



# PRECISION BOILERS



## ST "SERIES II" ELECTRIC STEAM BOILERS

### DESIGN ADVANTAGES

- Heavy duty 16 gauge cabinet and structural steel base provide greater strength.
- All electrical components are UL listed or recognized.
- All units meet CSD-1 requirements.
- Large steam chest effects high quality steam/minimum carryover.
- Optional features and trim available to meet any custom design criteria.
- Large control cabinets with ample room for addition of options or field mounted interfaces. All wiring is color-coded and all electrical components are readily accessible for ease of field service.
- Individual immersion heating elements are 2 1/2" square flanged for ease of replacement. The elements are made of a highly corrosion-resistant Incoloy-sheath (332 SS), with nickel-chromium resistance wire packed in magnesium oxide powder, and configured in a U-tube design. Elements are available in both 1-phase and 3-phase ratings, and are limited to 75 watts per square inch power density to assure long life.

### STRINGENT STANDARDS

- ASME Section IV "H" Code ( $\leq 15$ PSI)
- ASME Section I "S" Code ( $> 15$ PSI)
- UL Subject 834
- NEC/NFPA Article 424-G
- ASME Safety Code CSD-1

### Contact Your Sales Representative

for Many Other Options

to Meet Your

Specific Requirements.

### STANDARD FEATURES AND ACCESSORIES

- ASME National Board Registered Pressure Vessel ("H" or "S" Code)
- Full Size Structural Steel Base
- Heavy Duty Steel Boiler Vessel Housing
- Three Inch Fiberglass Insulation
- ASME Safety Valve(s) (2 on units  $> 1100$ KW)
- Pressure Gauge with Gauge Cock
- Feedwater Stop & Check Valves
- Full-Port Bottom Blowdown Valve(s) (2 on units  $> 100$  gal)
- Combination Float-Type Level Control/Low Water Cutoff with Blowdown Valve
- Water Level Sight Gauge with Blowdown Valve
- Manual Reset Probe-type Low Water Cutoff with Pilot Light
- Surface Blowoff Provision
- Incoloy-Sheathed Elements @ 75 WSI
- Construction per NEC & UL, with UL Label
- Integral Electric Control Panel with Key-Locked Door(s)
- Internal Branch Circuit Fusing
- Magnetic Contactors rated 500,000 Cycles
- Main Supply Circuit Lugs
- 120 Volt Fused Control Transformer
- On/Off Switch with Pilot Light
- Status Pilot Light for each Step
- Two Adjustable High Limit Cut-offs: w/Common Pilot Light
  - (1) Auto Reset (1) Manual Reset
- Pressure Control Via:
  - Staged On/Off Pressure Switches (Units of 1, 2, or 3 Steps)
  - Proportional Progressive Sequence Step Control (Units  $> 3$  Steps)
- Manual Limit Toggle Switches (one per step)



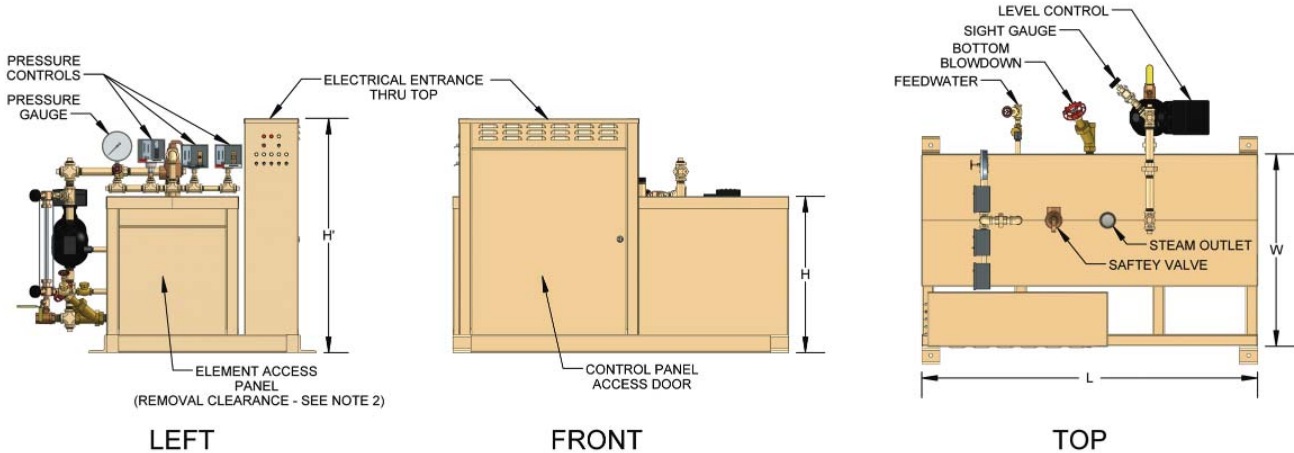
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### OPTIONAL EQUIPMENT AND ACCESSORIES

- Non-Fused Disconnect or Non-Auto Breaker
- Fused Disconnect or Automatic Breaker
- Shunt Trip Circuit Interrupter
- Ground Fault Detection System
- Ammeter (1 or 3 phase)
- Voltmeter (1 or 3 phase)
- Watt-hour Meter
- Time Clock (24 hour or 7 day)
- Alarm Buzzer with Silencing Switch
- Safety Door Interlock
- Auxiliary Float-Type Low Water Cutoff
- Vacuum Breaker (Installed)
- Design Pressures Above 150 PSI
- Integral Feed System
- Cabinet Over-Temperature Alarm System
- Stainless Steel Construction (100PSI / 200KW Max)
- Packaged with Feed Systems and Blowdown Tank
- Automatic Feedwater Solenoid Valve (Installed)
- Automatic Timed Surface Blowoff System (Installed)
- Low Pressure Switch/Alarm

### DIMENSIONAL DATA



NOTE: MINIMUM CLEARANCE OF 24" AROUND BOILER, 18" FROM TOP OF CONTROL PANEL AND 36" IN FRONT OF CONTROL PANEL.

(1) Model Number	Max Input KW	Steam F&A 212F (PPH)	Max # of Elements	Connection Sizes (NPT)						Tank Data		Dimensions (2) (Inches)				Weights (Pounds)	
				Feed Water	Blowdown		Steam Outlet			Dims (In)	Vol (Gal)	L(3)	W	H	H'	Ship	Oper
					15PSI	>15PSI	15PSI	50PSI	150PSI								
ST12S-	60	205	3	1/2"	3/4"	3/4"/1"	1-1/4"	1"	3/4"	12X42	20	50	28	24	27	550	650
ST16S-	140	478	7	1/2"	3/4"	3/4"/1"	2"	1"	1"	16X42	32	50	32	26	33	750	910
ST16D-	200	682	10	1/2"	3/4"	3/4"/1"	2"	1-1/4"	1"	16X42	32	54	32	26	33	800	960
ST20S-	240	819	12	3/4"	1"	1"	2-1/2"	1-1/4"	1-1/4"	20X42	41	50	36	30	51	1000	1200
ST20D-	320	1092	16	3/4"	1"	1"	3"	1-1/2"	1-1/4"	20X42	41	54	36	30	51	1050	1250
ST24S-	360	1228	18	3/4"	1-1/4"	1"	3"	1-1/2"	1-1/2"	24X44	74	52	40	34	51	1300	1670
ST24D-	600	2047	30	3/4"	1-1/4"	1"	4" FLG	2"	1-1/2"	24X44	74	56	40	34	51	1400	1770
ST30D-	960	3276	48	3/4"	1-1/2"	1"	6" FLG	3" FLG	2"	30X46	124	60	48	40	63	1700	2340
ST36D-	1280	4367	64	1"	1-1/2"	1"	6" FLG	3" FLG	2-1/2"	36X46	166	60	54	46	63	2100	2960
ST42D-	1880	6415	94	1"	1-1/2"	1"	8" FLG	4" FLG	3" FLG	42X48	230	64	62	52	81	2800	4000
ST48D-	2400	8325	122	1"	2"	1-1/4"	8" FLG	5" FLG	3" FLG	48X54	345	70	68	58	87	4600	6300
ST54D-	3040	11598	152	1-1/4"	2"	1-1/4"	10" FLG	6" FLG	4" FLG	54X60	500	76†	74	66	89	5600	8100
ST60D-	4000	13640	200	1-1/4"	2"	1-1/2"	10" FLG	6" FLG	4" FLG	60X66	725	82†	80	72	89	6300	10100

(1) For complete model number, suffix given number by KW, element designation letter (B=15KW; C=18KW; D=20KW), voltage and pressure (eg, ST24D-540C-480-150)

(2) Element removal clearance (R") is equal to 2 times the element KW. NOTE: Required both ends on "D" models; left end only on "S" models.

† Length of control panel may exceed this dimension. Actual Dimensions Depend on Options (Eg. # of Steps, Disconnect, Etc.).

(3) Add 30" to "L" for Jumbo Tanks. Desirable for cyclic loads and Low Pressure Applications.



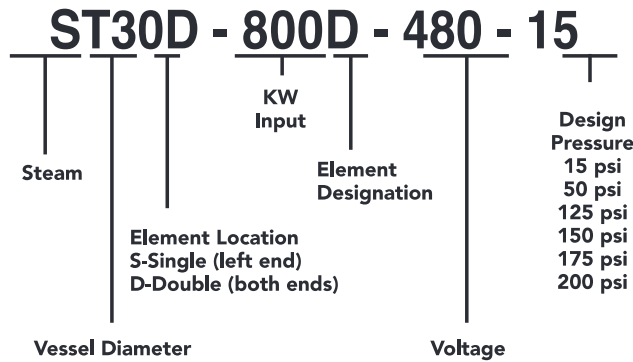
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### CONVERSIONS/EQUATIONS

$KW = \frac{GPH \times \Delta T (^{\circ}F)}{410} = \frac{LPH \times \Delta T (^{\circ}C)}{862}$ $KW = GPM \times \Delta T (^{\circ}F) \times .146$ $10KW = 1.02 BHP = 34 \text{ Lbs Steam/H} = 34,120 \text{ BTU/H}$ $GPH = \frac{KW \times 410}{\Delta T (^{\circ}F)} \quad \text{Amps (3 phase)} = \frac{KW \times 1000}{\text{Volts} \times 1.732}$ $GPH = \frac{BTU/H}{8.33 \times \Delta T (^{\circ}F)} \quad \text{Amps (1 phase)} = \frac{KW \times 1000}{\text{Volts}}$ $BTU/H = KW \times 3412 \quad BTU/H = \Delta T \times 500 \times GPM$ $1 \text{ gal water at } 62^{\circ}F = 8.34 \text{ Lbs} \quad 1 \text{ cu ft} = 7.48 \text{ gallons}$ $1 \text{ cu ft water at } 62^{\circ}F = 62.4 \text{ Lbs} \quad 1 \text{ ft water} = 0.435 \text{ psi}$ $\text{Enthalpy of water} = \text{Temp } (^{\circ}F) - 32 \text{ BTU/LB}$	<b>SATURATED STEAM: PRESSURE vs. TEMPERATURE</b>  <table border="0"> <tr> <td>0 psig = 0 KPa = 212°F</td> <td>150 psig = 1034 KPa = 366°F</td> </tr> <tr> <td>8 psig = 55 KPa = 235°F</td> <td>175 psig = 1207 KPa = 377°F</td> </tr> <tr> <td>15 psig = 103 KPa = 250°F</td> <td>200 psig = 1379 KPa = 388°F</td> </tr> <tr> <td>30 psig = 207 KPa = 274°F</td> <td>225 psig = 1551 KPa = 397°F</td> </tr> <tr> <td>50 psig = 345 KPa = 298°F</td> <td>250 psig = 1724 KPa = 406°F</td> </tr> <tr> <td>80 psig = 552 KPa = 324°F</td> <td>300 psig = 2068 KPa = 422°F</td> </tr> <tr> <td>100 psig = 690 KPa = 338°F</td> <td>350 psig = 2413 KPa = 436°F</td> </tr> <tr> <td>125 psig = 862 KPa = 353°F</td> <td>400 psig = 2758 KPa = 448°F</td> </tr> </table>	0 psig = 0 KPa = 212°F	150 psig = 1034 KPa = 366°F	8 psig = 55 KPa = 235°F	175 psig = 1207 KPa = 377°F	15 psig = 103 KPa = 250°F	200 psig = 1379 KPa = 388°F	30 psig = 207 KPa = 274°F	225 psig = 1551 KPa = 397°F	50 psig = 345 KPa = 298°F	250 psig = 1724 KPa = 406°F	80 psig = 552 KPa = 324°F	300 psig = 2068 KPa = 422°F	100 psig = 690 KPa = 338°F	350 psig = 2413 KPa = 436°F	125 psig = 862 KPa = 353°F	400 psig = 2758 KPa = 448°F
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### HOW TO SELECT A MODEL NUMBER



### 208 & 240 VOLT RATINGS\*

Model Number	Rating		Elements		Number of:			Amps (208/3)	Model Number	Rating		Elements		Number of:			Amps (208/3)
	PPH*	KW	Qty	KW	Circuits	Steps @ KW	Circuits			Steps @ KW	PPH*	KW	Qty	KW	Circuits	Steps @ KW	
ST12S-015B	51	15	1	15	1	1@15	42	ST24S-255B	870	255	17	15	17	1@45,7@30	709		
ST12S-030B	102	30	2	15	2	1@30	84	ST24S-270B	921	270	18	15	18	1@60,7@30	751		
ST12S-045B	154	45	3	15	3	1@15,1@30	125	ST24D-285B	972	285	19	15	19	1@60,1@45,6@30	793		
ST16S-060B	205	60	4	15	4	2@30	167	ST24D-300B	1024	300	20	15	20	2@60,6@30	834		
ST16S-075B	256	75	5	15	5	1@15,2@30	209	ST24D-315B	1075	315	21	15	21	2@60,1@45,5@30	876		
ST16S-090B	307	90	6	15	6	3@30	251	ST24D-330B	1126	330	22	15	22	3@60,5@30	918		
ST16S-105B	358	105	7	15	7	1@15,3@30	292	ST24D-345B	1177	345	23	15	23	3@60,1@45,4@30	959		
ST16D-120B	409	120	8	15	8	4@30	334	ST24D-360B	1228	360	24	15	24	4@60,4@30	1001		
ST16D-135B	461	135	9	15	9	1@15,4@30	376	ST24D-375B	1280	375	25	15	25	4@60,1@45,3@30	1042		
ST16D-150B	512	150	10	15	10	5@30	417	ST24D-390B	1331	390	26	15	26	5@60,3@30	1084		
ST20S-165B	563	165	11	15	1	1@15,5@30	459	ST24D-420B	1433	420	28	15	28	6@60,2@30	1167		
ST20S-180B	614	180	12	15	12	6@30	501	ST24D-450B	1535	450	30	15	30	7@60,1@30	1251		
ST20D-195B	665	195	13	15	13	1@15,6@30	542	(See †)									
ST20D-210B	717	210	14	15	14	7@30	584	ST30D-480B	1638	480	32	15	32	8@60	1334		
ST20D-225B	768	225	15	15	15	1@15,7@30	626	ST30D-510B	1740	510	34	15	34	7@60,3@30	1418		
ST20D-240B	819	240	16	15	16	8@30	667	ST30D-540B	1842	540	36	15	36	8@60,2@30	1501		
								ST30D-570B	1945	570	38	15	38	9@60,1@30	1584		
								ST30D-600B	2047	600	40	15	40	10@60	1667		

\*From & At 212°F.

†Models above 390KW are also available in 15KW increments.





# PRECISION BOILERS

## ST "SERIES II" ELECTRIC STEAM BOILERS

### SPECIFICATIONS

#### 1. GENERAL

Furnish and install as shown on the plans \_\_\_ electric steam boilers, fabricated per these specifications, including all accessories and construction features as described herein. Boilers shall be completely factory assembled and pre-tested prior to shipment. Boilers shall be UL labeled and shall include an ASME Section I or IV pressure vessel which has been fabricated under inspection by an authorized inspector holding a National Board commission and subsequently stamped and National Board registered. Units greater than 117 KW shall also comply with CSD-1.

#### 2. RATINGS

Boilers shall each be PRECISION "Series II" Model No. ST \_\_\_ - \_\_\_ rated \_\_\_ KW, designed and fabricated for a balanced 3-phase, 3-wire, delta load at \_\_\_ volts, 3-phase, \_\_\_ hertz. The boilers shall be designed for 15/150 psi.

#### 3. PRESSURE VESSEL

The pressure vessel and all trim shall be as set forth in the ASME Code, including ASME "HV" or "V" stamped safety relief valve sized as required. The vessel shall be provided with a (threaded) (flanged) \_\_\_" outlet, plus safety valve, feedwater inlet, and surface and bottom blowdown connections as required. The pressure vessel shall be housed in a 16-gauge steel enclosure allowing 3 inches of insulation space around the vessel and filled with 3 inches of 3/4 pound-density fiberglass insulation. The electric panel and vessel shall be mounted on a common, structural steel base with overall dimensions of the unit not to exceed \_\_\_"D x \_\_\_"W x \_\_\_"H.

#### 4. INTERNAL POWER DISTRIBUTION

The power distribution shall be through cable connection to mechanical lugs. Power shall be fed through current limiting fuses to magnetic contactors, and then to the heating element circuits. Contactors shall be 3-pole magnetic contactors tested by UL for 500,000 cycles at full load, The coil voltage shall be 120-volts. Internal wiring shall be in accordance with UL & NEC.

#### 5. HEATING ELEMENTS

Elements shall be individually mounted in steel flanges. The flange size shall not exceed 2 1/2 inches square, with a maximum of three single-bend U-shaped element blades per flange. Element sheath material shall be Incoloy; element watt density shall be 75 WSI.

#### 6. CONTROLS

The control circuit shall be 120-volt single-phase, one side grounded. Control voltage shall be provided by an integral control circuit transformer, fused on both legs of the primary, with a control circuit fuse on the ungrounded leg of the secondary. The controls shall include an ON/OFF switch, proportional pressure control and solid state progressive sequence step control(\_\_\_steps) (above 3 stages), indicator lights for each stage of heating, a combination float-type level control/low water cutoff, a manual reset low water cutoff, and one auto reset and one manual reset high limit pressure switches.

#### 7. MANUFACTURER

Boilers shall be PRECISION Model ST \_\_\_ - \_\_\_ or approved equivalent. Alternate bids shall indicate any deviations from these specifications, and shall state price additions or deductions for substitution of said alternates.





# PRECISION BOILERS

## ST "SERIES II" ELECTRIC STEAM BOILERS

### LIMITED WARRANTY

PRECISION warrants all electrical components (except pilot lights and fuses), pressure vessel and heating elements, if found defective in workmanship or material while under normal use and service within the first year of operation or until 18 months after shipment from PRECISION'S factory, whichever occurs first, after authorized return by purchaser to PRECISION (at purchaser's expense) and after examination discloses to PRECISION'S reason-

able satisfaction to be defective. The repair or replacement of defective parts will be made by PRECISION without charge. PRECISION will not be held responsible for any field charges in connection with the removal or replacement of allegedly defective parts, nor for incidental or consequential damages. This guarantee does not include damage resulting from unsuitable water.

### CONTACT US FOR THESE QUALITY PRODUCTS

- Electric Storage Heaters 125 to 5500 Gallons
- Electrode High Voltage Boilers
- Thermal Storage Systems Space Heating & Domestic or Process Water; Electric, Gas or Steam Fired
- Boiler Feedwater Systems
- Pressure Vessels Water Storage Tanks Flash Tanks Blowdown Tanks
- Unfired Hot Water and Steam Generators
- Deaerators and Surge Tanks
- Steam Superheaters-Electric
- Circulation Heaters-Electric
- Gas or Oil-Fired Vertical Firetube Boilers and Water Heaters
- Gas or Oil-Fired WaterTube Boilers (Flextube Type)
- Chemical Bypass Feeders and Automatic Chemical Feed Systems

**NOTE:** In pursuing our policy of continuous development of products, PRECISION reserves the right to vary any detail in this bulletin without notice.

Represented in your area by:

**Precision Boilers**  
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**PRECISION  
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