



Training guide for electrofusion. (Short version for Maple Sugaring application)

Rev-2016-09-30



BEFORE WE START...

This document is a general guide that will show the basic techniques of electrofusion. This procedure is a short version and should only be used for above-ground maple sugaring tubing installation.

We recommend using the full procedure for all projects that involve buried tubing.

This document does not replace a complete training that can be given by certified firms and should not be used for any other application than maple sugaring.



IMPORTANT

In the electrofusion process, the **preparation** is the most important part of the process in order to avoid any type of contamination. Good care should be taken for these steps.

It is strongly recommended to avoid welding when temperatures are below - **10 degrees Celsius (14 degrees Fahrenheit)** or under rainy or snowfall conditions, unless a shelter is used. The climate will have a direct effect on the welding quality.



Required tools

3.5 KVA Generator (Max 8" diameter)

**The process of electrofusion is basically an electrical voltage that goes through the elements embedded in the electrofusion fitting. The generator must be in A1 condition in order to supply the right voltage for the entire process. The generator should be running at full power and maintain a frequency between 45 Hz and 75 Hz at all times.*

During winter, cold weather has a major impact on the components and tools. The required energy will be even greater under cold conditions and at the beginning of the welding cycle. Make sure that the generator is in perfect condition and gives the appropriate performance.



Required tools

Mandatory tools:

- Electrofusion processors
**many models are available*
- Isopropyl alcohol (for cleaning)
- Paper towels
- Manual scraper
- Measuring tape or ruler
- Permanent marker (ex. Sharpie or Marks-a-lot)
- Tube-cutter
- Rubber mallet

Optional tools:

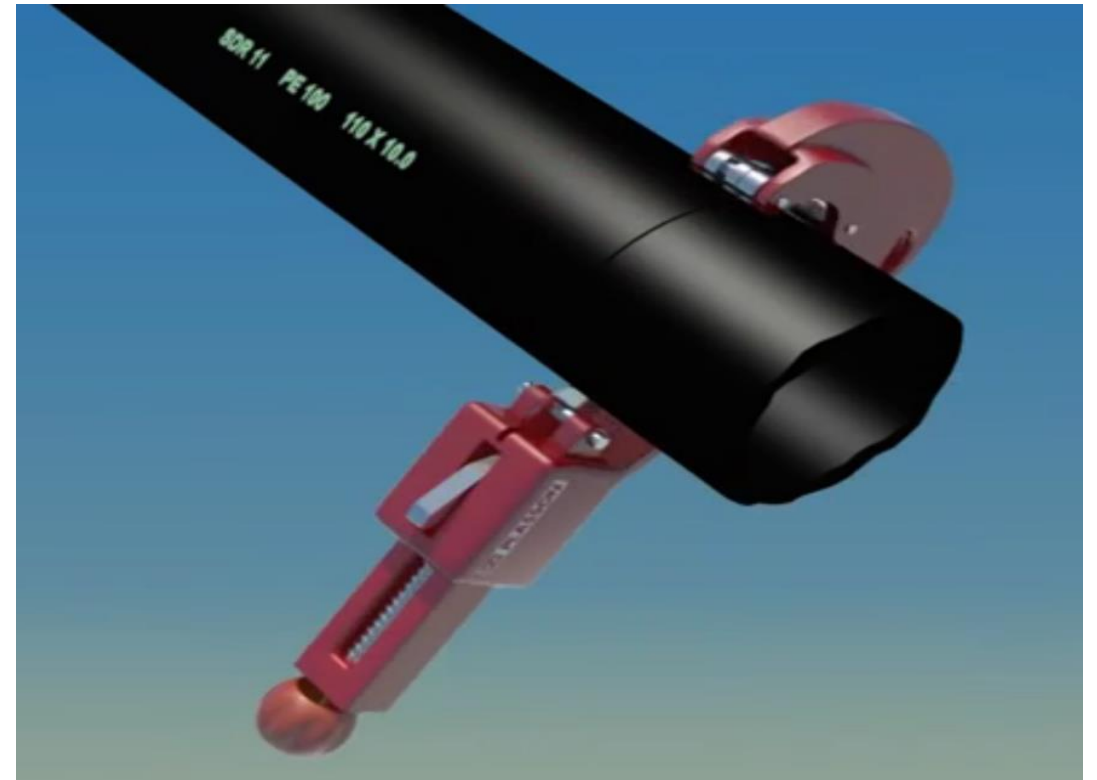
- Rotary scraper
- Infrared thermometer





Preparation

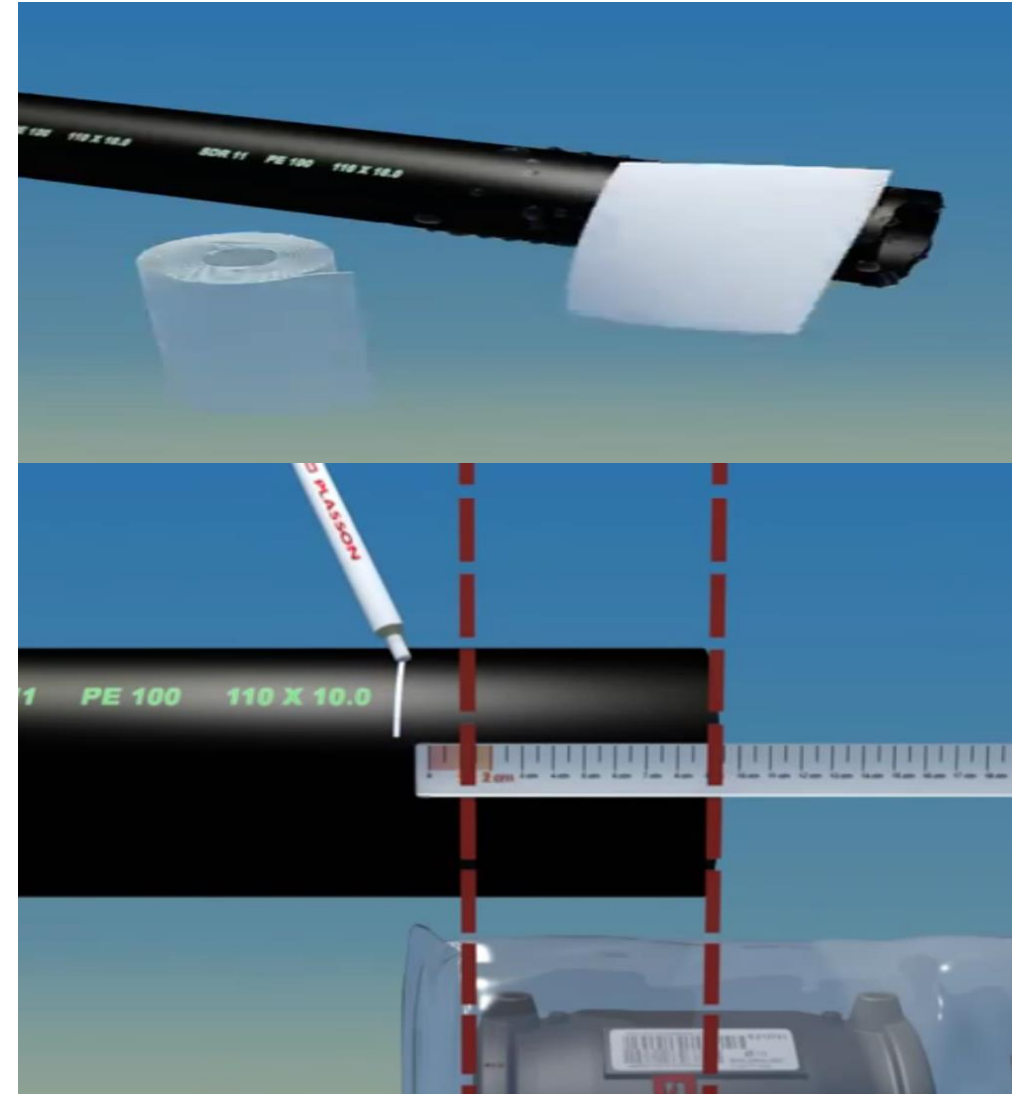
The cut needs to be clean and perpendicular to the pipe. An angle cut can lead to a short-circuit during the fusing process and ruin the fitting.



1. Make sure the end of the pipe is free of dirt, snow etc. using a clean towel and water then dry the pipe inside and out with a paper towel.
2. With a ruler or a measuring tape and pen, draw a line on the pipe at the distance of **½ the length of the fitting + 3/4"**. This will mark the zone to be scraped.

*(*WARNING : Do not use a wax or petroleum ink based marker. These types of markers will leave greasy residues that can contaminate the surface to be welded. The makers "Sharpie" or "Marks-A-Lot" are recommended.*

Preparation

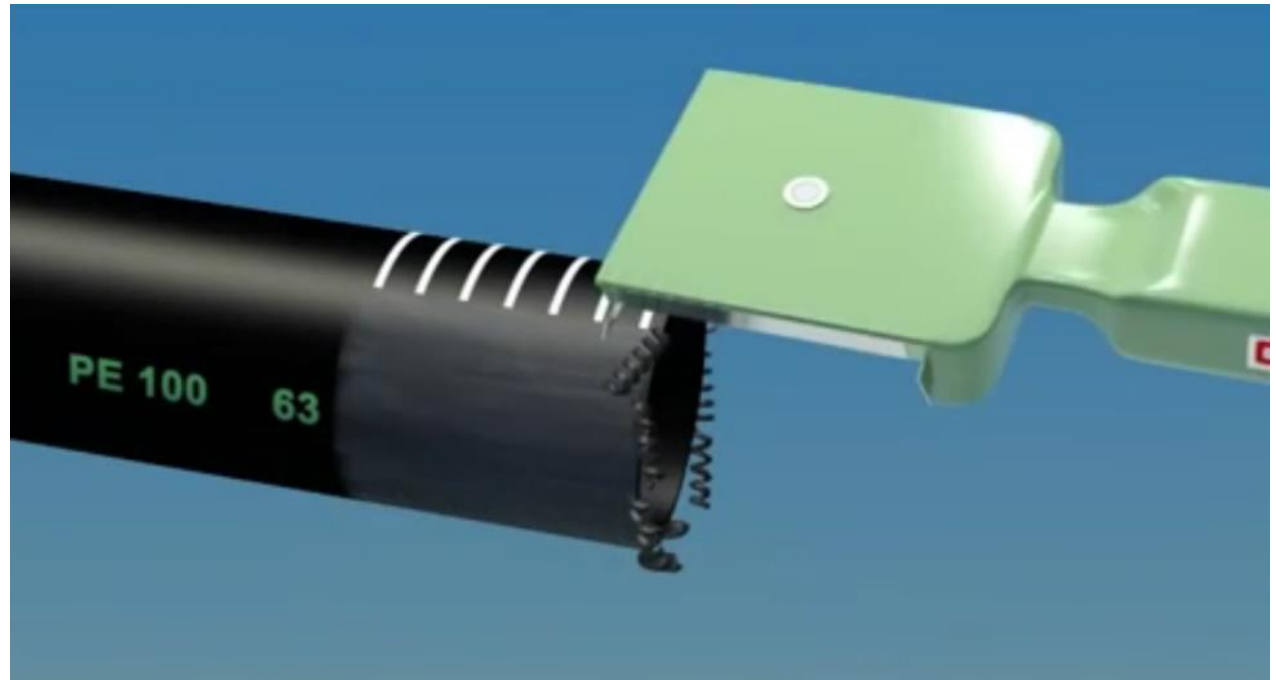
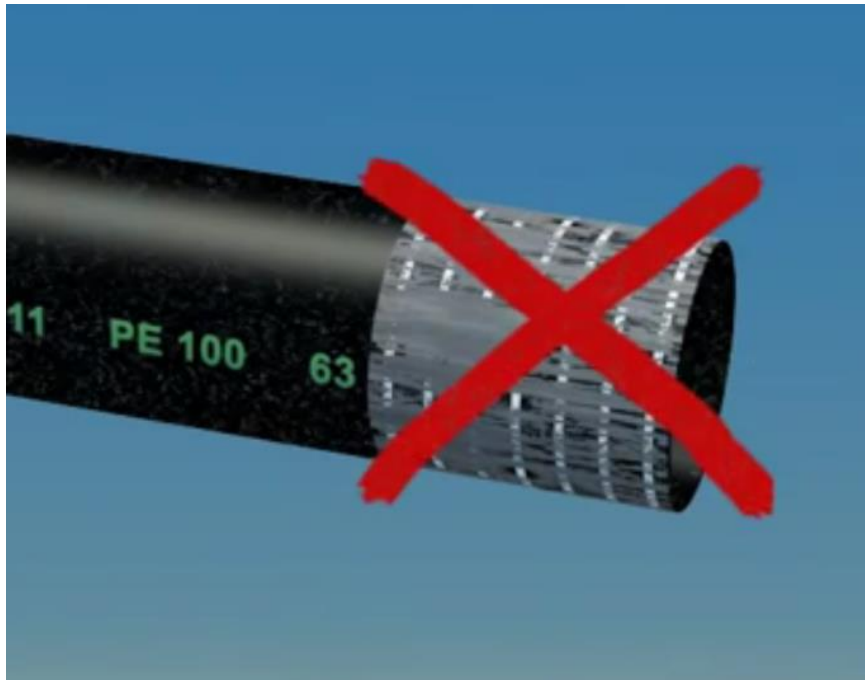




Preparation

Use a manual scraper to scrape the entire surface measured in the previous step. The surface must be entirely scraped in order to allow a good fusion and avoid contamination.

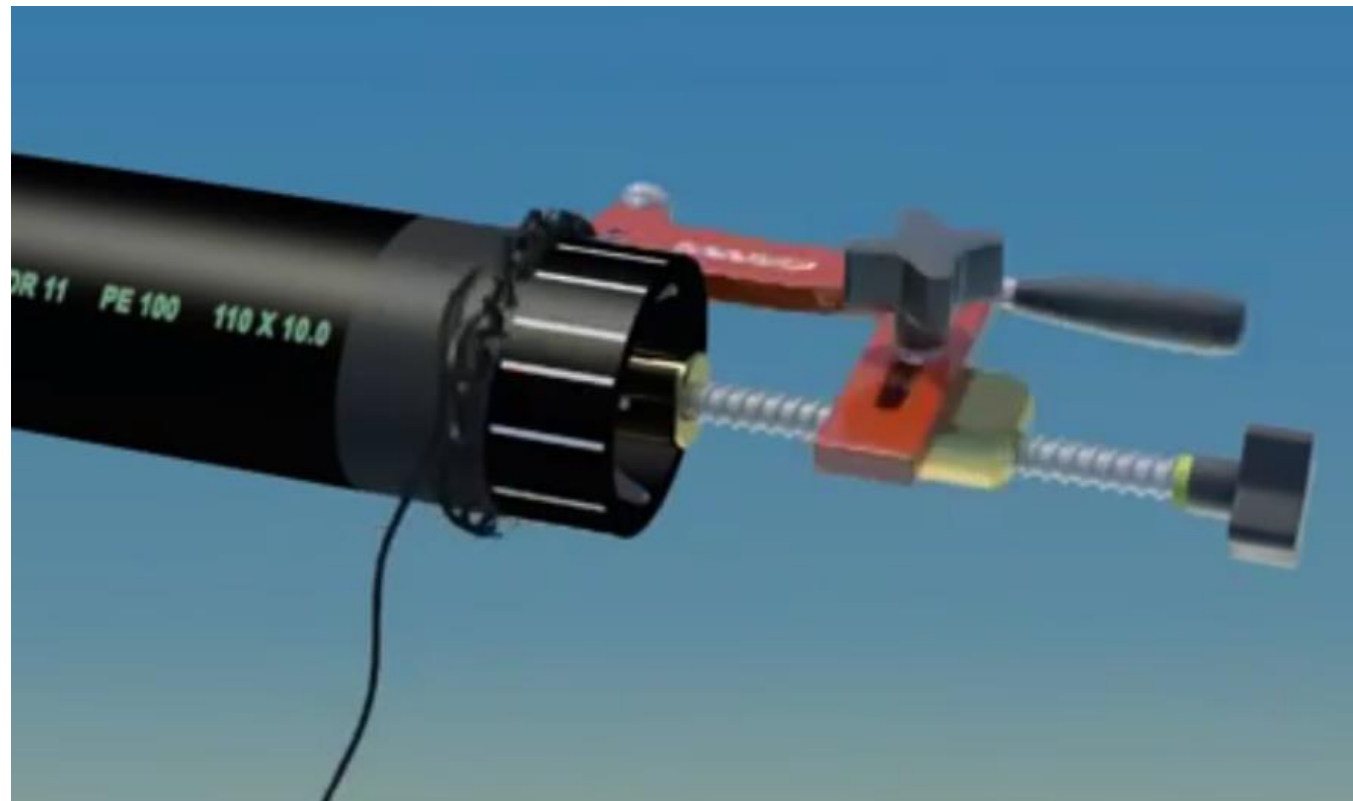
*****SANDING PAPER SHOULD NEVER BE USED BECAUSE IT LEAVES DEBRI ON THE SURFACE*****





Preparation

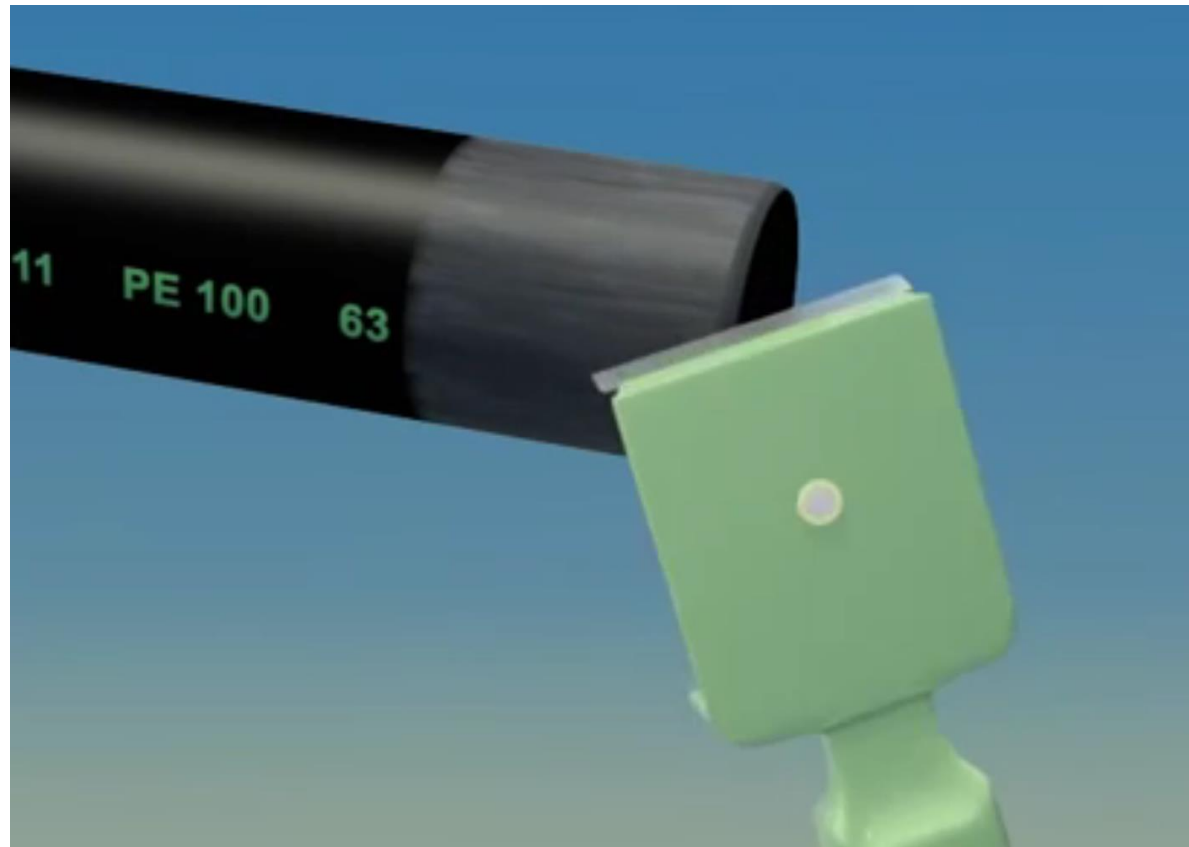
A rotary scraper can be very useful for large diameter pipes. It will be a lot faster and accurate than a manual scraper.





Preparation

Scrape the end of the pipe with the manual scraper in order to avoid a sharp edge that could damage the fitting when inserted.

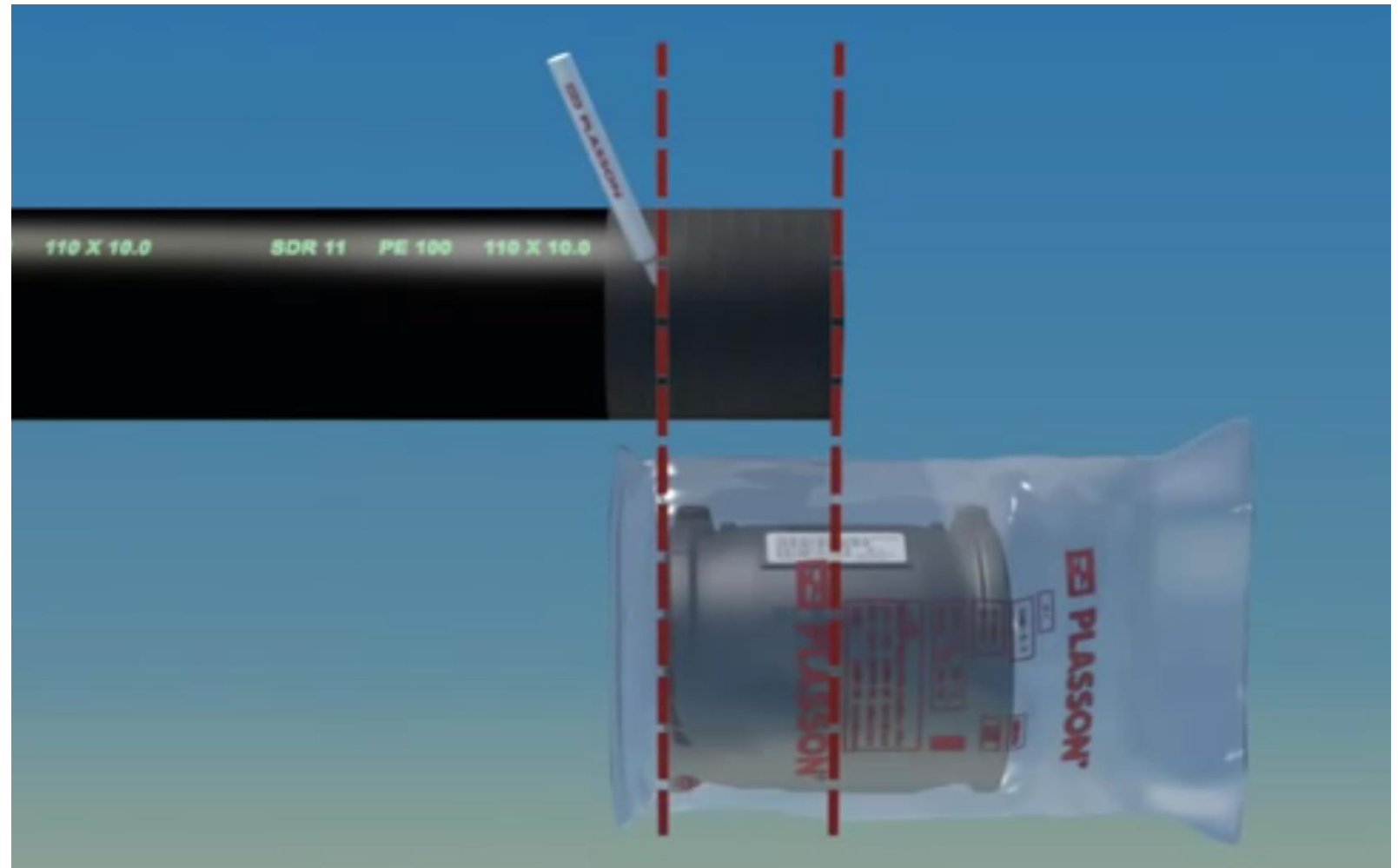




Preparation

Using the marker, mark the insertion depth on the pipe. This depth is the equivalent of **½ the length of the fitting.**

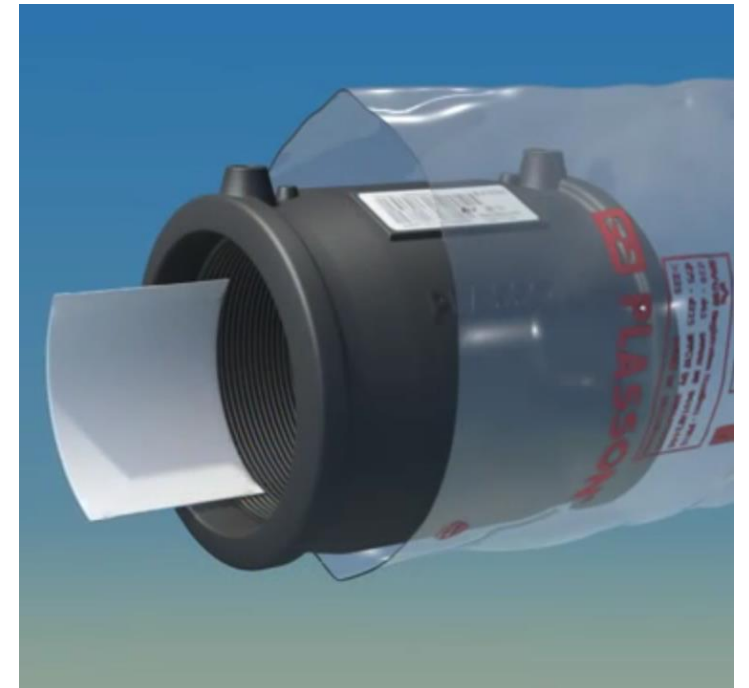
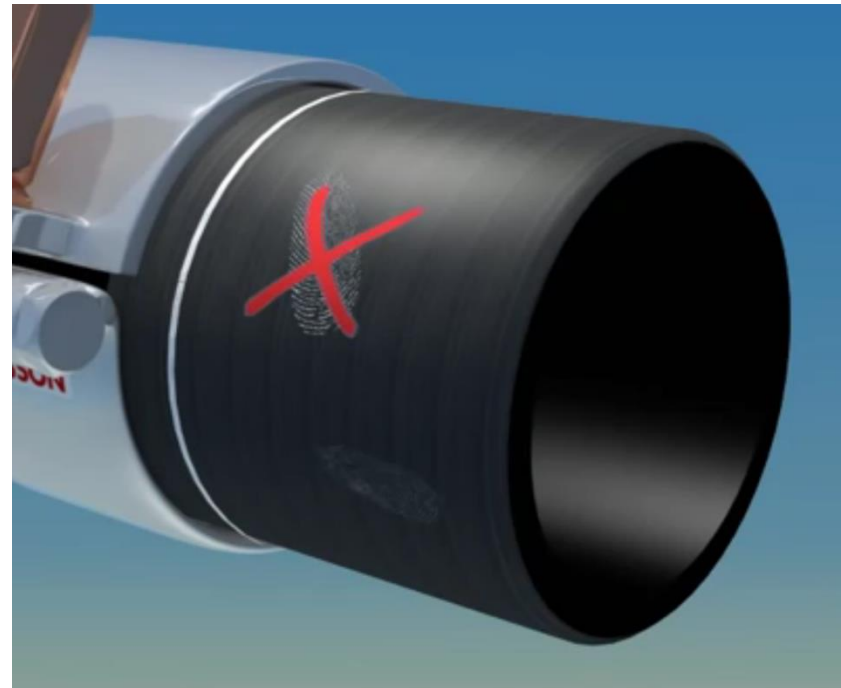
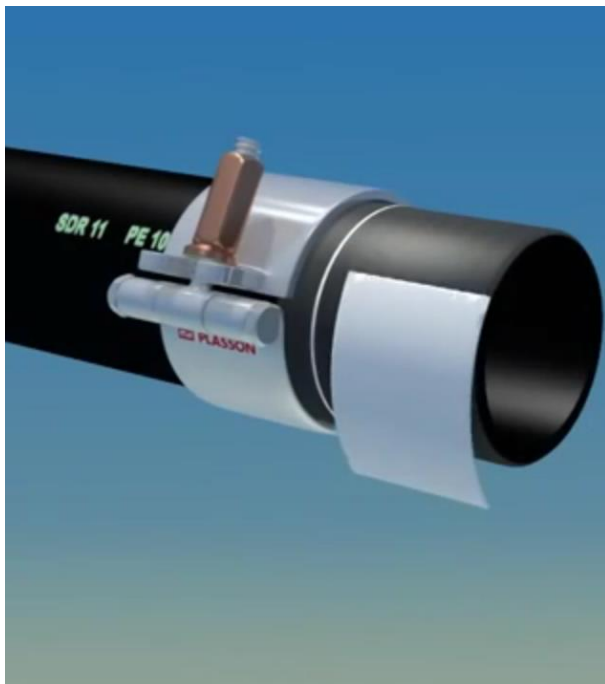
A fitting that is not inserted deep enough, can lead to a short-circuit during the fusion process and ruin the fitting.





Alcohol cleaning

Wipe the scraped surface and the inside of the fitting with isopropyl alcohol and a lint free cloth. Be careful not to contaminate the surface before the welding.



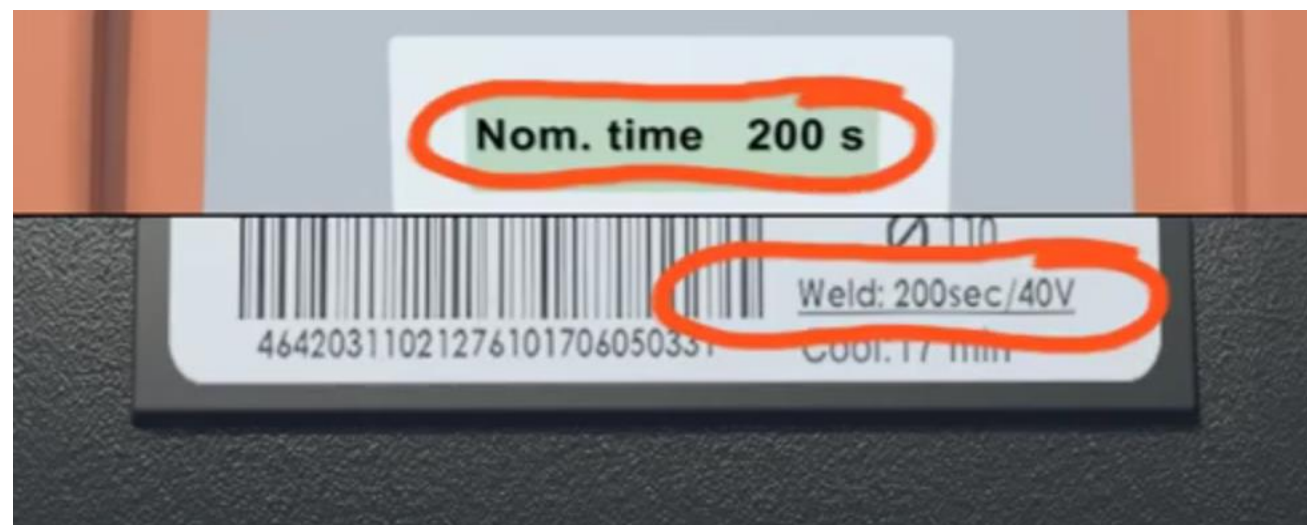
Fusion

-10°C +45°C One welding time



- *Considering the climate is OK (no rain, no snow etc...)
- Make sure there is enough gasoline in the generator.
- Make sure the connectors are clean and dry
- Connect the processor to the fitting
- Scan the barcode, or enter the time manually.
- Double check that the welding cycle noted on the machine matches the time on the fitting.
- Start the welding cycle

*****Make sure the pipe is stable during the welding cycle*****



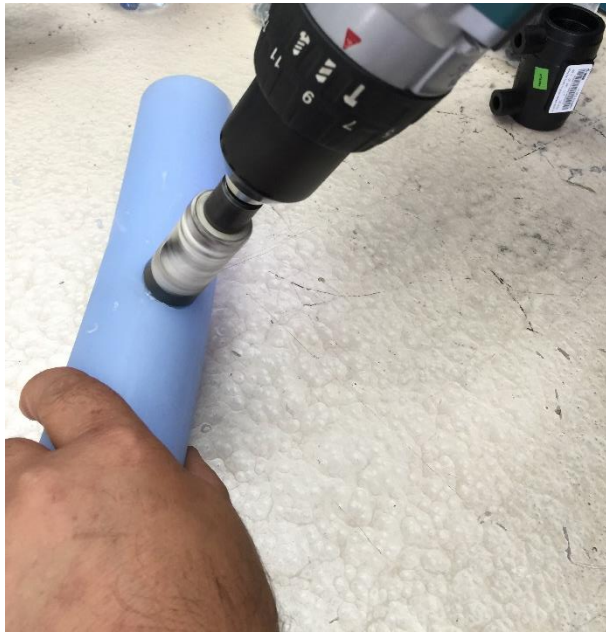


Saddle installation

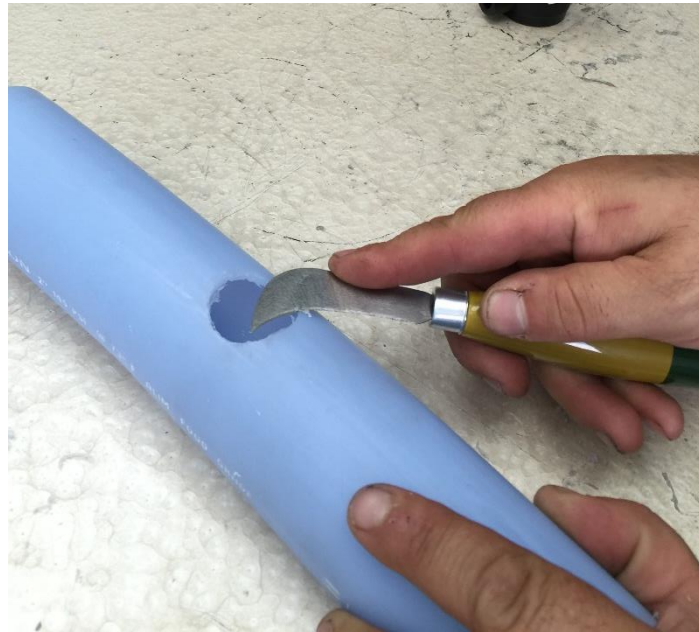




Drilling and surface preparation



Using a drill and a cut-out tool, drill the pipe. The cut-out diameter must be equal to the internal diameter of the "T" + 1/16".



Clean the edge with a cutting blade and make sure it is smooth.



Scrape the pipe on the entire fusing surface to remove the pipe finish completely. Use alcohol to clean the pipe and saddle interior.

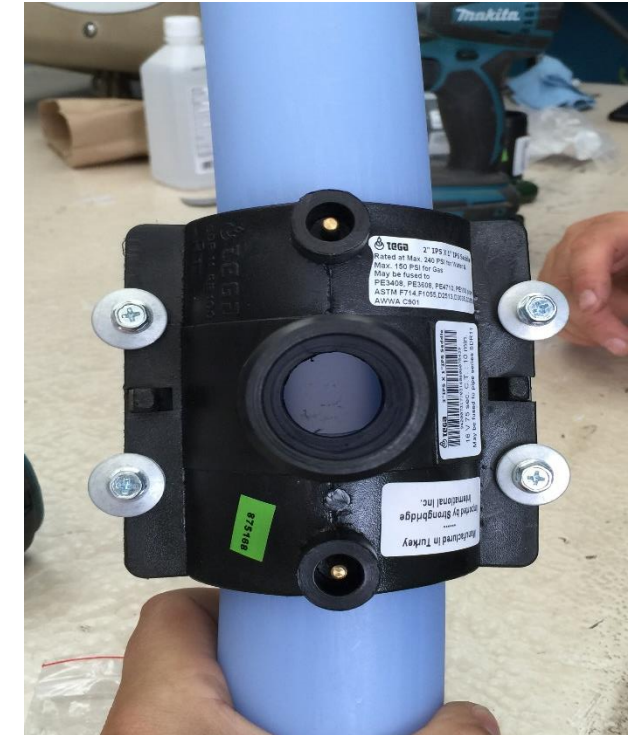
Saddle positioning



Install 2 screws tightly



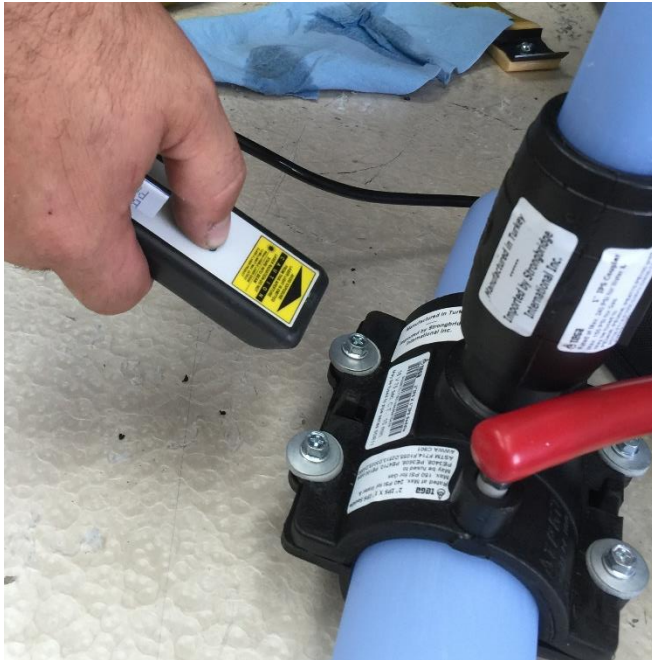
Install 2 screws on the opposite side, without tightening them completely, in order to be able to align the saddle with the hole on the pipe.



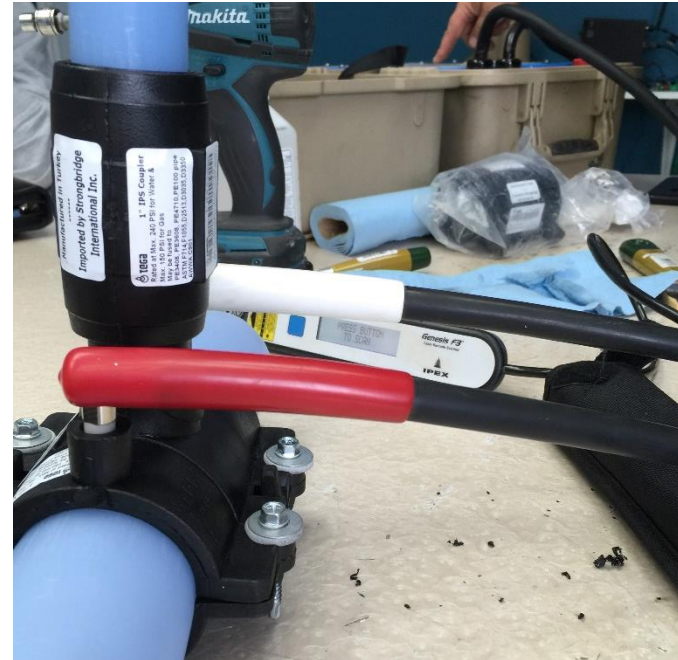
Align the holes and tighten all 4 screws to lock the saddle on the pipe.



Saddle and union fusion



Scan Bar-code.



- Start the saddle fusion process
- Wait for cooling time
- Repeat same steps for the union (picture on right).





Cooling

It is strongly recommended to allow a cooling period before moving the pipe.
The cooling time is normally written on the tag of the fitting.

Ex. The tag below shows a 17 minute cooling time.

Note : If a pressure test needs to be performed, the recommended cooling time should be 4x longer than the regular one, so it would be 68 minutes for the fitting shown below.





Conclusion

Electrofusion is a very simple and sure technology used in many fields. The key to success is taking the necessary steps to avoid any contamination.

The Main contaminants are:

-Dirt

-Grease

-Rain or Snow

-Wind

-Cold temperatures (under -10 deg. C or 14 deg. F)



The Warranty

CDL Maple Sugaring Equipment Inc. can not guarantee the quality of your work. So our warranty concerns only manufacturing defects for "Electrofusion" pipes and fittings.