

## Abrasives Characteristics Comparison

Material	Mesh Size	Shape	Density lbs/ft <sup>3</sup>	Mohs	Friability	Initial Cost	No. of Cycles	Per Use Cost	Source	Typical Applications
Sil. Sand †	6-270	★	100	5.0-6.0	high	low	1	med.	nat.	Outdoor blast cleaning
Min. Slag	8-80	★	85-112	7.0-7.5	high	med.	1-2	med.	b-p	Outdoor blast cleaning
Steel Grit	10-325	★	230	8.0	low	high	200+	med.	mfg.	Removing heavy scale
Steel Shot	8-200	●	280	8.0		high	200+	low	mfg.	Cleaning, peening
Al. Oxide	12-325	★	125	9.0	med.	high	6-8	med.	mfg.	Cleaning, finishing, deburring, etching
Silicon Carbide	12-325	★	110	9.5	med.	high	5-6	med.	mfg.	Surf. prep on extremely hard substrates
Glass Bead	10-400	●	85-90	5.5-6.0	med.	med.	8-10	low	mfg.	Cleaning, finishing
Plastic	12-80	★	45-60	3.0-4.0	low/med.	high	8-10	med.	mfg.	Paint stripping, deflashing, cleaning
Wheat Starch	12-80	★	45	3.0	med.	med.	12-15	high	mfg.	Paint, adhesive removal; composites
XL-Corn Hybrid Polymer	16-60	★	45	3.0	low	high	14-17	med.	mfg.	Composite paint removal, adhesive deflash
Corn Cob	8-40	★	35-45	2.0-4.5	med.	low	4-5	low	b-p	Removing paint from delicate surfaces

★ = Angular   ● = Spherical   nat. = Natural   b-p = By-product   mfg. = Manufactured  
 † Consult OSHA regulations before using silica sand as a blast abrasive.

## Compressed Air and Abrasive Consumption

Nozzle Orifice	Pressure at the Nozzle (psi)								*Consumption based on abrasives that weigh 100 pounds per cubic foot.
	50	60	70	80	90	100	125	140	
<b>No. 2 (1/8")</b>	11	13	15	17	18.5	20	25	28	Air (cfm)
	.67	.77	.88	1.01	1.12	1.23	1.52	1.70	Abrasive (cu.ft./hr & Lbs/hr)
	67	77	88	101	112	123	152	170	Compressor hp
	2.5	3	3.5	4	4.5	5	5.5	6.2	
<b>No. 3 (3/16")</b>	26	30	33	38	41	45	55	66	Air (cfm)
	1.50	1.71	1.96	2.16	2.38	2.64	3.19	3.57	Abrasive (cu.ft./hr & Lbs/hr)
	150	171	196	216	238	264	319	357	Compressor hp
	6	7	8	9	10	10	12	13	
<b>No. 4 (1/4")</b>	47	54	61	68	74	81	98	110	Air (cfm)
	2.68	3.12	3.54	4.08	4.48	4.94	6.08	6.81	Abrasive (cu.ft./hr & Lbs/hr)
	268	312	354	408	448	494	608	681	Compressor hp
	11	12	14	16	17	18	22	25	
<b>No. 5 (5/16")</b>	77	89	101	113	126	137	168	188	Air (cfm)
	4.68	5.34	6.04	6.72	7.40	8.12	9.82	11.0	Abrasive (cu.ft./hr & Lbs/hr)
	468	534	604	672	740	812	982	1,100	Compressor hp
	18	20	23	26	28	31	37	41	
<b>No. 6 (3/8")</b>	108	126	143	161	173	196	237	265	Air (cfm)
	6.68	7.64	8.64	9.60	10.52	11.52	13.93	15.6	Abrasive (cu.ft./hr & Lbs/hr)
	668	764	864	960	1052	1152	1393	1,560	Compressor hp
	24	28	32	36	39	44	52	58	
<b>No. 7 (7/16")</b>	147	170	194	217	240	254	314	352	Air (cfm)
	8.96	10.32	11.76	13.12	14.48	15.84	19.31	21.63	Abrasive (cu.ft./hr & Lbs/hr)
	896	1032	1176	1312	1448	1584	1931	2,163	Compressor hp
	33	38	44	49	54	57	69	77	
<b>No. 8 (1/2")</b>	195	224	252	280	309	338	409	458	Air (cfm)
	11.60	13.36	15.12	16.80	18.56	20.24	24.59	27.54	Abrasive (cu.ft./hr & Lbs/hr)
	1160	1336	1512	1680	1856	2024	2459	2754	Compressor hp
	44	50	56	63	69	75	90	101	

**Minimum Air Volume Table**  
 Air Volume Requirements at 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"	81	20	50	151 cfm
	6.5mm	2.3	0.5	1.4	4.2 m <sup>3</sup> /min
No. 5	5/16"	137	20	79	236 cfm
	8.0mm	3.9	0.5	2.2	6.6 m <sup>3</sup> /min
No. 6	3/8"	196	20	108	324 cfm
	9.5mm	5.5	0.5	3.0	9.0 m <sup>3</sup> /min
No. 7	7/16"	254	20	137	411 cfm
	11.0mm	7.2	0.5	3.9	11.6 m <sup>3</sup> /min
No. 8	1/2"	338	20	179	537 cfm
	12.5mm	9.6	0.5	5.0	16.1 m <sup>3</sup> /min

## Metric Nozzle Chart Compressor Air and Abrasive Consumption

Nozzle Orifice	Pressure at the Nozzle (bar & kPa)								Requirements: Air (m <sup>3</sup> /min) Abrasive (kg/h) * & kW
	3.5	4.2	4.9	5.6	6.3	7.0	8.6	10.3	
	350	420	490	560	630	700	860	1035	
<b>5mm</b> (3/16")	0.73	0.84	0.92	1.06	1.15	1.26	1.54	1.82	Air (m <sup>3</sup> /min) Abrasive (kg/h) kW
	68	78	89	98	108	120	145	174	
	4.5	5.3	5.6	6.4	7.1	7.5	9.0	10.8	
<b>6.5mm</b> (1/4")	1.31	1.51	1.71	1.90	2.08	2.27	2.75	3.22	Air (m <sup>3</sup> /min) Abrasive (kg/h) kW
	122	142	161	185	203	224	276	325	
	7.9	9.0	10.1	11.6	12.4	13.5	16.2	19.4	
<b>8mm</b> (5/16")	2.16	2.50	2.83	3.16	3.53	3.84	4.71	5.57	Air (m <sup>3</sup> /min) Abrasive (kg/h) kW
	212	242	274	305	336	368	445	534	
	13.1	15.0	19.1	20.2	21.0	22.9	27.5	33.0	
<b>9.5mm</b> (3/8")	3.02	3.53	4.00	4.50	4.85	5.50	6.64	7.79	Air (m <sup>3</sup> /min) Abrasive (kg/h) kW
	303	347	392	435	477	573	632	758	
	18.0	21.0	24.0	27.0	28.9	33.0	39.6	47.5	
<b>11mm</b> (7/16")	4.12	4.76	5.44	6.09	6.73	7.11	8.80	10.48	Air (m <sup>3</sup> /min) Abrasive (kg/h) kW
	406	468	533	595	657	719	876	1040	
	24.8	28.5	32.6	36.4	40.1	42.4	50.9	61.1	
<b>12.5mm</b> (1/2")	5.46	6.28	7.06	7.85	8.65	9.46	11.46	13.45	Air (m <sup>3</sup> /min) Abrasive (kg/h) kW
	526	606	686	762	842	918	1115	1333	
	32.6	37.5	42.0	46.9	51.8	56.3	67.6	81.1	

\* Based on abrasive with a density of 1.5 kg per liter.

## Effect of Nozzle Wear on Air Consumption

Nozzle Size.	Orifice size		Air Flow in cfm	Increase in Air Consumption
	inches	metric		
4	1/4	6.5mm	81 cfm	
5	5/16	8.0mm	137 cfm	69% more than No. 4
6	3/8	9.5mm	196 cfm	43% more than No. 5
7	7/16	11.0mm	254 cfm	29% more than No. 6
8	1/2	12.5mm	338 cfm	33% more than No. 7

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

## Minimum Compressor Air Line Sizes

Nozzle No.	Nozzle Orifice Size	Minimum Air Line ID
No. 3	3/16" (5.0mm)	1" (25.0mm)
No. 4	1/4" (6.5mm)	1" (25.0mm)
No. 5	5/16" (8.0mm)	1-1/4" (32.0mm)
No. 6	3/8" (9.5mm)	1-1/2" (38.0mm)
No. 7	7/16" (11.0mm)	2" (50.0mm)
No. 8	1/2" (12.5mm)	2" (50.0mm)
No. 10	5/8" (16.0mm)	2-1/2" (64.0mm)
No. 12	3/4" (19.0mm)	3" (76.0mm)

## Minimum Connector ID by Nozzle Orifice Size

Nozzle Orifice Size	Minimum Connector ID
<b>3</b> 3/16" (5mm)	----- 3/4" (19mm)
<b>4</b> 1/4" (6.5mm)	----- 1" (25mm)
<b>5</b> 5/16" (8mm)	----- 1-1/4" (32mm)
<b>6</b> 3/8" (9.5mm)	----- 1-1/2" (38mm)
<b>7</b> 7/16" (11mm)	----- 2" (50mm)
<b>8</b> 1/2" (12.5mm)	----- 2" (50mm)
<b>10</b> 5/8" (16mm)	----- 2-1/2" (64mm)
<b>12</b> 3/4" (19mm)	----- 3" (76mm)

## Approximate Pressure Loss Caused by Commonly Used Fittings

based on 100 psi (7 bar) in 1" (25mm) pipe

Fitting	Pressure Loss
90° pipe elbow	3 psi (0.2 bar/21 kPa)
pipe tee	5 psi (0.3 bar/34 kPa)
45° pipe elbow	1-1/2 psi (0.1 bar/10 kPa)
swing check valve	18 psi (1.2 bar/124 kPa)

## Internal Area Loss Due to Hose Size Reduction

Main Hose Size	Whip Hose Size	% of reduction
<b>2" (50mm)</b>	<b>1-1/2" (38mm)</b>	<b>44%</b>
<b>2" (50mm)</b>	<b>1-1/4" (32mm)</b>	<b>61%</b>
<b>1-1/2" (38mm)</b>	<b>1-1/4" (32mm)</b>	<b>31%</b>
<b>1-1/2" (38mm)</b>	<b>1" (25mm)</b>	<b>56%</b>
<b>1-1/4" (32mm)</b>	<b>1" (25mm)</b>	<b>36%</b>
<b>1-1/4" (32mm)</b>	<b>3/4" (19mm)</b>	<b>64%</b>
<b>1" (25mm)</b>	<b>3/4" (19mm)</b>	<b>44%</b>

## Typical ID to OD Relationship in Common Blast Hose

Standard Hose (2 Braid & 4 Ply)		SUPA Hose (Lightweight 2 ply)	
ID	OD	ID	OD
1/2"	1-5/32"		
3/4"	1-1/2"	3/4"	1-5/16"
1"	1-7/8"	1"	1-1/2"
1-1/4"	2-5/32"	1-1/4"	1-7/8"
1-1/2"	2-3/8"		

## Blast Hose Rating

Types of Blast Hose	Construction	Working Pressure Rating	Features and Applications
Two-braid	Two layers of cross-woven fabric	175 psi (12 bar, 1206 kPa)	Moderate flex with enough outer support to keep hose round. Common among contractors and at fixed sites and blast rooms.
Two-ply	Two layers of semi cross-woven fabric	175 psi (12 bar, 1206 kPa)	Smaller overall wall dimension for optimum flexibility with maximum internal diameter. Sometimes used as whip hose.
Four-ply	Four layers of straight-woven fabric	175 psi (12 bar, 1206 kPa)	Stiff, with greater exterior endurance, rebounds to a fully round shape. Used in shipyards, high traffic areas to withstand weight of motor vehicles.

## Pipe ID-Area-Nozzle Size

Pipe or Valve ID		Area *	Nozzle Sizes**	
(Inches)	(Metric)	(Sq. Inches)	(Inches)	(Metric)
1/2"	12.5mm	.20"	1/8"	4mm
3/4"	19mm	.45"	3/16"	5mm
1"	25mm	.80"	1/4"	6.5mm
1-1/4"	32mm	1.2"	5/16"	8mm
1-1/2"	38mm	1.8"	3/8"	9.5mm
2"	50mm	3.2"	7/16"	11mm
2"	50mm	3.2"	1/2"	12.5mm
2-1/2"	64mm	4.9"	5/8"	16mm
3"	76mm	7.1"	3/4"	19mm

\* Area derived from  $(\pi)r^2$  and rounded.

\*\*Nozzle sizes supported at one hundred feet.

(Piping of 1/2" is used only on 10" diameter blast machines.)

### Clemco (USA) Blast Machine Model Reference

Model Numbers	Dimensions		Capacity (Vol.)* Cu Ft	Capacity (Vol.)** Lbs
	Diameter	Height		
1028	10"	x 28"	.5	50
1042	10"	x 42"	1	100
1440	14"	x 40"	1.5	150
1642	16"	x 42"	2	200
1648	16"	x 48"	3	300
2016	16"	x 42"	2	200
2020	20"	x 42"	4	400
2024	24"	x 52"	6	600
2452	24"	x 52"	6	600
3054	30"	x 54"	7	700
3661	36"	x 61"	10	1000
3680	36"	x 80"	20	2000

\* Actual volume may vary based on head and cone sizes.

\*\* Based on abrasives with a density of 100 pounds per cubic foot.

### Clemco International Blast Machine Reference Table

European Models	Capacity (Vol.) * Capacity (Wt.) **	
	Liters	Kg
1028	20	25
1440	50	76
1628	40	60
1638	60	90
1648	100	150
2040	100	150
2048	140	210
2452	200	300

\* Actual volume may vary based on head and cone sizes. European machines are built to slightly larger dimensions and may have greater volumes.

\*\* Based on abrasives with a density of 1.5 kg per liter.

## Degrees of Cleanliness

	SSPC Std.	NACE Std.	SIS Std.
White Metal Blast	SSPC-SP 5	NACE No. 1	SA-3
Near White Metal Blast	SSPC-SP 10	NACE No. 2	SA-2 1/2
Commercial Blast	SSPC-SP 6	NACE No. 3	SA-2
Brush-off Blast	SSPC-SP 7	NACE No. 4	SA-1