

BLASTING GUIDELINES

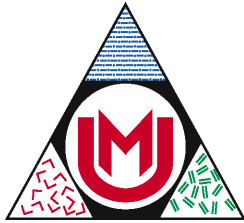
Achieving Maximum Performance From UMI's Sharpjet Garnet

COMMON BLASTING ERRORS WHEN USING SHARPJET GARNET:

- **ABRASIVE METERING VALVE ADJUSTED TOO RICH** – Garnet is a very dense abrasive (140-150#/cu.ft.), therefore it is necessary to adjust the abrasive metering valve on the blast pot so that less abrasive is introduced into the blast hose (refer the Blast Abrasive Comparison Chart). As a general rule, approximately half as much garnet as slag or silica sand should be metered into the air stream. (If the pressure vessel is equipped with a Schmidt MicroValve or Thompson Valve, then the starting point for adjustment should be 1-2 turns from a closed position.) When the mixture of garnet to air is too rich, the speed of the garnet passing through the nozzle is too slow thereby reducing the effectiveness of the garnet to remove coatings.
- **NOT ENOUGH AIR PRESSURE** – Due to the high density of the garnet, it is necessary for the air pressure to be 90-120 psi at the nozzle. The rule of thumb is to calculate 1.5% loss in efficiency for every 1 psi drop in air pressure (below 100 psi) at the nozzle (refer to Nozzle Air Consumption and Blast Efficiency Chart). Therefore, if there is only 80 psi at the nozzle, the blast process is only operating at approximately 70% efficiency (assuming all other factors are equal). Use a needle gauge to determine the air pressure at the nozzle.
- **INEFFICIENT BLASTING TECHNIQUE** – The standoff distance from the blast nozzle to the surface being blasted should be roughly 18" – 24" (which is typically farther from the surface than normal when blasting with slag or sand). The nozzle should be smoothly and slowly passed across the blast surface at an optimum angle of 55°-70 ° from the plane of the substrate. The smooth, slow blast pass generates more heat buildup in the coating (which assists in coating delamination from the substrate) than the oft used back-and-forth sweep technique; therefore the overall production will be improved. The angle of blast attack is necessary to build heat in the coating (to loosen the bond with the substrate) and assist in lifting the coating off the substrate.
- **THE GRADE OF GARNET IS TOO LARGE** – As a general rule, the size of the garnet used will be smaller than the general size of slag or silica sand that might be used on the same project. On site testing will determine the correct garnet grade, but the Sharpjet Garnet Application Chart will provide general guidelines. As a general rule, the smallest grade of garnet that will remove the coating the quickest and provide the required surface profile is the correct grade.

ADDITIONAL HINTS TO MAKE THE PROJECT MORE SUCCESSFUL:

- **AIR COMPRESSOR, DRY AIR & AIR LINES** – *Dirty, wet air reduces blasting efficiency. Use an aftercooler/air dryer whenever possible. The air compressor should be sized to compensate for line pressure loss and worn nozzles. For maximum efficiency, place the air compressor as near the blast operation as possible and use the largest air line available from the compressor to the blast machine. Refer to Blast System Air Volume Chart for guidelines to sizing the compressor.*
- **NOZZLES** – *Longer nozzles keep a tighter blast pattern and maintain abrasive velocity to the work surface. As a general rule of thumb, every size increment increase in nozzle bore will offer 20%-25% increase in productivity (e.g., if a #7 nozzle yields 80 sq. ft. per hour, then a #8 nozzle should yield at least 100 sq. ft. per hour), but, likewise, the corresponding compressed air requirements will increase. To provide uniform productivity and not tax the air compressor, the nozzle should be replaced when the bore has increased by 1/16". A #7 nozzle (7/16" bore) will consume 254 cfm @ 100 psi; when it has worn out to 1/2" bore, it will consume 338 cfm of compressed air in order to maintain an air pressure of 100 psi (refer to Chart #3). Frequently check the bore of the nozzle. If the bore has a rippled or orange peel effect, replace the nozzle. Anything other than a smooth wall surface on the inside of the nozzle will cause a reduction in the abrasive velocity which will affect productivity.*
- **ABRASIVE METERING VALVE** – *Although any metering valve will work, UMI recommends the Schmidt MicroValve or Thompson Valve (from Axxiom Manufacturing) for precise metering of abrasive consumption and superior results. Both valves provide instant smooth response, while the Thompson valve offers a fail safe option of shutting off the abrasive flow to the nozzle and sealing the blast tank in the same instant. Both valves are simple to adjust and easy to rebuild.*
- **BLAST MACHINE CONTAMINANTS** – *Paper, plastic, cigarette butts, leaves, twigs, nylon tie wraps and other contaminants will make it impossible to achieve uniform metering of the garnet through the abrasive metering valve. Whenever it is available, use the supplied pot screen to filter out potential contaminants.*



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BLAST ABRASIVE COMPARISON CHART

	Bulk Density (#/cu.ft.)	Hardness (mohs)	Dust Levels During Blasting	Silica Content	Heavy Metals	Estimated Recycles	Est. Usage* (#/sq. ft.)	Est. Blast Speed* (sq. ft. /min.)
SHARPJET GARNET	140-150	7.5-8.0	Minimal	< 0.1%	Trace	3-5	2.0-4.0	1.7-2.0
COPPER SLAG	104-112	6.5-7.5	Med High	< 0.1%	Yes	0	7.5 – 8.0	1.0-1.4
COAL SLAG	75-95	6.0-7.0	Med High	<1.0%	Yes	0	5.0-7.0	1.4-1.7
NICKEL SLAG	85-105	6.5-7.5	High	<0.1%	Yes	0-1	12.0-14.0	0.6-0.8
SILICA SAND	100	5.0-6.0	High	99%	Trace	0	11.0-13.0	0.9-1.4
OLIVINE SAND	90-110	6.5-7.0	Low	<0.1%	Yes	1-3	9.5-11.0	1.2-1.7
STAUROLITE	78	6.5-7.0	Med High	≤ 5%	Trace	1-3	10.0-12.0	0.9-1.3

* Estimated consumption and production rates to achieve a uniform 2-3 mil profile on new steel with light mil scale (no recycling). Results are for comparison only; results under actual blasting conditions may vary.

SHARPJET GARNET APPLICATION CHART

Grade	Profile / Coating Removal Estimate (mils)		Typical Applications	Grade	Profile / Coating Removal Estimate (mils)		Typical Applications
16 12-30 Mesh	4+	50+	Ship Repair, Tanks, Petrochemical, Non-skid Coatings, Bridges, Industrial Painting	30/60 30-80 Mesh	2-3	≤ 30	Heavy Equipment Refurbishment, Denim Blast, Powder Coat Surface Prep, Industrial Painting
20/30 16-40 Mesh	3.5-4.5	40-60	Ship Repair, Tanks, Petrochemical, Non-skid Coatings, Bridges, Industrial Painting	60 50-80 Mesh	1.5-2.5	≤ 10	Heavy Equipment Refurbishment, Powder Coat Surface Prep, General Purpose
36 18-45 Mesh	3-4	30-50	Ship Repair, Tanks, Petrochemical, Non-skid Coatings, Bridges, Industrial Painting	80 60-120 Mesh	1.5-2.0	≤ 10	Powder Coat Surface Prep, General Purpose, Sensitive Substrates, Maintenance Work
30/40 20-50 Mesh	2.5-3.5	≤ 40	Ship Cleaning, Tanks, Petrochemical, Industrial Painting. General Maintenance				

NOZZLE AIR CONSUMPTION AND BLAST EFFICIENCY WHILE USING SHARPJET GARNET

Nozzle		Approximate Abrasive Velocity ►	102 mph	186 mph	267 mph	363 mph	419 mph	504 mph	588 mph	
Size	Bore Diameter		Blast Pressure at the Nozzle ►		60 psi	70 psi	80 psi	90 psi	100 psi	120 psi
# 4	1/4"	cfm ►	66	75	84	93	103	119	136	
# 5	5/16"	cfm ►	103	117	131	145	158	186	214	
# 6	3/8"	cfm ►	149	169	189	209	229	269	309	
# 7	7/16"	cfm ►	203	230	258	285	312	367	422	
# 8	1/2"	cfm ►	265	300	335	371	407	478	549	
# 10	5/8"	cfm ►	412	468	524	580	632	744	855	
# 12	3/4"	cfm ►	596	676	756	836	916	1076	1236	
		Blast Efficiency ►	55%	64%	74%	86%	100%	130%	165%	

BLAST SYSTEM AIR VOLUME ESTIMATES

Nozzle		Nozzle Air Volume (@ 100 psi)	+ Air to Blast Helmet	+ Reserve Due To Line Loss, Worn Nozzles, Etc. (50%)	Minimum Total Air Required
Size	Bore Diameter				
# 4	1/4"	103 cfm	20 cfm	62 cfm	185 cfm
# 5	5/16"	158 cfm	20 cfm	89 cfm	267 cfm
# 6	3/8"	229 cfm	20 cfm	373 cfm	373 cfm
# 7	7/16"	312 cfm	20 cfm	498 cfm	498 cfm
# 8	1/2"	407 cfm	20 cfm	640 cfm	640 cfm
# 10	5/8"	632 cfm	20 cfm	326 cfm	978 cfm
# 12	3/4"	916 cfm	20 cfm	458 cfm	1,394 cfm