

EXPLOSIVE WELDING

TEi YIMPACT provides tube plugging, tube expansion, tube-to-tube sheet welding for heat exchanger users and manufacturers, and debris removal from industrial plant by the use of controlled explosive charges.

THE PROBLEM

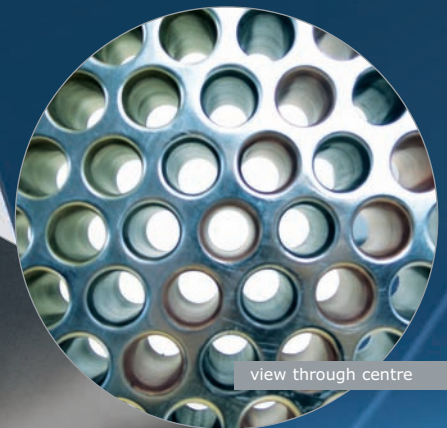
Over the last 30 years heat exchangers have been subject to increasingly stressful conditions - operating under higher temperatures and pressures and consequently requiring tighter leak security. Such conditions have highlighted problems with the fusion welding of tube-to-tubeplate joints. In high pressure applications, tube joint leaks can lead to the scrapping of the unit long before its estimated life span. Fusion welding determines the materials that can be used, materials which are often not the most suitable for the operating conditions.

THE SOLUTION

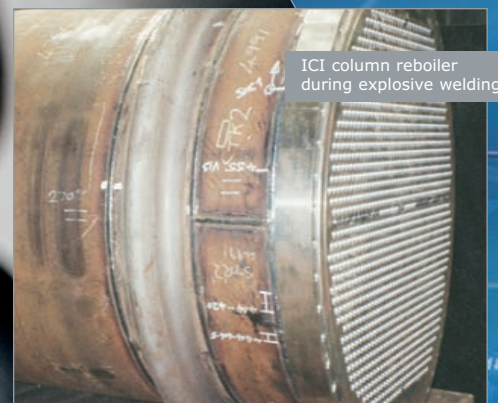
YIMPACT explosive welding produces a high velocity movement from a controlled axial detonation. This ensures a leak proof method of jointing which is able to withstand the higher temperatures and greater working pressures of modern heat exchangers.



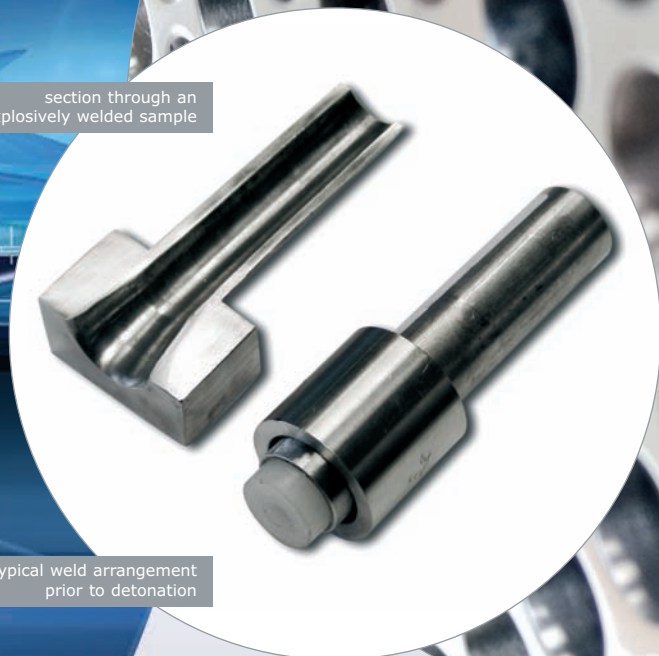
face of tubeplate



view through centre



ICI column reboiler during explosive welding



section through an explosively welded sample

typical weld arrangement prior to detonation

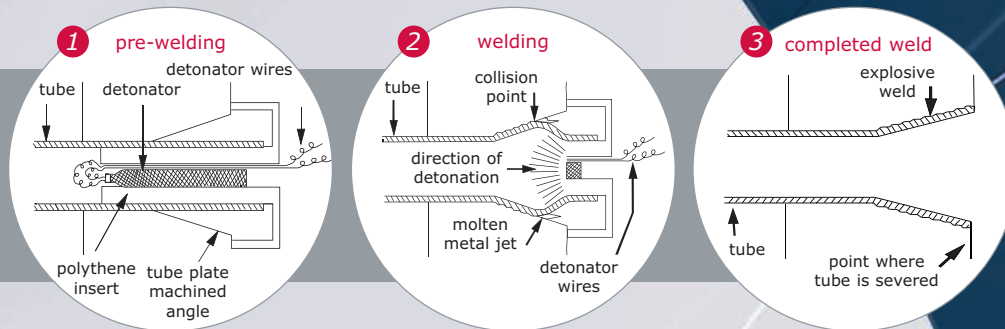


explosive welding configuration prior to detonation

THE METHOD

A controlled explosion creates an inter-facial pressure which melts the two surfaces about to be welded and forces them together. At the interface the collision front is projected forward ejecting the molten metal, and the exposed surfaces form a metallurgical bond similar to a pressure weld, irrespective of the materials being used.

SEQUENCE OF EVENTS



The ADVANTAGES

- Creates a high integrity joint of a strength equal to at least that of the parent materials, and capable of the most arduous working stresses
- Suitable for a wide variety of tube diameters above 9.5mm
- Suitable for most materials commonly used in heat exchanger manufacture
- Enables titanium tubes to be satisfactorily welded in workshop conditions
- Can be ultrasonically inspected
- No pre- or post-weld heat treatment required
- The YIMPACT explosive welding system has been tested extensively by thermal and fatigue cycling
- The system offers new standards of joint reliability reducing costly plant shut down repairs
- Heat exchangers employing the YIMPACT method have been in arduous service for many years without any reports of leakage



pushout test



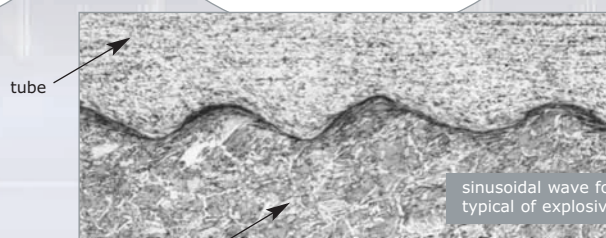
pullout test



peel test



weld depth test



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