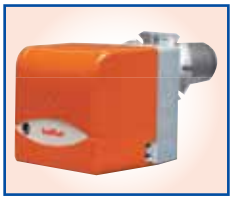
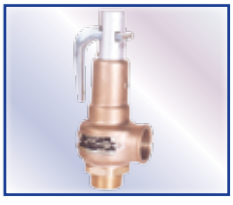
Precision Storage Vessels

OIL / GAS FIRED WATER HEATERS



PRECISION

Oil / Gas Fired Water Heaters

Direct Oil / Gas Fired water heaters are the best solution where fuel fired hot water system can be used. Wide range output can be achieved in this water heaters. Fully automatic burners are used for safe operation.

Storage Calorifier

Storage calorifiers are sized to meet the peak demand period with recovery periods varying from one to four hours.

Advantages

- Efficiency is maintained throughout the range of load. Even at part load all energy is converted into heat.
- Space requirements are minimum. Separate boiler not required.
- Installation is simplified.
- The calorifier can be installed with minimum electric load.
- Maintenance is kept to a minimum.
- Low nox burners are used.
- Fuel efficient burners are used.
- Diesel oil, Natural Gas, LPG and Propane can be used.

Standards

ASME Code construction:- All tanks are constructed in accordance with ASME code section IV Stamped and labeled for 125 PSI (8.6 BAR) as Standard.

Precision also design Oil/Gas calorifiers as per British Standard BS 853:1996, BS 5500:1997 or in accordance with Art 3.3 of the European Directive EEC/97/23 for pressure equipment.

HW	O/G	30	PC	V	1000 L
Hot Water	Oil / Gas	KW	Shell Material	Configuration	Capacity
	O	Input	PC-Precision Coat	V-Vertical H-Horizontal	Litres

Eg: HWO30PCV1000L

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Vessel Lining

Precision Coat

Precision coat is a polymerized coating which is applied to all internal surfaces of the tank. Tank surfaces are first sandblasted and cleaned to a white metal finish and then precision coat is applied uniformly. The tanks are then forced cured at 95°C to form a glossy lining unaffected by thermal shock from -6°C to 80°C. Precision coat is approved by US department of agriculture and with NSF/61 certification for drinking water.

Standard - Shells

Steel	SA516 Gr-70
Coating	FDA approved Precision coat material

Heating Section

Water heaters are fitted with removable type fire tube heat exchanger. These heat exchangers are made of carbon steel tubes and coated with specially formulated coating to withstand high temperature.

Burner

Monoblock pressure jet fully automatic oil / gas fired burners are used to heat the water. Depend on recovery, burners can be selected either on / off type or full modulation type.

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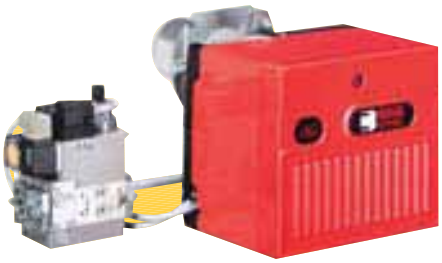
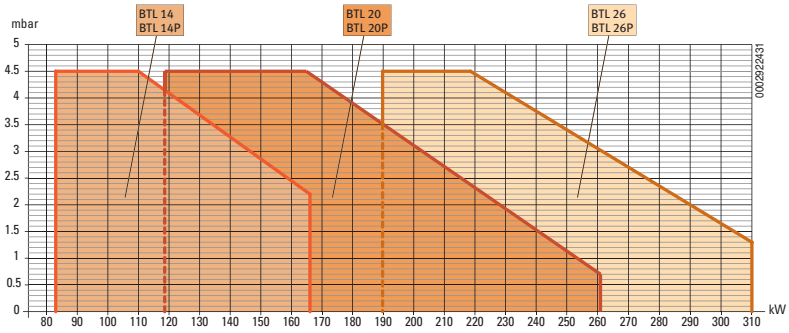
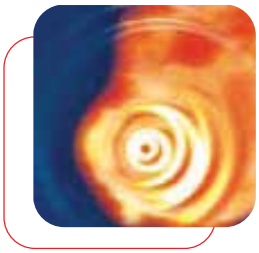
Oil Fired Burner



Gas Fired Burner

Burners will be highly fuel efficient and with low nox capabilities.





Monoblock, gas burners, completely automatic, one stage operation, made up of:
- Fan with forward curve blades
- Cover lined with sound-proofing material
- Air damper, completely closed in stand by, with external adjustment, with no need to remove the cover
- Single phase electric motor 230 V, 50 Hz
- Combustion head fitted with:
    - stainless steel head cone, resistant to high temperatures
    - ignition electrodes
    - ionisation probe
    - gas distributor
    - flame stability disk
- Flame inspection window
- Adjustable air pressure switch, with graduated selector, to guarantee burner lock out in the case of insufficient combustible air
- Microprocessor-based burner safety control box, with diagnostic and remote reset functions
- Protection filter against radio interference (included into burner safety control box)
- IP X0D (IP 40) electric protection level.

Standard equipment:

- Sliding flange
- Flange insulation screen
- Screws and nuts for fixing the flange to the boiler
- 7-pin plug
- Remote control release kit
- Instruction handbook for installation, use and maintenance
- Spare parts catalogue.

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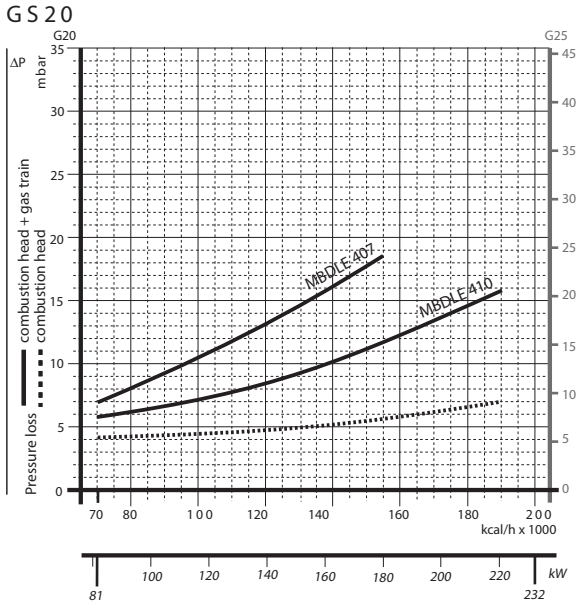
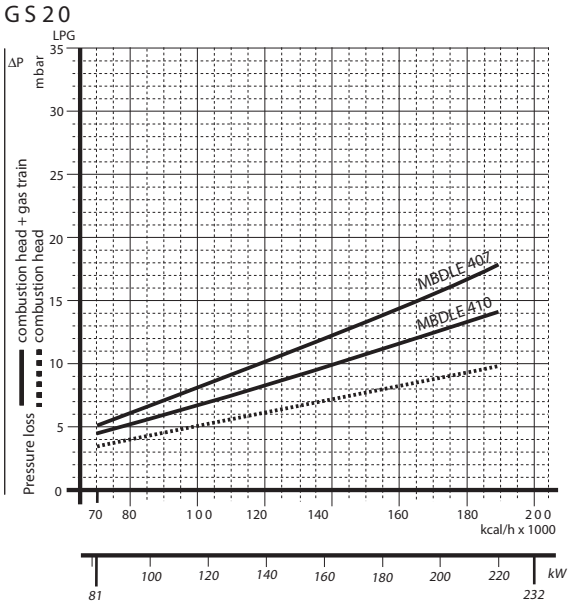
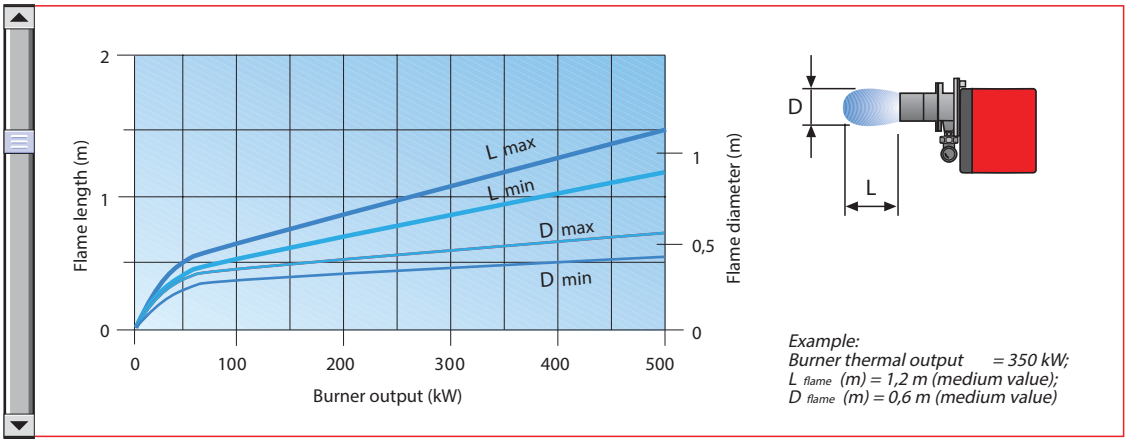
NATURAL GAS



LPG



Dimensions of the flame



Removable Type Heat Exchanger

Heat Exchanger section is made of seamless carbon steel sheet and coated with specially formulated lining material to withstand by high temperatures. Heating surface area is more.

Header Chest of the heat exchanger will be internally lined with refractory to withstand high flue gas temperatures. Header chest will be externally insulated with fibre glass wool mattress and clad with GI sheet painted.

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Control Panels

Control panels are manufactured in house. All the wiring of panel and components are to IEE (Current Edition) Standard.

Following Controls and Fittings are available in the panel

- Isolator
- Safety Door Inlet Lock
- Indicators
- Power On
- High Temperature alarm (Optional)
- Low Water Level Alarm (Optional)
- Operating Temperature Indication
- Hi limit Temperature Indication
- High temperature fault
- Low Water fault

Specifying Oil/ Gas Fired Storage Calorifiers

High capacity water heaters shall be model HWO with -------- litre storage capacity rated at --------

kW with -------- volts ----- phase, fired with oil/gas - HP 04. Heaters are to be insulated and jacketed for vertical / horizontal installations. The water heater tank shall be constructed in accordance with ASME Boiler and pressure vessel code requirements stamped and registered with the national Board of Boilers and Pressure vessel inspectors or requires BS standard of European Standards (specify one) The tank shall have 150Psi (10 bar) design pressure.

All tanks shall be lined with precision coat manufacturer approved certificate, confirming quality assurance to be provided along with the heaters. A manhole shall be provided as per standards. Each tank shall be furnished with magnesium anodes to protect against corrosion.

Water Heaters to be fitted with removable type shell and tube heat exchangers. Heat exchangers should be manufactured with seamless tubes. Heat exchangers should be coated with specially formulated precision coat.

Water heaters should be fitted with fuel efficient low nox burners fired either oil/gas.

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The water heaters to be fitted with factory fitted shell mounted pre-wired control panel with Isolator, Safety Door Inter Lock, Test/On/Auto switches, Illuminating Indication for power on, High Temperature fault, Low Water Fault, Thermostatic control shall comprise of a thermostatic switch for operating and high limit. Temperature display, low water cut out to be mounted on the shell.

The control panel should have 3 volt free contacts to give signals for Low Water /Power On/Off/Temperature and for external alarm.

The tank to be fully lagged with 50mm thick fibre glass mattress and clad with in a G.I sheets painted with two coat gloss blue paint.

The tank shall be fitted with screwed/flanged connection for safety valve, thermostats, Pressure gauge. The water heaters shall be factory mounted, wired and tested.

Selection & Sizing

Maximum Demand Rates (litres/hour)@60°C

Sl. No.	Description	Apartment house	Club	Gymnasium	Hospital	Hotel	industrial Pant	Office Building	Private Residence	School	YMCA
1	Basin, Private Lavatory	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
2	Basin, Public Lavatory	15	23	30	23	30	45.5	23	-	57	30
3	Bathtub	76	76	114	76	76	-	-	76	-	114
4	Dishwasher	57	190-570	-	190-570	190-760	76-380	-	57	76-380	76-380
5	Foot basin	11	11	46	11	11	46	-	11	11	46
6	Kitchen sink	38	76	-	76	114	76	76	38	76	76
7	Laundry, Stationary tub	76	106	-	106	106	-	-	76	-	106
8	Pandry sink	19	38	-	38	38	-	38	19	38	38
9	Shower	114	568	850	284	284	850	114	114	850	850
10	Service sink	76	76	-	76	114	76	76	57	76	76
11	Hydrotherapeutic shower				1520						
12	Hubbard bath				2270						
13	Leg bath				380						
14	Arm bath				130						
15	Sitz bath				114						
16	Continuous flow bath				625						
17	Circular wash sink				76	76	114	76		114	
18	Semicircular wash sink				38	38	57	38		57	
	Demand Factor	0.3	0.3	0.4	0.25	0.25	0.4	0.3	0.3	0.4	0.4
	Storage Factor	1.25	0.9	1	0.6	0.8	1	2	0.7	1	1

Courtesy: Ashrae

Example:- Determine heater and storage tank size for an apartment building from a number of fixtures.

Solution

60 Lavatories	x	2	7.6	l/h	=	456 l/h
30 Bathtubs	x	20	76	l/h	=	2280 l/h
30 Showers	x	30	114	l/h	=	3420 l/h
60 Kitchen sinks	x	10	38	l/h	=	2280 l/h
15 Laundry tubs	x	20	76	l/h	=	1140 l/h
Possible maximum demand					=	9776 l/h
Proable Maximum demand		=		9576 x 0.30	=	2873 l/h
Heater or coil capacity					=	2873 l/h
Storage tank capacity		=		2873 x 1.25	=	3591 l/h

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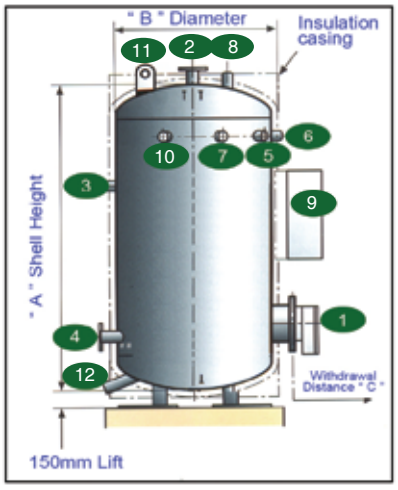
Sizes and Dimensions



Description

1	Burner	7	Pressure Gauge
2	Secondary Flow	8	Safety Valve/Pressure Temp. Relief Valve
3	Secondary Return	9	Control Panel
4	Cold Feed	10	Low water cut-off
5	High Limit Safety	11	Lifting Hooks
6	Thermometer	12	Drain

HWO DIMENSIONAL DATA

Model No.	Capacity Litres	Dimensions in mm				Connections			Weights kgs
		A	B	C (max)	D (max)	in /Out	DRAIN	RETURN	
HWO	440	1800	600	600	1500	1¼ "	1 "	1¼ "	250
HWO	550	1700	675	675	1500	1¼ "	1 "	1¼ "	260
HWO	700	1750	750	750	1500	1¼ "	1 "	1¼ "	300
HWO	800	1950	750	750	1500	1½ "	1¼ "	1½ "	330
HWO	900	2000	800	800	1500	1½ "	1¼ "	1½ "	400
HWO	1000	1950	750	750	1500	2 "	1¼ "	2 "	430
HWO	1200	2100	900	900	1500	2 "	1¼ "	2 "	480
HWO	1350	2350	900	900	1500	2 "	1¼ "	2 "	530
HWO	1500	1950	1050	1050	1500	2 "	1¼ "	2 "	550
HWO	1800	2300	1050	1050	1500	2 "	1¼ "	2 "	630
HWO	2000	2500	1050	1050	1500	2 "	1¼ "	2 "	670
HWO	2300	2400	1150	1150	1500	2 "	1¼ "	2 "	740
HWO	2500	2450	1250	1200	1500	2 "	1¼ "	2 "	800
HWO	3000	2900	1200	1200	1500	2 "	1½ "	2 "	910
HWO	3500	2700	1350	1350	1500	2 "	1½ "	2 "	1250
HWO	4000	3050	1350	1350	1500	2 "	1½ "	2 "	1370
HWO	4500	3400	1350	1350	1500	3 "	1½ "	3 "	1500
HWO	5000	3200	1450	1450	1500	3 "	1½ "	3 "	1500
HWO	6000	3800	1450	1450	1500	3 "	1½ "	3 "	1720
HWO	7000	3300	1680	1500	1500	3 "	1½ "	3 "	2350
HWO	8000	3700	1680	1500	1500	3 "	1½ "	3 "	2560
HWO	9000	4200	1680	1500	1500	3 "	1½ "	3 "	2820
HWO	10000	4600	1680	1500	1500	3 "	1½ "	3 "	3030
HWO	12500	6000	1830	1500	1500	3 "	1½ "	3 "	4360
HWO	15000	6000	1830	1500	1500	3 "	1½ "	3 "	4360

* Pressures available upto 20 bar (300psi).
* Capacities available upto 30,000 litres.
* Specified weights are for 7 bar Design pressure & 10.5 bar Test Pressure.
* Alternate sizes available.
* Please consult Factory.

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Accessories

Temperature Sensor

Each water heater will be fitted with 2 nos of Temperature sensor. One will be dedicated for sensoring operating temperature and the other will be set of high limit temperature

Pressure Gauge

Water heater will be fitted with pressure gauge. Pressure Gauge will indicate the pressure inside the water heater.

calorifier

Thermometer

The thermometer is located near the top of a storage calorifier to measure the temperature of water reaching the outlet.

Safety Valve

All calorifiers should be fitted with a safety valve to protect the cylinder against over-pressure due to malfunction of controls or incorrect operation.

Supports

All calorifiers have their legs or cradles permanently fixed to the shell before dispatch. This is to assist handling and to offer greater protection against damage.

Inspection Opening

Each water heater will be fitted with a 400 mm dia manhole for access of internals, without disturbing the heat exchanger.

Control Thermostats

Control Thermostats are applied for temperature regulation for heating installations. The control thermostats consists of a temperature sensor, a set point adjuster with temperature scale and excess temperature safety device, a capillary tube and an operating element. They regulate the temperature of the medium by causing the connected valve to open or close. The thermostats operate according to the liquid expansion principle.

Anodes

Magnesium anodes are supplied as standard to water properties. Magnesium anodes help to protect cylinders. The life of the magnesium anode depends on the quality of the water and regular checks should be made to establish a service period.

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Insulation

Adequate thermal insulation is essential to prevent unnecessary heat losses from storage calorifiers which may be standing for many hours at working temperature. Standard factory-fitted insulation consists of 50mm thick Fiber glass wool mattress which is closely fitted to the shell and encased in mild steel sheets of 1mm thick G.I sheets with one coat of redoxide primer and two coats of gloss paint.

Low Water Level Switch

Low water cut off probe type is fitted as standard for all water heaters.The risk of switching on the heaters when they are not covered by water damages the electric heating element.

High Limit Cut Out

All fired water heaters is fitted with a high temperature cut out as standard. This acts as and immediate monitor of overheating. It will be fitted with a manual reset button so that the heater will continue to operate from the high limit switch if the control thermostat is malfunctioning.

Water Quality

All water contain dissolved substances A large proportion of these dissolved substances are generally calcium and magnesium carbonates and sulphates. The concentration of these salts in the water define the hardness of the water. Greater their concentration harder the water, smaller their concentration softer the water.

Generally, water which can be considered as slightly hard to moderately hard we must consider the effects on the immersion heaters and other components within the calorifier shell.

For more details please consult your water treatment SPECIALIST.

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Useful Conversions

Electrical Data

$$\text{Amps (3 Phase)} = \frac{\text{kW} \times 1000}{\text{Volts} \times 1.732}$$

$$\text{Amps (1 Phase)} = \frac{\text{kW} \times 1000}{\text{Volts}}$$

Btu/hr Requirement

$$\text{Btu / hr Output} = \text{GPM} \times 60\ \text{min/hr} \times \times 8.33\text{lb/gal} \times \text{Temp.Rise}$$

$$\text{Btu / hr Input} = \frac{\text{GPM} \times 60\ \text{min/hr} \times \times 8.33\text{lb/gal} \times \text{Temp.Rise}}{\%\ \text{Efficiency}}$$

Efficiency of Heat Transfer

$$\%\ \text{Efficiency} = \frac{\text{GPH} \times 8.33\ \text{lb/gal} \times \text{Temp. Rise}}{\text{Btu/hr Input}}$$

Recovery - Electric

$$\text{GPH} = \frac{\text{kW Input} \times 3412\ \text{Btu/kW} \times \%\ \text{Efficiency}}{8.33\ \text{lb/gal} \times \text{Temp. Tise}}$$

Temperature Rise

$$\text{Temp. Rise} = \frac{\text{Btu/hr Input} \times \%\ \text{Efficiency}}{\text{GPM} \times 60\ \text{min/hr} \times 8.33\ \text{lb/gal}}$$

Heat - Up Time

$$\text{Time in hours} = \frac{\text{GPH} \times 8.33\ \text{lb/gal} \times \text{Temp. Rise}}{\text{Btu/hr Input} \times \&\ \text{Efficiency}}$$

% Hot Water Required to provide Mixed Water at a lower Temperature

$$\%\ \text{of the Hot water required in mixure} = \frac{\text{Temp.Mixed Water F - Temp. Cold Water F}}{\text{Temp. Mixed Hot F - Temp. Cold Water F}}$$

$$\text{KW} = \frac{m \times C_V \times \Delta T}{860 \times \text{No. of Hours}}$$

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RANGE OF PRODUCTS

- HEAT EXCHANGER PACKAGE
- AIR RECEIVER
- STEAM ACCUMULATORS
- INDIRECT HEATED STORAGE CALORIFIERS
- FEED TANKS & CONDENSATE RECEIVERS
- BLOWDOWN VESSEL
- ELECTRIC WATER HEATERS
- BUFFER VESSELS

PRECISION

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