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Abrasive blasting

Smooth operators blast better!

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Eco-efficiency for the Marine Industry Fact Sheet

Do you want to

- decrease disposal costs by reducing emissions and waste generated from spent abrasives?
- remove paint coatings and solvents that are harmful to human health and the environment?
- reduce noise and air pollutants released from solvents and abrasives?

Abrasive blasting uses mechanical energy to forcefully direct particles (either wet or dry) at a surface to remove paints or other coatings. Large or immovable objects are usually blasted in fully enclosed or fully screened textile or plastic structures. Smaller objects are often blasted in totally sealed enclosures that are vented through a dust collector.

Blasting media

Your choice of blasting medium will determine its effectiveness, durability and environmental impact. Is your blasting medium:

- appropriate for the intended application (e.g. correct shape and size)?
- durable so as to allow collection, reclamation and re-use?
- associated with a low environmental impact during storage, use or disposal (see table 1)?

Case study: Carstrip Pty Ltd uses plastic media to dry strip aluminum-hulled boats^[1]

Carstrip Pty Ltd in Victoria removes paint from cars, trucks, aluminium and fibre composite boats with a plastic-based dry stripping system. The stripping medium, a re-usable thermoplastic acrylic resin, is manufactured by Carstrip using virgin off-cuts from moulding operations. The irregular granular shape of the plastic particles gives excellent cutting and lifting properties, without damaging the surface underneath.

The system, unlike stripping solvents, acid-dipping, hand-stripping and sandblasting, does not produce any gaseous or liquid waste, and eliminates the generation of sludge. Compared to traditional blasting methods, the process is quick, reduces labour costs and provides a safer and cleaner working environment.

The dry plastic stripping system has not only reduced waste disposal costs, but has also led to lower energy costs for air compression of about \$10 per hour of operation. The system involved an initial capital investment of \$140,000 and paid for itself, with operational savings, in about 2.5 years.

Dry plastic stripping with reusable plastic particles



Table 1: Abrasive characteristics, recyclability and hazards^[2]

Abrasive	Mohs hardness ^a	Recyclable?	Dust	Hazards	Comments
Natural minerals					
Silica sand best quality	7.0	no	low	high levels of crystalline silica -possible carcinogen	Prohibited for use as an abrasive blasting medium in Australia
average quality	6.5	no	high		
Garnet					Commonly used. Hard, durable and fast cutting
Andradite	6.5	no	high		
Almandite	7.5	yes	low		
Staurolite	7.5	no	mod		Not for removal of lead-based paint
Olivine	6.5	no	mod	possible asbestos impurities	Used for steel where slags cause rust spotting
Hematite	6.0	yes	mod		
Mineral slags					
Copper slag	6.0	no	mod	heavy metals contamination possible	
Nickel, iron and coal boiler slag	6.0	no	high	heavy metals contamination possible	
Manufactured media					
Steel grit/shot	6.0	yes	low		Metallic abrasive Must not become wet
Baking soda	2.0 - 3.0	no	high-dry low-wet		For sensitive parts cleaning
Crushed glass (e.g. beads and grit)	6.0	yes	high		Iron free so can be used on all types of metals
Dry ice			no waste		CO ² is an asphyxiant - use ventilation
Plastic beads	softer than minerals	yes			
Organic media					
Corn cobs, nut shells, starch, etc.	low	no	high	potential for dust explosion	To remove dirt and grease (i.e.does not damage undercoating)

^a Mohs hardness is a measure of scratch resistance of minerals (e.g. talc=1, diamond=10)

Case study: Peel Away 9 —an abrasive blasting alternative^[4]

The Peel Away paint removal series, produced by Haymes Paint, comprises a thick paste that is applied to the substrate and then sealed with a laminated cover sheet. After some time, the sheet, which seals in the fumes and dust, is removed, peeling away paint from the surface. Peel Away 9 (Marine Safety Strip) is a product especially designed for the removal of marine antifouling, varnishes, exterior acrylic and water-based paints. It is suitable for use on painted wood, aluminium, fibreglass, laminated and compressed boards. A trial in Adelaide used Peel Away 9 to remove eight coatings of antifouling paint from a J24 cruising yacht. It took two men 3.5 hours to apply a 20 kg coat of Peel Away using dustpans and brushes. The coat was then left for 36 hours before peeling, which took one man two hours and produced about two large garbage bins worth of waste.

Lower your emissions and reduce waste treatment and disposal costs^[3]

- Do you test for the presence of lead-based paints before blasting? If lead is present, open abrasive blasting is not permitted in some jurisdictions (e.g. Brisbane City Council [BCC]).
- Do you make sure that there is a suitable buffer distance between your operation and adjoining land uses (50 metres for wet blasting and 200 metres for dry blasting in BCC)?
- If open air blasting, do you avoid blasting on windy days, and blast in a downward manner?
- If open air blasting, is your structure fully enclosed or screened to a suitable height above the structure (2 metres in BCC)?
- Do you blast and store spent abrasive in a bunded area with an impervious surface?
- If you have a permanent blast chamber, is it designed to enable the recovery of spent abrasives?
- Do you collect all the wastewater from wet and water blasting in a holding tank for treatment and re-use, disposal to sewer under a trade waste permit, or collection by a licensed waste contractor?
- Do you contain all waste from wet abrasive or water blasting before it dries, becomes wind borne or contaminates the ground or waterways?

References

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2. Gould, J. and Wilson, J (2003) Literature Review: Abrasive Blast Media, The Waste and Resources Action Programme, Banbury, Oxon, UK. Retrieved 13-12-2005 from: www.wrap.org.uk/document.rm?id=436
3. BCC (2000) Pollution Solutions - Abrasive Blasters, Brisbane City Council, Brisbane, Australia. Retrieved from 13-12-2005: www.brisbane.qld.gov.au/bccwr/environment/documents/abrasive.pdf
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For further information

Ecobiz can assist you to reduce costs and improve eco-efficiency in your business Call 1300 369 388 for further information.

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