

API Solutions
“An Easier Way”
Bulletin M-101

Water Jet Cutting

Water Jet Machining Benefits

In today's competitive environment, many decisions boil down to three items: cost, quality, and speed (turn around time). With most industrial machining processes, the decision typically requires selection of your two most important factors...usually 'quality' and 'speed'. Water-jet provides rapid programming, set-up, processing, and clean up while providing high quality, high tolerance cutting. As a result, abrasive water jet is the only process offering all three...low costs, high quality, and rapid turn around time.

Water Jet Cutting:

Wide Range of Materials - Cut wide range of materials from hard brittle materials such as hardened stainless steel, inconel, hastalloy, ceramics, glass, stone, and marble to soft materials such as rubber, foam, composites, laminates, and plastics.

Rapid Programming - Easy to draw parts or import standard DXF files from CAD or solid works parts can also be scanned and traced if a drawing does not exist. By inputting the material and thickness, a computer program determines the abrasive jet speed for accurate high tolerance cuts. Rapid programming is ideal for short prototype runs.

Fast Set-Up - Require qualifying one tool, the water-jet, as opposed to milling that may require set-up of several tools. Water jet also only applies a downward force and does not require extensive fixturing for side loads.

Quality Finish with Minimal Deburring - Edge finish of water jet machined parts is a smooth sandblasted finish with no rough edges, slag, burrs, or jagged edges. The as-cut edge finish for abrasive water-jet is ideal for metals that require secondary welding operations.

No Thermal Distortion - Unlike other cutting techniques, heat is generated during water jet machining. As a result, abrasive water jet is ideal for metals that are deformed by heat such as titanium and low melting point materials such as plastic and rubber.

Rapid Processing Speeds - Abrasive water jet does not require tooling changes and part repositioning thereby saving time and expense. In addition, no cutting oils are required reducing clean-up speeds.

Complex Shapes - Ideal to cut complex 2-dimensional shapes and some simple 3-D shapes. Ability to have small kerf radii (~1/2 the diameter of the water jet). Several thin materials can be stacked and cut simultaneously with water jet.

Water Jet versus Other Machining Processes

Abrasive Water Jet vs. Milling - Rapid clean-up, faster and easier programming; ability to machine a wider range of materials ranging from brittle hard materials to soft, 'gummy' materials; no tool change-out.

Abrasive Water Jet vs. EDM - Much faster and therefore less expensive machining; process non-electrically conductive materials such as plastics, glass, ceramics, and stone; does not require pre-drilling pilot holes; no heat-affected zone; capable of processing larger parts.

Abrasive Water Jet vs. Lasers - Abrasive jets do not cause thermal distortion or require post cutting heat treating; lower capital equipment cost reducing machining price; ability to process reflective materials; no scale on edges reducing clean-up cost; no potential dangerous fumes are generated using abrasive water-jets; safer operation; ability to cut thicker materials.

Abrasive Water Jet vs. Plasma or Flame - No thermal distortion or heat affected zone; no scale on edges reducing clean-up cost; cut wider range of materials including plastics, foams, and rubber.

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