Make Weld Ready Bevels on Pipe to Fit Your Application

When welding two pieces of pipe together the ends of the pipe must be properly prepared to obtain the best possible weld joint. The pipe or tube is typically beveled on the ends to facilitate the joining of the two pieces by forming a "V" between them.

This "V" can have different angles, forms, and other characteristics depending on the size of the pipe, the wall thickness, material grade, and method of welding.

In this guide we will review the types of bevels, methods for creating a bevel, and how to choose the right method for your application.

The Most Common Bevel

The most common weld bevel is a straight 37-1/2 degree bevel measured off of the face of the pipe. This forms a 75 degree angle between the two pieces of pipe and there is normally a "land" or small flat that is to eliminate the thin or "feather machined or ground on the end edge."

Other Types of Bevels

Other types of bevels include straight bevels (pictured to the left) but with differing angles or a combination of angles. J-Bevels are those bevels which have a profile machined on the end of the pipe. This produces a landing area with a very consistent thickness and a radius to form a J shape on the end of the pipe. This is typically applied on the pipe or tube for applications where an orbital or automatic welder is being used. By controlling the thickness of the land, the machine can be set to assure the weld produces full penetration but does not burn through.
J-Bevels (pictured below) are usually used on thicker wall pipe with a shallower angle than the 37-1/2 straight bevel, this reduces the amount of filler material required to make the joint.

Methods for Creating the Bevel

The cheapest, dirtiest, and least safe method is to use a hand grinder to grind the bevel on the pipe. This is time consuming and requires a skilled operator to produce the bevel accurately. Forms such as J-Bevels cannot be produced by hand beveling.

Another way is to either torch or plasma cut the bevel by hand or using a portable clamp on machine that guides the torch. Normally these cuts require the operator to “touch up” the torched end and form the land, if required, with a hand grinder. There are also CNC controlled machines that use a torch or plasma cutter and can cut & bevel the pipe and cut openings in the pipe or angled ends as needed. These are very expensive machines limited to high production operations. Only straight angles can be produced when using a torch or plasma cut.

Pipe Beveling Machines

Portable pipe beveling machines come in a number of different configurations; with these machines you bring the machine to the pipe. Typically used in the field for either new construction or maintenance operations, these types of machines remove the material from the pipe to form the bevel using cutters made of high speed tool steel. They can be powered electrically or with pneumatic or hydraulic motors. Different
designs clamp on the outside of the pipe or on the inside. The tools can produce many different types of bevels, including J-Bevels, depending on the design of the tooling. Clamp on machines are produced by a number of companies and can either be purchased or rented for the job.

Stationary pipe beveling machines are designed for high production automated beveling of pipe or tubing, with these machines the pipe or tube is brought to the machine for processing. These automated machines typically use inexpensive standard carbide cutting inserts and are very fast compared to the other means of beveling. Typical cycle times are in the 20 second and under range.

The automated machines can easily be incorporated into production cells, production lines, or be attended to by a robot. The pipe is held in a vise and does not rotate or move while beveling. The cutting operation is totally enclosed and shavings are collected in a drawer in the base of the machine.

All of this makes the automated Pipe Beveling Machines safe to operate and very cost effective for high volume operations. Operation of the machine can be done with a less skilled operator freeing up highly paid welders and machinists for more value added work. For example, a saw operator typically has time to bevel a piece of pipe while the next piece is being cut.

By using a combination of tools in the rotating cutter head, different angles and forms are easily produced such as:

- J-Bevels
- Compound J-Bevels
- Compound Straight Bevels
- ID Bores for Mating Two Different Wall Thicknesses
- Radius Pipe Ends
- Squaring Up the End of the Pipe
Choosing the Right Method

What method of pipe beveling suites your application? All of these methods have advantages and disadvantages in the process of beveling pipe.

A hand grinder is the cheapest BUT requires a skilled operator and takes a long time to produce a bevel. An Automated Stationary Pipe Beveling Machine is very fast and produces a consistent bevel but comes with a high initial cost.

The other methods fall in between. Factors that influence the decision include:

- Is portability for use in the field necessary?
- Is the application in a hazardous area?
- Can the pipe or tube be brought to the machine?
- What is the skill level of the operator?
- What size and wall thickness pipe needs to be beveled?
- How many pipes need to be beveled?
- What is the time available for each bevel?
- What is the finished quality required?

MSI

MSI produces automated beveling equipment and has been the leader in the field for over 20 years. We know what type of machine is best for your application.

See our website, www.msi-tx.com, for more information about beveling equipment and pipe beveling applications or call us at 409.842.4404.