Cold Weather Handling & Installation

Most design guidance for polyethylene pipe addresses maximum operating temperatures based upon unique material properties. However, in the winter, questions arise regarding fusion and handling of polyethylene pipe at extreme cold temperatures.

1. https://plasticpipe.org/pdf/tn-11_temperatue_limits_for_thermoplastic_non_pressure.pdf
   Joining of polyolefin pipe under the extreme temperatures presented in the tables may require special consideration and handling. Fusion joining of polyolefin pipe at these temperature extremes may require sheltering of the fusion apparatus and the fusion crew.
   Handling of any construction materials at the temperature extremes presented in the tables should be done with extreme caution... The effects of low temperature are different. As temperatures drop, the modulus of elasticity for most polyolefins increases thus increasing the potential of low-temperature embrittlement. As such, polyolefin piping should handled in accordance with specific manufacturer's recommendations at these low temperature extremes.
2. *The above referenced document suggests a minimum installation temperature of -30F. PolyPipe supports this recommendation.*
3. *Polyethylene pipe has very good impact resistance even in sub-freezing conditions; nonetheless its impact strength is reduced as temperatures drop into these ranges. Therefore, avoid dropping pipe in sub-freezing conditions. Also, keep in mind that butt, saddle and/or socket fusion, when temperatures are below -4 oF (-20oC), generally requires special provisions such as portable shelters or trailers or other suitable protective measures with auxiliary heating. The following guidance for cold weather handling can be found in ASTM F2620, Appendix 1. PolyPipe supports this guidance.*

   A1.4.3 Joining in Adverse Weather:

   A1.4.3.1 Cold Ambient Temperatures Below 32°F (0°C)—Butt, Saddle or Socket, Fusion is generally not recom mended below -4°F (-20°C) without special provisions such as a portable shelter or trailer or other suitable protective measures with auxiliary heating. When making a butt fusion joint with the ambient temperature is below 3°F(-16°C), the pipe ends shall be pre-heated using a heating blanket or warm air device to elevate the pipe temperature to improve the heating starting condition. With pipe mounted in the fusion machine, an alternate method of pre-heating is to stop the pipe ends within .25-.50 inches (6.4-12.7mm) of the heater plate face to allow the pipe ends to warm for 30 seconds to 2 minutes, depending on the pipe size and wall thickness. The use of direct application open flame devices, such as torches, for heating polyethylene pipe is prohibited due to the lack of adequate heating control and possibility of damage to the pipe ends. When fusing pipe under adverse cold weather or in windy field conditions with blowing dust is required, the provision of portable shelters or trailers with heating should be considered and are recommended to provide more consistent and acceptable working conditions. When fusing coiled pipe when the ambient temperature is below 32°F (0°C), it may be required to remove an end section of pipe from the coil and butt fuse on a straight section of pipe to enable correct pipe alignment. Completed joints shall be allowed to cool to ambient temperature before any stress is applied.

   A1.4.3.2 Wind—Exposure of the fusion heater plate and pipe to wind can result in unacceptable temperature variations during butt fusions and possible joint contamination. When extreme wind conditions exist, the provi- sion of a suitable shelter is required to protect the pipe and fusion heater plate to ensure a more consistent environment is provided. Wind conditions can develop through the pipe bore and cause unacceptable tempera ture variations during the heating process. Therefore, open pipe ends may require plugs or covers to prevent this condition. Note: Although wind conditions, during cold weather butt fusion, are the primary concern, wind conditions can affect butt fusion quality at all ambient temperatures by chilling the heated pipe surfaces during the heat soak. This increases the heat soak time to obtain the bead size against the heater surface.