BLASTONE
SUPERIOR PERFORMANCE

16 WAYS TO IMPROVE YOUR ABRASIVE BLASTING SYSTEM

SPECIAL REPORT

HELPING INDUSTRIAL PAINTING CONTRACTORS COMPLETE THEIR PROJECT FASTER, SAFER & CLEANER

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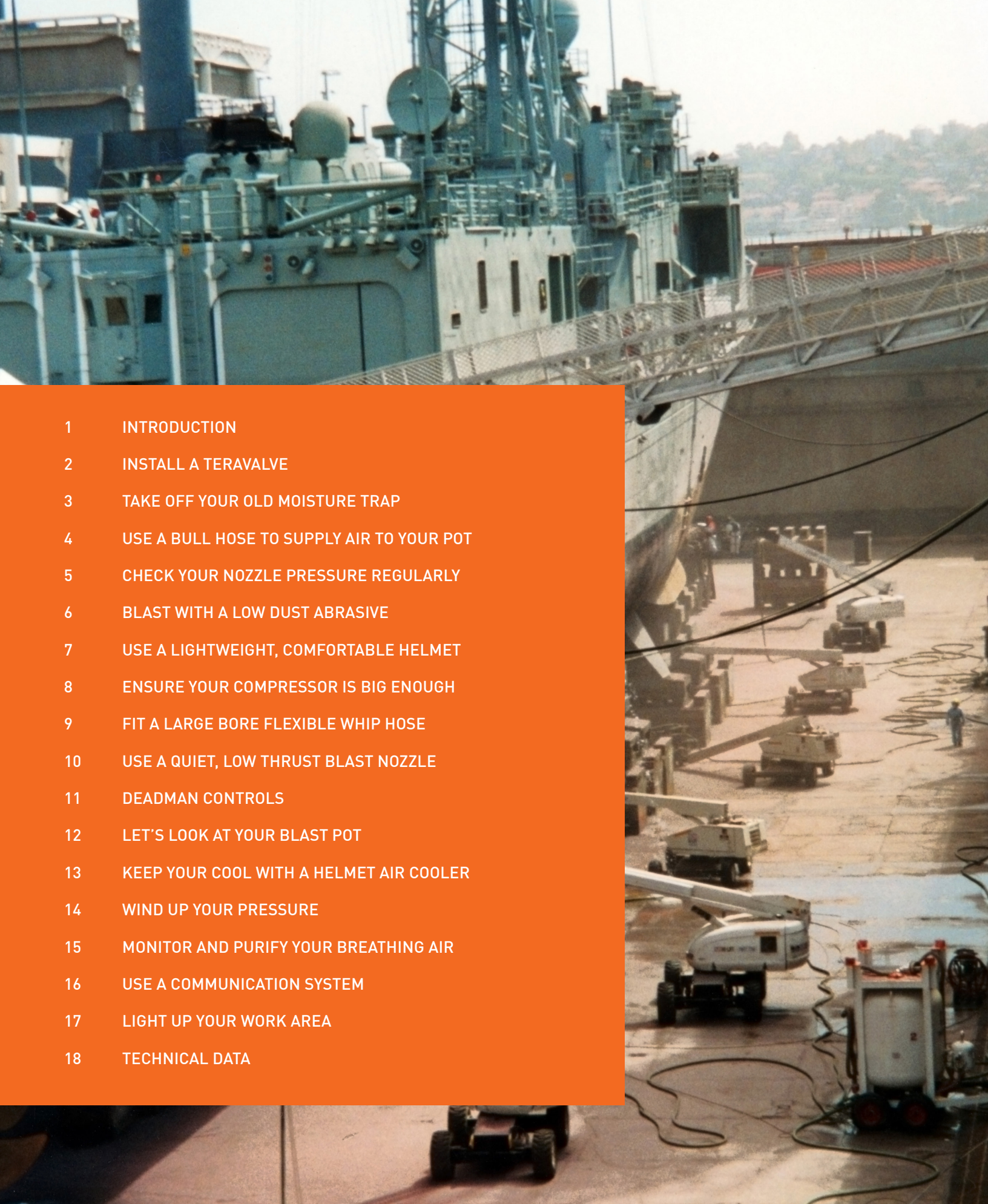


INTRODUCTION TO BLAST CLEANING EFFICIENCY

BlastOne is dedicated to its mission: to improve the lives of the people we touch, and extend the life of infrastructure our customers protect. We help industrial painting contractors complete their projects faster, safer and cleaner. We do this throughout innovation, trust and customer service.

This booklet has been written to assist you to identify ways to improve the lives of your blasters and blast faster, safer and cleaner. Some of the items explained here may seem common sense to you. In fact, you may have used them for some years. Unfortunately, many blasters haven't ever had any specialist training.

Who trains the blaster?

The old blaster.

Who trained him?

The blaster before him.

Did any of them investigate new techniques? New equipment? New ways of working more efficiently?

No. (It's sad but true).

Fortunately, this is now changing. By just using a few of the ideas in this booklet, you will have an impact on your blasting productivity and profits. This impact happens when you do a lot of the little things right.. it's the overall impact that we call Performance[3].

The majority of this booklet summarized in one sentence: **Increase your nozzle pressure and decrease your abrasive consumption. It makes all the difference to your efficiency.**

1

USE A VALVE WITH PRECISION CONTROL

MANY BLASTERS HAVE FOUND THEIR BLAST POT LASTS UP TO 3 TIMES LONGER BETWEEN REFILLS USING THE TERAVALVE, WITHOUT ANY DOWNTURN IN BLASTING SPEED!

The abrasive metering valve on the bottom of your blast pot can make or break your profits. If you have it open too wide, you use too much abrasive and have to refill the pot sooner. Too much abrasive can also mean slower, dustier blasting. The problem is, it is very hard to accurately adjust metering valves to get the perfect mix of air and abrasive.

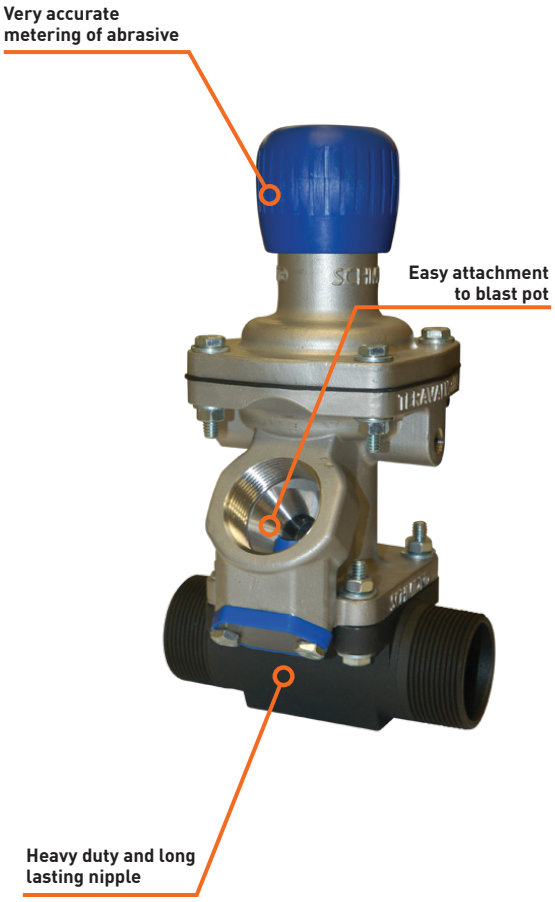
The Teravalve XL is a new valve from BlastOne which makes “fine tuning” your abrasive mix easy.

Install one onto your blast pot instead of your old metering valve, and you’ll immediately notice a big difference!

The Teravalve XL can be retrofitted to a blast pot with only 6" clearance. Lasts up to three times as long as its predecessor, the Thompson II.

Very simply designed for operation, it only takes two bolts and two minutes to pull it down for maintenance.

During a 10-year lifespan of the average blast pot, $500,000 worth of abrasive passes through the pot, so optimizing this flaw is paramount.



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2

TAKE OFF YOUR OLD MOISTURE TRAP

IT COULD BE SUCKING THE LIFE OUT OF YOUR BLASTING PRESSURE

Are you using a ⅜" (no. 6) nozzle or bigger? Have you got one of these moisture traps (as shown) on the side of your blast pot? Rip it off now if you want to improve production.

These moisture traps may work well when they are new. However, they have a fine filter element inside that very quickly becomes clogged with any dust, oil and foreign matter.

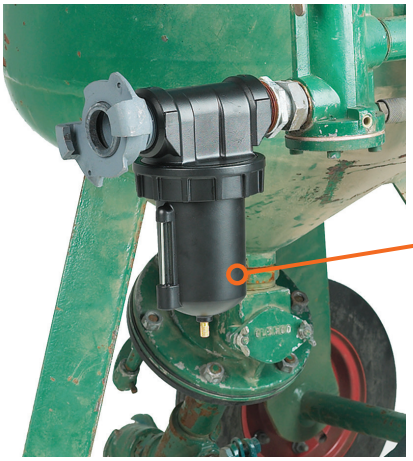
And then they become a big cause of pressure drop! You may have 100psi coming in from the compressor, but going out of the little moisture trap may be only 90psi! This is a very common problem.

Instead, you should install a high volume moisture separator, which operates without this pressure loss problem and removes more moisture. The MS H800 (shown right), works by allowing the air to expand and drop out the water, then stainless steel coalescing pads remove this moisture from the air.

Simply put, the MS H800 works very effectively. It was built for rugged site use and it doesn't drink up your pressure.

All blasting systems need to have a high production air dryer as part of the system. For portable application, a Deliquescent dryer is the most robust, reliable solution.

Blasters swear that a high throughput air dryer will save them 10-15% on their abrasive costs.



Old style moisture trap

(too restrictive for bigger nozzles)

High volume moisture separator

Reduces pressure loss and removes more water

3

USE A BULL HOSE TO SUPPLY AIR TO YOUR POT

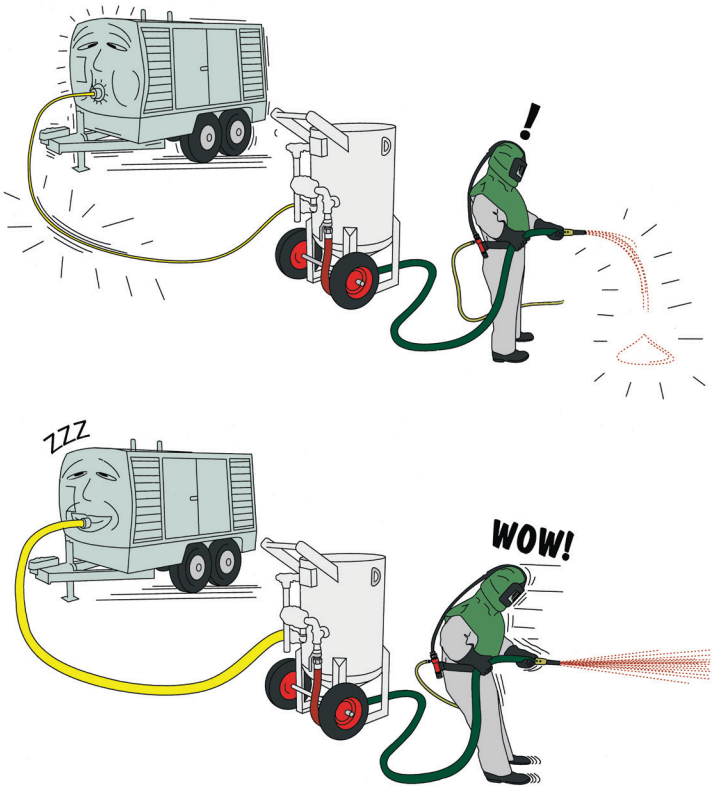
INCREASING YOUR PRESSURE – INCREASES YOUR PROFITS

Do you use a big nozzle to blast with, but only supply your blast pot with air from a jackhammer hose? Or you may have two jackhammer hoses? This is no good.

But, we do have good news! Overnight, you can double your blasting rate. Big nozzles need big hoses.

For any bigger than a 7/16" (no. 7) nozzle, you need a 2 inch (50mm) ID bull hose to supply air to your blast pot. When running four nozzles, a 3 inch (76mm) bull hose is needed to supply air to your blast pot. Any smaller air delivery hose will simply be choking the air supply. And you lose valuable air pressure.

Important note: Watch your hose fittings. It's no good fitting a nice big bull hose to the pot if you've still got hose fittings or pipe fittings that are smaller in the bore than your hose size. A 2" bull hose should be connected to a 2" outlet on the compressor and use large bore fittings right through.



RULE OF THUMB

Your bull air hose should be at least 4x your nozzle orifice.

4

CHECK YOUR NOZZLE PRESSURE REGULARLY

THIS CRITICAL CHECK SHOULD BE DONE AT LEAST WEEKLY

KEEP A GAUGE IN YOUR TOOL KIT

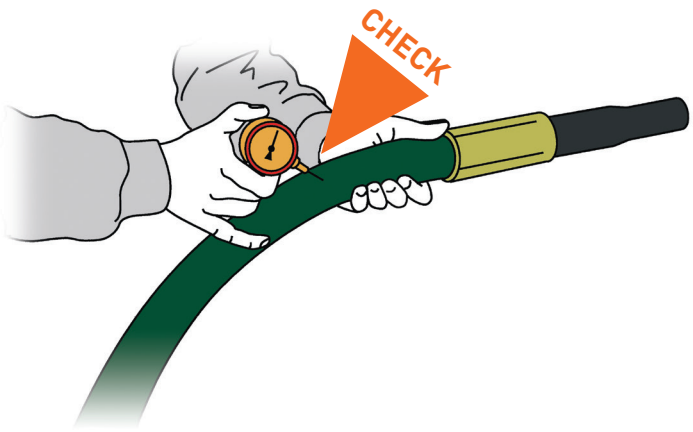
The nozzle pressure gauge is unarguably the most important testing instrument in your whole kit! Did you know that if your nozzle pressure drops from 100psi to 90psi, you'll take 15% longer to blast anything?

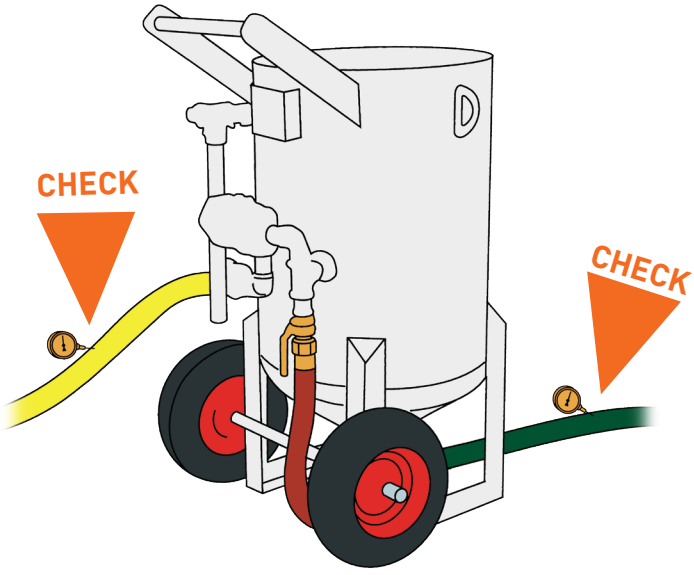
For every 1psi under 100psi, you lose 1.5% of your production efficiency. Check your system right through with this pressure testing gauge and find where the pressure losses are. Test the pressure at both ends of a long length of hose – you'll be amazed to see how much the pressure can drop!

Common pressure loss points include

- Worn out nozzle (< 1/16 wear)
- Blocked compressor filters
- Restrictions in blast post fittings
- Blast pot leaks
- Dirty moisture separators

We recommend getting two pressure test kits, to test both air pressure into your blast pot, versus the air pressure out in your blast hose, simultaneously. It can tell you a story.





5

BLAST WITH A LOW DUST ABRASIVE

WHY GMA GARNET WILL WORK BETTER FOR YOU

The largest cause of complaints about blasting is the DUST. It's amazing how much difference blasting with GMA Garnet makes. First of all, let's have a look at exactly what it is.

GMA Garnet is a silica-free abrasive made up of small garnet crystals. Each crystal is heavy, sharp and hard. When it slams into the steel at 500mph, it doesn't smash up and break into tiny pieces like other abrasives. This makes it very low dusting.

OSHA standard (29 CFR 1926.1153) requires employers to limit worker exposures to respirable crystalline silica and to take other steps to protect workers from respirable crystalline silica exposures above the PEL of 50 µg/m3, averaged over an 8-hour day.

Each small crystal carries tremendous cleaning energy. You blast faster and cleaner than with grits twice or three times its size, using half as much abrasive!

Dust is an enemy to productivity. It removes visibility leading to rework of missed areas, makes the blasting work area unpleasant, and stagnates the blasting process.

DUST CLOUD
From blasting with conventional abrasives

GMA GARNET
GMA Garnet is dense (heavy), and hard so it doesn't create dust clouds

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6

USE A LIGHTWEIGHT, COMFORTABLE HELMET

USE THE INDUSTRY LEADING HELMET THE RPB NOVA 3

An air-fed helmet is designed to protect your life. It should prevent you from breathing any dust, protect your face from flying particles and offer some hard hat protection. But, wearing a helmet on your head for hours, can give you a headache!

The Nova 3 Blast Helmet is the industry #1 for operator comfort.

This helmet has an excellent wide vision, combined with less weight on the head and neck. By using pillow foam as head support (instead of the old 'hard hat' suspension), these are the most comfortable and quietest helmets ever used--gives up to 20dB noise attenuation.

You'll find operators blast for longer and don't feel so worn out, when they wear RPB Nova 3 air-fed blast helmets.

7

ENSURE YOUR COMPRESSOR IS BIG ENOUGH

HOW MUCH AIR DO YOU NEED TO RUN A BLAST MACHINE?

The table above shows the amount of air each nozzle size needs when the nozzle is new.

But what happens when the nozzle starts to wear a bit? You are going to need more and more air to maintain the same pressure at the nozzle. (i.e. after 2-3 weeks).

When you buy an air compressor for your blast package, you should allow sufficient volume for the nozzle (from the table below) for your air-fed helmet PLUS a 20% reserve to allow for nozzle wear.

(Example: A new No.7 nozzle at 110psi needs 339cfm PLUS 50% reserve of 170cfm:

Optimal compressor size required = 509cfm).

Many blasters have said – "*I could blast a lot faster when my nozzle was new – but now I've lost pressure...*"

Guidelines for the amount of air you need on a jobsite to ensure you are successful. In this table, we have outlined the minimum and optimal requirements for maintaining 110 psi at the blast nozzle when using different sized blast nozzles.

NOZZLE SIZE		NOZZLE PRESSURE (110PSI)	MIN AIR REQ	OPTIMAL AIR REQ
No. 3	3/16"	62	74	93
No. 4	1/4"	111	133	167
No. 5	5/16"	172	206	258
No. 6	3/8"	249	299	374
No. 7	7/16"	339	407	509
No. 8	1/2"	442	530	663
No. 10	5/8"	688	826	1032
No. 12	3/4"	996	1195	1494
EFFICIENCY		100%		

OTHER JOB SITE REQUIREMENTS TO ALLOW	
Blast Helmet	30cfm
Graco King Spray Pump	225cfm
Air Mover Horn	200cfm
Blue Wizard Extraction Fan	175cfm

Refer to Page 18 for a complete table on air consumption (CFM) per blast nozzle using garnet abrasive.

8

FIT A LARGE BORE FLEXIBLE WHIP HOSE

DON'T USE A SMALLER SIZE BLAST HOSE AS A WHIP HOSE, YOU'LL JUST CHOKE THE SYSTEM UP

You need to be a mighty big man of muscle to continually hang onto some of those blast hoses these days.

By ensuring the blast hose internal diameter is three to four times the diameter of the nozzle sure helps keep the pressure up, but it becomes very hard to continually hold. We recommend you fit a 25ft (6m) SupaLife whip hose between your blast hose and nozzle.

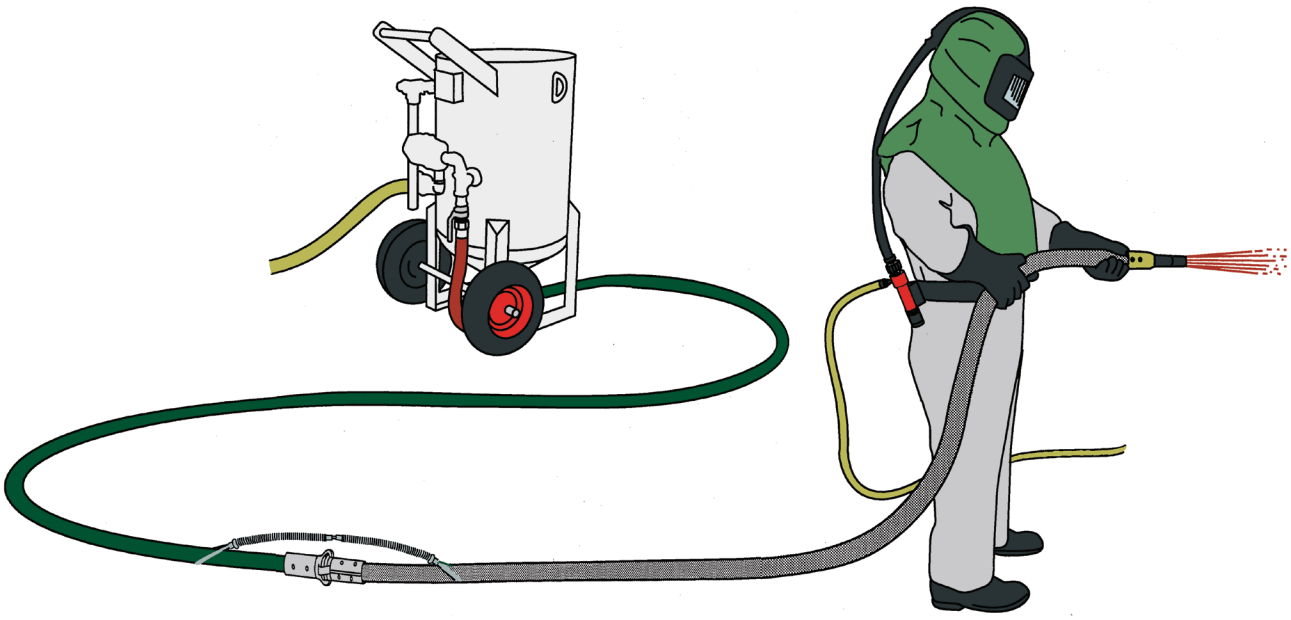
RULE OF THUMB

Blast hose should be a minimum of three times your nozzle orifice.

a. SYSTEM

This special hose is made of high-quality rubber to maintain life, but with thinner walls to make it lightweight and flexible. 'SupaLife' whip hose has a large bore, so you don't lose pressure to the nozzle.

Your operator will find it easier to blast, much less tiring on the back and easier to get into tough spots.



Refer to Page 19 for typical ID+OD hose measurements.

9

USE A QUIET, LOW THRUST BLAST NOZZLE

THE BUSINESS END OF YOUR BLAST HOSE

The blast nozzle at the end of your hose has to do a lot of work. It takes air and abrasive and accelerates it to about 500mph.

For the last 50 or so years, we have used tungsten carbide long venturi nozzles. These work fine and will normally last around 300 hours but they are heavy and tend to crack easily if dropped or hit against the steel. (Many blasters tend to think nozzles are hammers!)

The SnakeBite blast nozzle reduces noise generated by up to 16 dBA – that is a 75% reduction in noise – and reduces nozzle thrust and blaster fatigue by up to 45%.

You'll notice a big difference hanging onto a SnakeBite nozzle.

10

DEADMAN CONTROLS

DOES YOURS ACT FAST ENOUGH?

All blast machines must have remote controls (sometimes called dead man controls) which quickly stop the blasting when the control handle is released. (Many people have been injured in this Industry from poorly designed or even non-existent deadman systems.)

What have you got fitted onto your blast pot? Does it start and stop very quickly when you want it to? On some systems the deadman DELAY time is around 15-20 seconds before the pot stops blasting out grit (That seems like about 15 minutes if you've got trouble.)

Safety is not the only advantage of a FAST remote control system.

- It saves you time waiting for shut-down and start-up
- It can save you a lot of abrasive
- It will save you over-blasting or blasting inappropriate areas

RULE OF THUMB

Electric Deadman Systems are recommended when control lines exceed 100ft (30m) in length. Using the electric deadman will provide near instantaneous control and activation. An electric deadman can deliver a 5x faster response.

For FASTER and SAFER control, many blasters are now fitting:

a. TERAVALVE SYSTEM

For spot blasting operations or multiple outlet blasters. This system offers almost instantaneous on/off by immediately shutting off the abrasive and air flow, leaving the blast pot pressurized. It saves a lot of time and money (and by fitting your 'TeraValve' with the optional 'remote abrasive cut-off switch' installed at the nozzle, you can cut off the abrasive and blow down the workplace with air only at the simple flick of a switch, anytime)

The TeraValve is a fail-safe valve, which automatically shut off if there is an air supply problem. Very important feature on a blast pot!

Use a comfortable deadman for the blasting operator. The #1 reason for blasting injuries is incorrect usage of the deadman handle. The Blasting Accessories & Assist Bracket System (BAABS) is a unique deadman, that is safe and easy to use.

11

LET'S LOOK AT YOUR BLAST POT

DOES YOUR POT HAVE ANY RESTRICTIONS?

The heart of your blasting system is your blast pot. You should carefully consider the following points because a lot of blast pots that have been sold have been poorly engineered and can cost you more money to run. How a blast pot is manufactured can affect your profitability.

HAS IT GOT UNRESTRICTED PIPING?

OK, so we now have air delivered into the pot with 2-inch bull hose and the air abrasive mixture goes out in a 1-¼ blast hose. But what size pipe fittings have you got on your blast pot? Do you choke your air supply by trying to make it go through ¾ or 1-inch fittings or pipes? A good blast pot has large bore pipe fittings with a minimum of elbows and bends.

Get a needle pressure gauge and compare the air pressure just before the pot and then just after. You should have a maximum of 3 psi pressure drop across the pot.

Warning: Some manufacturers' blast pots come new with a 10 psi drop because of complicated pipe and valve configurations.

** Remember, 1 psi = 1.5% performance drop
*** This 10 psi drop is immediately making your blasting efficiency drop by 15%!

(eg: If you could blast at 300 ft²/hr at 100 psi, your production would drop to 250 ft²/hr at 90 psi.)

Fit valves and pipework that do not restrict the air flow.

Transform your old blast pot into a modern fast work system by upgrading using this complete retrofit kit. The TeraValve is a diaphragm-activated piston which provides smother action for improved valve life. It has a rugged stainless steel body for long service life. It will retro fit under a pot with only 6" clearance. Requires a minimum of 75 psi to use.

LOW RESTRICTION POT
Makes a faster blaster

12

KEEP YOUR COOL WITH A HELMET AIR COOLER

DO ALL YOUR BLASTERS HAVE THEIR OWN AIR-CONDITIONER?

Air compressors dramatically heat the air upon compression. Nice warm air coming into your blast helmet on a chilly cold morning may be very comfortable.

However, during hot months, warm to hot breathing air in your blast helmet is very uncomfortable and greatly reduces your ability to work efficiently.

A Helmet Air Cooler (normally worn on the belt) can be placed in the airline immediately before the helmet and is engineered to cool the temperature of the incoming air by up to 52°F (30°C) or heat the air by 30°F.

A small feature with big benefits.

An operator who is comfortable is less likely to remove their helmet or experience fatigue.

RPB C40 CLIMATE CONTROL DEVICE
Work in comfort year round

13

WIND UP YOUR PRESSURE

YOU WILL BE SURPRISED AT THE INCREASE IN PRODUCTION

What if you now take our standard, time-tested level of 100 psi blasting and increase it to 125 psi? What will it do to our blasting speed? You may increase your efficiency by 38%!

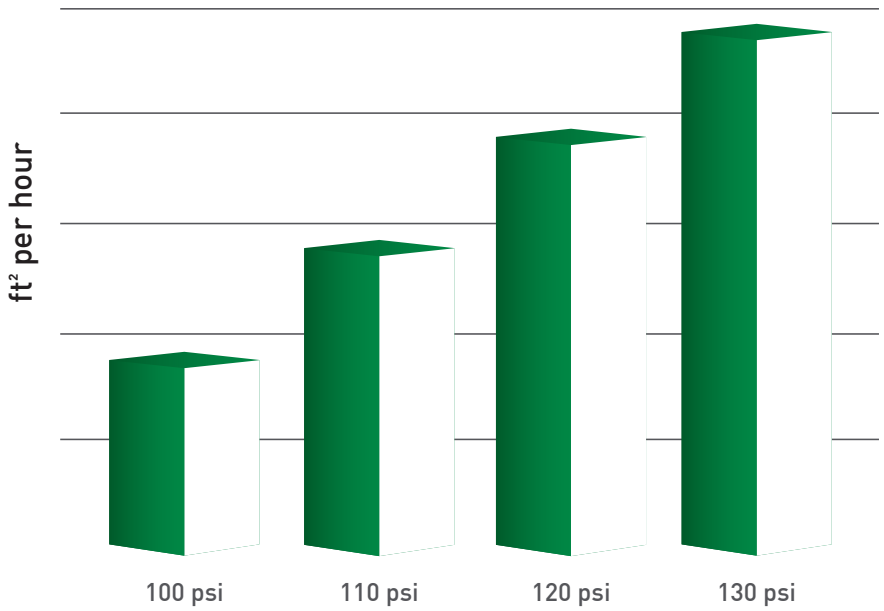
What does this 38% mean? It means that you can blast a lot more in four days than you used to do in five days! Or, it's like having a second blaster two days a week for free! It also means that you can make a lot more profit.

RULE OF THUMB

1 psi = 1.5% Blasting Efficiency

Important: Before increasing the pressure in your blasting system, ensure all equipment – compressor, blast pot, hoses and fittings are pressure rated to the working pressure required. Operators may need additional training to move the nozzle faster and hold the hose in such a way to minimize back thrust effect.

APPROXIMATE BLASTING SPEED AT ELEVATED PRESSURES



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14

MONITOR AND PURIFY YOUR BREATHING AIR

MANY BLASTERS USE DIESEL AIR COMPRESSORS TO SUPPLY BLASTING AND BREATHING AIR TO THE AIR-FED HELMET

Many blasters use diesel air compressors to supply blasting and breathing air to the air-fed helmet.

That same air compressor that is sucking air for breathing is pumping out carbon monoxide in large volumes from the diesel engine exhaust.

If the carbon monoxide is drawn back into the air intake of the compressor, you can poison your blaster (You can also poison your blaster if the compressor overheats. Overheated compressor oil can produce carbon monoxide gas. Carbon monoxide is an odorless, deadly gas).

Now, OSHA's Standard 1910.134 (i) (7) requires us to do something about this...

"For oil-lubricated compressors, the employer shall use a high-temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels.

If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10ppm."

For safety's sake, we recommend the installation of a carbon monoxide alarm and purification system.

These systems will continuously monitor the breathing air for carbon monoxide while the purification system will remove oils, water, particles, tastes, odors and toxic gases from the breathing air.

Not only will it be safer for your blasters, but it'll also keep OSHA very happy!

RPB GX4 GAS MONITOR
Monitor up to 4 gases simultaneously

15

USE A COMMUNICATION SYSTEM

A GOOD COMMUNICATION SYSTEM CAN IMPROVE NOT ONLY EFFICIENCY BUT ALSO SAFETY

When we are blasting or painting, whether it be on a site, in a blasting yard or in a blast room, having a "pot attendant or spotter" to fill, adjust and control the machine means actual time spent blasting or spraying is increased. The problem is that on a site where there are many workers but communication between the site personnel is poor, we may never actually realize our full productive potential.

Communication difficulties on blasting and painting sites are nothing new. Many blasters carry a hammer in their pocket and hit it on the steel (or hit the nozzle on the steel!) to give you a message (i.e. 1 hit = more abrasive, 2 hits = less abrasive, 3 hits = turn the machine off!). This can be very inaccurate.

Audio communication systems can increase efficiency by up to 21% due to less interruptions and clear communication without confusion.

Put your workers safety first and improve productivity. Do not wait to install communication systems into your blast helmets!

Example of communication system

16

LIGHT UP YOUR WORK AREA

GIVE YOURSELF VISIBILITY TO SAFELY AND QUICKLY WORK

Adequate lighting is critical for blaster safety and for a blaster to deliver a quality blasted surface.

Having good lighting allows the blaster to see the surface they are blasting, to catch any missed spots and prevent them from over-blasting because they can see. In days past, Blasters blasting with dusty abrasive and poor lighting, would blast mostly by instinct and feel. Then have to wait for the dust to subside so they could see what they had done.

There are 2 types of lighting:

1. Area Lighting: This primarily lights up the whole area you are working in, provides visibility for the whole blasting space for visibility and safety.
2. Worker or Directional Lighting: Provides light directly to the work surface that the operator is blasting. This lighting is critical for production.

Explosion proof lights are available, which allow you to use the same blast light for blasting and painting using a simple blast lens for abrasive protection and an overspray for paint protection. This will allow you to maximize the lifespan of your lights and lighting investments.

TECHNICAL DATA

AIR CONSUMPTION (CFM) PER BLAST NOZZLE USING GARNET ABRASIVE

NOZZLE SIZE		NOZZLE PRESSURE							
		50 psi	60 psi	70 psi	80 psi	90 psi	100 psi	120 psi*	140 psi*
No. 2	1/8"	14	17	19	21	24	26	30	34
No. 3	3/16"	32	37	42	47	52	57	67	77
No. 4	1/4"	57	66	75	84	93	103	119	136
No. 5	5/16"	89	103	117	131	145	158	186	214
No. 6	3/8"	129	149	169	189	209	229	269	309
No. 7	7/16"	176	203	230	258	285	312	367	422
No. 8	1/2"	229	265	300	336	371	407	478	549
No. 10	5/8"	356	412	468	524	580	632	744	856
No. 12	3/4"	516	596	676	756	836	916	1076	1236
EFFICIENCY		47%	55%	64%	74%	86%	100%	130%	165%

* Ensure equipment is rated for these pressures

NOZZLE PRESSURE VS EFFICIENCY

BLAST NOZZLE PRESSURE	APPROXIMATE ABRASIVE VELOCITY	APPROXIMATE EFFICIENCY FACTOR
100 psi	425 mph	100%
95 psi	400 mph	93%
90 psi	365 mph	86%
85 psi	330 mph	80%
80 psi	270 mph	74%
75 psi	200 mph	69%
70 psi	185 mph	64%

HOSE SELECTION GUIDE FOR BLASTING AT 100 PSI NOZZLE PRESSURE

NOZZLE NUMBER	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8
Nozzle Size	¼" (6mm)	5⁄16"(8mm)	⅜" (10mm)	7⁄16" (11mm)	½" (13mm)
CFM at 100 psi	103	158	229	312	407
Air Hose ID – minimum	1" (25mm)	1 ½" (38mm)	1 ½" (38mm)	2" (50mm)	2" (50mm)
Blast Hose ID – minimum	¾" (20mm)	1" (25mm)	1 ¼" (32mm)	1 ¼" (32mm)	1 ½" (38mm)

TYPICAL ID – OD RELATIONSHIP IN COMMON BLAST HOSE

STANDARD HOSE				SUPALIFE WHIP HOSE			
ID		OD		ID		OD	
mm	inch	mm	inch	mm	inch	mm	inch
13	½"	33	1 5/16"	13	½"	30	1 3/16"
19	¾"	40	1 ½"	19	¾"	33	1 5/16"
25	1	48	1 ⅞"	25	1	40	1 ½"
32	1 ¼"	55	1 5/32"	32	1 ¼"	48	1 ⅞"
38	1 ½"	60	2 ⅜"	38	1 ½"	55	2 5/32"

ENGLISH USA UNITS/METRIC CONVERSION CHART

INCH	MM	INCH	MM
3/16"	5mm	1 ¼"	32mm
¼"	6mm	1 5/16"	33mm
5/16"	8mm	1½"	38mm
⅜"	10mm	1 9/16"	40mm
7/16"	11mm	1 ¾"	44mm
½"	13mm	1 ⅞"	48mm
⅝"	16mm	2"	51mm
¾"	19mm	2 5/32"	55mm
1"	25mm	2 ⅜"	60mm
1 3/16"	30mm	2 ½"	64mm

DISCLAIMER: The performance characteristics provided in this brochure only serves as a guide and that the results can vary widely on every project. Let BlastOne assist you on using the right abrasive and the right equipment for every project.

While care has been taken in compiling these notes, no responsibility is accepted by the compiler for any damage or loss, caused to anyone or any company accepting the advice or suggestion contained herein. It is your responsibility to be aware of regulations which Local, State, or Federal Government authority may impose.

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