

# Immersed Electrode High Voltage Hot Water Boiler

## CEJW Immersed Electrode Hot Water Boilers for Large Applications

These immersed electrode boilers have unlimited application possibilities wherever a need for large hot water process or space heating exists. A partial list of possible uses includes:

- Office and apartment buildings
- Hospitals, schools, hotels, motels
- Food processing Plants
- Clothing and textiles plants
- Industrial plants
- Plastic and chemical plants
- Mining Operations
- Power plants for District Heating
- Car Manufacturing

## WHY CHOOSE A HIGH VOLTAGE BOILER?

### > OUTPUT MATCHES FUEL BURNING BOILERS

Due to considerable advances in High Voltage electric boiler technology for heat or power generation, Immersed Electrode Boilers can match the capacity of large gas or oil-fired boilers (up to 60 MW) while occupying a much smaller footprint.

### > LOWER OPERATING COSTS

Immersed Electrode Boilers are simple to operate and maintain with no complex pollution or combustion control equipment required. Users can also take advantage of lower energy rates during daily or seasonal off-peak periods.

### > ECONOMICAL INSTALLATION

Operating at distribution voltages, electrode boilers eliminate the need for fuel lines, storage and handling equipment, economizers and emission control equipment, saving on capital expenditures.

### > MINIMAL MAINTENANCE

Immersed Electrode Heating Loops have a minimum number of components, equipment and electrical controls, resulting in fewer parts to clean and maintain. They are not affected by the water quality on the process flow as the boiler heating loop is isolated from the existing heating water system.

### > ENVIRONMENTALLY FRIENDLY

Without combustion, the operations of Immersed Electrode Boilers are quiet, clean and emissions free. Problems associated with other energy sources such as noise, fuel fumes, fly ash and large stacks, do not exist.





## CEJW IMMERSED ELECTRODE HOT WATER BOILERS FEATURES:

- Capacity range: 2500 to 68,000 KW
- Electric Power Supply Voltage : 4160 to 25000 V
- Maximum Operating Temperature for Standard Models: 180 °C (360 ° F)
- Operating pressure: 3 to 14.5 bar (50 to 200 psi)
- Power Feeds (Current Passage) assembled and certified for 42000 V and 16 bar (230 psi) for any operating voltage
- Fast Response: 0 to 100 % capacity in:
  - Hot State: 1 minute
  - Cold to Hot state : 15 to 25 minutes (depends on the size)
- Economical even for capacities between 2 to 6 MW
- Simple controls
- Can be added to existing systems and suitable for optional water storage facilities
- Ability to take advantage of low off-peak electricity rates and demand swings



## PERFORMANCE

### CEJW PERFORMANCE & BENEFITS

CEJW boilers convert virtually 100% of the electrical energy into heat. Automatic load and temperature controls provide stepless control over an output range from 10 to 100%.

### ECONOMICAL INSTALLATION

Operating at distribution voltages, CEJW boilers eliminate the need for fuel lines, storage and handling equipment, economizers and emission control equipment, saving on capital expenditures. Also, in the case of using Electric Boiler, they eliminate the need for a stepdown transformer.

### LOWER OPERATING COSTS

The CEJW boilers are easy to operate. Automatic controls (PLC) reduce the need for operating and supervisory personnel. The cost of water treatment is practically eliminated as the system is isolated. The water loop is initially filled with water at the selected conductivity and quality. Automatic venting ensures full water filling of the vessel.

For areas affected by allocations or interruptions of natural gas and costly oil, our CEJW boilers provide an economical alternate solution, providing a dependable source of hot water. They also allow users to take advantage of lower energy rates during daily or seasonal off-peak periods or satisfying the swing demand.

### SAFER OPERATION

There are no combustion hazards because there are no flames, fumes, fuel lines or fuel storage tanks. There is no low water danger since the current cannot flow without water and there are no problems with heat buildup or electrode burnout even if scaling should occur. Thermal shock is eliminated. Electrically safe due to a grounded pressure vessel. A safety enclosure around boiler is not required and expensive isolating piping connections are not required.

### MINIMAL MAINTENANCE

Long-life electrodes are cooled by water jets produced by an integrated loop pump. Acme CEJW boilers having a minimum number of components and electrical controls, providing maximum reliability. Without fuels, cleaning and maintenance are reduced.

### ENVIRONMENTALLY FRIENDLY

Without combustion, the operation of the CEJW boiler is quiet, clean and emission-free. Problems associated with other energy sources such as noise, fuel fumes, fly ash, large stacks, do not exist with the CEJW boiler.



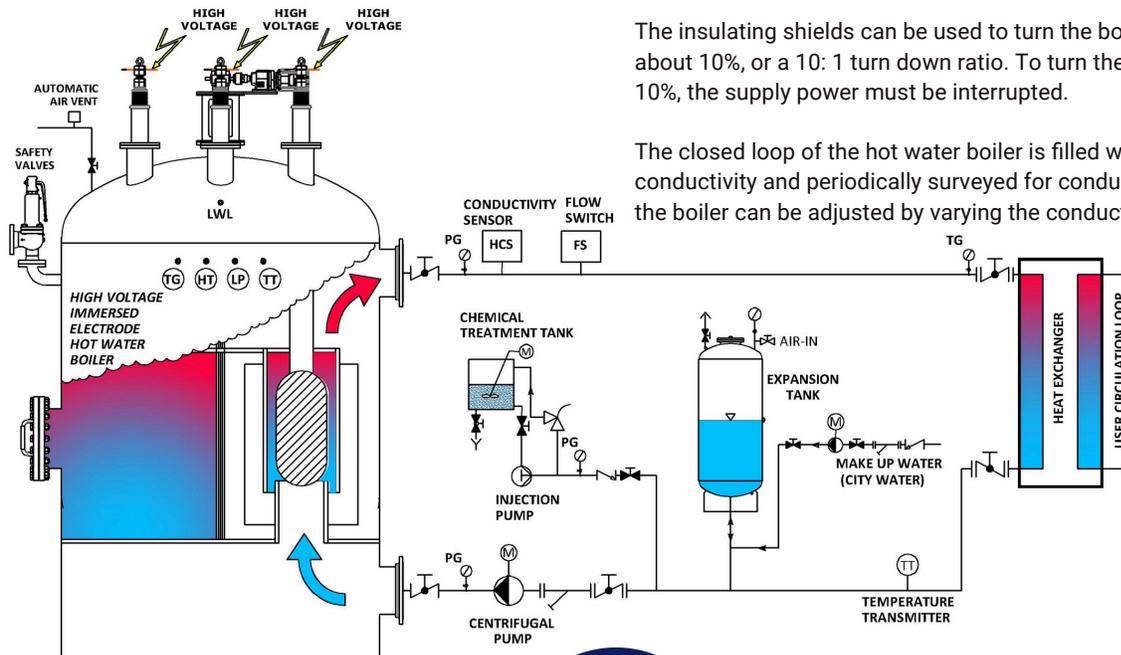
## OPERATION

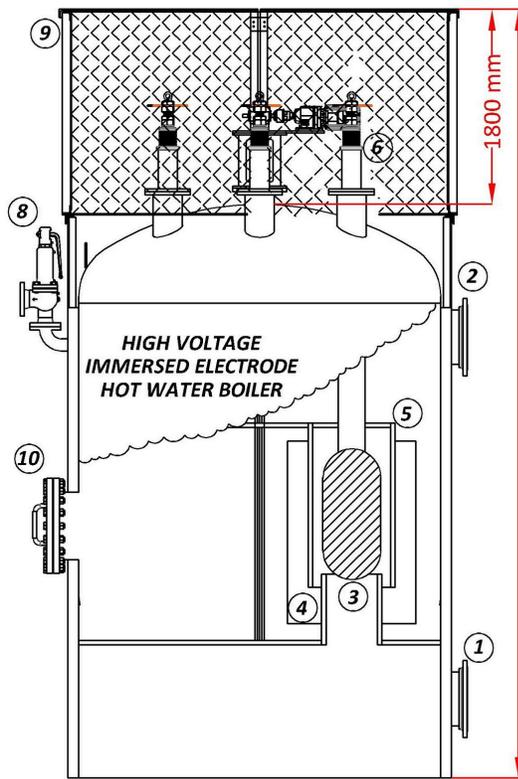
### HOW THE MODEL CEJW WORKS

The CEJW operates flooded with water at the selected conductivity. A motorized drive system is used to interpose a concentric insulating counter electrode between the electrode and the neutral counter electrode. The more direct the exposure between neutral shield and the electrode, the greater the current draw (amperage) and more hot water is produced. As the insulating shield is moved between the electrode and neutral, the current path length and output is changed. Hot water is generated in the space between the electrodes and neutral counter electrodes and escapes into the vessel.

The insulating shields can be used to turn the boiler output down to about 10%, or a 10: 1 turn down ratio. To turn the boiler down below 10%, the supply power must be interrupted.

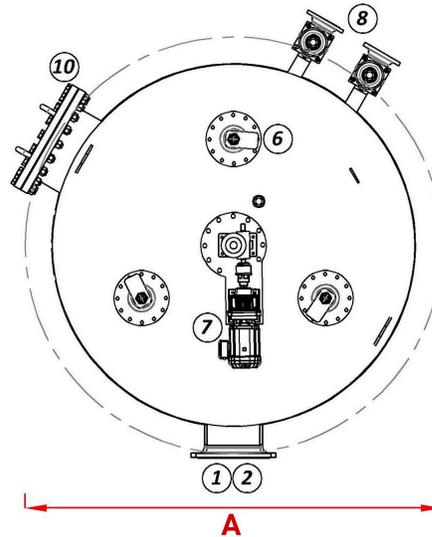
The closed loop of the hot water boiler is filled with water at selected conductivity and periodically surveyed for conductivity. The capacity of the boiler can be adjusted by varying the conductivity.





1	WATER INLET	6	POWER FEED
2	WATER OUTLET	7	MOTORIZED DRIVE SYSTEM
3	ELECTRODE	8	PRESSURE SAFETY VALVES
4	COUNTER ELECTRODE	9	SAFETY CAGE
5	SHIELD	10	MANHOLE

**B**



**A**

## STANDAR CEJW HOT WATER BOILER

MODEL	VOLTAGE (KV)	POWER (KW)	BOILER DIA. A mm(Inch)	BOILER HEIGHT B mm (Inch)	INITIAL CLEARANCE HEIGHT FOR POWER FEED INSERTION mm(Inch)	PUMP FLOW RATE m <sup>3</sup> /hr (gpm)
CEJW-6	4.16	2500	2100 (83")	4200 (165")	4700 (185")	300 (1300)
	6.9	4200				
	10	6000				
	13.8 - 25	7000				
CEJW-8	4.16	3500	2200 (86")	4500 (177")	5200 (205")	350 (1550)
	6.9	5700				
	10	8000				
	13.8 - 25	9000				
CEJW-10	4.16	4200	2550 (100")	4700 (185")	5500 (215")	480 (2100)
	6.9	7000				
	10	10000				
	13.8 - 25	11000				
CEJW-15	4.16	7500	2550 (100")	5300 (208")	6700 (263")	650 (2850)
	6.9	12000				
	10	15000				
	13.8 - 25	17000				
CEJW-20	4.16	9000	2900 (115")	5800 (228")	7400 (290")	850 (1700)
	6.9	15000				
	10	20000				
	13.8 - 25	22000				
CEJW-30	4.16	15000	3100 (122")	5850 (230")	7600 (300")	1300 (5700)
	6.9	25000				
	10	30000				
	13.8 - 25	33000				
CEJW-40	4.16	18000	3200 (126")	6800 (267")	9000 (355")	1700 (7500)
	6.9	30000				
	10	40000				
	13.8 - 25	45000				
CEJW-60	4.16	33000	3950 (155")	6800 (267")	9000 (355")	2550 (11200)
	6.9	54000				
	10	60000				
	13.8 - 25	68000				

This information provided is a general description of the CEJW. All specifications are subject to change without notice. Installation, maintenance, operating and any other instructions furnished with the equipment must be carefully followed by installers, owners and users.



# CEJW HEATING LOOP COMPONENTS FOR STANDARD MODELS

## BOILER

- Pressure vessel, ASME (Section I or IV) design, CRN/U stamp pressure vessel registration certificate or CE / PED required
- Complete assembled Power feeds tested and certified for 16 bar (230 psi) and 42 KV
- Boiler actuator and capacity control system
- Large DN 500 (20") Manhole
- Sheet metal jacket and 100 mm (4") ceramic fiber thermal insulation
- Safety cage surrounding high voltage connections
- Safety valve(s)
- Manual drain (initial fill-up) valve
- Automatic air vent

## CIRCULATION PUMP

Simplex or duplex pumps circulate water in the loop. Flow of each pump is determined by the cooling requirements of the electrodes therefore ensuring their long life and minimizing wear. Air cooled pump skids include TEFC motors, usually at building voltage controlled from the System Control Panel. Pressure loss in the loop determines the head of the pump at the required flow.

## HEAT EXCHANGER

Completes heating system loop including boiler and pump. Stainless Steel Plate type construction with standard steel plates individually removable on rod. Primary circuit design method is to pump flow and heat transfer of boiler heating capacity. Secondary circuit water heats building, plant or storage facilities transferring heating boiler capacity.

## EXPANSION TANK

Expansion tank based on total water content of the loop and its operating pressure.

## ELECTRICAL

- Ground terminals
- Ground Fault Detection Relay
- Power feeds connection busbars
- Electrodes
- Circulation pump motor starter or VFD

## GUARANTEE

All our Immersed Electrode Boilers are guaranteed for one year in operation or 18 months after shipment against defective workmanship and material. Guarantee limited to replacement of defective parts only, when returned, prepaid, to the factory. Copy of guarantee available on request.



## CHEMICAL FEED WATER TANK AND INJECTION PUMP

All boilers require adequate water quality as determined by conductivity, pH, softness and chemical content. The type and degree of water treatment will be determined by local water quality, type of boiler, nature of operation, and quantity of raw make-up water required.

Chemical Treatment tank equipped with a mixer and an injection pump to add chemical to heating loop water.

## INSTRUMENTS AND CONTROL

- Free standing control panel
- Pre-programmed electronic processor (PLC) and HMI on the panel
- Conductivity sensor to continuously monitor and control the conductivity of the Heating Loop Water
- Flow switch to continuously monitor the circulation pump water flow and interrupt the power in case of no water
- Two Temperature transmitters to control the maximum operating temperature and the boiler capacity
- Low water level
- High Temperature sensor
- Pressure/ Temperature gauges
- Proximity Sensors for shield traveling limits and position
- Remote Supervision (optional)



## ACCESSORIES

- Isolating valves for boiler, heat-exchanger and centrifugal pump
- Piping for the loop
- Y strainer, located on the pump suction pipe
- Filling water system, connected to the Expansion tank-includes pump, Y strainer, check valve and isolating valves

## ACCESSORIES FOR CEJW- OUT OF ACME SCOPE

- Circuit switchgear
- Water treatment equipment
- Thermal Storage: Can be incorporated as part of the heating system. It will store the hot water produced during periods of low demand and low cost and use it at advantageous time

## ELECTRICAL REQUIREMENTS

CEJW boilers can be connected directly to the high voltage power distribution network. Any voltage up to 13.8 KV, 3 phase, 3 wires and centerline grounded line. Any voltages more than 13.8 KV requires a 4 wire distribution. The boiler shell and cage must be grounded to the building steel and ground mat.



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