

World-Class **Cladded & Weld Overlayed** Components



Contents



1
About
Crystal Industrial



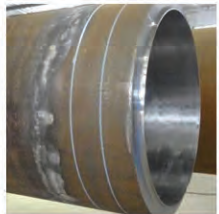
5
Quality Control
System



2
Cladding Process



7
Certifications



3
Cladded Products



8
Clients



4
Weld Surfacing
& Overlay



9
Contact



ABOUT CRYSTAL INDUSTRIAL

25
YEARS
EXPERIENCE

Crystal Industrial employs degreed and experienced Metallurgical and Welding engineers who can write all the required welding documents like Weld Plan, WPS / PQR etc. and also the different NDE and Testing procedures.

The over 400 different combinations of welding procedures developed is a testimony to our engineers' ingenuity and competence.

Exotic metal fabrication in Inconel, Hastelloy, Monel, Titanium and Weld Overlay cladding of vessels, Pipe fittings with computer controlled **Fronius** automated welding machines, makes us the specialists who can cater to the diverse and critical requirements of the Oil, Gas & Refinery industries.

[CONTACT](#)



400



**Over 400 Welding procedures
have been developed by the
engineering team of Crystal Industrial**

CLADDING PROCESS



Cladding & Weld Overlay provides protection against corrosion and wear for process and pipeline equipment.

Weld overlay can be applied to extend the service life of new parts, or refurbish corroded parts or worn surfaces.

Crystal Industrial's integrated and advanced welding technologies provides effective welding solutions for: ■ Oil & Gas Industries ■ Sub-Sea Applications ■ Petrochemicals & Refineries

TYPES OF CLADDING PROCESS

Weld Overlay

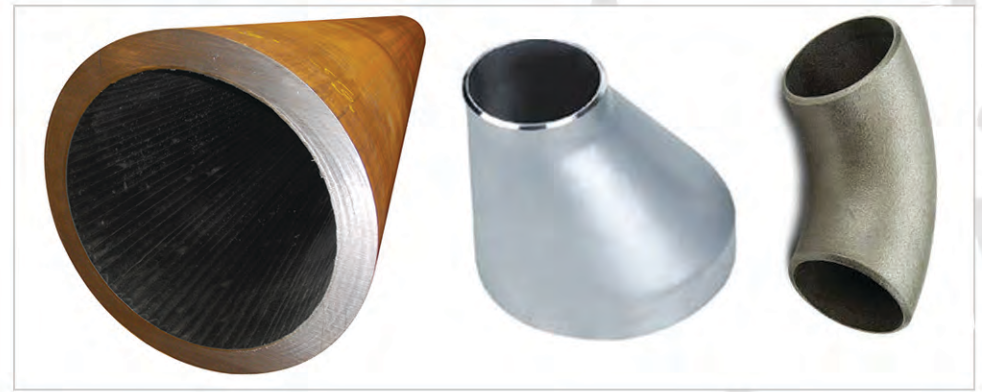
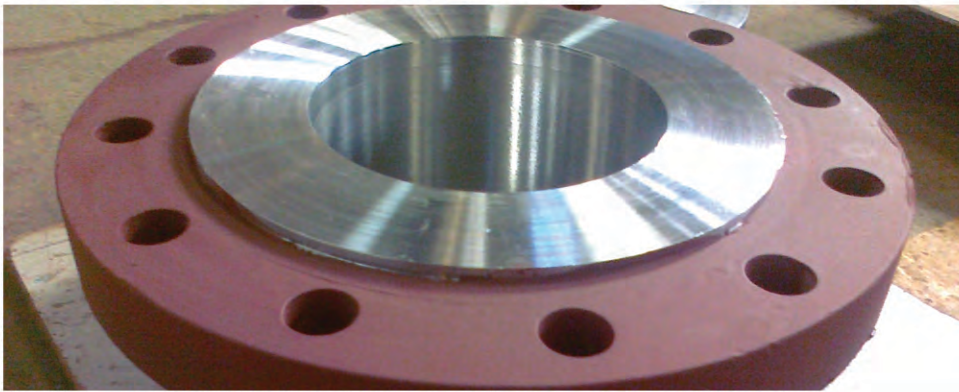
Weld overlay is a fusion welding technique used to deposit weld metal on to a component to achieve the desired dimensions, or properties replacing lost material or to provide corrosion-resistance and wear-resistance to a surface.

Explosion Bond

Explosion bonding is a process of bonding two dissimilar materials with the help of pressure and heat produced by explosion. The explosive material is spread on the material to be cladded which is kept on top of the base material. On ignition of the explosive, the resultant thrust bonds the clad plate to the base plate kept underneath. Various combinations of clad plate and base plate thicknesses can be bonded, depending on the job.

BASE MATERIAL	Carbon Steel, Stainless Steel & Low Alloy Steel
CLAD MATERIAL	SS304, SS316L, SS317L, SS410, UNS N0 8825, UNS N0 6625, Hastelloy C22, Hastelloy C276, Hastelloy B3, UNS N0 4400
WELD OVERLAY MATERIAL	ER410S, 430, ER308L, 309L, ER309LMo, 316L, 317L, UNS N0 8825, UNS N0 6625, Hastelloy C22, Hastelloy C276, Hastelloy B3, UNS N0 4400

CLADDED PIPES, FITTINGS & FLANGES



Crystal offers the following clad & weld overlaid components of various sizes & thicknesses by weld overlay or explosion bonding:

Contact sales@crystalindustrial.in for smaller bores with specific requirements

PIPES	DIAMETER	THICKNESS	CLAD/WELD OVERLAY THICKNESS
Welded Pipes	2" NB to 42" NB *	Minimum 7mm & above	1.5 mm to 4.5 mm
Seamless Pipes	2" NB to 42" NB *	Minimum 7mm & above	
FITTINGS			
Elbows	2" & above *	Minimum 7mm & above	1.5 mm to 4.5 mm
Reducers	2" & above *	Minimum 7mm & above	1.5 mm to 4.5 mm
Tees	2" & above *	Minimum 7mm & above	1.5 mm to 4.5 mm
Weldolets	2" & above	Minimum 7mm & above	1.5 mm to 4.5 mm
Sockolets	2" & above	Minimum 7mm & above	1.5 mm to 4.5 mm
FLANGES			
WNRF, BLRF, WNRTJ	2" & above	Minimum 7mm & above	1.5 mm - 4.5 mm (or as req)
VESSELS & HEADRES			
VESSELS	600mm to 3500mm & upto 20meters long	Minimum 7mm & above	1.5 mm to 4.5 mm

WELD SURFACING & OVERLAY



Crystal has developed an extensive range of procedures and techniques for weld overlay applications for the Oil & Gas, Petrochemical and Refineries.

To cater to the needs of its clients for weld overlaid items, Crystal has indigenous Automatic Overlaying Machines and Endless Torch Rotation (ETR) welding machine from Fronius which has the advantage of overlaying on 3D curved surfaces.

The ETR-S combines the features of the conventional TIG Hot Wire Cladding System as regards weld quality, functionality and software features.

Function of Arc Voltage Control (AVC) aids in the deposition of uniform thickness of weld overlay on various surfaces.

SALIENT FEATURES OF ETR-S

Weldable Bore Dia.	:	45 to 320 mm
Welding Speed	:	340 to 450 mm/min.
Deposition Rate	:	1.7 to 2.5 kg/hr

AUTOMATIC OVERLAYING MACHINES (3 NOS.)

Maximum Bore Depth	:	Up to 3 mtrs
Weldable Bore Dia.	:	100 to 1000 mm
Welding Speed	:	100 to 250 mm/min.
Deposition Rate	:	1 to 2 kg/hr

PIPE ID OVERLAYING MACHINE

Maximum Pipe Length	:	12 mtrs
Size	:	200 to 1000 mm



QUALITY CONTROL SYSTEM

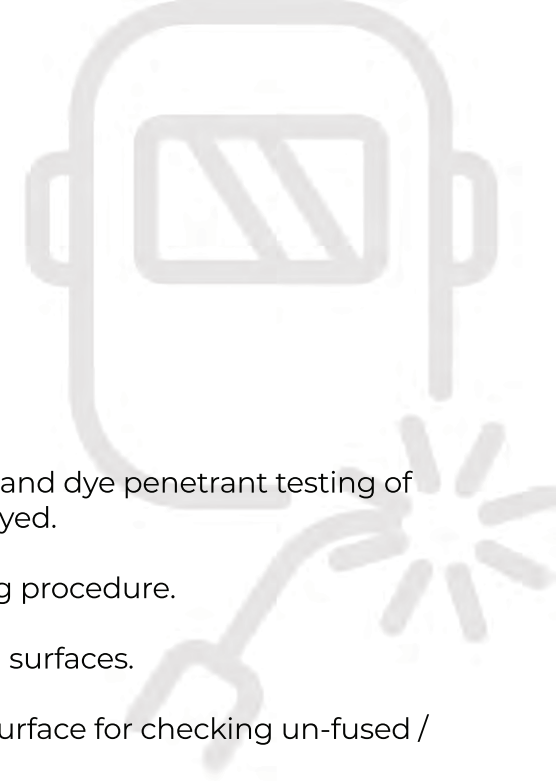


FOR CLAD FABRICATION

- Internal Ultrasonic Testing of plate before fabrication.
- Cleaning of clad surface after forming of head before heat treatment if required.
- Heat treatment in electric or gas fired furnace in controlled atmosphere to avoid any contamination and to prevent oxidation of surfaces.
- Ultrasonic testing of formed components for de-bond check between clad and base material.
- NDE testing, Radiography, Hydro test & PMI check.

FOR WELD OVERLAYED ITEMS

- Prior to overlay, grinding, cleaning and dye penetrant testing of surface of base material to be overlaid.
- Overlaying as per qualified welding procedure.
- Dye penetrant testing of overlaid surfaces.
- Ultrasonic Testing from opposite surface for checking un-fused / disbond areas.



QUALITY CONTROL SYSTEM

Crystal follows a stringent quality control system so that all parameters are complied with and the customer gets a high quality product.



Ultrasonic Testing



Hydrostatic testing



Dye Penetrant Testing



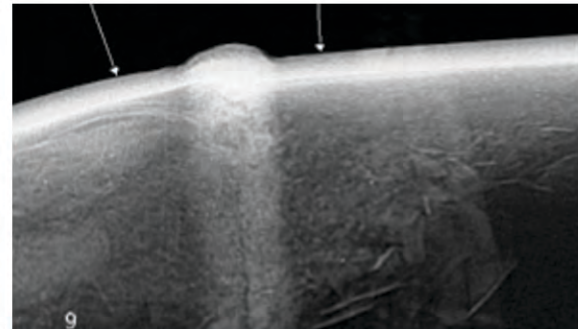
Hardness Testing



Positive Material Identification



Magnetic Particle Inspection



Radiography



Dimensional Inspection

CERTIFICATIONS



- ISO 9001 : 2015 Certificate
- ISO 14001 : 2015 Certificate
- OHSAS 18001 : 2007 Certificate
- Stamp Certificate
- National Board Registration
- IBR Approved



CLIENTS



CONTACT



India Office

412, 416 Raheja Arcade, Sector 11 C.B.D.
Belapur, Navi Mumbai - 400 614. Maharashtra India
Tel : +91-22-27563850
Telefax : +91-22-67939439
sales@crystalindustrial.in

USA Office

3838 Middleton Avenue
Cincinnati, OH 45220
Tel: (513) 885-6767

www.crystalindustrial.in



ABOUT US

