Quantum
Blast Technologies

Waterjet Cutting

Choosing the right abrasive

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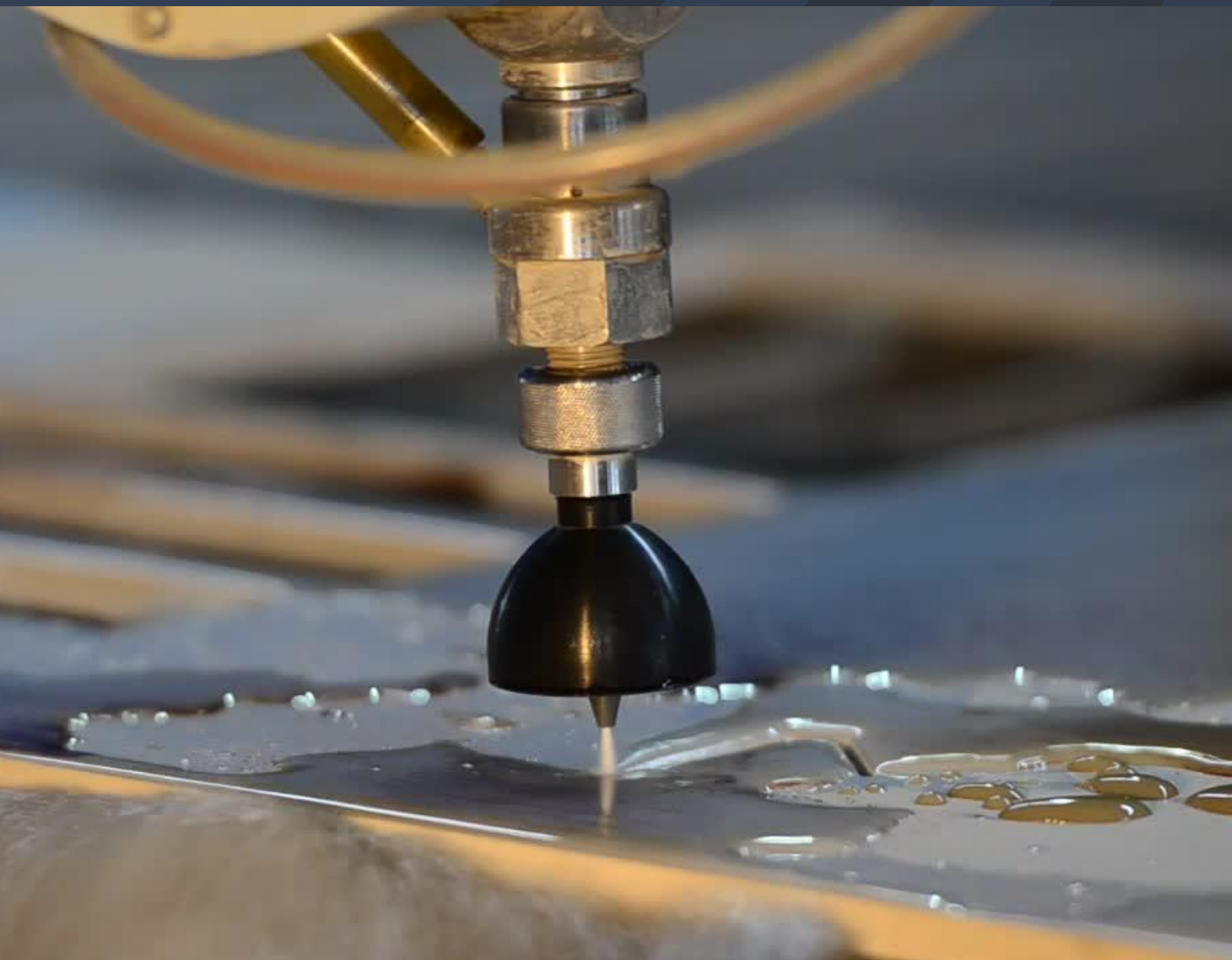


Choosing the best Garnet for Waterjet Cutting Applications

The Colorado river was able to cut through large rocks and form the Great Canyon over millions of years. Inspired by nature, the invention of waterjet cutting and the addition of abrasives enables cutting through all kinds of materials but in a fraction of the time. Choosing the right abrasive type and size and the consideration of the following factors can dramatically improve the performance and productivity of waterjet cutting.

Hardness

Typically, the harder the abrasive, the faster you can cut but hardness also impacts the integrity and longevity of the cutting nozzle. Industry experts consider almandine garnet to be the best in balancing the two considerations.

Density

The use of very light abrasives fail to achieve the desired velocity and on the other hand very heavy materials will also have the same effect. One needs to find the right balance between mass and velocity.

Particle Shape

The most suitable particle shape depends on the material being cut and edge finish requirements. Sharp, angular grains cut more quickly and offer superior edge finishes. Sub-rounded grains are used in more general-purpose, basic applications.

Rock Garnet vs Alluvial Garnet

Alluvial garnet is rounded by the tumbling effect of a steady flow of water over thousands of years. Rock garnet on the other hand is embedded in host rocks. Since it is freshly cut, it has the sharpest incisive edges.

The sharp angular grains of rock garnet cut more quickly and offer superior edge finishes compared to the rounded particles of alluvial garnet.

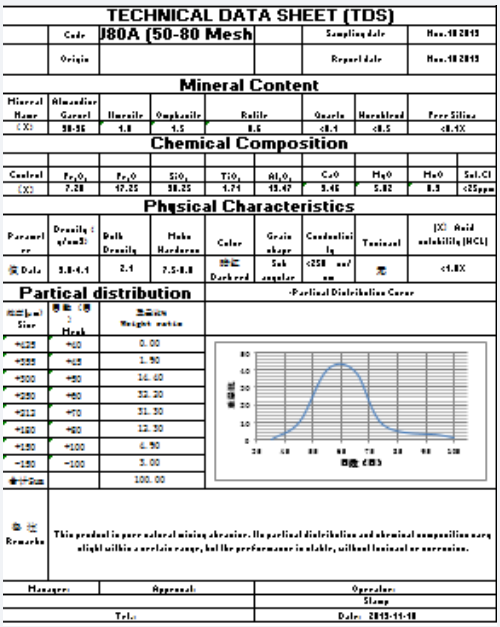
Alluvial garnet is cheaper to mine as it is excavated from river beds or natural hollows whereas Rock garnet is costlier as it is embedded in natural rocks, crushed, magnetically separated and is repeatedly washed.

Almandine

Sharp, angular hard rock garnet that offers the fastest cutting speed and best edge quality.

Alluvial

Versatile, all-purpose abrasive for general blasting.



TECHNICAL DATA SHEET (TDS)

	Code: J80A (50-80 Mesh		Sampling date:	Nov.18 2015
	Origin:		Report date:	Nov.18 2015

Mineral Content

Mineral Name	Almandine Garnet	Ilmenite	Amphibole	Rutile	Quartz	Hornblend	Feldspar
(%)	90-95	1.0	1.5	0.5	<0.1	<0.5	<0.1%

Chemical Composition

Content	Fe_2O_3	FeO	SiO_2	TiO_2	Al_2O_3	CaO	MgO	MnO	Sol.Cl
(%)	7.28	17.25	38.25	1.71	13.47	2.45	5.82	0.3	<25ppm

Physical Characteristics

Parameter	Density (g/cm3)	Bulk Density	Moh Hardness	Color	Grain shape	Conductivity	Toxicant	(%) Acid solubility (HCL)
Data	3.8-4.1	2.4	7.5-8.0	Dark red	Sub angular	<250 us/cm	No	<1.0%

Partical distribution

Size	Mesh	Weight ratio
+425	+40	0.00
+355	+45	1.50
+300	+50	14.40
+250	+60	32.20
+212	+70	31.30
+180	+80	12.30
+150	+100	6.90
-150	-100	1.00
Sum		100.00

Partical Distribution Curve

Remarks: This product is pure natural mining abrasive. Its partical distribution and chemical composition may slight within a certain range, but the performance is stable, without toxicant or corrosion.

Manager:	Approval:	Operator: Stamp
Tel.:		Date: 2015-11-18

Other important considerations

While Alluvial garnet is cheaper to mine, it is not necessarily sold cheap. Many factors determine a good abrasive, and the advantage of using a high-quality abrasive is that you will get faster cutting, higher precision, and less frequent nozzle plugging.

Here are some qualities to look for in choosing an abrasive and an abrasive supplier:

Mesh Size

When cutting thin or softer materials that require a good finish, a finer abrasive is recommended. When cutting harder or thicker materials, choose a coarse abrasive such as 50 or 60 mesh. 80 mesh abrasive is the most popular abrasive size because it provides the greatest versatility for a wide variety of applications.

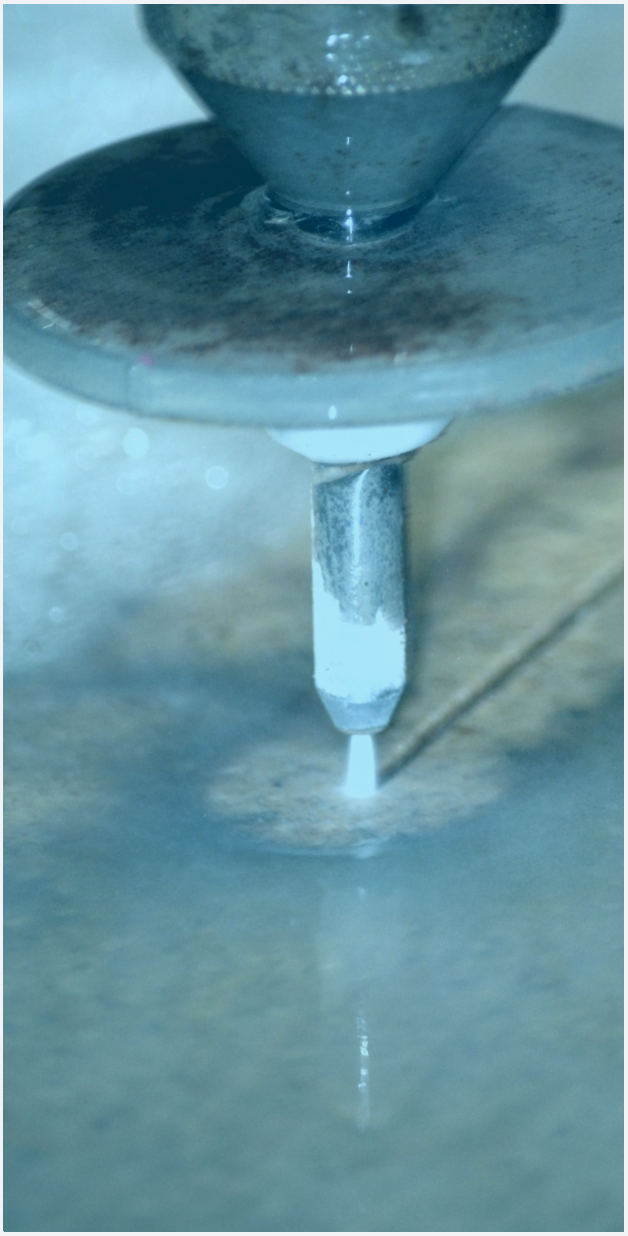
Particle Distribution

Fine particles and large particles both contribute to nozzle plugging, inefficient cutting, and other problems. The narrower the range the better. Many unscrupulous companies choose to term the abrasive only by their brand and do not specify the mesh size. Ask your supplier to provide independent test reports showing the particle distribution and compare the % of particles in the range of the desired mesh size.

Purity

Abrasives that have a lower purity level and contain minerals other than garnet will affect a waterjet's performance significantly (longer cuts, more abrasive usage etc.). Ask your supplier for a test report showing the percentage of garnet and the Soluble Chloride level.

Q-Blast 80 Mesh Garnet for Waterjet Cutting



Q-Blast garnet undergoes the process of magnetic separation and is also washed 5 times to achieve the highest level of purity. Keeping in mind the constant balancing act between acceleration, cutting and wear in waterjet cutting, Q-Blast provides higher productivity and lower equipment and labour time.

In addition, Q-Blast Garnet provides straighter cuts (less taper) from top to bottom and cleaner edges.

The garnet is sourced from top quality mines accredited to ISO 9001 certification, the technical data is independently tested and mill test reports are available for each batch.

The following article explains the factors involved in determining the best abrasive for waterjet cutting.

https://www.thefabricator.com/thefabricator/article/waterjetcutting/selecting-the-right-waterjet-abrasive

Waterjet Cutting Services

We asked Shaun Stewart from Waterjet Cutting Services, Lonsdale what he thought was most important decision factor in choosing the garnet and the abrasive supplier. Shaun has been in the waterjet cutting industry for many years and has grown the family business into what it is today.

Shaun's preference is to use Quantum Blast's Rock Almandine garnet as it provides the best efficiency. According to Shaun, it flows well and does not clog as it is very clean and pure. It sucks well into the orifice and he has not encountered a single issue.

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Thanks to

WATERJET CUTTING SERVICES