



CMI's Denarad Boiler is a single-drum water tube boiler with natural circulation and a vertical flue gas flow. This well-proven design was developed for heavy industrial use and easy maintenance.

The boiler is a self-supporting boiler with water cooled furnace walls.

Each boiler meets steam equipment design, fabrication and safety regulations according to international standards (PED 97/23/EC, EN or ASME).

All tubes connected to the steam drum and to the headers are welded.

The convection parts (superheaters, evaporators and economisers) of the steam generator are pre-assembled in the workshop in respect with traditional road transport possibilities. Hydro-testing of the convection parts can be carried out prior to the assembly on-site. The complete boiler is then assembled on-site.

A radiant part with an empty combustion chamber enables the assembly of burner(s) at the bottom or on the side of the furnace.

A large steam drum outside of the flue gas is installed to enable fast start-up and ramping-up.

Both radiant and convection parts can be equipped with cleaning systems, such as sootblowers, waterguns, wall blowers and/or gravitational bullet cleaning systems.

To meet today's stringent low NO<sub>x</sub> emission requirements, CMI offers a range of solutions: low NO<sub>x</sub> burners, flue gas recirculation, SNCR or SCR systems.



CMI ENERGY

# Denarad Boilers

## Single-Drum Water Tube Boilers

### Operational Data

Steamflow	50 up to 250 T/h
Pressure	40 up to 170 bar(g)
Saturated/superheated steam temperature	Up to 545°C

### References

Customer	Country		Steam production (t/h)	Design Pressure (barg)	Working Pressure (barg)	Temp (°C)
BASF	Belgium	1	190	145	125	520
BASF - Antwerpen	Belgium	1	59	55.3	51.3	310
BASF - Antwerp (Linde)	Belgium	2	80	145	125	530
Südzucker - Werk Zeitz	Germany	1	80	110	92	537
Intercom, Aalst	Belgium	1	225	140	120	540
Rhône-Poulenc-Roussillon (CDF)	France	1	100	76	68	500
Agroindustria La Sierra	Uruguay	1	20	20		320
Finaneste - Antwerp	Belgium	2	100		103	510
Baron-Levêque-Krupp Moso Sugar Mill	Burundi	2	25	28	25	380
Leuna Werke AG	Germany	1	120		116	515
Cargill - Tilbury - UK	U.K.	1	45		45	400
Intercom, Ruien Power Plant Unit 5	Belgium	1	878	189	175	542
Louis De Poortere - Mouscron	Belgium	1	23	23	20	Sat.
Tiense Raffinaderij Tienen Sugar Mill	Belgium	1	100-110	101	85	520
U.C.B. - Sidac - Gent	Belgium	1	72		80	475
Denaeyer Papier NV	Belgium	1	120	105	120	515
Britisch Sidac - Wigton	U.K.	3	25		43	400
Soc. De Cultures for Binga	Zaire	2	6		32	350
Unerg, Awirs Power Plant Unit 4	Belgium	1	380	155	140	545
Intercom, Ruien Power Plant Units 3-4	Belgium	2	385	189	175	555
Cousa	Uruguay	1	18	30		410
Intercom Ruien Power Plant Units 1-2	Belgium	2	185	145	130	546
U.C.E. Linalux-Hainaut Liège Awirs Power Plant - Unit 1/2	Belgium	1	420-440	88	75	500

### Main Strengths

- / Operational flexibility from 10 to 100% MCR (Maximum Continuous Rate)
- / High thermal efficiency up to 97.5%
- / High availability up to 99.5%
- / Low-corrosion
- / Guaranteed low NOx
- / No special transport needed
- / Bundle cleaning is an option
- / Easy maintenance

### Fuels

- / Liquids
  - / Heavy fuel oil
  - / Light fuel oil
  - / Waste liquid fuel
- / Gaseous
  - / Natural gas
  - / Refinery gas
  - / Waste gas
  - / Blast furnace gas
  - / Cokes gas

### Our Offer

#### Process Engineering:

- / Process Flow Diagram (PFD)
- / Process and Instrumentation Diagram (P&ID)
- / Risk analyses (HAZOP/SIL)

#### Mechanical & Electrical Engineering

- / Steel structure
- / Piping
- / Ducting
- / Insulation and cladding
- / Electricity and Instrumentation (E&I)

#### Process Control

- / DCS, Digital Control System
- / ESD, Emergency Shut Down system
- / CEMS, Continuous Emission Monitoring System

#### Equipment Engineering

- / Boilers according to DIN and ASME codes
- / Bundle cleaning with sootblowers, water-guns, wall blowers and/or gravitational bullet cleaning systems.
- / Rotating equipment (pumps, fans, turbines, ...)
- / Flue gas cleaning (DeNOx, DeSOx, dustfilter, ESP, ...)

#### EPC Contracting

#### Certificates

- / ISO 9001
- / ISO 14001
- / ASME 'S' – 'U' – 'PP'
- / VCA Petrochemical

#### CMI Energy

Willebroek – Belgium  
 Tel. +32 3 860 08 60  
 Fax +32 3 886 58 31  
 industrial.boilers@cmigroupe.com