The technology described herein is protected under several Patents, including US Patent No's, 4490209, 6994766 and 7294222, as well as several pending patent applications & trade secrets.

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Explanation of the Use of Fast Fusion

Fast Fusion® is not a separate fusion procedure and is a proprietary technology & innovation to the HDPE and pipeline construction industries. The technology is used with industry pipe joining fusion procedures and is an added product to industry known & accepted fusion equipment.

Fast Fusion products are being used extensively in energy development, clean water, waste water, irrigation, environmental and mining projects in the United States, Canada, Australia, New Zealand & India. We continue to expand to other geographic locations worldwide.

Our primary objective is to create the safest and the most controlled work environment to eliminate failed fusions in the welding of PE pipe. It was through our scientific data of improving the methods of welding the pipe that it was determined that that the technology developed significantly increased efficiencies and productivity. Increased production per hour is secondary to the elimination of failed fusion welds.

The technology Fast Fusion® is used within the butt fusion jointing procedures for polyethylene (PE) pipes and fittings under the ISO and ASTM standards for low pressure, dual pressure and high pressure fusion parameters and welding equipment. The use of Fast Fusion® does not change the pipe joining procedure in the welding of the pipe and has been scientifically proven that the use does not affect the fusion or parent material in any way.

Fast Fusion® test standards & qualification procedures are the same as the pipe manufacturers and are more stringent than the industry used fusion equipment that is approved to complete the actual fusion.

Fast Fusion does not manufacture fusion equipment. We install or attach our equipment to existing industry known & approved fusion equipment. Creating a much safer work environment for completing the process of pipe fusion with one person accountability is our primary design factor. Our focus is to eliminate the factors that lead to weld failures which includes controlling the environment of the welding of the pipe, hydraulic handling of the pipe designed to eliminate pull & drag of the pipe, specific controls and automation to adhere to industry fusion procedures and reducing or eliminating the risk of human error. Technician training is extensive and certification is only issued by Fast Fusion.

All of the Fast Fusion equipment is fully automatic and operated by either a PLC or a micro processor that is programmed with Fast Fusion proprietary software which controls the Fast Fusion® method of removing heat from the weld zone and heat affected zone of the fusion weld. The Fast Fusion software program is based upon an electronic menu that the tech selects the pipe being fused then the OD & SDR which then has a specific input code that controls the operation of weld bead temperature.

Fast Fusion® is a proven technology that controls the weld bead temperature and replaces the conventional fusion (T5) minimum time in machine under pressure after the fusion has been completed and is cooling to the industry standard. This technology cools each weld to be exactly the same for every fusion made ensuring consistent quality improvement. Using the technology the fusion weld cools 70% faster which eliminates the waste of labor and equipment waiting for the fusion weld to cool. Fast Fusion is currently used for pipe sizes 2" (50mm) to 65" (1600mm) and is not limited to size or thickness of the pipe material.

Our "MobileFusion Trac" models of equipment are operated by one person. These machines self-load the pipe into the machine with the FastLoad® front boom, contain the Fast Fusion® cool time (T5) technology, are all tracked machines, have an all-weather controlled cabin to eliminate the contributing factors of failed fusions such as wind, cold, rain, dust and to have the equipment necessary to create an environment that every weld can be completed to be exactly the same. Industry known & approved fusion equipment is installed inside the Fast Fusion machine to join the pipe. These machines are used for pipe 2" (50mm) through 36" (900mm). This equipment typically increases fusion's completed per hour by three (3) times more than one conventional fusion machine.

The Fast Fusion "Cool Pack" models contain just the Fast Fusion® cool time weld bead temperature control equipment. These are a self-contained skid mount unit that allows the Fast Fusion® to be attached to any made fusion machine. This equipment is used for pipe size ranges from 2" (50mm) to 65" (1600mm) This equipment increases fusions completed per hour by two (2) times more than one conventional fusion machine using the same labor & equipment.

Fast Fusion® is a technology that has proven through third party- testing to meet ISO 21307 standards and ASTM F2620 standards and has clearly demonstrated successful performance over several years to be consistent with industry and regulatory guidelines for qualification for industry pipe joining procedures for polyethylene pipe.

Using Fast Fusion following ISO 21307, TR 33, F2620,ASME XXII, Canadian CSA 2662-11, Australian PIPA POP003, India 7634 (part II) bead up time, heat soak time, heater change over time, achieve welding pressure & cooling time in machine "without pressure" all remain as specified under the industry guidelines and recommended parameters and are not changed.

Only the *minimum cooling time in machine "under pressure"* T5 is changed to a specific period of seconds. Again this is based upon the pipe manufactured, OD & SDR, the heater temperature required for the joining of the pipe and the temperature desired for the fusion pressure to be released.

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In PE the use of the Fast Fusion® technology just accelerates what would be a natural reversal of temperature from the center of the weld bead from point of fusion based upon the cross sectional mass density of the material being fused by a controlled method to transfer a specific known heat value within the weld zone and the heat affected zone to return to the base temperature of the parent material or to a temperature desired that is specified typically within a pipe joining procedure.

It is a form of heat transfer. Heat being the entity of interest carried and dispersed using a reverse convection in engineering design to provide a desired temperature.

Pressurized air flow's that can easily be controlled by flow rate, pressure, pattern, temperature and duration became the most logical choice in how to apply the technology. Technology we developed allows the control of the weld bead temperature which the machine monitors and makes the adjustments needed. Each weld made with an ambient temperature from minus 45 Fahrenheit (-43C) to plus 140 Fahrenheit (60C) the air used is automatically adjusted to maintain ratio's of hot, warm or cooler air.

From freezing ambient temperatures and below the air used is much warmer than ambient and for ambient temperatures above freezing is slightly cooler than ambient but it allows each weld to lower in temperature at a specific rate and it cannot go faster or slower than how we set it. The technology and equipment can all be adjusted if parameters change such as a heater temperature required above 500 F (260C) or to a specific desired weld bead temperature can all easily be done and the new program updated into the PLC or micro-processor.

Our research showed that controlling the material weld bead temperature through very specific temperature reduction changes based upon ambient temperature became very important in elimination of failures that occurred after fusion pressure was applied and the weld in a cooling period with no control of the material other than ambient temperature hot or cold. The process is consistent in how polyethylene pipe is manufactured.

Fast Fusion weld test documentation is presented on our website www.fast-fusion.com which is meant for easy access to scientific data we provide.

Testing completed:
ISO 21307 – ISO 1167-1, ISO 1167-3 & ISO 1167-4 for long term 1,000 hr. 80C Testing
ASTM F2634
ASTM D638
ASTM 714
ASTM 2513-04a - 1,000 hr 80C Testing
ASTM 1598-02
For:
PE 2406, PE 3408, PE 80, PE 100 & PE 4710

Some of the pipe manufacturers that have reviewed the Fast Fusion technology and support the use of it in conjunction with an industry approved pipe procedure;

WL Plastic	PPI Corporation	Charter Plastics
Performance Pipe/CP Chem	IPLEX Pipelines Australia	JM Plastics
KWH	Poly Pipe	US Poly Charter Pla

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