

Fabrication Bulletin # 2015

Fabricating HanStone Using a Waterjet

HanStone Quartz offers the natural beauty of quartz with up to six times the strength and durability of granite. More than 90% of HanStone Quartz is mined quartz crystals, one of nature's hardest minerals. The quartz is combined with resins and pigment to create the look of natural stone without the high maintenance. There is no need for sealing, conditioning, and polishing. HanStone Quartz is scratch and stain resistant and its non-porous nature makes it an ideal surface for residential or commercial applications.

Overview

The cutting of quartz slabs with waterjets using garnet abrasives are the current state-of-the-art in cutting quartz slabs. There are other methods including Bridge Saws and CNC's. This bulletin will specifically focus on waterjet technology.

Please note that the material contained in this bulletin is largely general and non-specific. More detailed information on cutting speed, pressure, etc. can be obtained from your specific equipment manufacturers or tooling vendors.

Also note that there are a large number of variables in the fabrication process that can affect the final outcome and potentially result in damage to the material. Changing any of these variables can have an impact on accurately cutting HanStone quartz slabs and eliminating damage.

Best Practices (General)

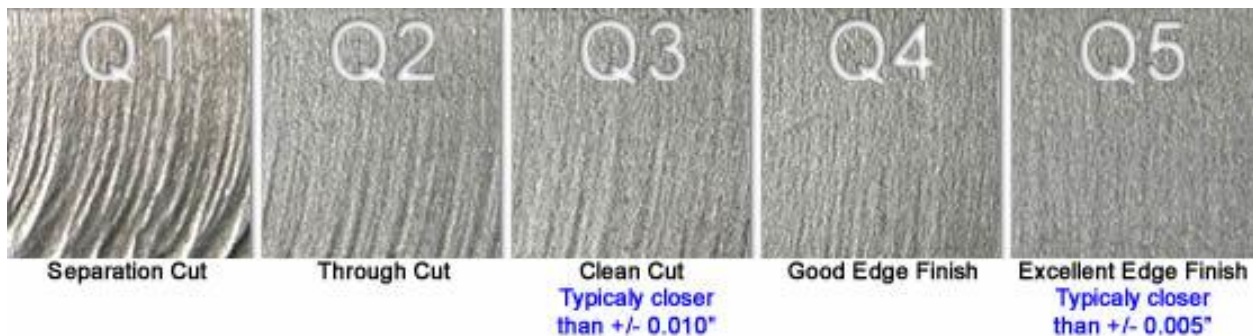
- Use a slower feed rate to cut HanStone when compared to granite.
- Whenever possible cut from the outside of the slab toward the center. Make sure the initial pierce cut is well outside the finished geometry of the piece.
- Avoid plunge cutting when using a combination Saw-Jet.
- Maintain a level cutting bed. Depending on volume, change waterjet slats every 6 to 8 weeks.
- Vary your baseline and 0.0 start point to extend the life of the slats / waterjet bed.
- Use the correct type abrasive for cutting quartz (per manufacturer's recommendations).
- Inspect your equipment for excessive wear on a regular basis. It is recommended that inspections be performed frequently, but at least after each 300 hours of use.
- Upgrade to manufacturers current software for numeric controlled equipment.

Waterjet: Best Practice

Waterjet cutting is accomplished using a high velocity stream of water and abrasive to cut HanStone slabs. Water pumped at 40,000 to 60,000 psi accelerates through a sapphire, or ruby orifice. The stream mixes with abrasive and air as it accelerates through the nozzle, exiting as an abrasive stream with a cutting diameter of 0.020" to 0.060". The combination of high velocity water and abrasive particles impact on the material face to perform the actual cutting. Quartz material is removed as microchips, with the resulting kerf often serrated at the bottom.

The stream which produces the cut will generally carry 0.5 to 1.5 pounds per minute of abrasive. The quantity of abrasive is dependent on the orifice size which in turn, produces the cutting stream size. This is chosen based on the material being cut. The most cost effective and commonly used abrasive is garnet.

The cutting speed is variable with the trade-off being the quality of the cut. Most manufacturers use a scale of 5 levels of quality in cutting. At faster speeds the cut becomes visibly serrated and irregular at the bottom of the cut. This corresponds with the lowest level quality of cut or what is referred to as a separation cut – Q 1 (see below).



Hyundai L&C USA does not recommend Q1 or separation cut quality, as this could lead to material breakage during cutting. There are a great number of variables in the use of waterjet technology that can affect cutting speed. Some of these include the type of equipment being used, pump size, horsepower, pressure, abrasive volume, material thickness, geometry of cut, etc. In addition, the software that controls the cutting nozzle also varies in levels of complexity, allowing the cutting speed to change due to the varying geometry of the cut. Due to this you will need to consult with your equipment manufacturer for recommended feed rates.

To Avoid Excessive Chipping or Cracking

- Maintain the slats that form the cutting bed. Replace when worn.
- Reduce feed rate. Never use Q 1 (separation cut) quality.
- Check abrasive volume and increase if necessary.
- Reduce the distance from the nozzle to the HanStone slab.
- Upgrade software to the most current version.

Summary

1. There are many variables in the fabrication process; slab handling methods, condition of equipment, level cutting bed, type and quality of abrasive, cutting feed rate, water pressure, and variable geometry of cutting, just to name a few. If HanStone material is breaking during the fabrication process, all of these variables should be looked at and/or adjusted prior to assuming that the slab is defective.
2. Always inspect slab material for defects prior to cutting.
3. In general, HanStone Quartz materials should be cut at a slower speed or feed rate than granite. Do not use a Q1 or separation quality cut.
4. Whenever possible, cut from the outside of the slab toward the center. On a combination Saw-Jet, avoid plunge cutting.
5. Use the correct size and type of abrasive for cutting Quartz Surfacing.
6. Always comply with the equipment manufacturer's recommendations and/or vendor's advice.