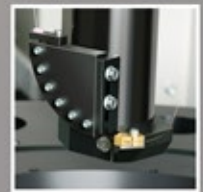


PATENTED SYSTEMS FOR MANUFACTURING ELECTROFUSION FITTINGS

ELECTROFUSION OVERVIEW





WIRE LAYING PROCESS

When clamped in the machine the component revolves around a fixed wire laying insert. The insert moves in a parallel direction to the fitting wall and a continuous spiral groove is formed in the wall by the insert. The forming action displaces the material alongside the insert and wire is simultaneously inserted into the groove. The displaced material is then closed back over the wire using a 'closer' feature on the tool, sealing the wire back under the surface of the fitting wall.

The systems are capable of single wire laying (end-to-end) or double wire laying (dependent on size). Double wire laying can be used for fittings which require separate fusion zones and have two terminals at one end. Wire is laid from the first terminal at double the pitch, then special tooling rotates in a U-turn and returns in the opposite direction to the second terminal.

MSA can offer a complete electrofusion technology consultancy package* related to the design of fittings. Machine systems are pre-programmed to suit the design of each customers fittings.

Additionally, MSA manufactures the **NEXUS Series*** of electrofusion control units, including a COMBI-UNIT, which combines a generator and NEXUS ECU in one convenient, portable unit.



Recently MSA has introduced the **SWL 5-Axis CNC Saddle Wire Laying Machine**, designed for machining and wire laying the curved profile of saddle fittings. Machine capacity is suitable for producing fittings 500mm x 500mm with outlet sizes up to diameter 400mm and saddle/base sizes from diameter 90mm to infinity (standard and special types).



MSA can also produce or tailor machines for bespoke fittings/requirements.

MSA hold The Queen's Award for Enterprise: Innovation 2017, related to the creation of the SWL Saddle Wire Laying System and associated principles and equipment for bifilar wire laying of large diameter couplers and specialist smaller electrofusion fittings. Having previously won in 2006, the new award further recognises MSA's continuous development and production of high quality, pioneering wire laying systems for the production of electrofusion fittings.

** see separate data sheets for more information*

MSA are forerunners in the development of technology and systems for the wire laying and production of electrofusion fittings using a **patented wire laying process**. MSA currently offer production equipment for the manufacture of fittings ranging from 20mm to 1400mm (internal diameter), with the systems presenting a much simpler, flexible and more efficient alternative to the traditional method of inserting wire coils during the initial moulding stage of producing fittings. Production licenses are sold to each customer in line with worldwide patents (contact MSA for further details).

Horizontal or vertical format machines are available* (depending on fitting size) with design layout allowing easy access for set-up and component loading; while the CNC control system enables optimum production cycle times and repeatability.

Moulded fittings or pipe sections are manually loaded into specially designed fixtures fitted to the main spindle(s) of the machine. The typical production cycle for monofilar socket type fittings consists of 3 main operations:

1. boring and chamfering
2. wire laying cycle
3. final boring

For the 'traditional' method of winding wire onto a mandrel and forming the fitting around the coil/mandrel during injection moulding, a complex capital set-up is required, along with a very strictly controlled cooling process before removing the mandrels from the moulded fittings. Laying the wire after the fitting has been moulded offers several advantages unique to the process:

Injection moulding cycle time reduced, so increased utilisation of moulding machines.

Moulded fittings in a stable condition when wire laying carried out, producing a high tolerance product with accurate internal diameter (no ovality), resulting in a better fit with the corresponding pipe.

No need for a heavy mandrel in the injection moulding stage, eliminating the requirement for expensive specialist lifting equipment to interface with the moulding machines.

Flexible CNC process reduced capital set-up costs, reduces setting times, has fewer design constraints and is easy to operate.

Wire laying has enabled electrofusion fittings to be manufactured at a LOWER COST.

PROCESS & EQUIPMENT PROTECTED BY PATENTS: EP1042108 | E215874 | P19813732-8 | 2,312,374 | ZL98812630.3 | 69804854.7-08 | 215588 | 202927 B | 136,935 | P4527278 (2000-526336) | 10-0616469 | P341526 | RU 2476753 B | ES2173657T3 | TR2004023208 | US 6,530,139 B1 | US 6,751,840 B2 | US 7,069,637 B2 | US 9,314,965 B2 | PCT/GB2008/050487 | EP2177096B1 | 2632 | 57411



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