Envirosystems℠

STRIPMASTER® and LAB® SERIES MEDIA BLAST SYSTEMS

TECHNICAL TRAINING MANUAL

PUBLICATION NO. TM-SMS/LAB-0403

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IMPORTANT NOTICE

This user's manual, and the recommendations for usage it contains, are based on proven techniques and also on test data believed to be reliable. It is intended that this manual be used by personnel having specialized training in accordance with currently accepted practice and normal operating conditions. Variations in environment, changes in operating procedures or extrapolation of data may cause unsatisfactory results. Since Envirosystems LLC has no control over the conditions of service, we expressly disclaim responsibility for the results obtained or for any consequential or incidental damages of any kind incurred.

STRIPMASTER® SERIES
MEDIA BLAST SYSTEMS

TECHNICAL TRAINING MANUAL

PUBLICATION NO. TM-SMS-1098

ENVIROSYSTEMS EQUIPMENT COMPANY INC.
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IMPORTANT NOTICE

This proprietary training manual was prepared by Envirosystems Equipment Company Inc. (EECI) for the exclusive use by their customers. The recommendations contained herein are based on proven techniques and also on test data believed to be reliable. It is intended that this manual be used by personnel having specialized training in accordance with currently accepted practice and normal operating conditions. Variations in environment, changes in operating procedures or extrapolation of data may cause unsatisfactory results. Since EECI has no control over the conditions of service, it expressly disclaims responsibility for the results obtained or for any consequential or incidental damages of any kind incurred.

PREFACE

Media blasting is a process for the rapid, economic, safe and environmentally considerate removal of coatings from almost any product without the use of toxic chemical strippers, burn-off methods, sandblasting or hand or mechanical abrasion methods.

Although resembling sandblasting, media blasting does not use hard abrasives, such as silica sand. Rather, the process employs recyclable media crystals that are pneumatically applied at low pressure of 20 to 40 psi (1,4 - 2,7 Bars). The media crystals vary in hardness from 2.8 to 4.0 Mohs, as compared to hard abrasives that are in the 7.0 Mohs range.

Since the media crystals are harder than coatings but softer than underlying substrates, media blasting can quickly remove top-coats and primers without harming sensitive substrates, such as aluminum, brass, copper, magnesium, thin steel and titanium. Additionally, the process can be used on surfaces where chemical strippers cannot, or must be applied with caution, such as panels of honeycomb construction, engineered plastics, fiberglass and advanced composites.

Media blasting technology has been in use since 1983, principally for the stripping of strategic aircraft and aerospace components. However, with the increase in environmental awareness and stricter environmental regulations, the process has matured into a distinct technology, applicable to the de-painting requirements of a broad range of industries. Indeed, in the years to come, media blasting will become the method of first choice for many surface preparation tasks.

The objective of this Technical Training Manual is to provide the customers of Envirosystems Equipment Company Inc. (EECI) with comprehensive information concerning the application of the media blasting technology.

Although the use of this Manual, along with hands-on training, cannot make a person an "overnight expert" in media blasting technology, a conscientious trainee can learn to avoid causing damage to target products, many of which can be very expensive.

With this background and on-going practical experience, the purchaser of the Company's media blasting equipment should soon become highly proficient in the emerging media blasting technology.

TRADEMARK ACKNOWLEDGMENTS

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CHAPTER 3
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SAFETY PRECAUTIONS

These safety precautions have been prepared to assist the operator in practicing good shop safety procedures.

These safety precautions are to be used as a guide and supplement to all other safety precautions and warnings in:

a. all other manuals pertaining to machines, controls and auxiliary equipment.

b. local, plant and shop safety rules and codes.

c. federal and state safety laws and regulations.

See the latest edition of the OCCUPATIONAL SAFETY AND HEALTH STANDARDS, available from the DEPARTMENT OF LABOR, WASHINGTON, D.C.

WARNING

Read all the Safety Precautions in this chapter before operating the equipment. Failure to follow this precaution may result in severe bodily injury.

GENERAL SAFETY INSTRUCTIONS AND CONSIDERATIONS

Machine owners and operating personnel must be aware that constant, day-to-day safety practices are a vital part of their job. Accident prevention must be one of the principal objectives of the job regardless of what activity is involved.

Know and respect your machinery. Read and practice the prescribed safety and checking procedures. Make sure that everyone who works for, with or near you fully understands, and, more importantly, complies with the following safety precautions and procedures.

PERSONAL SAFETY

Avoid sudden movement, loud noises and horseplay. Distractions may result in unsafe conditions for those working near equipment. Equipment can and will cause extensive damage and/or injury if the practice of horseplay is not totally prohibited.

Observe and follow safety instructions such as NO SMOKING, HIGH VOLTAGE and DANGER in your working area.

Accidents can occur that result in serious injury to you or others due to clothing and other articles becoming entangled or in contact with revolving parts, levers and electrical equipment.

a. Do not wear neckties, scarves or loose-fitting clothing.

b. Do not wear jewelry such as bracelets, watches, rings or necklaces.

Use safety protective equipment. An OSHA-NIOSH approved respirator must be worn at all times while blasting, changing filter cartridges, emptying dust collection drawers and when handling media that contains free levels of silica and toxic material that are in excess of those allowed by applicable OSHA, USEPA, ACGIH or NIOSH regulations and recommendations. Wear clean, approved eye or face protection. Keep your protective equipment in good condition. Wear sturdy safety-toe shoes with slip-proof soles.

The following chart lists the permissible noise level exposures for hourly duration.

Permissible Noise Exposures

Duration per Day, Hour	Sound Level dBa Slow response A Scale
8	90
6	92
4	95
3	97
2	100
1	105
1/2	110
1/4 or less	115

Make sure the hearing protection is in good working order and replace as necessary. Wear hearing protection whenever you are in a noisy environment, such as a media blasting area, and when equipment is in operation. Noise from a blasting operation can exceed 120 dBa. Anytime visitors are in the blasting area, it is important to provide them with respiration, eye and hearing protection and to make sure they use it for their safety. There are disposable types of dust respirators, plastic goggles and earplugs that are satisfactory for limited exposure. See WARNING next page.

WARNING

Wear hearing protection whenever you are in a noisy environment, such as a blasting area, and when equipment is operating. Failure to follow this precaution may result in severe bodily injury.

WORK AREA SAFETY

Keep your work area clean. Dirty work areas with such hazards as oil, debris or water on the floor may cause someone to fall to the floor, into the machine or onto other objects, resulting in severe bodily injury.

Make sure your work area is free of hazardous obstructions and be aware of protruding equipment components.

Return tools and similar equipment to their proper storage place immediately after use. Keep work benches neat, orderly and clean.

Report unsafe working conditions to your supervisor or safety department. Worn or broken flooring, ladders and handrails, unstable or slippery platforms or scaffolds must be repaired before use. Do not use skids, stock, media drums or boxes as makeshift climbing aides.

LIFTING AND CARRYING SAFETY

Contact supervision if you have any questions or are not sure about the proper procedures for lifting and carrying.

Before lifting or carrying an object, determine the weight and size by referring to such things as tags, shipping data, labels and marked information or manuals.

Use power hoists or other mechanical lifting and carrying equipment for heavy, bulky or hard-to-handle objects. Use hookup methods recommended by your safety department. Know and use the signals for safely directing a crane operator. See WARNING next page.

If in doubt as to the size or type of lifting equipment, method or procedure for lifting, contact Envirosystems Equipment Company Inc. (EECI) before proceeding to lift the equipment or its components. Always inspect slings, chains, hoists and other lifting devices prior to use. Do not use lifting devices, which are defective or questionable.

Never use lifting devices that have been painted, as the paint can hide stress or fatigue cracks.

WARNING

Never place any part of your body under a suspended load or move a suspended load over any part of another person's body. Before lifting, be certain that you have a safe location for depositing the load. Never work on a component while it is hanging from a crane or

other lifting mechanism. Failure to follow this precaution may result in severe bodily injury or death.

Never exceed the safety rated capacity of cranes, eyebolts, hoists, slings or other lifting equipment. Follow standards and instructions applicable to any lifting equipment used.

SETUP AND OPERATION SAFETY

Do not set up or operate any machine until you read and understand all safety instructions.

Assign only qualified, fully trained personnel, instructed in safety and all machine functions, to operate any equipment.

Operators must carefully read, understand and fully comply with all machine-mounted warning and instruction plates. Do not paint over, alter or deface these plates. Replace all plates, which become illegible. Replacement plates can be obtained from EECI.

Do not operate machinery with safety guards, shields, barriers, covers or other protective devices disconnected, removed or out of place. Interlocks are provided for various units. Do not remove or bypass them.

Never lean on a machine or reach over or through a machine. You may become caught between moving elements or you may accidentally activate start buttons or similar devices.

Be attentive during operation. Excessive vibration, unusual sounds, etc. can indicate problems requiring your immediate attention.

System power must be off if the equipment is left unattended. Shut off power to a machine when you leave the operating area or at the end of your work period. Never leave the machine running unattended. Make sure system power is off before cleaning any machinery. Working space around electrical equipment must be clear of obstructions. Provide adequate illumination to allow for proper operation.

INTRODUCTION

NOTE: Paint thickness is usually expressed in "mils", with 1 mil equal to .001 U.S. in. Throughout this training manual, thickness will be expressed in thousands (.001) of an inch, followed by the metric equivalent in millimeters. Example: .003 in. (0,08mm).

Blasting pressures, expressed in psi, are followed by their metric equivalent in bars. Example: 30 psi (2,0 bars).

Media blasting began in 1983 as a new technology for the rapid and environmentally safe removal of primer, paint, and other coatings from military aircraft substrates without the use of toxic chemical strippers. Today, media blasting is rapidly gaining acceptance as a method of first choice for many surface preparation tasks.

Because the media crystals are harder than coatings, but softer than underlying substrates, the media blasting process can quickly remove primer, paint and even chemically resistant coatings without harming substrates. This includes those that are easily damaged by sandblasting and those on which chemical strippers cannot be used, or that can be used only with extreme caution.

The original three (3) types of media were all made from thermoset resins, rather than from a thermoplastic resin. Thermoset resins, once cured, do not soften when heated and cannot be re-melted. If sufficiently heated, they will char but will not re-melt. Thermoplastic resins soften when heated and can be re-melted numerous times.

Media is classified into types according to hardness or aggressiveness:

Type I - Polyester (Thermoset)
Type II - Urea Formaldehyde (Thermoset)
Type III - Melamine Formaldehyde (Thermoset)
Type IV - Phenolic Formaldehyde (Thermoset)
Type V - Acrylic (Thermoplastic)
Type VI - Poly (ally diglycol carbonate) (Thermoset)
Type VII - Crystallized wheat starch

Media specifications are detailed in Chapter 4, entitled MEDIA SELECTION.

All media are inert, and, in many applications, are reusable up to twenty (20) or more times. Those listed above which meet the military specification requirement for blast media are also non-toxic. Waste residue produced from the media blasting process is a combination of the coatings removed and media fines, all of which are reduced to a fine powder similar in appearance to gray flour. This residue is generally non-hazardous, depending on the type of coating being removed. Additionally, the total volume of waste residue generated is but a small fraction of that generated by other stripping methods, and can normally be disposed of in an approved landfill.

NOTE: Always make sure that waste residue is disposed of according to federal, state and local environmental regulations (see Chapter 6, POST BLAST CLEANING.

The major benefits of media blasting over chemical stripping are economical as well as environmental. It is not unusual to realize a 50 to 70 percent reduction in stripping man-hours. This can be converted directly to a reduction in downtime, a major cost factor in some operations.

NON-MEDIA BLAST STRIPPING METHODS

Until the early 1980s, there were only three common methods for removing primer, paint and other coatings from substrates. These methods were:

chemical stripping
sandblasting
hand or mechanical sanding

Each of these methods has specific drawbacks.

Chemical Strippers

Chemical strippers, commonly used for removing paint from metal and wood, are not effective on chemically resistant coatings. Also, chemical strippers should not be used on certain substrates, such as engineered plastics, fiberglass and advanced composites. When used on intricate parts, the use of chemicals may require extensive masking or disassembly to prevent damage to seals and sealants. Chemicals may present the possibility of future corrosion from hidden chemical residue that has not been neutralized.

Most importantly, chemical strippers typically contain up to 75 percent organic solvents (acids, methylene chloride, methyl ethyl ketone (MEK), toluene or phenols). These chemicals pose a danger to workers, generate air and water pollutants and create major hazardous waste disposal problems. Because of this, the United States Environmental Protection Agency (USEPA) promulgated its Final Rule prohibiting the disposal of untreated chemical strippers in landfills throughout the U.S. This ruling has fostered the increased use of media blasting technology and its many applications.

Hard Abrasive Strippers

Hard abrasives, which are pneumatically blasted, include silica sand, glass beads, metal abrasives and synthetic media (such as aluminum oxide and silicon carbide). The use of these abrasives, which are applied at pressures of over 100 psi (6,8 bars), can cause serious damage to substrates. This damage can include changes in critical mechanical or surface dimensions, as well as etching, pitting and substrate penetration. Hard, abrasive media can also cause warping and stretching when used on thin metals.

Certain metal abrasives may impart ferrous or other undesirable residue, increasing the likelihood of future rust or other corrosion.

The use of silica sand presents a major health problem to workers from possible silicosis exposure. This process generates large volumes of contaminated waste, which must be disposed of in an environmentally acceptable manner. Also, the use of copper slag may result in high concentrations of respirable arsenic.

MEDIA BLASTING APPLICATIONS

Media blasting technology is fast replacing highly toxic chemical strippers in the stripping of commercial and military aircraft airframes. Other important applications have developed that are dwarfing aviation airframe applications. These include the stripping of:

aerospace components

aerospace ground support equipment

weapons systems, such as missile airframes

commercial and industrial products, including heavy machinery and equipment, computer housings, powder-coated fluorescent lighting fixtures, engines and other products, especially where critical surface or mechanical dimensions cannot be compromised

components and panels fabricated of engineered plastics or advanced composites, either to remove coatings or to obtain a texture on the parts to ensure excellent paint bonding

consumer household items, such as garden furniture, cabinets, floors, walls, pool tiles and other items

aluminum and fiberglass marine vessels and components

injection molding screw-feeders and related hardware ground transportation vehicles, such as metal and fiberglass automobiles, trucks, tractors, trailers, vans and recreational vehicles (RVs)

TRAINING PROGRAM

NOTE: If during this training program, the EECI training representative recognizes in an individual the traits of carelessness or horseplay, that individual will not be certified for media blasting operation.

The objective of EECI during the hands-on portion of this training program is not to make everyone an expert in media blasting; it is to provide each person with the skills and knowledge to safely proceed in acquiring the experience needed to become proficient in the media blasting technology, without causing damage in the process.

Media Blasting is an efficient and environmentally safe way to remove paint or other coatings from most substrates. It has been characterized by the military and independent consultants as "Best Available Technology" for many applications.

NOTE: Media blasting is not a cure-all. It does have the potential for damage if reasonable care is not taken. The best way to avoid damage to an item being stripped is to be well trained in the technique required for a specific task. If you have any doubts as to the best way to proceed, ask someone with experience in removing a specific coating from the target substrate.

There are some surfaces which, normally, should not be stripped with media blasting. These include:

aircraft radomes

very thin aluminum or magnesium substrates

various types of resin-starved composites

This is not to say that these items cannot be stripped safely. However, these types of materials should raise a caution flag to any properly trained media blasting operator. No processing should be attempted until some testing has been done on a sample piece (scrap) first.

The media blasting training program will introduce you to the various types of equipment you will be using. These will include the StripMaster blast and reclaim machine, and various support equipment, such as the air compressor, AirWall dust collection/air ventilation equipment and operator respiration equipment.

Training will cover:

- safety
- substrate material and its thickness
- types of coatings to be removed
- masking requirements
- operation of the equipment
- pre-blast preparation
- media selection, including type and size
- blasting parameters, including blasting pressures and media flow rates
- blasting stand-off distance
- angle of blast nozzle to substrate
- post-blast cleaning and waste disposal
- detailing
- preventive maintenance
- basic troubleshooting

CONTINUATION OF TRAINING

Your training does not end with the completion of this training course. Constant changes in paint coatings, substrates and media types will continue to affect media blasting operations. Media blasting is a new and rapidly developing technology. The learning process never stops.

CHAPTER 2: EQUIPMENT, MAINTENANCE, AND TROUBLESHOOTING

EQUIPMENT OVERVIEW

Media blasting requires the use of several types of equipment. This training program will review the equipment types in this order:

compressed air system
operator respiration equipment
AirWall dust collection/ventilation unit
media blasting/reclaim system

Preventive maintenance and troubleshooting will also be reviewed at the end of this chapter.

COMPRESSED AIR SYSTEM

All media blasting systems use compressed air to convey the blast media from the pressure vessel to the workpiece. In addition to supplying compressed air for the blasting operation, the compressor also supplies air for:

centrally-supplied air respiration unit
reclaim/dust collector reverse-pulse filter cleaning system
reclaim hopper vibrator
utility air connections in the blast and preparation areas

Air requirements from the compressed air system are as follows (cfm = cubic feet per minute; cu m/min. = cubic meters per minute):

air respiration unit*	10 – 15 cfm @ 85 – 95 psi (0,3 – 0,4 cu m/min. @ 5,8 – 6,5 bars)
reclaim/dust collector	momentary pulse only
reclaim hopper vibrator	7 cfm @ 100 psi (0,2 cu m/min. @ 6,8 bars)
utility air connections**	10 – 15 cfm @ 100 psi (0,3 – 0,4 cu m/min. @ 6,8 bars)
centrally supplied air respiration unit*	10 – 15 cfm @ 100 psi (0,3 – 0,4 cu m/min. @ 6,8 bars)

* multiply requirement by the number of operators, media tenders
** multiply requirement by the number of connections

The compressed air requirements of StripMaster media blasting machines depend on factors such as the blast air pressure and blast nozzle size. The following charts (Figure 2-1) indicate approximate air requirements for the various size blast nozzles.

CFM CONSUMPTION

NOZZLE NO.	VENTURI SIZE	PSI 25	30	35	40	45	50	60
		CFM						
4	1/4 in.	28	32	37	41	45	49	56
5	5/16 in.	44	50	57	64	70	76	88
6	3/8 in.	63	73	82	91	100	109	126
7	7/16 in.	85	99	112	124	137	149	172
8	1/2 in.	112	129	146	163	179	194	225

Cu M/MIN. CONSUMPTION

NOZZLE NO.	VENTURI SIZE	BARS 1,7	2,0	2,4	2,7	3,1	3,4	4,1
		Cu M/MIN.						
4	6,4mm	0,8	0,9	1,0	1,2	1,3	1,4	1.6
5	8,0mm	1,2	1,4	1,6	1,8	2,0	2,2	2,5
6	9,5mm	1,8	2,1	2,3	2,6	2,8	3,1	3,6
7	11,1mm	2,4	2,8	3,2	3,5	3,9	4,2	4,9
8	12,7mm	3,2	3,7	4,1	4,6	5,1	5,5	6,4

Figure 2-1
COMPRESSED AIR REQUIREMENTS

As determined from the top chart, two (2) No. 7 blast nozzles at 25 psi (1,7 bars) can be operated at nearly the same cfm requirement as one No. 8 blast nozzle at 40 psi (2,7 bars)

The minimum recommended compressed air system for a one (1) blast nozzle media blast system is a 50 hp (37,3kw) rotary screw air compressor with at least a 200 acfm (5,7 acu m/min.) capacity rated pressure of 100 psig (6,8 bars). The system should incorporate an efficient air/oil separation unit and built-in after cooler. Appropriate filters should be installed to remove oil aerosols and particulates.

NOTE: Media blast systems, especially those using crystallized wheat starch, are not moisture-tolerant. In most locales, it is usually necessary to install a refrigerated air dryer to assure clean, dry compressed air.

To reduce pressure drops between the compressor system and the blast generator, EECI recommends that the compressor be installed as close as possible to the media blast system, and that a minimum of 1 1/2 in. (38mm) plumbing be used. Refer to Figure 2-2 for the compressed air system layout.

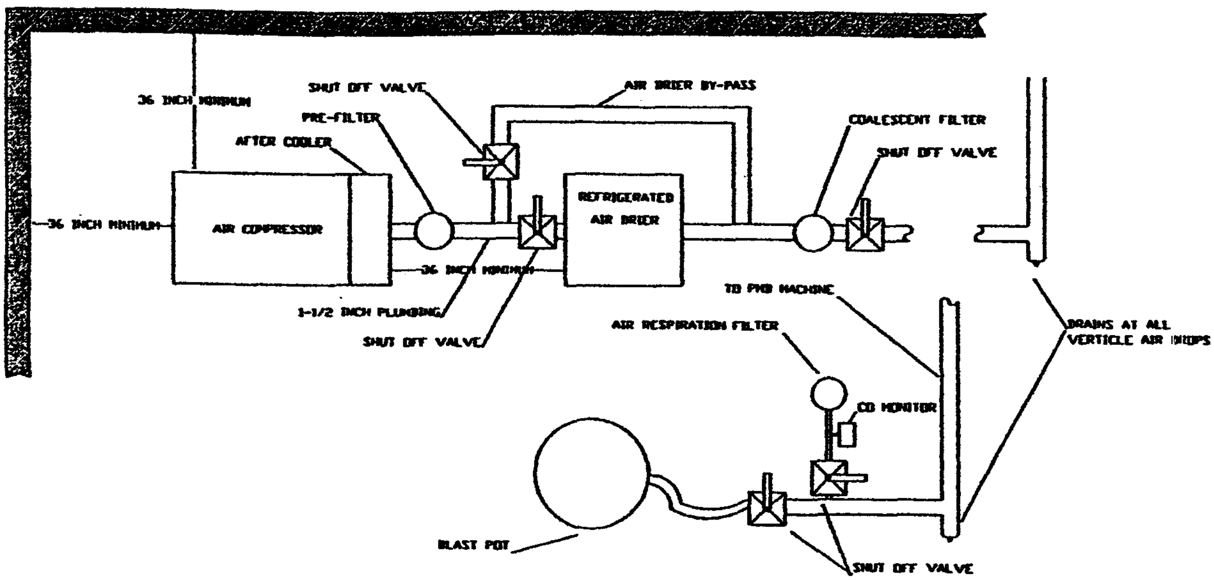


Figure 2-2
COMPRESSED AIR SYSTEM LAYOUT

CHAPTER 2: EQUIPMENT, MAINTENANCE, AND TROUBLESHOOTING

OPERATOR AIR RESPIRATION SYSTEM

Air respiration equipment is designed to provide the wearer with respiratory protection against inhalation of airborne contaminants. All respiration equipment should be OSHA and NIOSH approved. The air respiration equipment supplied by EECI is comprised of:

- positive pressure blast helmets
- air conditioners
- airline filters
- waist-length capes
- optional CO monitor

A centrally supplied air respiration system relies on the compressed air system for its source of breathing air. OSHA regulations (Section 1910.134) require that when oil-lubricated compressors are used as sources of breathing air, they must be equipped with high temperature alarms or carbon monoxide monitors/alarms, or both. If only a high temperature alarm is used, it is imperative to frequently test the compressor air for carbon monoxide to ensure it meets the following Grade D requirement for breathing air:

oxygen	19.5 – 23.0%
hydrocarbons (condenses) in Mg/m(3) of gas	5 mg/m(3) max.
carbon monoxide	20 ppm max.
carbon dioxide	100 ppm max.
no toxic contaminants at levels which Would make the air unsafe to breathe.	

NOTE: Refer to American National Standards Institute (ANCI) Standard Z88, or the C.G.A. Commodity Specifications G7.1, available from:

Compressed gas association
500 Fifth Avenue
New York, NY 10036

The helmet airline respirator supplied by EECI is a Type CE supplied-air respirator with continuous flow. This maintains a positive pressure in the helmet at all times and is less apt to permit inward leakage of contaminants. The cape is constructed so that it will cover the neck and shoulders to protect the wearer from rebounding media. When this type air respirator is used, the air flow rate must be at least 6 cfm (0,2 cu m/min.).

Federal law also requires that breathing air hose couplings be incompatible with outlets for other gas systems to prevent accidental connection of a supplied air respirator to non-respirable gases or oxygen.

Air supplied through a central air respiration system must first be filtered through a special filtering system to ensure the removal of moisture and oil which becomes atomized during the compression process. These contaminants can produce serious respiratory problems if they are not filtered out. This filtering requires special equipment that is supplied with the system. Refer to the compressed air system layout, Figure 2-2

NOTE: If there is a possibility that the compressed air source may become contaminated from a defective compressor, or from the possible collection of carbon monoxide fumes by the compressor from its environment (e.g. automobile exhaust), an online CO monitor with audible alarm should be installed

Air pressure supplied to the filter inlet should not exceed 100 psig (6,8 bars). Air will be released by the pressure relied valve when pressure within the filter exceeds 125 psig (8,5 bars). Air discharging from the filter to the air respiration helmet can be controlled by the pressure regulator adjustment knob (Figure 2-3) to meet the specific air pressure requirements of the respiration helmet.

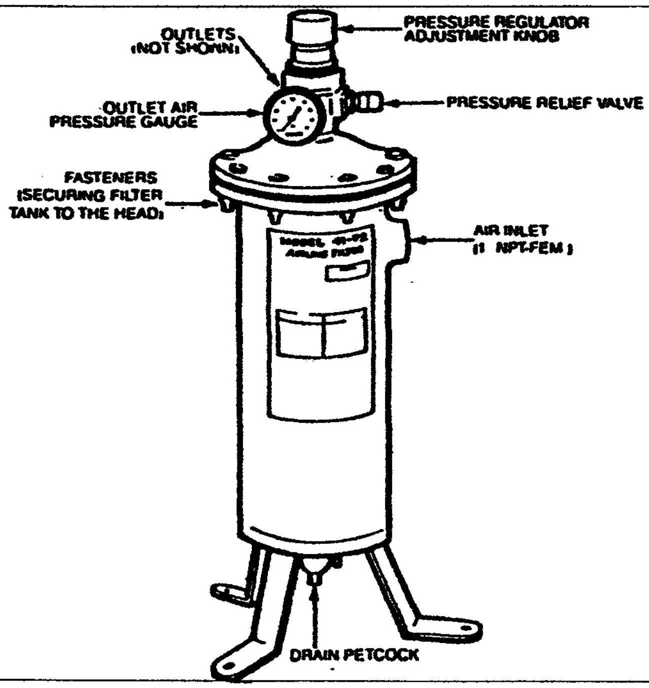


Figure 2-3
COMPRESSOR AIRLINE FILTER

Preparation Of The EECI Optionally Supplied Air Respiration Helmet

Make sure that all air respiration components are present. The respirator box contains the following:

a. helmet with chin strap, suspension and cape

b. breathing hose, 10 ft. (3,0m) long

c. air-supply hose, 25 ft. (7,6m) long; one female quick-disconnect fitting

d. air-control valve with belt, optional cool air tube or optional climate control tube

Follow this procedure to adjust the helmet suspension.

1. Remove the cape (Figure 2-4) and chin strap from the helmet.

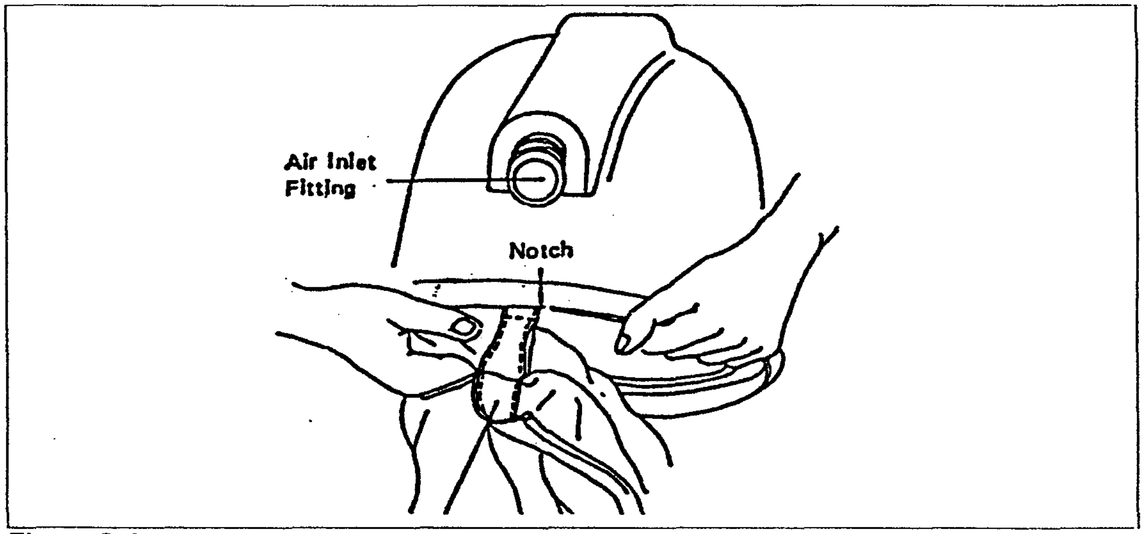


Figure 2-4
CAPE REMOVAL

2. Remove the headband from the helmet by unsnapping four (4) white plastic tabs from the helmet interior.

3. Unfasten the vinyl sweatband.

4. Slip the headband tongue through the front holder until the correct head size is reached. Adjustment will fit head sizes 6 1/2 to 8 in. (165 – 203mm). Sizes are marked on the headband slots. Adjust evenly on both sides. Press the selected slots firmly onto the lugs on the front band.

5. Reattach the sweatband.

6. Reinstall the suspension into the helmet by inserting the four (4) white plastic tabs into the wedge-shaped holders on the helmet interior.

NOTE: The suspension maintains a fixed distance between the head and the helmet. The suspension must be properly installed in the helmet to provide the protection and comfort for which it was designed. Do not tilt the helmet on your head.

The following steps complete preparation of the air respiration helmet

7. Check the helmet lens system. The inner lens is held in place by a rubber gasket. Five (5) tear-off lenses are held in front of the inner lens by a window frame.

8. Thread the breathing hose onto the air inlet at the back of the helmet.

9. Using the same assembly technique as in step 8, thread the air-control valve (attached to the operator belt), the optional cool-air control valve, the optional cool-air tube, or the optional climate control tube onto the free end of the breathing hose.

10. Attach the quick-disconnect coupling to the air-control valve, the optional cool-air tube or the optional climate control tube.

11. Attach the air-supply hose to the quick-disconnect coupling. Use the adapter provided to attach the other end of the air-supply hose to an air filter.

NOTE: If additional air-supply hose is required, it must be approved air-supply hose. Extension hoses of 25, 50 and 100 ft. (8, 15 and 31m) in length can be added to the standard 10 ft. (3m) starter hose or to an optional 25 ft. (8m) starter hose. Maximum hose length is 200 ft. (61m).

Operation Of The Air Helmet

NOTE: Prior to operation of the air helmet, the helmet air-supply hose, air entry ports and fittings should be inspected for dust and debris, and cleaned.

WARNING

Never use the air helmet without both the inner lens and outer perforated lenses in place. Failure to follow this instruction may cause serious personal injury.

1. Place the helmet on your head. Position the chinstrap and knit cuff in the cape so that they fit snugly, yet comfortably.
2. Pull the cape down around your chest and connect the four (4) elastic belts (two on each side) under your arms. Tighten as required using the slides provided.
3. The air-control valve is attached to a belt. After buckling the belt around your waist outside the cape, use the slide to tighten the belt.
4. The air-control valve permits increasing or decreasing the supply of breathing air while the air respirator is in use. The valve provides a range of 9 – 14 cfm (0,3 – 0,4 cu m/min.) of breathing air to the wearer. To regulate the air supply, pull down and turn the large sleeve on the lower end of the valve in the desired direction to increase or decrease the airflow as required.

NOTE: A soft hissing sound is normal when the air control valve is in operation. Some air is allowed to escape underneath the sleeve to prevent entry of dust into the adjustment mechanism.

Replacing The Inner Lens

To replace the inner lens, refer to Figure 2-5 and follow this procedure.

1. Unlatch and open window frame that secures the outer tear-off lenses.
2. Reach inside the helmet. Push up the window gasket lip and push the gasket and lens out of the helmet window opening.
3. Remove the gasket from the old lens and place it on the new lens.
4. Place the new lens and gasket over the window opening. From the inside of the helmet, slowly work the gasket lip back onto the helmet.

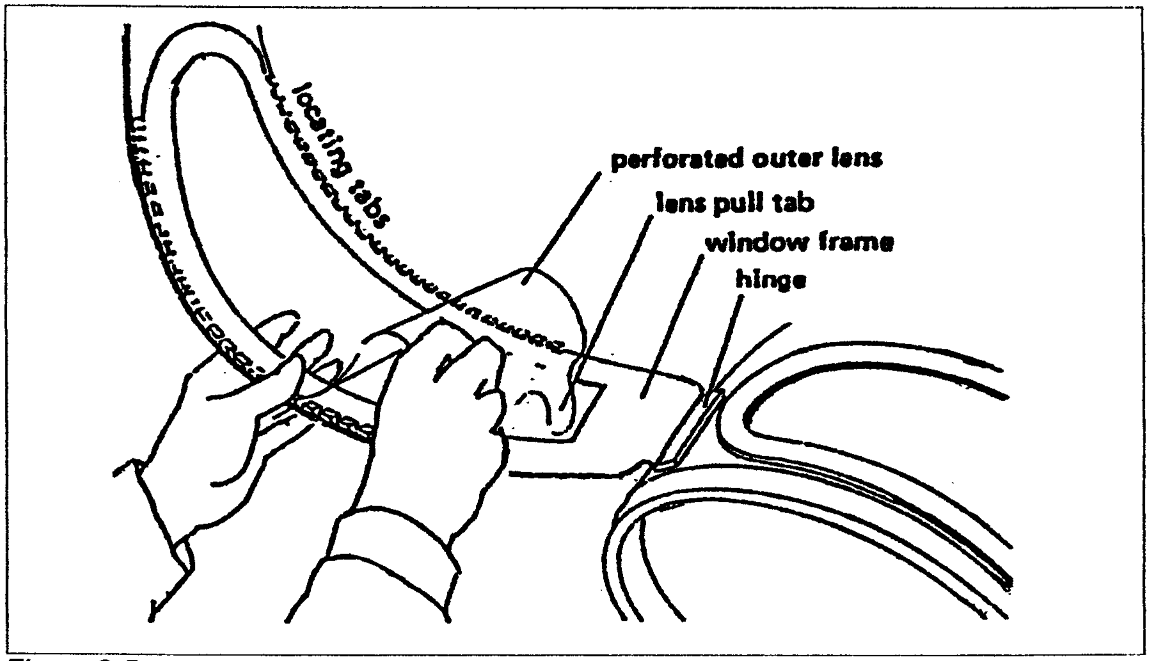


Figure 2-5
REPLACING THE INNER AND OUTER LENSES

Replacing The Outer Perforated lenses

1. Unlatch and open the window frame.

2. Pick up five (5) lenses, holding them with the straight side toward the top of the helmet. The pull tabs of the lenses go toward the hinged end of the window frame.

3. Drop only the pull tabs of the lenses through the window frame opening at the window frame hinge end. Allow them to drop in place between the locating tabs on the window frame. The lens perforations should line up close to the window frame opening.

4. Secure the pull tabs by attaching them to the hook protruding from the front of the window frame. Re-latch the window frame by snapping it back onto the holding lugs.

Maintenance

The helmet, hoses, air entry ports and fittings should be routinely checked for dust and debris, and cleaned.

CAUTION

Never mix or substitute components from one respirator with those of another brand even though they may look similar or identical. Failure to follow this instruction will void the warranty.

When the inner lens requires replacement, which is not often, refer to the previous section Replacing The Inner Lens.

Replace the helmet suspension at the first sign of wear. Proper suspension is critical to helmet safety. The chinstrap wears out from normal use. Replace it at the first sign of wear.

When the acoustical foam on the inside of the helmet becomes dirty, wipe it off with a damp cloth. Do not use caustic solution or thinners. If necessary, pull off the acoustical foam and replace it.

Clean and disinfect the respirator on a regular basis. For personal hygiene, an OSHA-NIOSH approved respirator should be issued for the exclusive use by one worker and must be cleaned by that employee after each use, or more often if necessary. Respirators used by more than one worker must be thoroughly cleaned and disinfected by the user after each use. Use a hospital-grade quaternary-ammonium solution that is proven effective and has wide-ranging disinfecting qualities.

Store respirators in a clean and sanitary location. See CAUTION.

CAUTION

Never hang the helmet by the breathing hose. Use the strap at the top of the helmet for this purpose. Failure to follow this instruction may cause permanent damage to the hose-helmet connection.

Respirator Health And Safety Training

The following procedures are in use at EECI and are provided here as a sample for facilities using StripMaster media blasting equipment.

Trainer Qualifications. Training for supervisors and workers must be conducted by a competent individual skilled and knowledgeable in respiratory protection. The trainer must receive a higher level of training than those receiving the training.

Documentation. Training must be documented by a qualified trainer and training records must be maintained. Employee records of respirator training must be kept for at least the duration of employment of the user, or as specified by specific contaminant exposure. At EECI, records are maintained and include the following minimum information:

a. employee's name, Social Security number or other identifying worker number

b. job title

c. work location and supervisor's name

d. dates of training or testing, and medical evaluations

e. type of respirator selector

f. results of fit test

g. name of each person performing the training

h. wearer's need for glasses or other eye protection

i. other pertinent information (e.g. allergies, hyper-tension, pulmonary function, heart conditions, etc.)

In addition to the employee records, health and safety records should be kept on file. Refer to Figure 2-6 for an example of EECI's RESPIRATORY PROTECTION TRAINING AND RESPIRATOR FIT TEST CERTIFICATION form.

Minimum documentation should include:

a. air monitoring results

b. equipment maintenance records

Training Elements. Minimum respiratory training requirements at EECI include the following:

a. names of personnel responsible for the implementation and enforcement of the Respiratory Protection Program

b. instructions on the nature of the hazards (acute, chronic, or both) and an appraisal of the consequences if the respirator is not used

c. an explanation of why more positive engineering controls are not immediately feasible to reduce or eliminate the need for respirators

d. discussion of the proper types of respirators for particular purposes

e. discussion of each type respirator's capabilities and limitations

f. instructions and training on actual use of the respirator, including recognition of the end of service life of filter cartridges, canisters, or filters (e.g. tasting or smelling of contaminants, manufacturer's expiration date, or increased breathing resistance)

g. classroom and field training to recognize and cope with emergency situations

h. instructions on cleaning and maintaining a respirator

i. specialized training, as required, for unique purposes

j. additional training prior to the introduction of a new process, procedure and/or respiratory hazard into the workplace

Employee Name:__________________________

Employee Number:__________________________

Physician's Approval: Yes No   Date of Last Medical Exam:________

Fit Test Date:______________   Corrective Lens: Yes No

	Respirator #1	Respirator #2
Equipment Type:	______________	______________
Manufacturer:	______________	______________
Model:	______________	______________
Size:	______________	______________

TEST RESULTS (Circle correct response)	Respirator #1	Respirator #2
1. Negative Pressure Test	Pass Fail	Pass Fail
2. Positive Pressure Test	Pass Fail	Pass Fail
3. Saccharin Vapor Test	Pass Fail	Pass Fail
4. Irritant Smoke Test	Pass Fail	Pass Fail

The employee has been trained in the fundamental principles of respiratory protection, use, inspection, cleaning, maintenance and storage of equipment   Yes No

Saccharin odor recognition   Yes No

I hereby certify that the subject employee has been trained and fit-tested in accordance with Title 29 CFR 1910.134. The results of the test indicate that said employee is accepted for work assignments requiring respiratory protective devices.

Examiner's Name (Trainer/Fit Tester): __________________________

Examiner's Signature: ______________________ Date: ________

Employee's Name: ______________________________________

Employee's Signature: ______________________ Date: ________

Figure 2-6
RESPIRATORY PROTECTION TRAINING AND RESPIRATOR FIT TEST CERTIFICATION

Air Respirator User's Acknowledgment Form. All EECI employees who wear air respiration equipment in their work are required to complete and sign an acknowledgment form. The following form, Figure 2-7, is provided as a sample only.

ENVIROSYSTEMS EQUIPMENT COMPANY INC. (EECI)
RESPIRATORY PROTECTION PROGRAM

EMPLOYEE ACKNOWLEDGMENT FORM

The Envirosystems Equipment Company Inc. (EECI) Respiratory Protection Program applies to all employees who are required to wear a respirator during certain operations. Carefully review the written program and make notes of any questions you may have. Please direct your questions to your supervisor.

I have read and understand the EECI Respiratory Protection Program. I have been adequately trained in the use, inspection, cleaning, maintenance and storage of respiratory devices currently used at EECI. I agree to comply with the policies and procedures contained within the EECI Respiratory Protection Program as a condition of employment.

Employee's Name: ______________________________

Employee's Signature: ______________________________

Date: ______________

Figure 2-7
EMPLOYEE ACKNOWLEDGMENT FORM

Trainee Certification. At the completion of the EECI Respiratory Protection Program, the trainee is issued a certificate that the trainee has satisfactorily completed the program and has been fit-tested. Figure 2-8 illustrates a sample certificate.

ENVIROSYSTEMS EQUIPMENT COMPANY INC.

CERTIFICATE OF ACCREDITATION

____

Has Satisfactorily Completed

Respiratory Protection

Has received training and has been fit-tested

in accordance with 29 CFR 1910.134

Said employee is accepted for work assignment

requiring respiratory protective devices.

EnviroMD on ______________, 1998

____
Coordinator

Certificate Number ______________

Figure 2-8
CERTIFICATION OF ACCREDITATION

AIRWALL DUST COLLECTION/AIR VENTILATION UNIT

A media blasting system generates little dust in comparison to conventional abrasive blasting systems. However, even this dust must be properly controlled to provide a clean working environment. The dust collection/air ventilation system provided by EECI is the AirWall filter cartridge dust collection system.

The AirWall dust collection/air ventilation system, Figure 2-9, is a patented stand-alone unit that may be installed in an existing blast room or supplied as part of a turnkey EECI Contamination Control Booth (CCB) or blast booth.

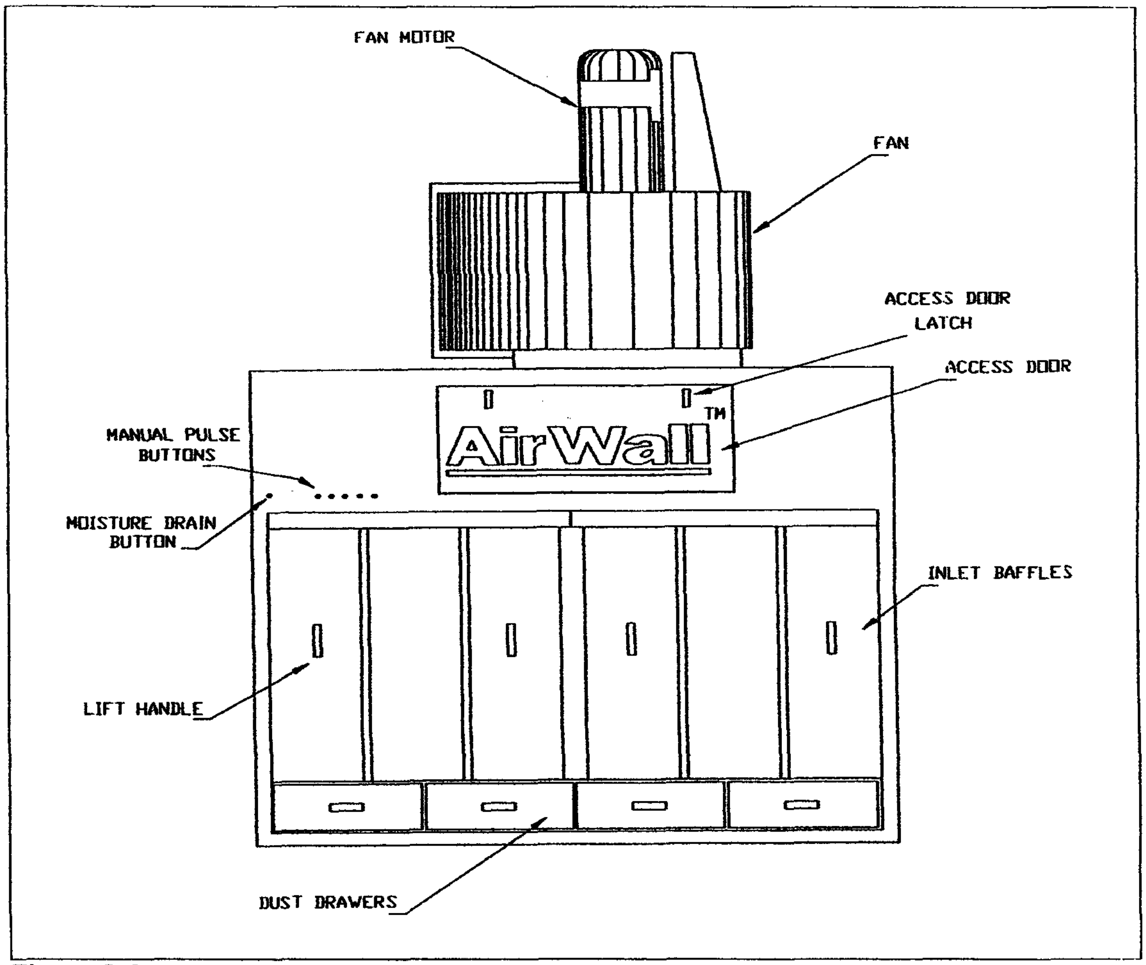


Figure 2-9
AIRWALL DUST COLLECTION/AIR VENTILATION SYSTEM

The AirWall unit is available in capacities ranging from 6,000 to 16,000 cfm (170 – 453 cu m/min.). Because of this range, the AirWall unit can be configured to meet required linear airflow for practically any size contamination control booth or blast booth. The average airflow for a blast booth is 50 linear feet per minute (15,2 m/min.). To determine the correct size AirWall unit for an example booth 16 ft (4,9m) wide x 10 ft. (3m) high x 30 ft. (9m) long (Note: length is not a factor in the following equations):

Multiply width x height: 16 x 10 = 160 sq. ft. (15 sq. m)

Multiply sq. ft. x 50 fpm: 160 sq. ft. x 50 fpm = 8,000 cfm
(15 sq m x 15,2 m/min. = 226,5 cu m/min)

Therefore, the example booth would require an AirWall unit with an 8,000 cfm (227 cu m/min) capacity to maintain 50 linear feet (15m) per minute airflow.

Features of the AirWall dust collection/ air ventilation units include:

6,000 to 16,000 cfm (170 – 453 cu m/min) capacity in a single module

baffle doors to pre-separate heavy particles

large air inlet to allow operation with low hp blowers at less than 3 in. (76mm) s.p. (w.g.) (static pressure, water gage)

filtration capability efficiency of 99.99994 percent by weight

automatic, on-demand cleaning of filter elements by reverse pulsejets of air

Incoming air passes through the baffle doors on the front inlet where large or heavy particles are stopped and drop to the floor. This pre-separates the heavier particles. The dust-laden air then passes through the filter medium from the outside to the inside of the filter cartridges and out the open top of each filter cartridge. This leaves the dust on the outside surface of the filter cartridges. The filtered air then flows from the filter cartridges into the clean-air plenum above the cartridges where it is pulled into the fan inlet and exhausted.

A Photohelic gage and switch provide automatic reverse pulsejet cleaning of filter cartridges on demand. This device monitors pressure differential between the clean and dirty sides of the filter cartridges, actuating the reverse pulsejet cleaning as required. This results in cost savings from lower compressed air consumption and increased life for filter cartridges and diaphragm pulse valves. Refer to Figure 2-10.

The Photohelic monitoring device has two (2) small knobs on the front of the gage for establishing two different "set points" – one low and one high. The HIGH set point

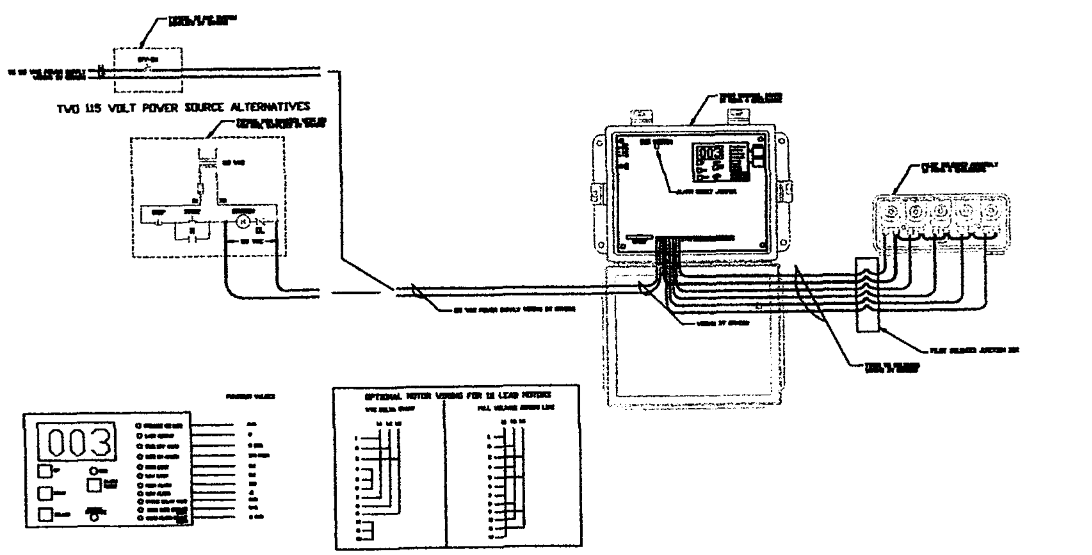


Figure 2-10
PHOTOHELIC MONITORING DEVICE

(right knob) is established at the point when the cleaning cycle is to start, normally about 3.0 in. (76mm) s.p. (w.g.). The LOW set point (left knob) is established at the point when the cleaning cycle is to stop, normally about 2.0 in. (51mm) s.p. (w.g.)

A solid state sequence controller determines the cleaning cycle of the filter cartridges. When the HIGH set point is reached on the Photohelic gage, a relay signals the sequence controller to start the cleaning cycle. The controller then initiates a series of five (5) timed pulses, cleaning a set of filter cartridges with each pulse. This sequence starts left-to-right (facing the air inlet). The length of each pulse is adjustable from .05 to 0.5 second with the normal pulse being 0.2 second.

A time delay between each pulse allows the compressed air reservoir to recharge for the next pulse. This delay is adjustable between 1 and 30 seconds with the normal delay being 7 seconds. During the cleaning cycle, the controller will pulse each set of filter cartridges in turn until the pressure differential drops below the LOW set point on the Photohelic gage. When the LOW set point is reached, the cleaning cycle stops until the HIGH set point is again reached.

NOTE: The controller's memory feature remembers which filter cartridge set was last cleaned, and the next cleaning cycle will start with the next filter cartridge set in line. This feature makes sure that all filter cartridges receive the same cleaning regardless of their position in the cycle.

Because controller memory is lost when power is turned off, the manufacturer recommends that power to the controller be left on. Turning power to the control box off on a daily basis will defeat the memory function, causing some filter cartridges to be cleaned more often than others.

Options for the AirWall unit include:

1. time delayed cleaning feature to provide automatic reverse pulsejet cleaning of filter cartridges during non-working hours

2. complete central control panel including disconnect, motor starter(s), control transformer, Photohelic gage and switch indicator lights for up to four (4) AirWall units

3. optional hoppers and a pneumatic conveying tube below each module for the pneumatic transfer of dust to a central collection point such as a small bin vent system with a 3 to 5-hp (2,2 – 3,7kw) blower and a 55-gallon (208 liters) drum for disposal of dust and media fines

4. HEPA (High Efficiency Particulate Air) filter package

5. fan silencers to further reduce noise levels

6. motor starters

MEDIA BLASTING/RECLAIM/MEDIA STORAGE SYSTEM

EECI's media blasting systems include Stripmaster Series 100 and Portable models (refer to Figures 2-11 and 2-12). Portable systems are on caster wheels for ease of movement throughout the floor. Additionally, EECI supplies LAB blast cabinets.

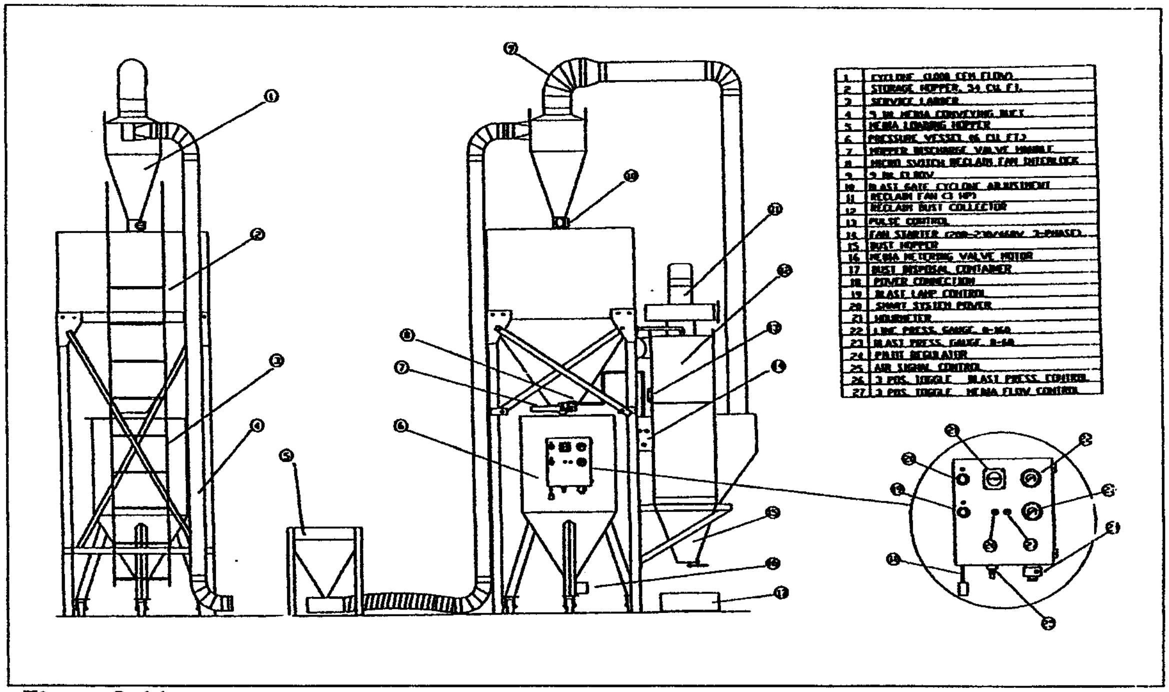


Figure 2-11
STRIPMASTER SERIES 100 MEDIA BLASTING MACHINE

StripMaster media blasting machines are dry stripping machines with the capacity to store, blast, reclaim and clean all types of low aggression, abrasive blast media.

The media processing sequence begins by first loading new or used media into the media loading/reclaiming hopper. Media then exits the base of the hopper through a small hole where it falls into an air stream drawn through a 5 in. (127mm) metal duct at the base of the hopper. Media is then conveyed through the metal ducting into a cyclone separator. The cyclone separator uses centrifugal force and an adjustable air gate to separate reusable blast media from paint/coating residue and media fines. The cleaned media falls into the media storage hopper while the residue and media fines are conveyed in an air stream to a reverse pulsejet, dual filter cartridge unit that removes 99.96 percent of all particulates .5 micron or larger.

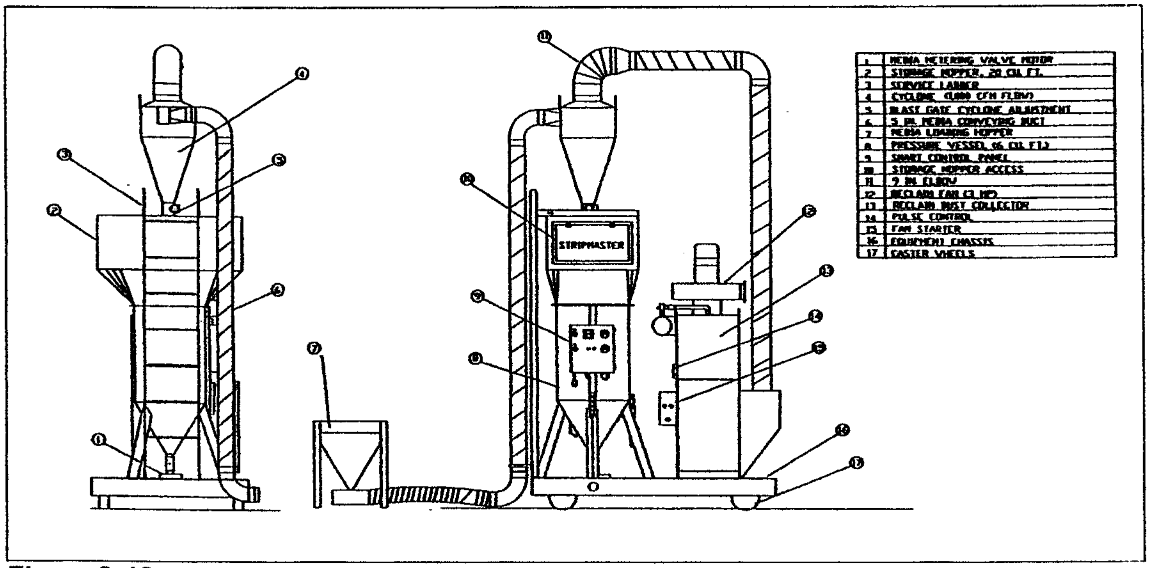


Figure 2-12
STRIPMASTER PORTABLE MEDIA BLASTING MACHINE

The StripMaster media blast machine is comprised of four (4) separate systems. These include:

1. operator control system
2. pressure blast system
3. media reclamation and storage system
4. dust collection system

Standard Operator Control System

The standard operator control system consists of a deadman switch control lever mounted on the free end of the blast hose that, when compressed, sends an air signal to the air inlet valve. The normally closed (NC) air inlet valve opens, allowing air to enter the pressure vessel and blast hose.

Optional Operator Control System

Stripmaster media blast systems with the optional SMART blast handle (Figure 2-13) can remotely control blast pressure and media flow directly at the blast handle. The SMART blast handle rotates freely about the hose, eliminating hose twist.

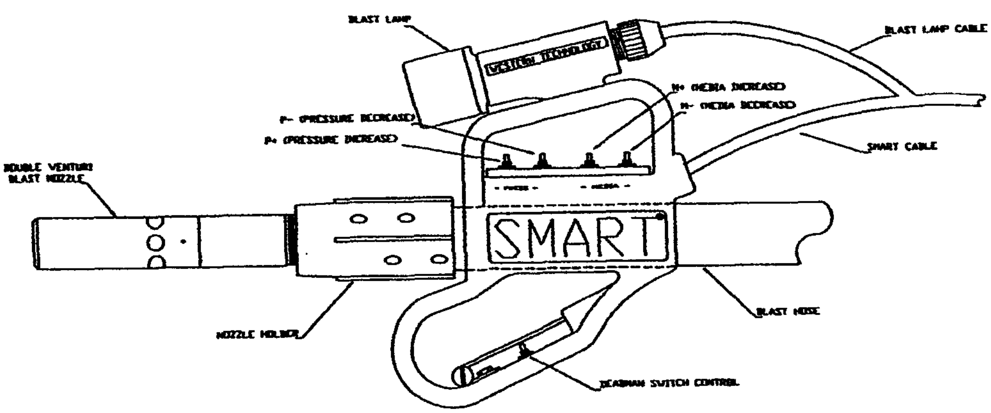


Figure 2-13
SMART BLAST HANDLE (OPTIONAL)

A high-intensity, quartz-halogen blast lamp mounted on the SMART blast handle provides workpiece lighting at the point of media impact. A 4-pushbutton control panel is located under the blast lamp mount. The pushbuttons are a magnetic type, permanently sealed against the environment. The front two (2) pushbuttons (P+ and P-) increase or decrease the blasting pressure. The rear two (2) pushbuttons (M+ and M-) increase or decrease the media flow.

The bottom grip of the SMART blast handle has an electric deadman switch control that consists of an additional magnetic switch under an easily actuated lever. This deadman switch control lever provides instant response, even at the end of a 100 ft. (31m) blast hose, to open or close the air inlet valve in the pressure blast system.

A solid state control module, that uses 12 VDC, 4 mA signals to switch power to the 110 VAC components, minimizes all power through the SMART blast handle.

The machine-mounted SMART control panel (optional), Figure 2-14, contains: compressor line pressure gage, blast pressure gage and a minute meter to track actual blasting time.

When the deadman switch control lever is pressed (activated), the minute meter begins tracking time. Releasing (deactivating) the deadman switch control lever stops

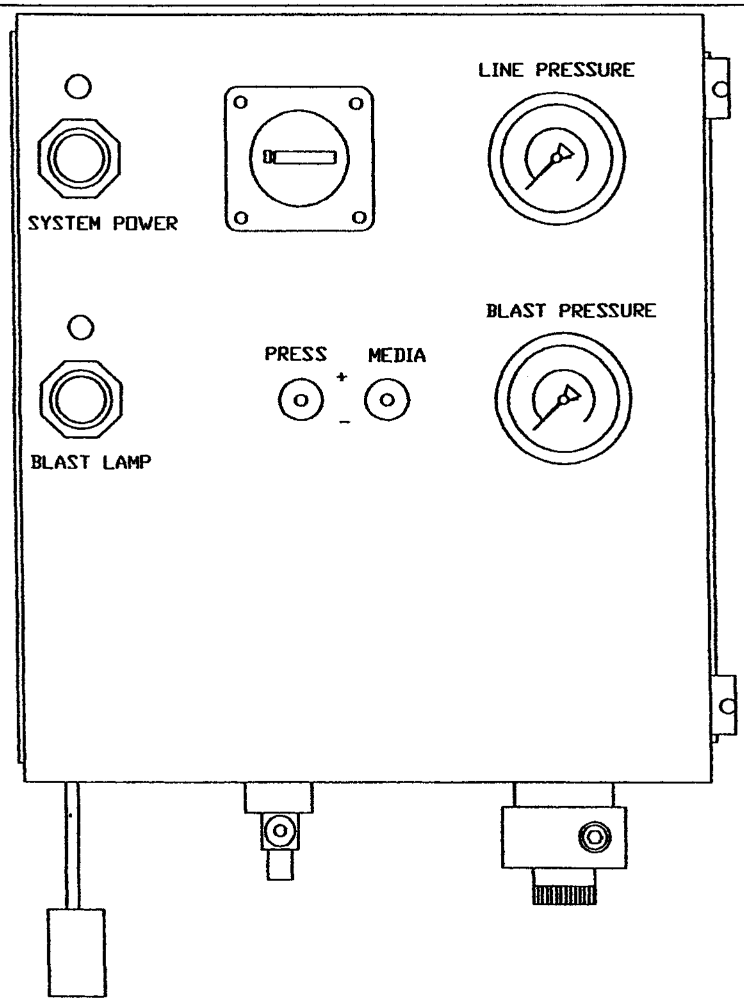


Figure 2-14
SMART CONTROL PANEL (OPTIONAL)

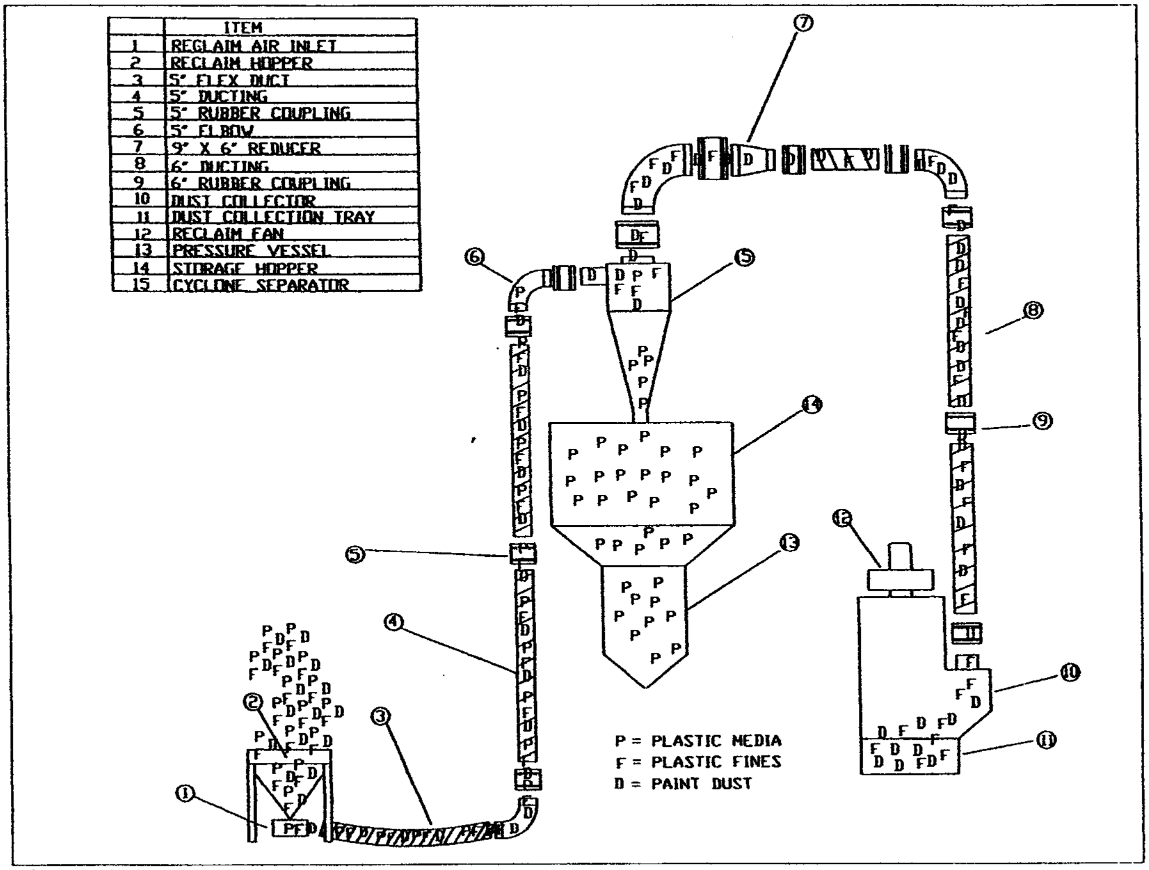
the minute meter. Pressing the RESET pushbutton to the left of the minute meter resets the meter to zero. Controls include illuminated pushbuttons for the main system power and blast lamp, and return-to-center toggle switches for air pressure and media flow. These toggle switches duplicate the control functions on the SMART blast handle.

Pressure Blast System

The pressure blast system is comprised of the following components. For a detailed description of these components, refer to the Installation, Operation, Maintenance and Replacement Parts Manual furnished with your StripMaster machine.

- pressure vessel
- moisture separator
- line pressure manifold supply
- pressure regulator
- pilot-operated regulator
- air signal control valve
- air inlet valve
- exhaust valve
- choke valve
- media metering device
- inlet backflow eliminator
- peripheral blast components

Media Reclamation And Storage System



	ITEM
1	REGLAIM AIR INLET
2	RECLAIM HOPPER
3	5" FLEX DUCT
4	5" DUCTING
5	5" RUBBER COUPLING
6	5" ELBOW
7	9" X 6" REDUCER
8	6" DUCTING
9	6" RUBBER COUPLING
10	DUST COLLECTOR
11	DUST COLLECTION TRAY
12	RECLAIM FAN
13	PRESSURE VESSEL
14	STORAGE HOPPER
15	CYCLONE SEPARATOR

Figure 2-15
RECLAIM PROCESS

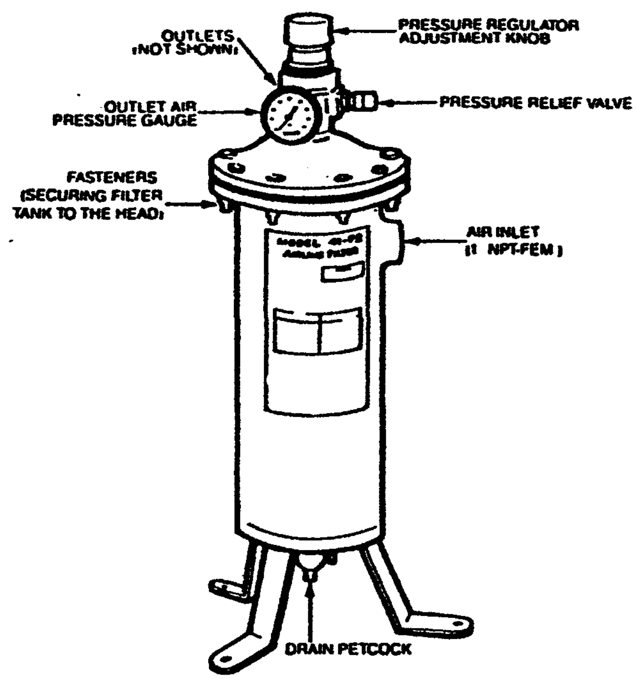


Figure 2-16
AIRLINE FILTER UNIT

c. Insert a new filter cartridge as specified by the manufacturer.

5. Record the date the filter cartridge was replaced on the label attached to the airline filter tank. See WARNING.

WARNING

If changing the filter cartridge does not improve the condition of the breathing air, do not use the air respiration system until appropriate corrective measures have been taken. Failure to follow this instruction may result in serious personal injury.

AirWall Dust Collection System

1. Momentarily open the accumulator tank moisture drain located behind the inlet baffle on the left side of the AirWall dust collection unit. Refer to figure 2-9.

2. Empty the dust collection drawers located in the bottom of the dust collection unit. See WARNING.

WARNING

Always wear OSHA-NIOSH approved respiration equipment when emptying the dust collection drawers. Failure to follow this instruction may cause serious personal injury.

---

3. Dispose of waste according to federal, state and local environmental regulations. See NOTE.

NOTE: Always dispose of waste according to federal, state and local environmental regulations.

Media Blast/Reclaim system

At the start of operations each morning, or at the beginning of each shift, open the drain on the pressure vessel moisture separator and the reverse-pulse accumulator tank on the reclaim dust collector to check for water accumulation (Figure 2-11). More than one or two teaspoons of water are cause for concern and the reason must be identified and corrected. Check the drains for blockage and also to ensure that the water trap and air dryer on the air compressor are both working.

A quick check of various moisture traps and separators (Figure 2-17) on your particular system will ensure that no moisture reaches the valves and controls.

Make a thorough inspection of hoses and connections prior to beginning the stripping operation and again after pressurization. Replace or tighten as necessary. This is especially important on the main blast hose. A bulge in the hose indicates a weakened area that could rupture, causing the hose to whip around. Nylon couplings provided with your system have a lock-wire built into them. Make sure these lock-wires have not been dislodged and are properly secured prior to pressurizing the system. See WARNING next page.

StripMaster media blasting machines use a multiple-stage reclaim system consisting of a vibrating reclaim/loading floor hopper with a gross contamination-separator screen to remove coarse debris. A high-efficiency cyclone separator removes dust and spent media from the blast cycle, and a large-area magnetic separator removes damaging ferrous particles from the blast stream. Refer to Figure 2-15 to trace the reclaim process.

Media first passes through the gross contamination-separation screen. As the reusable media falls into the hopper, it passes over the magnetic separator located at the bottom of the hopper. This removes and captures any ferrous particles that may have been picked up during the reclaim process or blown off the workpiece during blasting operations.

Dust Collection System

From the reclaim system, media is pneumatically conveyed in an air stream, generated by a high-pressure fan, through hard ducting to a cyclone separator. This removes the paint dust and the media fines. The paint dust and fines go from the cyclone separator through hard ducting into a 900 cfm (25,5 cu m/min) dust collection system. This system not only collects the dust from the reclaimed air but also provides the vacuum power that operates the reclaim process.

PREVENTIVE MAINTENANCE

OVERVIEW

Most problems with media blasting can be avoided through a good preventive maintenance program. Items most often causing work stoppage include:

insufficient media in the pressure vessel
foreign material in the pressure vessel
worn or punctured control or blast hose
moisture accumulation in aeration valve or solenoids

Many problems can be avoided by observing proper maintenance. Good housekeeping habits will preclude the accumulation of tape and other debris from the workplace. This will save time otherwise lost in cleaning out screens and metering valves.

DAILY INSPECTION

Compressed Air System

The rotary screw-type compressor requires little maintenance, providing some daily checks are made. Referring to the compressor manufacturer's manual, items that need to be checked daily include:

oil level
filter restriction
moisture content

Check the sight gage on the compressor oil reservoir to confirm a full system. If the sight gage registers less than full, fill it according to the compressor manufacturer's specifications. Check the air filter monitor, or the filter itself, to determine the condition of the filter.

Refer to your individual compressor manual for details and timing of these checks as well as less frequent checks. Also, check the manual anytime there is a noticeable difference in operating pressures without an increase in normal operating air demand, or if there is a sudden appearance of oil in the blasting or control lines.

Airline Filter Unit

The frequency of airline filter cartridge replacement depends on the conditions of the particular air system in which the filter is installed. However, the filter cartridge should be replaced immediately if:

a. the user smells or tastes contaminants in the air being supplied to the air respiration system, or

b. there is a large pressure drop in the system even though the compressor and other components appear to be operating correctly.

To correct the problem, refer to Figure 2-16 and follow this procedure.

1. Shut off the air supply.

2. Drain any accumulated water and oil from the filter tank by opening the petcock valve. Normally the tank will need to be drained at least once a day or shift. In humid climates, or if large amounts of water and oil are present in the air supply, drain the filter tank as required.

3. Disconnect the filter cartridge from the air source.

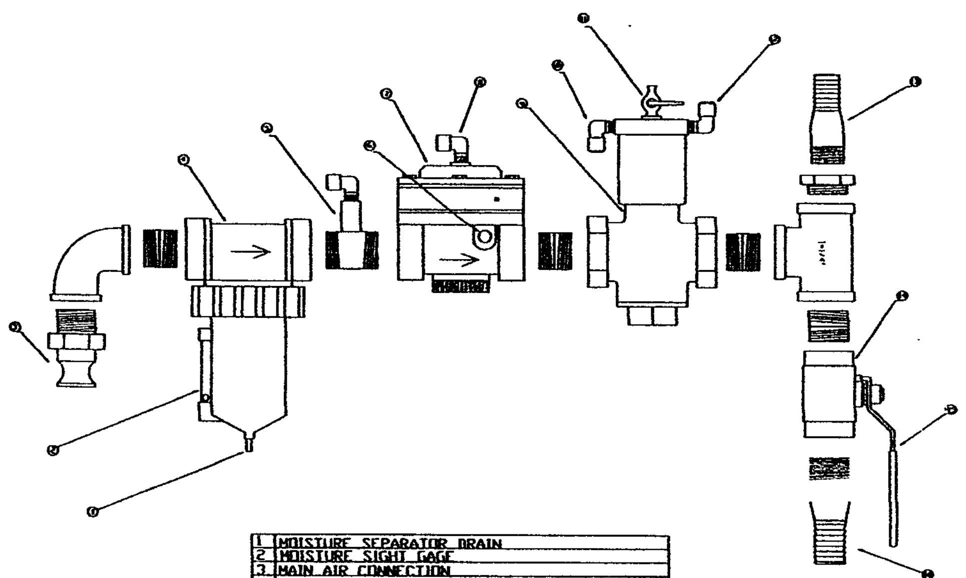
4. Replace the filter cartridge using the following procedure.

    a. Remove the fasteners to separate the head from the tank.

    b. After removing the filter cartridge, clean the inside of the tank to remove any remaining contaminants.

WARNING

Replace any hoses that have a bulge, indicating a weakened area. Make sure the lock-wires built into the nylon couplings have not been dislodged and that they are properly secured prior to pressurizing the system. Although the media blasting system uses relatively low pressure, the volume of air moving through these hoses is considerable and can be potentially dangerous if a hose ruptures or a coupling unexpectedly comes loose. Failure to follow these instructions can cause serious personal injury.



1	MOISTURE SEPARATOR DRAIN
2	MOISTURE SIGHT GAGE
3	MAIN AIR CONNECTION
4	MOISTURE SEPARATOR
5	LINE PRESSURE MANIFOLD SUPPLY
6	BLAST PRESSURE GAGE PORT
7	PILOT OPERATED REGULATOR
8	PILOT REGULATOR CONNECTION
9	AIR INLET VALVE
10	AIR SIGNAL CONTROL VALVE CONNECTION
11	BLEED VALVE
12	EXHAUST VALVE CONNECTION
13	PRESSURE VESSEL AIR SUPPLY
14	CHOKE VALVE
15	CHOKE VALVE HANDLE
16	BLAST AIR SUPPLY

Figure 2-17
PLUMBING TREE

TROUBLESHOOTING PROCEDURES
STRIPMASTER PORTABLE AND SERIES 100 MEDIA BLAST MACHINES

NOTE: Any time you notice something you think is wrong, review the Installation, Operation, Maintenance, and Replacement manual, especially during the early days of your new operation. The better you know your system the more you will get out of it.

CONDITION: **Main system power will not come on.**

CAUSES:

1. Power not connected
2. Tripped circuit breaker.
3. Short in main panel.

CORRECTIONS:

1. Connect the power.
2. Reset the circuit breaker.
3. Contact EECI.

CONDITION: **System power comes on but system will not blast.**

CAUSES:

1. No line pressure.
2. No blast pressure.
3. Obstruction in blast hose or nozzle.
4. Air signal control valve stuck (optional SMART control panel).
5. Short in transformer (optional SMART control panel).

CORRECTIONS:

1. Check the line pressure gage on the compressor or the optional SMART control panel. If no pressure, check for line pressure.
2. Check blast pressure. If no pressure, adjust "up" with the blast pressure regulator on the plumbing tree or the toggle switch on the optional SMART control panel.
3. Disconnect airline and check for obstruction in blast hose and nozzle. See WARNING next page.

WARNING

Make sure that the air system is depressurized before disconnecting air fittings. Failure to follow this instruction may cause serious personal injury.

4. Clean the air signal control valve (optional SMART control panel). For disassembly and cleaning procedure, refer to the Installation, Operation, Maintenance and Replacement Parts manual.

5. Replace the transformer (optional SMART control panel).

CONDITION: **Decrease in operating pressure.**

CAUSES:

1. Operating pressure inadvertently reduced.

2. Insufficient pressure in main air supply line.

3. Manually operated regulator in fully open or fully closed position, or faulty pressure control (SMART control panel or SMART blast handle).

4. Loose coupling between pilot regulator and servomotor (optional SMART control panel).

5. Pilot regulator stuck in fully open or fully closed position (optional SMART control panel).

6. Moisture or other contamination in pilot or pilot-operated regulator.

CORRECTIONS:

1. Reset blast air pressure.

2. Check main air supply line and compressor. Make sure main air supply line has sufficient pressure.

3. Check position of manually operated regulator and adjust as necessary, or open SMART control panel door. Make sure that the pilot regulator servomotor is turning while activating the pressure increase/decrease control. If the motor works

from the SMART blast handle but not the SMART control panel, replace the switch.

4. Tighten the coupling between the pilot regulator and servomotor (optional SMART control panel).

5. Use pliers on the lower section of the coupling (optional SMART control panel) to gently turn the lower section to unbind the jam (fully open or fully closed).

6. Check for moisture or other contamination in the pilot and pilot regulators.

CONDITION: Reduced Media Flow

NOTE: Insufficient media in the pressure vessel is the most common cause of reduced media flow.

CAUSES:

1. Insufficient media in the pressure vessel.
2. Incorrect position of media metering valve.
3. Media shut-off valve (Figure 2-18) not depressurized.
4. Low line pressure.

CORRECTIONS:

1. Make sure there is sufficient media in the pressure vessel before looking for a mechanical failure.

2. Check position for the media metering valve. Activate the electric controls to ensure the valve is responding to the signals.

3. Verify that the media shut-off valve has depressurized, allowing media to enter the metering valve. See WARNING. If necessary, disconnect the air pressure fitting at the media shut-off valve to ensure the valve is pressurized

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WARNING

Make sure that the air system is depressurized before disconnecting air fittings. Always handle the hose carefully. Failure to follow this instruction may cause serious personal injury.

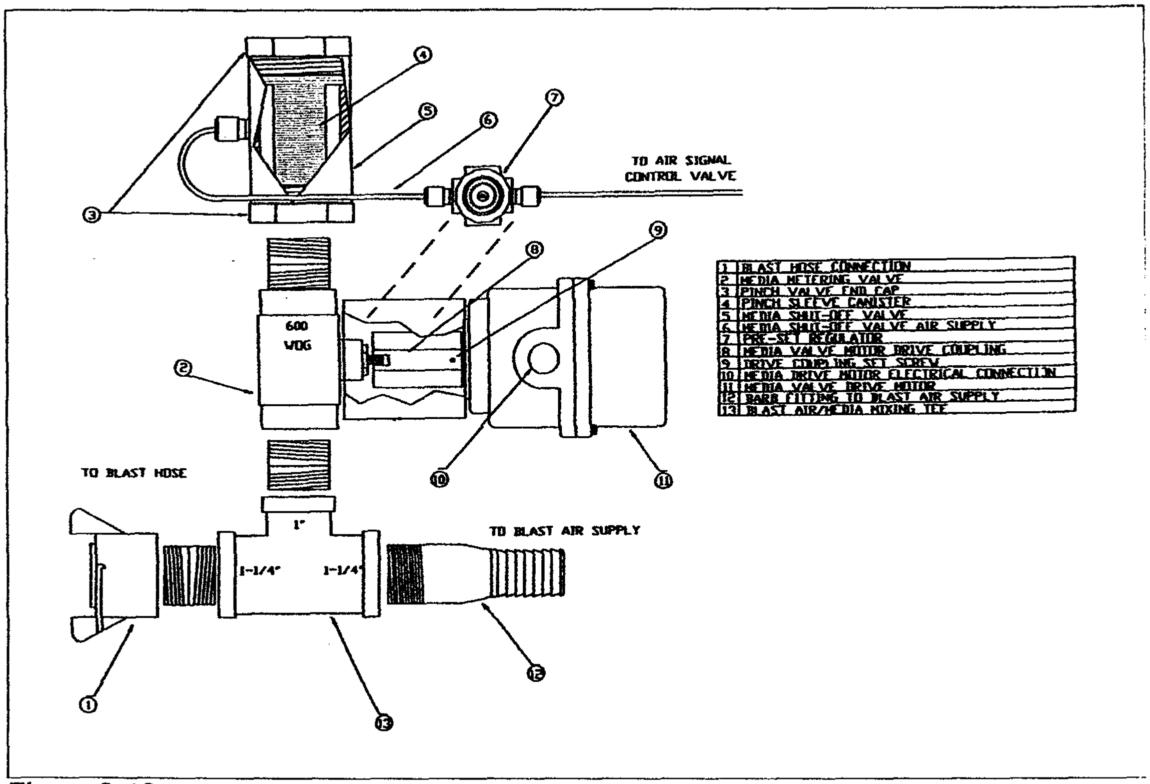


Figure 2-18
MEDIA VALVE

4. If line pressure drops during blasting, consult EECI.

CONDITION: **Dust collector will not start.**

CAUSES:

1. Main supply power off at the disconnect.
2. Overload heaters in the magnetic starter are tripped.

CORRECTIONS:

1. Investigate cause for the disconnect being off.
2. Reset the heaters by pressing the RESET pushbutton located on the lower front of the dust collector magnetic starter box under the operator pneumatic control panel. If the heaters trip a second time, a qualified electrician should determine and repair the cause of the tripping.

CONDITION: **Media is not being conveyed from the loading hopper.**

CAUSES:

1. Reclaim fan not running.
2. Scalping screen blinded by debris.
3. Reclaim hopper ball vibrator needle valve (side of the reclaim hopper) not turned on.
4. Magnetic separator is loaded with ferrous contamination.
5. Entrainment duct opening under the magnetic separator is obstructed.

CORRECTIONS:

1. Press the magnetic starter on the left side of the dust collector.
2. Clean the debris off the scalping screen.
3. Turn on the reclaim hopper air, using the needle valve on the reclaim hopper.
4. Lift the magnetic separator out of the media-loading hopper and clean it.
5. Remove the obstruction from the duct opening.

SUBSTRATE IDENTIFICATION

Before performing any masking or other blast preparations, first determine which areas are to be masked and which are to be blasted. If the object to be stripped is a familiar one, these decisions can be made as masking progresses. However, initially, it is best to take the entire masking-blasting crew on a walk-around of the workpiece. This ensures all potential problem areas are recognized prior to the start of the masking and blasting processes.

WALK-AROUND

Areas to look for, and to identify on a walk-around, are areas for potential intrusion of media into spaces which would be difficult - if not impossible - to remove during the post-blast cleanup. Typical examples are:

fuel cell fill/vent openings
ventilation or air-conditioning inlets or outlets
tooling or drain holes leading into permanently sealed areas.

Other obvious areas, which must be considered, include:

aircraft pitot tubes
static vents
openings into engines or engine nacelles

The second purpose of the walk-around is the positive identification of the various substrates that are to be either masked or blasted. This includes not only the separation of surfaces by type of substrate, but also by thickness.

NOTE: Conducting a walk-around with the entire stripping crew has proven to be a productive means of avoiding subsequent problems or damage. The walk-around procedure is recommended even on workpieces that are familiar, if the potential for damage exists.

During the walk-around of an automobile, open the trunk and hood. Remove any items from the trunk to lessen clean-up time. While the hood is open, remove the PVC valve from the engine and seal any openings to prevent media intrusion. Refer to Figures 3-1 and 3-2.

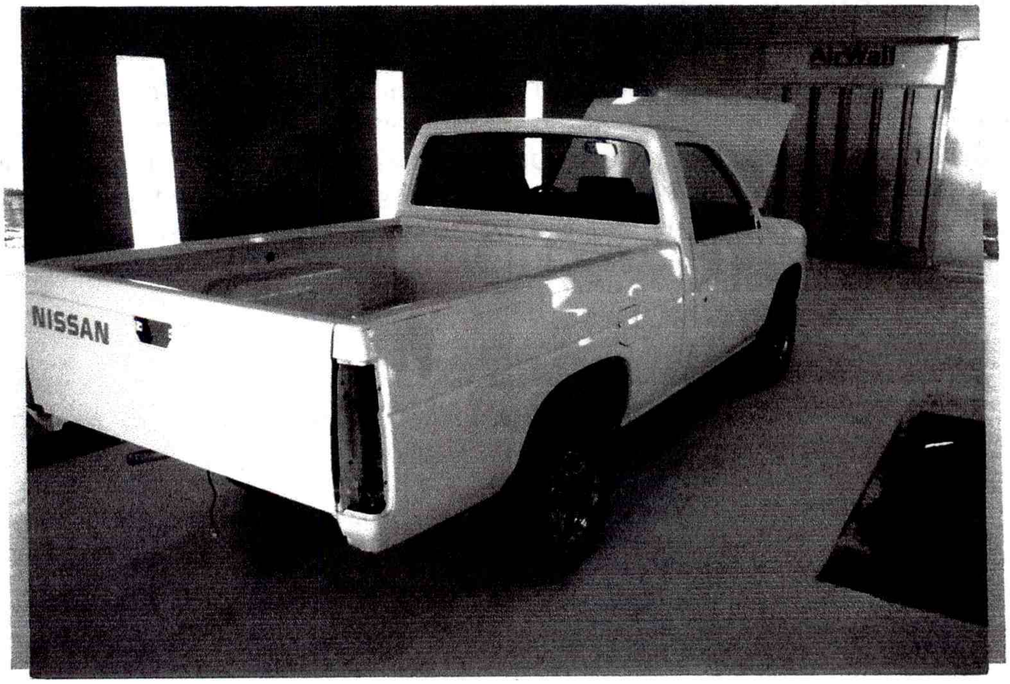


Figure 3-1
OPEN HOODS, TRUNKS DURING WALK-AROUND

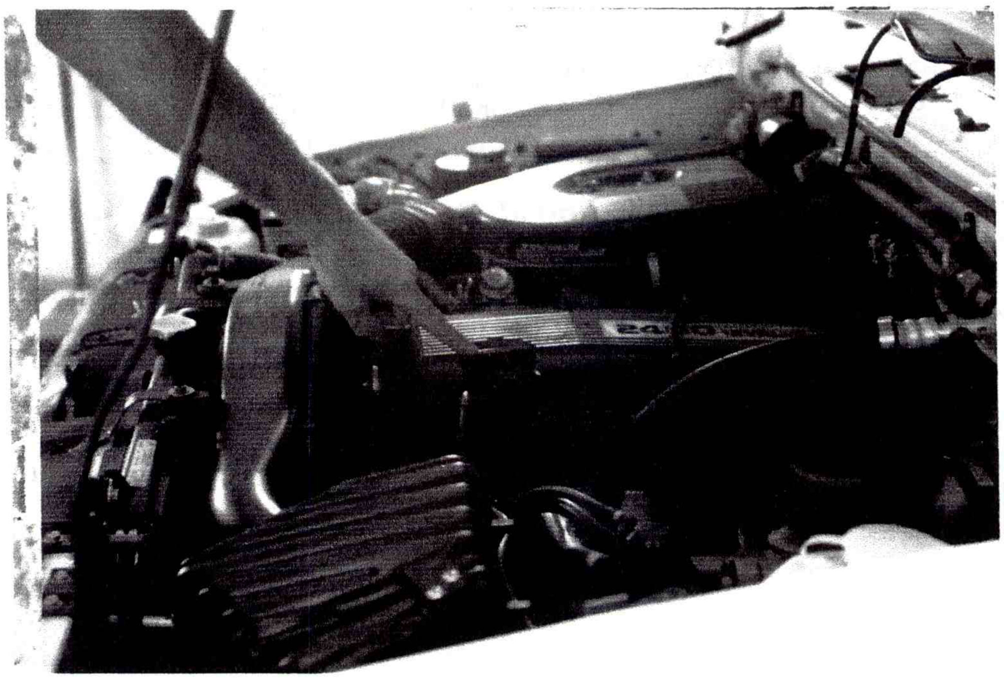


Figure 3-2
REMOVE PVC VALVE, SEAL ANY OPENINGS TO PREVENT MEDIA INTRUSION

MAPPING THE WORKPIECE SURFACE

During, or immediately after the walk-around, it is important to "map" the surface of the workpiece. This is especially important if the workpiece is an aircraft or large motor vehicle. The reason is that the larger the workpiece, the easier it is to forget critical components. For example, during the walk-around you may have noticed a small Kevlar panel on an aircraft tail section. However, by the time you get to that part of the workpiece with the blast hose, you are concentrating on the thin aluminum skin next to the panel and, before you know it, you will have moved the nozzle across the Kevlar panel at 25 psi (1,7 bars) instead of the 12 psi (0,8 bars) which should be used.

Mapping is used not only to identify critical areas such as the Kevlar panel, but also to mark the area with a marking pen or tape. This will alert you as you approach the part to a) avoid the area for the time being, or b) to adjust the air and media flow and strip it immediately. Either decision will be made in time to avoid the disaster inherent in the rapid transition from one substrate to another; and a potential problem will be transformed into a planned, professional procedure.

NOTE: The planning portion of the pre-blast preparation is just as important as being proficient in using the nozzle. All adjustments and methods for the prevention of damage are useless if the operator hasn't taken the time to plan ahead as he approaches critical areas. Remember...PLAN YOUR WORK AND WORK YOUR PLAN.

During mapping, closely examine the coating to be removed. Determine its type and estimate the removal rate. As with any estimate, some guesswork is involved. Accurate removal rate estimates will come with experience.

Mapping will identify areas that - because of the sensitivity of the substrate - will be considered too risky to attempt stripping, and therefore should be placed on a "non-strip" list. Typical examples include:

aircraft radomes
navigation antennas
very thin or resin-starved composite panels

NOTE: The very thin or resin-starved composite panel type of substrate can be identified by the rough texture on the surface due to the absence of a gel coat.

These types of substrates are difficult, if not impossible, to strip using most types of media. Fibers near the surface become eroded and damaged before the coating has been removed from the fibers set lower in the matrix. The advent of the softer crystallized starch media, however, allows the safe stripping of these components. In the case of radomes, the combination of thin, honeycomb construction, coupled with the tough, erosion-resistant coatings used on these surfaces, make the removal of paint from these components very risky with media other than crystallized starch.

There are times when it is possible to strip excessive topcoats from the surface of these types of substrates, leaving the primer or original paint film intact. However, for the purpose of this manual, EECI has included all resin-starved composite material and thin honeycomb structures on a "non-strip" list.

NOTE: Media blasting has never been declared a cure-all. Many operators have attempted to prove that media blasting can strip anything and, in their enthusiasm, have only succeeded in destroying valuable parts. Do not take chances. The time-savings realized by using media blasting is not equal to the cost of the damage if you fail.

There is no method of paint removal, past or present, which works equally well on everything. Chemical strippers, normally, can be used only on metallic surfaces and are useless on all sealed seams where sealants or adhesives are present. Hand sanding can cause much damage to thin honeycomb or resin-starved composite surfaces, as can media blasting.

There are significant manpower savings in the use of media blasting without pressing the application beyond the safety margins of the media blasting application envelope. Continue to handle the "non-strip" list components separately until you can satisfy yourself through experiments on scrap parts that you can safely remove coatings without damage.

DETERMINING COATING TYPE

Determining coating type can be difficult but not impossible. Some coatings exhibit certain characteristics after weathering, or react to some chemicals that can provide clues as to the expected removal rate.

NOTE: SFPM (sfpm) = Square Feet Per Minute
Sq M/MIN. (sq m/min.) = Square Meters Per Minute

Alkyd Enamel

A white, chalky film on the surface, which can be wiped off easily with the bare hand, indicates a weathered alkyd enamel coating. These are common on many pieces of ground transportation equipment and on some aircraft. Unless these coatings are excessive, over .006 in. (0,15mm), removal rates of 2 to 4 sfpm (0,18 - 0,37 sq m/min.), depending on the substrate, can be expected.

WARNING

The following test for lacquer requires the use of MEK. MEK emits dangerous fumes and is highly volatile. This test should only be performed in a room with adequate ventilation in a non-smoking area. Failure to follow this instruction can cause serious personal injury or death.

Lacquer

A coating that softens and transfers to a rag moistened with MEK indicates a lacquered surface. This test with MEK should be conducted with adequate ventilation in a non-smoking area. See above WARNING.

The test should be performed on an area of the workpiece that is known to be metallic. MEK will melt some plastics and sealants and this test should not be conducted near these materials. See CAUTION.

CAUTION

MEK will melt some types of plastics and sealants. Perform this test only on an area of the workpiece that is known to be metallic. Failure to follow this instruction may cause damage to the workpiece.

With lacquered surfaces, removal rates will be among the fastest of any coating, providing the coating is not excessive in thickness. Most lacquer coatings found on aircraft will be .003 to .004 in. (0,08 to 0,1mm) in thickness. However, if the aircraft has had several paint jobs, the coating thickness could triple.

On automobiles, lacquer finishes are used on many custom paint systems including candy colors and metal flake. These types of paint systems are extremely thick. Any advantage expected due to a lacquer finish could be lost because of film thickness. Finishes of .020 to .030 in. (0,5mm - 0,8mm) are common and it is not unusual to encounter film thickness in excess of .070 in. (1,8mm) on metal flake automotive finishes. A .003 in. (0,1mm) lacquer finish could result in removal rates of 5 sfpm (1,5 sq m/min.) or more, but a .030 in. (0,8mm) finish can reduce that rate to 1 sfpm (0,3 sq m/min.) or less.

Many of the newer factory-applied primers are difficult to remove. If the job requires removing everything down to the substrate, check with the body shop or factory to determine the type of primer.

Epoxy/Polyurethane

Epoxy and polyurethane paints are the finishes most dreaded by chemical strippers. In most cases, these paint films will not offer any more resistance to media blasting than a good enamel finish. Even components which have been powder coated - a coating which is very resistant to chemical stripping - can be easily stripped using media blasting with little noticeable difference in removal rate from that of a good quality enamel finish.

The epoxy or polyurethane finish can sometimes be identified through elimination. If you have already eliminated alkyd enamel and lacquer, and the finish is unusually glossy or smooth, most likely the surface is either polyurethane or a synthetic enamel. Most synthetic enamels will soften, or lift completely, if soaked with a rag full of MEK for a few minutes. Therefore, synthetic enamels can usually be eliminated along with lacquer.

> **NOTE: There is no productivity gain by identifying either epoxy or synthetic enamel, since the removal rate for either material will be approximately the same. Depending on film thickness, removal rates of 1 to 3 sfpm (0,3 - 0,9 sq m/min.) can be expected, with slightly faster rates being possible.**

WORKPIECE PREPARATION

Authorization Forms, Check Lists

Workpiece preparation is the foundation for efficient workpiece stripping. An important part of that preparation is a comprehensive plan. It is important for the success of your operation to develop blast plans, check lists, etc. This ensures that not only is everything done that is supposed to be done, but that there is complete understanding between you and your customer as to what is to be done or not done.

Figure 3-3 is an example of a work authorization form used by EECI. Feel free to use it as a guide in preparing one for your facility.

ENVIROSYSTEMS EQUIPMENT COMPANY INC.
WORK AUTHORIZATION FORM

INVOICE NO. ____________ DATE REC'D: ____________

JOB CONTROL NO. ______ DATE DUE: ______________

CUSTOMER: __________________________ PHONE NO. _____________

ADDRESS: ____
(City) (State) (Zip)

AUTO/ITEM: ______________________________ LIC/SER.

VEH ID NO. _______________________________

WORK AUTHORIZED

EXTERIOR:
Complete: _____________
Part: ________________

ENGINE COMPARTMENT:
Firewall: ____________
Under hood: _________
Fender wells: ________

DOOR JAMBS: Yes: ___ No: ___

TAPE SEAMS: Yes: ___ No: ___

TRUNK COMPARTMENT:
Under lid: ___________
Compartment: _______

WHEELS:
Outside: ______
Inside: ______

TRUCK BED:
Inside: _____________
Tailgate: ___________

BONDO:
Remove:______
Leave: _______

SPECIAL NOTES: ____
____

COST:_____________ Customer Signature:________________________

BLAST TIME:_______ Date:___________________________

Figure 3-3
WORK AUTHORIZATION FORM

The following is a pre-blast checklist for the exterior blasting of an automobile. Although the items are covered in detail in this chapter, EECI recommends that such a checklist be prepared for your facility and referred to during the pre-blast preparation of automobiles.

PRE-BLAST CHECKLIST - EXTERIOR BLASTING

1.	Remove any dust, dirt and grease from vehicle (either blow-off or washing).	_____
2.	Open the trunk. Check for any parts to be removed.	_____
3.	Open the hood. Check for missing plugs, filters, covers that need to be masked.	_____
4.	While hood is open, seal radiator with a double layer of masking film to protect the radiator cores (fins) from a direct blast.	_____
5.	While hood is open (newer cars), seal air conditioning ducts.	_____
6.	On older cars, remove the cowling. Seal the opening so that media cannot enter the air conditioning plenum.	_____
7.	Close the trunk and hood for taping of seams.	_____
7.	Do not tape the driver door until the car is in the booth and Ready for blasting. Leave the car in neutral.	_____
8.	Double tape all seams to protect door jambs and inside edges from media ricocheting.	_____
10.	Double tape around all windows to protect any delicate rubber substrates.	_____
11.	Apply masking film to windows, double layering for best possible protection. Make sure there are no exposed areas.	_____
12.	If the car is fully assembled, apply protective masking to head-lights, tail lights, bezels, chromed parts, mirrors, antenna, etc.	_____
13.	Remove wheel covers or hubcaps. Protect wheels with wheel covers.	_____
14.	Identify and mark any substrate other than steel (i.e., plastic, aluminum, fiberglass, etc.).	_____

14. Seal any small openings in side panels with hot melt glue gun or tape. _____

16. Tape driver's door seams once the car is positioned in the booth. _____

17. Inspect to make sure all areas have been properly masked and sealed. _____

18. Attach grounding cable to workpiece. _____

Masking Materials

Masking accounts for the major portion of the pre-blast preparation. Masking of the workpiece can be accomplished using various materials. Although several types of professional masking materials are currently in use, keep an open mind in your day-to-day work, as there are many types of common materials used in other applications and processes that may be of value for a particular masking application.

Early stripping techniques produced such innovations as using rubber golf tees to plug small holes, as well as using various sizes of rubber balls and bottle stoppers. Even rubber trash can lids, plastic coffee can lids, sections of fire hose and old sections of blast hose have all been used effectively to solve many types of masking problems.

The tools of the trade are shown in Figure 3-4. They include: masking film, razor knife, narrow and wide masking tape and the hot-melt glue gun and glue sticks. The use of a hot-melt glue gun has been found to be most effective on holes - both round and oblong - up to 1/2 in. (13mm) in diameter.

The characteristics to look for in a suitable masking material or device include:

flexibility
abrasion resistance
good masking tape adhesion for sealing purposes

NOTE: A large, abrasion-resistant cover is useless if tape will not stick to it.

Masking Tapes. The main types of masking tapes in common use for media blasting are the 3M brand YR-500, commonly referred to as "tombstone" or "monument" tape", and the Nashua Brand 357 Heavy Duty Duct Tape, which has a tight weave. The Nashua brand tape must be doubled along the edge of blast lines for maximum protection, but it will resist a direct blast while giving good protection. Many users favor the

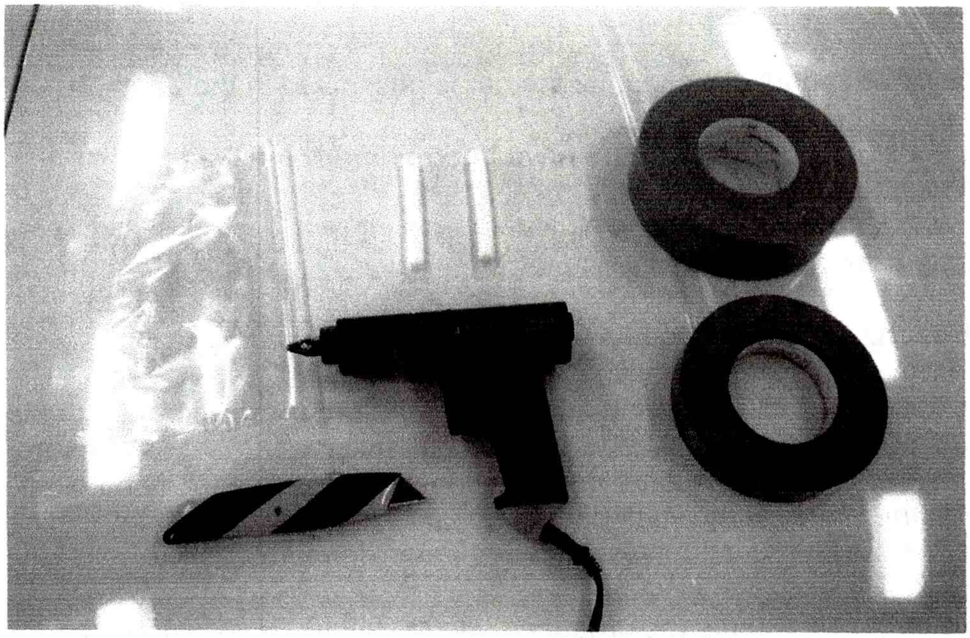


Figure 3-4
MASKING TOOLS

use of the Nashua brand duct tape from a purely economical point of view, but either will provide excellent protection.

Masking Films. In addition to masking tape, the masking process requires a substantial quantity of masking film. There are many films on the market appropriate for use in masking. In this manual, all references will be to the EECI brand .002 in. (0,05mm) polyester masking film. This film, although very thin, is extremely tough and, if doubled in critical areas, will provide excellent resistance to a direct blast of media. The film is light, easy to handle, and, in many cases, reusable, an economic factor worth consideration. The main advantage of this film over other types of heavier plastic sheeting is that the tape will adhere very well to its surface but can be removed without tearing the film once blasting is completed.

NOTE: If the masking film to be reused, it must be clean enough for the masking tape to adhere to it.

The film is transparent with a light green or amber tint. This allows the safe movement of vehicles that have already been masked and permits easy recognition of an area that was not covered. Tinted film is an easily inspected masking material, eliminating one cause of potential damage. If a clear plastic is used, it is easy to miss an uncovered area during the pre-blast inspection, letting an unprotected window or other item face the risk of damage during blasting. This can easily happen while masking a large number of windows, or a large area requiring several pieces of film to be spliced together.

MASKING OPERATION

NOTE: Masking for the media blasting operation requires different techniques than that for any painting process. If you have experience masking aircraft or motor vehicles for painting operations, we caution you not to try to apply those techniques to the masking operation for media blasting.

Example: A paint spray gun at 90 psi (6,1 bars) delivers only 10 to 15 cfm (0,28 - 0,42 cu m/min.) of air volume even in the worst case. A No. 8 blast nozzle at 35 psi (2,4 bars) delivers almost 150 cfm (4,2 cu m/min.), or 10 times the air volume. Therefore, changes in masking techniques are required to prevent damage to the workpiece.

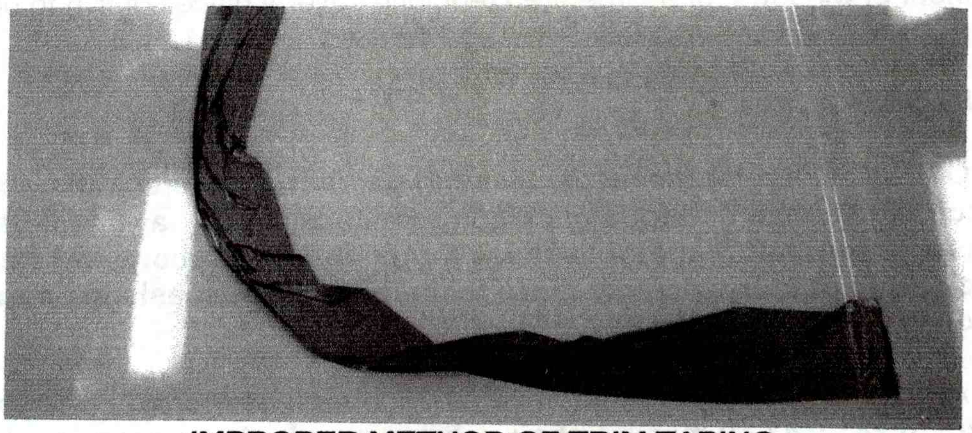
Tape Laying

This section outlines the tape-laying portion of the masking operation. Make sure all taping surfaces are clean so that the tape will hold securely. It is best if the vehicle has been washed prior to the tape laying operation. This not only makes the tape laying easier but also prevents media contamination from normal road dirt and dust. Remove any remaining oil or grease film with hot water or, if necessary, a solvent. See WARNING.

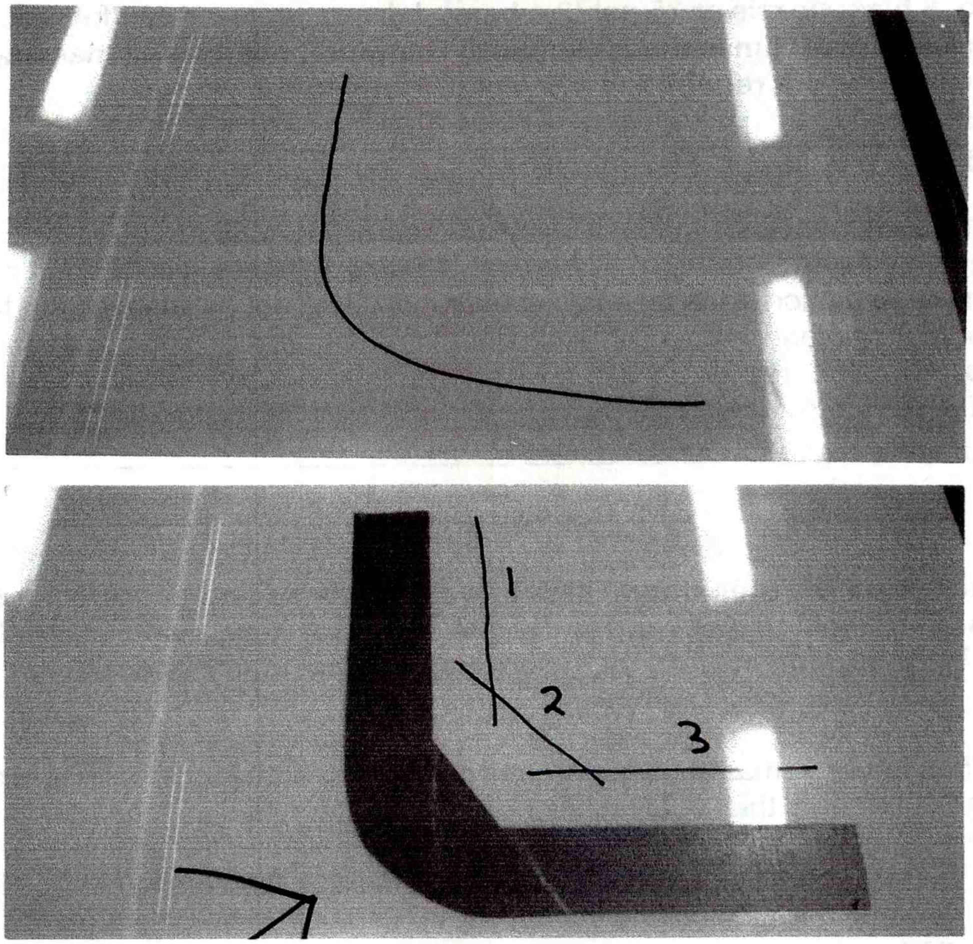
WARNING

Make sure the preparation area is well ventilated and is designated as non-smoking if solvent is used to clean surfaces. Failure to follow this instruction may result in serious personal injury or death.

When applying masking tape around curves and tight corners, do not mold the tape to the curve as is the usual technique in masking for painting operations, as shown in the top illustration of Figure 3-5. Instead, lay the tape flat and trim with a razor blade to obtain the curved outline as shown in the bottom illustration of Figure 3-5. This must be carefully done to avoid scribing the substrate. Practice with a sharp razor knife on a piece of scrap.



IMPROPER METHOD OF TRIM TAPING



PROPER METHOD OF LAYING TAPE AND TRIMMING.
NOTE THE THREE STEPS IN LAYING THE TAPE.

Figure 3-5
TAPE LAYING

NOTE: There may be some isolated cases which will not allow this technique. In these instances, lay flat strips as close to the trim edge as possible, followed by the final application of the trim tape by the molding method. Use the narrowest tape possible to avoid excessive wrinkles. Avoid stretching any masking tape as the tape tends to return to its original length, causing it to lift and lose adhesion.

When applying masking materials, such as to a window, it is important to keep the tape and film as smooth and tight as possible. While a large fold in a window mask is not necessarily bad for a painting operation, the fold can trap air during a media blasting operation, resulting in the masking material being torn off.

The initial tape application is for the outline of any large area requiring the use of masking film. This will provide the first layer of protection for the blast edge. After the masking film is tacked in place, it can be sealed using another layer of tape to provide the second and final layer of protection.

Figure 3-6 shows the correct way to tape and trim a window outline.

Film Application

The following procedure describes the film application portion of the masking operation.

NOTE: When following this procedure, keep in mind that the positioning and trimming of the film is done in such a way as to cover half of the original trim tape as shown installed in Figure 3-6.

1. Cut a length of film large enough to cover the required area with the film doubled. This provides two-layer protection.

2. Tack the film in place along the top edge of the area to be covered. Adjust the film until it hangs smoothly without folds or wrinkles (Figure 3-7).

3. Tack the bottom edge, keeping the film as smooth as possible while conforming to any contours or bulges in the workpiece.

4. With the top and bottom tacked in place, proceed to the sides of the film that will be trimmed or folded under as required to obtain a smooth-finished covering.

5. After all four sides have been tacked and trimmed, seal the edges. Since the trimming and positioning of the film has been done in such a way as to cover half of the original trim tape, it is possible to place a second layer of trim tape exactly over the first layer.

Figure 3-6
READY FOR MASKING FILM APPLICATION

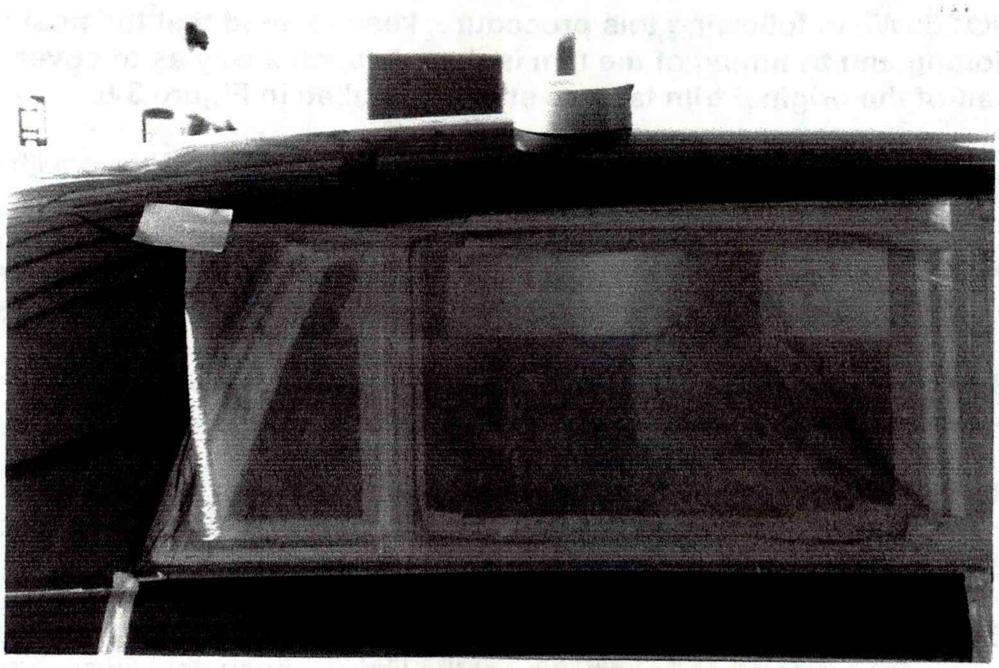


Figure 3-7
TACKING MASKING FILM ALONG TOP EDGE.

This method achieves a full double layer of tape around the edges while having half of the second layer overlaying the masking film, as shown in Figure 3-8. This results in an effective sealing bond that will prevent any dust or media entrance into the vehicle interior while providing excellent blast line protection.

Not all areas can be protected with masking film; many are too small to allow the use of film, but must still be protected. These can be protected in other ways, but two of the most common are the use of a hot-melt glue gun on round or oblong holes or, if preferred, small plugs. Figure 3-9 illustrates the use of a hot-melt glue gun.

Sealing The Engine Compartment

If your workpiece is an aircraft or motor vehicle, one area of concern will be the engine compartment.

Most aircraft engine nacelles are relatively easy to mask, but require time and technique to prevent media and dust entry. One of the best methods is to open all cowlings, and using the inside frame surface as a tape-sealing surface, "bag" the entire engine compartment inside the cowling. Then close the cowling. In many instances, it will not be necessary to tape the nacelle seams to avoid media and dust intrusion. This bagging method can save the hand work required to sand these seams after the blasting is complete, and, at the same time, provide a much better seal than is possible by only masking the seams.

NOTE: In some cases, it will be necessary to tape the nacelle seams and "bag" the entire engine compartment to ensure proper protection. With experience, you will discover that a minute's worth of masking time will save many minutes of clean-up time. Masking time is an investment that can produce substantial dividends.

In addition to bagging the engine and checking the seams for proper sealing, also check for other openings into the engine or engine compartment. These include:

intake and exhaust manifolds
breather or vent lines
engine compartment drain holes

NOTE: Check the engine compartment carefully. Even a 1/8 in. (3mm) drain hole or seam can allow the entry of media and dust. Masking 99 percent of the possible openings to any area is not acceptable. The remaining 1 percent will result in enough dust contamination to render the 99 percent useless.

Figure 3-8
FULL DOUBLE LAYER OF TAPE ALONG ALL EDGES

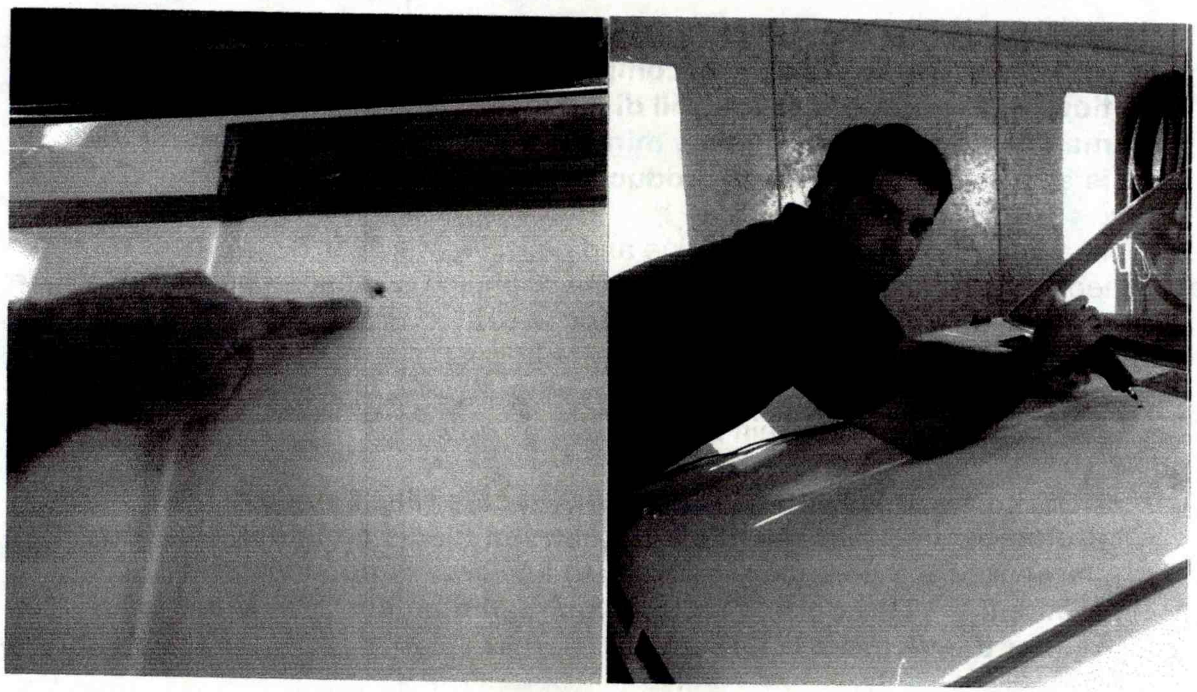


Figure 3-9
USING A HOT-MELT GLUE GUN TO SEAL A HOLE

Sealing a motor vehicle engine is more difficult than sealing an aircraft engine compartment. However, surface contamination on a motor vehicle engine is not nearly as critical. Make every effort to exclude as much contamination as possible while keeping the masking time reasonable. The major items of concern in a motor vehicle engine compartment are the air intake and ignition system. Since the underside of most motor vehicle engine compartments is open to the road, the engine and related systems are designed to allow considerable surface contamination without detrimental effects.

The most common method of sealing a motor vehicle engine compartment is to tape the hood seams as shown in Figure 3-10.

NOTE: If the hood has large or direct openings into the engine compartment, such as a hood scoop opening or a set of louvers, it will be necessary to tape the louvers or seal off the hood scoop opening with masking film. To protect the engine from a direct blast should the film be hit and torn, lay an abrasion-resistant cover, such as a rubber mat, over the engine before closing the hood. This method is effective and requires little time.

If no hood is present, it will be necessary to use a modified form of the aircraft bagging technique. Figure 3-11 illustrates the proper method for engine sealing in a motor vehicle if no hood is present.

These techniques will eliminate the major sources of surface contamination. Some dust and media, however, will be blown up from the underside of the engine during blasting and can accumulate on the engine surface. Since the air intake and any other opening into the engine will also be masked, this surface contamination will cause no problem and is easily blown off during the post-blast cleanup.

Sealing The Fresh Air Ventilation Inlet

Besides the engine compartment, the fresh air ventilation inlet is the most critical masking requirement on most motor vehicles, since there is almost no effective way to remove media that has intruded into this area. The only way to remove this type of contamination is by removing the heating/air-conditioning coils and the interior ventilation plenum behind and under the dashboard. This is time-consuming, and the labor involved can cost more than the actual media blasting operation. For this reason, the ventilation inlet is one of the most critical areas to be masked.

The method of sealing the fresh air inlet will vary with each vehicle. Some vehicles are easier to seal than others; and if the vehicle has been completely disassembled inside and out, then the problem is less critical since there is no place for the media to become trapped. However, it is extremely important to ensure the proper sealing of this component without fail.

Figure 3-10
HOOD SEAMS TAPED

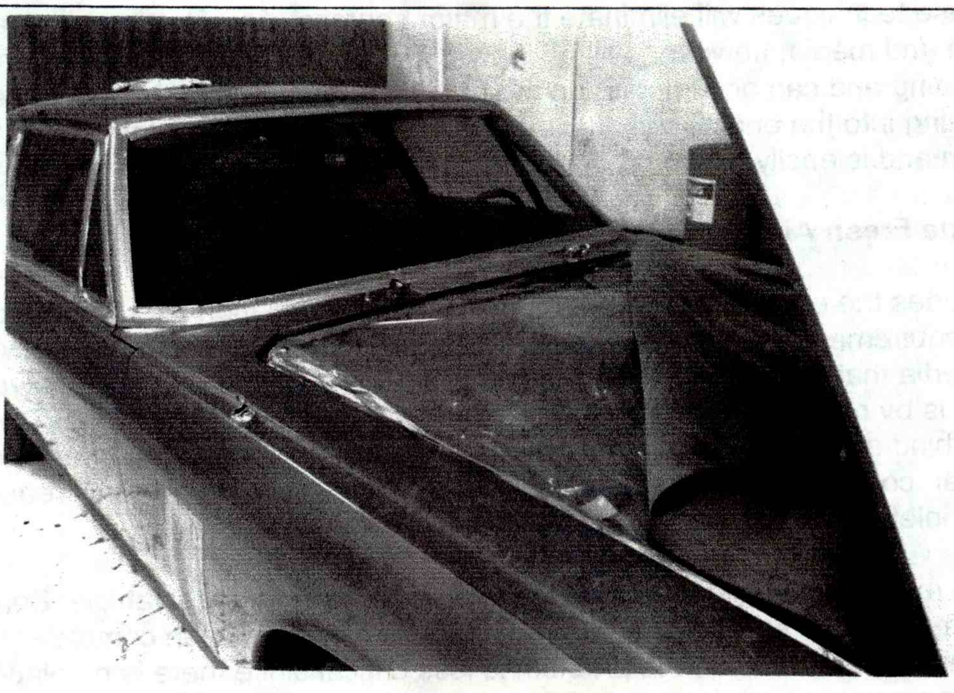


Figure 3-11
SEALING THE ENGINE COMPARTMENT IF THE HOOD IS OFF

Figure 3-12 shows the fresh air inlet with protective grill removed, and with the air inlet completely sealed.

Use the following procedure to seal the fresh air inlet:

1. Seal the forward edge of inlet from inside the engine compartment. This will eliminate the possibility of blast air lifting an exposed tape edge.

2. Overlap the tape to cover the exposed inlet. A rag can be forced into the inlet passage leading to the interior ventilation plenum. This provides additional protection should any media get under the masking.

3. As the inlet is covered, three to four layers of masking will be built up over the opening.

4. Taping the windshield wiper actuators completes this portion of the masking.

This type of sealing will leave some handwork around the inlet, but on many automobiles, such as a Rolls Royce, the cost of removing and cleaning a ventilation system can be extremely expensive. This is a risk not worth taking.

Sealing The Radiator

Another area requiring protection is the cooling radiator. Most motor vehicles being stripped by media blasting will have had the front grill and other radiator protection removed, along with the rest of the body molding and trim. This can result in damage if the exposed radiator is subjected to a direct media blasting blast. The radiator's cooling fins are thin and can be flattened or pushed together by the force of the air blast. In addition, the small cooling air passages between the fins can become packed full of media, rendering them useless.

If the grill has been removed, the easiest way to protect the radiator is with a double layer of masking film taped to the front of the radiator. This will protect the cooling fins from a direct hit.

Figure 3-13 shows a vehicle with the grill in place. This actually makes the masking job easier since a double layer of masking film, Figure 3-14, can be used not only to protect the grill, but also to completely seal off the front of the vehicle to prevent media from entering the engine compartment.

Miscellaneous Masking Requirements

Other types of masking requirements are for the various fittings, hose ends, electrical connections and/or openings left after removal of exterior components and trim.

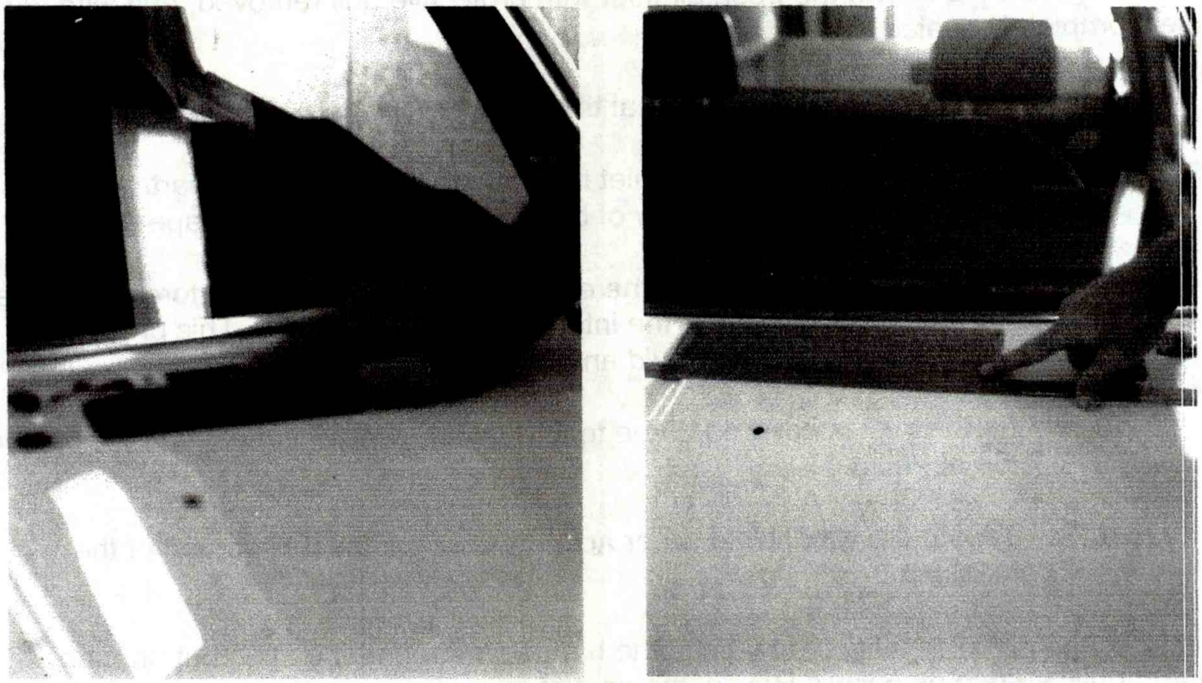


Figure 3-12
FRESH AIR INLET WITH PROTECTIVE GRILL REMOVED (LEFT)
AND COMPLETELY SEALED (RIGHT)

Figure 3-13
VEHICLE WITH GRILL IN PLACE

While most openings can be sealed using the techniques shown in previous illustrations, loose hoses, fittings or electrical connections must be masked differently.

The easiest method is to wrap the item in a scrap piece of masking film that is then secured with masking tape (Figure 3-15). Small plastic bags can also be used. The use of scrap masking film, however, will be more cost effective since it would normally be discarded. Also, it provides better protection than most small plastic bags. If the item being protected passes through the surface into an enclosed area, be sure to tape the masking film to the outer surface. This will prevent media from forcing its way past the item and into the enclosed area where it may be impossible to remove later.

Inspecting The Masked Workpiece

The final step in the masking process is an inspection prior to positioning the workpiece in the blast area. The time and effort required for this inspection differs, depending on the complexity of the workpiece. An automobile will take 5 to 10 minutes while a Boeing 727-200 could take a half hour or more. The main objective of the inspection is to verify that all areas requiring masking are, in fact, masked.

If your stripping operation is one which requires a written stripping procedure or "blast plan" (e.g., aircraft stripping operations), the procedure under which your operation is certified will include a Masking Section with a "map" of the workpiece. These documents will form the basis of a masking inspection sheet and will be filled out in accordance with your procedural requirements during this inspection.

NOTE: If your operation does not require this type of documentation, designing some type of checklist for this purpose is a good idea. It is easy to forget an area during masking, but it is very difficult to mask a forgotten air vent or piece of auto trim molding after blasting has started, and the required work stoppage results in unnecessary nozzle downtime.

On large aircraft, with many passenger windows to mask, a useful technique for the quick inspection of the window masking is to extinguish all interior lighting in the aircraft and walk down the aisles looking out into a well-lit hangar. If tinted masking film is used, any missed areas on the windows will show up immediately.

After all areas have been properly masked, proceed to the next phase of the blast preparation, which is moving the workpiece into the blast area.

Figure 3-14
DOUBLE LAYER OF MASKING FILM TO PROTECT GRILLWORK

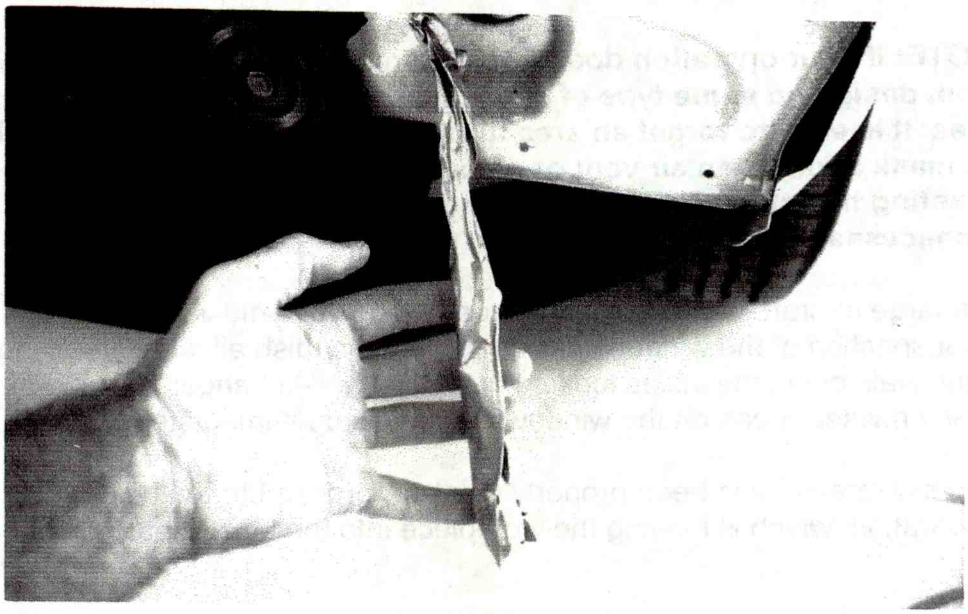


Figure 3-15
MASKING OF AN ELECTRICAL CABLE AND PLUG CONNECTION IN A HEADLIGHT ENCLOSURE

Workpiece Positioning

Positioning the workpiece can mean anything from carrying a patio chair into the blast area to towing in a large aircraft and placing it on jacks.

Automobile. If the workpiece is an automobile, someone must steer the auto into position. Final taping of the driver side door is left until the auto is in the booth. After positioning the vehicle, several final areas must be attended to:

1. First, mask the driver side door seam.

2. Next, install temporary "wheel covers". These can be made of masking film or, if desired, install the snap-on type of canvas covers used for spray paint masking. The latter type is inexpensive and can be installed in minutes.

3. Attach the grounding cable to a good connection point on the workpiece. The ideal location is one that will not interfere with blasting operations, or present a tripping or snagging hazard. Usually, a bumper, leaf or coil spring, or headlight enclosure is a good point of attachment. See WARNING.

WARNING

Make sure that both the blasting equipment and workpiece are properly grounded to prevent static electricity build-up in the stripping process. Static electricity can cause electrical shock and in the proximity of fuel vapors or other potentially explosive environments can be deadly. Failure to follow this instruction can cause serious personal injury or death.

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4. Perform a final check to make sure all is in order.

5. Lay out the hose, making sure there is enough length to go completely around the vehicle so that you can start counter-clockwise and work back.

6. Check the blasting and media pressures, and reset the minute meter in preparation for the blasting operation.

Figure 3-16 shows an automobile in the blast area ready for blasting. Door seams are sealed, wheel covers installed, and the all-important ground cable is barely visible coming from the ceiling to the left-front headlight enclosure.

Figure 3-16
VEHICLE IN BLAST ROOM READY FOR MEDIA BLASTING

Aircraft. If the workpiece is a large or even small aircraft, there will are some additional requirements regarding positioning.

If the aircraft has retractable landing gear, it is recommended that the aircraft be processed with the landing gear in the retracted position. This allows a more complete masking phase and will limit media access into the wheel wells, which is one of the areas most prone to media intrusion. Also, some of the openings inside the wheel wells can be masked prior to retracting the gear, further ensuring a clean blast operation.

If the landing gear is to be retracted, it will be necessary to place the aircraft on jacks. Perform this operation according to your facility's particular jacking procedure. Make sure the jacks are locked firmly in place. See CAUTION.

CAUTION

If it is necessary to place the aircraft on jacks, make sure the jacks are locked firmly in place. Failure to follow this instruction can cause serious damage to the aircraft.

Positioning Propellers/Control Surfaces. For propeller-driven aircraft, it is usually best to position the propeller in the vertical position to avoid bumping into it during blasting operations. A three-bladed prop should be positioned to form the letter "Y" and a four-bladed prop positioned to form the letter "X". These are just examples, but the result should be that the blades would be easily seen while wearing a blast helmet. Unfortunately, a horizontally positioned blade will usually be just above your line of sight through the visor but just below the top of your head. Also note the position of antenna and various other projections. Your best defense against these types of projections is to make them visible and to constantly be aware of their location.

Some aircraft control surfaces, if they have not been removed, will need to be positioned prior to, or during, blasting. Whichever the case may be, now is the time to position these control surfaces for the initial processing.

Workstands. After props and control surfaces have been positioned, set up any required workstands. Position any aerostands or other types of work platforms carefully to avoid damage to the aircraft and to allow access during blasting. Once the workstand is properly located, make sure it is locked in place. Check workstands to make sure that all guardrails are properly installed, hose tie-off straps are in place and that the workstand or platform is properly grounded. See WARNING.

WARNING

Make sure that the work stand or platform is properly grounded to prevent static electricity build-up in the stripping process. Static electricity can cause electrical shock. In the proximity of fuel vapors or other potentially explosive environments, it can be deadly. Failure to follow this instruction can cause serious personal injury or death.

Take the blast hose up onto the workstand or platform, with assistance if necessary. Secure the hose to one of the solid railings with the hose tie-off straps. A section of nylon strapping or other suitable material can also be used. Allow enough free hose to work with while allowing the workstand to support the bulk of the hose weight. You will soon learn to judge the amount of hose required.

Some facilities have overhead cables installed with runners that support the hose off the ground when working from high elevations. Even though the bulk of the hose weight is supported by the overhead cable system, it is still recommended to tie the nozzle end of the hose off to a secure railing on the workstand.

Attach the grounding cable to a good connection point on the workpiece. The ideal location is one that will not interfere with blasting operations, or present a tripping or snagging hazard. On an aircraft, the built-in grounding connections would be best for this purpose. See previous WARNING.

Make one final check to make sure all covers, masking, propellers, surface controls, work platforms and grounding cables are in place. If the masking on the windows was checked from the inside, it will be necessary to seal the cabin door after the inspector leaves the aircraft. If the aircraft being processed has pressurized cabin capability, it is advisable to pressurize the aircraft using a ground power unit. This can be accomplished using normal ground pressurization testing procedures and will minimize the possibility of media or dust entering the cabin or cockpit areas.

If the final check reveals that all is in order, lay out the hose, check the blasting and media pressures and reset the minute meters in preparation for the blasting operation.

Grounding Requirements

Grounding the workpiece is a vital step, not only to eliminate the attraction of dust to the workpiece surface as you work, but also to eliminate the sometimes startling - if not painful - shock received as a result of the static build-up during the blasting operation. Movement of media through the rubber hose generates substantial levels of static electricity. It is not uncommon to draw a 3 or 4 in. (75 or 100mm), bright blue arc of static electricity if the blast equipment, workpiece and workstand have not been properly grounded. While this type of energy is not usually dangerous by itself, in the proximity of fuel vapors or other potentially explosive environments it could be deadly. See WARNING.

WARNING

Make sure that the work stand or platform is properly grounded to prevent static electricity build-up in the stripping process. Static electricity can cause electrical shock, and, in the proximity of fuel vapors or other potentially explosive environments, can be deadly. Failure to follow this instruction can cause serious personal injury or death.

TYPES OF MEDIA

Several types of media are currently being used for abrasive blasting by both the military and private industry.

For the most part, this media is obtained from injection mold scrap. Recently, more emphasis has been placed on molding raw resins specifically for blasting media and, as the demand grows, injection-molding scrap will not be able to supply the market for quality blasting media.

The military specification for media designates media manufactured from scrap as Grade B, while media manufactured from virgin resin is designated as Grade A.

When raw virgin resins are used, they will first need to be "reacted" by a process similar to injection molding. This is required to supply the heat and pressure cure these resins need to achieve their unique qualities.

Most resins used for media blasting are of the thermoset type. That is, once cured by the molding process they will not re-melt. The other type of media used in media blasting is thermoplastic, which will re-melt after curing if enough heat is applied.

MEDIA PROPERTIES

Each type of media has properties that make it suitable for specific types of media blasting. These properties include:

- shape
- resin base
- hardness (aggressiveness)
- friability
- sieve size

Shape

The first item for consideration is the shape of the media. From its inception, media blasting has been referred to as media bead blasting. This is a misnomer. Media is shaped like crystals, not beads. If the media were not shaped like crystals, it probably would not work. The many sharp edges of each crystal are what cut through the paint and lift it off the surface. A round bead would just bounce off, probably without leaving a mark. The media maintains these sharp edges due to the friability property.

Resin Base

Resin base refers to the type of resin used to produce the media. There are seven major types currently in use and include, by type number:

TYPE
I Polyester (Thermoset)
II Urea Formaldehyde (Thermoset)
III Melamine Formaldehyde (Thermoset)
IV Phenol Formaldehyde (Thermoset)
V Acrylic (Thermoplastic)
VI Poly/Clear Cut (ally diglycol carbonate) (Thermoset)
VII Crystallized Starch

These media are referred to as Type I, II, III, IV, V, VI or VII according to the way they are listed above. These are the identifications the military has given these particular media in Navy Military Specification MIL-P-85891(AS) for the identification of abrasive blasting media. Consequently, Polyester is commonly referred to as Type I, Urea as Type II, etc. The MEDIA/APPLICATION CHART, Figure 4-1, lists the media type, operating range and preferred applications.

Type VII, a biodegradable crystallized starch media, was recently introduced. The trade name for this proprietary product is EnviroStrip.

EECI, based on the experience of thousands of hours of blasting with media on a wide range of products, eliminates three (3) types of media. These are:

Type I (Polyester) - This type is too soft and lacks the hardness (aggressiveness) to efficiently remove most paint topcoats and underlying primers.

Type III (Melamine) - This type is very aggressive and friable, and when used alone, has an unacceptable fry (friability/fracture) rate.

Type IV (Phenol Formaldehyde) - This type is too friable and has an unacceptable breakdown rate. Also, because of its dark brown or black color, the dust from the blasting operation creates an unsightly environment in which to work.

NOTE: These media are eliminated only when being used alone. This is not to eliminate them from effective use in a blend with another media type.

The four (4) types of media that EECI recommends for media blasting operations are:

Type II (Urea) - This media is very aggressive for rapid removal rates, yet has a medium breakdown rate. Urea is the most frequently used media.

Type V (Acrylic) - This media is less aggressive than Type II, but because of its low breakdown rate, offers the advantage of longevity with the potential cost savings. Although in many cases this media will not remove tenacious primers, it

MEDIA/APPLICATION CHART

TYPE	NAME	OPERATING RANGE – PSI (bars)	STRIPPING APPLICATION
I	Polyester	10 – 25 (0,7 - 1,7)	Soft substrates, i.e. aluminum, fiber-glass, plastics,composition material, SMC (Sheet Mold Compound)
II	Urea	10 - 35 (0,7 - 2,4)	Steel, stainless steel, cast iron, cast/forged aluminum, brass
III	Melamine	15 - 45 (1,0 - 3,1)	Steel, stainless steel, cast iron
IV	Phenol For-Maldehyde	10 - 35 (0,7 - 2,4)	Steel, stainless steel, cast iron, cast/forged aluminum, brass
V	Acrylic	10 - 65 (0,7 - 4,4)	Thin aluminum, fiberglass, plastics, SMC (Sheet Mold Compound)
VI	Poly (Clear Cut)	10 - 25 (0,7 - 1,7)	Aluminum, copper, fiberglass, advanced composites
VII	Crystallized Starch (Wheat)	10 - 35 (0,7 - 2,4)	Thin aluminum, fiberglass, SMC (Sheet Mold Compound)

Figure 4-1
MEDIA APPLICATION CHART

will rapidly remove most topcoats and is well suited for the stripping of powder coats

NOTE: Certain military and commercial applications require leaving primers intact, making this characteristic quite desirable for such applications as the stripping of ground support equipment.

Type VI (Poly) - This media, which is sometimes referred to as Clear Cut, has a reasonable removal rate and is well suited for sensitive substrates.

Type VII (Crystallized Starch) - Although new, this media holds great promise for the stripping of very thin alloy substrates. In certain applications, this media may be the only one that can do the job.

Hardness

Hardness is the property that determines how fast a media will cut through a paint film, and is therefore usually referred to as aggressiveness. Hardness is usually expressed as a Mohs number.

The Mohs number comes from a relative scale of hardness developed by Frederick Mohs. This scale is numbered from 1 to 10, with 1 representing the hardness of talc that is very soft. A 10 represents the hardness of a diamond, which is very hard. Silica sand is about a 7 on the Mohs scale.

A more accurate method of measuring media hardness is with a Barcol Impresser. This device measures hardness by registering the force needed to make a uniform dent with a calibrated tool in a piece of material. This device is used only when a suitable piece of the raw material can be obtained prior to grinding. The Barcol Impresser is not practical when the material is already granulated. Looking at the following chart, notice the difference in hardness between media Types IV and V when using the Barcol scale, while the Mohs scale indicates they are the same hardness.

Media falls into the following Barcol and Mohs ranges. See Figure 4-2. Make a note of the differences. These are important when choosing a media for a delicate job, especially when removing a tenacious coating.

BARCOL- MOHS RANGES

Media Type	Barcol Number	Mohs Number
I.	34 to 42	3.0
II.	54 to 62	3.5
III.	64 to 72	4.0
IV.	54 to 62	3.5
V.	46 to 54	3.5
VI.	28 to 34	<3.0
VII.	85 Shore (D Scale)	2.8

Figure 4-2
BARCOL - MOHS RANGES

Note in Figure 4-2 that the various media are very soft when compared to silica sand, which is approximately a 7.0 Mohs number. This is one reason media works as well as it does for paint removal, yet does not damage the substrate.

Friability

Friability is the ability of a material to shatter, or break apart, and is one reason the media can be used and reused for paint removal. As the media crystals strike the workpiece during blasting, they break instead of wearing down. This ensures that they continually have sharp edges for the effective removal of paint.

Friability also determines how fast a particular media type will break down into particles too small to be effective. These very small pieces of media are referred to as "fines," which is exactly what they are - "fine" media.

Friability is a necessary property for an effective abrasive material. However, a media that is too friable will be expensive to use since the reclaim rate, or the number of times you can blast and reclaim a material, decreases as the friability increases.

Generally speaking, the harder a media is, the more friable it will be. All requirements for the blast media must be considered before a media is selected. A media which will give a good reclaim rate, such as Type V, may not be aggressive enough to remove a particular coating effectively. This results in a much lower removal rate than would be achieved with a Type III material, and this is usually more expensive than losing a little extra media each time you blast. However, a media such as Type V can remove many common coatings and will sometimes last twice as long as a Type III material. This can represent a substantial media savings.

The objective is to use the least friable media with which you can obtain a cost-effective removal rate.

Sieve Size

This is the size of the crystals as determined by a standard screen sieve size and is sometimes referred to as the "mesh" of the media. Media sieve sizes are usually expressed as two sets of numbers. The first set of numbers is the largest particle size to be found in the blend, and the second set is the average size of the blend. A combination of the first and second number sets should represent approximately 80 percent of the total blend.

The following chart, Figure 4-3, is representative of the types of applications which would be satisfactory for the sieve sizes listed. These sieve sizes represent the standard sizes available from most vendors of blasting media.

Most materials, regardless of type can be obtained in any of the above sieve sizes. When the system hopper is first loaded or "primed," you should be using a 20/30 sieve size. As you continue to use, reclaim and add fresh media to the supply, you will be using a blend of what could be termed 12/60-mesh (1680/250 microns). This is due to retaining media in your system until it reaches the stage of fineness at which you

SIEVE SIZE VS. PMB APPLICATION

Sieve Size		Application
U.S. Mesh	Microns	
12/16	1680/1190	Heavy equipment, thick coating removal on steel parts.
16/20	1190/841	Automobiles, trailers, ground support equipment, light steel, some aluminum and fiberglass.
20/30	841/595	Aluminum, fiberglass, light steel.
30/40	595/420	Most aircraft components such as aluminum or composite panels, fiberglass, thin sheet metal.
40/60	420/250	Thin composite or honeycomb structures, thin aluminum, or wood.

Figure 4-3
SIEVE SIZE VS. MEDIA BLASTING APPLICATION

have determined to have it pulled off with the dust. This is set by adjustments on the cyclone separator.

For Urea, Type II, the normal setting for the removal of fines is about 50- to 60-mesh (297/250 microns). A 60-mesh (250 microns) particle is not very effective for heavy paint removal. Therefore, it is recommended that the cyclone be adjusted to remove anything 60-mesh (250 microns) or finer. This will provide clean media of a sieve size that is effective. As you add fresh media you will have a portion of true 12/16-mesh (1680/1190 microns) and the remainder of your existing blend will be everything down to 60-mesh (250 microns).

This method produces an effective blend. Actually, the "broken in" media will clean better than does new media. This results from the polishing action of the finer particles that were lacking in the prime load.

An effective blend for Clear Cut, Type VI, is a 20/30 mix (841/595), spiked with 16/20 (1190/841).

There are many ways to blend different media types to achieve specific results. It may be advisable to blend some Type II and III for their aggressiveness, with a large portion of Type V for its low friability. You might want to blend some Type III with some

Type II for some additional aggressiveness on a particularly tough coating. Blending of media types comes with the experience. It allows tailoring which isn't possible with other stripping methods. Blending must be done carefully with only small quantities of media, and must be followed by experimentation on scrap items.

Media types are almost impossible to separate from each other, and if soft Type VI (Clear Cut) material is contaminated with something more aggressive, you will have lost the use of the contaminated Clear Cut for anything sensitive. Contaminating a large quantity of any type media is an expensive way to learn a lesson.

There is an old saying that explains this problem very well: "If you add a glass of wine to a drum of sewage, you have a drum of sewage. If you add a glass of sewage to a drum of wine, you still have a drum of sewage." Contamination can happen if you are not careful.

In selecting a media for a specific job, first determine what type of substrate is present.

TYPES OF SUBSTRATES

The substrate is the base material surface from which you are removing the coating. Common types of substrates are steel, aluminum, composite materials, such as carbon graphite or Kevlar, titanium, magnesium, etc. You must know what the specific substrate is before selecting the media.

If you are going to strip a steel surface, you can use virtually any media without danger of causing damage. In the case of steel, the choice is removal rate versus recovery rate.

When stripping paint from aluminum or a composite material, the choice is a little more complicated.

Composite materials, such as fiberglass or the newer sheet mold compounds (SMC), require reduced operating pressure, an increased distance between the blast nozzle end and the workpiece, and reduced dwell time.

Aluminum comes in a variety of alloys and hardness, and often has a corrosion-preventing coating referred to as "Alclad." This is a layer of pure, soft aluminum that provides a protective cover for the alloy underneath. The thickness of the Alclad varies with the thickness of the aluminum sheet and is generally 10% of the thickness of the sheet to which it is applied. For example, a sheet of .032 in. (0,8mm) thick aluminum will have an Alclad layer thickness of approximately .003 in. (0,1mm).

The thickness is important since the soft Alclad produces a textured finish when processed by media blasting, and the thicker the Alclad, the rougher the texture. The finish on a .032 in. (0,8mm) fuselage skin will be much smoother than the finish on a piece of .250 in. (6mm) plate. Fortunately, at least on aircraft, the thickest plates are usually found on the wings. The machining processes that produce these types of panels usually remove the Alclad coating, and therefore the problem. However, it pays to check.

The hardness of aluminum alloys varies, which results in varied results in finish quality after blasting. The softer alloys, such as 6061 Condition O (no heat treat), will be left with a frosted-to-medium texture finish while the harder 6061 T-6 aluminum will, for the most part, retain its shiny appearance. The 2024 T-3 aluminum is a very common alloy used for many types of aircraft skins and is a good candidate for media blasting. It is relatively hard and is left with a light frosting, which greatly improves adhesion of the new paint without being rough enough to require extra effort to achieve a high paint gloss.

Between steel and aluminum, you may encounter any number of common - and not so common - metal alloys. The hard alloys, such as stainless steel, titanium, inconel or hastelloy, will not pose a problem as far as avoiding a texture is concerned. You can blast on any of these alloys all day long with media and not leave a texture. However, if the section of substrate you are blasting is adjacent to one of these alloys that is highly polished, care must be taken to prevent damage.

NOTE: When stripping aluminum, fiberglass or sheet mold compound (SMC), check with the owner or body shop as to acceptable finish texture.

PREPARATION FOR BLASTING

MEDIA OVERVIEW

Many jobs can be performed using Type II (Urea) media. However, closely examine the coating and substrate you will be working on to determine if there is sufficient need to blend a special media. Frequently, the need for a special media is realized too late and the damage is already done.

Every job is different and some applications may require the blending of two different media types for the best result. Each job must be considered individually, and the pros and cons of using a soft or harder media must first be considered.

Using hard media, such as Type II (Urea), to first strip less sensitive areas allows the paint coating on the more sensitive areas to be used as a protective mask. However, using the hard media first demands a very thorough cleanup prior to loading softer media such as Type V (Acrylic) or Type VI (Clear Cut) to avoid contamination of these softer media when they are reclaimed.

Small amounts of softer media left on the floor will not be a problem if mixed in with the harder media to follow. However, hard media mixed with soft media will result in contamination of the soft media, rendering it useless for further use on sensitive substrates.

SYSTEM SETUP

Blast Nozzle Size

Blast nozzles are sized in sixteenths of an inch. The standard long venturi blast nozzle design is illustrated in Figure 5-1. Three of the common blast nozzle sizes used on open media blasting operations are:

No. 6 nozzle - 6/16, or 3/8 in. (10mm) venturi bore size
No. 7 nozzle - 7/16 in. (11mm) venture bore size
No. 8 nozzle – 8/16, or 1/2 in. (13mm) venturi bore size

The double-venturi blast nozzle, also shown in Figure 6-1, draws in additional air from the outside. This results in a 20 to 30-percent increase in the blast pattern (footprint) without increasing the actual air pressure.

Selection of the proper nozzle is relatively easy. The main consideration is to achieve the fastest possible removal rate while maintaining the degree of control necessary to avoid damage to the workpiece. Also selecting the proper blast nozzle size prevents using more media than necessary.

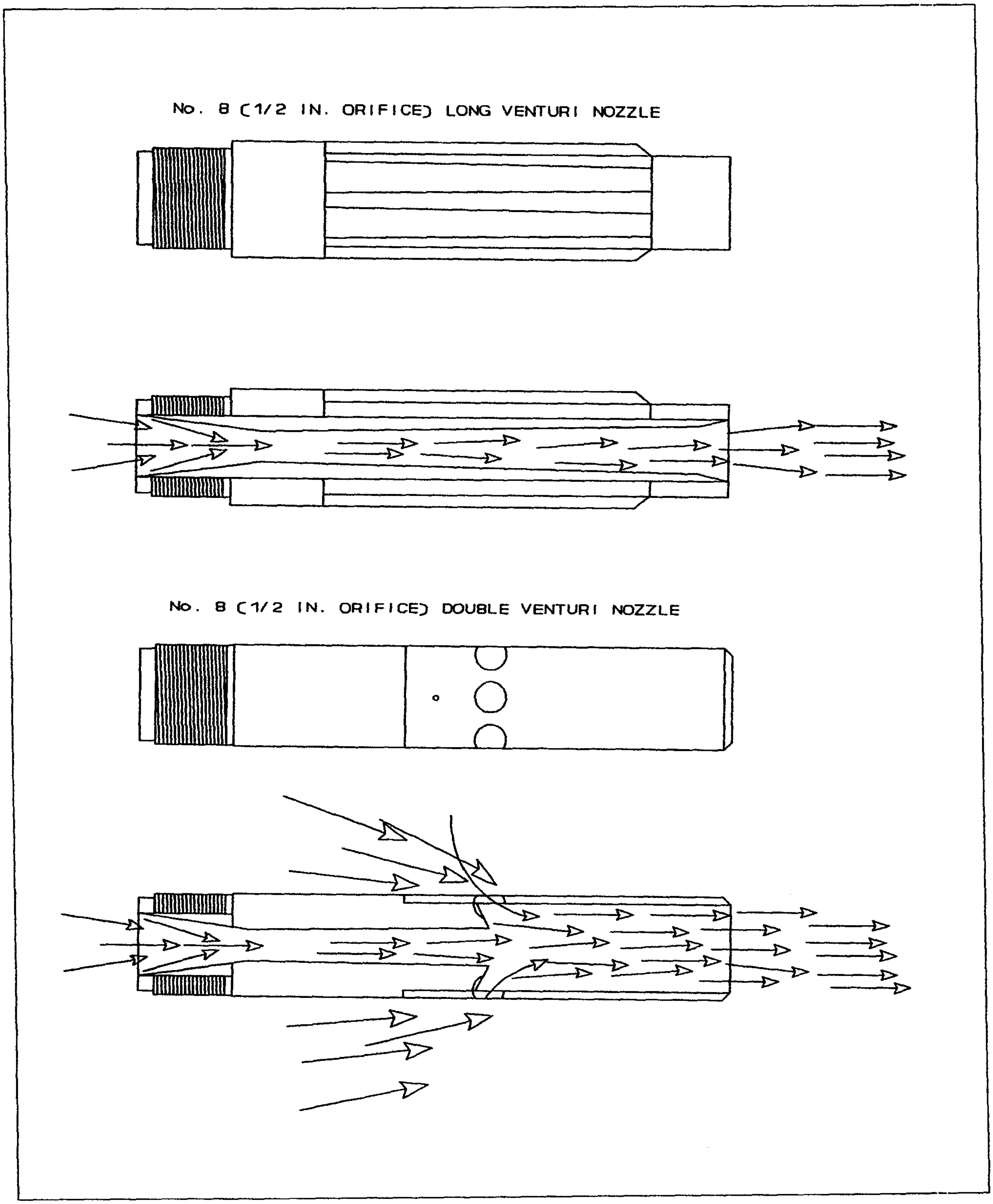

Figure 5-1
STANDARD LONG VENTURI AND DOUBLE-VENTURI BLAST NOZZLES

The NO. 7 blast nozzle is valuable when working on complex shapes or inside structures such as vehicle interiors, where a reduced media flow is required to maintain visibility and provide extra control. When used by an experienced operator, a No. 7 blast nozzle will allow stripping to be safely performed in close quarters with a minimum of protective masking. An additional advantage of using the No. 7 blast nozzle is that the lower media consumption significantly reduces reclaim times and material costs.

For the stripping of most ground transportation equipment, a No. 8 blast nozzle will be the most appropriate choice. Since close control is minimal, the No. 7 blast nozzle is not necessary. A No. 8 blast nozzle will considerably increase the removal rate and is generally recommended for most steel substrates as well as large expanses of relatively hard aluminum alloys. Fiberglass or composites must be looked at individually, but many of these types of substrates may also benefit for the use of the larger No. 8 blast nozzle if it is used with discretion by an experienced operator.

Media consumption will vary between the two blast nozzle sizes with an average consumption of approximately 200 pounds (90kg) per hour using a NO. 7 blast nozzle. A No. 8 blast nozzle will use approximately 400 pounds (180kg) per hour.

Setting Blasting Pressure

For the standard StripMaster machine, use the manually operated regulator on the plumbing tree to set the blast pressure. The pressure gage will indicate the pressure being set. See Figure 5-2.

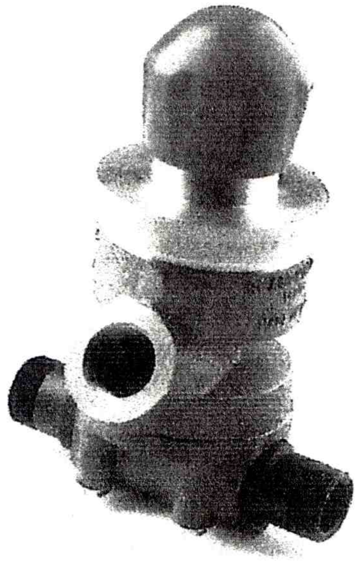

Figure 5-2
MANUALLY OPERATED REGULATOR

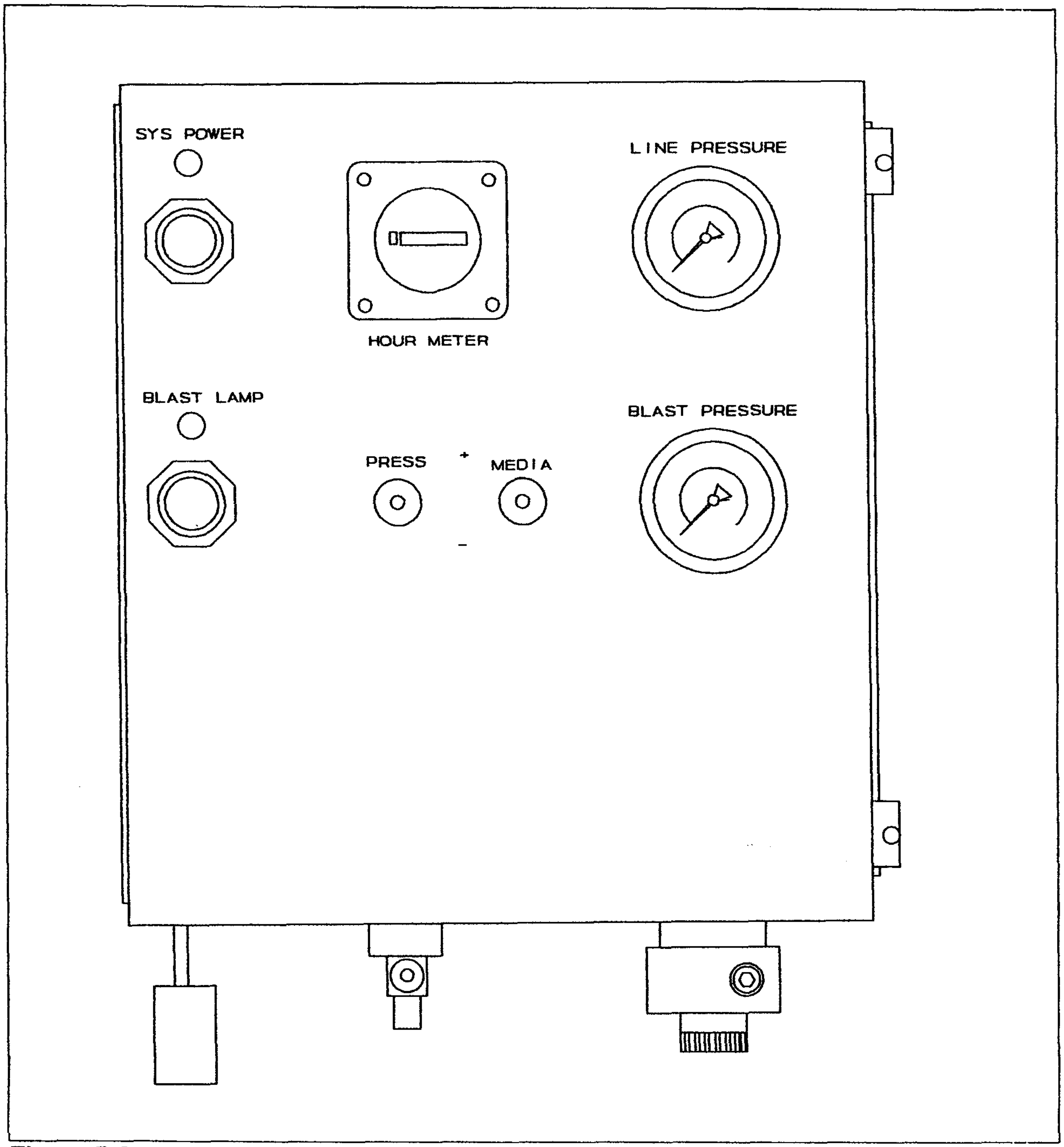

Figure 5-3
SMART CONTROL PANEL

For the StripMaster machine with the optional SMART control panel and SMART blast handle, initially set the blast air pressure at the SMART control panel (Figure 5-3). This allows setting the blast pressure without activating the deadman switch control, so this step can be taken before suiting up to blast.

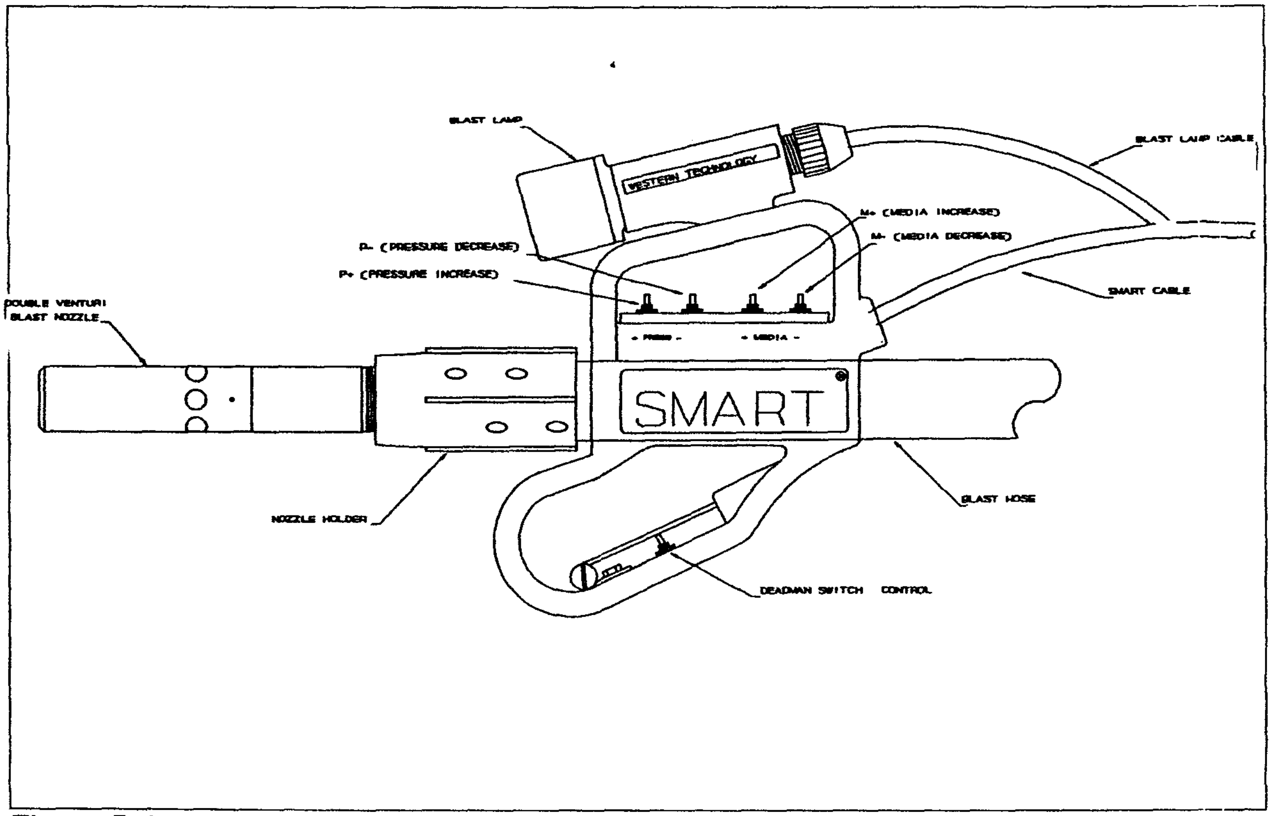

Figure 5-4
SMART BLAST HANDLE

After blasting has begun, and anytime adjustment is required, the blasting pressure can be re-adjusted using controls on the SMART blast handle (Figure 5-4). The blast pressure may be read on a pressure gage remotely mounted in the blast room (Figure 5-5). This gage indicates pressure from 0 to 60 psi (4 bars) with 30 psi (2 bars) being straight up (12 o'clock). When your system is first set up, a pressure reading may be taken at the nozzle using a nozzle pressure gage kit (Figure 5-6). Use this pressure reading to manually adjust the remote pressure gage to compensate for any pressure drop caused by the length of hose.

NOTE: Periodic checks to ensure the accuracy of the remote pressure gage are recommended since changes due to hose wear or trimming of the blast hose can affect this accuracy. This can be checked at any time using a blast nozzle pressure gage kit. This technique will result in blast pressure readings, which reflect blast pressure at the blast nozzle. A 50 ft. (15m) length of 1 1/4 in. (32mm) diameter blast hose can result in a 2 to 3 psi (0,14 – 0,2 bars) pressure drop between the regulator and the blast nozzle. This represents a substantial percentage of the total blast pressure and can result in a significant error if this reading is not corrected.

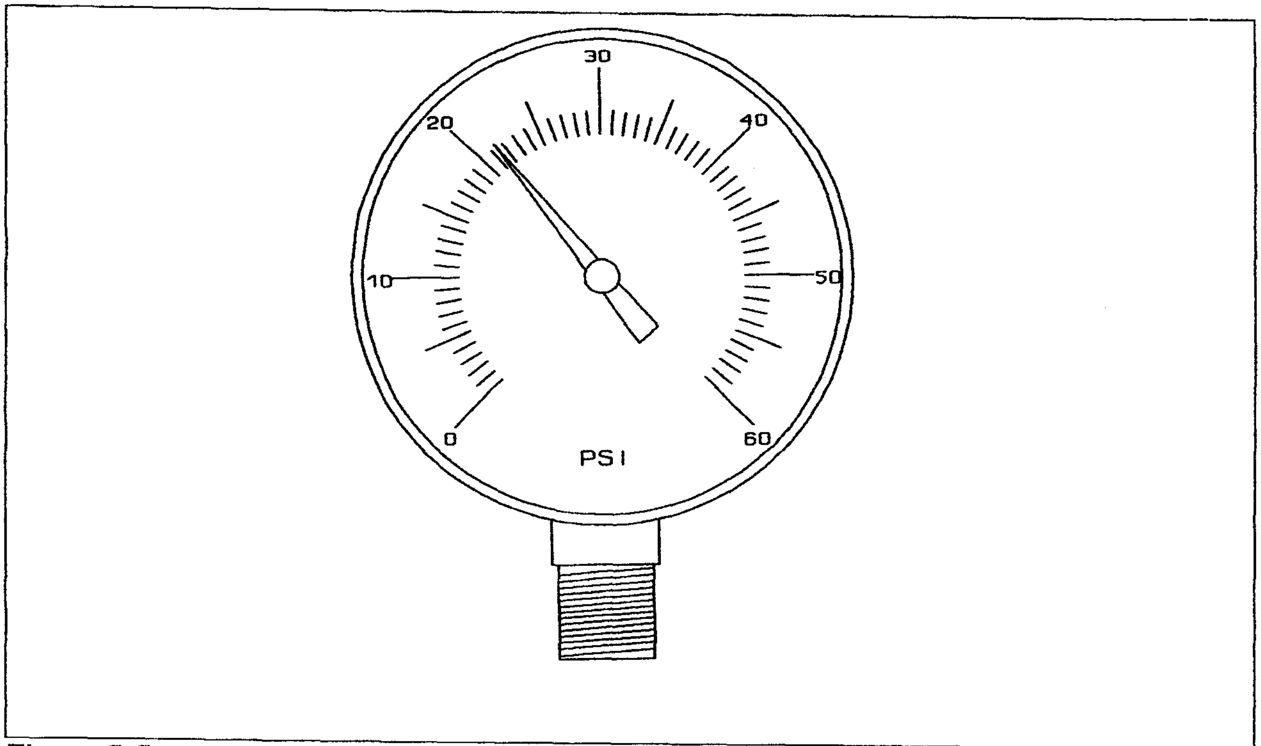

Figure 5-5
PRESSURE GAGE

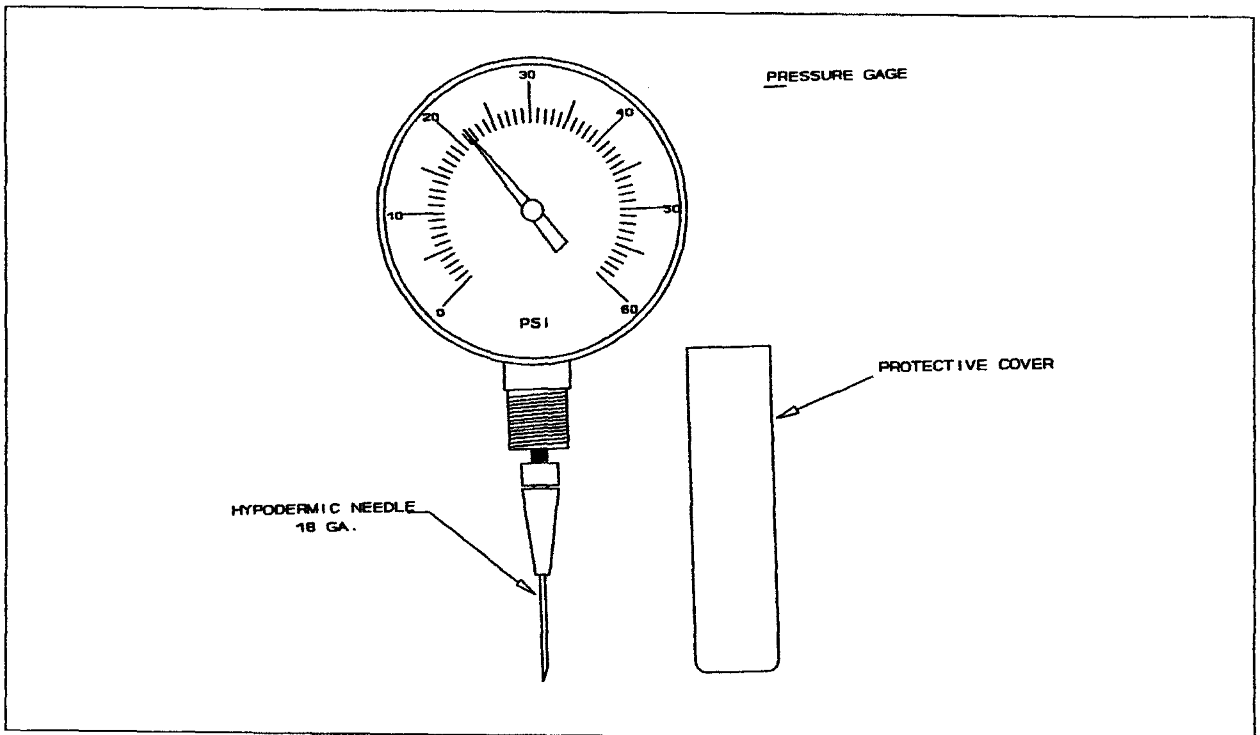

Figure 5-6
BLAST NOZZLE PRESSURE GAGE KIT

To make a blast pressure increase, press the forward-most pushbutton (P+) in the SMART blast handle (Figure5-4). To make a blast pressure decrease adjustment, press the second pushbutton in line (P-). The response to these controls is quite rapid.

The objective in selecting correct blast pressure is to set a pressure that will provide:

little risk of damage
fastest removal rate
lowest media consumption

With abrasive blast media, blast pressures in excess of 40 psi (2,7 bars) increase the removal rate very little, but cause extremely rapid media breakdown.

Most aircraft applications are accomplished with pressures of between 25 and 30 psi (1,7 – 2,0 bars), while most ground transportation applications may use pressures of between 30 and 35 psi (2,0 – 2,4 bars). There is no "best" pressure for all items, even items of like kind. Each workpiece is different and must be considered on its own merits.

Setting Media Flow

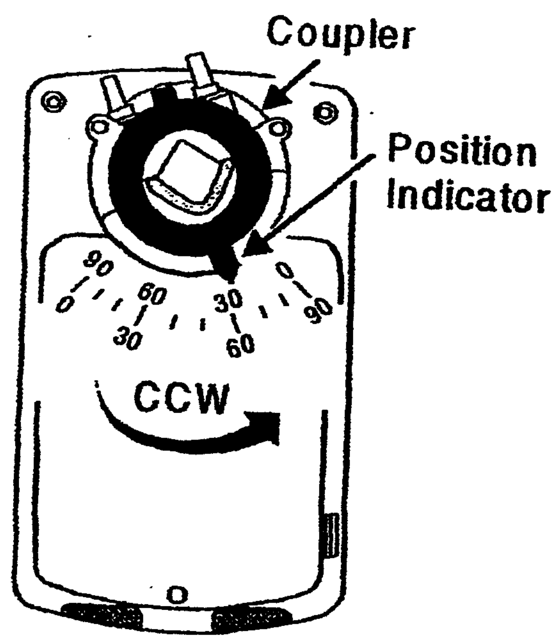

Figure 5-7
MEDIA METERING VALVE

Media flow is another variable the operator must consider prior to the start of blasting. With the standard StripMaster machine, media flow is set with the media metering valve (Figure 5-7) on the plumbing tree. Under normal conditions, the media metering valve is set to a 15 to 20-degree position. Blasting different substrates may require changing the media flow to a richer or leaner setting.

With the optional SMART control panel and SMART blast handle, media flow is initially set at the SMART control panel. The SMART blast handle is used to adjust flow as required using the two rear pushbuttons marked M+ for media flow increase, and M- for media flow decrease. Refer to Figure 5-4.

A good starting point for the initial media flow setting will result in a barely visible stream of media. During a media flow decrease adjustment, this stream becomes less visible. This is referred to as a "lean" mixture. During a media flow increase, the media stream will become more visible, resulting in a "richer" mixture.

Generally, the most economical setting is the leanest possible setting that will give the required removal rate. It is often true that a lean mixture provides the fastest removal rate. A rich media flow can produce slugging (pulsing action), which results in the media wasting much of its energy as it impacts on itself within the media stream. This results in a poor removal rate and excessive media consumption.

After an initial setting at the SMART control panel, the media flow may be fine tuned using the pushbuttons on the SMART blast handle. This feature allows optimizing both media consumption and removal rate during the actual blasting.

The SMART blast handle pushbuttons are also helpful when the blasting is complete. By leaning the mixture back to zero, the large volume of air supplied by the blast nozzle may then be used to blow off the workpiece before moving it out of the blast room.

Damage Prevention

There are countless combinations of blast pressures and media flows. At first glance, the most obvious parameter for controlling aggressiveness (damage potential) is the blast pressure. However, while the blasting pressure may be capable of more dramatic results than any other single parameter, the total concept of damage prevention requires the balancing of all parameters to be truly effective.

<u>Stand-Off Distance/Dwell Time/Blast Angle Parameters.</u> After the main parameters of blast pressure and media flow are properly set, the following parameters must then be considered:

stand-off distance
dwell time
blast angle

NOTE: While blast nozzle stand-off distance and dwell time are the most critical of these last three parameters, all combine to give more or less satisfactory results depending on the experience and capability of the operator. While removing the paint from the workpiece is the goal, the most important objective is to prevent damage to the workpiece.

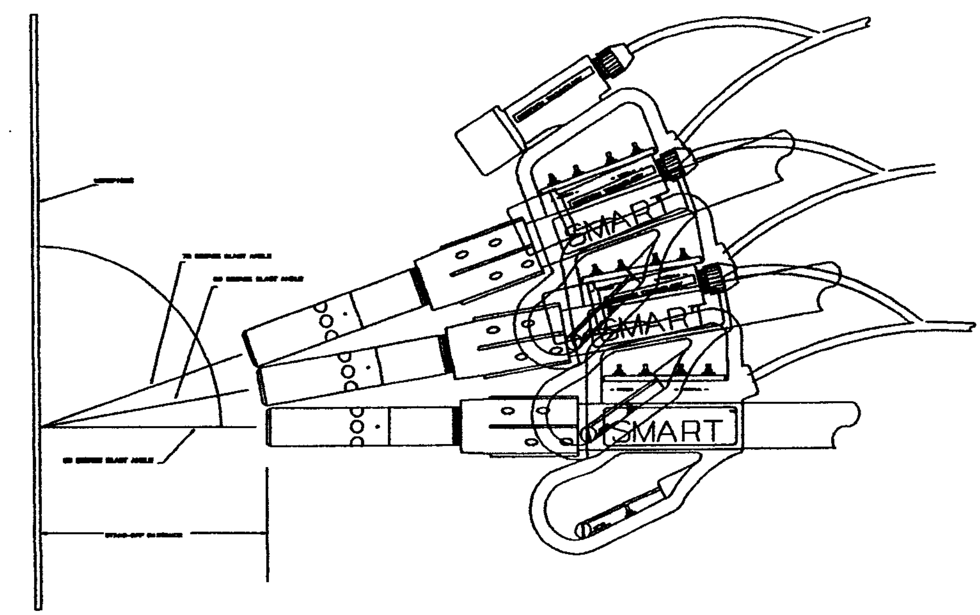

Figure 5-8
STAND-OFF DISTANCE AND BLAST ANGLE

1. Stand-Off Distance — The distance from the tip of the blast nozzle to the tip of workpiece.

2. Dwell Time — Dwell time refers to the speed with which you move or sweep the blast nozzle across a workpiece surface while blasting. A slow movement results in a longer (increased) dwell time in any one area. This allows the stripping of multiple layers of paint in one pass, but it also increases the possibility of damage to the substrate, particularly on thin metals or composites.

3. Blast Angle — This is the angle of the blast nozzle in relation to the surface of the workpiece. This will usually be between 45 and 80-degrees to aggressively remove a coating from a workpiece.

The blast angle may drop to 30-degrees or lower when the objective is to carefully scuff the top coating from a sensitive substrate.

As an example of how all the parameters intertwine, imagine a typical workpiece. The imaginary workpiece will be an aircraft flap made of relatively heavy 2024 T3 aluminum alloy, .040 in. (1mm) thickness. Assume the flap has had at least three (3) separate paint jobs which must be removed.

After loading some Type VI media in a 30/40-mesh size, the initial blast pressure will be set at 20 psi (1,4 bars). This is the bottom edge of what would be an optimum removal rate pressure, allowing the operator to work up gradually and safety.

The media flow would initially be set to a relatively lean mix. This also allows gradually increasing the richness setting without risking damage during the initial blasting.

The blasting is started at a stand-off distance of approximately 30 in. (760mm) and an angle of 45 to 80-degrees (Figure 5-8), keeping the blast nozzle moving at all times in a pattern of approximately 12 in. (300mm) per second sweep. The results of this initial blasting will determine what parameters to alter and by how much. The 12 in. (300mm) sweep pattern will give exceptional removal rates if the coating is easily removed, since the blast pattern or "footprint" at the 30 in. (760mm) stand-off distance with a No. 8 nozzle is about 4 to 5 in. (100 –125mm). It is also a safe distance since the blast pattern is not concentrated enough to cause damage to this type of substrate unless an unusually long swell time is used.

If the coating is not being removed efficiently, the dwell time will be gradually increased and the sweep pattern stand-off distance will be decreased before making adjustments to the blast pressure or media flow.

On a part with multiple coatings, especially a sensitive part, it is often best to peel off one or two layers at a time, rather than attempting to remove all coatings with one pass. The potential for damage is much less with a faster dwell time that does not attempt to remove multiple coatings in one pass.

As the coating begins to come off, it is often possible to increase the removal rate by lowering the blast angle and working into the paint edge. This allows some of the blast air to force its way under the coating and "blow" off large pieces of paint. This technique is not always possible but is always worth trying early in any blasting job.

If blast angles of up to 80-degrees and stand-off distances of 12 to 14 in. (300 – 350mm) do not significantly increase the removal rate, the "sweep" action can be slowed down to increase the dwell time. Again, do not try to remove all the coatings in

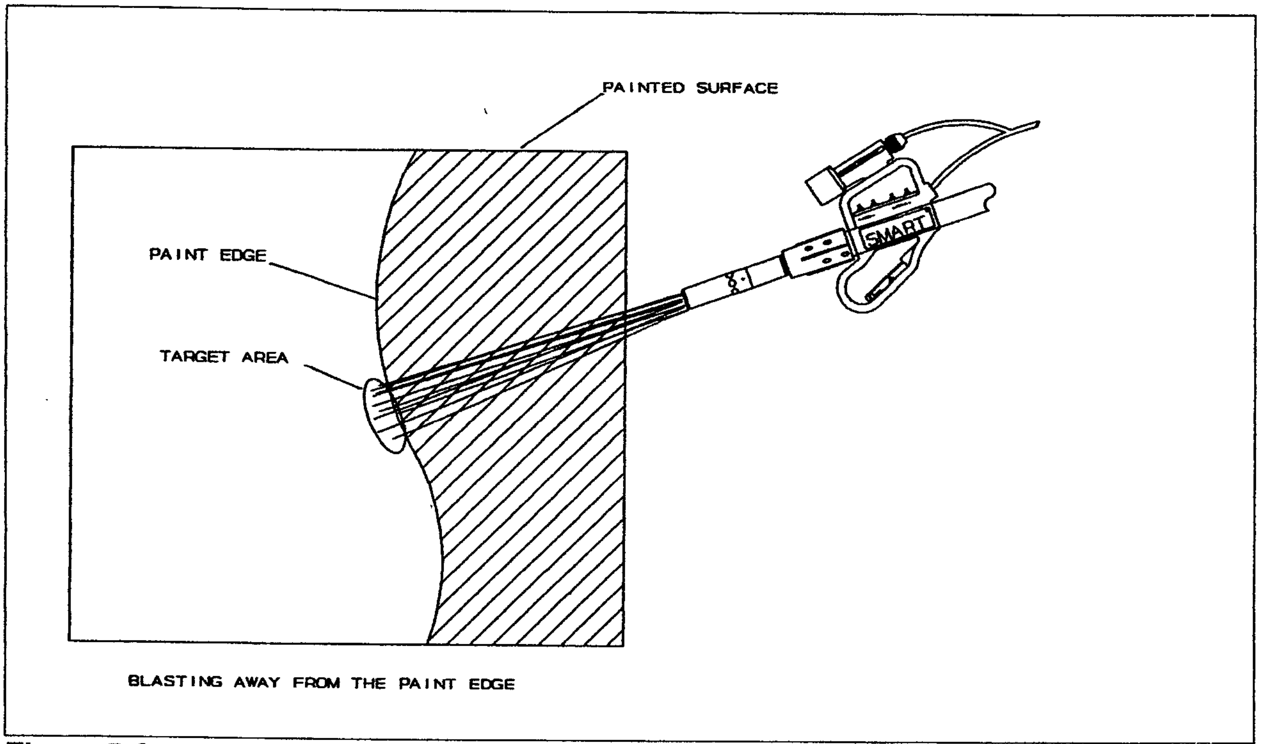

Figure 5-9
BLASTING AWAY FROM THE PAINT EDGE

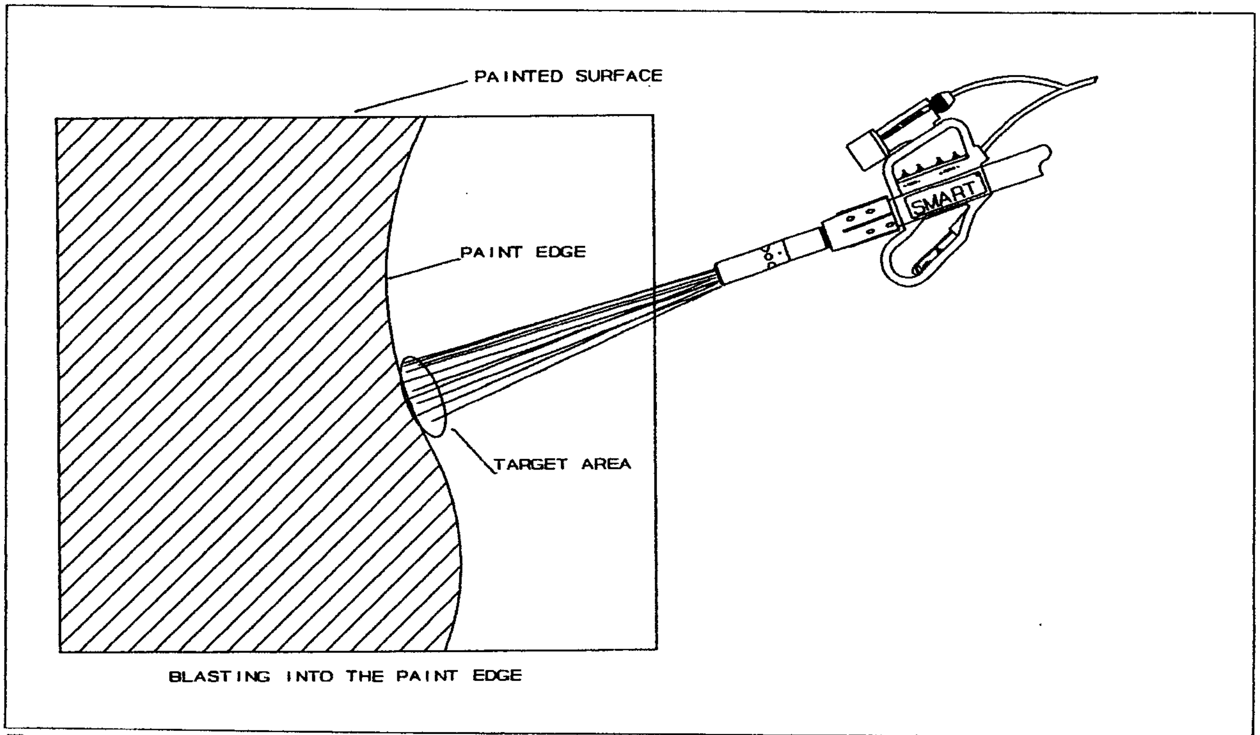

Figure 5-10
BLASTING INTO THE PAINT EDGE

one pass. It is better to strip the bulk of the coatings, leaving the remaining primer patches for a final "polish" pass.

Any irregularities in a section, such as a fitting, handle or other attachment, should be completely detained and cleaned with that section. It is not good work practice to come back after the rest of the workpiece is completed to finish the detail work. This will often lead to missed areas or pieces that were forgotten.

If a longer dwell time does not help the removal rate, then – and only then – should the media flow or blast pressure be adjusted. Media flow is usually the first of these two parameters to be changed. A slight increase should be all that is necessary. If that has little or no effect on the removal rate, the final step would be to increase the blast pressure.

Using the SMART blast handle, press the P+ pushbutton and increase the pressure in 2 psi (0,14 bar) increments until the removal rate improves. On this type of substrate, pressure can frequently be increased safety to 25 psi (1,7 bars). Note that other parameters may have to be altered.

An optimum set of parameters will allow the blasting of this type of substrate using a relatively short dwell time and blasting at an 80-degree angle and a stand-off distance of approximately 18 to 20 in. (450 – 500mm).

With one or two paint layers to remove, these parameters should give removal rates between 2 and 4 sfpm (0,18 – 0,37 sq m/min).

Operator Techniques

Many techniques are available to the media blast operator. One previously described technique is angling the blast nozzle to direct the blast flow under the coating to aid in lifting it off the surface. Another technique is blasting away from the paint edge (Figure 5-9) instead of into it (Figure 5-10).

In the case of some of the newer automobile coatings that use a base coat, then clear-coat system, blasting into the paint edge results in the blasting action softening and pushing the clear-coat in front of the media flow. This results in building up a resistant barrier on the paint edge. By blasting away from the paint edge, the paint edge is cleanly stripped away without forming the build-up. This technique can reduce the time required to strip an automobile with this type coating by 50-percent.

Some types of ground transportation equipment use vinyl decals for trim or graphic displays. While these decals can be stripped off with media blasting, it is often counter-productive and can cause damage to some substrates. A slow pass with the blast nozzle over a large decal, while not resulting in removing the decal, will cause a fracturing of the paint coating under the decal. This will then allow removal of the decal by lifting an edge and slowly pulling it off. This technique has worked well where large decals are concerned, and can save a considerable amount of time over other methods of removal. This method also reduces the chance for damage.

Blast Training

All the information in the world will not make a good media blasting operator. Only experience will do that. EECI has tried to include as much practical information in this manual as possible so that each new operator will have the benefit of EECI's experience, as well as that of others. By using this information, it is our intention that a program of practical experience takes place without the fear of damage to any work-pieces being processed early in the learning process. One way to further ensure that experience will be gained before damage results is to locate as much scrap material as possible to practice on. There is no substitute for hands-on experience.

During this training program, each new operator will experience the results of the various changes in each parameter. Hopefully, EECI will be able to duplicate the types of workpieces and substrates each operator will encounter in his or her own facility. Training does not end at the completion of this course. There are constant changes in paint coatings, substrates, blasting equipment and media, all of which will have an ongoing effect on the media blasting operation of tomorrow. This is a new and developing technology. The training never stops.

CLEAN-UP PROCESS

WARNING

Always use protective safety equipment while performing the clean-up operation. Wear OSHA-NIOSH approved respiration equipment, full-length coveralls or jumpsuits and gloves to cover exposed skin. Wear clean, approved eye or face protection and safety-toe shoes with slip-proof soles. Keep protective equipment clean and in good condition. Failure to follow these instructions may result in serious personal injury.

After blasting is completed, the workpiece is ready for the clean up. This is the final phase of the media blasting process. The following sequence is an example that may used for post blast cleaning of an automobile:

1. Reduce the media flow through the blast hose by pressing the pushbutton on the SMART blast handle marked M-. Keep the pushbutton depressed until the media flow has stopped.

2. Blow the workpiece off using blast air only.

NOTE: This technique allows the operator to blow off a large work-piece with relatively little effort and, if any remaining paint is discovered during the blow off, pressing the media increase (M+) push-button on the blast handle will start the media flow to remove any remaining paint. This method also eliminates most of the media from being moved outside the blast area with the workpiece.

3. Inspect the workpiece after the media and dust have been blown off. Any missed areas or detail work that were overlooked can now be reworked.

NOTE: This inspection can save rework time later. It is much easier to clean up any missed areas before the workpiece is moved out of the booth and unmasked.

4. Remove all tape and masking film from windows, etc.

NOTE: The masking was left on for the first blow-off to eliminate the chance of dust or media being blown into areas which were sealed prior to blasting, such as the fresh-air vent.

5. Repeat the blow-off procedure (Step 2) to achieve a relatively clean workpiece.

6. Un-tape the hood seams.

7. Raise the hood and blow off under the hood.

8. Un-tape the remaining seams.

9. Raise the trunk lid and vacuum inside the trunk. Using a commercial-grade vacuum unit is the most efficient method of cleaning inside the vehicle and trunk areas.

10. Completely vacuum inside the vehicle.

In the case of a typical motor vehicle stripping facility, all that is generally required for the final wipe down is to wipe off the interior surfaces with a damp cloth and to check the fresh air vent and air conditioning system for dust.

NOTE: During the wipe down procedure, never use water spray on anything metallic. The stripping process may have left the surface susceptible to spotting.

The workpiece is now complete and ready for the body shop or customer. EECI, in its stripping operation, usually does not perform sanding of paint strips along seams, etc., unless specifically requested by the customer. Body shops will sometimes use a DA sander with 180-grit, or, in some cases, coarser sandpaper, to remove paint strips which have been left around areas that had been previously unmasked.

WASTE ACCUMULATION, REDUCTION AND DISPOSAL

Waste Accumulation

WARNING

Always wear OSHA-NIOSH approved respiration equipment, full-length coveralls and gloves when handling waste residue. Failure to follow this instruction may cause serious personal injury.

All media blasting residue, consisting of paint dust and media fines (typically smaller than 60-mesh), should be collected, either in the reclamation of the media or in ventilation filtering. After collection, residue should be transferred into large containers, such as 55-gallon (208 liters) drums. See previous WARNING.

Reduction of Waste Materials

Factors that can reduce the amount of residue, which may require transport to a hazardous waste site, include the following:

1. Use a highly efficient media reclamation system.
2. Use a room ventilation system (dust collector) that precludes the collection of reusable blast media.
3. Avoid contaminating blast media.

<u>Media Reclamation System</u>. EECI's systems remove substantially all paint dust from the otherwise reusable media. The media should be effective down to a 60-mesh size.

<u>Room Ventilation System</u>. Some dust collectors may pull in recyclable blast media along with the dust. This will result in increased volume of waste as well as increasing the consumption of media. For these reasons, dust collectors, such as EECI's AirWall unit, should be used to preclude the collection of recyclable blast media.

Disposal of Waste Materials

WARNING

Always wear OSHA-NIOSH approved respiration equipment, full-length coveralls and gloves when handling waste residue. Failure to follow this instruction may cause serious personal injury.

NOTE: Always make sure that waste material is disposed of according to federal, state and local environmental regulations.

Blast media by itself is inert and non-toxic. Accordingly, if the coatings being removed by the media blasting process are not toxic or hazardous (i.e., do not contain heavy metals), then the residue should not be toxic and may be disposed of in a local landfill. This is often the case in the stripping of commercial or industrial items, and especially in the stripping of late model ground transportation vehicles.

If the coating contains heavy metals, such as cadmium, chromium or lead, the total residue may or may not be hazardous, depending upon the concentration of these heavy metals. The only way to determine whether the residue is hazardous, as defined in the USEPA's Toxic Characteristic Leaching Procedure (TCLP), is to subject samples of the residue to a TCLP laboratory test. This test can be expensive ($200 to $400 per test).

If it is suspected that the residue will be hazardous by TCLP definition, then all residue should be classified as hazardous and disposed of in an environmentally acceptable manner.

A

A (Amp/ampere) - unit of electrical current strength

AC (ac) - alternating current (electrical)

ACFM - cubic feet per minute under standard (sea level) conditions

ACGIH - American Conference of Government Industrial Hygienists

Acrylic (Thermoplastic) - classified as Navy Military Specification Type V. Less aggressive than Type II but offers the advantage of longevity because of its low breakdown rate

Aeration valve - valve that controls a small air nozzle, allowing air to enter at the base of the pressure vessel to enhance the flow of the plastic media

Aggressiveness (hardness) - property that determines how fast a media will cut through a paint film

Alclad - layer of pure, dead-soft aluminum which provides a protective cover from corrosion for the underlying alloy

B

Bar - metric unit of pressure equal to 14.7 psi

Barcol impresser - device to measure hardness by registering the force necessary to make a uniform dent with a calibrated tool in a piece of material. This device is used only when a suitable piece of the raw material can be obtained prior to grinding

Blast gate - sliding damper on cyclone

Blow off - cleaning of the workpiece by using a large volume of air from the blast hose

C

C (Centigrade) - thermometric scale which is divided into 100 degrees between 0 (zero), the melting point of ice and 100, the boiling point of water

CFM (cfm) - cubic feet per minute

Contamination (media) - accidental mixing of one media type with a harder substance

Chemical stripping - stripping by chemical means containing organic solvents, such as: acids, methylene chloride, methyl ethyl ketone (MEK), toluene or phenols
Cu M/Min. (cu m/min.) - cubic meters per minute

Crystallized starch media - blast media made from processed crystallized wheat starch

D

DA (dual action) sander - reciprocating/orbital sander

dBa (decibel) - unit of power ratio equal to one tenth of a bel

DC (dc) - direct current (electrical)

Decibel (dBa) - unit of power ratio equal to one tenth of a bel

Deadman switch control - located on the SMART blast handle, this control lever shuts off power to the blast handle when released

Distance, stand-off - distance from tip of nozzle to the workpiece

Double venturi nozzle - design permits additional air to be pulled in from the outside, resulting in a 20 to 30 increase in the pattern without increasing the actual air pressure

Dump valve - used to refill the pressure vessel; located on the bottom of the media storage hopper on Series 100 and 200 PMB machines

Dwell time - speed with which you move, or sweep, the blast nozzle across a workpiece while blasting

F

F (Fahrenheit) - thermometric scale in which the melting point of ice is 32 degrees above zero Centigrade, and the boiling point of water is 212 degrees

Final wipe down - cleaning of the workpiece with materials or solvents. Performed after all reworking, detailing and cleaning are completed

Fines, media - particles of media which have been reduced to a U.S. mesh size of less than 60 micron

Friability - ability of a material to shatter or break apart

G

Ground cable - cable(s) attaching the blast equipment, workpiece and workstand to earth ground to prevent the buildup of static electricity

H

Hand/mechanical sanding - performed with a DA (dual action) sander with 180-grit sandpaper to remove paint from a missed spot or masking line

Hard abrasive strippers - silica sand, glass beads, metal abrasives and synthetic media, such as aluminum oxide and silicon carbide

Hardness (aggressiveness) - the property, which determines how fast a media, will cut through a paint film

HP (hp) - horsepower; unit for measuring power

Hz (Hertz) - electromagnetic wave frequency expressed in one cycle per second

I

In. (in./inch/inches) - decimal unit of length equal to 25.4 mm

K

Kevlar - registered trademark for arimid fiber manufactured by E.I. Du Pont de Nemours and Co., Inc.

Kg (kg/kilogram) - metric unit of mass and weight equal to 1000 grams

Kw (kW/kilowatt) - unit of power equal to 1000 watts

L

Lbs. (lbs.) - pounds

M

M (m/meter/meters) - unit of length in the metric system, equivalent to 39.37 U.S. inches

Map/mapping - process used to identify critical areas, such as a Kevlar panel, and to mark it with a marking pen or masking tape. Mapping is performed during the walk-around

Media flow - flow of media through the nozzle. Strive for the "leanest" mixture to achieve the required removal rate

Media shape - crystal or granular shape with multiple cutting edges

Metering valve - valve which determines the ratio of flow of plastic media into the blast air stream

MEK - methyl ethyl ketone

Melamine - classified as Navy Military Specification Type III. Very aggressive and friable. Has an unacceptable breakdown rate when used at blast pressures above 30 psi (2 Bars)

Mesh, U.S. - standard for screen sizing

Micron - unit of length; the millionth part of a meter, or thousandth part of a millimeter, 1/25,000 inch

Mil - unit of length (or thickness) equal to .001 inch

mm - millimeter(s) - unit of length in the metric system, equivalent to 0.03937 inch

Mohs number - scale of hardness from 1 to 10, with 1 representing the hardness of talc (soft), and 10 representing the hardness of a diamond. Scale developed by Frederick Mohs

Moisture trap - a 40-micron element which removes moisture and fine aerosols in StripMaster machines

Monument (tombstone) tape - masking tape; derives its name from its use as a mask for the abrasive engraving of monuments

N

NIOSH - National Institute for Occupational Safety and Health

Nozzle angle - angle of the nozzle in relation to the surface of the workpiece

Nozzle distance - distance from the tip of the nozzle to the workpiece

Nozzle size - venturi bore size expressed in sixteenths of an inch (No. 4 - 4/16 in. = 1/4 in. venturi bore size)

O

OSHA - Occupational Safety and Health Administration

P

Phenol formaldehyde - classified as Navy Military Specification Type IV. Very friable and has an unacceptable breakdown rate

Pilot regulator - a small electric motor-controlled device which adjusts the main (pilot-operated) regulator

Plumbing tree - assembly of main plumbing components, located on the rear of the pressure vessel

Poly ally diglycol carbonate - classified as Navy Military Specification Type VI. Reasonable removal rate and well suited for sensitive substrates

Polyester - classified as Navy Military Specification Type I. Too soft and lacks the aggressiveness to efficiently remove most paint topcoats and underlying primers

Primer - first coating applied to a substrate before the top coat

PSI (psi) - pounds per square inch equal to .06804 bar

PSIG (psig) - pounds per square inch gage (pressure above or below atmospheric pressure)

R

Recovery (reclaim) rate - pounds per hour media reclaim processing rate

Removal rate - rate at which a coating is removed from a substrate. Expressed in square feet per minute (sfpm) or square meters per minute (sq m/min)

Resin base - the type of resin used to produce the plastic media

Respirator - device designed to provide the wearer with respiratory protection against inhalation of airborne contaminants

S

SFPM (sfpm) - square feet per minute as applied to removal rate

Shape (media) - crystal or granular shape

Sieve size - rating of the size of the granules; usually expressed as two numbers, the first number is the largest particle size to be found in the blend, and the second is the average size of the blend (i.e. 12/16). Sometimes referred to as the "mesh of the media"

Slugging - the expulsion of a dense stream of media without benefit of air to propel it against the surface to be stripped. Caused by media bleeding into the hose during pot depressurization

SMART - StripMaster Advanced Remote Technology

Sq M/Min. (sq m/min) - square meters per minute as applied to removal rate

Sound level dBa slow response - sound pressure reading expressed as decibels. Read as a time-weighted average to dampen out the highs and lows

S.p. (static pressure) - potential pressure exerted in all directions by a fluid at rest. Usually expressed in inches water gage (w.g.) when dealing with air

Spiked - adding new media to existing media to maintain a complete mesh range

Stand-off distance - distance from the tip of the nozzle to the workpiece

Substrate - base material surface to which a primer and top coat have been applied

T

Tape laying - application of masking tape to the workpiece prior to the application of the masking material to seal off areas not to be blasted

TCLP (Toxic Characteristic Leaching Procedure) - concerned primarily with the content of heavy metals in solid waste, e.g. cadmium, chromium and especially lead

Tombstone (monument) tape - masking tape; derives its name from its use as a mask for the abrasive engraving of monuments

U

Unmasking - removal of the masking materials from the workpiece

Urea formaldehyde - classified as Navy Military Specification Type II. Very aggressive for rapid removal rates, yet has a medium breakdown rate

U.S. Mesh - standard for screen sizing

USEPA - United States Environmental Protection Agency

V

Vacuuming - performed with a commercial vacuum cleaner to recover exposed media during the clean-up cycle

W

Walk-around - complete review of the workpiece for identification of critical areas

W.g. (water gage) - inches of water as opposed to mercury. 1 inch of water = .0736 inch mercury

Workstand - work platform, usually used in the stripping of large workpieces such as aircraft