294	380	449	537			
	DLQ 3370 xx	2-1/2"	17,5	11,1	179	214	302	370	478	565	676	128	27	75
	DLQ 3470 xx		23	11,1	227	271	384	470	607	718	858			
	DMQ 3588 xx	3"	28	14,3	284	339	480	588	759	898	1074	153	30	85
	DNQ 3740 xx	3-1/2"	29	17,5	357	427	604	740	955	1130	1351	190	32	105
	DNQ 3940 xx		36	17,5	454	543	768	940	1214	1436	1716			
	DPQ 4117 xx	4"	39	19	568	678	959	1175	1517	1795	2145	205	36	110

D

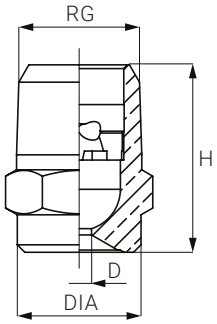
	CODE	RG	D	D1	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							H	H1	WS
		inch	mm	mm	0,7	1	2	3	5	7	10	mm	mm	mm
90°	**DEU 2295 xx**	3/4"	5,8	3	14,2	17	24,1	29,5	38,1	45,1	53,9	42,5	15,5	27
	DEU 2370 xx		6,4	4,5	17,9	21,4	30,2	37	47,8	56,5	67,6			
	DEU 2470 xx		8	4,5	22,7	27,1	38,4	47	60,7	71,8	85,8			
	DEU 2590 xx		9,7	4,5	28,5	34,1	48,2	59	76,2	90,1	108			
	DFU 2590 xx	1"	8,6	4,5	28,5	34,1	48,2	59	76,2	90,1	108	58	18	36
	DFU 2740 xx		9,3	5	35,7	42,7	60,4	74	95,5	113	135			
	DFU 2830 xx		9,9	6	40,3	48,2	68,2	83,5	108	128	152			
	DGU 3118 xx	1-1/4"	13	6	57	68,1	96,3	118	152	180	215	74	19	41
	DGU 3147 xx		16	6	71	84,9	120	147	190	225	268			
	DHU 3147 xx	1-1/2"	16	6	71	84,9	120	147	190	225	268	85	19	50
	DHU 3188 xx		14,5	9	90,8	109	154	188	243	287	343			
	DKU 3235 xx	2"	16,6	11	114	136	192	235	303	359	429	106	24	60
	DKU 3294 xx		18	11	142	170	240	294	380	449	537			
	DKU 3370 xx		25	11	179	214	302	370	478	565	676			
	DLU 3470 xx	2-1/2"	27	11,1	227	271	384	470	607	718	858	128	27	75
	DLU 3588 xx		30	14,3	284	339	480	588	759	898	1074			
	DMU 3740 xx	3"	30	17,5	357	427	604	740	955	1130	1351	153	30	85
	DMU 3870 xx		32,5	17,5	420	502	710	870	1123	1329	1588			
	DNU 3940 xx	3-1/2"	35,5	17,5	454	543	768	940	1214	1436	1716	190	32	105
	DNU 4117 xx		39	19	568	678	959	1175	1517	1795	2145			
	DPU 4147 xx	4"	42,8	25,4	710	849	1200	1470	1898	2245	2684	205	36	110

	CODE	RG	D	D1	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							H	H1	WS
		inch	mm	mm	0,7	1	2	3	5	7	10	mm	mm	mm
120°	**DEW 2295 xx**	3/4"	5,1	3	14,2	17	24,1	29,5	38,1	45,1	53,9	42,5	15,5	27
	DEW 2370 xx		6,5	3,5	17,9	21,4	30,2	37	47,8	56,5	67,6			
	DEW 2470 xx		8,5	4,5	22,7	27,1	38,4	47	60,7	71,8	85,8			
	DEW 2590 xx		9,2	4,5	28,5	34,1	48,2	59	76,2	90,1	108			
	DFW 2590 xx	1"	11,5	4,5	28,5	34,1	48,2	59	76,2	90,1	108	58	18	36
	DFW 2740 xx		12	4,5	35,7	42,7	60,4	74	95,5	113	135			
	DFW 2830 xx		13	5,6	40,3	48,2	68,2	83,5	108	128	152			
	DGW 3118 xx	1-1/4"	13,5	6	57	68,1	96,3	118	152	180	215	74	19	41
	DGW 3147 xx		17	6	71	84,9	120	147	190	225	268			
	DHW 3118 xx	1-1/2"	13	6	57	68,1	96	118	152	180	215	85	19	50
	DHW 3188 xx		20	9	90,8	109	154	188	243	287	343			
	DKW 3235 xx	2"	18	11	114	136	192	235	303	359	429	106	24	60
	DKW 3294 xx		19	11	142	170	240	294	380	449	537			
	DKW 3370 xx		21,3	11	179	214	302	370	478	565	676			
	DLW 3470 xx	2-1/2"	23,5	11,1	227	271	384	470	607	718	858	128	27	75
	DLW 3588 xx		26,5	14,3	284	339	480	588	759	898	1074			
	DMW 3740 xx	3"	29,5	17,5	357	427	604	740	955	1130	1351	153	30	85
	DMW 3870 xx		32	17,5	420	502	710	870	1123	1329	1588			
	DNW 3940 xx	3-1/2"	33,5	17,5	454	543	768	940	1214	1436	1716	190	32	105
	DNW 4117 xx		37	19	568	678	959	1175	1517	1795	2145			
	DPW 4147 xx	4"	42	25,4	710	849	1200	1470	1898	2245	2684	205	36	110

THREAD SIZE CODING TABLE (RG)

DE	DF	DG	DH	DK	DL	DM	DN	DP
3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	3-1/2"	4"

D PLUS



FULL CONE NOZZLES, CONSTANT SPRAY ANGLE

The Dplus series nozzles provide a full cone jet with a characteristic spray angle independent of the inlet pressure, between 1 and 10 bar.
The spray distribution is perfectly balanced and symmetrical, with a very uniform coverage of the circular impact area. At the same time, the perforated vane – *now already patented* – guarantees the homogeneity of the spray angle regardless of the inlet pressure.
The large free internal passages prevent the nozzle from clogging even with large particles, while the controlled internal turbulence maintains stable and reliable performance over the entire range of working pressures. The significant free internal passages guarantee low local speeds with a consequent high resistance to wear.
CONSTANT SPRAY ANGLE AS THE INLET PRESSURE CHANGES: above 3 bar the spray angle is stable, even when the inlet pressure varies.
UNIFORM DISTRIBUTION AS THE INLET PRESSURE CHANGES: if the distribution is constant as the pressure varies, the nozzle's wetting action is constant, controllable, and repeatable.
IMPROVED ANTI OCCLUSION: a larger free passage with a more regular geometry means less occlusion.

MATERIAL

AISI 303 Stainless Steel
AISI 316L Stainless Steel
Brass
Other materials on request

THREAD SPECIFICATION

BSPT
NPT
from 1/8" to 1/2"

HOW TO ORDER THE PRODUCT

SPRAY ANGLE
M - 45°
Q - 60°
U - 90°

MATERIAL
B1 - AISI 303 Stainless Steel
B31 - AISI 316L Stainless Steel
T1 - Brass

NOZZLE TYPE — **D1** **Q** **1235** **xx** **Sx** — **CONNECTION**
SB - BSPT
SN - NPT

CAPACITY

1/8"	CODE	D	ANGLE			FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							DIMENSIONS (mm)			
D1		mm	45°	60°	90°	1	2	3	4	5	7	10	H	DIA	WS	RG
	1235	2	•	•	•	1,43	2,15	2,35	2,7	3,15	3,52	4,1	19,5	11	12	1/8" BSPT 1/8" NPT
	1294	2,1		•	•	2,3	2,7	2,94	3,4	3,7	4,3	5,2				
	1370	2,2		•	•	2,1	2,8	3,7	4	4,3	5	5,8				

1/4"	CODE	D	ANGLE			FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							DIMENSIONS (mm)			
D2		mm	45°	60°	90°	1	2	3	4	5	7	10	H	DIA	WS	RG
	1235	2	•	•	•	1,43	2,15	2,35	2,7	3,15	3,52	4,1	22,5	13,5	14	1/4" BSPT 1/4" NPT
	1294	2,1	•	•	•	2,3	2,7	2,94	3,4	3,7	4,3	5,2				
	1370	2,2	•	•	•	2,1	2,8	3,7	4	4,3	5	5,8				
	1470	2,5		•	•	3	3,9	4,7	5,2	5,8	6,8	7,5				
	1588	2,8		•	•	3,8	5	5,88	6,6	7,2	8,2	9,5				
	1659	3,3		•	•	3,8	5,4	6,59	7,6	8,5	10	12				
	1740	3,5		•	•	4,3	6	7,4	8,54	9,55	11,3	13,5				
	1940	3,8		•	•	5,4	7,7	9,4	10,8	12,1	14,3	17,2				

D PLUS

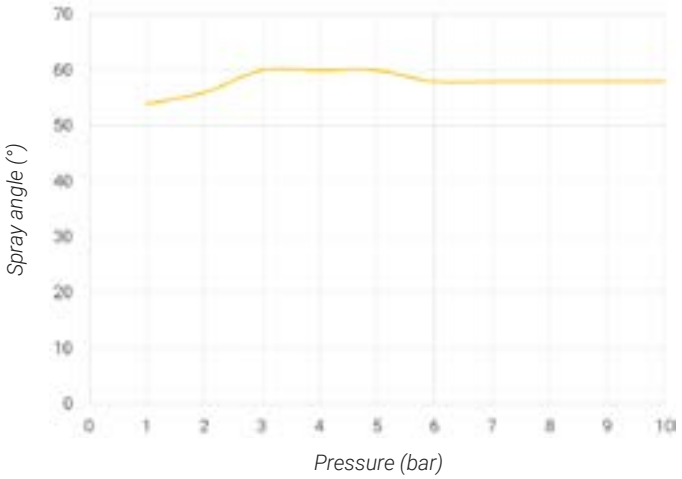
3/8"	CODE	D	ANGLE			FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							DIMENSIONS (mm)			
D3		mm	45°	60°	90°	1	2	3	4	5	7	10	H	DIA	WS	RG
	1235	1,8	•	•	•	1,43	2,15	2,35	2,7	3,15	3,52	4,1				
	1294	2	•	•	•	2,3	2,7	2,94	3,4	3,7	4,3	5,2				
	1370	2,2	•	•	•	2,1	2,8	3,7	4	4,3	5	5,8				
	1470	2,4	•	•	•	3	3,9	4,7	5,2	5,8	6,8	7,5				
	1588	2,8	•	•	•	3,8	5	5,88	6,6	7,2	8,2	9,5				
	1659	3,1	•	•	•	3,8	5,4	6,59	7,6	8,5	10	12	25	16,5	17	3/4" BSPT 3/4" NPT
	1740	3,4	•	•	•	4,3	6	7,4	8,54	9,55	11,3	13,5				
	1940	3,6	•	•	•	5,4	7,7	9,4	10,8	12,1	14,3	17,2				
	2105	3,8		•	•	6,1	8,57	10,5	12,1	13,5	16	19,1				
	2118	4		•	•	6,8	9,6	11,8	13,6	15,2	18	21,5				
	2147	4,4			•	8,5	12	14,7	16,9	18,9	22,4	26,8				
	2188	4,6			•	10,8	15,3	18,8	21,7	24,3	28,7	34,3				

1/2"	CODE	D	ANGLE			FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							DIMENSIONS (mm)			
D4		mm	45°	60°	90°	1	2	3	4	5	7	10	H	DIA	WS	RG
	1740	3,4	•	•	•	4,3	6	7,4	8,54	9,55	11,3	13,5				
	1940	3,6	•	•	•	5,4	7,7	9,4	10,8	12,1	14,3	17,2				
	2105	3,8	•	•	•	6,1	8,57	10,5	12,1	13,5	16	19,1				
	2118	4	•	•	•	6,8	9,6	11,8	13,6	15,2	18	21,5	33	21,5	22	1/2" BSPT 1/2" NPT
	2147	4,4	•	•	•	8,5	12	14,7	16,9	18,9	22,4	26,8				
	2188	4,6	•	•	•	10,8	15,3	18,8	21,7	24,3	28,7	34,3				

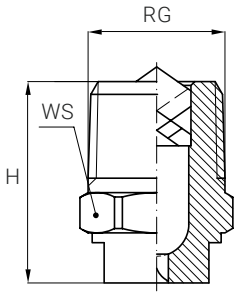
THREAD SIZE CODING TABLE (RG)

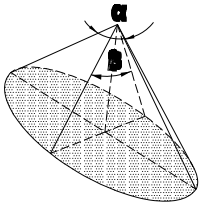
D1	D2	D3	D4
1/8"	1/4"	3/8"	1/2"

SPRAY ANGLE AT DIFFERENT PRESSURE (D3Q EXAMPLE CHART)



D..OB





OVAL JET NOZZLES

D..OB full cone nozzles with oval spray pattern are used for continuous casting cooling.
Their jets, which cover an oblong surface, can be easily positioned to ensure a uniform cooling action. Their construction in two pieces, body and X-vane, offers the same benefits of the normal full cone nozzle in terms of resistance to clogging and a secure vane.

MATERIAL

AISI 303 Stainless Steel
Brass

THREAD SPECIFICATION

Male BSPT
NPT

HOW TO ORDER THE PRODUCT

NOZZLE TYPE — **D B U 1330 xx y z** — **VERSION**
B - BSPT
N - NPT

SPRAY ANGLE
α - 90°
β - 60°

MATERIAL
B1 - AISI 303 Stainless Steel
T1 - Brass

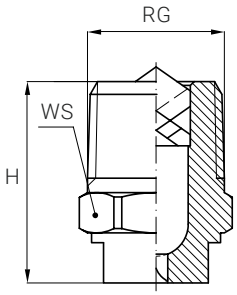
THREAD
B - 1/4"
C - 3/8"

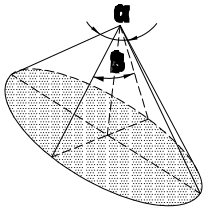
CAPACITY

CONSTRUCTION
O - Oval

CODE	MARKING	α	β	H (mm)	RG (In)	WS (mm)	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							
							0,7	1,5	2,0	3,0	4,0	6,0	7,0	10
DCU 1240 zzOx	DC 2U / O. PNR	90°	60°	24,5	3/8	17	1,16	1,73	1,96	2,40	2,77	3,40	3,67	4,38
DCU 1320 zzOx	DC 3U / O. PNR						1,55	2,26	2,61	3,20	3,70	4,53	4,89	5,84
DCU 1400 zzOx	DC 4U / O. PNR						1,93	2,83	3,27	4,00	4,62	5,66	6,11	7,30
DCU 1520 zzOx	DC 5U / O. PNR						2,52	3,68	4,25	5,20	6,00	7,35	7,94	9,49
DCU 1680 zzOx	DC 7U / O. PNR						3,28	4,81	5,55	6,80	7,85	9,62	10,4	12,4
DCU 1840 zzOx	DC 8U / O. PNR						4,05	4,85	6. 86	8. 40	9. 70	11. 9	12. 8	15,3
DCU 1240 xxPx	DC 2U / P. PNR		30°				1,16	1,73	1,96	2,40	2,77	3,40	3,67	4,38
DCU 1320 zzPx	DC 4U / P. PNR						1,55	2,26	2,61	3,20	3,70	4,53	4,89	5,84
DCU 1410 zzPx	DC 4U / P. PNR						1,93	2,83	3,27	4,00	4,62	5,66	6,11	7,30
DCU 1540 zzPx	DC 5U / P. PNR						2,52	3,68	4,25	5,20	6,00	7,35	7,94	9,49
DCU 1680 zzPx	DC 7U / P. PNR						3,28	4,81	5,55	6,80	7,85	9,62	10,4	12,4
DCU 1840 zzPx	DC 8U / P. PNR						4,05	4,85	6,86	8,40	9. 70	11. 9	12. 8	15,3
DCN 1410 zzPx	DC 4N / P. PNR	50°	30°				2,0	2,9	3,3	4,10	4,7	5,8	6,3	7,5
DCN 1540 zzPx	DC 5N / P. PNR						2,60	3,8	4,4	5,40	6,2	7,6	8,2	9,8

D..PB





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 operating angles at 90° and 30°.
Their construction in two pieces, body and X-vane, offers the same benefits of the normal full cone nozzle in terms of resistance to clogging and a secure vane.

MATERIAL

AISI 303 Stainless Steel
Brass

THREAD SPECIFICATION

Male BSPT
NPT

HOW TO ORDER THE PRODUCT

NOZZLE TYPE — **D B U 1330 xx y z** — **VERSION**
B - BSPT
N - NPT

SPRAY ANGLE
α - 90°
β - 30°

MATERIAL
B1 - AISI 303 Stainless Steel
T1 - Brass

THREAD
B - 1/4"
C - 3/8"

CAPACITY

CONSTRUCTION
P - Oval

CODE	MARKING	α	β	H (mm)	RG (In)	WS (mm)	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							
							0,7	1,5	2,0	3,0	4,0	6,0	7,0	10
DCU 1240 zzOx	DC 2U / O. PNR	90°	60°	24,5	3/8	17	1,16	1,73	1,96	2,40	2,77	3,40	3,67	4,38
DCU 1320 zzOx	DC 3U / O. PNR						1,55	2,26	2,61	3,20	3,70	4,53	4,89	5,84
DCU 1400 zzOx	DC 4U / O. PNR						1,93	2,83	3,27	4,00	4,62	5,66	6,11	7,30
DCU 1520 zzOx	DC 5U / O. PNR						2,52	3,68	4,25	5,20	6,00	7,35	7,94	9,49
DCU 1680 zzOx	DC 7U / O. PNR						3,28	4,81	5,55	6,80	7,85	9,62	10,4	12,4
DCU 1840 zzOx	DC 8U / O. PNR						4,05	4,85	6. 86	8. 40	9. 70	11. 9	12. 8	15,3
DCU 1240 xxPx	DC 2U / P. PNR		30°				1,16	1,73	1,96	2,40	2,77	3,40	3,67	4,38
DCU 1320 zzPx	DC 4U / P. PNR						1,55	2,26	2,61	3,20	3,70	4,53	4,89	5,84
DCU 1410 zzPx	DC 4U / P. PNR						1,93	2,83	3,27	4,00	4,62	5,66	6,11	7,30
DCU 1540 zzPx	DC 5U / P. PNR						2,52	3,68	4,25	5,20	6,00	7,35	7,94	9,49
DCU 1680 zzPx	DC 7U / P. PNR						3,28	4,81	5,55	6,80	7,85	9,62	10,4	12,4
DCU 1840 zzPx	DC 8U / P. PNR						4,05	4,85	6,86	8,40	9. 70	11. 9	12. 8	15,3
DCN 1410 zzPx	DC 4N / P. PNR	50°	30°				2,0	2,9	3,3	4,10	4,7	5,8	6,3	7,5
DCN 1540 zzPx	DC 5N / P. PNR						2,60	3,8	4,4	5,40	6,2	7,6	8,2	9,8

CONTINUOUS CASTING COOLING (WATER)

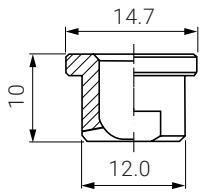
COLD LAMINATION

In cold rolling, the strip is progressively reduced in thickness through stands operating at room temperature.

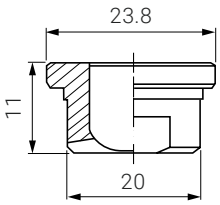
The main requirement is not managing large amounts of heat, but rather ensuring a uniform distribution of coolant and lubricant across the entire width of the strip: variations in distribution cause flatness defects, thickness differences, and deterioration of the working surfaces.

For this application, PNR Italia proposes **GX and GY series flat fan nozzles**, characterized by a very uniform distribution profile on the surface to be treated, and suitable for the typical operating conditions of cold-rolling lines.

GX



3/8" STANDARD CAPACITY



3/4" LARGE CAPACITY

FLAT FAN NOZZLES, STANDARD AND LARGE CAPACITIES

GX flat fan nozzle tips are usually mounted onto a pipe using a welded 3/8" nipple or a clamp and secured in place with a retaining nut. They can be easily replaced and their jet can be conveniently oriented in the desired direction. These nozzles are available in two types: 3/8" standard capacity and 3/4" large capacity.
The tip is assembled with a pipe clamp, a welding nipple and a locknut.

MATERIAL

AISI 303 Stainless Steel
AISI 316L Stainless Steel
Brass

THREAD SPECIFICATION

Flange / Nipple /
Plastic pipe clamp + Locknut
3/8" - 3/4"

HOW TO ORDER THE PRODUCT

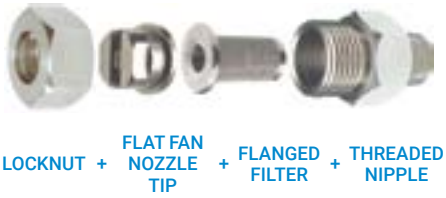
SPRAY ANGLE
A - 0° **Q** - 60°
F - 30° **U** - 90°
M - 45° **W** - 120°

NOZZLE TYPE — **GX** **A** **1310** **xx** — **MATERIAL**
B1 - AISI 303 Stainless Steel
B31 - AISI 316L Stainless Steel
T1 - Brass

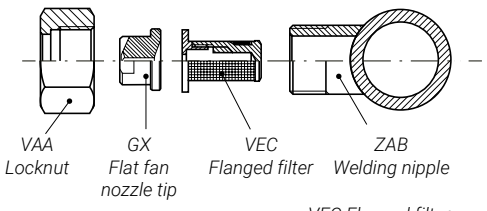
CAPACITY

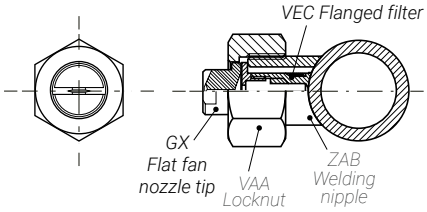
ASSEMBLY FITTINGS

VAA	**GX**	VEC / VED (optional)	ZAA/ZAB

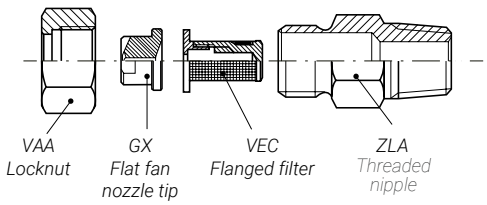


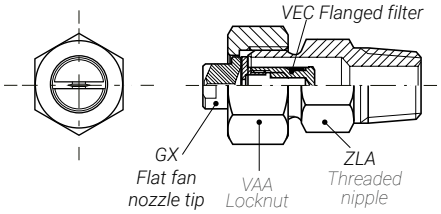
LOCKNUT + FLAT FAN NOZZLE TIP + FLANGED FILTER + THREADED NIPPLE





VAA	**GX**	VEC / VED (optional)	ZLA
VAA	**GX**	VEC / VED (optional)	ZPB
	GX	VEC / VED (optional)	ZPC





GX

3/8" STANDARD CAPACITY TIPS

GXA	GXF	GXM	GXQ	GXU	GXW	CODE	D	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)								
0°	30°	45°	60°	90°	120°		mm	0,5	1	1,5	2	3	4	5	7	10
•	•	•	•	•	•	**0780**	0,91	0,32	0,45	0,55	0,64	0,78	0,9	1,01	1,19	1,42
•	•	•	•	•	•	**1120**	1,1	0,49	0,69	0,85	0,98	1,2	1,39	1,55	1,83	2,19
•	•	•	•	•	•	**1160**	1,3	0,65	0,92	1,13	1,31	1,6	1,85	2,07	2,44	2,92
•	•	•	•	•	•	**1190**	1,3	0,78	1,1	1,34	1,55	1,9	2,19	2,45	2,9	3,47
•	•	•	•	•	•	**1233**	1,5	0,95	1,35	1,65	1,9	2,33	2,69	3,01	3,56	4,25
•	•	•	•	•	•	**1310**	1,7	1,27	1,79	2,19	2,53	3,1	3,58	4	4,74	5,66
•	•	•	•	•	•	**1385**	1,8	1,57	2,22	2,72	3,14	3,85	4,45	4,97	5,88	7,03
•	•	•	•	•	•	**1490**	2,1	2	2,83	3,46	4	4,9	5,66	6,33	7,48	8,95
•	•	•	•	•	•	**1581**	2,3	2,37	3,35	4,11	4,74	5,81	6,71	7,5	8,87	10,6
•	•	•	•	•	•	**1780**	2,7	3,18	4,5	5,52	6,37	7,8	9,01	10,1	11,9	14,2
•	•	•	•	•	•	**1980**	3	4	5,66	6,93	8	9,8	11,3	12,7	15	17,9
•	•	•	•	•	•	**2124**	3,4	5,06	5,85	8,77	10,1	12,4	14,3	16	18,9	22,6
•	•	•	•	•	•	**2153**	3,8	6,25	7,2	10,8	12,5	15,3	17,7	19,8	23,4	27,9
•	•	•	•	•	•	**2194**	4,3	7,96	9,2	13,8	15,9	19,5	22,5	25,2	29,8	35,6
•	•	•	•	•	•	**2245**	4,8	10	11,5	17,3	20	24,5	28,3	31,6	37,4	44,7

Note: the nozzle GXx 0780 B31 is made with "low capacity" body, while when it's fabricated with other materials is made with "standard capacity" body.

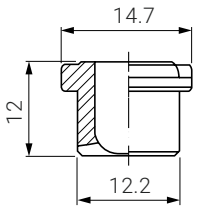
3/4" LARGE CAPACITY TIPS

GXA	GXF	GXM	GXQ	GXU	GXW	CODE	D	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)								
0°	30°	45°	60°	90°	120°		mm	0,5	1	1,5	2	3	4	5	7	10
•	•	•	•	•	•	**1781**	2,7	3,18	4,5	5,52	6,37	7,8	9,01	10,1	11,9	14,2
•	•	•	•	•	•	**1981**	3	4	5,66	6,93	8	9,8	11,3	12,7	15	17,9
•	•	•	•	•	•	**2125**	3,4	5,06	7,16	8,77	10,1	12,4	14,3	16	18,9	22,6
•	•	•	•	•	•	**2154**	3,8	6,25	8,83	10,8	12,5	15,3	17,7	19,8	23,4	27,9
•	•	•	•	•	•	**2195**	4,3	7,92	11,2	13,7	15,8	19,4	22,4	25	29,6	35,4
•	•	•	•	•	•	**2246**	4,8	10	14,1	17,3	20	24,5	28,3	31,6	37,4	44,7
•	•	•	•	•	•	**2311**	5,4	12,7	17,9	21,9	25,3	31	35,8	40	47,4	56,6
•	•	•	•	•	•	**2490**	6,4	20	28,3	34,6	40	49	56,6	63,3	74,8	89,5
•	•	•	•	•	•	**2610**	7,5	24,9	35,2	43,1	49,8	61	70,4	78,8	93,2	111
•	•	•	•	•	•	**2760**	8,3	31	43,9	53,7	62,1	76	87,8	98,1	116	139
•	•	•	•	•	•	**3122**	12,5	49,8	70,4	86,3	99,6	122	141	158	186	223

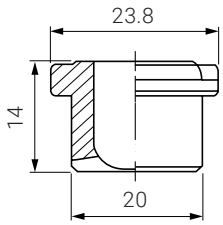
TABLE OF MATERIALS

MATERIALS	0060	0100	0130	0150	0200	0260	0390	0590	0780
AISI 316L					•	•	•	•	• (1)
AISI 303	•	•	•	•	•	•	•	•	• (2)
Brass	•	•	•	•	•	•	•	•	• (2)

GY



3/8" STANDARD CAPACITY



3/4" LARGE CAPACITY

FLAT FAN NOZZLES, DOVE TAIL NIPPLE

GY flat fan nozzle tips are usually mounted onto a pipe using a welding nipple and secured in place with a retaining nut Therefore, they can be easily replaced, and their dovetail connection ensures an always precise assembly, as the nozzle can be assembled only when the flat fan is properly oriented. They are available in three types: 3/8" standard capacity, 3/4" large capacity and 1" extra-large capacity. The tip models shown on this page deliver the most popular capacity values, while GY flat fan nozzle tips with bigger capacities and sizes can be manufactured on request and supplied with matching dove-tail nipples and retaining nuts.

MATERIAL

AISI 303 Stainless Steel
AISI 316L Stainless Steel
Brass

THREAD SPECIFICATION

Dove-tail welding nipple + Locknut
3/8" - 3/4"

HOW TO ORDER THE PRODUCT

SPRAY ANGLE
A - 0° **Q** - 60°
F - 30° **U** - 90°
M - 45° **W** - 120°

NOZZLE TYPE — **GY F 1190 xx** — **MATERIAL**
B1 - AISI 303 Stainless Steel
B31 - AISI 316L Stainless Steel
T1 - Brass

CAPACITY

DOVE-TAIL NIPPLES

GY nozzle tips are assembled onto their own series of matching dovetail nipples, to assure perfect alignment: the two tip sizes require nipples and caps as shown in the table below.

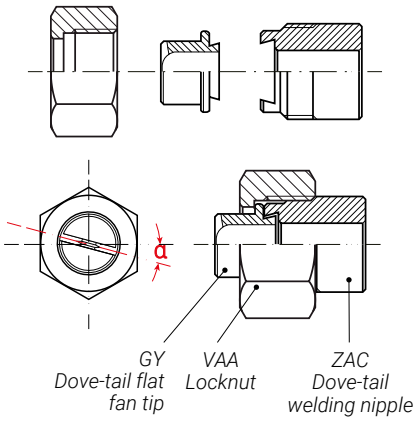
The orientation of the spray jets, properly inclined to avoid their interfering, is automatically obtained welding the nipples in place with their dovetail aligned along the pipe axis. This is easily done by running a stright rule across the dovetail profile machined on the nipple.

POS.2 POS.1

ASSEMBLY FITTINGS

VAA | **GY** | ZAC

LOCKNUT + DOVE-TAIL FLAT FAN TIP + DOVE-TAIL WELDING NIPPLE



PRODUCT	MATERIAL CODE	PRODUCT CODE	
		STANDARD SIZE 3/8"	LARGE SIZE 3/4"
Locknut	B1 - AISI 303 B31 - AISI 316L T 1 - Ottone	VAA 0381 xxB	VAA 0750 xxB
Dove-tail welding nipple	B1 - AISI 303 B31 - AISI 316L	ZAC C018 xx	ZAC E027 xx

GY

STANDARD CAPACITY 3/8"

JET DEVIATION ANGLE α = 5°

GYF	GYM	GYQ	GYU	GYW	CODE	D	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)								
30°	45°	60°	90°	120°		mm	0,5	1	1,5	2	3	4	5	7	10
•	•	•	•	•	**1190**	1,30	0,78	1,1	1,34	1,55	1,9	2,19	2,45	2,9	3,47
•	•	•	•	•	**1233**	1,50	0,95	1,35	1,65	1,9	2,33	2,69	3,01	3,56	4,25
•	•	•	•	•	**1310**	1,70	1,27	1,79	2,19	2,53	3,1	3,58	4	4,74	5,66
•	•	•	•	•	**1385**	1,80	1,57	2,22	2,72	3,14	3,85	4,45	4,97	5,88	7,03
•	•	•	•	•	**1490**	2,10	2	2,83	3,46	4	4,9	5,66	6,33	7,48	8,95
•	•	•	•	•	**1581**	2,30	2,37	3,35	4,11	4,74	5,81	6,71	7,5	8,87	10,6
•	•	•	•	•	**1780**	2,70	3,18	4,5	5,52	6,37	7,8	9,01	10,1	11,9	14,2
•	•	•	•	•	**1980**	3,00	4	5,66	6,93	8	9,8	11,3	12,7	15	17,9
•	•	•	•	•	**2124**	3,40	5,06	5,85	8,77	10,1	12,4	14,3	16	18,9	22,6
•	•	•	•	•	**2153**	3,80	6,25	7,2	10,8	12,5	15,3	17,7	19,8	23,4	27,9
•	•	•	•	•	**2194**	4,30	7,96	9,2	13,8	15,9	19,5	22,5	25,2	29,8	35,6

LARGE CAPACITY 3/4"

JET DEVIATION ANGLE α = 15°

GYA	GYF	GYM	GYQ	GYU	GYW	CODE	D	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)								
0°	30°	45°	60°	90°	120°		mm	0,5	1	1,5	2	3	4	5	7	10
	•	•	•	•	•	**1781**	2,70	3,18	4,5	5,52	6,37	7,8	9,01	10,1	11,9	14,2
	•	•	•	•	•	**1981**	3,00	4	5,66	6,93	8	9,8	11,3	12,7	15	17,9
•	•	•	•	•	•	**2125**	3,40	5,06	7,16	8,77	10,1	12,4	14,3	16	18,9	22,6
•	•	•	•	•	•	**2154**	3,80	6,25	8,83	10,8	12,5	15,3	17,7	19,8	23,4	27,9
•	•	•	•	•	•	**2195**	4,30	7,92	11,2	13,7	15,8	19,4	22,4	25	29,6	35,4
•	•	•	•	•	•	**2246**	4,80	10	14,1	17,3	20	24,5	28,3	31,6	37,4	44,7
•	•	•	•	•	•	**2311**	5,40	12,7	17,9	21,9	25,3	31	35,8	40	47,4	56,6
•	•	•	•	•	•	**2490**	6,40	20	28,3	34,6	40	49	56,6	63,3	74,8	89,5
•	•	•	•	•	•	**2610**	7,50	24,9	35,2	43,1	49,8	61	70,4	78,8	93,2	111
		•	•	•	•	**2760**	8,30	31	43,9	53,7	62,1	76	87,8	98,1	116	139
		•	•			**3122**	12,5	49,8	70,4	86,3	99,6	122	141	158	186	223

CONTINUOUS CASTING COOLING (AIR/WATER)

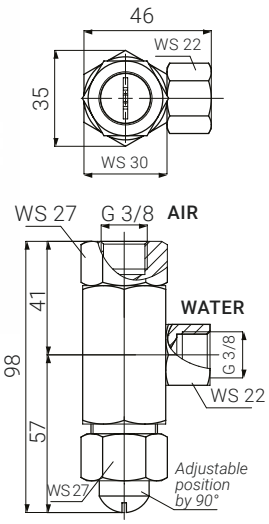
When the cooling profile requires wide variations in flow rate — to manage different products on the same line or apply differentiated thermal curves based on steel quality — hydraulic nozzles show their adjustment limits in terms of turn-down ratio.
In these cases, *air/water atomization* is the most effective solution.

Pneumatic atomizers combine compressed air and water, producing finely fragmented droplets with a turn-down ratio (the ratio between the maximum and minimum flow rates at which good atomization is achieved) much wider than that of hydraulic nozzles.

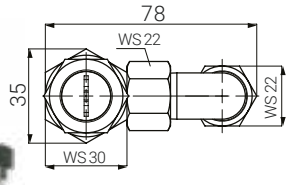
This allows the cooling curve to be adjusted in real time without compromising spray quality.

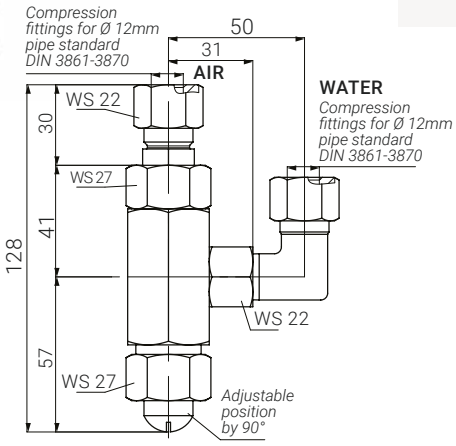
PNR Italia offers **MC, MN, MO, MR, MB, and MT series atomizers** for this application, available in various sizes and configurations for integration into casting line nozzle headers.

MC



MC STANDARD





PY MODEL

FLAT JET ATOMIZERS

MC atomizers are commonly used for cooling in the continuous casting process in steel mills. They feature a flat spray pattern and a 3/8" female connection for water and air.
All MC atomizers come with a capacity/pressure chart to adjust pumps according to the plant's requirements. The tip can be supplied upon request in nickel-plated brass to ensure less nozzle wear.

MATERIAL

AISI 303 Stainless Steel
Brass

THREAD SPECIFICATION

BSPP
NPT
Compression fittings *(PY model)*

HOW TO ORDER THE PRODUCT

NOZZLE TYPE — **MC** **U** **D** **A** **B** **C** **xx** **y** **z** — **THREAD CONNECTION**

SPRAY ANGLE
Q - 60°
U - 90°
J - 110°

SLOT CONFIG.
D - Flat jet

SLOT WIDTH
A - 0,5 mm
B - 1 mm
C - 1,5 mm...

AIR INLET PASSAGE HOLE
A - 0,5 mm
B - 1 mm
C - 1,5 mm...

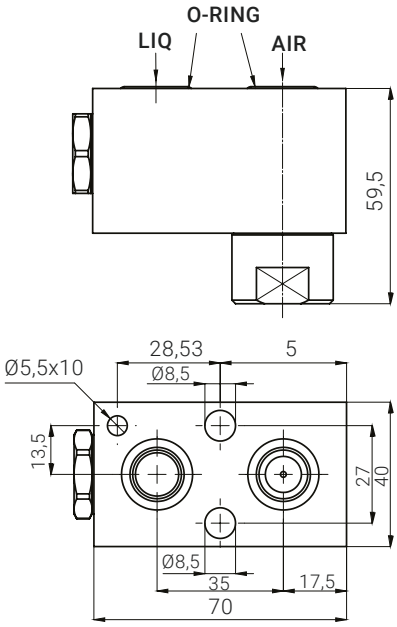
WATER INLET PASSAGE HOLE
A - 0,5 mm
B - 1 mm
C - 1,5 mm...

MATERIAL
T1 - Brass
B1 - AISI 303 s.s.

VARIANT
S - Standard
PY

THREAD CONNECTION
G - BSPP
N - NPT

MN



FULL CONE ATOMIZERS

The MN series atomizers are typically used to cool blooms and billets. They have a full cone spray pattern and a mounting system that connects to the support plates through two pins and Viton O-rings. 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 that the pumps can be adjusted to the capacities required by the plant.

MATERIAL

AISI 303 Stainless Steel
AISI 316L Stainless Steel
Brass

THREAD SPECIFICATION

Plug-in
BSP (1/4" - 3/8")
NPT (1/4" - 3/8")

HOW TO ORDER THE PRODUCT

NOZZLE TYPE — **MN** **Q** **1069** **T1** **SH** — **THREAD CONNECTION**

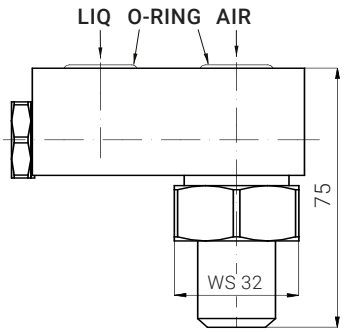
SPRAY ANGLE
Q - 60°

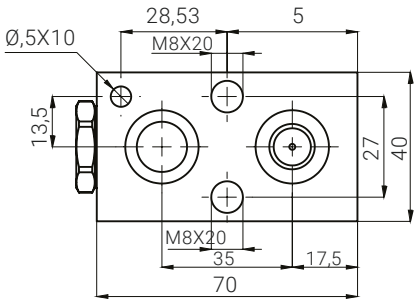
MATERIAL
B1 - AISI 303 Stainless Steel
B31 - AISI 316L Stainless Steel
T1 - Brass

CAPACITY

	CODE	WATER FLOW RATE (lpm) AT DIFFERENT WATER PRESSURE VALUES (bar)		MAX AIR FLOW RATE (Nm3/h) AT PRESSURE (bar)	MATERIAL
60°	**MNQ 1069 T1SH**	0,5 @ P = 1,5 bar	2,8 @ P = 6,5 bar	3,8 @ P = 1,5 bar	Brass
	MNQ 1021 T1SH	0,4 @ P = 0,5 bar	4,0 @ P = 7,0 bar	4,0 @ P = 0,5 bar	
	MNQ 1040 T1SH	0,8 @ P = 1,0 bar	7,0 @ P = 7,0 bar	8,5 @ P = 1,0 bar	
		Air pressure = 2 bar		*Air pressure = 2 bar*	

MO





OVAL JET ATOMIZERS

The MO atomizers with oval spray coverage are typically used to cool blooms and billets. They have a fastening system to lock them on the supporting plates through two pins and an O-ring in Viton. Upon request, they can be supplied with 1/4" or 3/8" female liquid/air connections.
All MO atomizers are supplied with a capacity/pressure chart to adjust the pumps to the plant's required capacities.

MATERIAL

AISI 303 Stainless Steel
AISI 316L Stainless Steel
Brass

THREAD SPECIFICATION

Plug-in
BSP (1/4" - 3/8")
NPT (1/4" - 3/8")

HOW TO ORDER THE PRODUCT

SPRAY ANGLE
Q - 60°
U - 90°

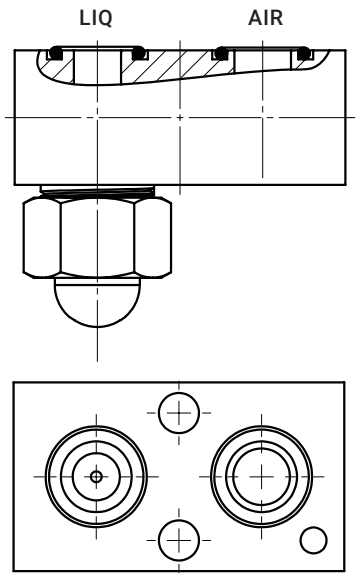
MATERIAL
B1 - AISI 303 Stainless Steel
B31 - AISI 316L Stainless Steel
T1 - Brass

NOZZLE TYPE — **MO U F101 T1 SH** — **THREAD CONNECTION**

CAPACITY

α	β	CODE	WATER FLOW RATE (lpm) AT DIFFERENT WATER PRESSURE VALUES (bar)		MAX AIR FLOW RATE (Nm3/h) AT PRESSURE (bar)	MATERIAL
90°	*30°*	**MOU F101 T1SH**	0,4 @ P = 1,0 bar	3,0 @ P = 6,0 bar	3,0 @ P = 1,0 bar	Brass
		MOU F109 T1SH	0,5 @ P = 0,5 bar	7,0 @ P = 7,0 bar	4,6 @ P = 0,5 bar	
		MOU F113 T1SH	0,6 @ P = 0,5 bar	6,7 @ P = 7,0 bar	6,4 @ P = 0,5 bar	
60°	*30°*	**MOQ F113 T1SH**	0,6 @ P = 0,5 bar	6,7 @ P = 7,0 bar	6,4 @ P = 0,5 bar	
			Air pressure = 2 bar		*Air pressure = 2 bar*	

MR



FLAT JET ATOMIZERS

The MR series atomizers, commonly used to cool blooms, billets, sheets, and round bars in steel plants, have a flat jet spray configuration and a robust clamping system that secures them onto support sheets using two pins and a Viton O-ring.
They can be provided with 1/4" or 3/8" female liquid/air connections upon request.
Each MR atomizer is supplied with a capacity/pressure chart to ensure optimal pump adjustments, according to plant requirements.

MATERIAL
Brass

THREAD SPECIFICATION
BSPP (1/4" - 3/8")

SPRAY ANGLE
From 60° to 140°

CAPACITY
(Pw 2 bar- Pa = 2 bar)
QW = 0,9 - 7,0 l/min
QA = 9,7-12,3 Nm³/h

FLAT FAN LANCE ATOMIZERS

In continuous casting, and in slab casting in particular, lance atomizers replace conventional compact atomizers, currently called block atomizers, where the atomizer body is equipped with an extension and the spray tip is located at the exit end of the extension. The reasons of this replacement are due either to the geometrical need to insert the spraying pipe between rolls, whose clearance is often very small and prevents the use of block atomizers, or to the convenience to position the feeding pipes far from the intensely heated area near the slabs.

Lance atomizers can be classified according to different parameters:

ATOMIZER'S BODY
The body where atomization is generated is matched by a plug-in connection to fluid feeding ducts, may have different shapes according to the model and may be casted or machined.

GEOMETRY OF THE PIPE
Straight pipe, or bent type.

CONNECTIONS OF THE PIPE TO THE BODY
The extension pipe is welded onto the block body, or the extension pipe is screwed to the block body with a locknut.

MB TYPE

Casted body, with welded extension pipe

Casted body, with screwed extension pipe

MT TYPE

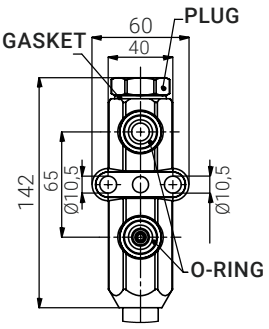
Machined body, with welded extension pipe

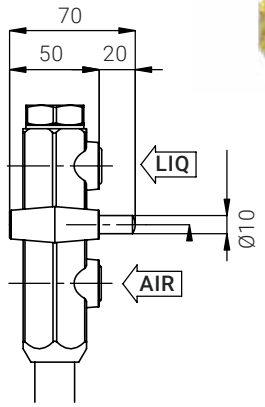
Machined body, with screwed extension pipe

Straight extension pipe

Bent extension pipe (angles can be customized)

MB





LANCE ATOMIZERS

Lance atomizers are replacing standard block atomizers in slab continuous casting. Unlike compact models, lance atomizers use an extension to place the spray tip directly at the point of application.
This design is essential when space between rolls is limited, making block atomizers impractical.
Additionally, it protects the feeding system by keeping supply pipes at a safe distance from the intense heat of the slabs.

MATERIAL

BODY: Brass
TUBE: Brass
TIP: Brass Ni-plated brass, AISI 316L s.s.

THREAD SPECIFICATION

Plug-in

CODE	SPRAY ANGLE	WATER FLOW RATE (lpm)		MAX AIR FLOW RATE (Nm3/h)
		MIN	MAX	
MBX BA08A XXXX	30° – 130°	0,3	3	3
MBX BA10A XXXX		0,4	4	4
MBX D0D3A XXXX		0,4	4,5	9
MBX BA12A XXXX		0,5	5	5
MBX BA15A XXXX		0,6	6	6
MBX BA21A XXXX		0,8	8	8
MBX D010A XXXX		1,55	10	13,4
MBX BA28A XXXX		1,1	11	11
MBX BA32A XXXX		3	13	14,8
MBX D014A XXXX		2	13,7	14,8
MBX B016A XXXX		2	16	16
MBX BA42A XXXX		1,7	17	17
MBX BA50A XXXX		2	20	20
MBX D021A XXXX		3,8	21,4	18,1
MBX A023B XXXX		3	23	23
MBX B028A XXXX		5,5	34,3	34,5
MBX BAA1A XXXX		6,8	41,7	42
		Pw = 1 bar	*Pw = 7 bar*	*Pw = 1 bar*
		Pa = 2 bar		

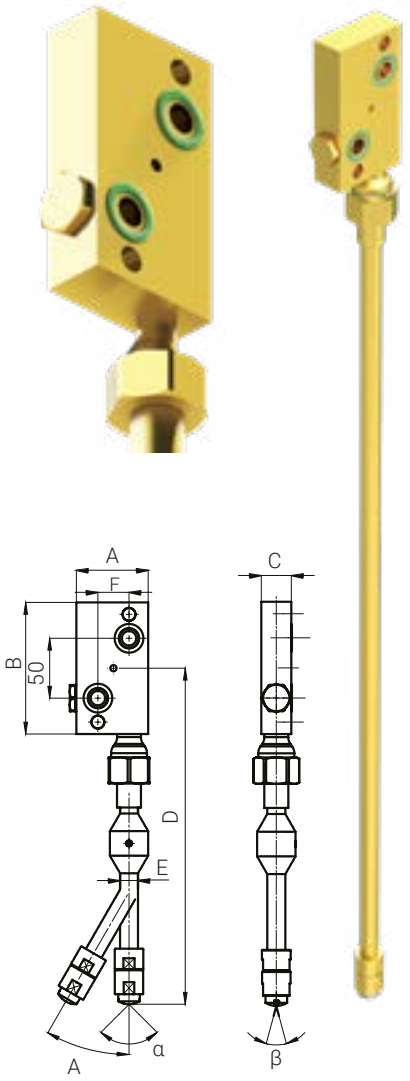
Note: For all models, the ECO version is available, with reduced air consumption. For instance:

CODE	SPRAY ANGLE	WATER FLOW RATE (lpm)		MAX AIR FLOW RATE (Nm3/h)
MBX B016A XXXX	30° – 130°	2	16	12,1
MBX B028A XXXX		5,5	34,3	19
		Pw = 1 bar	*Pw = 7 bar*	*Pw = 1 bar*
		Pa = 2 bar		

Pw = Water Pressure
Pa = Air Pressure

DIMENSION	MIN	MAX
BODY WIDTH	60 mm	
BODY LENGTH	142 mm	
BODY TICKNESS	49,5 mm	
DISTANCE BETWEEN REFERENCE PIN AND SPRAY PIN	customized	
TUBE BENT ANGLE	0°	35°
TUBE OUTSIDE DIAMETER	10 mm	40 mm
HORIZONTAL DISTANCE BETWEEN PLUGS	65 mm	
PRIMARY SPRAY ANGLE	30°	130°
SECONDARY SPRAY ANGLE	5°	30°

MT



LANCE ATOMIZERS

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This design is essential when space between rolls is limited, making block atomizers impractical.
Additionally, it protects the feeding system by keeping supply pipes at a safe distance from the intense heat of the slabs.

MATERIAL

BODY: Brass
TUBE: Brass
TIP: Brass Ni-plated brass, AISI 316L s.s.

THREAD SPECIFICATION

Plug-in

CODE	SPRAY ANGLE	WATER FLOW RATE (lpm)		MAX AIR FLOW RATE (Nm3/h)
		MIN	MAX	
MTX BA08A XXXX	*30° – 130°*	0,3	3	3
MTX BA10A XXXX		0,4	4	4
MTX D0D3A XXXX		0,4	4,5	9
MTX BA12A XXXX		0,5	5	5
MTX BA15A XXXX		0,6	6	6
MTX BA21A XXXX		0,8	8	8
MTX D010A XXXX		1,55	10	13,4
MTX BA28A XXXX		1,1	11	11
MTX BA32A XXXX		3	13	14,8
MTX D014A XXXX		2	13,7	14,8
MTX B016A XXXX		2	16	16
MTX BA42A XXXX		1,7	17	17
MTX BA50A XXXX		2	20	20
MTX D021A XXXX		3,8	21,4	18,1
MTX A023B XXXX		3	23	23
MTX B028A XXXX		5,5	34,3	34,5
MTX BAA1A XXXX		6,8	41,7	42
		Pw = 1 bar	*Pw = 7 bar*	*Pw = 1 bar*
		Pa = 2 bar		

Note: For all models, the ECO version is available, with reduced air consumption. For instance:

CODE	SPRAY ANGLE	WATER FLOW RATE (lpm)		MAX AIR FLOW RATE (Nm3/h)
MTX B016A XXXX	*30° – 130°*	2	16	12,1
MTX B028A XXXX		5,5	34,3	19
		Pw = 1 bar	*Pw = 7 bar*	*Pw = 1 bar*
		Pa = 2 bar		

Pw = Water Pressure
Pa = Air Pressure

DIMENSION (A)	MIN	MAX
BODY WIDTH (B)	50 mm	80 mm
BODY LENGTH (C)	80 mm	150 mm
BODY TICKNESS (D)	25 mm	35 mm
DISTANCE BETWEEN REFERENCE PIN AND SPRAY PIN (Y)	customized	
TUBE BENT ANGLE (E)	0°	35°
TUBE OUTSIDE DIAMETER (A)	10 mm	40 mm
HORIZONTAL DISTANCE BETWEEN PLUGS (F)	26 mm	46 mm
PRIMARY SPRAY ANGLE (α)	30°	130°
SECONDARY SPRAY ANGLE (β)	5°	30°

DESCALING
(HOT ROLLING)

Descaling is a fundamental process in hot rolling: the oxide layer (scale) that forms on the surface of the semi-finished product during heating must be removed before the rolling stands to avoid irreversible surface defects on the finished product, such as pitting, streaks, and irregularities.

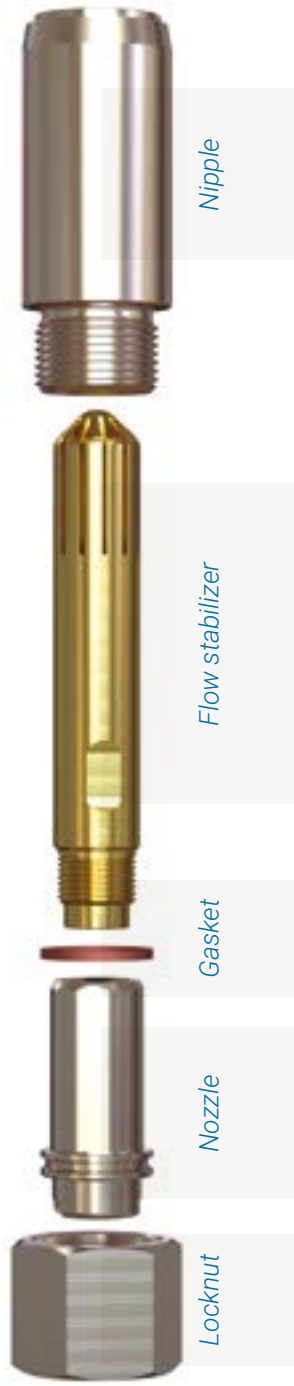
The most effective technique is high-pressure hydromechanical descaling: water jets at 50-400 bar strike the surface of the semi-finished product, generating a dual effect — direct mechanical impact and thermal shock — that effectively removes scale. The quality of the jet is decisive for the effectiveness of removal and the final product quality.

PNR Italia offers a complete range of nozzles for this application: the **GW** dovetail model, the **HX/GB** and **HX/GK series** for standard nozzle holders, and the **HW/AA, HW/AB, HW/AH, HW/AK, HV/AX, and HW/AM series** in *mini, standard, micro, and high-impact* variants. All models feature high wear resistance and optimized jet geometry to maximize impact force on the semi-finished product surface.

DESCALING NOZZLES

Descaling nozzles are used for an efficient scale removal in hot rolling. The best method is the hydro-mechanical descaling process using high pressure water jets formed by special descaling nozzles. Working pressure range is from 50 to 400 bar (725 to 5.800 psi), for GW type from 30 to 200 bar (435 to 2.900 psi).

The impact of the water jet on the steel hot surface produces an impact force that, combined with the thermal action due to the temperature difference between jets and slabs, generates the descaling effect. The jet quality of the nozzle has a great effect upon the steel surface descaling in hot-rolling and is crucial for the quality of the final product.



DESCALING NOZZLES FEATURE

An efficient scale removal requires the use of proper nozzle designed and manufactured with a special internal profile to provide high values of impact and a consistent flow jet spray along the descaling process. The general composition of a descaling nozzle is shown in the picture at the right. PNR R&D , improving spray uniformity and reducing secondary spray angle, could achieve an increase of 22 % of impact pressure with respect to former standards.

IMPACT FORCE

- Impact force F i is the term used to define the momentum of a fluid vein
- Where Fi = m x ve = (Qe x ρ) x Ve
- Qe = Flow rate (m3 / sec)
- ρ = Fluid density (N.s2 / m4)
- Ve = Fluid speed (m / sec)

For practical purpose, it's common to use the formula

$$Fi^* = 0{,}236 \times Q \times \sqrt{(P)}$$

Where: Q = lt / min P = Kg / cm2 (bar) Fi = Newton

It represents the theoretical impact force of a fluid vein arriving to the nozzle, and does not consider:
A. Internal pressure drop inside the nozzle;
B. Impact force reduction due to the distance between orifice and impact point.
To adjust the real impact force to the former theoretical one, correction factors are used, based on laboratory tests.

IMPACT PRESSURE

When the flat fan spray generated by nozzle hits an area A, it's defined as impact pressure the ratio between the impact force and the area A.

IMPACT MEASUREMENT

Our descaling nozzles are tested by means of a three-dimensional testing machine that measures the spray jet impact and distribution. A load cell, placed at the bottom of the nozzle, moves along the path of the spray jet measuring its force of impact millimeter by millimeter. The pressure values with respect to the surface to be descaled, angle of inclination and offset angle, can be varied according to the technical specifications required by customers.
PNR has designed and manufactured a descaling test bench, with measurement steps adjustable from 0,2 to 2 mm. The output curves of descaling test bench are shown in the following page, and are available on request by customer, specifying required nozzle and flow straightener, working pressure and spray height.

EXTRA HX/GB

HIGH IMPACT NOZZLES, MINI SIZE

The water path leading to the nozzle orifice has been completely redesigned to reduce energy losses caused by turbulence. All sharp cross-section changes have been eliminated, significantly increasing water velocity at the nozzle orifice. The water path leading to the nozzle orifice has been completely redesigned to reduce energy losses caused by turbulence. All sharp cross-section changes have been eliminated, resulting in a significant increase in water velocity at the nozzle orifice. These advantages are added to those offered by a carefully designed flow stabilizer and a filter when assembled in the nipple inlet, minimizing clogging and abrasion of the nozzle orifice.
EXTRA-HX GB is the improved version of our HW AB model.

MATERIAL

AISI 303 Stainless Steel
AISI 420 Stainless Steel hardened
Tungsten carbide

THREAD SPECIFICATION

Welding nipple and locknut

HOW TO ORDER THE PRODUCT

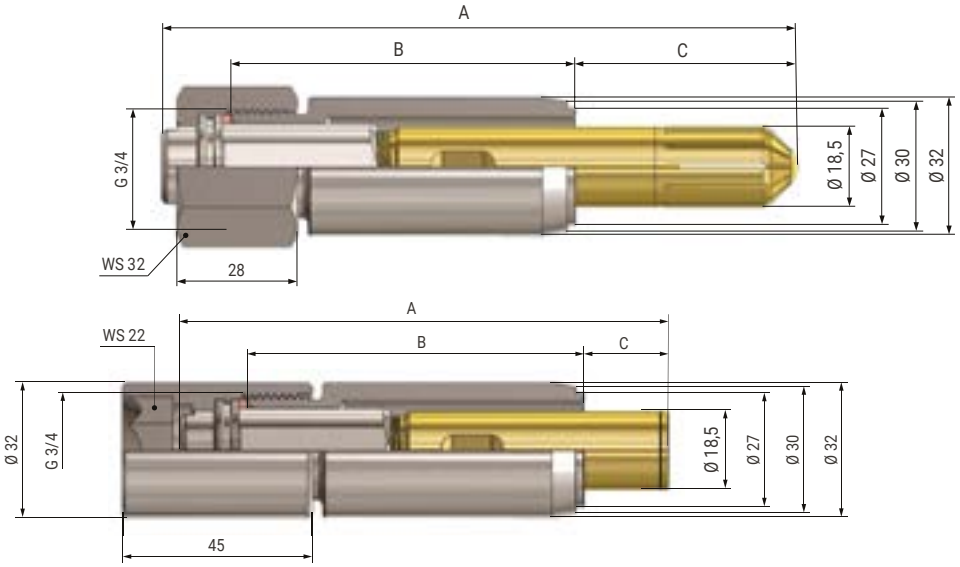
NOZZLE TYPE — HX (SPRAY ANGLE) C 2045 (CAPACITY) xx (NOZZLE MATERIAL) GB — TYPE

SPRAY ANGLE CODES				
HXC	HXE	HXF	HXK	HXL
22°	26°	30°	34°	40°

DIMENSIONS OF ASSEMBLED NOZZLES

NIPPLE	ZWA 0032 B2			ZWA 0039 B2			ZWA 0080 B2		
STABILIZER	A	B	C	A	B	C	A	B	C
XHX DG10 T1	116	32	68	116	39	61	116	80	20
XHX DG11 T1	133	32	85	133	39	78	133	80	37
XHX DG20 T1	147	32	99	147	39	92	147	80	51
XHX DG21 T1	167	32	119	167	39	112	167	80	71
XHX DG22 T1	187	32	139	187	39	132	187	80	91

A = Complete descaling unit length
B = Welding nipple length
C = Flow straightener protrusion



EXTRA HX/GB

WELDING NIPPLE

WELDING NIPPLE CODE	RG inch	LN mm	WEIGHT kg
ZWA 0032 B2	G 3/4	32	0,08
ZWA 0039 B2	G 3/4	39	0,10
ZWA 0080 B2	G 3/4	80	0,23

MATERIALS	
B1	AISI 304 Stainless Steel

FLOW STABILIZER

FLOW STABILIZER CODE	LS mm	WEIGHT Kg	NOTES
XHX DG10 T1	79	0,08	without filter
XHX DG11 T1	96	0,10	without filter
XHX DG20 T1	110	0,12	with filter
XHX DG21 T1	130	0,14	with filter
XHX DG22 T1	150	0,15	with filter

MATERIALS		
T1	Body	Brass
	Filter	
B31	Flow stabilizer	AISI 316L s.s.

GASKET

GASKET CODE
VDA 20C1 T3

MATERIAL	
T3	Copper

NOZZLE

CODE	FLOW RATE (lpm) AT PRESSURE (bar)					
	80	140	200	240	300	400
HX 2045 xxGB	4,5	5,9	7,2	7,8	8,7	10
HX 2063 xxGB	6,3	8,3	10	10,9	12,2	14,1
HX 2106 xxGB	10,6	14,2	16,8	18,4	20,5	23,7
HX 2134 xxGB	13,4	17,7	21,2	23,2	25,9	29,9
HX 2162 xxGB	16,2	21,4	25,6	28	31,4	36,2
HX 2208 xxGB	20,8	27,5	32,9	36	40,2	46,5
HX 2250 xxGB	25	33	39,5	43,3	48,4	55,9
HX 2320 xxGB	32	42,3	50,6	55,4	62	71,6
HX 2402 xxGB	40,2	53,2	63,6	69,6	77,8	89,9
HX 2520 xxGB	52	68,8	82,2	90	101	116
HX 2642 xxGB	64,2	84,9	102	111	124	144
HX 2798 xxGB	79,8	106	126	138	155	178
HX 2996 xxGB	99,6	132	157	173	193	223
HX 3112 xxGB	112	148	177	194	217	250
HX 3120 xxGB	120	159	190	208	232	268

MATERIALS			WEIGHT kg
C1	Body	AISI 303 s.s.	0,09*
	Insert	AISI 420 hardened	
F1	Body	AISI 303 s.s.	0,09*
	Insert	Tungsten carbide	

** Average value*

LOCKNUT

LOCKNUT CODE	NOTES	WEIGHT kg
VAW A075 B1	outside hexagon	0,09*
VAW C075 B1	built in hexagon	0,13 *

** Average value*

MATERIAL	
B1	AISI 303 Stainless Steel

EXTRA HX/GK

HIGH IMPACT NOZZLES, STANDARD SIZE

The water path leading to the nozzle orifice has been completely redesigned to reduce energy losses caused by turbulence. All sharp cross-section changes have been eliminated, significantly increasing water velocity at the nozzle orifice. The water path leading to the nozzle orifice has been completely redesigned to reduce energy losses caused by turbulence. All sharp cross-section changes have been eliminated, resulting in a significant increase in water velocity at the nozzle orifice. These advantages are added to those offered by a carefully designed flow stabilizer and a filter when assembled in the nipple inlet, minimizing clogging and abrasion of the nozzle orifice.
EXTRA-HX GK is the improved version of our HW AK model.

MATERIAL

AISI 303 Stainless Steel
AISI 420 Stainless Steel hardened
Tungsten carbide

THREAD SPECIFICATION

Welding nipple and locknut

HOW TO ORDER THE PRODUCT

NOZZLE TYPE — HX C 2045 xx GK — TYPE

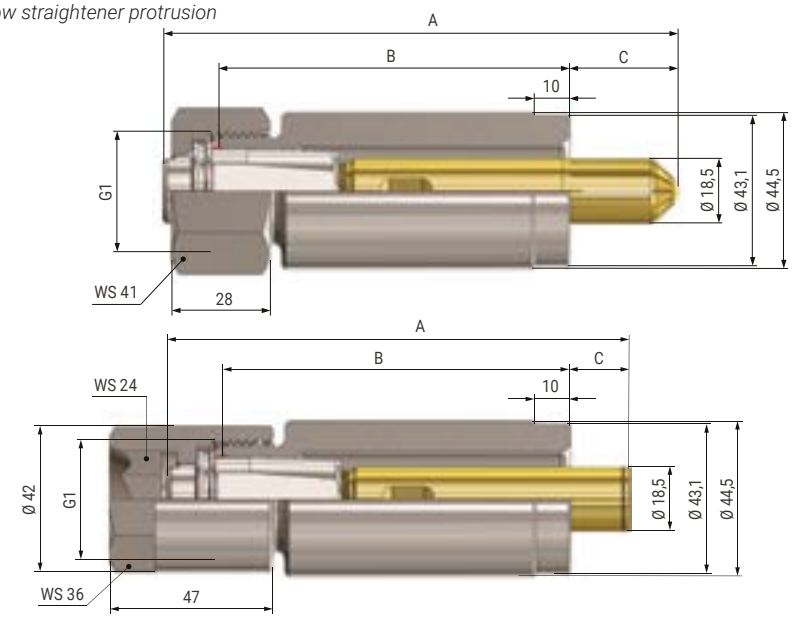
SPRAY ANGLE: C
CAPACITY: 2045
NOZZLE MATERIAL: xx

SPRAY ANGLE CODES				
HXC	HXE	HXF	HXK	HXL
22°	26°	30°	34°	40°

DIMENSIONS OF ASSEMBLED NOZZLES

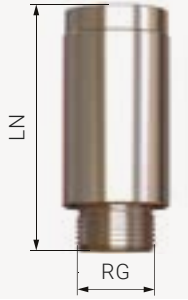
NIPPLE	ZWB 0073 B2			ZWB 0100 B2			ZWB 0120 B2		
STABILIZER	A	B	C	A	B	C	A	B	C
XHX DG10 T1	116	73	27	116	100	0	116	120	0
XHX DG11 T1	133	73	44	133	100	17	133	120	0
XHX DG20 T1	147	73	58	147	100	31	147	120	11
XHX DG21 T1	167	73	78	167	100	51	167	120	31
XHX DG22 T1	187	73	98	187	100	71	187	120	51

A = Complete descaling unit length
B = Welding nipple length
C = Flow straightener protrusion



EXTRA HX/GK

WELDING NIPPLE



WELDING NIPPLE CODE	RG inch	LN mm	WEIGHT kg
ZWB 0073 B2	G 1	73	0,49
ZWB 0100 B2	G 1	100	0,71
ZWB 0120 B2	G 1	120	0,85

MATERIALS	
B1	AISI 304 Stainless Steel

FLOW STABILIZER

FLOW STABILIZER CODE	LS mm	WEIGHT Kg	NOTES
XHX DG10 T1	79	0,08	without filter
XHX DG11 T1	96	0,10	without filter
XHX DG20 T1	110	0,12	with filter
XHX DG21 T1	130	0,14	with filter
XHX DG22 T1	150	0,15	with filter

MATERIALS		
T1	Body	Brass
	Filter	
B31	Flow stabilizer	AISI 316L s.s.

GASKET

GASKET CODE
VDA 24C1 T3

MATERIAL	
T3	Copper

NOZZLE

NOZZLE CODE	FLOW RATE (lpm) AT PRESSURE (bar)					
	80	140	200	240	300	400
HX 2045 xxGK	4,5	5,9	7,2	7,8	8,7	10
HX 2063 xxGK	6,3	8,3	10	10,9	12,2	14,1
HX 2106 xxGK	10,6	14,2	16,8	18,4	20,5	23,7
HX 2134 xxGK	13,4	17,7	21,2	23,2	25,9	29,9
HX 2162 xxGK	16,2	21,4	25,6	28	31,4	36,2
HX 2208 xxGK	20,8	27,5	32,9	36	40,2	46,5
HX 2250 xxGK	25	33	39,5	43,3	48,4	55,9
HX 2320 xxGK	32	42,3	50,6	55,4	62	71,6
HX 2402 xxGK	40,2	53,2	63,6	69,6	77,8	89,9
HX 2520 xxGK	52	68,8	82,2	90	101	116
HX 2642 xxGK	64,2	84,9	102	111	124	144
HX 2798 xxGK	79,8	106	126	138	155	178
HX 2996 xxGK	99,6	132	157	173	193	223
HX 3112 xxGK	112	148	177	194	217	250
HX 3120 xxGK	120	159	190	208	232	268

MATERIALS			WEIGHT kg
C1	Body	AISI 303 s.s.	0,14*
	Insert	AISI 420 hardened	
F1	Body	AISI 303 s.s.	0,14*
	Insert	Tungsten carbide	

** Average value*

LOCKNUT

LOCKNUT CODE	NOTES	WEIGHT kg
VAW B100 B1	outside hexagon	0,16*
VAW D100 B1	built in hexagon	0,25 *

** Average value*

MATERIAL	
B1	AISI 303 Stainless Steel

GW

DOVE-TAIL NOZZLES

GW series nozzles have been the worldwide standard in hot descaling mills for many years. They have undergone many improvements, specifically to the inner orifice profile, resulting in a very even distribution of the water jet impact onto the steel surface.
Their typical design with a dove-tail coupling between the nipple and nozzle tip assures the correct nozzle alignment onto the spray manifold. Several nipple length values and a specific locknut allow for a wide choice of different assembly dimensions.

MATERIAL

AISI 303 Stainless Steel
AISI 420 Stainless Steel hardened
Tungsten carbide

THREAD SPECIFICATION

Dove-tail coupling between nipple and nozzle tip

HOW TO ORDER THE PRODUCT

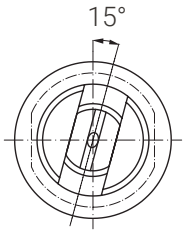
NOZZLE TYPE	SPRAY ANGLE	CAPACITY	NOZZLE MATERIAL
GW	C	2162	xx

SPRAY ANGLE CODES			
GWC	GWE	GWF	GWL
22°	26°	30°	40°

CONVERSION TABLE (UE - USA)

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

OFFSET ANGLE

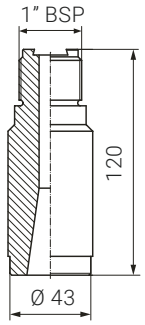


GW

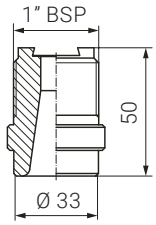
WELDING NIPPLE

WELDING NIPPLE CODE	RG inch	LN mm	WEIGHT Kg
ZWW 0120 B31	G 1	120	0,90
ZWW 0050 B31M	G 1	50	0,22
ZWW 0040 B31F	G 1	40	0,18

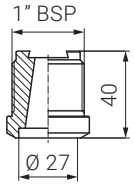
MATERIALS	
B31	AISI 316L Stainless Steel



ZWW 0120 B31

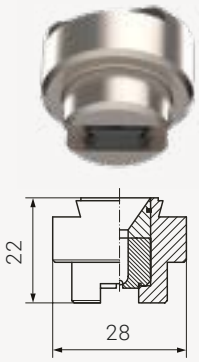


ZWW 0050 B31M



ZWW 0040 B31F

NOZZLE

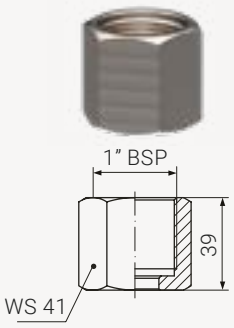


NOZZLE CODE	FLOW RATE (lpm) AT PRESSURE (bar)					
	80	140	200	240	300	400
GW 2162 xx	16,2	21,4	25,6	28,0	31,4	36,2
GW 2208 xx	20,8	27,5	32,9	36,0	40,2	46,5
GW 2250 xx	25,0	33,0	39,5	43,3	48,4	55,9
GW 2320 xx	32,0	42,3	50,6	55,4	62,0	71,6
GW 2402 xx	40,2	53,2	63,6	69,6	77,8	89,9
GW 2520 xx	52,0	68,8	82,2	90,0	101	116
GW 2642 xx	64,2	84,9	102	111	124	144
GW 2798 xx	79,8	106	126	138	155	178
GW 2996 xx	99,6	132	157	173	193	223
GW 3112 xx	112	148	177	194	217	250
GW 3120 xx	120	159	190	208	232	268

MATERIALS			WEIGHT kg
C1	Body	AISI 303 s.s.	0,07*
	Insert	AISI 420 hardened	
F1	Body	AISI 303 s.s.	0,08*
	Insert	Tungsten carbide	

** Average value*

LOCKNUT



LOCKNUT CODE	WEIGHT KG
VAA 1001 B1B	0.22*

** Average value*

MATERIAL	
B1	AISI 303 Stainless Steel

HW/AA

SHORT NOZZLES, MINI SIZE

The modern design of these nozzles offers the same advantage as the full-size HW nozzles. In addition, it makes it possible to use a smaller pitch between the nozzles, allowing for a higher impact value per unit length.
A carefully designed flow stabilizer enhances nozzle efficiency by minimizing turbulence due to the sharp direction change at the inlet from the main manifold. A filter is also provided for mounting at the nozzle inlet, minimizing nozzle clogging and abrasion.

MATERIAL

AISI 303 Stainless Steel
AISI 420 Stainless Steel hardened
Tungsten carbide

THREAD SPECIFICATION

Welding nipple and locknut

HOW TO ORDER THE PRODUCT

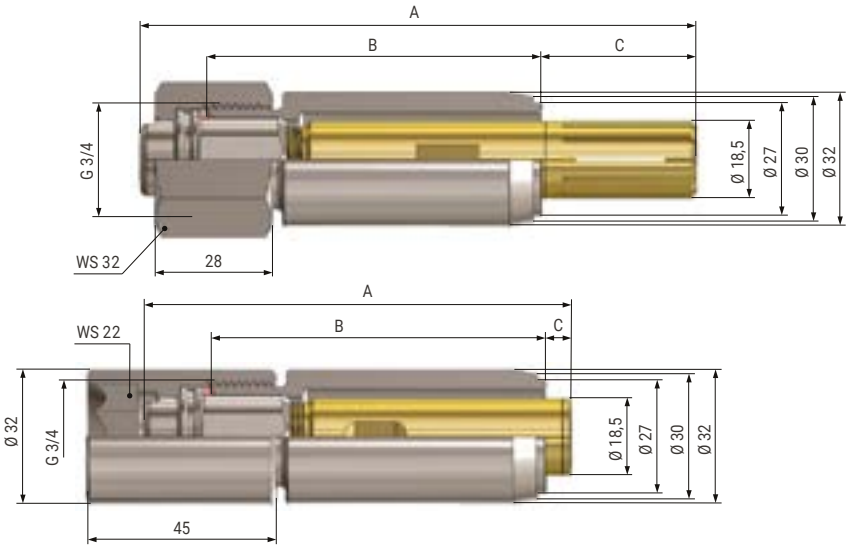
NOZZLE TYPE	SPRAY ANGLE	CAPACITY	NOZZLE MATERIAL	TYPE
HW	C	2045	xx	AA

SPRAY ANGLE CODES			
HWC	HWE	HWF	HWL
22°	26°	30°	40°

DIMENSIONS OF ASSEMBLED NOZZLES

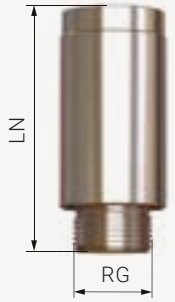
NIPPLE	ZWA 0032 B2			ZWA 0039 B2			ZWA 0080 B2		
STABILIZER	A	B	C	A	B	C	A	B	C
XHW AG10 T1	97	32	48,5	97	39	41,5	97	80	0.5
XHW AG20 T1	133	32	85	133	39	78	133	80	37
XHW AG21 T1	153	32	105	153	39	98	153	80	57

A = Complete descaling unit length
B = Welding nipple length
C = Flow straightener protrusion



HW/AA

WELDING NIPPLE



WELDING NIPPLE CODE	RG inch	LN mm	WEIGHT kg
ZWA 0032 B2	G 3/4	32	0,06
ZWA 0039 B2	G 3/4	39	0,08
ZWA 0080 B2	G 3/4	80	0,19

MATERIALS	
B1	AISI 304 Stainless Steel

FLOW STABILIZER

FLOW STABILIZER CODE	LS mm	WEIGHT kg	NOTES
XHW AG10 T1	74	0,09	without filter
XHW AG20 T1	110	0,14	with filter
XHW AG21 T1	130	0,16	with filter

MATERIALS		
T1	Body	Brass
	Filter	
B31	Flow stabilizer	AISI 316L s.s.

GASKET

GASKET CODE
VDA 20C1 T3

MATERIAL	
T3	Copper

NOZZLE

NOZZLE CODE	FLOW RATE (lpm) AT PRESSURE (bar)					
	80	140	200	240	300	400
HW 2045 xxAA	4,5	5,9	7,2	7,8	8,7	10
HW 2063 xxAA	6,3	8,3	10	10,9	12,2	14,1
HW 2106 xxAA	10,6	14,2	16,8	18,4	20,5	23,7
HW 2134 xxAA	13,4	17,7	21,2	23,2	25,9	29,9
HW 2162 xxAA	16,2	21,4	25,6	28	31,4	36,2
HW 2208 xxAA	20,8	27,5	32,9	36	40,2	46,5
HW 2250 xxAA	25	33	39,5	43,3	48,4	55,9
HW 2320 xxAA	32	42,3	50,6	55,4	62	71,6
HW 2402 xxAA	40,2	53,2	63,6	69,6	77,8	89,9
HW 2520 xxAA	52	68,8	82,2	90	101	116
HW 2642 xxAA	64,2	84,9	102	111	124	144
HW 2798 xxAA	79,8	106	126	138	155	178
HW 2996 xxAA	99,6	132	157	173	193	223
HW 3112 xxAA	112	148	177	194	217	250
HW 3120 xxAA	120	159	190	208	232	268

MATERIALS			WEIGHT kg
C1	Body	AISI 303 s.s.	0,07*
	Insert	AISI 420 hardened	
F1	Body	AISI 303 s.s.	0,08*
	Insert	Tungsten carbide	

** Average value*

LOCKNUT

LOCKNUT CODE	NOTES	WEIGHT kg
VAW A075 B1	outside hexagon	0,09*
VAW C075 B1	built in hexagon	0,12 *

** Average value*

MATERIAL	
B1	AISI 303 Stainless Steel

HW/AB

HIGH IMPACT NOZZLES, MINI SIZE

The water path leading to the nozzle orifice has been completely redesigned to reduce energy losses caused by turbulence.
All sharp cross-section changes have been eliminated, significantly increasing water velocity at the nozzle orifice. These advantages are added to those offered by a carefully designed flow stabilizer and a filter when assembled in the nipple inlet, minimizing clogging and abrasion of the nozzle orifice.

MATERIAL

AISI 303 Stainless Steel
AISI 420 Stainless Steel hardened
Tungsten carbide

THREAD SPECIFICATION

Welding nipple and locknut

HOW TO ORDER THE PRODUCT

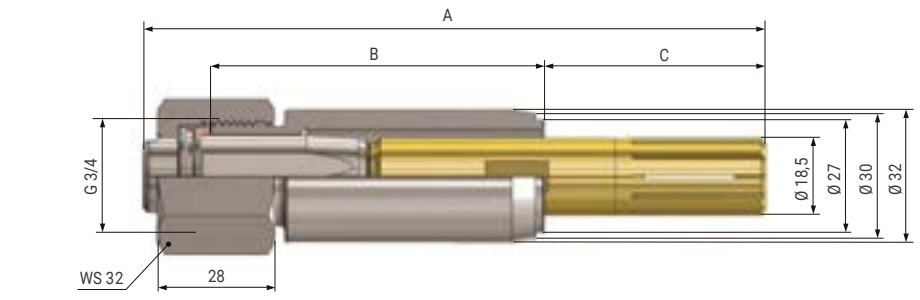
NOZZLE TYPE	SPRAY ANGLE	CAPACITY	NOZZLE MATERIAL	TYPE
HW	C	2045	xx	AB

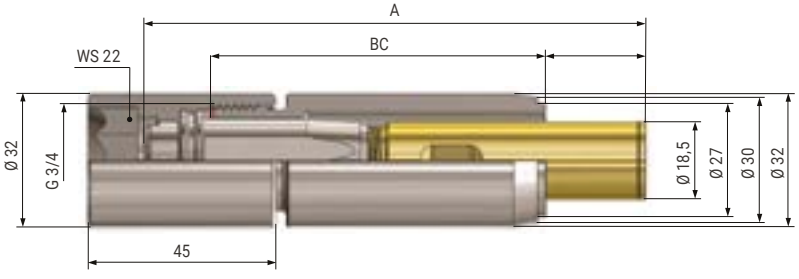
SPRAY ANGLE CODES			
HWC	HWE	HWF	HWL
22°	26°	30°	40°

DIMENSIONS OF ASSEMBLED NOZZLES

NIPPLE	ZWA 0032 B2			ZWA 0039 B2			ZWA 0080 B2		
STABILIZER	A	B	C	A	B	C	A	B	C
XHW DG10 T1	115	32	67	115	39	60	115	80	19
XHW DG11 T1	135	32	87	135	39	80	135	80	39
XHW DG20 T1	149	32	101	149	39	94	149	80	53
XHW DG21 T1	169	32	121	169	39	114	169	80	73
XHW DG21 T1	189	32	141	189	39	134	189	80	93

A = Complete descaling unit length
B = Welding nipple length
C = Flow straightener protrusion





HW/AB

WELDING NIPPLE

WELDING NIPPLE CODE	RG inch	LN mm	WEIGHT kg
ZWA 0032 B2	G 3/4	32	0,06
ZWA 0039 B2	G 3/4	39	0,08
ZWA 0080 B2	G 3/4	80	0,19

MATERIALS	
B1	AISI 304 Stainless Steel

FLOW STABILIZER

FLOW STABILIZER CODE	LS mm	WEIGHT kg	NOTES
XHW DG10 T1	76	0,08	without filter
XHW DG11 T1	96	0.10	without filter
XHW DG20 T1	110	0,11	with filter
XHW DG21 T1	130	0,14	with filter
XHW DG22 T1	150	0.16	with filter

MATERIALS		
T1	Body	Brass
	Filter	
B31	Flow stabilizer	AISI 316L s.s.

GASKET

GASKET CODE
VDA 20C1 T3

MATERIAL	
T3	Copper

NOZZLE

CODE	FLOW RATE (lpm) AT PRESSURE (bar)					
	80	140	200	240	300	400
HW 2045 xxAB	4,5	5,9	7,2	7,8	8,7	10
HW 2063 xxAB	6,3	8,3	10	10,9	12,2	14,1
HW 2106 xxAB	10,6	14,2	16,8	18,4	20,5	23,7
HW 2134 xxAB	13,4	17,7	21,2	23,2	25,9	29,9
HW 2162 xxAB	16,2	21,4	25,6	28	31,4	36,2
HW 2208 xxAB	20,8	27,5	32,9	36	40,2	46,5
HW 2250 xxAB	25	33	39,5	43,3	48,4	55,9
HW 2320 xxAB	32	42,3	50,6	55,4	62	71,6
HW 2402 xxAB	40,2	53,2	63,6	69,6	77,8	89,9
HW 2520 xxAB	52	68,8	82,2	90	101	116
HW 2642 xxAB	64,2	84,9	102	111	124	144
HW 2798 xxAB	79,8	106	126	138	155	178
HW 2996 xxAB	99,6	132	157	173	193	223
HW 3112 xxAB	112	148	177	194	217	250
HW 3120 xxAB	120	159	190	208	232	268

MATERIALS			WEIGHT kg
C1	Body	AISI 303 s.s.	0,10*
	Insert	AISI 420 hardened	
F1	Body	AISI 303 s.s.	0,11*
	Insert	Tungsten carbide	

** Average value*

LOCKNUT

LOCKNUT CODE	NOTES	WEIGHT kg
VAW A075 B1	outside hexagon	0,09*
VAW C075 B1	built in hexagon	0,12 *

** Average value*

MATERIAL	
B1	AISI 303 Stainless Steel

HW/AH

SHORT NOZZLES, STANDARD SIZE

High-impact nozzles are widely used in hot rolling processes as they provide adequate impact for consistent descaling. Their modern design offers the convenience of a more rational alignment system that allows a copper seal to be used between the nipple and nozzle tip.
The nozzle efficiency is enhanced using a carefully designed flow stabilizer, which minimizes turbulence due to sharp direction changes at the inlet from the central manifold. Provision is also made for a filter to be mounted at the nozzle inlet, minimizing nozzle clogging and abrasion.

MATERIAL

AISI 303 Stainless Steel
AISI 420 Stainless Steel hardened
Tungsten carbide

THREAD SPECIFICATION

Welding nipple and locknut

HOW TO ORDER THE PRODUCT

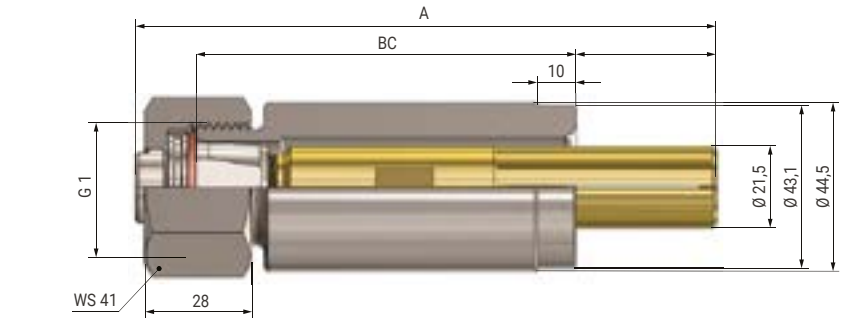
NOZZLE TYPE	SPRAY ANGLE	CAPACITY	NOZZLE MATERIAL	TYPE
HW	C	2045	xx	AH

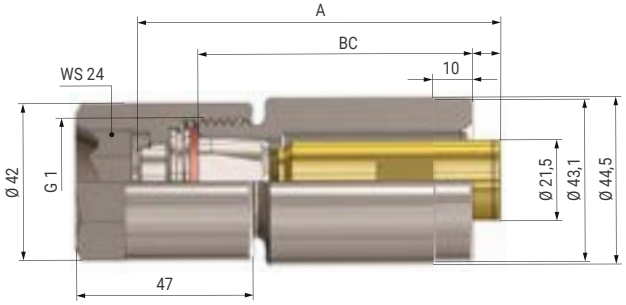
SPRAY ANGLE CODES			
HWC	HWE	HWF	HWL
22°	26°	30°	40°

DIMENSIONS OF ASSEMBLED NOZZLES

NIPPLE	ZWB 0073 B2			ZWB 0100 B2			ZWB 0120 B2		
STABILIZER	A	B	C	A	B	C	A	B	C
XHW CG10 T1	96,5	73	7,5	116	100	0	136	120	0
XHW CG20 T1	133	73	44	133	100	17	136	120	0
XHW CG21 T1	153	73	64	153	100	37	153	120	17

A = Complete descaling unit length
B = Welding nipple length
C = Flow straightener protrusion





HW/AH

WELDING NIPPLE

WELDING NIPPLE CODE	RG inch	LN mm	WEIGHT kg
ZWB 0073 B2	G 1	73	0,48
ZWB 0100 B2	G 1	100	0,70
ZWB 0120 B2	G 1	120	0,84

MATERIALS	
B1	AISI 304 Stainless Steel

FLOW STABILIZER

FLOW STABILIZER CODE	LS mm	WEIGHT Kg	NOTES
XHW CG10 T1	74	0,12	without filter
XHW CG20 T1	110,5	0,18	with filter
XHW CG21 T1	130,5	0,20	with filter

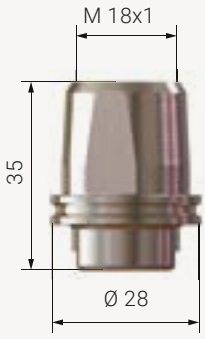
MATERIALS		
T1	Body	Brass
	Filter	
B31	Flow stabilizer	AISI 316L s.s.

GASKET

GASKET CODE
VDA 24C1 T3

MATERIAL	
T3	Copper

NOZZLE



CODE	FLOW RATE (lpm) AT PRESSURE (bar)					
	80	140	200	240	300	400
HW 2045 xxAH	4,5	5,9	7,2	7,8	8,7	10
HW 2063 xxAH	6,3	8,3	10	10,9	12,2	14,1
HW 2106 xxAH	10,6	14,2	16,8	18,4	20,5	23,7
HW 2134 xxAH	13,4	17,7	21,2	23,2	25,9	29,9
HW 2162 xxAH	16,2	21,4	25,6	28	31,4	36,2
HW 2208 xxAH	20,8	27,5	32,9	36	40,2	46,5
HW 2250 xxAH	25	33	39,5	43,3	48,4	55,9
HW 2320 xxAH	32	42,3	50,6	55,4	62	71,6
HW 2402 xxAH	40,2	53,2	63,6	69,6	77,8	89,9
HW 2520 xxAH	52	68,8	82,2	90	101	116
HW 2642 xxAH	64,2	84,9	102	111	124	144
HW 2798 xxAH	79,8	106	126	138	155	178
HW 2996 xxAH	99,6	132	157	173	193	223
HW 3112 xxAH	112	148	177	194	217	250
HW 3120 xxAH	120	159	190	208	232	268

MATERIALS			WEIGHT kg
C1	Body	AISI 303 s.s.	0,08*
	Insert	AISI 420 hardened	
F1	Body	AISI 303 s.s.	0,09*
	Insert	Tungsten carbide	

** Average value*

LOCKNUT

LOCKNUT CODE	NOTES	WEIGHT kg
VAW B100 B1	outside hexagon	0,16*
VAW D100 B1	built in hexagon	0,24 *

** Average value*

MATERIAL	
B1	AISI 303 Stainless Steel

HW/AK

HIGH IMPACT NOZZLES, STANDARD SIZE

The water path leading to the nozzle orifice has been completely redesigned to reduce energy losses caused by turbulence.
All sharp cross-section changes have been eliminated, significantly increasing water velocity at the nozzle orifice.
This design, with the flow stabilizer mounted, allows results of absolute relief.

MATERIAL

AISI 303 Stainless Steel
AISI 420 Stainless Steel hardened
Tungsten carbide

THREAD SPECIFICATION

Welding nipple and locknut

HOW TO ORDER THE PRODUCT

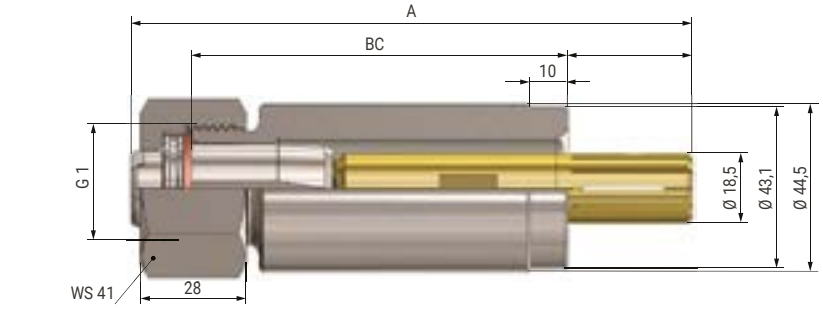
NOZZLE TYPE	SPRAY ANGLE	CAPACITY	NOZZLE MATERIAL	TYPE
HW	C	2045	xx	AK

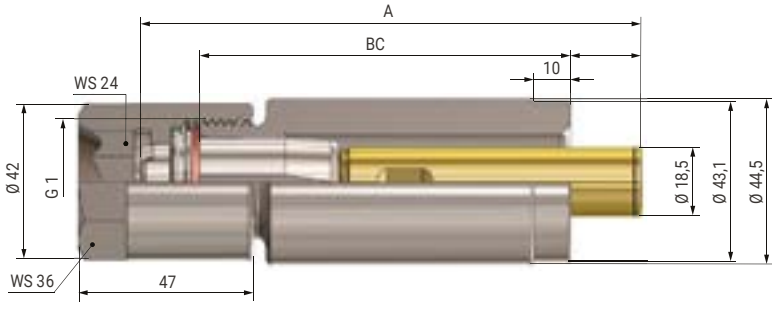
SPRAY ANGLE CODES			
HWC	HWE	HWF	HWL
22°	26°	30°	40°

DIMENSIONS OF ASSEMBLED NOZZLES

NIPPLE	ZWB 0073 B2			ZWB 0100 B2			ZWB 0120 B2		
STABILIZER	A	B	C	A	B	C	A	B	C
XHW DG10 T1	115	73	26	115	100	0	115	120	0
XHW DG11 T1	135	73	46	135	100	19	135	120	0
XHW DG20 T1	149	73	60	149	100	33	149	120	13
XHW DG21 T1	169	73	80	169	100	53	169	120	33
XHW DG21 T1	189	73	100	189	100	73	189	120	53

A = Complete descaling unit length
B = Welding nipple length
C = Flow straightener protrusion





HW/AK

WELDING NIPPLE

WELDING NIPPLE CODE	RG inch	LN mm	WEIGHT kg
ZWB 0073 B2	G 1	73	0,48
ZWB 0100 B2	G 1	100	0,70
ZWB 0120 B2	G 1	120	0,84

MATERIALS	
B1	AISI 304 Stainless Steel

FLOW STABILIZER

FLOW STABILIZER CODE	LS mm	WEIGHT kg	NOTES
XHW CG10 T1	76	0,08	without filter
XHW CG20 T1	96	0.10	without filter
XHW CG21 T1	110	0,11	with filter
XHW DG21 T1	130	0,14	with filter
XHW DG22 T1	150	0.15	with filter

MATERIALS		
T1	Body	Brass
	Filter	
B31	Flow stabilizer	AISI 316L s.s.

GASKET

GASKET CODE
VDA 24C1 T3

MATERIAL	
T3	Copper

NOZZLE

CODE	FLOW RATE (lpm) AT PRESSURE (bar)					
	80	140	200	240	300	400
HW 2045 xxAK	4,5	5,9	7,2	7,8	8,7	10
HW 2063 xxAK	6,3	8,3	10	10,9	12,2	14,1
HW 2106 xxAK	10,6	14,2	16,8	18,4	20,5	23,7
HW 2134 xxAK	13,4	17,7	21,2	23,2	25,9	29,9
HW 2162 xxAK	16,2	21,4	25,6	28	31,4	36,2
HW 2208 xxAK	20,8	27,5	32,9	36	40,2	46,5
HW 2250 xxAK	25	33	39,5	43,3	48,4	55,9
HW 2320 xxAK	32	42,3	50,6	55,4	62	71,6
HW 2402 xxAK	40,2	53,2	63,6	69,6	77,8	89,9
HW 2520 xxAK	52	68,8	82,2	90	101	116
HW 2642 xxAK	64,2	84,9	102	111	124	144
HW 2798 xxAK	79,8	106	126	138	155	178
HW 2996 xxAK	99,6	132	157	173	193	223
HW 3112 xxAK	112	148	177	194	217	250
HW 3120 xxAK	120	159	190	208	232	268

MATERIALS			WEIGHT kg
C1	Body	AISI 303 s.s.	0,14*
	Insert	AISI 420 hardened	
F1	Body	AISI 303 s.s.	0,15*
	Insert	Tungsten carbide	

** Average value*

LOCKNUT

LOCKNUT CODE	NOTES	WEIGHT kg
VAW B100 B1	outside hexagon	0,16*
VAW D100 B1	built in hexagon	0,24 *

** Average value*

MATERIAL	
B1	AISI 303 Stainless Steel

HV/AX

HIGH-IMPACT NOZZLE, SPECIAL SIZE

High-impact nozzles are widely used in hot rolling processes as they provide adequate impact for consistent descaling. Their modern design offers the convenience of a more rational alignment system that allows a copper seal to be used between the nipple and nozzle tip.
The nozzle efficiency is enhanced using a carefully designed flow stabilizer, which minimizes turbulence due to sharp direction changes at the inlet from the central manifold. Provision is also made for a filter to be mounted at the nozzle inlet, minimizing nozzle clogging and abrasion.

MATERIAL

AISI 303 Stainless Steel
Tungsten carbide

THREAD SPECIFICATION

Welding nipple and locknut

HOW TO ORDER THE PRODUCT

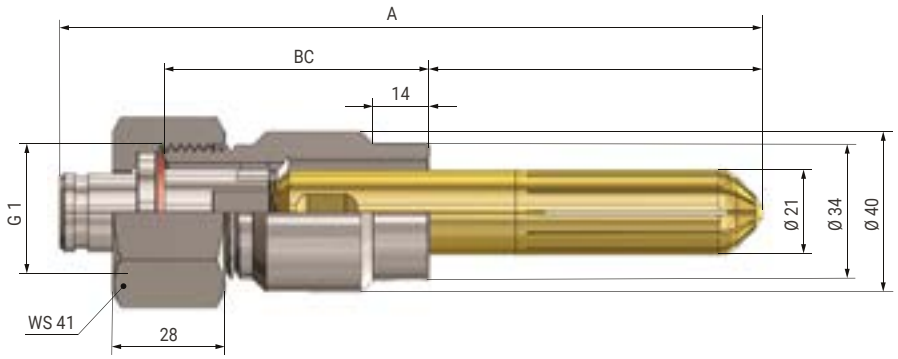
NOZZLE TYPE	SPRAY ANGLE	CAPACITY	NOZZLE MATERIAL	TYPE
HV	C	2045	F1	AX

SPRAY ANGLE CODES				
HVC	HVE	HVF	HVK	HVL
22°	26°	30°	34°	40°

DIMENSIONS OF ASSEMBLED NOZZLES

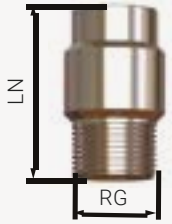
NIPPLE	ZWC 0062 B2			ZWC 0066 B2		
STABILIZER	A	B	C	A	B	C
XHV EG30 T1	130	62	87	130	66	83
XHV EG31 T1	175	62	8	175	66	8

A = Complete descaling unit length
B = Welding nipple length
C = Flow straightener protrusion



HV/AX

WELDING NIPPLE



WELDING NIPPLE CODE	RG inch	LN mm	WEIGHT kg
ZWC 0062 B2	G 1	62	0,65
ZWC 0066 B2	G 1	66	0,70

MATERIALS	
B1	AISI 304 Stainless Steel

FLOW STABILIZER

FLOW STABILIZER CODE	LS mm	WEIGHT kg	NOTES
XHW EG30 T1	93,5	0,11	with filter
XHW EG31 T1	138,5	0,15	with filter

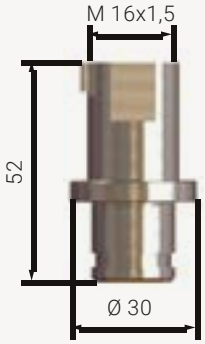
MATERIALS		
T1	Body	Brass
	Filter	
B31	Flow stabilizer	AISI 316L s.s.

GASKET

GASKET CODE
VDA 24C1 T3

MATERIAL	
T3	Copper

NOZZLE



CODE	FLOW RATE (lpm) AT PRESSURE (bar)					
	80	140	200	240	300	400
HV 2045 F1AX	4,5	5,9	7,2	7,8	8,7	10
HV 2063 F1AX	6,3	8,3	10	10,9	12,2	14,1
HV 2106 F1AX	10,6	14,2	16,8	18,4	20,5	23,7
HV 2134 F1AX	13,4	17,7	21,2	23,2	25,9	29,9
HV 2162 F1AX	16,2	21,4	25,6	28	31,4	36,2
HV 2208 F1AX	20,8	27,5	32,9	36	40,2	46,5
HV 2250 F1AX	25	33	39,5	43,3	48,4	55,9
HV 2320 F1AX	32	42,3	50,6	55,4	62	71,6
HV 2402 F1AX	40,2	53,2	63,6	69,6	77,8	89,9
HV 252 F1AX	52	68,8	82,2	90	101	116
HV 2642 F1AX	64,2	84,9	102	111	124	144
HV 2798 F1AX	79,8	106	126	138	155	178
HV 2996 F1AX	99,6	132	157	173	193	223
HV 3112 F1AX	112	148	177	194	217	250
HV 3120 F1AX	120	159	190	208	232	268

MATERIALS			WEIGHT kg
F1	Body	AISI 303 s.s.	0,13*
	Insert	Tungsten carbide	

** Average value*

LOCKNUT

LOCKNUT CODE	NOTES	WEIGHT kg
VAW B100 B1	outside hexagon	0,16*
VAW D100 B1	built in hexagon	0,24 *

** Average value*

MATERIAL	
B1	AISI 303 Stainless Steel

HW/AM

HIGH-IMPACT NOZZLE, SPECIAL SIZE

In some plants, the centre-to-centre distance between descaling nozzles can be very narrow.
In these cases, using micro-descaling tips avoids installing nipples and nozzles or rings onto the spray manifold, which would be difficult, if not impossible, with standard nozzles.

MATERIAL

AISI 303 Stainless Steel
Tungsten carbide

THREAD SPECIFICATION

Welding nipple and locknut

HOW TO ORDER THE PRODUCT

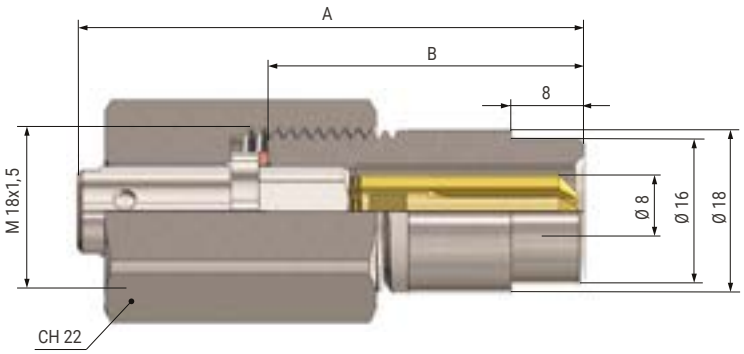
NOZZLE TYPE	SPRAY ANGLE	CAPACITY	NOZZLE MATERIAL	TYPE
HW	C	2045	F1	AM

SPRAY ANGLE CODES			
HVC	HVE	HVF	HVL
22°	26°	30°	40°

DIMENSIONS OF ASSEMBLED NOZZLES

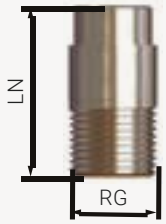
NIPPLE	ZWM 0035 B2	
STABILIZER	A	B
XHW MG20 T1	56	62

A = Complete descaling unit length
B = Welding nipple length
C = Flow straightener protrusion



HW/AM

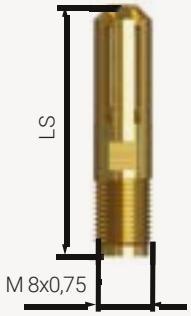
WELDING NIPPLE



WELDING NIPPLE CODE	RG inch	LN mm	WEIGHT kg
ZWM 0035 B2	M18X1,5	35	0,2

MATERIALS	
B1	AISI 304 s.s.

FLOW STABILIZER



FLOW STABILIZER CODE	LS mm	WEIGHT Kg	NOTES
XHW MG20 T1	35	0,04	with filter

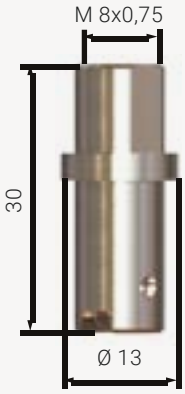
MATERIALS		
T1	Body	Brass
	Filter	
B31	Flow stabilizer	AISI 316L s.s.

GASKET

GASKET CODE
VDA 10A5 T3

MATERIAL	
T3	Copper

NOZZLE



CODE	FLOW RATE (lpm) AT PRESSURE (bar)					
	80	140	200	240	300	400
HW 2045 F1AM	4,5	5,9	7,2	7,8	8,7	10
HW 2063 F1AM	6,3	8,3	10	10,9	12,2	14,1
HW 2106 F1AM	10,6	14,2	16,8	18,4	20,5	23,7
HW 2134 F1AM	13,4	17,7	21,2	23,2	25,9	29,9
HW 2162 F1AM	16,2	21,4	25,6	28	31,4	36,2
HW 2208 F1AM	20,8	27,5	32,9	36	40,2	46,5
HW 2250 F1AM	25	33	39,5	43,3	48,4	55,9

MATERIALS			WEIGHT kg
F1	Body	AISI 303 s.s.	0,16*
	Insert	Tungsten carbide	

** Average value*

LOCKNUT

LOCKNUT CODE	NOTES	WEIGHT kg
VAW MM18 B1	outside hexagon	0,06*

** Average value*

MATERIAL	
B1	AISI 303 s.s.

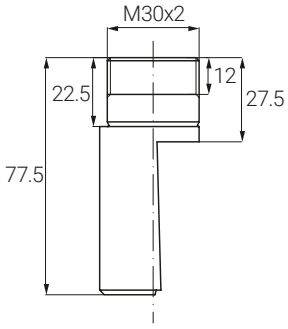
ROLL COOLING

Rolling and transport rolls are exposed to intense thermal cycles: when in contact with hot material, they absorb heat and must be continuously cooled to maintain their dimensional and mechanical characteristics, extend service life, and ensure the laminate's surface quality.

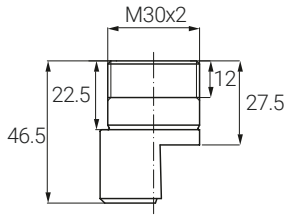
The cooling strategy depends on the roll geometry, its position in the line, and the thermal load intensity.

PNR Italia proposes the **KZA blade nozzle** for this application, designed to distribute the fluid uniformly along the entire length of the roll, and the **GY flat fan nozzle** for configurations requiring a differentiated impact profile.

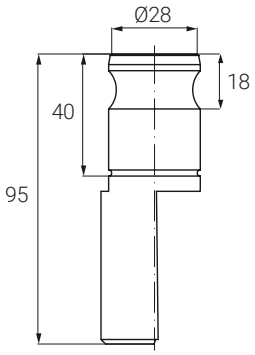
KZA



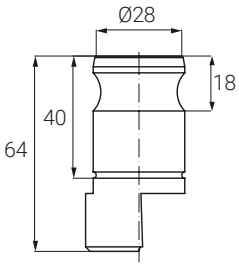
KZA 1510 xxLA



KZA 1510 xxCA



KZA 2100 xxLX



KZA 2100 xxCX

FLAT FAN NOZZLES

KZA type special flat fan jet nozzles are the best solution to cool forged steel rolls on continuous casting machines with high spray width values. The direction of the two jets is designed to obtain maximum cooling efficiency over a long reach.
It is available in four different versions: standard *(C)* or long *(L)* body, metric thread *(A)* or quick coupling *(X)*.

MATERIAL
AISI 303 Stainless Steel
Brass
Other materials on request

THREAD SPECIFICATION
Metric Thread M30x2
Quick Coupling Ø28

HOW TO ORDER THE PRODUCT

MATERIAL
B31 - AISI 316L Stainless Steel
T1 - Brass

NOZZLE TYPE — **KZA 1510 xx y z** — **VARIATION**
A - Metric Thread M30x2
X - Quick Coupling Ø28

CAPACITY

CONSTRUCTION
C - Standard
L - Long body

CODE	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)								W (B31)	W (T1)
	1	2	3	4	5	6	7	10	KG	KG
KZA 1510 xx	2,94	4,16	5,1	5,89	6,58	7,21	7,79	9,31	0,26	0,28
KZA 2107 xx	6,18	8,74	10,7	12,4	13,8	15,1	16,3	19,5	0,33	0,35

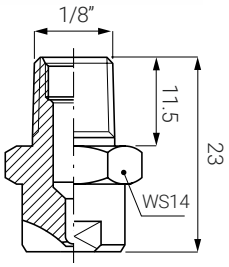
PICKLING

Pickling removes the oxide layers formed during hot-rolling, leaving the sheet surface clean and ready for subsequent processes such as galvanizing, painting, coating, or further rolling. The process involves spraying acid solutions — typically hydrochloric or sulfuric acid — onto the material's surface, followed by rinsing and neutralization.

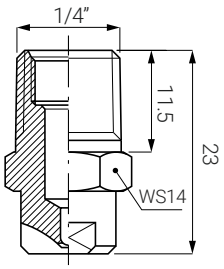
In this application, nozzles are exposed to chemically aggressive fluids and must ensure a uniform distribution of the acid solution across the sheet's full width.

Chemical resistance is a fundamental requirement for the material.
For pickling, PNR Italia proposes **J and K HIGH flat-fan nozzles**, selectable based on the required flow rate, operating pressure, and available connection type, all in materials that resist process acids.

J



JA



JB

FLAT FAN NOZZLES, LOW CAPACITY

These standard flat fan nozzles are available in a wide range of capacities, spray angles and materials. Nozzles shown on this page cover the low to minimal capacity range from 0.06 to 1.60 litres per minute.
The tiny outlet orifices, machined with high precision, may be protected from clogging using an adequate filter inside the supply line, depending upon the quantity and type of the solid particles suspended in the liquid. These nozzles can be made with a customized inner thread for a VEF filter *(*optional)*.

MATERIAL

AISI 303 Stainless Steel
AISI 316L Stainless Steel
Brass
PVC, PTFE (opt.)
Other materials on request

THREAD SPECIFICATION

Male BSPT
Male NPT
From 1/8" to 1/4"

HOW TO ORDER THE PRODUCT

SPRAY ANGLE
D - 25° **R** - 65° **V** - 95°
L - 40° **S** - 75° **J** - 110°
N - 50° **T** - 80°

NOZZLE TYPE — **J A D 0130 xx** — **MATERIAL**
B1 - AISI 303 Stainless Steel
B31 - AISI 316L Stainless Steel
T1 - Brass

CONNECTION
A - 1/8”
B - 1/4”

CAPACITY

LIST OF MATERIALS

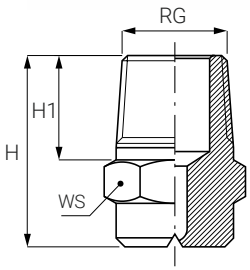
MATERIAL	100	130	150	200	260	390	590	780
B31 - AISI 316L SS				•	•	•	•	• *(1)*
B1 – AISI 303 SS	•	•	•	•	•	•	•	• *(2)*
T1 – BRASS	•	•	•	•	•	•	•	• *(2)*

(1) Low capacity body
(2) Standard capacity body

LOW CAPACITY

	25°	40°	50°	65°	80°	95°	110°	CODE	D	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							
1/8"	JAD	JAL	JAN	JAR	JAT	JAV	JAJ										
1/4"	JBD	JBL	JBN	JBR	JBT	JBV	JBJ		MM	0,7	1	1,5	2	3	5	7	10
				•				**100**	0,34	0,048	0,06	0,07	0,08	0,1	0,13	0,15	0,18
				•				**130**	0,38	0,06	0,08	0,09	0,11	0,13	0,17	0,2	0,24
•	•	•	•	•	•	•	•	**150**	0,4	0,07	0,09	0,11	0,12	0,15	0,19	0,23	0,27
•	•	•	•	•	•	•	•	**200**	0,46	0,096	0,12	0,14	0,16	0,2	0,26	0,31	0,37
•	•	•	•	•	•	•	•	**260**	0,53	0,1	0,15	0,18	0,21	0,26	0,34	0,4	0,47
•	•	•	•	•	•	•	•	**390**	0,66	0,19	0,23	0,28	0,32	0,39	0,5	0,6	0,71
•	•	•	•	•	•	•	•	**590**	0,79	0,28	0,34	0,42	0,48	0,59	0,76	0,9	1,08

J



FLAT FAN NOZZLES, STANDARD CAPACITY

Standard flat fan nozzles are available in a wide range of different capacities, spray angles, thread sizes and materials. Used in several industrial applications, they produce a mist spray and supply an appropriate force of impact.

MATERIAL

AISI 303 Stainless Steel
AISI 316L Stainless Steel
Brass
PVC, PTFE (opt.)
Other materials on request

THREAD SPECIFICATION

Male BSPT
Male NPT
From 1/8" to 3/8"

HOW TO ORDER THE PRODUCT

SPRAY ANGLE
A - 0° **M** - 45° **W** - 120°
C - 20° **Q** - 60°
F - 30° **U** - 90°

NOZZLE TYPE — **J A A 1160 xx** — **MATERIAL**
B1 - AISI 303 Stainless Steel
B31 - AISI 316L Stainless Steel
T1 - Brass

CONNECTION
A - 1/8" **B** - 3/8"
B - 1/4"

CAPACITY

THREAD SIZE CODING TABLE

CODE	RG inch	H mm	H1 mm	WS mm
JA	1/8"	19,5	11	12
JB	1/4"	22	12	14
JC	3/8"	25	14	17

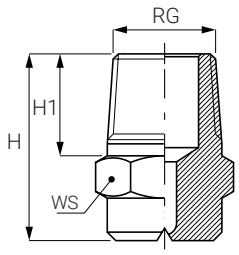
SPRAY ANGLE CODES

JxA	JxC	JxF	JxM	JxQ	JxU	JxW
0°	20°	30°	45°	60°	90°	120°

STANDARD CAPACITY

1/8"	1/4"	3/8"	CODE	D	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)								
JAX	JBX	JCX		MM	0,5	1	2	3	4	5	7	10	20
•	•		**780**	0,91	0,32	0,45	0,64	0,78	0,9	1,01	1,19	1,42	2,01
•	•		**1120**	1,1	0,49	0,69	0,98	1,2	1,39	1,55	1,83	2,19	3,1
•	•		**1160**	1,3	0,65	0,92	1,31	1,6	1,85	2,07	2,44	2,92	4,13
•	•		**1190**	1,3	0,78	1,1	1,55	1,9	2,19	2,45	2,9	3,47	4,91
•	•		**1233**	1,5	0,95	1,35	1,9	2,33	2,69	3,01	3,56	4,25	6,02
•	•		**1310**	1,7	1,27	1,79	2,53	3,1	3,58	4	4,74	5,66	8
•	•		**1385**	1,8	1,57	2,22	3,14	3,85	4,45	4,97	5,88	7,03	9,94
•	•		**1490**	2,1	2	2,83	4	4,9	5,66	6,33	7,48	8,95	12,7
•	•		**1581**	2,3	2,37	3,35	4,74	5,81	6,71	7,5	8,87	10,6	15
•	•	•	**1780**	2,7	3,18	4,5	6,37	7,8	9,01	10,1	11,9	14,2	20,1
•	•	•	**1980**	3	4	5,66	8	9,8	11,3	12,7	15	17,9	25,3
•	•	•	**2124**	3,4	5,06	7,16	10,1	12,4	14,3	16	18,9	22,6	32
•	•	•	**2153**	3,8	6,25	8,83	12,5	15,3	17,7	19,8	23,4	27,9	39,5
	•	•	**2195**	4,3	7,96	11,3	15,9	19,5	22,5	25,2	29,8	35,6	50,3
	•	•	**2245**	4,8	10	14,1	20	24,5	28,3	31,6	37,4	44,7	63,3
	•	•	**2274**	5,2	11,2	15,8	22,4	27,4	31,6	35,4	41,9	50	70,7
	•	•	**2310**	5,4	12,7	17,9	25,3	31	35,8	40	47,4	56,6	80
		•	**2390**	6	15,9	22,5	31,8	39	45	50,3	59,6	71,2	101
		•	**2470**	6,2	19,2	27,1	38,4	47	54,3	60,7	71,8	85,8	121

J



FLAT FAN NOZZLES, LARGE CAPACITY

J series standard flat fan nozzles are available in various capacities, spray angles, thread sizes, and materials.
The large-capacity models produce a high-impact spray jet with a mist effect and a decisive washing action.

MATERIAL

AISI 303 Stainless Steel
AISI 316L Stainless Steel
Brass
PVC, PTFE (opt.)
Other materials on request

THREAD SPECIFICATION

Male BSPT
Male NPT
From 1/2" to 1"

HOW TO ORDER THE PRODUCT

SPRAY ANGLE
A - 0° **L** - 40° **T** - 80°
B - 15° **N** - 50° **V** - 95°
D - 25° **R** - 65°

NOZZLE TYPE — **J D A 2590 xx** — **MATERIAL**
B1 - AISI 303 Stainless Steel
B31 - AISI 316L Stainless Steel
T1 - Brass

CONNECTION
D - 1/2"
E - 3/4"
F - 1"

CAPACITY

THREAD SIZE CODING TABLE

CODE	RG inch	H mm	H1 mm	WS mm
JD	1/2"	33	20	22
JE	3/4"	41	20	27
JF	1"	61	/	27

SPRAY ANGLE CODES

JDA	JDB	JDD	JDL	JDN	JDR	JDT	JDV
0°	15°	25°	40°	50°	65°	80°	95°

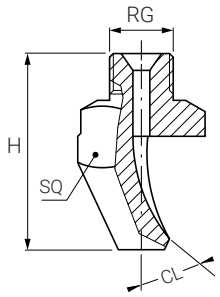
LARGE CAPACITY

	1/2"	3/4"	1"	CODE	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)								
	JDX	JEX	JFX		0,5	1	2	3	4	5	7	10	20
0° (XXA)	•			**JDA 2590 XX**	24,1	34,1	48,2	59	68,1	76,2	90,1	108	152
	•			**JDA 2780 XX**	31,8	45	63,7	78	90,1	101	119	142	201
		•		**JEA 3134 XX**	54,7	77,4	109	134	155	173	205	245	346
		•		**JEA 3275 XX**	112	159	225	275	318	355	420	502	710
			•	**JFA 3390 XX**	159	225	318	390	450	503	596	712	1007
			•	**JFA 3435 XX**	178	251	355	435	502	562	664	794	1123
15° (XXB)	•			**JDB 2195 XX**	7,96	11,3	15,9	19,5	22,5	25,2	29,8	35,6	50,3
	•			**JDB 2274 XX**	11,2	15,8	22,4	27,4	31,6	35,4	41,9	50	70,7
	•			**JDB 2390 XX**	15,9	22,5	31,8	39	45	50,3	59,6	71,2	101
		•		**JEB 2990 XX**	40,4	57,2	80,8	99	114	128	151	181	256
25° (XXD)	•			**JDD 2390 XX**	15,9	22,5	31,8	39	45	50,3	59,6	71,2	101
	•			**JDD 2590 XX**	24,1	34,1	48,2	59	68,1	76,2	90,1	108	152
	•			**JDD 2780 XX**	31,8	45	63,7	78	90,1	101	119	142	201
			•	**JFD 3195 XX**	79,6	113	159	195	225	252	298	356	503

J

	1/2"	3/4"	1"	CODE	FLOW RATE (LPM) AT DIFFERENT PRESSURE VALUES (BAR)								
	JDX	JEX	JFX		0,5	1	2	3	4	5	7	10	20
40° (XXL)	•			**JDL 2195 XX**	7,96	11,3	15,9	19,5	22,5	25,2	29,8	35,6	50,3
	•			**JDL 2240 XX**	9,8	13,9	19,6	24	27,7	31	36,7	43,8	62
	•			**JDL 2274 XX**	11,2	15,8	22,4	27,4	31,6	35,4	41,9	50	70,7
	•			**JDL 2390 XX**	15,9	22,5	31,8	39	45	50,3	59,6	71,2	101
	•			**JDL 2590 XX**	24,1	34,1	48,2	59	68,1	76,2	90,1	108	152
50° (XXN)	•			**JDN 2274 XX**	11,2	15,8	22,4	27,4	31,6	35,4	41,9	50	70,7
	•			**JDN 2390 XX**	15,9	22,5	31,8	39	45	50,3	59,6	71,2	101
	•			**JDN 2590 XX**	24,1	34,1	48,2	59	68,1	76,2	90,1	108	152
	•			**JDN 2780 XX**	31,8	45	63,7	78	90,1	101	119	142	201
		•		**JEN 3158 XX**	64,5	91,2	129	158	182	204	241	288	408
			•	**JFN 3195 XX**	79,6	113	159	195	225	252	298	356	503
			•	**JFN 3230 XX**	93,9	133	188	230	266	297	351	420	594
65° (XXR)	•			**JDR 2195 XX**	7,96	11,3	15,9	19,5	22,5	25,2	29,8	35,6	50,3
	•			**JDR 2240 XX**	9,8	13,9	19,6	24	27,7	31	36,7	43,8	62
	•			**JDR 2274 XX**	11,2	15,8	22,4	27,4	31,6	35,4	41,9	50	70,7
	•			**JDR 2390 XX**	15,9	22,5	31,8	39	45	50,3	59,6	71,2	101
	•			**JDR 2590 XX**	24,1	34,1	48,2	59	68,1	76,2	90,1	108	152
			•	**JFR 2780 XX**	31,8	45	63,7	78	90,1	101	119	142	201
80° (XXT)	•			**JDT 2195 XX**	7,96	11,3	15,9	19,5	22,5	25,2	29,8	35,6	50,3
	•			**JDT 2240 XX**	9,8	13,9	19,6	24	27,7	31	36,7	43,8	62
	•			**JDT 2274 XX**	11,2	15,8	22,4	27,4	31,6	35,4	41,9	50	70,7
	•			**JDT 2390 XX**	15,9	22,5	31,8	39	45	50,3	59,6	71,2	101
	•			**JDT 2590 XX**	24,1	34,1	48,2	59	68,1	76,2	90,1	108	152
	•			**JDT 2780 XX**	31,8	45	63,7	78	90,1	101	119	142	201
		•		**JET 2780 XX**	31,8	45	63,7	78	90,1	101	119	142	201
		•		**JET 3158 XX**	64,5	91,2	129	158	182	204	241	288	408
95° (XXV)	•			**JDV 2195 XX**	7,96	11,3	15,9	19,5	22,5	25,2	29,8	35,6	50,3
	•			**JDV 2240 XX**	9,8	13,9	19,6	24	27,7	31	36,7	43,8	62
	•			**JDV 2274 XX**	11,2	15,8	22,4	27,4	31,6	35,4	41,9	50	70,7
	•			**JDV 2390 XX**	15,9	22,5	31,8	39	45	50,3	59,6	71,2	101
	•			**JDV 2590 XX**	24,1	34,1	48,2	59	68,1	76,2	90,1	108	152

K HIGH



HIGH-IMPACT FLAT FAN NOZZLES

The K flat fan nozzle is designed with a spoon-shaped deflected surface to concentrate the liquid flow and produce a narrow-angle flat fan spray with a high-impact value. For this feature, they are widely used in all working environments requiring powerful jets. Compared to the standard cat-eye-shaped flat fan nozzle tips, K nozzles have a larger, free inner passage and are less prone to clogging.
They provide high-performance cleaning efficiency and have an extended operating life. Compared to the standard cat-eye-shaped flat fan nozzle tips, K nozzles have a larger, free inner passage and are less prone to clogging.
These nozzles are available with standard male threads but also with quick coupling nipples to shorten maintenance time.

MATERIAL

AISI 303 Stainless Steel
AISI 316L Stainless Steel
Brass
Other materials on request

THREAD SPECIFICATION

Male BSPT
Male NPT
Quick Connect
From 1/8" to 3/4"

HOW TO ORDER THE PRODUCT

SPRAY ANGLE
B - 15° **L** - 40°
D - 25° **N** - 50°
H - 35°

MATERIAL
B1 - AISI 303 Stainless Steel
B31 - AISI 316L Stainless Steel
T1 - Brass

NOZZLE TYPE — **K P B 1390 xx Sx** — **CONNECTION**
SB - BSPT
SN - NPT
Q1 - QC type 1
Q2 - QC type 2

CONNECTION
O - 1/8" **R** - 1/2"
P - 1/4" **S** - 3/4"
Q - 3/8" **T** - Quick-connect

CAPACITY

THREAD SIZE CODING TABLE

KOx	KPx	KQx	KRx	KSx	KTx
1/8"	1/4"	3/8"	1/2"	3/4"	QC

ASSEMBLY FITTINGS

PRODUCT	THREAD SIZE (RG) inch	STANDARD SIZE	LARGE SIZE	H mm	WS mm	DIA mm
Male nipple	1/4"	ZHS 0025 xx Q1	-	29	22	-
	3/8"	ZHS 0038 xx Q1	-	29	22	-
	1/2"	-	ZHS 0050 xx Q2	35	30	-
Female nipple	3/8"	ZHT 0038 xx Q1	-	29	22	-
Welding nipple	-	ZHU 0038 xx Q1	ZHU 0050 xx Q2	32	-	28
Seal (Viton) for SS nipple	-	VDH BQ10 E7	VDH BQ20 E7	-	-	-
Seal (BUNA) for brass nipple	-	VDH BQ10 E8	VDH BQ20 E8	-	-	-

K HIGH

	KOx	KPx	KQx	KRx	KSx	KTx	CODE	DIA	FLOW RATE (lpm) AT DIFFERENT PRESSURE VALUES (bar)							CL	H	SQ
	1/8"	1/4"	3/8"	1/2"	3/4"	QC		mm	2	3	4	5	6	7	10	deg	mm	mm
15° (xxB)		•				•	1390	1,9	3,18	3,9	4,5	5,03	5,52	5,96	7,12	22	48	15
		•				•	1780	2,6	6,37	7,8	9,01	10,1	11	11,9	14,2	19	54	15
			•			•	2117	3,2	9,55	11,7	13,5	15,1	16,5	17,9	21,4	25	72	20
			•			•	2156	3,7	12,7	15,6	18	20,1	22,1	23,8	28,5	18	92	20
			•			•	2195	4,2	15,9	19,5	22,5	25,2	27,6	29,8	35,6	15	90	20
				•			2230	4,6	18,8	23	26,6	29,7	32,5	35,1	42	14	125	25
				•			2310	5,3	25,3	31	35,8	40	43,8	47,4	56,6	14	130	25
				•	•		2390	5,9	31,8	39	45	50,3	55,2	59,6	71,2	14	137	25
					•		2780	8,4	63,7	78	90,1	101	110	119	142	14	191	30
25° (xxD)		•				•	2156	3,7	12,7	15,6	18	20,1	22,1	23,8	28,5	25	65	20
35° (xxH)	•					•	1160	1,2	1,31	1,6	1,85	2,07	2,26	2,44	2,92	40	23	12
		•				•	1390	1,9	3,18	3,9	4,5	5,03	5,52	5,96	7,12	36	37	15
		•	•			•	1780	2,6	6,37	7,8	9,01	10,1	11	11,9	14,2	30	43	20
		•	•			•	1980	2,9	8	9,8	11,3	12,7	13,9	15	17,9	28	49	20
		•	•			•	2117	3,3	9,55	11,7	13,5	15,1	16,5	17,9	21,4	28	52	20
			•			•	2156	3,7	12,7	15,6	18	20,1	22,1	23,8	28,5	26	58	20
			•			•	2195	4,1	15,9	19,5	22,5	25,2	27,6	29,8	35,6	23	64	20
				•		•	2230	4,5	18,8	23	26,6	29,7	32,5	35,1	42	22	73	25
				•		•	2310	5,3	25,3	31	35,8	40	43,8	47,4	56,6	24	81	25
				•			2390	5,9	31,8	39	45	50,3	55,2	59,6	71,2	19	89	25
				•	•		2630	7,5	51,4	63	72,7	81,3	89,1	96,2	115	23	114	30
					•		2780	8,4	63,7	78	90,1	101	110	119	142	22	122	30
40° (xxL)			•			•	2156	3,7	12,7	15,6	18	20,1	22,1	23,8	28,5	35	60	20
			•			•	2195	4,1	15,9	19,5	22,5	25,2	27,6	29,8	35,6	33	64	25
			•			•	2230	4,5	18,8	23	26,6	29,7	32,5	35,1	42	33	72	25
			•			•	2270	5	22	27	31,2	34,9	38,2	41,2	49,3	29	75	25
			•			•	2310	5,2	25,3	31	35,8	40	43,8	47,4	56,6	26	77	25
			•			•	2350	5,7	28,6	35	40,4	45,2	49,5	53,5	63,9	28	77	25
			•			•	2390	6	31,8	39	45	50,3	55,2	59,6	71,2	28	87	25
50° (xxN)		•	•			•	1200	1,5	1,63	2	2,31	2,58	2,83	3,06	3,65	50	31	15
		•	•			•	1270	1,6	2,2	2,7	3,12	3,49	3,82	4.12	4.93	50	31	15
		•	•			•	1390	1,9	3,18	3,9	4,5	5,03	5,52	5,96	7,12	60	31	15
		•	•			•	1980	2,9	8	9,8	11,3	12,7	13,9	15	17,9	42	41	20
		•	•			•	2156	3,7	12,7	15,6	18	20,1	22,1	23,8	28,5	45	47	20
		•	•			•	2230	4,5	18,8	23	26,6	29,7	32,5	35,1	42	37	55	25
			•			•	2390	6	31,8	39	45	50,3	55,2	59,6	71,2	40	72	30
			•			•	2490	6,7	40	49	56,6	63,3	69,3	74,8	89,5	38	72	30
			•			•	2630	7,5	51,4	63	72,7	81,3	89,1	96,2	115	37	72	30
			•			•	2780	8,4	63,7	78	90,1	101	110	119	142	32	72	30

DISCLAIMER

Our products are manufactured with the best care and according to the latest developments of the technology available. However we cannot assure that every one of our products is perfectly fit for every specific application. The information in this catalogue is provided “as seen” and so we offer no warranty of any kind with respect to the subject matter or accuracy of the information contained herein. This publication may include technical inaccuracies or typographical errors and changes may be periodically made to the information herein without prior notice.
As a result of continuous product improvement our documentation is regularly updated: please visit our website www.pnr.eu to be always updated.

PRODUCT WARRANTY

PNR Italia products shall be replaced and/or repaired at PNR Italia’s discretion free of charge if they are found to be genuinely non-compliant due to manufacturing or packaging defects or incorrect labelling. The conformity guarantee shall only apply if PNR Italia receives written notice of non-conformity from the customer within 30 days from the date of installation of the product or within one year from the date of shipment. The cost of repair or the cost of replacing the product with an identical or equivalent product shall be the entire responsibility of PNR Italia and the exclusive remedy of the purchaser for any breach of warranty and PNR Italia shall not be liable for any personal injury or loss resulting from product malfunction.
This warranty does not cover problems or damage resulting if our products are improperly stored, assembled, or installed, used for a purpose other than that for which they were intended, tampered with, or used in a manner inconsistent with the instructions for the product such as, but not limited to:

- Operation at pressures higher than those indicated in the performance table published in the catalogue or product data sheet,
- operation with or exposure to fluids containing abrasive particles that can cause erosive wear,
- operation with or exposure to fluids that cause chemical aggression on the nozzle’s material of construction,
- mechanical damage to the orifices, nipple or nozzle body caused by improper handling or assembly.

In all of the above cases, the customer must accept a reduction in the product’s lifecycle or performance inferior to that declared in the catalogue by PNR Italia.
Warranty claims shall be addressed directly to PNR Italia by drawing up a precautionary report or complaint on the conformity defect detected, which must be forwarded by email to: quality@pnr.it.

RETURN PROCEDURE

PNR Italia verifies and ascertains that the product which is the subject of the claim is actually covered by the established warranty period and communicates this in writing to the customer;
The customer shall apply in writing to PNR Italia for authorisation to return the product;
PNR Italia authorises the customer in writing to return the product, which must be returned by the customer in its original packaging the product which is the subject of the complaint must be returned in a manner that PNR Italia will communicate to the customer in writing and the transport costs of the returned goods shall be borne entirely by PNR Italia.
PNR Italia may, at its discretion, use new, refurbished or used parts in good working order to repair the product.
No salesperson, agent or employee of PNR Italia is authorised to make any modification, extension or addition to this Guarantee.
PNR Italia guarantees the best spray quality and accuracy of flow values, with a tolerance of 10% on the flow rate and ± 5° on the spray angle. Specific cases with smaller tolerances can be considered on a case-by-case basis.

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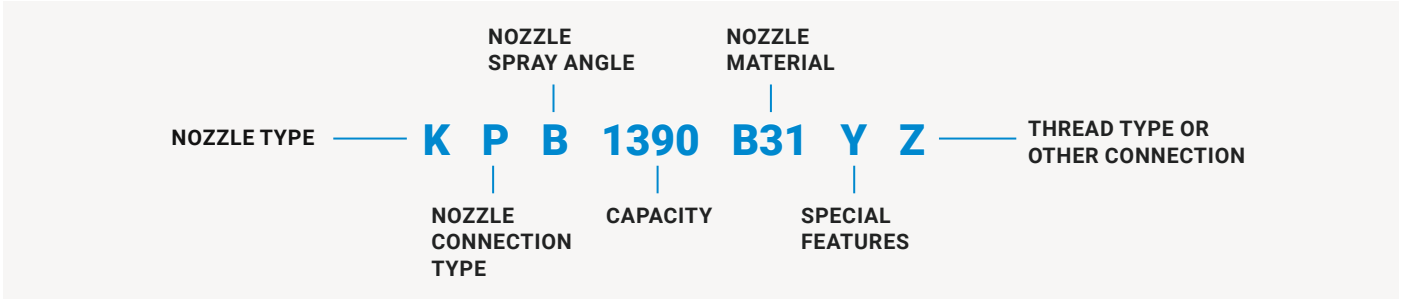
PNR IDENTIFICATION CODES

Like any industrial product, spray nozzles must be precisely identified by a unique code to prevent errors. The PNR coding system was designed with the following objectives in mind:

- *Sequential Processing:* Codes are designed for easy computer processing in ascending order.
- *Self-Explanatory:* Codes are intuitive, eliminating the need for additional descriptions.
- *Quick Reference:* Codes provide core specifications, making it easy to locate products within the catalogue.

Our coding system is structured as follows:



SPRAY ANGLE CODES

CODE	SPRAY ANGLE
A	0°
B	15°
C	20°
D	25°
F	30°
H	35°

CODE	SPRAY ANGLE
L	40°
M	45°
N	50°
Q	60°
R	65°
S	75°

CODE	SPRAY ANGLE
T	80°
U	90°
J	110°
W	120°
Y	130°
Z	180°

NOZZLE MATERIAL CODES

A1	Carbon steel
A2	High speed steel
A8	Zinc coated steel
A9	Nickel coated steel
B1	AISI 303 stainless steel
B2	AISI 304L stainless steel
B3	AISI 316 stainless steel
B31	AISI 316L stainless steel
B35	AISI 316L stainless steel (sintered)
C2	AISI 416 stainless steel, hardened
C3	AISI H13 steel, hardened
C7	AISI 316Ti stainless steel
D1	Polyvinylchloride (PVC)
D2	Polypropylene (PP)
D21	Molded polypropylene (PP)
D3	Polyamide (PA)

D4	Nylon, Glassfibers reinforced
D5	Talcum filled Polypropylene
D6	Glassfibre reinforced PP
D7	High density polyethilene
D8	Polyvinylidenefluoride (PVDF)
D82	PVDF, Injection molded
E0	EPDM
E1	Polytetrafluoroethylene (PTFE)
E2	PTFE (15% glassfibers)
E3	Polyoxymethylene (POM)
E31	Polyoxymethylene - molded (POM
E6	LUCITE ® (PMMA)
E7	Viton
E8	Synthetic rubber (NBR)
F30	Ruby insert, AISI 303 body
F31	Ruby insert, AISI 316 body
F5	Ceramic

G1	Cast iron
H1	Gr.2 titanium
L1	Monel 400
L2	Incolloy 825
L61	Hastelloy C22
L8	Hastelloy C276
N1	AISI 302 stainless steel
T1	Brass
T2	Brass, chrome plated
T3	Copper
T33	Copper + AISI 316
T5	Bronze
T8	Brass, nickel plated
T81	Brass, electroless nickel plated
V1	Aluminum
V7	Aluminum, electroless n. plated

ABBREVIATIONS

CODE	NAME	UNIT
CL	Jet deflection angle	deg
D	Conventional orifice diameter	mm
D1	Smallest free inside diameter	mm
D2	Liquid inlet diameter	mm
D3	Liquid outlet diameter	mm
DE	Liquid inlet diameter	mm
DF	Flange size	inch
DN	Flange nominal size	mm

CODE	NAME	UNIT
DIA	Outside diameter	mm
DU	Liquid outer diameter	mm
E	Inlet diameter	mm
EF	Flange diameter	mm
FF	Flange outer diameter	mm
G	Flange center-hole diameter	mm
H,H1,H2	Height	mm
L,L1	Lenght	mm

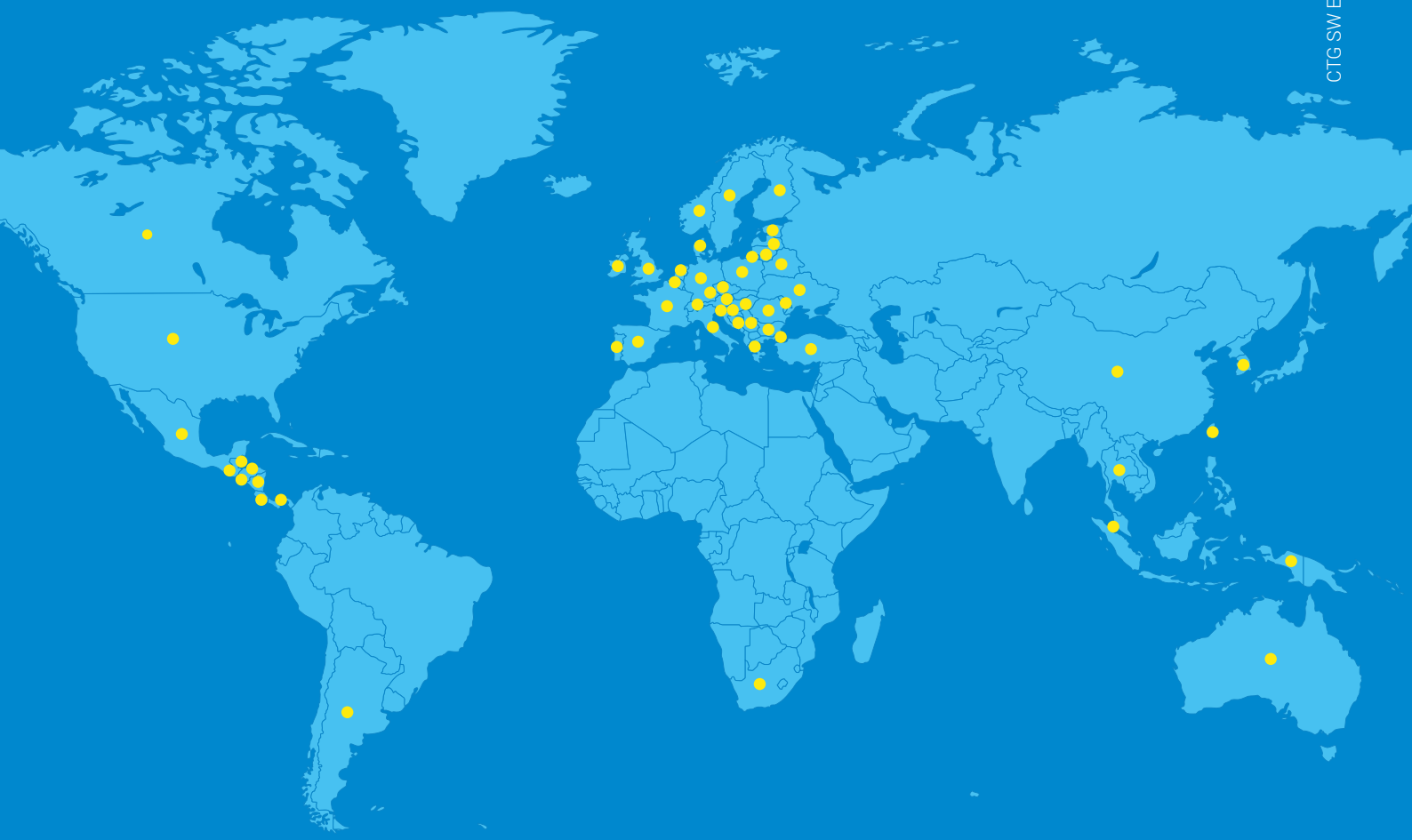
CODE	NAME	UNIT
NR	Number of orifices	--
QC	Quick-fit connection	--
RF	Female BSP straight thread	inch
RG	Male BSPT tapered thread	inch
SQ	Square bar size	mm
UF	Outlet diameter	inch
WS	Wrench size (female)	mm
WS1	Wrench size (female)	mm

AZIENDA CON
SISTEMA DI GESTIONE
CERTIFICATO DA DNV
ISO 9001 - ISO 14001
ISO 45001

COMPANY WITH
QUALITY SYSTEM
CERTIFIED BY DNV

ISO 9001
ISO 14001
ISO 45001

A GLOBAL PRESENCE ALL OVER THE WORLD.



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PNR

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