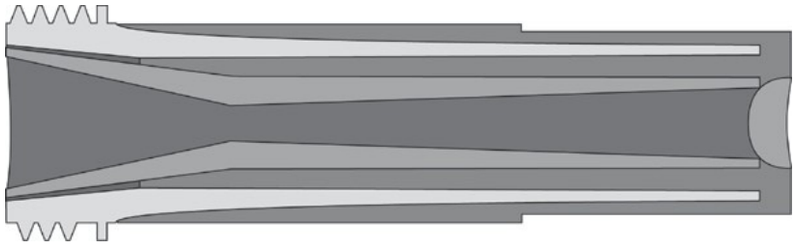
Airblast Tech Tips
Nozzle Info

AIRBLAST

Blasting Efficiency depending on proper nozzle selection
Perhaps the most critical component for reaching production goals is the nozzle chosen for the job. The nozzle's bore shape determines its blast pattern as needed for the application.

- Straight bore nozzles create a tight blast pattern and are ideal for blasting small areas.
- Venturi bore nozzles create a wide blast pattern and increase particle velocity, improving productivity when blasting larger surfaces.

Venturi type of pressure blast nozzles are generally used. They are designed with unique internal shape to achieve different objectives.



The Airblast venturi shaped nozzles gradually tapers outward from the orifice to the exit-end of the nozzle. This gradual exit expansion allows a mixing of air and media within the nozzle causing them to expand uniformly before leaving the nozzle. A venturi nozzle provides excellent peening intensity and cleaning capability with a broad pattern. The performance of the venturi nozzle depends on a precise ratio of length to orifice size, and to entry and exit tapers. This design creates a large blast pattern that produces maximum acceleration for cleaning.

As nozzles wear from continuous exposure to high-velocity media, more air and media are allowed to pass through the orifice. The resulting larger area within the nozzle consumes more air volume placing greater demand on the compressed air source. Unless air volume can keep up with the increased flow, pressure at the nozzle will drop. With reduced pressure, peening intensity and productivity falls and efficiency goes downs. A rule of thumb to follow for ensuring continuous high production is to replace the nozzle when the orifice wears to the next larger size.

Effect of Nozzle Wear on Air Consumption				
Nozzle Size	**Orifice size**		**Air Flow in cfm**	**Increase in Air Consumption**
	inches	**metric**		
4	1/4	6.5 mm	81 cfm	
5	5/16	8.0 mm	137 cfm	96% more than No. 4
6	3/8	9.5 mm	196 cfm	43% more than No. 5
7	7/16	11.0 mm	254 cfm	29% more than No. 6
8	1/2	12.5 mm	338 cfm	33% more than No. 7

Information shown is based upon air consumption at 100 psi (7 bar/700kPa)

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Nozzle Pressure

Maintaining adequate nozzle pressure is essential to high-production blasting. The gauge on the compressor shows the air pressure at the compressor only. It does not indicate blasting pressure. Hoses, air filters, blast machines, and other components between the compressor and the nozzle all contribute to friction and pressure losses. To accurately determine nozzle pressure, use a hypodermic needle gauge. This simple tool consists of a needle mounted on a pressure gauge. Insert the needle into the blast hose at a 45° about 15 cm behind the nozzle holder, with the tip of the needle pointing toward the nozzle.

Nozzle pressure below 5,8 bar (85 psi) indicates something wrong. Check the air compressor setting, then check for restrictions at all hoses and fittings, moisture separators, and any system components. Also check the nozzle orifice for excessive wear.

ORIFICE (mm) (“)	NOZZLE PRESSURE / NOZZLE DIAMETER GUIDE														
	60 PSI	4.2 BAR	70 PSI	4.9 BAR	80 PSI	5.6 BAR	90 PSI	6.3 BAR	100 PSI	7.0 BAR	120 PSI	8.5 BAR			
5.0 mm 3/16”	30.0 171.0 7	0.85 77.00 5.3	33.0 196.0 8	0.93 89.00 5.6	38.0 216.0 9	1.08 96.00 6.4	41.0 238.0 10	1.16 108.00 7.1	45.0 264.0 10	1.27 120.00 7.5	58.0 375.0 12	1.64 170.00 9.0	REQUIRED AIR REQUIRED ABRASIVE REQUIRED POWER	CFM Lbs./hr. hp	m³/min KG/hr. * kw
6,5 mm 4/16”	54.0 312.0 12	1.53 141.00 9.0	61.0 354.0 14	1.73 160.00 10.1	68.0 408.0 16	1.93 185.00 11.6	74.0 448.0 17	2.10 203.00 12.4	81.0 494.0 18	2.29 224.00 13.5	105.0 660.0 22	2.97 300.00 16.2	REQUIRED AIR REQUIRED ABRASIVE REQUIRED POWER	CFM Lbs./hr. hp	m³/min KG/hr. * kw
8.0 mm 5/16”	89.0 534.0 20	2.52 242.00 15.0	101.0 604.0 23	2.86 274.00 19.1	113.0 672.0 26	3.20 305.00 20.2	126.0 740.0 28	3.57 335.00 21.0	137.0 850.0 31	3.88 385.00 22.9	160.0 1.050.0 37	4.53 476.00 27.5	REQUIRED AIR REQUIRED ABRASIVE REQUIRED POWER	CFM Lbs./hr. hp	m³/min KG/hr. * kw
9.5 mm 6/16”	126.0 764.0 28	3.57 346.00 21.0	143.0 864.0 32	4.05 392.00 24.0	161.0 960.0 36	4.56 425.00 27.0	173.0 1.052.0 39	4.90 477.00 28.9	196.0 1.152.0 44	5.55 523.00 33.0	235.0 1.475.0 52	6.65 669.00 39.6	REQUIRED AIR REQUIRED ABRASIVE REQUIRED POWER	CFM Lbs./hr. hp	m³/min KG/hr. * kw
11.0 mm 7/16”	170.0 1.032.0 38	4.81 468.00 28.5	184.0 1.176.0 44	5.21 533.00 32.6	217.0 1.312.0 49	6.14 595.00 36.4	240.0 1.448.0 54	6.80 657.00 40.1	254.0 1.584.0 57	7.19 719.00 42.4	315.0 2.050.0 69	8.92 930.00 50.9	REQUIRED AIR REQUIRED ABRASIVE REQUIRED POWER	CFM Lbs./hr. hp	m³/min KG/hr. * kw
12.5 mm 8/16”	224.0 1.336.0 50	6.34 606.00 37.5	252.0 1.512.0 56	7.14 686.00 42.0	280.0 1.680.0 63	7.93 762.00 46.9	309.0 1.856.0 69	8.75 842.00 51.8	338.0 2.024.0 75	9.57 918.00 56.3	410.0 2.650.0 90	11.61 1.202.00 67.6	REQUIRED AIR REQUIRED ABRASIVE REQUIRED POWER	CFM Lbs./hr. hp	m³/min KG/hr. * kw

Chart shows calculated consumption rates of air and abrasive for new nozzles. When slecting a compressor add 50% to above figures to allow for normal nozzle wear and friction loss.

* Based on abrasive density of 1,5 kgs. per liter.

NOTE: Figures may vary depending upon working conditions. To maintain desired air pressure as nozzle orifice wears, air consumption increases. The effects of nozzle wear on air consumption must be considered when selecting nozzles and the compressors that support them.

Minimum Air Volume Table
Air Volume Requirements at 7 bar (100 PSI) for a Complete Blast System

Nozzle	Size of orifice	Volume of air	Plus helmet	Plus 50% (reserve)	Minimum air required
No. 4	1/4” 6.5 mm	81 2.3	20 0.5	50 1.4	151 cfm 4.2 m³/min.
No. 5	5/16” 8.0 mm	137 3.9	20 0.5	79 2.2	236 cfm 6.6 m³/min.
No. 6	3/8” 9.5 mm	196 5.5	20 0.5	108 3.0	324 cfm 9.0 m³/min.
No. 7	7/16” 11.0 mm	254 7.2	20 0.5	137 3.9	411 cfm 11.6 m³/min.
No. 8	1/2” 12.5 mm	338 9.6	20 0.5	179 5.0	537 cfm 16.1 m³/min.