Company Presentation

MISSION STATEMENT

Provide "**exceptional service**" and "**quality products**" to its customers at a fair price across Southeast Asia.

VISION STATEMENT

Fusion Equipment (ASIA) will be the leading provider of pipe fusion equipment across Southeast Asia, delivering the best quality, most effective, and technologically advanced service to our industrial partners. Our core values of Quality, Delivery, People, and Value are at the heart of everything we do. We ensure **Fusion Equipment (ASIA)** is, and will continue to be, an employer and supplier of choice.

Products and Services

- Electrofusion Machines
- Butt Fusion Machines
- PP-R Welding Machines
- Electrofusion Tooling
- Butt Fusion Tooling
- Squeeze-off Tooling
- General Tooling
- Repair and Calibration
- Rental Units
- Training and Certification

Electro Fusion Machines

Exclusive Distributor for Caldertech and Hamlem across Southeast Asia and Japan

HAMLEM MECHANICS

- Designed and manufactured in Turkey
  - **Fuerte – Case**
  - **Fuerte – Eco+**
    - 5 Sizes available
    - 20-180mm, 500mm, 800mm, 1200mm, 1600mm Connectors
  - **Fuerte – Pro**
    - 5 Sizes available
    - 20-180mm, 500mm, 800mm, 1200mm, 1600mm Connectors

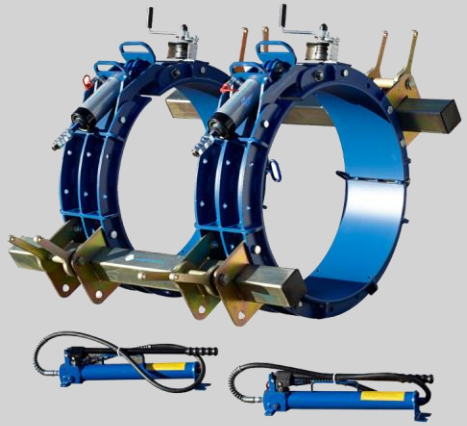
Electro Fusion Machines

Caldertech
good people to connect with

- 7 Models Designed and manufactured in the United Kingdom
  - **Calder Aquafuse AF315 110v**
  - **CalderAquafuse AF315 240v**
  - **Calder Connexion Blue**
  - **Calder Griffon**
  - **Calder Pegasus**
  - **Calder Proxima**
  - **Calder Nomad II – Battery Operated**

Electro Fusion Tooling

- Rotary Scraping Tools
- Pipe Clamps
- Positioning Kits
- Towing Heads

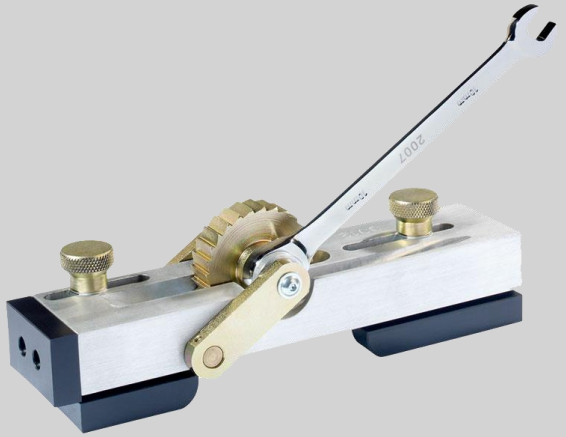


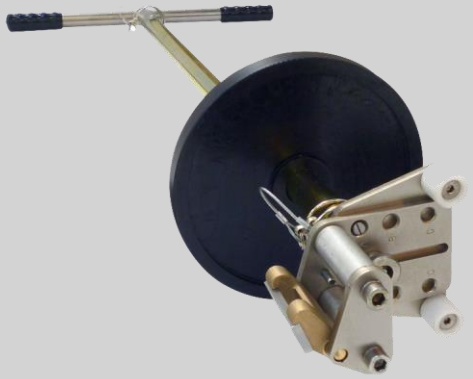
Butt Fusion Machines

- Hydraulic and Hand-Operated Machines
- Range from 63mm up to 1600mm
- 220v and 380v machines

Butt Fusion Tooling

- External Debeader range from 63mm up to 900mm
- Internal Debeading Tools Range from 110 up to 630mm





PP-R Welding Machine and Cutters

PVC and Metal Pipe Cutters

40 - 250m Pipe Cutter

- PP-R Pipe Hand Cutter
  - Various styles and types available up to 63mm
- PP-R Welders
  - 220v Various models available ranging Including Digital

General Tooling

Electric Pipe Cutters

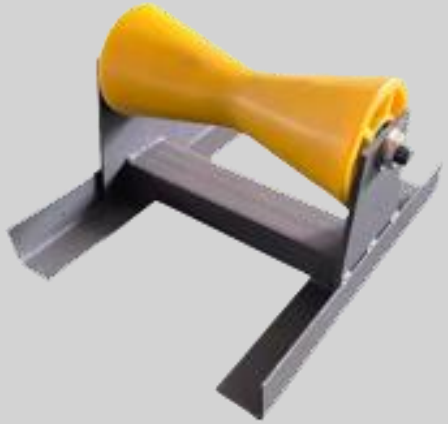
40 - 250mm Pipe Cutter

Voltage: 220V
Water Supply Pipes
Galvanized Pipes
Plastic Lined Pipes
Fire Pipes
Sewage Pipes

160 - 400mm Pipe Cutter

Voltage: 220V
Plastic Pipes
Iron Pipe
Zinc Coated Pipes
Aluminium Pipes

General Tooling



Rental Program

As the exclusive Distributor for Caldertech and Hamlem across Southeast Asia and Japan, we offer a range of benefits that set us apart from other equipment rental providers.

- **Cost Savings:** Renting equipment from us can help you avoid the high upfront costs of purchasing, allowing you to allocate your budget more effectively.
- **Selection:** We will help you find the right fusion equipment from our fleet of pipe fusion machines and accessories, depending on the pipe material, size, and intended application.
- **Increased Flexibility:** Our rental options provide the flexibility to choose the equipment you need, when you need it, without the long-term commitment of ownership.
- **Delivery:** Directly to your jobsite to save you time and resources. we will schedule the rental based on the estimated time requirements for project completion.
- **Reduced Maintenance:** Our team of maintenance engineers will take care of equipment maintenance, reducing your workload and minimizing downtime, and ensuring you receive the machine in optimal working condition.
- **Expert Support:** Our experienced team is always available to provide technical support, training to ensure your project and equipment is running smoothly.

Fusion Equipment (Asia) will ensure that you have the right equipment that You need to get the job done safely, securely, and on time.

Training

Fusion Equipment (Asia), we understand how important quality fusion equipment training is in the market segments we serve, ensuring our clients are professionally trained by an authorized manufacturer's fusion equipment partner thus making sure they are following the manufacturer's procedures, which is not only a requirement, but will ensure the safety of the operators, and quality and successful joint assembly and fusion.

Quality
Proper training significantly reduces the likelihood of improper fusion joints. Ensure the highest quality outcomes with our specialized training courses.

Efficiency
Our courses teach operators how to use accessories and techniques that enhance efficiency, helping them work safely, work smarter, and faster.

Experience
Experience comes through hands-on practice. That's why our training emphasizes real-world application, ensuring every participant gains the skills needed for reliable, successful fusion joints.

Training

Training is carried out to comply with DVS Technical code DVS 2207-1

August 2007

DVS – DEUTSCHER VERBAND FÜR SCHWEISSEN UND VERWANDTE VERFAHREN E.V.

Welding of thermoplastics Heated tool welding of pipes, pipeline components and sheets made of PE-HD

DVS Technical Code DVS 2207-1

Translation of the German version september 2005

Content:

1 Scope

This technical code applies to the heated tool butt welding of sheets according to DIN EN ISO 14632 and for the heated tool butt-, the heated tool socket- and the electro-socket welding of pipes, fittings and tapping tees made from PE-HD[1] according to DIN 8074 and 8075, DIN 16 963, DIN 3543-4 and DIN 3544-1, being used for the conduction of gas, fluids and solids.

With regard to the following instructions, suitability within the melt flow rates MFR[2] 190/5 of 0,3 up to 1,7 g/10 min or 0,2 up to 0,7 g/10 min respective may be assumed. For the heated tool butt welding of tapping tees restrictions according to section 4.2 have to be attended.

Deviating MFR values require an additional proof by tensile creep tests according to DVS 2203-4 or supplement 1.

[1] The material indication is the specification of thermoplastics group and includes the types PE 63, PE 80 and PE 100. The information complies to the current standards.
[2] old indication MFI = Melt Flow Index

2 General requirements

The quality of welded joints depends on the qualification of the welder, the suitability of the utilized equipment and devices as well as on compliance with the welding standards. The welded joint can be tested by means of non-destructive and/or destructive methods.

The welding work must be monitored. Type and range of supervising has to be agreed between the contract partners. It is recommended to record the welding data in welding protocols (sample see appendix) or on data carriers.

Within the framework of the quality assurance it is recommended to produce and test samples of joints before and during welding.

Every welder has to be trained and has to be in possession of a valid qualification certificate. The intended application range may be decisive for the kind of qualification. For the heated tool butt welding of sheets as well as in the industrial piping system construction, the technical code DVS 2212-1 is valid. The DVGW-specification GW 330 applies analogously as qualification proof for heated tool butt and heated tool socket welding at the construction of gas and water supply systems. The welding of plastics for indoor applications is described in the technical codes DVS 1905-1 and -2.

The equipment and devices which are used for welding must comply with the requirements in DVS 2208-1.

3 Measures before welding

3.1 Requirements for welding

The welding zone must be protected against bad weather influences (e.g. wind, moisture). If it is ensured by suitable measures (e.g. preheating, tent, heating) that the conditions are suitable for welding, work may be carried out at any outside temperature insofar as the welder is not hindered in his handling (see explanation). If necessary, an additional proof must be provided by carrying out sample welds under the mentioned conditions (section 7).

If the semi-finished product is heated up unevenly under influence of sunshine, a temperature compensation in the area of the welding joint can be reached by covering. A cooling down during the welding process by ventilation has to be avoided. During welding the pipe ends have to be closed additionally.

PE-HD-pipes from coils are oval and bent immediately after uncoiling. The pipe end must be prepared before welding, e.g. by careful heating up with a hot-air equipment and/or use of a suitable clamping res. re-rounding device.

The joining zones of the components to be welded must be undamaged and have to be free of contaminations (e.g. dirt, grease, shavings).

This publication has been drawn up by a group of experienced specialists working in an honorary capacity and its consideration as an important source of information is recommended. The user should always check to what extent the contents are applicable to his particular case and whether the version on hand is still valid. No liability can be accepted by the Deutscher Verband für Schweißen und verwandte Verfahren e.V. and those participating in the drawing up of the document.

DVS, Technical Committee, Working Group "Joining of Plastics"

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3.2 Cleaning

For the production of perfect welded joints it is very important that the joining areas as well as the tools and heated tools are clean and free of grease.

3.2.1 Cleaning agents

The cleaning agents or already moistened cloths in a lock-up plastic box have to consist of a 100 % vaporizing solvent, e.g. 99 parts ethanol with a purity grade of 99,8 % and 1 part MEK (methylethylketone, denaturation). Agents tested according to DVGW 603 comply with this requirement. The use of ethyl alcohol could result in a reduction of quality because of the contained water.

The paper for cleaning has to be clean, unused, absorbent, non-fuzzy and non-coloured. Exhaust the air afterwards.

3.2.2 Cleaning of heated tools

The heated tools have to be cleaned with paper before every welding process. No residues of cleaning agents or paper may remain on the heated tool.

3.2.3 Cleaning of joining areas

Before machining the joining areas it has to be ensured that the utilized tools and components are clean and free of grease even outside the welding zones, if necessary use a cleaning agent.

The treatment of the joining areas has to be done directly before the welding process starts.

Any shavings have to be removed without contacting the joining areas.

In case of contamination of the surface after machining, e.g. by contact with hands, the joining areas have to be treated with a cleaning agent if a further machining is impossible.

4 Heated tool butt welding

4.1 Heated tool butt welding of pipes, pipeline components, fittings and sheets

4.1.1 Description of the process

With the heated tool butt welding process, the joining zones of the components to be welded are aligned under pressure on the heated tool (alignment), heated up to the welding temperature with reduced pressure (heating up) and joined under pressure (joining) after removal of the heated tool (changeover). Figure 1 shows the principle of this procedure.

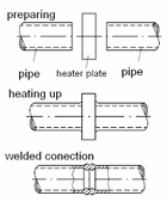

Figure 1. Principle of the heated tool butt welding of a pipe.

4.1.2 Preparation of welding

Prior to the start of the welding process, the welding temperature of the heated tool is to be checked. This is done e.g. by means of a fast-indicating measuring device with a contact surface of 10 mm for measuring the surface temperature. The control measurement must be done within the area on the heated tool which corresponds to the semi-finished product. For adjusting a thermal balance, the heated tool may be inserted at the earliest 10 minutes after reaching the set temperature.

To ensure an optimum welding connection the heated tool has to be cleaned according to section 3.2.2 before every welding operation. The anti-adhesive coating or covering of the heated tool must be free of damages in the working zone.

The joining forces and joining pressures have to be specified for the machines to be used. These can be based on e.g. manufacturer information, calculated or measured values. Additionally, at the welding of pipes, the work piece moving force res. moving pressure is taken from the indicator of the welding machine during the slow displacement of the part to be welded and have to be added to the prior determined joining force res. joining pressure. Electronically controlled equipment is preferred, if possible with recording.

The nominal wall thickness of the parts to be welded must match in the joining area.

Pipes and fittings have to be aligned in axial direction in the welding machine before the clamping. The easy axial movement of the part to be welded-on can be ensured e.g. by means of dollies or swinging suspension.

The joining areas have to be planed with a clean and grease-free tool directly before the welding so that they are coplanar in clamped condition. Permissible gap width under alignment pressure see table 1.

Table 1. Maximum gap width between the treated welding zones.

Pipe outside diameter d mm	Gap width mm	Sheet width mm
≤ 355	0,5	
400 ... < 630	1,0	≤ 1500
630 ... < 800	1,3	> 1500 ≤ 2000
800 ... ≤ 1000	1,5	> 2000 ≤ 2300
> 1000	2,0	> 2300 ≤ 3000

Both, the gap width and the misalignment have to be controlled. The misalignment of the joining areas on the pipe outside or sheet respectively may not exceed the permissible size of 0,1 x wall thickness. A reduction of the quality arises in case of larger misalignment which limits the strength of the joint. In this case, the evaluation according to DVS 2202-1 under consideration of requirements to the joint can be done.

The treated welding areas should be neither dirtied nor touched by hand, as a retreatment would be necessary then. **An additional cleaning is not necessary and means no quality improvement.** Shavings fallen into the pipe have to be removed.

4.1.3 Welding procedure

With heated tool butt welding the joining areas are heated-up to the welding temperature by means of the heated tool and joined under pressure after removing the heated tool. The heated tool temperature is 200 to 220 °C. In principle the upper temperature limit is to be aspired for smaller wall thickness, the lower temperature limit for bigger ones (see figure 2). The upper temperature has to be chosen for PE 100 as well. The different steps of the welding process are illustrated in figure 3.

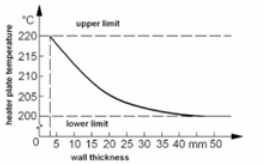

Figure 2. Recommended values for the heated tool temperatures as function of the wall thickness.

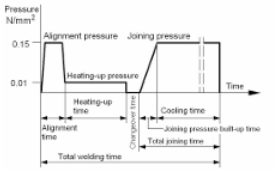

Figure 3. Process steps of heated tool butt welding.

Alignment

The joining areas of the welding components are pressed to the heated tool until all areas are coplanar on the heated tool. This fact is visible on the formation of beads. The alignment is finished when the bead heights have reached the mentioned values in table 2, column 2 on the total pipe circumference or the total sheet surface respectively. The bead sizes are an index for a complete contact of the joining areas on the heated tool.

Heating-up

For heating-up, the joining areas must contact the heated tool with low pressure. The pressure is reduced to nearly zero (≤ 0,01 N/mm²). During heating-up, the heat penetrates the joining areas and the welding temperature is reached. Heating-up times are given in table 2, column 3.

Changeover

After heating-up, the joining areas are to be detached from the heated tool. The heated tool should be withdrawn without damage or contamination of the heated joining zones. The joining areas should be joined together quickly until they almost have contact. The changeover time should be as short as possible (see table 2, column 4), as otherwise the plasticized areas will cool down. The welding joint quality would be influenced negatively.

Joining

The areas to be welded should meet with a speed of nearly zero. The demanded joining pressure is built possibly linear. The required times are shown in table 2, column 5. The joining pressure is 0,15 ± 0,01 N/mm².

Raised mechanical loads during or directly after the declamping are allowed only after finished cooling. The joining pressure has to be kept completely during the cooling time at ambient temperature (see table 2, column 5).

The reduction of the cooling time up to 50 %, that means joining pressure release and removal of the welded part from the welding equipment, is allowed under the following requirements:

– the welding is done under workshop conditions
– the removal from the welding equipment and the temporary storage are causing only slight loads to the joint
– it concerns components with a wall thickness of ≥ 15 mm.

A further treatment with full mechanic load of the joint is allowed only after complete cooling down according to table 2, column 5.

Table 2. Recommended values for the heated tool butt welding of pipes, fittings and sheets made of PE-HD at an outside temperature of approx. 20 °C and moderate air flow (interim values have to be interpolated).

1 Nominal wall thickness s	2 Alignment	3 Heating-up	4 Changeover	5 Joining	
	Heated tool temperature see figure 2			Joining pressure 0,15 N/mm² ± 0,01	
	Bead height on heated tool on the end of the alignment time (alignment p = 0,15 N/mm²)	Heating-up time =10 x wall thickness p= ≤ 0,01 N/mm²	Changeover time (Maximum time)	build-up time	Cooling time under joining pressure (minimum values) p = 0,15 N/mm² ± 0,01
mm	mm	s	s	s	min
up to 4,5	0,5	up to 45	5	5	6
4,5 ... 7	1,0	45 ... 70	5 ... 6	5 ... 6	6 ... 10
7 ... 12	1,5	70 ... 120	6 ... 8	6 ... 8	10 ... 16
12 ... 19	2,0	120 ... 190	8 ... 10	8 ... 11	16 ... 24
19 ... 26	2,5	190 ... 260	10 ... 12	11 ... 14	24 ... 32
26 ... 37	3,0	260 ... 370	12 ... 16	14 ... 19	32 ... 45
37 ... 50	3,5	370 ... 500	16 ... 20	19 ... 25	45 ... 60
50 ... 70	4,0	500 ... 700	20 ... 25	25 ... 35	60 ... 80

Training

Electro Welding Training

- Identify Compatibility of Electrofusion Control Systems
- Maintaining and Adjusting Electrofusion Control Equipment
- Performing Electrofusion Welding Operations
- Visual Inspection of Completed Electrofusion Joints

Duration: 1 Day

Students: Max 4

Cost: To be advised

Location: Hua Hin

Training

Butt Welding Training

- Identify Material Compatibility
- Calculate Pipe Welding Parameters
- Maintaining and Adjusting Butt Welding Equipment
- Performing Butt Welding Operations
- Visual Inspection of Completed Joints

Duration: 1 Day

Students: Max 4

Cost: To be advised

Location: Hua Hin

Training

Butt Welding & Electro Welding Training

- Identify Material Compatibility
- Calculate Pipe Welding Parameters
- Maintaining and Adjusting Butt Welding Equipment
- Identify Compatibility of Electrofusion Control Systems
- Maintaining and Adjusting Electrofusion Control Equipment
- Performing Butt and Electrofusion Welding Operations
- Visual Inspection of Completed Electrofusion Joints

Duration: 2 Days

Students: Max 4

Cost: To be advised

Location: Hua Hin

Any Questions

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