

EPC Contractors

Captive Power Plants & Co-Generation



- EPC Services
- Coordination Services
- Inspections
- Supervision of Installation
- Performance Test Services





Pre-Engineering of Power Projects

Understanding the client needs

Preparation of Technical Specifications

Pre-Engineering

Power Cycle Scheme

Heat Balance Distribution Scheme

General Arrangement Drawings

Layout Drawing

Single Line Diagram

P & ID

Cost Estimation

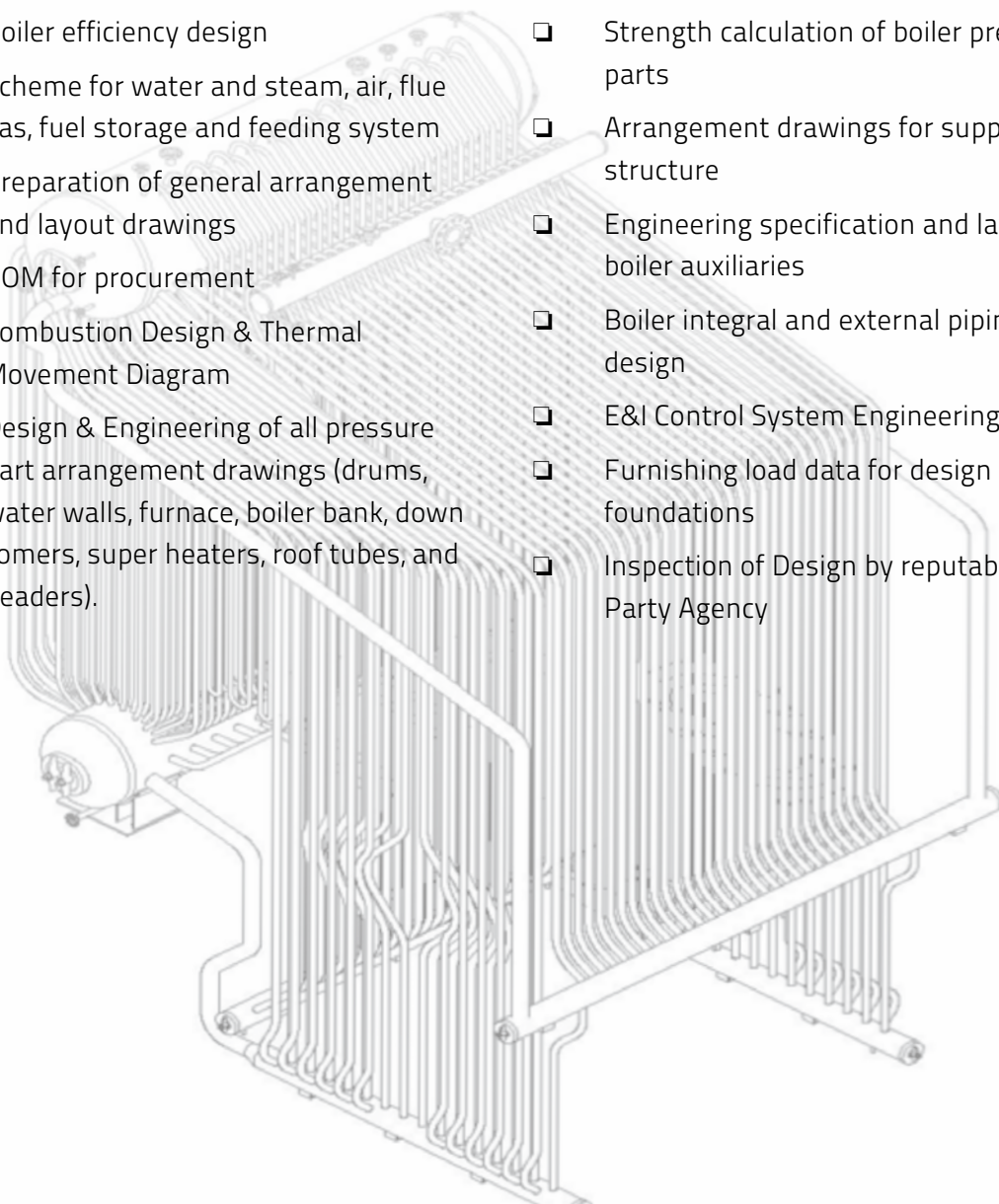
Compilation of Technical Offer

Response to the technical queries of the customer



DETAIL ENGINEERING OF BOILERS

- ❑ Boiler efficiency design
- ❑ Scheme for water and steam, air, flue gas, fuel storage and feeding system
- ❑ Preparation of general arrangement and layout drawings
- ❑ BOM for procurement
- ❑ Combustion Design & Thermal Movement Diagram
- ❑ Design & Engineering of all pressure part arrangement drawings (drums, water walls, furnace, boiler bank, down comers, super heaters, roof tubes, and headers).
- ❑ Strength calculation of boiler pressure parts
- ❑ Arrangement drawings for supporting structure
- ❑ Engineering specification and layout for boiler auxiliaries
- ❑ Boiler integral and external piping design
- ❑ E&I Control System Engineering
- ❑ Furnishing load data for design foundations
- ❑ Inspection of Design by reputable Third Party Agency



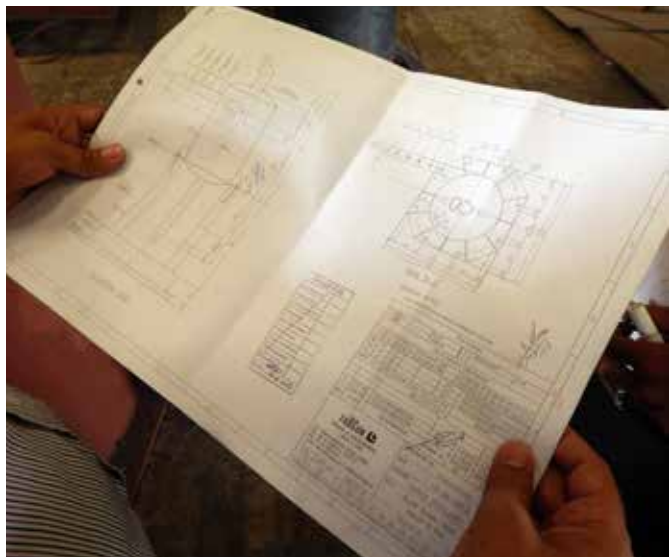


DESIGN CAPABILITIES - OUT-SOURCE ARRANGEMENTS...

Fabcon has developed arrangements with international reputable design & engineering companies from Europe, South Korea, China and India for extending capabilities in design of power boilers and transfer of technology.

We get assistance in the following areas:

- ☐ Fuel Specifications Research
- ☐ Process Design
- ☐ Thermal Design
- ☐ Combustion Design

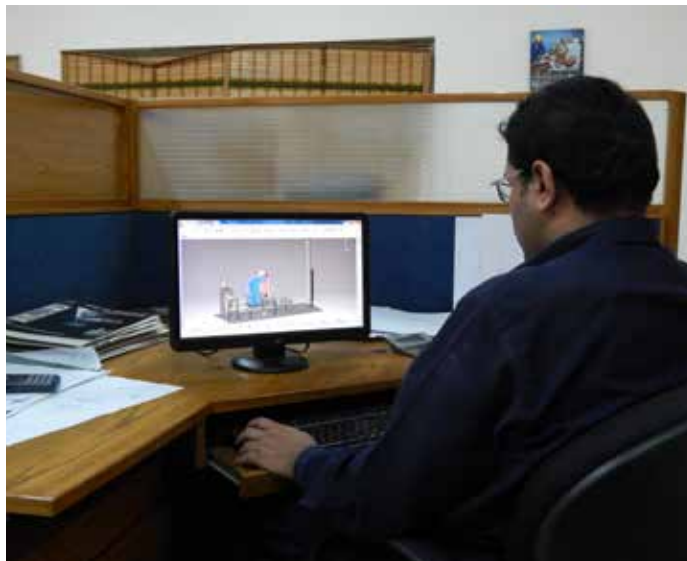
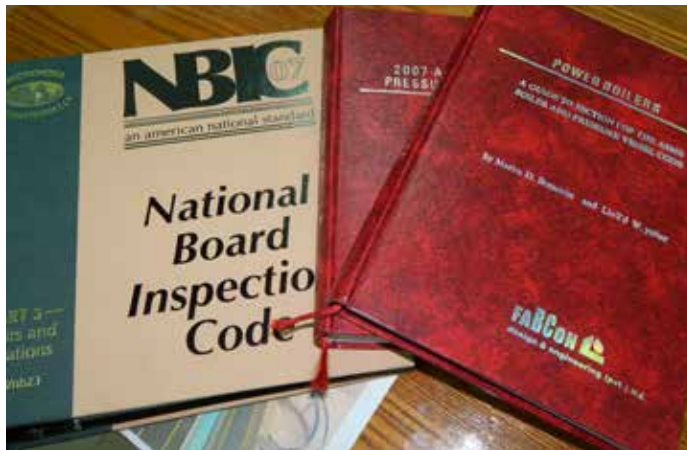


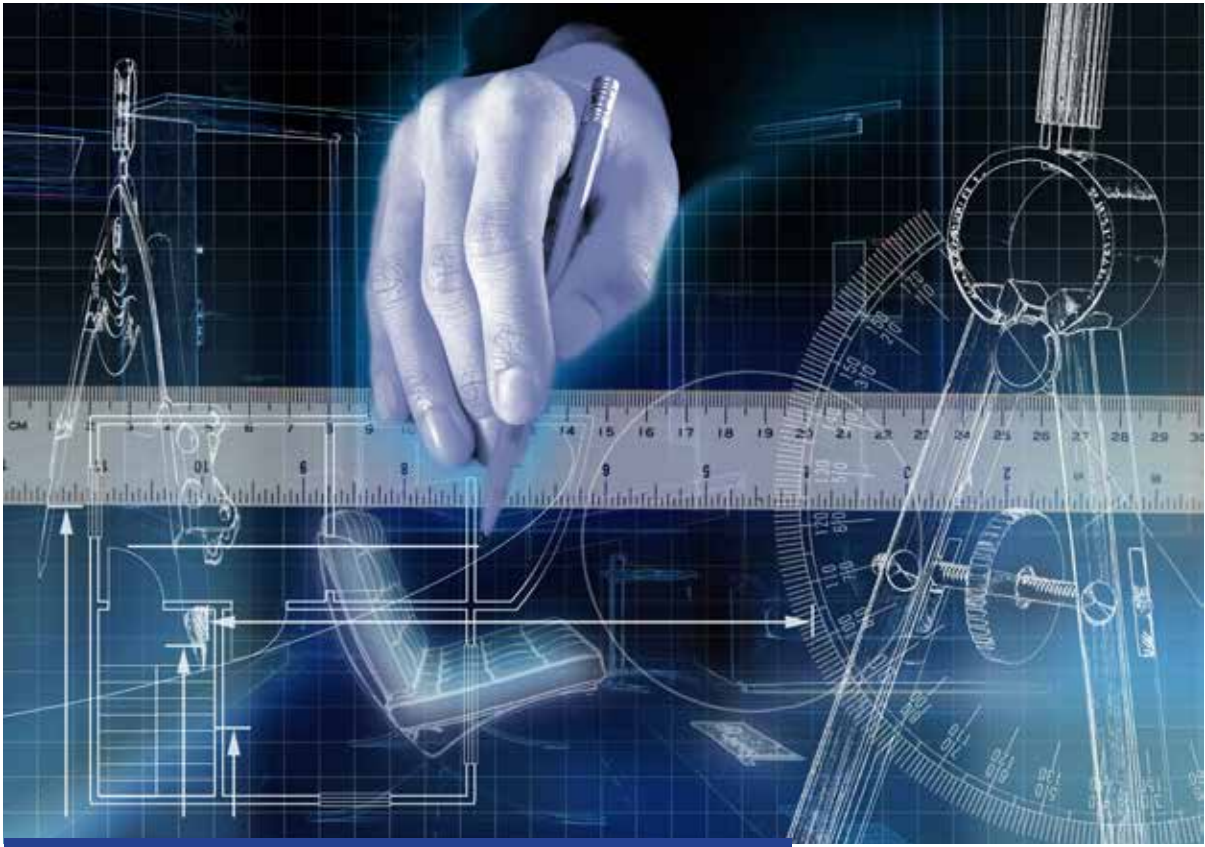
IN-HOUSE CAPABILITIES

Fabcon has acquired experienced engineers from private and public sector on permanent and contract basis who make the design office capable for the following activities

Detailed Engineering

- ❑ Mechanical Design of Pressure Parts, Heat Exchangers and allied equipment.
- ❑ Preparation of bought-out items specifications and their selection
- ❑ Supervision to ensure compliance of design code requirements during manufacturing and installation





We incorporation with our international collaborators are capable to design different types of boilers.

The list includes but not limited to the followings;

Water Tube Vertical Boilers

Fuels

Capable of efficient burning of low quality, high and low calorific value fuels with good efficiency;
 (Imported Coal, Bagasse, Rice Husk, Corn Cob, Wood Chips, Wheat-Straw, Cotton Stack)

Types

Ground Supported / Hanged (Expansion upwards/ Downwards)
 Site Erected, Balanced Draft
 Single Drum/Bi-Drum
 Fixed Grate/ Moving Grate

Capacity Ranges

Various from 20 TPH to 160TPH
 Pressure / Temperature Ranges vary from 20 kg/cm², 300°C to 72 kg/cm², 550°C.



Water Tube Fluidized Bed Combustion

Fuels

Capable of efficient burning of low quality, low calorific value fuels with better efficiency; (Local Coal, Rice Husk)

Types

Single Drum

Capacity Ranges

Various from 45 TPH to 220TPH

Pressure / Temperature Ranges

vary from 45 kg/cm², 400°C to 150 kg/cm², 550°C.

Water Tube Circulation Fluidized Bed Combustion

Fuels

Capable of efficient burning of low quality, low calorific value fuels with better efficiency; (Local Coal, Rice Husk)

Types

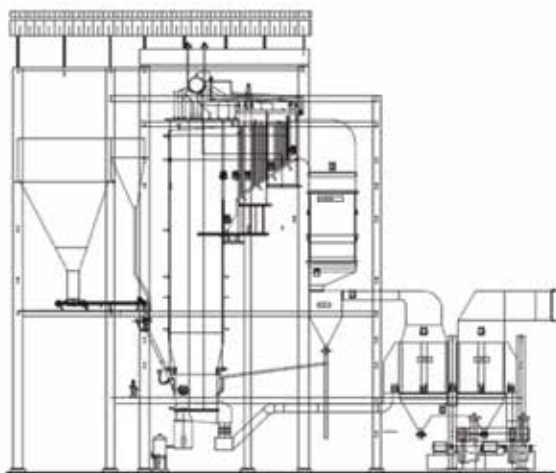
Single Drum

Capacity Ranges

Various from 45 TPH to 220TPH

Pressure / Temperature Ranges

vary from 45 kg/cm², 400°C to 150 kg/cm², 550°C.



CODE, STANDARDS & SOFTWARE



Design Codes

ASME
API
ASTM
EN
TEMA
AWS
ANS

Mechanical

TANK
ASPEN

Electrical

Smart Plant
ETAP

3D Plant Design

Auto Cad
Plant Design System

Software

Civil and Steel Structures

SAP-2000
STAD Pro

Process

PRO II
ASPEN
HYSIS
CFBCAD

Manufacturing

Compress
PV Elite
Staad Pro
KED
ASPEN

Piping

CESAR
CAD Pipe



PROCUREMENT

1. Scope

- ❑ Vendor Sourcing & Evaluation
- ❑ Compliance of Engineering Specifications
- ❑ Comparative Study of offers
- ❑ Draft Agreements and P.O
- ❑ Proposal Drawing Review
- ❑ Monitoring of progress

2. Philosophy

As an EPC contractor of captive power and co-generation plants, our procurement philosophy consists of the following:

- ❑ Selection of Off-shore vendors
- ❑ Utilization of Local Sources

3. Off-shore Procurements

Turbo-Generator Set

- ❑ Turbines, Generators, E&I Equipment are imported from USA, Europe, South Korea, Japan, China & India.
Sources: USA, Europe, India, China
- ❑ Types of Turbines
 - Condensing
 - Back Pressure
 - Extraction Condensing
 - Extraction Back Pressure

- ❑ Capacity
Ranging from 0.5 MW up to 100 MW and more

Boiler and Accessories

- ❑ Complete boilers especially of CFBC design for pressures more than 72 kg/cm² are imported from Korea & China.
- ❑ Pressure parts of medium pressure boilers above 52kg/cm² are imported from Korea & China.
- ❑ Boiler raw materials like carbon steel plates, dish heads, high pressure pipes & fittings, flanges and tubes are imported from Korea & China.
- ❑ Allied equipment like Grate , FD, ID, SA fans with drives, Feed pumps with drive, All valves and fittings, Safety valves, Field Instruments, Soot blowers with auxiliaries, Pressure reducing stations, De-super heater, Orifices and flow meters are imported from Europe, South Korea, India and China.



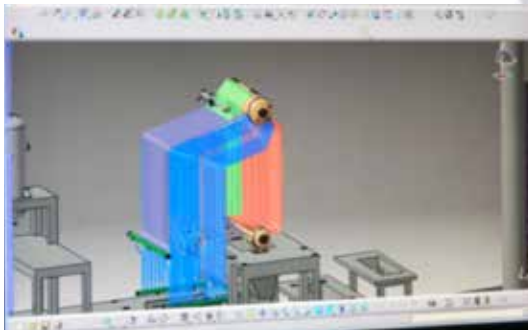


4. Local Procurements

In-house resources and local market is utilized to achieve economy of the project. Fabcon's own workshop facility is capable to produce the following equipment of the boiler.

- ❑ Pressure parts for boiler up to 52 kg/cm² pressure which includes boiler drum, headers, tube bending, economizer etc. are manufactured and supplied from our own facility.
- ❑ Non-pressure parts like air-heater, dust collector, steel structures, gangways & ladders, fuel handling, supply and feeding equipment, ducts and piping, steel stack are fabricated in-house and supplied at site.
- ❑ Materials and equipment like structural profiles and plates, refractory, lagging and insulation are arranged from the local market.





5. Selection of Critical Materials and Equipment

Special emphasis is given while selection of vendors from off-shore market for the selection of following materials and equipment

Acceptance Criteria

- ☐ International Accreditation
- ☐ Chemical Analysis
- ☐ Physical Properties
- ☐ Testing
- ☐ Review of Inspection by Third Party
- ☐ Internationally recognized third party agency like BV, AGS, Lloyd



Carbon Steel Plates (Steam and Water Drum)

Sources: Europe, Japan, South Africa,
South Korea, China.

ASME Material

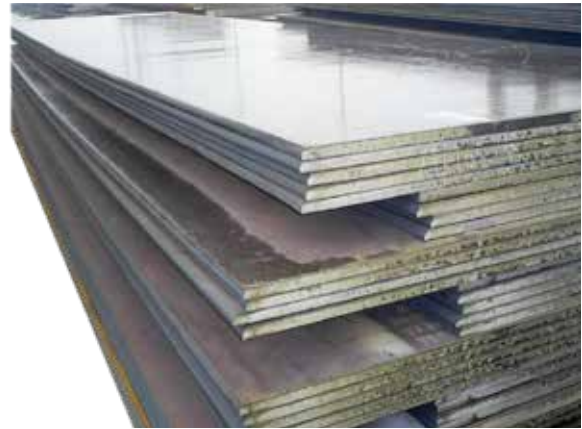
ASTM 515 Gr.70/516 G70

GB Material

Q345R/Q245R

EU Materials

JIS Materials



Dish heads for boiler drums (hemi-spherical and elliptical)

Sources: Europe, Japan, South Africa,
South Korea, China.

ASME Material

ASTM 515 Gr.70/516 G70

GB Material

Q345R/Q245R

EU Materials

JIS Materials



Tubes for Convection and Radiation, Super heating, Economizer and Air-Heater

Sources: South Korea, China

Convection and Radiation

ASTM 192

GB

Super Heater

ASTM P11, P22

GB

Economizer

ASTM 192

GB

Air-Heater

ASTM ERW-53

GB



Valves

Sources: Germany, Spain, South Korea,
India, China

Safety Valves

Control Valves

DE super heater Stations

Globe/Gate/NRV/Blow down Valves



Pipes, Fittings and Flanges

Pipes

ASTM A 106

ASTM A335GR P11, P22

Pipe Fittings

(Elbows, Tees, Bends, Reducers, Caps)

ASTM / ASME A 234 WPB, WPC

Flanges (Blind, SORF, WNRF)

ASTM A 182, A 240

ASTM A 105, ASTM A 181

ASTM A 182, F11, F22

Draft Fans

Sources: Germany, Spain, South Korea,
India, China

Impeller Blade Design

Backward curved blades

Radial blades

Forward curved or radial-tip blades

Discharge Orientations

GD / GI 360, 90, 180, 270, 45, 135, 225, 31

Soot Blowers

Sources: South Korea, India, China

Retractable Soot Blowers

Rotary Motorized Soot Blowers

Rotary Chain Type Soot Blowers

Burners

Sources: Spain, South Korea, India, China

Bio gas Burners

Natural Gas Burners

Oil Burners

Instrumentation & Control

Sources: USA, South Korea, India, China

Make: Yokogawa, Honey Well, ABB

Flow meters, Temperature
Transmitters, Pressure Calibrators

Remote Indicators Data Acquisition
& Recorders

Distributed Control Systems (DCS)

Controllers (PID/PLC/RTU/PAC)

Supervisory Control and Data
Acquisition (SCADA)



MCC

Sources: USA, South Korea, India, China

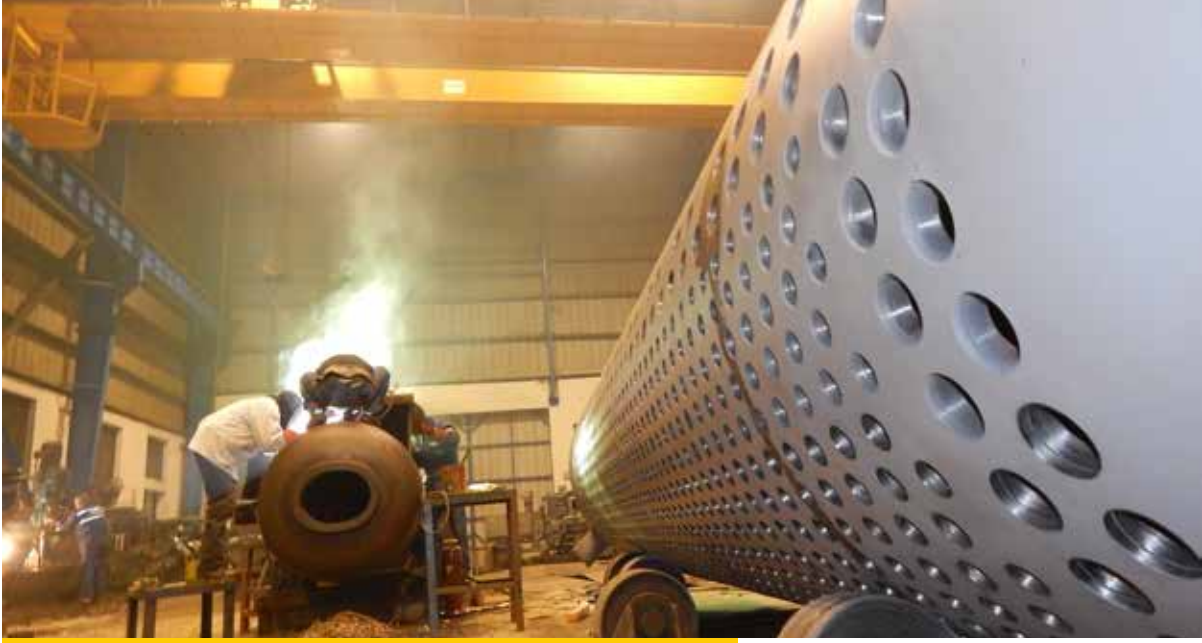
Full voltage non-reversing and full
voltage reversing starters

DOL, Star-Delta, Soft Starter & VFD

Analog or digital metering

Feeder circuit breakers

CONSTRUCTION



Manufacturing in Fabcon's own workshop

Fabcon has state of the art manufacturing facility which is capable of production of following activities

1. Plate Bending and Rolling Facility

Mechanical press 10,000 ton

2. Drum Welding

SAW
SMAW
GTAW
GMAW
TIG
MIG

3. Drum Drilling

Vertical Radial Machine

Pilot Drilling up to Dia. 20 mm
Drilling with drill bits
Reaming





Horizontal CNC drilling center

4. Stress Reliving

Temperature, Time acc. to material thickness and kind

5. Hydraulic Testing

6. NDE

DPT

MPI

RT

UT

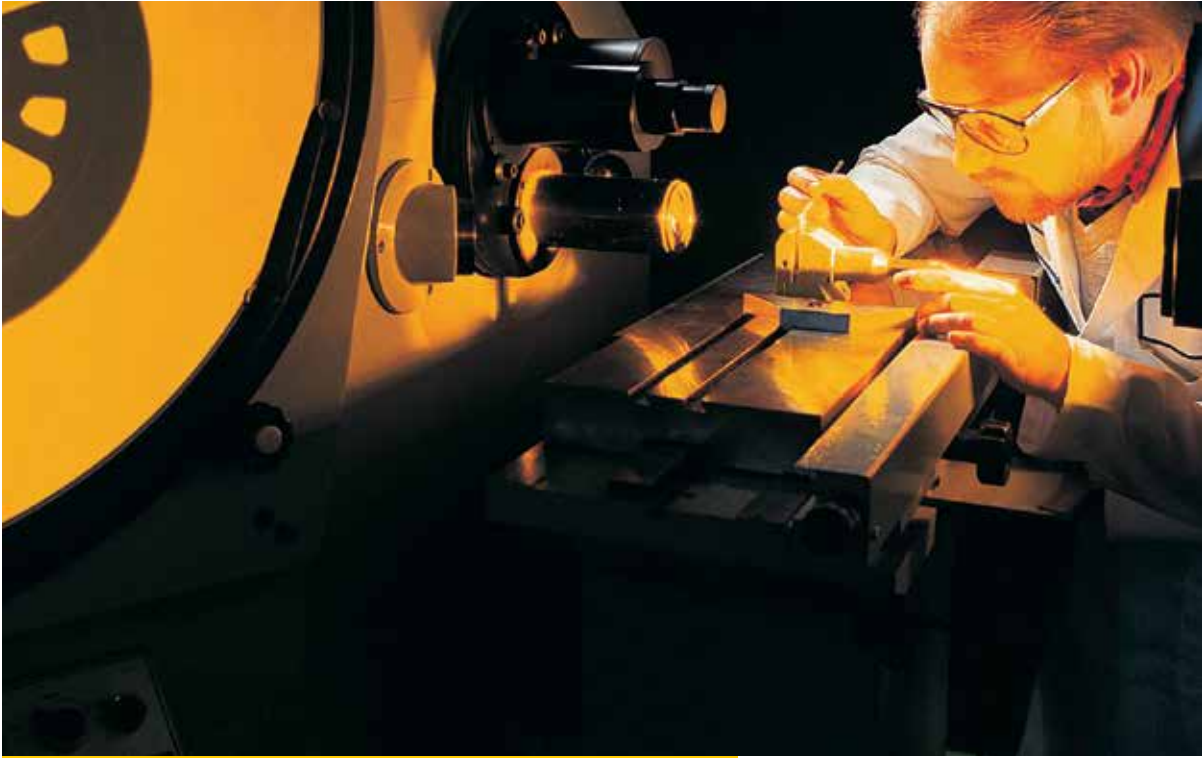
7. Third Party Inspection

Companies such as BV, etc.



QA / QC

At Fabcon's workshop we are committed to maintain quality assurance and control procedure to ensure top quality products under ASME and ISO requirements.



1. Certifications & Accreditations

ASME U, R & S STAMPS
 ISO 9001-2008
 ISO 14001-2004
 OHSAS 18001:2007



2. Procedures & Records

- ☐ Quality Control Manual
- ☐ Quality Inspection Plan
- ☐ Material Verification Records
- ☐ Welding Procedure Specification (WPS,PQR)
- ☐ Welder Performance Qualification (WPQ)
- ☐ Calibration Records
- ☐ NDE Records
- ☐ Field Sites
- ☐ Manufacturer Data Record (MDR,MTR's & CMTR's)





Material Examination and Testing

- Tensile Tests
- Pressure Tests
- Notched Toughness Test
- Hardness Tests HB/HV/HRC
- Metallographic Examination
- Determination of the Chemical Composition

NDT Facilities

- Radiographic Examination
- Ultrasonic Examination
- Magnetic Particle Inspection
- Dye Penetrant Test
- Eddy Current Testing





**A COMMITMENT
TO OUR VISION...**



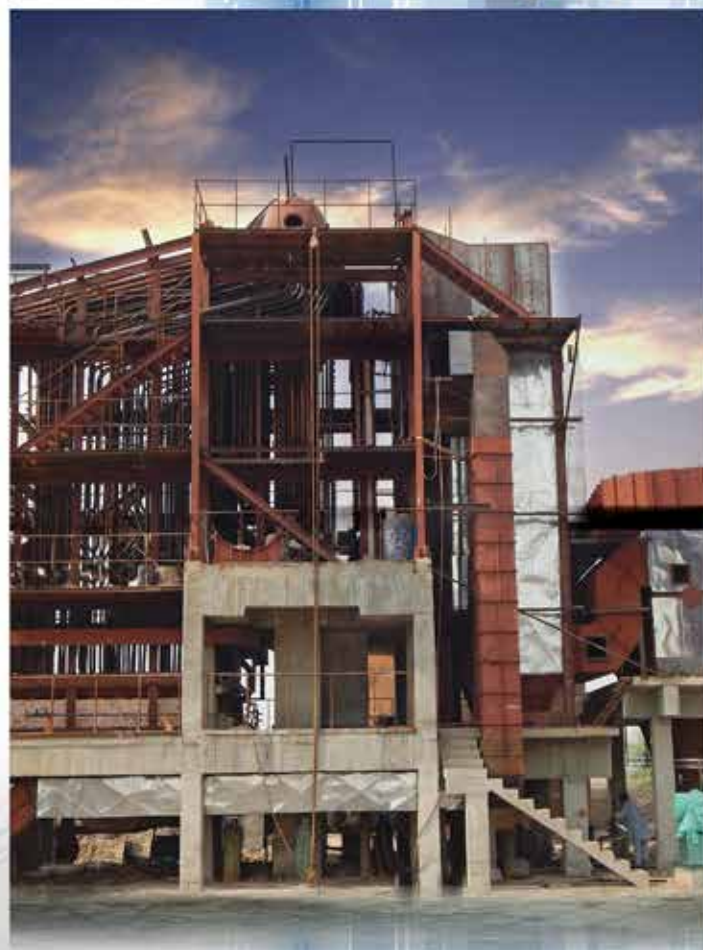
SUPERVISION OF ERECTION AND COMMISSIONING

Fabcon as an EPC contractor, awards the installation work to pre-qualified contractors and they are evaluated on the following basis

- ❑ Relevant experience of power plant installation
- ❑ HRM Evaluation
- ❑ HSE Procedures and Compliance
- ❑ QA/QC Procedures and Compliance
- ❑ Enlistment with relevant government authorities like PEC, FBR, EOBI, Social Security etc.
- ❑ Verification of tools and equipment required for installation work
 - Rigging
 - Carnage
 - Welding
 - Levelling and Alignment
 - Allied Electric Generation Equipment
 - Transportation







CERTIFICATIONS





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