



Eight Steps to Selecting the Right Abrasive

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Introduction

This discussion paper aims to help contractors and inspectors choose the right abrasive for their project. Discover the key differences between blasting abrasives and the benefits of securing a continuous abrasive supply and consistent product quality.

Additionally, this discussion paper also provides a step-by-step guide for reviewing and selecting the right blast abrasive for your next on-site project or operation. Not only will this ensure a blast abrasive media that optimises your product performance, but it also safeguards employees and workers on-site from potential health risks.

1 Hardness

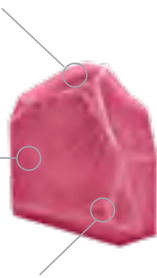
Higher relative resistance to abrade a surface compared to other abrasives.

2 Toughness

To remove surface coatings effectively, an abrasive must be tough enough to resist fracturing on impact.

3 Density

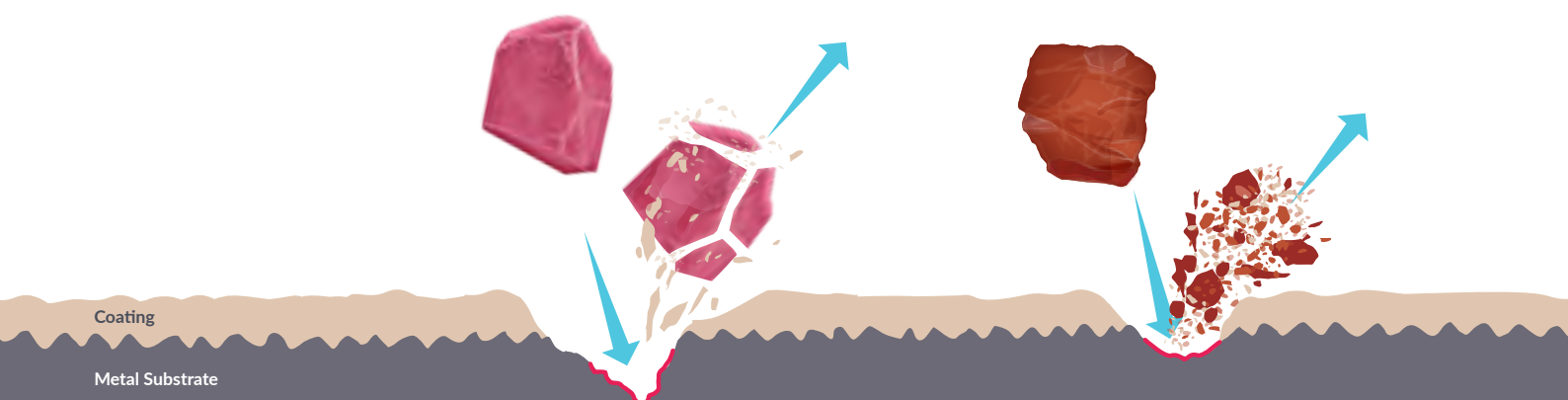
A heavier, denser abrasive grain outperforms a less dense abrasive.



Not all blasting abrasives were created equal

Three critical abrasive characteristics, Hardness, Toughness (low friability) and Density, create a powerful and efficient blasting abrasive. When used correctly it will result in high productivity, minimal dust and a cleaner, uniform surface finish that is ready for coating.

- ✓ Lower dust levels
- ✓ Increased productivity
- ✓ Cleaner surface
- ✓ Safer for workers
- ✓ Lower consumption
- ✓ Uniform surface profile



GMA GARNET™

Harder, tougher and denser grains generate a cleaner, consistent profile – the optimal surface preparation for coating application.

OTHER GARNET

Inherently weaker with more fracture plains that shatter on impact creating dust.

Eight steps to selecting the right blast abrasive

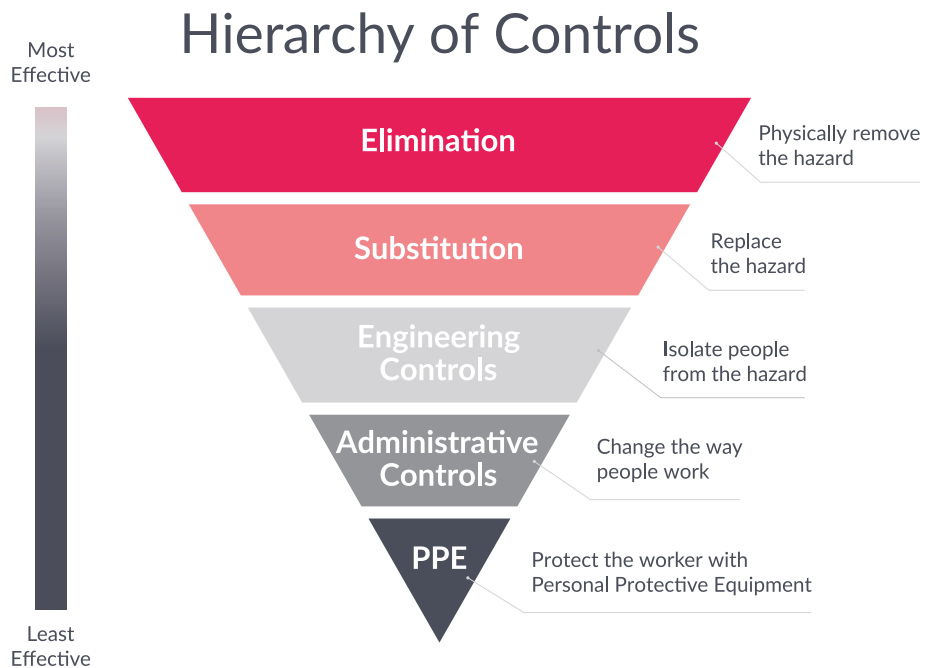


Substitution control strategies are by far the most effective method of reducing hazards.

Step 1 - Understand and prepare the workplace for abrasive blasting operations

Hazard anticipation and identification

The first step is to recognise that abrasive blasting creates dust, and companies need to address these hazards according to the safety hierarchy of controls (image below).



Companies must protect employees who handle potential heavy metals and free silica-containing products at all stages of their blasting operations (i.e. from use to disposal). Elimination and substitution control strategies are by far the most effective methods to reduce dust levels and prevent heavy metal exposure.

Substitution is often less expensive and more effective than other controls.



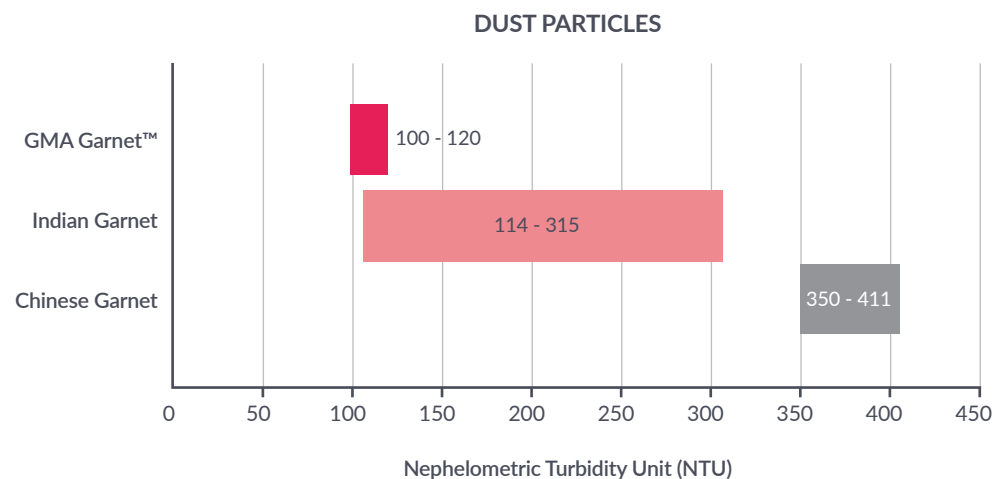
Step 2 – Look for blast abrasives that are low in dust particles

Dust not only impacts visibility but also create airborne hazards.

It is important to review the turbidity or Nephelometric Turbidity Unit (NTU) levels of your chosen blast abrasive. NTU is the measure of the degree to which the water loses its transparency due to the presence of suspended particulates. The higher the NTU level, the higher the dust producing particles in an abrasive. Test reports should be available from your manufacturer or vendor.

Recent laboratory test results showed that Indian and Chinese garnet abrasives sold in Australia have high levels of dust levels and inconsistencies (refer to the diagram below).

Tip: Always request a recent NTU report from your abrasive supplier or distributor.





Step 3 - Examine the levels of heavy metal and hazardous content

Some abrasives contain high concentration levels of heavy metals and other hazards such as free crystalline silica. These abrasives create long-term health and environmental effects.

Tip: Request independent reports from NATA approved laboratories.

Do not use:-

- 1** **Materials containing more than 1% free silica** (i.e. crystalline silicon dioxide). Independent bulk sample data analysis will provide an outline of this information⁹.
- 2** Materials with any **radioactive substances** where the level of radiation exceeds 1 becquerels per gram. You should request independent laboratory reports from the manufacturer or vendor.
- 3** **Materials containing a range of heavy metals** such as antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, nickel and tin. You should request independent laboratory reports of bulk sample tests from the manufacturer or vendor.

 Refer to **Selecting an abrasive blasting medium (Appendix B)** in the **Safe Work Australia's Code of Practice for Abrasive Blasting**¹.



Step 4 – Thoroughly review Safety Data Sheets (SDS)

It is important to review in particular Sections 8 and 9 - Exposure Controls/Personal Protection and, Physical and Chemical Properties, and other resources such as the Safe Work Australia's Code of Practice for Abrasive Blasting² before bringing potentially hazardous blasting media onsite.

Tip: An SDS only informs you part of the story on hazardous materials present in a product. Request independent reports on hazardous heavy metals.

Always work with vendors and manufacturers to **substitute highly hazardous blasting media for alternative safer products.**

 **Safe Work Australia's Code of Practice for Abrasive Blasting**

¹ ISO 11126-10 Preparation of steel substrates before application of paints and related products – Specifications for non-metallic blast-cleaning abrasives Part 10 listed in section 6.1 General Requirements.

² https://www.safeworkaustralia.gov.au/sites/default/files/2020-07/model_code_of_practice_abrasive_blasting%20.pdf



Step 5 – Review additional independent laboratory test reports

A PDS contains a lot of information but how would one know the data is accurate or has changed? Independent laboratory test reports should provide customers with peace of mind that data is accurate and are backed by external third party test results.

Data examples:

- Radiation
- MOH's hardness
- Free silica (XRD method)
- Particle size analysis
- Certificate of soil & leachate analysis - heavy metals
- Certificate of conformance documentation
- Specific gravity
- Density

To understand more or should you have specific specification requirements, please contact your regional sales representative.



GMA's comprehensive trial testing programme is a practical low risk approach.

Step 6 – Perform on-site trials: A low-risk approach

On-site product testing and performance trials are low-risk approaches to *proof of concept*. Testing a product in a controlled environment with vendors, contractors, and asset owners provides real-time, practical results on your blast abrasive performance.

Due to the complexity of equipment and abrasive choice, on-site trials are invaluable for assessing product quality, productivity, consumption, environmental performance, as well as health and safety parameters. Additionally, on-site trials allow technical personnel to help optimise results through best practices product selection and reduce overall project costs.

A trial will help you see first-hand how the products perform against other brands and iron out any issues before critical turnaround requirements or plant shutdowns. You do not want surprises.

Request for an on-site guided trial from your manufacturer or vendor.



Step 7 - Conduct on-site health monitoring for workers

Environment Health and Safety Officers should conduct air monitoring to determine if the blast exercise poses any risk to workers' health and safety; and any uncertainty regarding legal dust exposure levels onsite.



Workplace checklist: Changes to the workplace exposure standard for silica dust³.



Step 8 – Request a capability statement document

It is good practice to request a capability statement from your abrasive supplier or manufacturer as it defines their capabilities, achievements, and skills within the business. More importantly, a capability statement presents the business' unique competitive advantages against other industry suppliers.

Request a detailed capability statement from your abrasive supplier. Reach out to your respective GMA regional sales representative for a tailored capability statement for your business.

³ <https://www.safeworkaustralia.gov.au/doc/workplace-checklist-changes-workplace-exposure-standard-silica-dust>



“In the 1970's
GMA pioneered
the use of
garnet minerals
as a natural
industrial
abrasive.”

Not all garnets are equal

Consistency issues with other garnet suppliers

Unlike GMA, other garnet traders' (particularly the Indian and Chinese) manufacturing processes, sourcing controls vary and are limited. Their garnets are pooled and blended from multiple inconsistent sources. The volatility in product consistency and quality becomes a key risk for businesses that require consistent supply.

Security of supply - fully integrated global business

GMA is the only company that owns the supply chain from the mine to the customer. Being a fully integrated global business, we are able to maintain an uninterrupted high-quality, consistent garnet supply to our customers.

We own and operate mines in Australia and the USA, and have long term agreements with a significant supply source in South Africa. These operations provide us with an ample, consistent, and secure garnet supply.

Our Supply Chain



Restoration

The tailings sands are returned to the mined area which is rehabilitated to its former environment.

1



Mining

Garnet rich sand is mined and transported to our 24/7 'Wet' plant for processing.

2



Wet Plant

Water and centrifugal forces are used to separate the garnet from lighter waste minerals, leaving a high quality garnet concentrate.

3



Quality Control

The concentrate is sample tested in the laboratory to ensure consistent product quality.

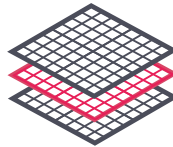
5



Final Quality Control

Final laboratory testing ensures the highest quality standards are met.

4



Dry Plant

Magnetic separators remove impurities and the pure garnet is screened and graded into the correct size particles.

6



Packaging

GMA Garnet is packaged into one-tonne or two-tonne bulk bags and 25kg paper bags.

7



Distribution

GMA Products are distributed in 80 countries via our warehouses and over 100 distributor outlets worldwide.

8



Customer Service

Dedicated sales team assist customers in selecting the best products and logistics arrangements.

9



Technical Support

Our experts support customers in solving technical challenges and maximizing productivity and performance of their projects.



12
key testing
areas to ensure
the highest
quality standard.

Consistent quality that performs

GMA Garnet™ is not only intrinsically safe to use, its consistent sizing and quality produce reliable abrasive blasting performance every time. We systematically test and analyse our garnet across 12 key areas, ensuring that GMA Garnet™ meets the highest industry, safety, and quality standards.

The entire process is certified under various international quality standards, where the product supplied to customers will be from GMA's Australian mining operations, which has been assessed and is currently certified as meeting the requirements of:

- **ISO 9001:2015** (Quality Management Systems)
- **ISO 14001:2015** (Environmental Management Systems)
- **ISO 45001:2018** (Occupational Health & Safety Management Systems)

You can be assured that every bag of GMA Garnet™ delivered to you will contain at least 96% garnet or more. It is a stark contrast compared to other low-quality operations around the world, where every bag contains 15-25% trash material. Not only will this impact performance but also coating life.



GMA GARNET™



INDIAN GARNET



CHINESE GARNET



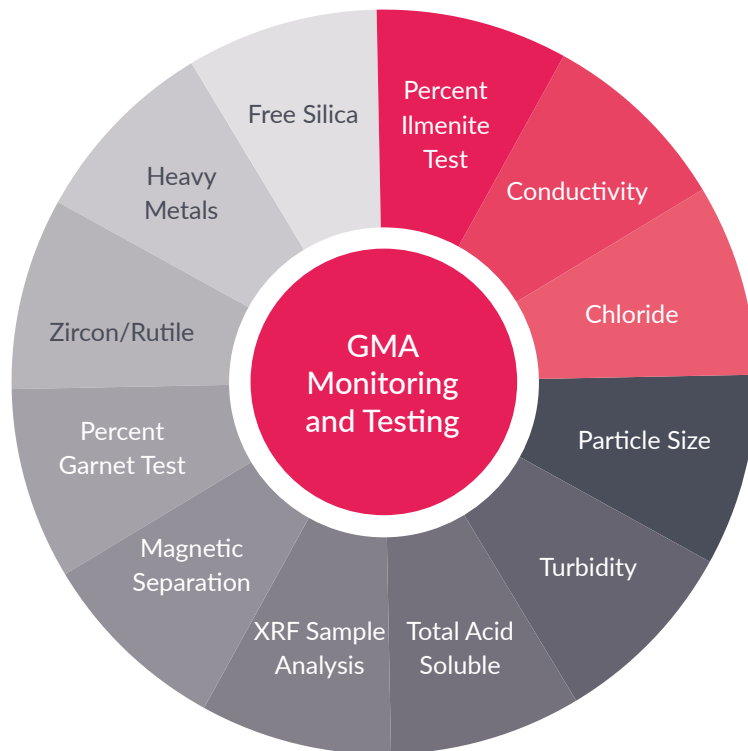
Independent reports are performed regularly to ensure product accuracy.

World class sampling process

Samples are taken every two hours to ensure GMA's processed garnet are of the highest standards. For 35 years, we have developed advanced production monitoring and processes that are embedded into our operations.

Product analysis is regularly conducted to ensure that products meet the highest industry and product quality standards. The analytical information from these results is used to ensure the accuracy of the PDS and SDS of GMA products. GMA undertakes rigorous internal and external product testing before our products are packaged and dispatched to customers (refer to the image below).

GMA GARNET™ PRODUCT MONITORING AND TESTING



Tip: Request for third party reports to ensure product safety and integrity.

To ensure accuracy, third party product testing reports are also available upon request.

The preferred industry choice

GMA has been supplying high-quality garnet abrasives to the global markets for over 35 years.

We offer a complete range of garnet abrasives for any surface preparation requirement from removing resistant coatings and heavy rust, to fast millscale removal and specialty coating requirements.

GMA Garnet™ is approved by leading paint manufacturers and is the preferred abrasive among global oil & gas companies, full-service shipyards and international fabricators.

Find out more about how we can work together to keep your worksite and workers safe when using GMA Garnet™ abrasives.

References

1. ISO 11126-10 Preparation of steel substrates before application of paints and related products – Specifications for non-metallic blast-cleaning abrasives Part 10 listed in section 6.1 General Requirements.
<https://www.iso.org/obp/ui/#iso:std:iso:11126:-10:ed-1:v1:en>
2. Abrasive Blasting Code of Practice
https://www.safeworkaustralia.gov.au/sites/default/files/2020-07/model_code_of_practice_abrasive_blasting%20.pdf
3. Workplace checklist: Changes to the workplace exposure standard for silica dust
<https://www.safeworkaustralia.gov.au/doc/workplace-checklist-changes-workplace-exposure-standard-silica-dust>



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