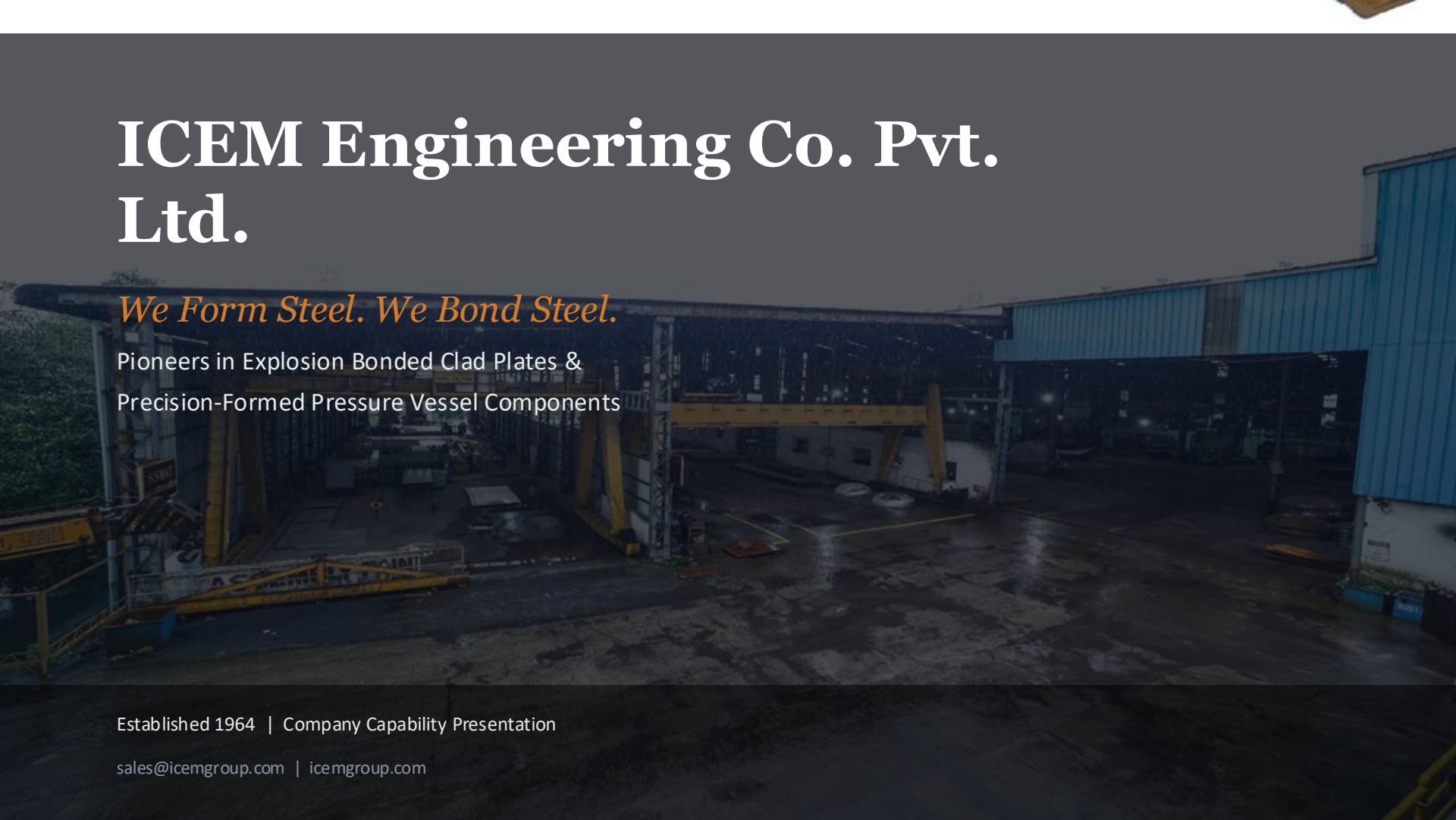
ICEM Engineering Co. Pvt. Ltd.

We Form Steel. We Bond Steel.

Pioneers in Explosion Bonded Clad Plates &
Precision-Formed Pressure Vessel Components



Established 1964 | Company Capability Presentation

sales@icemgroup.com | icemgroup.com

Agenda

ABOUT US

Committed to Tradition. Focus on the Future.

Since 1964, ICEM has been a trusted name in heavy engineering. Specializing in explosion bonded clad plates and precision-

Plant 1 — Wada

"We Form Steel"

Dished ends, shells, toricones, cones, bellows, elbows

Plant 2 — Multai

"We Bond Steel"

Explosion bonded clad plates.

OUR JOURNEY

Six Decades of Forming. A Legacy in Steel.

1964 — **Inception**
Founded as a fabrication unit.

1990s — **Specialization**
Pivot to Dished Ends & Static Equipment.

2002 — **Global Entry**
Commenced exports, ASME & PED standards.

2012 — **Expansion**
Wada Heavy Engineering facility inaugurated.

2014 — **2500T Capability**
Bespoke 2500T Hot Forming Press.

2016 — **Kinetic Fusion**
Explosion Clad Plate division launched.

2019 — **PDO Approval**
Vendor validation from PDO Oman.

2022 — **Aramco Verified**
Saudi Aramco approval achieved.

2026 — **Automation**
Flanging & Manipulation systems.

60+	Years	2	Plants	8	Presses	27	Cranes	10+	Countries

FLAGSHIP EQUIPMENT

2,500 T HOT PRESS

SERTOM 3-ROLL PLATE BENDING

FLANGING MACHINE

FACCIN MANIPULATOR

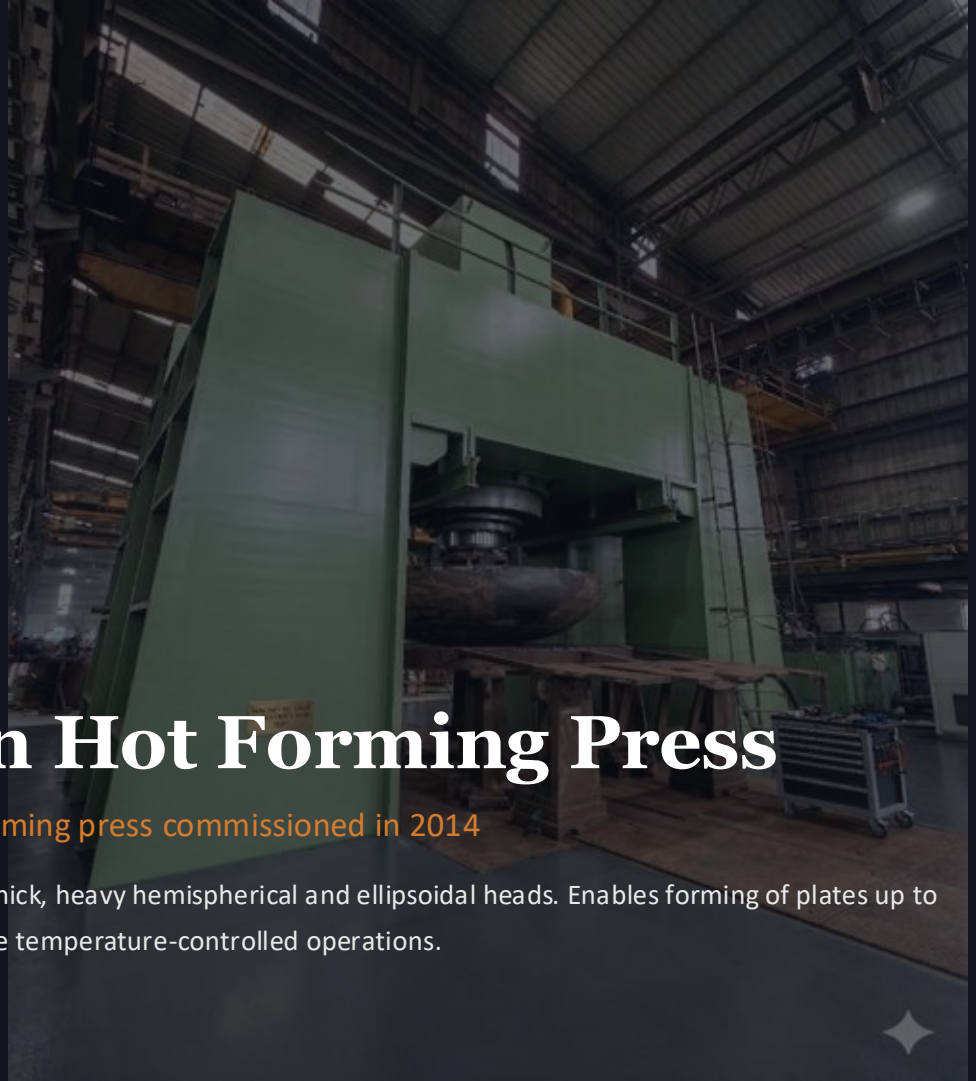
FLAGSHIP EQUIPMENT

Sertom 3-Roll Plate Bending Machine

Heavy plate rolling shells up to 120 mm thick, 3,200 mm wide

Three-roll bending for cylindrical shells and cones. Precision-controlled for consistent curvature across the full plate width.

FLAGSHIP EQUIPMENT

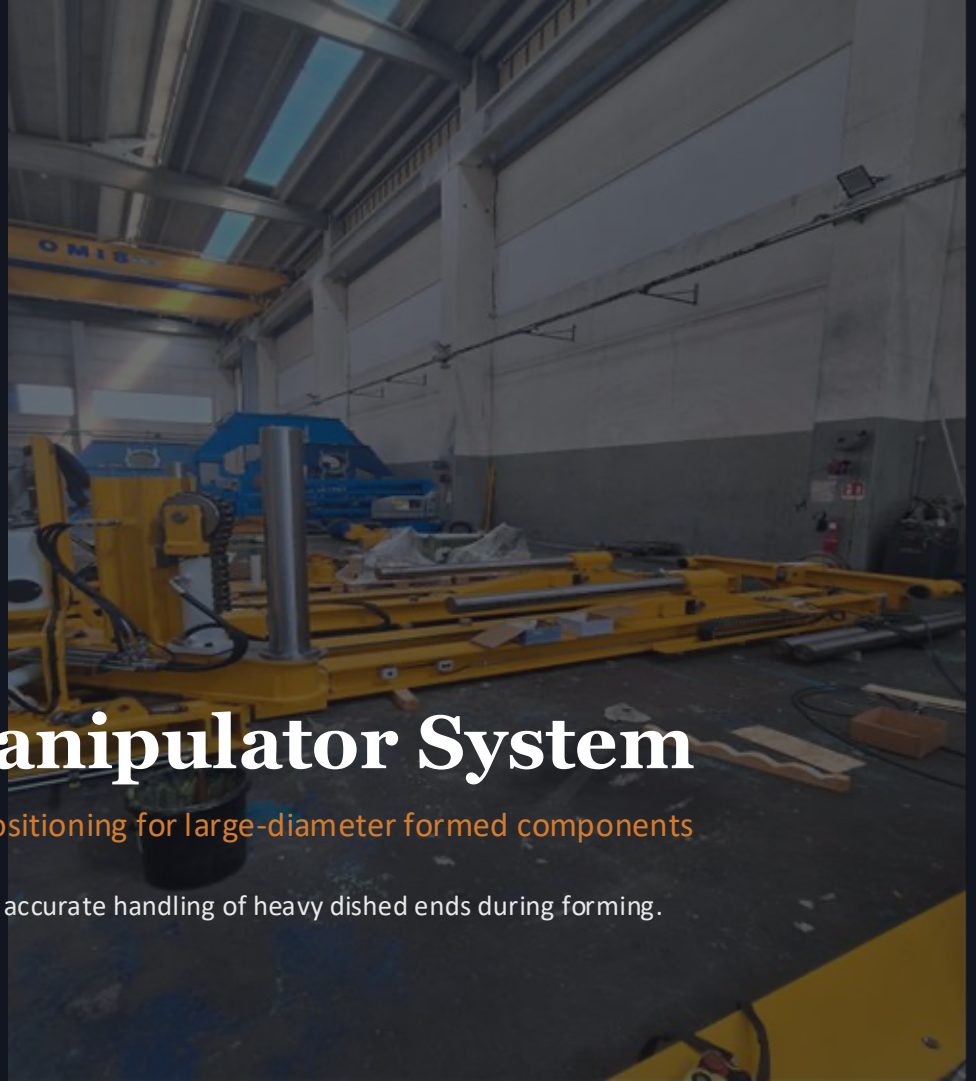


2,500 Ton Hot Forming Press

Bespoke in-house hot forming press commissioned in 2014

Designed for hot pressing of thick, heavy hemispherical and ellipsoidal heads. Enables forming of plates up to 250 mm thickness with precise temperature-controlled operations.

FLAGSHIP EQUIPMENT



Faccin Manipulator System

Precision handling and positioning for large-diameter formed components

Manipulation system for safe, accurate handling of heavy dished ends during forming.

Flanging Machine

Dished ends up to 5,200 mm diameter one of the largest in the Indian subcontinent

Dedicated flanging machine for precision edge forming of pressure vessel heads. Handles carbon steel, stainless steel, duplex, and exotic alloys.

Press Line — 8 Presses

Press	Capacity	Type	Status
Press 1	2,000 T	Cold Forming	Operational
Press 2	1,200 T	Cold Forming	Operational
Press 3	1,200 T	Cold Forming	Operational
Press 4	1,000 T (Faccin)	Cold Forming	**New**
Press 5	1,000 T	Cold Forming	Operational
Press 6	1,250 T	Cold Forming	Operational
Press 7	500 T	Cold Forming	Operational
Hot Press	**2,500 T**	**Hot Forming**	Operational

Heat Treatment, Machining & Testing

Heat Treatment & Quenching Tank

Furnaces: 12m × 5m × 5m & 6m × 3m × 3m

Stress relief, normalizing, PWHT, solution annealing

Temperature range up to 1,100°C

Machining & Testing

VTL for bevelling & edge prep

NDT: UT, MPI, LPT, RT (approved subcontractors)

PRODUCTS

What We Manufacture

Ellipsoidal

Torispherical

Hemispherical

Flat Bottom

Toricones

Rolled Shells

Cones

Expansion Bellows

Hot formed heads

Special Parts

PRODUCT HERO

Heads

Ellipsoidal, Torispherical, Hemispherical & Flat Bottom

Max Diameter

No limit. Largest: 16,500 mm

Max Thickness

250 mm

Standards

ASME VIII, PD 5500, EN 13445, IS 2825

Materials

CS, alloy, SS, duplex, Inconel, Monel, Hastelloy, clad

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PRODUCT HERO

Toricones & Rolled Shells

Toricones

Single & double knuckle conical transitions

Rolled Shells

Cylindrical shells rolled from plate. Max 120 mm thick, 3,200 mm wide

PRODUCT HERO

Expansion Bellows & Special Formed Parts

Expansion Bellows

BOD 3,000 mm × SID 2,470 mm at 28 mm

Cones & Special Parts

Eccentric cones, floating dished ends, segmental bends, flanged components

Forming Limits Summary

Parameter	Specification
Maximum Diameter	No limit. Largest: 16,500 mm (16.5 meters)
Maximum Thickness	250 mm
Rolled Shell Max	120 mm thick, 3,200 mm wide
Materials	CS, alloy, SS, duplex, Inconel, Monel, Hastelloy, clad
Standards	ASME Sec. VIII Div. 1 & 2, PD 5500, EN 13445, IS 2825

Largest Ellipsoidal Head by ICEM

Crown & Petal Hemispherical Head

UNIT 2 — MULTAI

Explosion Bonding Facility

Captive in-house bonding one of the very few in India

Explosion bonding uses the energy of a controlled detonation to metallurgically bond two dissimilar metals at the atomic level creating bond strengths exceeding the weaker parent material.

80	2	No limit	250mm	~20,000
Acres	Bonding Beds	Max Plate Size	Max Thk	sqm/yr Cap.

Explosion Bonding — 7-Step Process

1 — Surface Prep

Clean, degrease, verify finish

2 — Assembly

Position clad above base with standoff

3 — Explosive Loading

Uniform detonation layer applied

4 — Detonation

Controlled blast bonds at atomic level

5 — Flattening

Press/roll to eliminate curvature

6 — Heat Treatment

Stress relief or normalizing

7 — Testing

UT per SA 578/264, shear, bend, DPT

Clad Sheet Automatic Welding

Clad Sheet Leveler

Clad Products & Material Combinations

Clad Products

- Clad Plates — Flat bonded: base + clad
- Clad Dished Ends — Bonded plates formed into heads
- Clad Rolled Shells — Bonded plates rolled into shells
- Clad Toricones — Bonded conical transitions
- Clad Tubesheets — Bonded HX tubesheets

Material Combinations

Base	Clad	Application
SA 516 Gr 60/65/70N	SS 304/316L	General corrosion
SA 516 Gr 60/65/70N	Inconel 625/825	Sour service
SA 516 Gr 60/65/70N	Monel 400	Seawater/marine
SA 516 Gr 60/65/70N	Hastelloy C-276	Aggressive chemical
SA 387 Gr 11/22	SS 410S/347	High-temp refinery
SA 516 Gr 60/65/70N	Duplex 2205	High-strength corrosion

ICEM is the ONLY company in India that can both explosion-bond AND form clad plates in-house — a true single-source solution.

QUALITY

Certifications & Quality Assurance

ASME U

Sec. VIII Div. 1

ASME U2

Sec. VIII Div. 2

ISO 9001:2015

+

IBR

Indian Boiler Regs

EIL Approved

Engineers India Ltd

PESO

Explosives Safety

Quality Assurance System

Dedicated QA/QC engineers at Wada & Multai
Stage-wise inspection with hold points per QAP
NDT: UT, MPI, LPT, DPT, RT (NABL-accredited)
Full heat/lot traceability from receipt to dispatch

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HSE Commitment

PESO-approved safety protocols at Multai. Licensed explosive handling, designated safety zones, and controlled access during bonding operations.

CLIENTS & MARKETS

Global Reach — 10+ Countries

Middle East	UAE, Oman, Saudi Arabia, Kuwait, Qatar, Bahrain
South & SE Asia	India, Malaysia, Indonesia, Singapore
Africa	South Africa, Egypt
Americas	USA
Europe	Turkey

Our Clients

End Users

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EPC Contractors

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Overseas Fabricators

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National Clients

+ + + + : g M + + + + k b MA + + + + +

Large-Diameter Formed Heads

Product	Material	Dimensions	Thk	Qty	Year
2:1 Ellip. DE	SS 316L	ID 15,500 mm	14	1	2023
2:1 Ellip. DE	SA 516 Gr 70N	ID 9,144 mm	38	3	2022
Rolled Shell	SA 516 Gr 70N	ID 6,700×L 2,300	99	4	2023
2:1 Ellip. DE	SA 516 Gr 70N	ID 7,391 mm	32	4	2025
Hemi DE	SA 516 Gr 70N+HIC	ID 7,010 mm	57	6	2022
Flat Bottom DE	P460NH	OD 4,450 mm	60	3	2025

Highlight: 15,500 mm diameter dished end in SS 316L — among the largest formed in India

Heavy-Wall & Exotic Materials

Heavy-Wall Forming

Product	Material	ID (mm)	Thk	Year
Hemi DE	SA 516 Gr 70N	1,750	125 mm	2022
Hemi DE	SA 516 Gr 70N	1,600	105 mm	2022
Rolled Shell	SA 516 Gr 70	766	110 mm	2026

High-Alloy & Exotic Materials

Product	Material	Dimensions	Thk	Year
Hemi DE	SA 516+Inconel 825	ID 7,925 mm	102+4	2023
Toricone	SA 516+Inconel 825	BID 5,645	86+4	2023
Hemi DE	SA 387 Gr22+Type 347	ID 2,440 mm	80+5.7	2026
2:1 Ellip.	Duplex SS 32205	ID 2,000 mm	60	2025

Clad Plates & Complex Geometries

Explosion-Bonded Clad Plates

Material	Size (mm)	Thk	Qty	Year
SA 516+SS 316L	3,000×12,000	22+4	1	2024
SA 516+Inconel 825	2,450×11,900	14+3	6	2025
IS 2062+Alloy C-276	2,500×6,000	8/25+2	120	2025

Complex Geometries

Product	Material	Dimensions	Thk	Year
Toricone (Clad)	SA 516+SS 316L	BID 7,425×SID 5,723	46+4	2024
Expansion Bellow	SA 516 Gr 70N	BOD 3,000×SID 2,470	28	2022
Floating DE	SA 965 Gr F316L	ID 1,254 mm	84	2022

3m × 12m clad plates • 148mm clad DE+shells for Petronas • 8

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