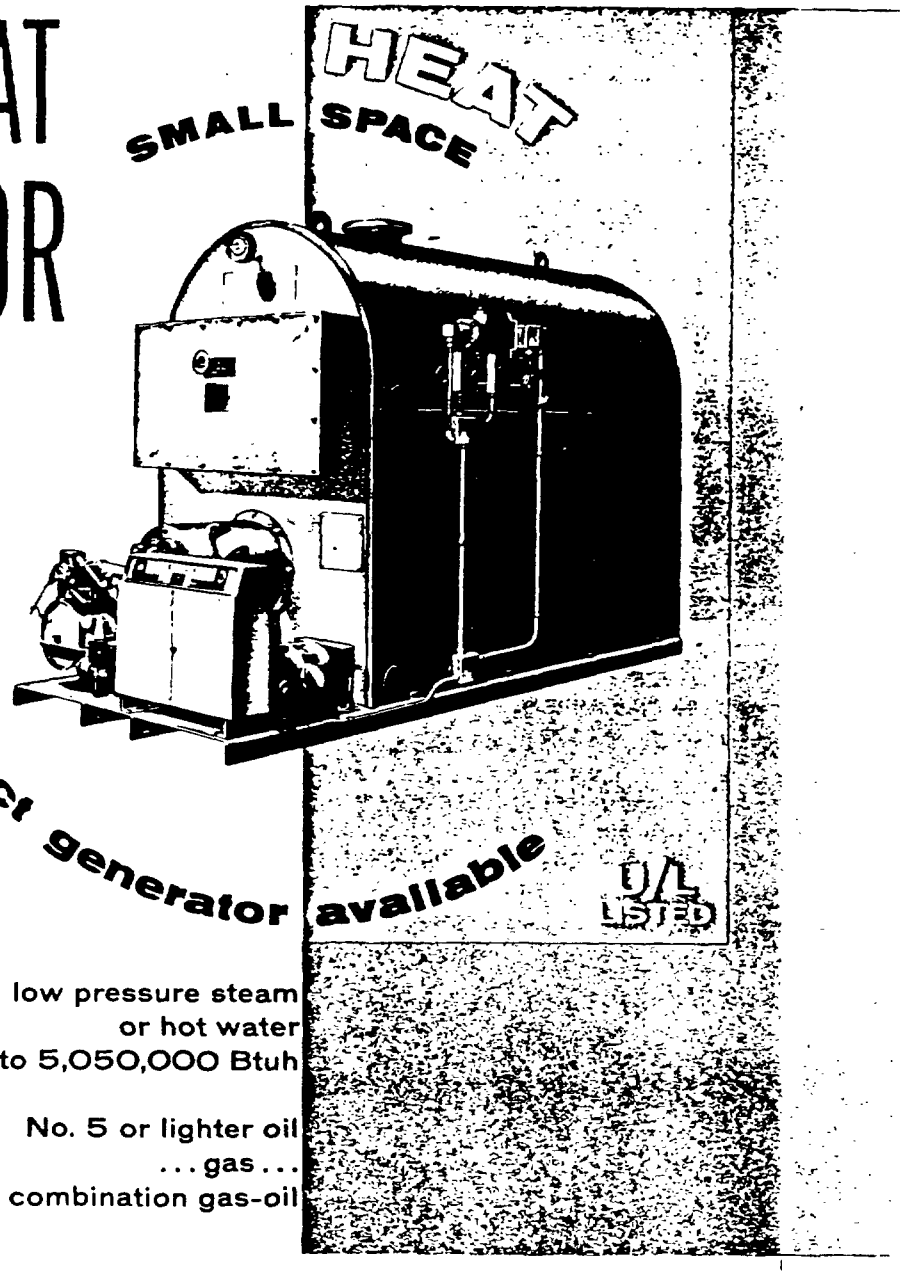
AMERICAN STANDARD

PLAINTIFF'S EXHIBIT

ASI-920

KEWANEE®

SQUARE-HEAT GENERATOR



low pressure steam
or hot water
450,000 to 5,050,000 Btuh

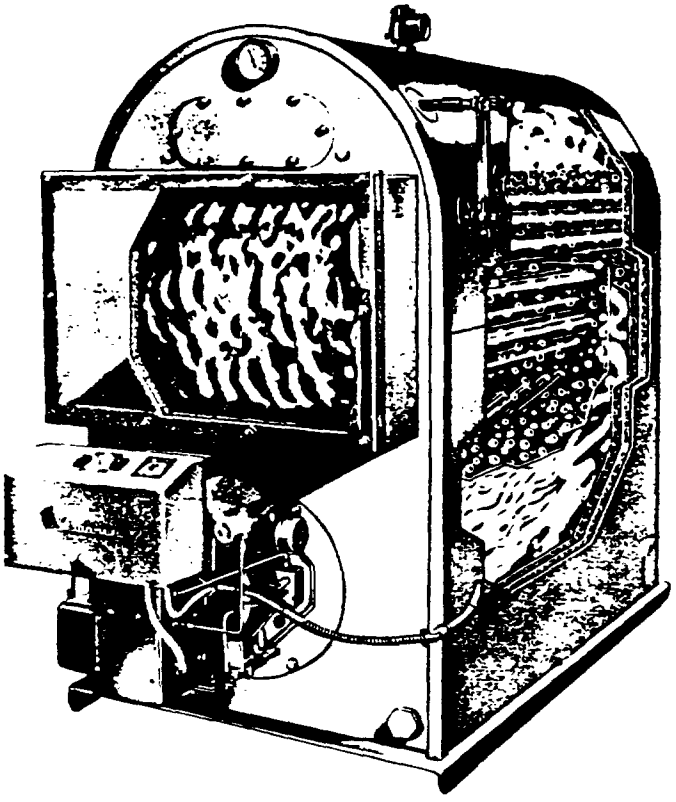
No. 5 or lighter oil
...gas...
combination gas-oil

bulletin 96-15-96E
supersedes bulletin 1349D

24348

KEWANEE SQUARE-HEAT

BIG HEAT SMALL SPACE



This new steam generator is ideal for office and store buildings, schools, motels, hospitals, small factories, apartments and other buildings of medium size.

Intensive research, added to nearly a century of boiler experience, produced this modern Square-Heat Generator with amazing compactness, plus highest efficiency, plus Kewanee Time-Proved structural features.

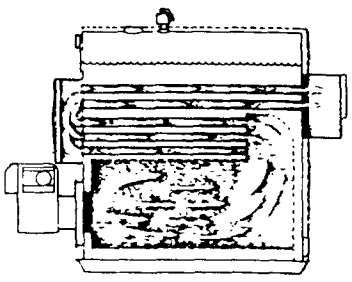
The secret of this remarkable design, which results in highest efficiency, top-quality performance, and long dependable service, is . . . exceptionally high proportion of primary (direct) heating surface which is many times more efficient than secondary (indirect) heating surface . . . plus . . . extra large furnace volume for complete combustion, smooth starts, clean firing, quiet operation, unrestricted gas flow and low heat release.

The entire unit is listed by Underwriters' Laboratories, Inc.

24349

COMPARE THESE QUALITY FEATURES

THREE PASS DESIGN



Assures maximum heat transfer with low stack temperature . . . highest operating efficiency. The large firebox with arched upright crown sheet provides thorough mixing of fuel and air . . . complete combustion before hot gases enter fire tubes. The second pass is rear to front through the direct fire tubes . . . the third from front to rear in the return tubes. Gas travel is longer and there are no refractory baffles to burn out and permit short circuiting of gases.

HIGH EFFICIENCY HEATING SURFACE

Primary heating surface (exposed directly to the flame) is 4 to 15 times more effective than secondary heating surface (exposed only to hot gases). The Square-Heat Generator design utilizes nearly 50% greater ratio of primary to secondary heating surface than competitive units. Square-Heat Generators provide MORE more effective heat transfer surfaces, and LESS less effective heat transfer surfaces.

LARGE FURNACE VOLUME

For complete combustion with smooth starts . . . clean firing . . . unrestricted gas flow . . . quiet operation . . . heat release averages 50% less than competitive units.

FORCED-DRAFT OPERATION

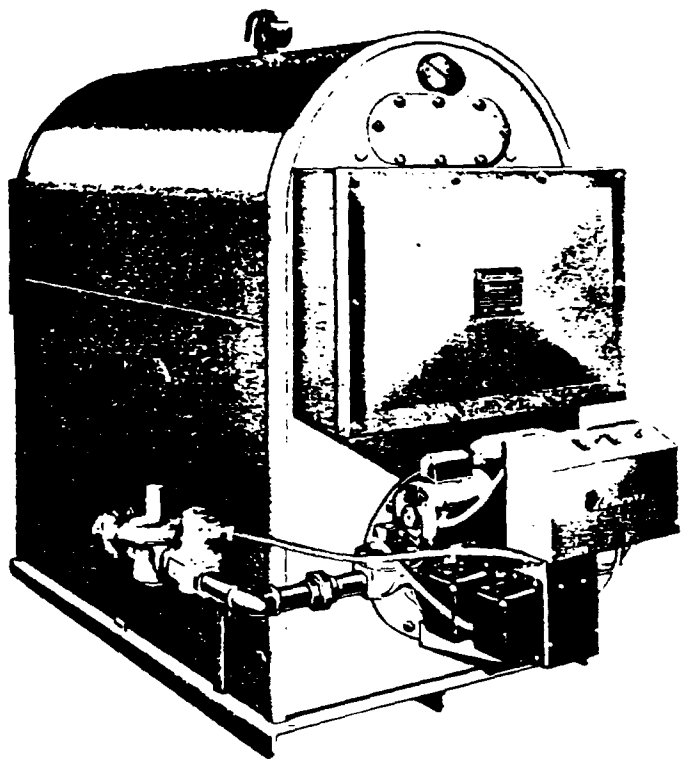
Provides ample combustion air for stub stack applications. Only a vent to the outside is needed. Special assemblies available for high altitude installations.

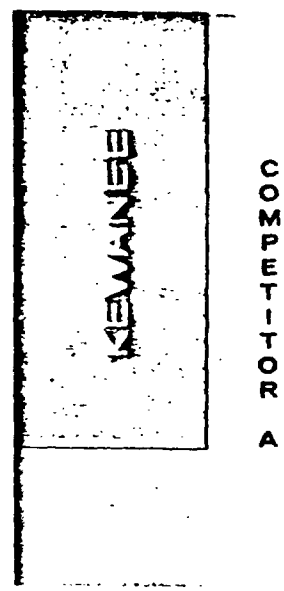
Copyright 1967 by AMERICAN STANDARD Inc.

Since product improvement is a continuing effort at American Standard, the rig

GENERATOR

MORE ENERGY PER SQUARE FOOT OF OCCUPIED FLOOR SPACE THAN ANY OTHER COMPARABLE UNIT





COMPETITOR B

COMPACT

This Kewanee is the most compact generator you can buy. For example, you can have 80 hp in 42.7 square feet of occupied floor space. Two principal competitive 80 hp generators require 72.7 square feet and 78.0 square feet, respectively. The illustration above shows the contrast. Head room also is minimum.

LARGE STEAM SPACE
Combined with abundant, unbroken disengaging area and ample water content assures steady water line and a plentiful reserve of dry steam.

TUBES ROLLER EXPANDED
All tubes are secured to tube sheets by roller expander—none are welded to tube sheets.

WELDED STEEL
Flange quality plate. All welded integral construction for strength and durability. Gas tight throughout.

SKID TYPE BASE
Refractory filled, provides ventilation under the unit and distributes weight evenly.

INSULATED STEEL JACKET
Heavy gauge steel jacket with attractive [illegible] finish. Glass or mineral fiber insulation minimizes heat loss.

WATER HEATING COILS
Standard Kewanee "KI" (instantaneous) and "KT" (tank)) coils available for all units. Coil opening at front of boiler avoids interference with controls, wiring or breeching.

EASY ACCESS TO TUBES
Steel flue access cover with insulation securely keyed in place provides easy access to flues without disturbing fuel burning equipment.

TESTED—APPROVED
ASME Boiler Construction Code requirements have been followed to the last detail . . . and the Kewanee name assures design and performance above and beyond any code requirements. These generators have Underwriters' Laboratories listing.

COMPLETELY ASSEMBLED
With burner and all accessories—may be moved in by fork truck, hoist, or rollers. Only service connections are needed to place unit in operation.

d to make reasonable changes of any kind without notice.

24350

KEWANEE SQUARE-HEAT

GENERATOR

BURNER FEATURES

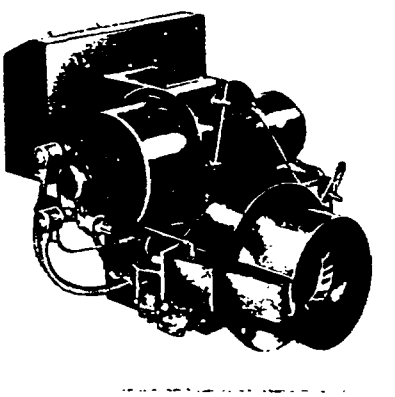
Kewanee Square-Heat Generators are available for oil, gas, or combination gas-oil firing. Each Kewanee Forced Draft Burner is custom engineered for the generator it fires, assuring long, dependable and economical service.

Two series of Kewanee Forced Draft Burners cover the entire range of boiler capacities and fuels.

The Kewanee KR Burner fires light oil (No. 2 CS12-48), gas, and combination gas-light oil in Units M-45 thru M-265. The oil burner is of the high pressure mechanical atomizing type, and the gas burner is of the multiple jet flame retention type.

Units M-45 thru M-175 with the KR burner feature on-off operation (with low fire start on oil-fired Units M-135 thru M-175). Combustion air is regulated by a fixed position damper in addition to an adjustable primary-secondary air shutter.

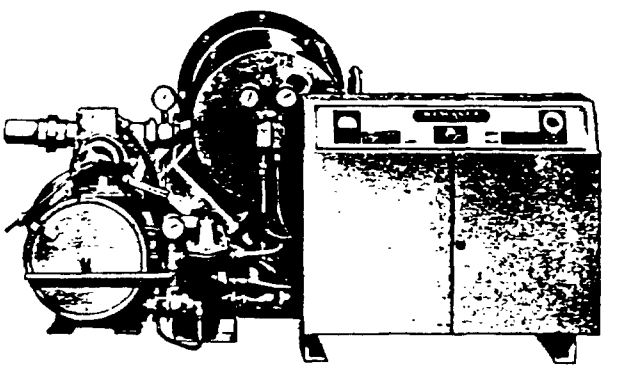
Units M-205 thru M-265 with the KR burner feature on-off operation with controlled low fire start. Fuel and air supply are regulated for both high and low firing by a two position motor. This provides smooth starting and top efficiency.



The Kewanee Burner (Pressure Atomizing) fires light oil (No. 2 CS12-48), gas, and combination gas-light oil in Units M-335 thru M-505. The oil burner is of the high pressure mechanical atomizing type, and the gas burner is of the flame retention type.

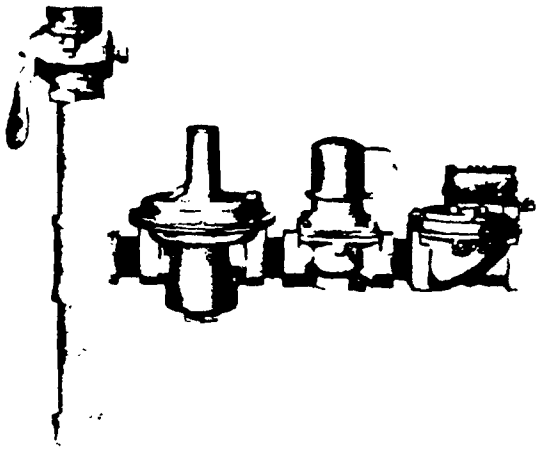
The Kewanee Burner (Air Atomizing) fires No. 5 or lighter oil, gas, and combination gas-oil in Units M-335 thru M-505. The oil burner is of the low pressure air atomizing type, and the gas burner is of the flame retention type.

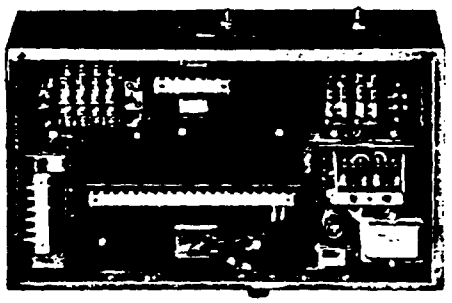
Units M-335 thru M-505 with the Kewanee burner feature full modulation with proved low fire start. Fuel and air supply are regulated throughout the firing range by a modulating motor controlled by a boiler mounted pressure or temperature modulating potentiometer.



MAXIMUM SAFETY

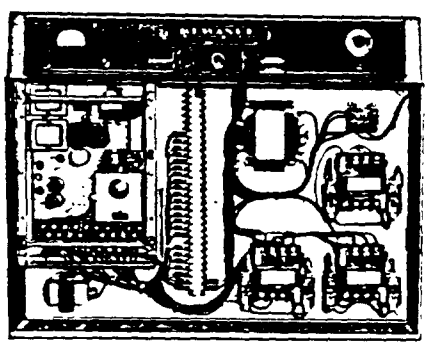
Dual automatic main gas valves (on units over 1000 MBh input) provide added protection. Boiler passages are purged of combustible gases before and after each firing cycle. Combustion is continuously monitored by an electronic flame safeguard.

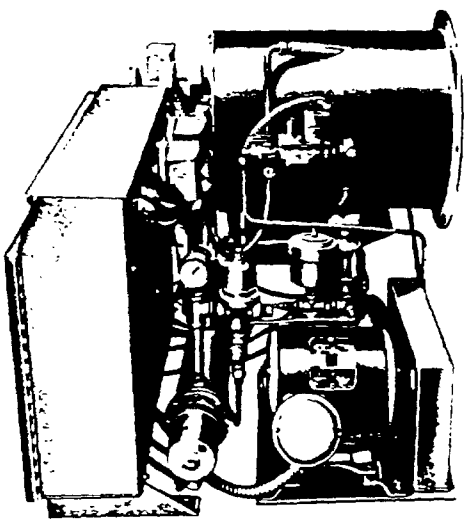




CONTROL CABINET

Programming and flame safeguard relays, switching relays, motor magnetic starter (if required), numbered terminal strips, indicating lights for major operations, and fuel selector switch—all mounted and wired in a heavy-gauge steel control cabinet mounted on the boiler unit. Wiring is ready for connection to a source of power.





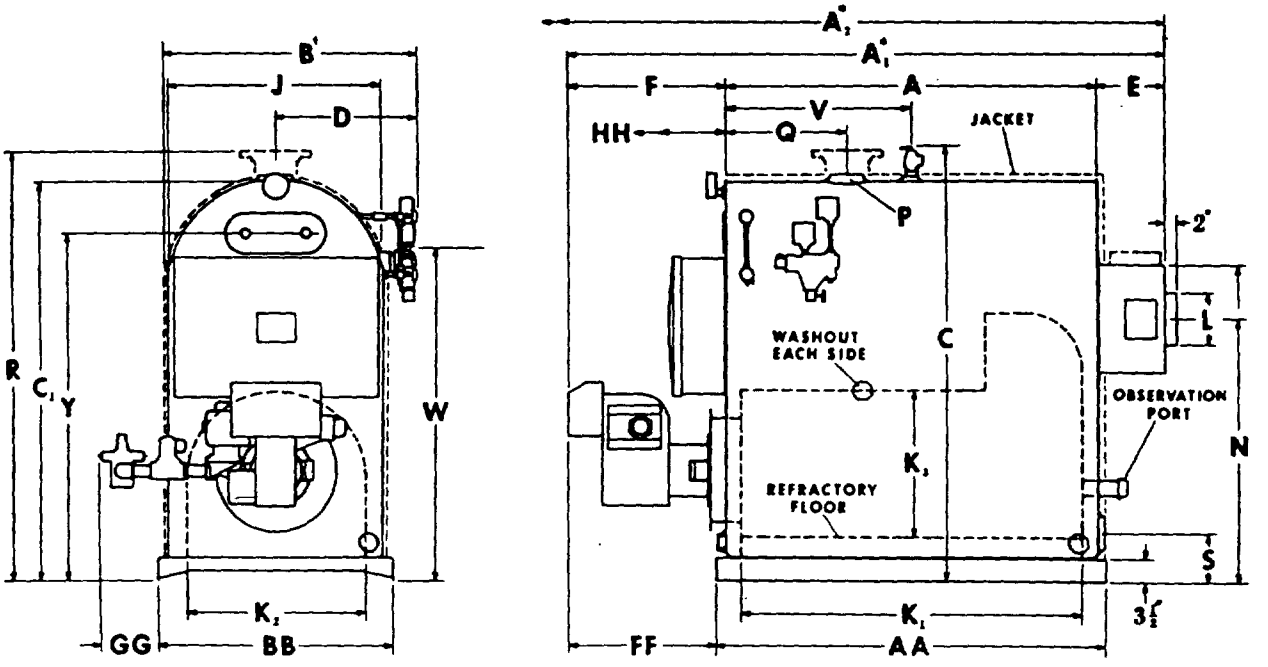
AIR-OIL UNIT

The air-oil unit assembly of the Kewanee burner includes air compressor, oil pump, valves, belt drive, motor, and all necessary accessories to provide the fine oil atomization required for clean, efficient oil firing. A thermostatically controlled electric oil heater maintains uniform oil temperature to compensate for varying viscosities of residual oils. The multi-louvered air proportioning damper provides accurately measured air supply to match fuel supply for top operating efficiency at all firing rates.

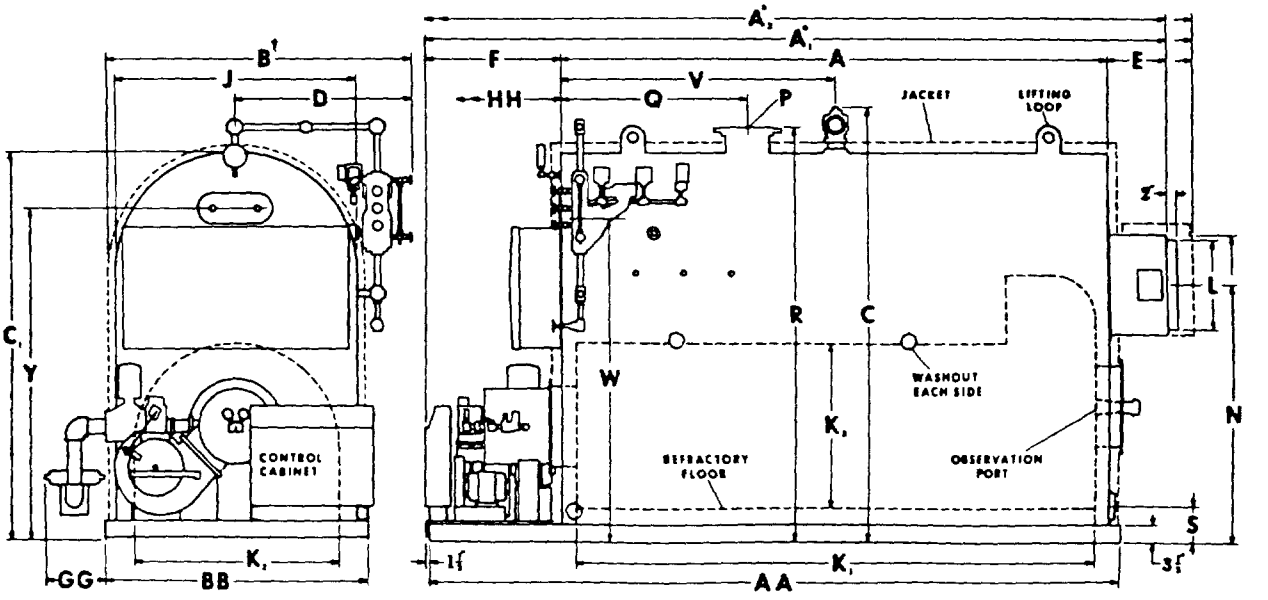
KEWANEE

SQUARE-HEAT GENERATOR

DIMENSIONAL DRAWINGS



M-45 thru M-265



M-335 thru M-505

Rating—MBH	450	550	650	750	950	1,150	1,350	1,550	1,750	2,050	2,350	2,650	3,350	4,250	5,050
—Horsepower	13.4	16.4	19.4	22.4	28.4	34.4	40.3	46.3	52.3	61.2	70.0	80.0	100.0	126.9	150.8
—Steam per hour—212°F lbs.	464	567	670	773	979	1,186	1,392	1,598	1,804	2,113	2,423	2,732	3,452	4,380	5,204
—Steam (gross output) sq. ft.	1,875	2,291	2,708	3,125	3,958	4,792	5,625	6,458	7,292	8,542	9,791	11,042	13,958	17,708	21,042
—Steam (MCA net) sq. ft.	1,410	1,723	2,036	2,349	2,976	3,603	4,230	4,855	5,483	6,422	7,362	8,302	10,490	13,110	15,733
Firing rate—Gas 1,000 Btu/cu. ft.	563	688	813	938	1,188	1,438	1,688	1,938	2,188	2,563	2,937	3,313	4,181	5,312	6,312
—Oil 140,000 Btu/gal.	4.0	4.9	5.8	6.7	8.5	10.3	12.1	13.8	15.6	18.3	21.0	23.6	30.0	38.0	45.0
—Oil 150,000 Btu/gal.	—	—	—	—	—	—	—	—	—	—	—	—	27.9	34.8	41.7
Heating surface—Total sq. ft.	63	78	92	107	127	154	180	208	239	275	309	343	450	562	675
—Primary sq. ft.	19.0	21.1	23.2	25.4	30.8	34.2	37.6	41.4	47.6	51.9	55.9	59.9	86.3	100.2	112.9
Furnace volume cu. ft.	7.8	9.1	10.5	11.7	15.4	17.9	20.4	23.3	29.5	33.4	37.1	40.8	66.0	80.4	94.3
Safety valve capacity—Steam per hr lbs	450	550	650	750	950	1,150	1,350	1,550	1,750	2,050	2,350	2,650	3,350	4,250	5,050
Approx dry weight lbs	1,900	2,050	2,200	2,350	2,600	2,950	3,300	3,650	4,000	4,450	4,900	5,300	8,200	9,300	10,800

UNIT NUMBER															
Fuel control—Gas	On-Off								Low Fire				Modulating		
—Oil	On-Off								Low Fire				Modulating		
Air control	Fixed									Two			Modulating		
Programming and flame safeguard control	T-4 Pre-Purge and Post-Purge Timer With RA-890E									R-4150			Fireye FP-7		
Gas controls—Min. inlet pressure	6"	6"	6"	6"	6"	6"	6"	6"	6½"	6½"	6½"	6½"	6½"	7½"	7½"
—Size	1"	1"	1¼"	1¼"	1¼"	1½"	2"	2"	2"	2"	2"	2½"	2½"	2½"	3"
Motors—Fan—HP	½	½	½	½	½	½	½	½	¾	1½	1½	1½	2	3	5
—Voltage	115-60-1								230-60-1		230-60-3			230-60-3	
—Oil pump—HP	—	—	—	—	—	—	—	—	—	—	—	—	½	½	½
—Voltage	—	—	—	—	—	—	—	—	—	—	—	—		230-60-1	
—Air Unit —HP	—	—	—	—	—	—	—	—	—	—	—	—	1½	1½	1½
—Voltage	—	—	—	—	—	—	—	—	—	—	—	—		230-60-3	
Electric preheater*—Watts	—	—	—	—	—	—	—	—	—	—	—	—	5,000	5,000	5,000
—Voltage	—	—	—	—	—	—	—	—	—	—	—	—		230-60-1	

*No. 4 and No. 5 Oil Only—Requires Separate Fused Disconnect Switch By Others

UNIT NUMBER															
A —Boiler length	30½	36½	42½	48½	42½	50½	58	67	56½	64½	72	79½	91	112	132
A_1—Overall length*	65½	71½	77½	83½	77½	85½	93	102	96½	104½	112	119½	136	157	177
A_2—Overall length including tube removal*	70	82	94	106	94	110	125	143	123	139	154	169	195	237	277
†B —Overall width	37½	37½	37½	37½	42	42	42	42	49	49	49	49	66½	66½	66½
C —Overall height	62½	62½	62½	64½	71½	74	74	74	83	83	83	83	93½	93½	93½
C_1—Shell height	55	55	55	55	62	62	62	62	71	71	71	71	78	78	78
D —Boiler centerline to greatest width	21½	21½	21½	21½	23½	23½	23½	23½	27	27	27	27	37½	37½	37½
E —Rear smokebox depth															
—Rear outlet	8	8	8	8	8	8	8	8	9	9	9	9	12	12	12
—Top outlet	8½	8½	8½	8½	10½	10½	10½	10½	12½	12½	12½	12½	17½	17½	17½
F —Burner to front of boiler	27	27	27	27	27	27	27	27	31	31	31	31	33	33	33
J —Boiler inside width	28½	28½	28½	28½	32½	32½	32½	32½	39½	39½	39½	39½	48	48	48
K_1—Firebox length	25½	31½	37½	43½	37½	45	53	62	51	59	66½	74	84½	105½	125½
K_2—Firebox width	24	24	24	24	28	28	28	28	35	35	35	35	42	42	42
K_3—Firebox height	18½	18½	18½	18½	23	23	23	23	28	28	28	28	36	36	36
L —Smoke outlet diameter	6	6	6	6	8	8	8	8	10	10	10	10	16	16	18
N —Smoke outlet height															
—Rear outlet	36	36	36	36	41	41	41	41	47½	47½	47½	47½	52	52	52
—Top outlet	43	43	43	43	49	49	49	49	58	58	58	58	62	62	62
P —Supply size	4	4	4	4	4	4	4	4	6**	6**	6**	6**	8**	8**	8**
Q —Supply location	10	12	14	16	14	17	19	22	16	18	20	24	27	38	48
R —Supply height	56	56	56	56	63	63	63	63	75½	75½	75½	75½	83	83	83
S —Return location	7	7	7	7	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½	7½
—Return size	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4
V —Safety valve location	18	20	22	24	22	27	29	32	28	30	32	36	45	56	66
W —Normal waterline	45	45	45	45	52	52	52	52	60	60	60	60	64	64	64
Y —Coil connection height	47	47	47	47	54	54	54	54	62	62	62	62	67	67	67
AA —Base length	33½	39½	45½	51½	45½	53½	61½	70	59½	67½	75	82½	125	146	166
BB —Base width	32½	32½	32½	32½	37	37	37	37	44	44	44	44	54	54	54
FF —Burner front to base	25½	25½	25½	25½	25½	25½	25½	25½	29½	29½	29½	29½	1½	1½	1½
GG —Standard gas train to base	5	5	5	5	7	7	8½	8½	8½	8½	8½	8½	12	12	12
HH —Tube removal space	31½	37½	43½	49½	43½	51½	59	68	57½	65½	73	80½	92	113	133

*Add for increased length for top outlet see Dim. E **150 lb. American Std. Flange †Add GG for increased width on gas and gas-oil units

KEWANEE

STANDARD AND OPTIONAL EQUIPMENT

SQUARE-HEAT

ALL UNITS

STANDARD EQUIPMENT

1. Three-Pass ASME Code Boiler
2. Refractory Filled Skid Type Base
3. Gas-Tight Insulated Front Smokebox
4. Pyrex Observation Ports (Front and Rear)
5. 2" Firetubes—Roller expanded
6. Gas-Tight Rear Smokebox with Horizontal Discharge (Rear) Vent
7. Wrap-around Insulated Steel Jacket
8. Lifting Loops (Units M-335 thru M-505)
9. Washout Plug Socket Wrench and Flue Cleaner with Handle
10. Forced Draft Operation
11. Operating Limit Control
12. Safety High Limit Control
13. Control Voltage—115 V, 60 cy, 1 ph. Includes Reduced Voltage Transformer where required
14. Control Cabinet Including: Electronic Flame Safeguard, Programming Control, Control Circuit Fuse, Burner Switches, Indicating Lights (2), Numbered Terminal Strip, Color Coded Wiring, Engraved Nameplates, and Necessary Relays, Magnetic Starters, and Transformers
15. Listed Standard and Selected Optional Equipment Mounted, Piped, Wired, Ready for Field Connection to Fuel, Water, Steam, and Electricity (Exceptions: Items shipped separately to prevent shipping damage)
16. Starting Service

OPTIONAL EQUIPMENT

1. Explosion Relief Door
2. Vertical Discharge (Top) Vent
3. Instantaneous or Tank Type Hot Water Coils
4. Flue Gas Temperature Gauge
5. Alarm Bell or Alarm Horn
6. Circuit Breaker
7. Other Than Standard Voltages
8. Controls for FM
9. Controls for FIA
10. One Year Service Period

STEAM UNITS

STANDARD EQUIPMENT

1. No. 767 Low Water Cut-Off (Units M-45 thru M-265)
2. No. 157 Combination Water Column, Low Water Cut-Off, and Pump Control (Units M-335 thru M-505)
3. Safety Valve(s)
4. Compound Steam and Vacuum Gauge
5. Water Gauge and Glass

OPTIONAL EQUIPMENT

1. Combination Low Water Cut-Off and Pump Control
2. Combination Water Feeder, Low Water Cut-Off, and Alarm Switch
3. Second Low Water Cut-Off

HOT WATER UNITS

STANDARD EQUIPMENT

1. No. 764 Low Water Cut-Off
2. Relief Valve(s)
3. Combination Altitude Gauge and Thermometer

OPTIONAL EQUIPMENT

1. Combination Water Feeder, Low Water Cut-Off, and Alarm Switch
2. Second Low Water Cut-Off

PRESSURE ATOMIZING OIL UNITS M-45 thru M-265

STANDARD EQUIPMENT

1. High Pressure Mechanical Atomizing Oil Burner for No. 2 Oil
2. Two-Stage Oil Pump direct connected to Burner Motor
3. Motor Horsepower and Voltage—
   - ⅓ HP, 115 V, 60 cy, 1 ph. (Units M-45 thru M-75)
   - ½ HP, 115 V, 60 cy, 1 ph. (Units M-95 thru M-155)
   - ¾ HP, 230 V, 60 cy, 1 ph. (Unit M-175)
   - 1½ HP, 230 V, 60 cy, 3 ph. (Units M-205 thru M-265)
4. On-Off Firing Sequence (Units M-45 thru M-115)
   On-Off Firing Sequence with Low Fire Start (Units M-135 thru M-265)
5. Fixed Position Air Supply (Units M-45 thru M-175)
   Two-Position Air Supply Controlled by Modutrol Motor (Units M-205 thru M-265)
6. RA-890 Flame Safeguard with Photocell Flame Detector and T-4 Timer for Pre-Purge and Post-Purge Timing (Units M-45 thru M-175)
7. R-4150 Flame Safeguard with Photocell Flame Detector (Units M-205 thru M-265)
8. Oil Atomizing Nozzle (Dual Nozzles on Units M-205 thru M-265)
9. Oil Solenoid Valve (Dual Valves on Units M-135 thru M-265)
10. Direct Spark Electric Ignition
11. Oil Filter (Not Mounted)
12. Factory Component and Control Check

OPTIONAL EQUIPMENT

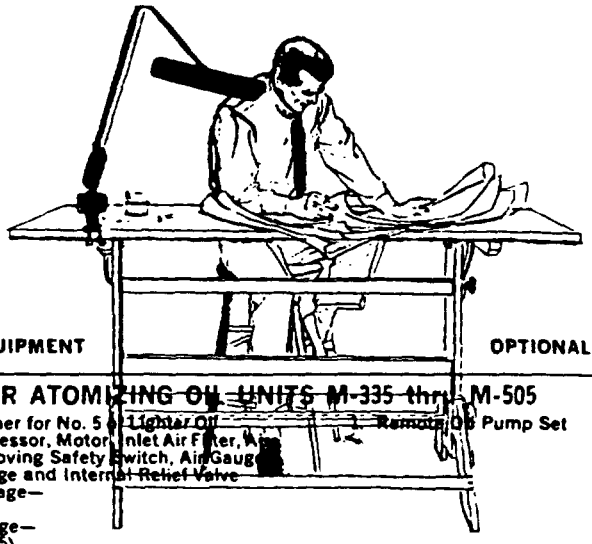
1. Fireye Flame Safeguard System
2. DC Voltmeter for Fireye System
3. High-Low-Off Firing Sequence (Units M-95 thru M-265)
4. Modulating Firing Sequence (Units M-135 thru M-265)
5. Manual Potentiometer for Modulating Fire Control
6. Factory Firetest

PRESSURE ATOMIZING OIL UNITS M-335 thru M-505

STANDARD EQUIPMENT

1. High Pressure Mechanical Atomizing Oil Burner for No. 2 Oil
2. Two-Stage Oil Pump Assembly with Gauge, Relief Valve, ⅓ HP, 230 V, 60 cy, 1 ph. motor
3. Motor Horsepower and Voltage—
   - 2 HP, 230 V, 60 cy, 3 ph. (Unit M-335)
   - 3 HP, 230 V, 60 cy, 3 ph. (Unit M-425)
   - 5 HP, 230 V, 60 cy, 3 ph. (Unit M-505)
4. Modulating Firing Sequence with Low Fire Start
5. Modutrol Motor with Low Fire Interlock to Control Air and Fuel Supply
6. Operating Control for Modutrol Motor (Boiler Mounted)
7. DC Voltmeter for Fireye System
8. Manual Potentiometer
9. Fireye FP-2 Flame Safeguard System with Lead Sulphide Flame Detector
10. Air Flow Safety Switch
11. Variable Capacity Oil Nozzle
12. Oil Solenoid Valve
13. Oil Metering Valve
14. Gas-Electric Ignition Assembly
15. Oil Filter (Not Mounted)
16. Factory Firetest

24355



STANDARD EQUIPMENT

AIR ATOMIZING OIL UNITS M-335 thru M-505

1. Low Pressure Air Atomizing Oil Burner for No. 5 or Lighter Oil
2. Air-Oil Unit Consisting of: Air Compressor, Motor, Inlet Air Filter, Air Pressure Regulating Valve, Air Proving Safety Switch, Air Gauge and Oil Pump Assembly with Gauge and Internal Relief Valve
3. Air Unit Motor Horsepower and Voltage—
   1½ HP, 230 V, 60 cy, 3 ph.
4. Blower Motor Horsepower and Voltage—
   2 HP, 230 V, 60 cy, 3 ph. (Unit M-335)
   3 HP, 230 V, 60 cy, 3 ph. (Unit M-425)
   5 HP, 230 V, 60 cy, 3 ph. (Unit M-505)
5. Modulating Firing Sequence with Low Fire Start
6. Modutrol Motor with Low Fire Interlock For Fuel-Air Control
7. Operating Control for Modutrol Motor (Boiler Mounted)
8. DC Voltmeter for Fireye System
9. Manual Potentiometer for Modulating Fire Control
10. Fireye FP-2 Flame Safeguard System with Lead Sulphide Flame Detector
11. Air Flow Safety Switch
12. Air-Oil Nozzle
13. Oil Metering Valve
14. Thermostatically Controlled Electric Oil Heater—
    5,000 Watts (On No. 4 & 5 Oil Only)
15. Gas-Electric Ignition Assembly
16. Oil Strainer (Not Mounted)
17. Factory Firetest

GAS UNITS M-45 thru M-265

1. Multiple-Jet Flame Retention Type Gas Burner
2. Motor Horsepower and Voltage—
   ⅓ HP, 115 V, 60 cy, 1 ph. (Units M-45 thru M-75)
   ½ HP, 115 V, 60 cy, 1 ph. (Units M-95 thru M-155)
   ¾ HP, 230 V, 60 cy, 1 ph. (Unit M-175)
   1½ HP, 230 V, 60 cy, 3 ph. (Units M-205 thru M-265)
3. On-Off Firing Sequence (Units M-45 thru M-175)
   On-Off Firing Sequence with Low Fire Start (Units M-205 thru M-265)
4. Fixed Position Air and Fuel Supply (Units M-45 thru M-175)
   Two position Air and Fuel Supply Controlled by Modutrol Motor (Units M-205 thru M-265)
5. RA-890 Flame Safeguard with Flame Rod Flame Detector and T-4 Timer for Pre-Purge and Post-Purge Timing (Units M-45 thru M-175)
6. R-4150 Flame Safeguard with Flame Rod Flame Detector (Units M-205 thru M-265)
7. Air Flow Safety Switch
8. UL Gas Control Group Including: Automatic Operating Gas Valve; Automatic Safety Gas Valve (Units M-95 thru M-265 only); Gas Volume Control Valve (Units M-205 thru M-265 only); Gas Pressure Regulator; and Manual Gas Cock
9. Gas-Electric Ignition Assembly
10. Factory Component and Control Check

OPTIONAL EQUIPMENT

1. Remote Oil Pump Set

1. Fireye Flame Safeguard System
2. DC Voltmeter for Fireye System
3. High-Low-Off Firing Sequence (Units M-95 thru M-265)
4. Modulating Firing Sequence (Units M-95 thru M-265)
5. Manual Potentiometer for Modulating Fire Control
6. Automatic Safety Gas Valve (Units M-45 thru M-75)
7. Gas Controls for Other Than Standard Pressures
8. Factory Firetest

GAS UNITS M-335 thru M-505

1. Flame Retention Type Gas Burner
2. Motor Horsepower and Voltage—
   2 HP, 230 V, 60 cy, 3 ph. (Unit M-335)
   3 HP, 230 V, 60 cy, 3 ph. (Unit M-425)
   5 HP, 230 V, 60 cy, 3 ph. (Unit M-505)
3. Modulating Firing Sequence with Low Fire Start
4. Modutrol Motor with Low Fire Interlock to Control Air and Fuel Supply
5. Operating Control for Modutrol Motor (Boiler Mounted)
6. DC Voltmeter for Fireye System
7. Manual Potentiometer
8. Fireye FP-2 Flame Safeguard System with Lead Sulphide Flame Detector
9. Air Flow Safety Switch
10. UL Gas Control Group Including: Automatic Operating Gas Valve, Automatic Safety Gas Valve; Gas Volume Control Valve; Gas Pressure Regulator; Gas Pressure Gauge; and Manual Gas Cock
11. Gas-Electric Ignition Assembly
12. Factory Firetest

1. Gas Controls for Other Than Standard Pressures

COMBINATION GAS-OIL UNITS

1. Manual Fuel Changeover Switch

KEWANEE®

SQUARE-HEAT GENERATOR

FOR ALL UNITS M-45 THRU M-505

The contractor shall furnish and install . . . . . Model No. . . . . Square-Heat Generator(s) for (No. (2) (4) (5) oil), (gas), (combination gas-No. (2) (4) (5) oil) firing. The unit(s) shall be three-pass compact firebox design with arched upright crown sheet and two passes of firetubes, and constructed in accordance with the ASME Code for (15 lbs. steam) (30 lbs. water).

Unit(s) shall have not less than total square feet of waterside heating surface including a minimum of square feet of primary or direct heating surface.

Unit(s) shall contain not less than..... cubic feet of furnace volume and shall have a gross output rating of not less than. . . . . MBh. Heat release shall not exceed 83,200 Btu per cubic foot of furnace volume.

Normal water line of unit(s) shall not exceed . inches. A pyrex observation port shall be provided at the rear of the firebox. Front flue access cover, with refractory securely keyed in place and of a size permitting easy access to all fire tubes, shall be mounted on a gas-tight, insulated front smokebox. Gas-tight rear smokebox shall be provided with a (rear) (top) outlet.

Unit(s) shall be provided with a wrap-around steel jacket with glass or mineral fiber insulation and smooth enamel finish. All tubes shall be set with a roller expander at each end. No welding of tubes to the tube sheets nor use of refractory baffling to provide the second or third pass will be permitted.

Unit(s) shall be assembled and wired, with burner, controls, trim, insulated steel jacket, and refractory filled skid type base installed at the factory.

Fuel burning equipment shall be forced draft type: Factory assembled, wired, mounted, and tested. The entire unit shall bear the Underwriters' Laboratories label and shall be ready for field connection to power and fuel supply. Equipment shall include forced draft fan with air damper; dual high limit controls; flame sensing device; and control cabinet containing electronic flame safeguard and programming timer, burner switch, control circuit fuse, two indicating lights for major operations, numbered terminal strips, color-coded wiring, engraved nameplates, and necessary relays, starters and switches for automatic operation.

All motors shall be for volts, cycle, phase operation. Controls shall be 115 volt, 60 cycle, single phase. Magnetic motor starters with thermal overload protection and a step-down control circuit transformer shall be provided in the control cabinet when other than 115 volt motors are specified.

Fuel burning equipment shall be set and adjusted by a factory authorized representative to burn G.P.H. of No. (2) (4) (5) oil (and) (or) C.F.H. of Btu/cu. ft. (natural) (manufactured) (L.P.) gas having a sp. gr. with inches w.c. pressure at inlet of burner manual gas cock. Unit efficiency, based on flue gas analysis, shall be not less than 80% *NOTE: Specify job altitude if over 2,500 ft. above sea level.* Owner's representative shall be present to receive instructions in care and maintenance of the unit at the time it is started up by the service representative. Contractor shall provide a free service period of 90 days after start-up.

NOTE: Select applicable paragraphs below according to fuel and unit size. The following equipment conforms to UL requirements. Specify additional controls if FM or FIA insured, or subject to special utility requirements

FOR PRESSURE ATOMIZING OIL UNITS M-45 THRU M-175

Oil burner shall be of the high pressure mechanical atomizing type for No. 2 oil, with a two-stage oil pump direct connected to the blower motor. Burner shall include oil atomizing nozzles; oil solenoid valves; 12,000 volt ignition transformer; T-4 Timer for pre-purge and post-purge; RA-890E flame safeguard with photocell flame detector; and all necessary controls for "on-off" type of operation. Air control shall be by fixed position air inlet damper and adjustable primary-secondary air shutter.

FOR PRESSURE ATOMIZING OIL UNITS M-205 THRU M-265

Oil burner shall be of the high pressure mechanical atomizing type for No. 2 oil, with a two-stage oil pump direct connected to the blower motor. Burner shall include dual oil atomizing nozzles; dual oil solenoid valves; 12,000 volt ignition transformer; R-4150 flame safeguard with photocell flame detector, and all necessary controls and linkage for "on-off" type of operation with controlled low fire start. Fuel-air control shall provide two-position regulation of the air inlet damper and the high fire oil solenoid valve by means of a modutrol motor.

FOR PRESSURE ATOMIZING OIL UNITS M-335 THRU M-505

Oil burner shall be of the high pressure mechanical atomizing type for No. 2 oil, with a two-stage oil pump assembly with internal relief valve mounted on the boiler base. Burner shall include variable-flow oil atomizing nozzle; oil solenoid valve; oil metering valve; gas-electric ignition assembly, 6,000 volt ignition transformer, automatic gas valve, gas pressure regulator, and manual gas cock; air flow safety switch; Fireye FP-2 flame safeguard system with lead sulphide flame detector; low fire interlock; and all necessary controls and linkage for modulated firing with proved low fire start. Fuel-air control shall provide modulated regulation of the air damper and the oil metering valve by means of a modutrol motor.

FOR AIR ATOMIZING OIL UNITS M-335 THRU M-505

Oil burner shall be of the low pressure air atomizing type for No. 5 or lighter oil with an air-oil unit consisting of air compressor, motor, inlet air filter, air proving safety switch, air gauge, oil pump assembly, and relief valve mounted on the boiler base. Burner shall include air-oil atomizing nozzle; oil solenoid valve; oil metering valve, thermostatically controlled electric heater *(omit for No. 2 oil)*; gas-electric ignition assembly; 6,000 volt ignition transformer, automatic gas valve, gas pressure regulator, and manual gas cock; air flow safety switch; Fireye FP-2 flame safeguard with lead sulphide flame detector; low fire interlock; and all necessary controls and linkages for modulated firing with proved low fire start. Fuel-air control shall provide modulated regulation of the air damper and the oil metering valve by means of a modutrol motor.

FOR GAS UNITS M-45 THROUGH M-175

Gas burner shall be of the multiple-jet flame retention type including a main gas control group consisting of an automatic diaphragm gas valve, automatic safety gas valve on inputs over 1,000 MBh, gas pressure regulator, and manual gas cock; gas-electric ignition assembly consisting of a 6,000 volt ignition transformer, automatic gas valve, gas pressure regulator and manual gas cock; air-flow safety switch; T-4 Timer for pre-purge and post-purge; RA-890E flame safeguard with flame rod flame detector; and all necessary controls for "on-off" type of operation. Air control shall be by fixed position air inlet damper and adjustable primary-secondary air shutter.



TYPICAL SQUARE-HEAT GENERATOR SPECIFICATIONS

FOR GAS UNITS M-205 THRU M-265

Gas burner shall be of the multiple-jet flame retention type, including a main gas control group consisting of an automatic diaphragm gas valve, automatic safety gas valve, gas volume control valve, gas pressure regulator, and manual gas cock; gas-electric ignition assembly consisting of a 6,000 volt ignition transformer, automatic gas valve, gas pressure regulator, and manual gas cock; air-flow safety switch; R-4150 flame safeguard with flame rod flame detector; and all necessary controls and linkage for "on-off" type of operation with controlled low fire start. Fuel-air control shall provide two-position regulation of the air inlet damper and the gas volume control valve by means of a modutrol motor.

FOR GAS UNITS M-335 THRU M-505

Gas burner shall be of the flame retention type including a main gas control group consisting of an automatic motorized gas valve, automatic safety gas valve, gas volume control valve, gas pressure regulator, gas gauge, and manual gas cock; gas-electric ignition assembly, 6,000 volt ignition transformer, automatic gas valve, gas pressure regulator, and manual gas cock; air flow safety switch; Fireye FP-2 flame safeguard with lead sulphide flame detector; low fire interlock; and all necessary controls and linkage for full modulated firing with proved low fire start. Fuel-air control shall provide modulated regulation of the air damper and the gas volume control valve by means of a modutrol motor.

FOR COMBINATION GAS-PRESSURE ATOMIZING OIL UNITS M-45 THRU M-175

Gas-oil burner shall consist of a combination multiple-jet flame retention type gas burner and a high pressure mechanical atomizing oil burner for No. 2 oil, including all necessary controls for "on-off" type of operation. Gas controls shall include a main gas control group consisting of an automatic diaphragm gas valve, automatic safety gas valve on inputs over 1,000 MBh, gas pressure regulator, and manual gas cock; gas-electric ignition assembly consisting of a 6,000 volt ignition transformer, automatic gas valve, gas pressure regulator, and manual gas cock; and flame rod flame detector. Oil controls shall include a two-stage oil pump direct connected to the blower motor; oil atomizing nozzles; oil solenoid valves; 12,000 volt ignition transformer, and photocell flame detector. Controls for both fuels shall include T-4 Timer for pre-purge and post-purge; RA-890E flame safeguard; and air-flow safety switch. Air control shall be by fixed position air inlet damper and adjustable primary-secondary air shutter. Changeover from one fuel to the other shall be accomplished by means of a manual fuel selector switch in the control cabinet. No changes in linkage, burner position, or mechanical adjustment shall be necessary when changing fuels. The fuel selector switch shall provide, through the combustion control relay, proper ignition timing for the fuel being burned.

FOR COMBINATION GAS-PRESSURE ATOMIZING OIL UNITS M-205 THRU M-265

Gas-oil burner shall consist of a combination multiple-jet flame retention type gas burner and high pressure mechanical atomizing oil burner for No. 2 oil, including all necessary controls for "on-off" type of operation with controlled low fire start. Gas controls shall include a main gas control group consisting of an automatic diaphragm gas valve, an automatic safety gas valve, gas volume control valve, gas pressure regulator, and manual gas cock; gas-electric ignition assembly consisting of a 6,000 volt ignition transformer, automatic gas valve, gas pressure regulator, and manual gas cock, and flame rod flame detector. Oil controls shall include a two-stage oil pump direct connected to the blower motor; dual oil atomizing nozzles; dual oil solenoid valves; 12,000 volt ignition transformer; and photocell flame detector. Controls for both fuels shall include R-4150 flame safeguard and air-flow safety switch. Fuel-air control shall provide two-position regulation of the air inlet damper, the gas volume control valve, the high fire oil solenoid valve by means of a modutrol motor. Changeover from one fuel to the other shall be accomplished by means of a manual fuel selector switch in the control cabinet. No changes in linkage, burner position, or mechanical adjustment shall be necessary when changing fuels. The fuel selector switch shall provide, through the combustion control relay, proper ignition timing for the fuel being burned.

FOR COMBINATION GAS-PRESSURE ATOMIZING OIL UNITS M-335 THRU M-505

Gas-oil burner shall consist of a combination flame retention type gas burner and high pressure mechanical atomizing oil burner, for No. 2 oil, including all necessary controls for modulated type of operation with proved low fire start. Gas controls shall include a main gas control group consisting of an automatic motorized gas valve, an automatic safety gas valve, gas volume control valve, gas pressure regulator, gas gauge, and manual gas cock. Oil controls shall include a two-stage oil pump assembly with internal relief valve; variable-flow oil atomizing nozzle; oil solenoid valve; oil metering valve. Controls for both fuels shall include Fireye FP-2 flame safeguard with lead sulphide flame detector; air flow safety switch; low fire interlock; and gas-electric ignition assembly, 6,000 volt ignition transformer, automatic gas valve, gas pressure regulator, and manual gas cock. Fuel-air control shall provide modulated regulation of the air damper, the gas volume control valve, and the oil metering valve by means of a modutrol motor. Changeover from one fuel to the other shall be accomplished by means of a manual fuel selector switch in the control cabinet. No changes in linkage, burner position, or mechanical adjustment shall be necessary when changing fuels. The fuel selector switch shall provide, through the combustion control relay, the proper ignition timing for the fuel being burned.

FOR COMBINATION GAS-AIR ATOMIZING OIL UNITS M-335 THRU M-505

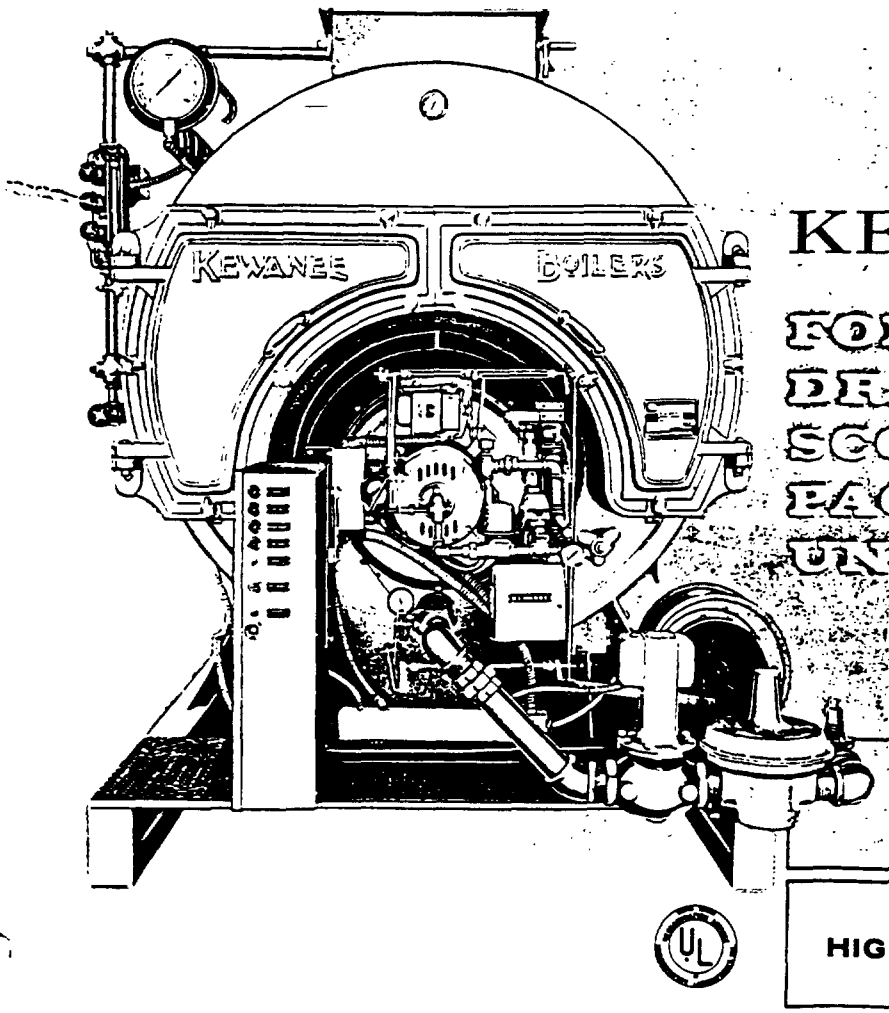
Gas-oil burner shall consist of a combination flame retention type gas burner and low pressure air atomizing oil burner for No. 5 or lighter oil with all necessary controls for modulating type of operation with proved low fire start. Gas controls shall include a main gas control group consisting of an automatic motorized gas valve, automatic safety gas valve, gas volume control valve, gas pressure regulator, gas gauge, and manual gas cock. Oil controls shall include an air-oil unit consisting of an air compressor, motor, inlet air filter, air proving safety switch, air gauge, oil pump assembly and relief valve; air-oil atomizing nozzle; oil solenoid valve; oil metering valve; thermostatically controlled electric oil heater *(omit for No. 2 oil)*. Controls for both fuels shall include Fireye FP-2 flame safeguard with lead sulphide flame detector; air flow safety switch; low fire interlock; and gas-electric ignition assembly, 6,000 volt ignition transformer, automatic gas valve, gas pressure regulator, and manual gas cock. Fuel-air control shall provide modulated regulation of the air damper, the gas volume control valve, and the oil metering valve by means of a modutrol motor. Changeover from one fuel to the other shall be accomplished by means of a manual fuel selector switch in the control cabinet. No changes in linkage, burner position, or mechanical adjustment shall be necessary when changing fuels. The fuel selector switch shall provide, through the combustion control relay, proper ignition timing for the fuel being burned.

PLAINTIFF'S EXHIBIT

ASI-921

QUALITY ENGINEERED

to give you better service longer . . .



KEWANEE

FORCED DRAFT SCOTCH PACKAGE UNITS

24360

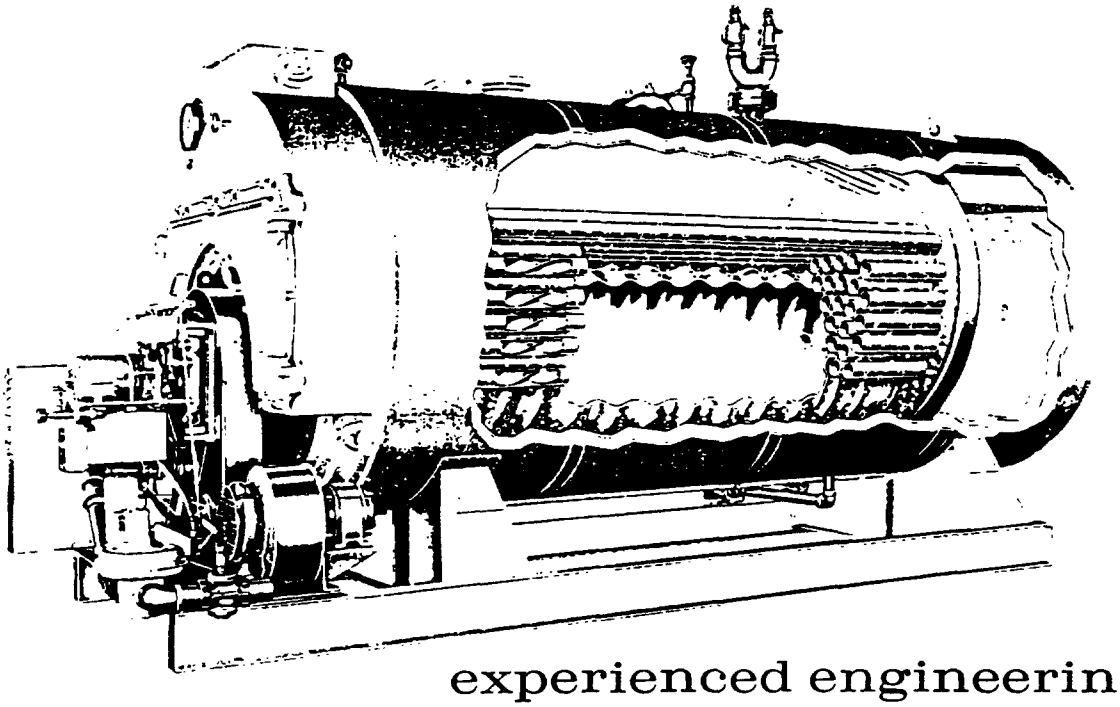
OIL OR GAS
combination gas-oil

HIGH AND LOW PRESSURE

bulletin 149D

AMERICAN-Standard
INDUSTRIAL DIVISION

single responsibility



experienced engineering assures peak performance

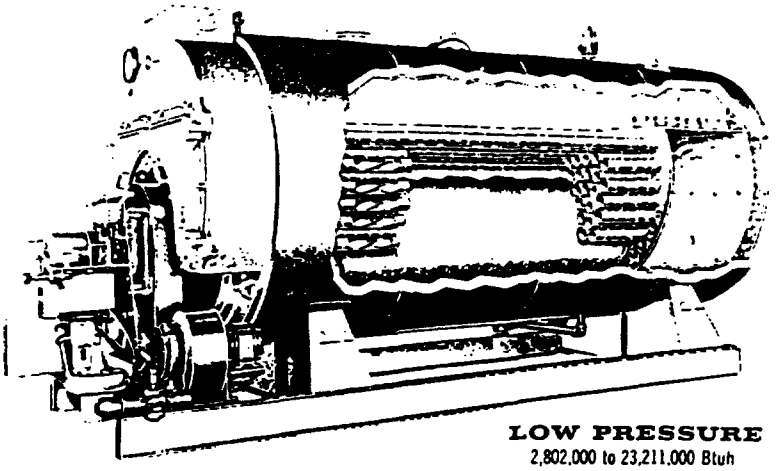
HIGH PRESSURE
82 to 672 hp.
125-150 lb. steam wp std.
Higher pressures on application

Certified ratings are conservative—five square feet of A.S.M.E. (fireside) heating surface per horsepower—providing adequate reserve capacity. Firing rates are carefully matched to heating surface. Flame size and shape are matched to furnace dimensions. Furnace volume is designed for efficient combustion, and direct heat absorbing surfaces are ample. Construction meets or exceeds A.S.M.E. Code requirements. Entire unit is listed by Underwriters Laboratories, Inc.

Kewanee Forced Draft Scotch Package Units present a combination of high quality, experienced engineering, modern concept and conservative design which assure you highest efficiency, faithful performance and long time dependability. These qualities have been proved in many thousands of installations . . . Kewanee has been the leader in the steel boiler industry for nearly a century.

24361

KEWANEE FORCED DRAFT SCOTCH PACKAGE UNITS



LOW PRESSURE
2,802,000 to 23,211,000 Btuh
15 lb. steam or 30 lb. water std.
Higher water wp (250° max.) on application.

FACTORY ASSEMBLED
FIRE TESTED BEFORE SHIPMENT

FORCED DRAFT OPERATION
Assures an ample supply of combustion air for stub stack applications. Special blower assemblies are available for high altitude installations.

OVERSIZE FURNACE TUBE
Provides abundant volume for complete combustion and greater proportion of primary heating surface. The hot flanged furnace tube openings assure maximum permanent strength at junction of furnace tube and tube sheets. The high pressure unit furnace tube is corrugated for greater strength and more primary heating surface. Location near bottom of boiler affords maximum protection against low water.

TUBES
All tubes in high and low pressure units are 3" OD, set into trepanned holes by roller expander and beaded at each end. No tubes welded to tube sheets. Spinner blades in all tubes swirl hot gases against tube surfaces for longer gas travel and maximum heat transfer.

TWO PASS DESIGN
Eliminates refractory baffles that can burn out and short circuit hot gases to stack. Kewanee design avoids wasted fuel, costly shutdown and expensive repairs.

LARGE STEAM SPACE
Combined with abundant unbroken disengaging area and unusually large water content assures steady water line, dry steam and plentiful reserves.

WELDED SHELL
Flange quality plate. Heads and furnace tube are firebox steel. Exclusive head braces are one-piece forgings with ends extending through boiler shell and heads. High pressure shells are X-rayed and stress relieved.

CAST IRON FLUE DOORS
An exclusive Kewanee feature—heavily insulated—precision ground and gasketed for gas tight fit. Hinged to provide quick access to tubes without interference with firing equipment.

I-BEAM SKIDS
Rugged with extra heavy reinforced saddles. They support the unit, distribute the weight evenly and facilitate handling.

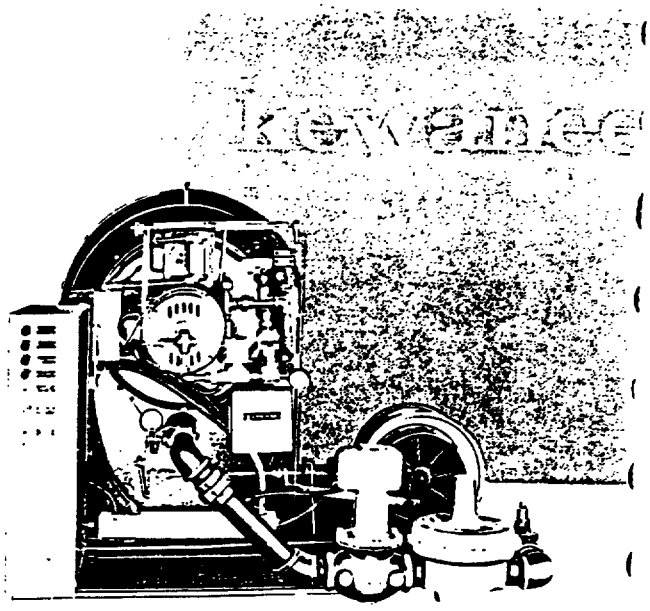
INSULATED STEEL JACKET
Factory installed heavy gauge steel jacket of drawband construction with 2" of glass fiber insulation and a 12" catwalk.

WATER HEATING COILS
Standard Kewanee "KI" (instantaneous) and "KT" (tank) coils can be provided for all low pressure units.

Kewanee horizontal rotary gas-oil combination burner

A very adaptable burner which handles efficiently all types of gas and the complete range of fuel oils. Designed especially for forced draft firing. Versatility greatly simplifies fuel supply problems. Completely automatic controls assure smooth functioning. Oil preheating equipment, complete with automatic thermostatic control is available for firing No. 6 and heavy No. 5 oils.

The oil burner combines the time-tested rotary cup principle of oil atomization with a unique method of air control for most efficient air-fuel mixtures.



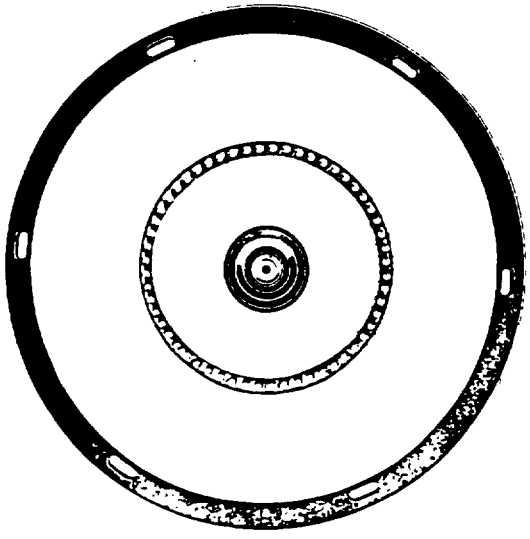
Horizontal rotary oil burner

Same as combination, but without gas burner.

Kewanee ring type gas burner

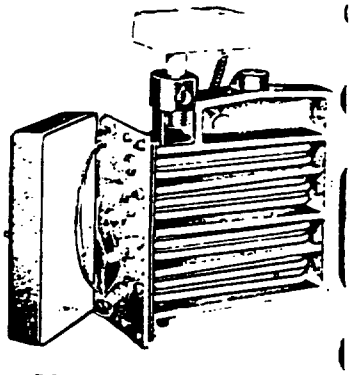
Multi-jet construction with specially designed gas manifold ring. Angle-drilled orifices mix gas with secondary air in burner throat ahead of combustion zone. Provides quiet, efficient gas firing with good flame retention.

Gas burners are available for all types of gas . . . to meet any gas pressure supply . . . or to meet any special utility or insurance requirements.



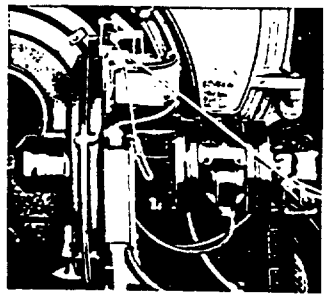
Electric oil preheater

Cast aluminum multi-pass reservoir, with immersed thermostat control. Low watt density elements and long oil travel through several passes combine for accurate temperature control at all firing rates.



Air-fuel ratio adjustment

Exclusive Kewanee curved slot linkage is the simplest and most permanent method of adjusting fuel-air ratio. Regulates air-fuel ratio throughout load range with no slippage or "drifting." Result is higher efficiency, fuel savings. This design permits swinging the burner out full 90° without disconnecting linkage.



Separate oil pump sets

Available for use on multiple installations or for separate mounting.

Burner equipped

Kewanee Forced Draft Scotch Package Units are available with the Kewanee Horizontal Rotary Oil Burner—Kewanee Ring Type Gas Burner, or Kewanee Gas-Oil Combination Burner.

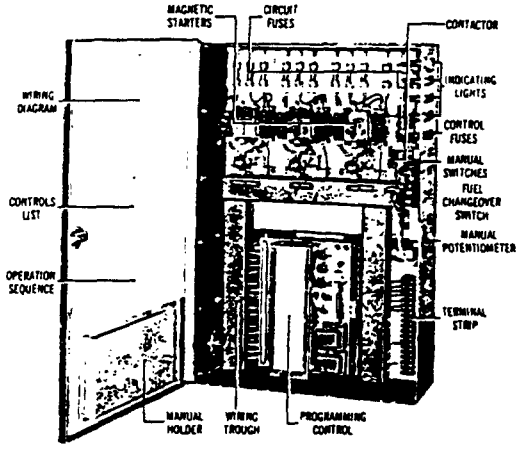
Each burner is especially designed for the Kewanee Boiler it fires. Capacity and characteristics are carefully matched so that boiler and burner work as an effective team. Light or heavy oils, high or low pressure gas may be fired efficiently. All three burners offer long economical service with minimum maintenance. Forced draft eliminates need for conventional stacks.

The multi-vaned inlet dampers control air supply to assure proper air-fuel ratio at all firing rates. Noise level is low and there is no "blow-back" at any firing rate.

Some features of the dependable Kewanee Burner are shown below:

Control cabinet

Heavy gauge steel, dustproof—contains individual fuses for each circuit. Enclosed controls include magnetic motor starters with thermal overload protection . . . master programming relay, etched nameplates, indicating lights for major operations, numbered terminal strips, wiring troughs, fuel selector switch. Wiring diagram and holder for instruction manual mounted inside door.



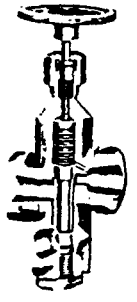
Exclusive—adjustable variable vaned air nozzle

Readily permits shaping the oil flame for different grades of fuel.



Viscosity compensating valve

The ultimate in simplicity . . . no complex mechanisms . . . no moving parts to wear. A simple adjustment sets the high fire and assures an accurately proportioned supply of oil to atomizing cup.



Burner latch switch

Exclusive design includes safety interlock to prevent burner operation when burner is not locked in firing position. Releases easily for maintenance service. Eliminates troublesome twist lock plugs.

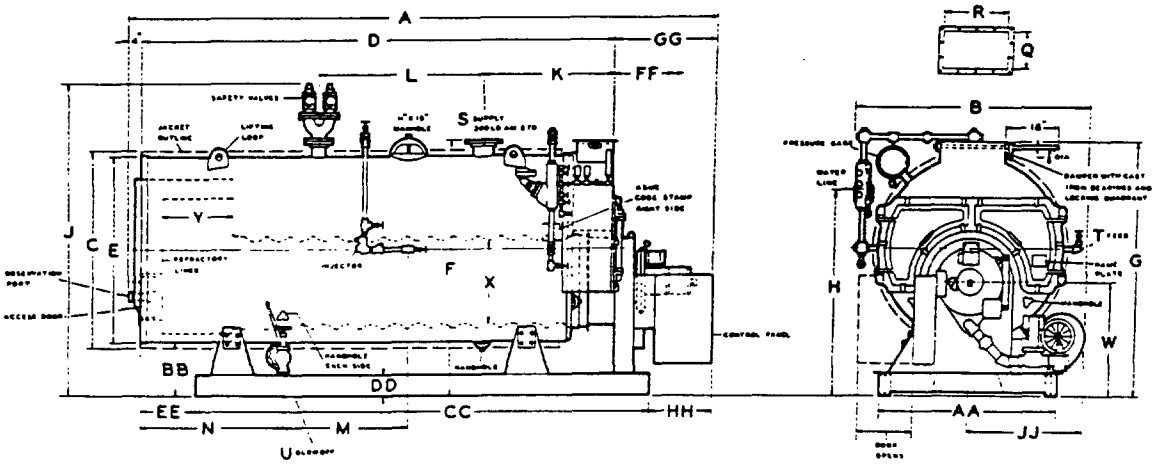


Change fuels with flip of a switch

That's all that's needed. No readjustment of linkage—no burner change.



KEWANEE forced draft package units (high pressure)



ratings

Unit number *		80	81	82	83	84	85	86	87	88	89	90	91	92	93
Rating—horsepower		82	95	116	137	169	202	236	270	338	405	469	538	605	672
—MBtuh		2769	3179	3911	4610	5665	6787	7916	9072	11357	13595	15758	18070	20321	22572
—steam per hour 212°F	lb	2840	3260	4020	4730	5820	6970	8130	9310	11660	13960	16180	18550	20870	23180
—steam radiation	sq ft	11540	13240	16300	19210	23600	28280	32980	37800	47320	56640	65660	75290	84670	94050
Firing rate—oil 140000 Btu	gph	24 7	28 4	34 9	41 2	50 6	60 6	70 7	81 0	101 4	121 4	140 7	161 3	181 4	201 5
—oil 150000 Btu	gph	23 1	25 5	32 6	38 4	47 2	56 6	66 0	75 6	94 6	113 3	131 3	150 6	169 3	188 1
—gas	MBtuh	3461	3973	4889	5762	7081	8484	9895	11340	14196	16993	19698	22588	25402	28216
Heating surface ASME	sq ft.	412	473	582	686	843	1010	1178	1350	1690	2023	2345	2589	3024	3359
Net furnace volume	cu ft	62 5	67.7	85 4	94.2	118 5	149 9	164 1	185 1	228 2	271 3	333.5	348 7	393 1	437 6
Safety valve capacity lb steam per hr		3296	3784	4656	5488	6744	8080	9424	10800	13520	16184	18760	21512	24192	25872

data

Outside surface to cover (unjacketed)	sq. ft	178	197	222	252	297	332	373	383	438	493	525	558	601	644
Approximate dry weight—125 lb W P		13700	14450	16550	19100	22150	26550	29950	33600	38450	45100	50300	54650	59950	65100
—150 lb W P		14600	15050	17450	20100	23350	27850	31450	35400	40550	47300	52900	58350	64050	69700
Vent diameter	in	15	16	17	19	20	22	23	24	26	28	30	32	34	36

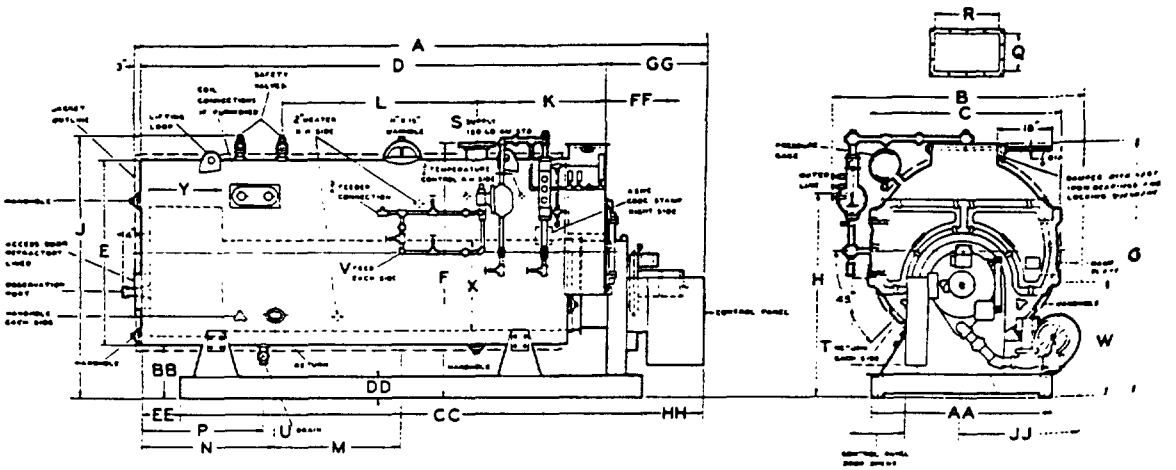
dimensions, inches

Unit number*	80	81	82	83	84	85	86	87	88	89	90	91	92	93
A —length overall	176	190½	194	216	230	235½	262½	251½	266	280	280	285	293	300
B —width overall	84½	84½	88	91	94	98	109½	112½	115½	122½	125½	127½	142½	144½
C —boiler—width	65	65	71	71	77½	84	84	90	96	102	108	112	116	120
D —length	139	153½	158	178	193	199	223	213	227	240	241	247	256	265
E —inside diameter	60	60	66	66	72	78	78	84	90	96	102	106	110	114
F —steam supply height	84	84	90½	90½	97	102½	102½	108	114½	121½	127½	132½	136	140
G —smoke outlet height	85½	85½	91	91	97½	102	102	108	113	119½	125½	129½	133	137½
H —water line height	67½	67½	71	71	75	78½	78½	82	89	94	100	104½	107½	110½
J —safety valve height	89	90	94	108	117½	122½	126½	132	144	150½	158½	162	166	179
K —steam supply	37	43	44	50	57	58	64	65	65	66	67	68	72	72
L —safety valve	51	52	53	60	60	60	78	66	78	84	84	84	84	84
M —feed water	30	37	37	47	53	47	59	52	60	66	66	66	67	71
N —blowoff	48	48	51	51	53	64	64	66	66	66	66	71	75	80
Q —smoke outlet—inside width	12	12	13	13	14	15	15	16	16	17	18	19	20	21
R —inside length	17	17	22	22	23	28	28	29	34	37	40	42	44	47
S —steam supply size	4	4	6	6	6	6	6	6	8	8	8	10	10	10
T —feed size	1¼	1¼	1½	1½	1½	1½	1½	1½	1½	2	2	2½	2½	2½
U —blow-off size	2	2	2	2	2	2	2½	2½	2½	2½	2½	2½	2½	2½
W —furnace—height	37½	37½	39	39	41	42	42	43	44½	47½	49½	50½	52	52
X —inside diameter	26¼	26¼	29¼	29¼	31¾	34¾	34¼	38	40½	44	50	50	52	52
Y —rear chamber	24	24	26	26	28	33	33	33	35	34	34	34	39	46
AA —base—width	60	60	66	66	72	78	78	84	90	96	96	96	96	102
BB —floor to boiler	18	18	18	18	18½	17½	17½	17	17	18	18	18	18	18
CC —length	137½	151½	153½	173½	189	189½	213½	201½	229½	242½	242½	248½	254	252
DD —height	6	6	8	8	8	8	8	10	10	10	12	12	12	12
EE —location	17½	18	19½	19½	21½	26½	25½	27½	30	29	29	28	31	40
FF —tube replacement space	83	97½	98	118	129	128	152	139	151	162	161	165	167	167
GG —control panel	33	33	32	34	33	32½	35½	34½	35	36	35	34	33	31
HH —control panel	17	17	17	19	15½	15½	18½	18½	21½	4½	4½	4½	4	4
JJ —fan to CL of unit	43½	43½	43½	46½	46½	46½	58	58	58	62	62	62	75	75

*For complete unit number designations for various fuels refer to Kewanee Burner Data page 8

forced draft package units
(low pressure)

AMERICAN-Standard
INDUSTRIAL DIVISION



ratings

Unit number **		80	81	82	83	84	85	86	87	88	89	90	91	92
Rating—horsepower		83	97	118	139	173	208	242	277	346	415	484	553	692
—MBtuh		2802	3259	3958	4657	5820	6982	8138	9300	11630	13957	16256	18574	23260
—steam per hour 212°F	lb	2880	3350	4060	4780	5980	7170	8360	9550	11930	14310	16690	19070	23870
—steam radiation	sq ft	11680	13580	16490	19400	24250	29090	33910	38750	48430	58070	67730	77390	96920
—water	sq ft	18680	21730	26390	31050	38800	46550	54250	62000	77480	92920	108370	123830	155075
MCA net steam radiation	sq ft	8580	10000	12160	14300	17860	21440	25000	28580	35720	42860	50000	57140	71520
Firing rate—oil 140000 Btu	gph	25 0	29 1	35 3	41 6	52 0	62.3	72 7	83 0	103	124 4	145 1	165 2	207
—oil 150000 Btu	gph	23 4	27 2	33 0	38 8	48 5	58 2	67 8	77 51	96.8	116 1	135 5	154 3	193
—gas	MBtuh	3503	4074	4948	5821	7274	8728	10172	11626	14520	17422	20320	23218	29050
Heating surface ASME	sq ft	417	485	589	693	866	1039	1211	1384	1729	2074	2419	2764	3459
Net furnace volume	cu ft	62 5	69 1	83 5	93 3	112 8	137 4	152 6	182.0	223 3	272 1	338 0	356 2	398 2
Safety valve capacity lb steam per hr		2802	3259	3958	4657	5820	6982	8138	9300	11630	13957	16256	18574	23260

data

Outside surface to cover (unjacketed)	sq ft	186	208	233	263	308	337	378	410	472	529	572	610	686
Approximate dry weight	lb	10250	11250	13750	15450	17900	20300	22750	25600	30650	35900	40700	43600	49000
Vent diameter	in	15	16	17	19	20	22	23	24	26	28	30	32	36

dimensions, inches

Unit number **	80	81	82	83	84	85	86	87	88	89	90	91	92
A —length overall	166	182½	183	205½	217½	216½	243½	243½	256½	281½	274	281	307½
B —width overall	85½	85½	91	94	97	100	111½	114½	121½	128½	131½	133½	139½
C —boiler—width	64	64	69	69	75	81	81	87	93	99	105	109	117
D —length	130	146½	148	168½	181½	181½	205½	206	232½	232½	236	244	270
E —inside diameter	60	60	66	66	72	78	78	84	90	96	102	106	118
F —steam supply height	84	84	90	90	97	102	102	107½	114½	121½	127½	131	138
G —smoke outlet height	85½	85½	91	91	97½	102	102	107½	113	119½	125½	129	136
H —water line height	66½	66½	70½	70½	74½	77½	77½	82	87½	93	98½	102	110
J —safety valve height	88	88	95½	95½	100½	105½	107	113	119	126	132	135½	142½
K —steam supply	37	43	44	50	57	58	64	65	65	65	67	62	72
L —safety valve	62	70	69	84	84	84	96	84	96	108	108	102	120
M —feed water—each side	26	33½	31	41	43	43	49	43	45	53	53	50	62
N —return—each side	43	45	47	47½	51½	50½	56½	68	71½	71½	74	82	92
P —drain	39	41	41	41½	41½	46½	46½	59	59½	59½	61	66	76
Q —smoke outlet—inside width	12	12	13	13	14	15	15	16	16	17	18	18	20
R —inside length	17	17	22	22	23	28	28	29	34	34	40	42	48
S —steam or water supply size	8	8	8	8	8	8	8	8	10	10	10	12	12
T —return size (two)	4	4	4	4	4	4	4	4	6*	6*	6*	6*	8*
U —drain size	2	2	2	2	2	2	2½	2½	2½	2½	2½	2½	2½
V —feed water size	1¼	1¼	1½	1½	1½	1½	1½	1½	2	2	2	2	2½
W —furnace—height	37½	37½	39	39	41	42	42	43	44	47½	49½	51	55
X —inside diameter	29¼	29¼	32½	32½	34¾	37¼	37¼	41	43	46¼	52¼	52	58
Y —rear chamber	24	24	24	24	24	28	28	30	32	32	34	34	38
AA —base—width	60	60	66	66	72	78	78	84	84	90	96	96	108
BB —floor to boiler	18	18	18	18	18½	17½	17½	17	17	18	18	18	18
CC —length	137½	151½	153½	173½	189	189½	213½	201½	225½	249½	242½	248	272
DD —height	6	6	8	8	8	8	8	10	10	10	12	12	12
EE —location	8½	11	9½	10	10	8½	8½	20	20	22	24	24	24
FF —tube replacement space	78	94	94	114	124½	119	142½	133	153	153	161	161	185
GG —control panel	33	33	32	34	33	32	35	34	37	35	35	34	34
HH —control panel	17	17	17	19	15½	14½	18½	32	32	32	4½	32	32
JJ —tan to CL of unit	43½	43½	43½	46¼	46½	46½	58	58	58	58	62	62	62

*150 lb American Standard Flange

**For complete unit number designations for various fuels, refer to Steam Burner Data

24366

high pressure

The contractor shall furnish and install .....Number..... Kewanee Forced Draft Scotch Package Unit(s) for (oil) (gas) (gas-oil combination) firing. The unit(s) shall have a certified output rating of .....H.P. and shall contain not less than.....sq. ft. of heating surface (ASME, Fireside) and a minimum furnace volume of..... cu. ft. The heat release shall not exceed 65,000 BTU per cubic foot of combustion space when operating at certified output rating. The furnace diameter shall be no less than.....in., the diameter of the vent.....in.

The shell shall be of the scotch type, two pass, horizontal firetube design, ASME Code construction for (125) (150) PSIG Steam. The boiler shall be mounted on steel I-beam skid base with integral forced draft burner and burner controls.

The furnace tube openings in the front and rear tube sheets shall be hot flanged to provide maximum strength at junction of tube sheets and corrugated furnace tube. The outer edges of the tube sheets shall also be hot flanged so that the joining of the shell and tube sheets will provide maximum efficiency. The longitudinal joints shall be double welded butt type and girth joints full fillet welds, x-rayed and stress relieved in full compliance with the latest ASME Boiler Construction Code.

The boiler tubes shall be 3" O.D. and tube holes shall be reamed not to exceed 1/32" greater than outside tube diameter. All tubes shall be set with a roller expander and beaded at each end. Welded tube ends will not be permitted.

The front smokebox shall be of heavy gauge steel welded to the boiler to secure a gas tight fit. The flue doors shall be of cast iron* and gasketed to secure a gas tight fit with a minimum number of clamps. They shall be lined with refractory insulating cement securely keyed in place and capable of withstanding a temperature of 1500°F. A damper with cast iron bearings and locking quadrant shall be furnished in the flue outlet.

The rear flue gas chamber shall be of pressure tight construction, lined with insulating castable refractory and provided with an access door of at least 16" diameter.

Boiler trimmings shall consist of the following, mounted and piped:

Safety valve(s); steam gauge with siphon and cock; No. 157A or 157D combination water column, pump control and low water cut-off; hand operated water gauge and try cocks assembly (chain operated on Unit No. 88 and larger); blow-off valves; globe and check valves for boiler feed line and injector.

Boiler shall be inspected during construction by an authorized inspector and after completion shall be subjected to a hydrostatic test one and one-half times the working pressure and stamped with all identifying markings and symbols as required by the latest edition of the ASME Boiler Construction Code.

Unit(s) shall be provided with factory installed aluminum finished jacket of 22 ga. steel securely fastened with drawbands. Jacket shall have a 2" thick insulation of lightweight mineral or glass wool material of 3 lbs. density per cu. ft. attached with adhesive. A similar material of 9 lb. density, 2" thick, shall be applied at selected locations for reinforcement including the top splice where it will form a 12" catwalk along the entire length of the boiler. Cover rings shall be provided at all openings. Lifting loops shall be provided so that unit may be handled without damage to the jacket.

*Units 80 to 90 incl.—steel doors on 91 to 93 incl.

Fuel burning equipment as follows shall be provided:

(Refer to Burner Specification)

BURNER SPECIFICATIONS FOR

For all units

The Fuel Burning Equipment shall be an integral part of the Boiler Unit; factory mounted and factory fire-tested. The complete Boiler Unit shall bear the Underwriter's Label. Fuel Burning Equipment shall include high limit control; operating control; windbox complete with refractory lining; linkage; gas-electric ignition assembly; forced draft fan with adjustable air inlet vanes; air-flow safety switch; safety latch switch; modutrol motor; auxiliary end switch for low-fire start interlock; pilot manual gas cock; pilot gas solenoid valve; pilot gas pressure regulator; ignition transformer; modulating operating control; lead sulphide scanner assembly; control cabinet containing (Fireye FP2) (M.H. R47S-B) electronic com-

Strike Out One

bustion and programming control; manual potentiometer; terminal strips and color coded internal wiring; signal lights indicating ignition, main fuel, flame failure and low water; individual fused circuits for controls, motors and heater; burner on-off switch; magnetic motor starters with thermal overload protection. All indicating lights and switches shall be identified by etched nameplates.

For gas units

Gas Burning Equipment shall be of the ring type equipped with multiple jets threaded into a manifold ring complete with gas pressure gauge; gas volume control valve; manual gas shut-off valve; gas pressure regulating valve and automatic motorized gas control valve with safety end switch. *NOTE. Specify additional controls if FM or FIA insured.*

For all types of oil units

Oil Burning Equipment shall be of the Horizontal Rotary Cup Type complete with (direct drive oil burner motor) *on Units 80 thru 88* (V-belt drive oil burner motor) *on Units 89 thru 93;* (integral fuel pump) *for #5 or lighter oil* (separate fuel pump) *for #6 oil;* fuel oil strainer; magnetic solenoid oil valve; viscosity compensating valve; oil pressure and vacuum gauges; electric oil preheater (*omit for #2 or #4 oils*).

(*Strike out underscored items that do not apply.*)

For heated oil units

Oil Burning Equipment for #6 oil shall include factory

KEWANEE BURNER DATA

Kewanee Model Number					Gas Controls Standard*—UL 1000 btu/cf—.6 s.g.		Motor Data H.P.			Electric Oil Heater 230v.		Oil Pump Capacity G.P.H.	
No. 5 or Lighter Oil	No. 5 or Lighter Oil & Gas	No. 6 Oil	No. 6 Oil & Gas	Gas	Required Inlet Pressure	Control Group Size	Oil Burner	Forced Draft	Oil† Pump (KSH)	Watts	Phase	KP	KS
KPE-80	KPEC-80	KSH-80	KSHC-80	KG-80	6" w.c.	2½"	1.0	1.5	½‡	2500	1	60	45
KPE-81	KPEC-81	KSH-81	KSHC-81	KG-81	6" w.c.	2½"	1.0	1.5	½‡	2500	1	60	60
KPE-82	KPEC-82	KSH-82	KSHC-82	KG-82	6" w.c.	2½"	1.0	1.5	½‡	2500	1	60	60
KPE-83	KPEC-83	KSH-83	KSHC-83	KG-83	6" w.c.	3"	1.5	2.0	½	3750	1	115	102
KPE-84	KPEC-84	KSH-84	KSHC-84	KG-84	7" w.c.	3"	1.5	2.0	½	3750	1	115	102
KPE-85	KPEC-85	KSH-85	KSHC-85	KG-85	7" w.c.	3"	1.5	2.0	½	3750	1	115	102
KPE-86	KPEC-86	KSH-86	KSHC-86	KG-86	7" w.c.	4"	3.0	3.0	½	5000	3	205	130
KPE-87	KPEC-87	KSH-87	KSHC-87	KG-87	8" w.c.	4"	3.0	3.0	½	5000	3	205	130
KPE-88	KPEC-88	KSH-88	KSHC-88	KG-88	8" w.c.	4"	3.0	5.0	½	5000	3	205	162
KVPE-89	KVPEC-89	KVSH-89	KVSHC-89	KG-89	8" w.c.	6"	5.0†	5.0	½	5000	3	305	192
KVPE-90	KVPEC-90	KVSH-90	KVSHC-90	KG-90	8" w.c.	6"	5.0†	7.5	½	5000	3	305	192
KVPE 91	KVPEC-91	KVSH-91	KVSHC-91	KG-91	12" w.c.	6"	5.0†	7.5	½	5000	3	305	244
KVPE-92	KVPEC-92	KVSH-92	KVSHC-92	KG-92	12" w.c.	6"	7.5†	7.5	½	5000	3	305	303
KVPE-93	KVPEC-93	KVSH-93	KVSHC-93	KG-93	12" w.c.	6"	7.5†	7.5	½	5000	3	305	303

*Controls for other pressures or insurance requirements available.
†V-belt drive.
‡230v., 60 cy., 1 phase all other motors 230v, 60 cy., 3 phase standard

low pressure

The contractor shall furnish and install..... .Number..... Kewanee Forced Draft Scotch Package Unit(s) for (oil) (gas) (gas-oil combination) firing. The unit(s) shall have a certified output rating of .....H.P. and shall contain not less than.....sq. ft. of heating surface (ASME, Fireside) and a minimum furnace volume of..... cu. ft. The heat release shall not exceed 67,000 BTU per cubic foot of combustion space when operating at certified output rating. The furnace diameter shall be no less than.....in., the diameter of the vent.....in.

The shell shall be of the scotch type, two pass, horizontal firetube design, ASME Code construction for (15 PSIG steam) (30 PSIG water). The boiler shall be mounted on steel I-beam skid base with integral forced draft burner and burner controls. The boiler shall be of the wet back type requiring no refractory in rear combustion chamber. An access door of at least 16" in diameter shall be provided to permit entry into the rear combustion chamber.

The furnace tube openings in the front and rear tube sheets shall be hot flanged to provide maximum strength at junction of tube sheets and circular furnace tube.

The boiler tubes shall be 3" O.D. and tube holes shall be reamed not to exceed 1/32" greater than outside tube diameter. All tubes shall be set with a roller expander and beaded at each end. Welded tube ends will not be permitted..

The front smokebox shall be of heavy gauge steel welded to the boiler to secure a gas tight fit. The flue doors shall be of cast iron* and gasketed to secure a gas tight fit with a minimum number of clamps. They shall be lined with refractory insulating cement securely keyed in place and capable of withstanding a temperature of 1500°F. A damper with cast iron bearings and locking quadrant shall be furnished in the flue outlet.

Boiler trimmings shall consist of the following, mounted and piped:

For Steam—Safety valve(s), steam gauge with siphon and shut off cock, Kewanee cast iron water column with water gauge and try cocks assembly (chain operated water column trimmings on Unit No. 88 and larger), combination water feeder and low water cut-off including alarm switch, angle drain valve.

For Hot Water—Relief valves, pressure gauge, thermometer, low water cut-off, angle drain valve.

Boiler shall be inspected during construction by an authorized inspector and after completion shall be subjected to a 60 lb. hydrostatic test and stamped with all identifying markings and symbols as required by the latest edition of the ASME Boiler Construction Code.

Unit(s) shall be provided with factory installed aluminum finished jacket of 22 ga. steel securely fastened with drawbands. Jacket shall have a 2" thick insulation of lightweight mineral or glass wool material of 3 lbs. density per cu. ft. attached with adhesive. A similar material of 9 lb. density, 2" thick, shall be applied at selected locations for reinforcement including the top splice where it will form a 12" catwalk along the entire length of the boiler. Cover rings shall be provided at all openings. Lifting loops shall be provided so that unit may be handled without damage to the jacket.

*Units 80 to 90 incl.—steel doors on 91 to 93 incl.

Fuel burning equipment as follows shall be provided:

(Refer to Burner Specification)

HIGH OR LOW PRESSURE UNITS

mounted and piped (baffled U-tube oil preheater) (safety type oil preheater) complete with necessary temperature control—(aquastat and circulating water pump) *for low pressure units* (steam trap, steam regulating valve, strainer, and steam pressure reducing valve) *for high pressure units.* A control shall be provided to permit continuous operation of oil pump and oil preheaters when burner is not running. *NOTE: Specify oil tank heating system to be used.*

(Strike out underscored items that do not apply.)

For gas-oil units

Combination Gas-Oil Burning Equipment shall include the following in addition to the items specified above. Changeover from one fuel to the other shall be accomplished by means of a manual fuel selector switch mounted on the control cabinet. No changes in linkage, burner position, or mechanical adjustments shall be necessary when changing fuels. Fuel selector switch shall provide, through the combustion control relay, proper ignition timing for fuel being burned.

For all units

Fuel Burning Equipment shall be set and adjusted by a Factory Authorized Service Representative to burn .... G.P.H. of ... oil (and) (or) .. C.F.H. of . btu cu. ft. (natural) (mfg.) gas having a . sp. gr. with... .inches W.C. pressure at inlet of burner manual gas cock. *Note: Specify job altitude if over 3000 ft. above sea level.*

For all units

Owner's representative shall be present to receive instructions in the care and maintenance of the Boiler Unit at the time the Boiler Unit is started up by the Service Representative. *Note: Specify free service period of not less than 90 days after start-up.*

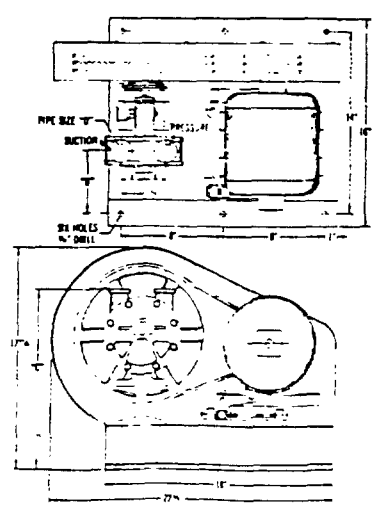
For all units

All motors shall be for volts, cycle, phase. Controls shall be for volts, cycle, single phase. Electric oil preheater shall be for volts, cycle, phase.

For use on multiple installations or for remote mounting
Select Pump Sets having capacity equal to approximately twice the burning capacity of the burner(s). Pump Sets Numbers 1 through 4 are equipped with mechanical seals. Sets 5 and 6 have packing type seals.

Pump Set Number	Standard on KSH Units	G. P. H.	Relief Valve Size	Port Size	Motor—HP @75# Discharge Pressure	Pump RPM
1B	80	45	¾"	½"	½	452
1C	81-82	60	¾"	½"	½	596
2A	83-84-85	102	¾"	½"	½	306
2B	86-87	130	¾"	½"	½	392
2C	88	162	¾"	½"	½	485
3A	89-90	192	1"	¾"	½	306
3B	91	244	1"	¾"	½	392
3C	92-93	303	1"	¾"	½	485
4A		369	1"	1"	¾	306
4B		434	1"	1"	¾	360
4C		472	1"	1"	¾	392
5A		613	1¼"	1¼"	1	306
5B		720	1¼"	1¼"	1	360
5C		785	1¼"	1¼"	1	392
6A		827	1¼"	1¼"	1½	306
6B		970	1¼"	1¼"	1½	360
6C		1060	1¼"	1¼"	1½	392

STANDARD EQUIPMENT Pump set consists of Tuthill pump, pump base, adjustable motor base, V-belt drive, belt guard, relief valve, motor—230v, 60 cy., 3 phase*, Linestarter*, vacuum gauge, pressure gauge, oil strainer.
*Size 1 pumps are ⅓hp, 230v, 60 cy., single phase. No linestarter included.



24368

KEWANEE forced draft package units

standard equipment

ALL UNITS

1. Windbox complete with refractory lining
2. Forced draft fan, motor, adjustable inlet vanes —230v, 60cy, 3 ph.
3. Air flow safety switch
4. Safety latch switch
5. Gas-electric ignition assembly
6. Pilot gas pressure regulator (except LP)
7. Modulating motor, transformer, linkage
8. Low-fire start interlock
9. Modulating control
10. Operating limit control
11. Safety high limit control
12. Control cabinet complete with:
    MH-R478-B (or Fireye FP-2) electronic flame safeguard, motor starters, relays, transformers, terminal strips, signal lights (4), etched name plates, manual switches, manual potentiometer, individually fused circuits
13. Boiler flue cleaner and handle
14. Boiler (ASME Code) mounted on steel skids
15. Gas-tight front steel smokebox with gasketed cast iron doors (Units 80-90)
16. Rear access opening with Pyrex observation port
17. 3" firetubes with spinner blades
18. Quadrant locking outlet damper
19. Insulated steel jacket with reinforced catwalk area
20. Listed standard and selected optional equipment mounted, piped, wired ready for field connection to fuel, water, steam, and electricity
21. Factory fire test
22. Starting service

ALL OIL FIRED UNITS

1. Horizontal rotary cup oil burner —230v, 60cy, 3 ph.
   Direct Drive (Units 80-88)
   V-Belt Drive (Units 89-93)
2. Primary air fan
3. Magnetic oil valve
4. Electric oil heater
5. Oil strainer assembly
6. Oil check valve
7. Oil viscosity valve
8. Oil vacuum and pressure gauges

(KPE) NO. 5 OR LIGHTER OIL UNITS

1. Integral oil pump

(KSH) NO. 6 OIL UNITS

1. Separate oil pump set for remote mounting with V-Belt drive, relief valve manual-off-automatic control
2. Below-water-line oil heater (hot water and low pressure steam units) mounted complete with water circulating pump and pump control
3. Steam oil heater (high pressure steam units) mounted complete with temperature regulating valve, trap, strainer, and steam pressure reducing valve

ALL GAS UNITS

1. Multiple-jet ring type gas burner
2. Gas pressure gauge
3. UL approved low pressure gas control group
   a gas volume control valve
   b Automatic motorized gas valve with safety end switch
   c Gas pressure regulator
   d Gas lubricated plug cock

GAS-OIL COMBINATION UNITS

1. Manual fuel changeover switch
2. Changeover without mechanical adjustments or changes

ALL STEAM UNITS

1. Safety valve(s)
2. Steam gauge with siphon and cock
3. Hand operated water column trim (Units 80-87)
4. Chain operated water column trim (Units 88-93)

HIGH PRESSURE STEAM UNITS

1. Rear combustion chamber refractory
2. No. 157A or No. 157D combination water column, pump control, and low water cut-off
3. Blow down valves
4. Injector
5. Corrugated furnace tube
6. Globe and check valves for boiler feed line

LOW PRESSURE STEAM UNITS

1. Kewanee water column
2. Combination water feeder, low water cut off, and alarm switch
3. Wet back type construction
4. Angle drain valve

HOT WATER UNITS

1. Water relief valve(s)
2. Pressure gauge and thermometer
3. Low water cut-off
4. Angle drain valve

optional equipment

ALL UNITS

1. Electric characteristics other than 230v, 60cy, 3 ph.
2. Flue gas temperature gauge
*3. Circuit breakers in lieu of fuse blocks
4. Alarm bell
5. DC voltmeter
6. Draft gauge
*7. Sequencing draft control
8. One year service period

*Requires special control cabinet

ALL OIL FIRED UNITS

1. Fuel oil meter mounted on burner
2. Increased capacity electric oil heater
3. Duplex oil strainer in lieu of standard strainer
4. Controls for FM requirements
5. Controls for FIA requirements
6. Controls for future addition of gas firing
7. Diesel-electric ignition

(KPE) NO. 5 OR LIGHTER OIL UNITS

1. Separate oil pump set with V-belt drive, relief valve and manual-off-automatic control.
2. Omit electric oil heater for No. 2 and No. 4 oil

(KSH) NO. 6 OIL UNITS

1. Separate oil pump mounted, piped, and wired on boiler skid
2. Safety-type below-water-line oil heater in lieu of standard

ALL GAS UNITS

1. Gas control group for FM requirements
2. Gas control group for FIA requirements
3. Gas control group for other than standard gas pressures
4. Gas control group for special local or utility requirements
5. Controls for future addition of oil firing

GAS-OIL COMBINATION UNITS

1. Automatic fuel changeover control
2. Swing out oil burner to fire gas

ALL STEAM UNITS

1. Chain operated water column trim in lieu of hand-operated (Units 80-87)

HIGH PRESSURE STEAM UNITS

1. Second low water cut-off
2. No. 191D water column, pump control, and low water cut off in lieu of 157A or 157D
3. Higher than standard 125 or 150 lb. S.W.P.

LOW PRESSURE STEAM UNITS

1. Second low water cut-off
2. No. 157A or No. 157D water column, pump control and low water cut-off in lieu of (or in addition to) standard column feeder and cut-off
3. No. 191D water column, pump control, and low water cut-off in lieu of (or in addition to) standard column feeder and cut-off
4. Instantaneous or tank type hot water coils

HOT WATER UNITS

1. Higher than standard 30 lbs. water working pressure
2. Instantaneous or tank type hot water coils

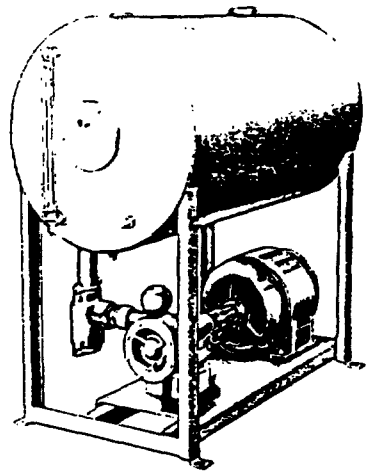
Kewanee
Forced Draft
Scotch Package Units

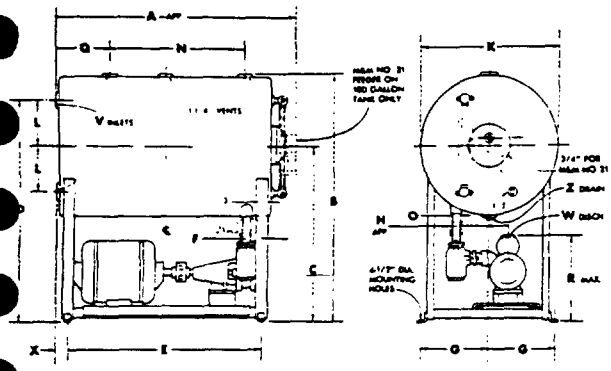
Pump and Receiver for Steam Units

If specified, a Boiler Feed Unit is included in the complete shipment. This equipment is not attached to the boiler skids, allowing installation at the most convenient location in the boiler room. Sizes for every unit . . . 15, 125, 150 lb. steam working pressures.

M & M No. 21 feeder—100 gallon tank.

Solenoid valve and float switch—larger tanks.





Simplex or Duplex Units

The Simplex Unit is illustrated. Duplex Unit consists of two pumps and two motors mounted on a single chassis with the tank. Duplex Units are often advisable for stand-by purposes or with a battery of two boilers; each boiler supplied by a separate pump.

boiler feed units (dimensions—inches)

unit	A	B	C	D	E	F	G	H	K	L	N	O	P	Q	R	S	V	X	Z
KXF	46	78	63½	73¾	36	4½	14	5	27	10⅛	28	1½		9	18¼		3	3	1¼
KXG	66½	78	62	73	56	4½	14⅛	5½	30	11	48	2	12	9	19¼	¾	4	3¼	1½
KXH	66½	78	60	74½	56	4½	17½	7¼	36	14½	48	2	15	9	20⅛	¾	4	3¼	1½
KXJ	66½	78	56	73	56	6	20¾	8	42	17	48	2½	15	9	21⅜	¾	4	3¼	1½
KXK	90½	78	56	73	78	6	20¾	8	42	17	72	2½	15	9	18⅛	1	4	4	1½
KXM	dimensions on request																		

pump number	W
1133	1
143-149. 1141-1252	1¼
263-269. 1255-2283	2
3751-3791	2½"

*250 lb. ASA RF Flg.
All others are standard screwed connections.

specifications and catalog numbers

unit number		80	81	82	83	84	85	86	87	88	89	90	91	92	93
boiler feed unit number	15 swp	KXF-1	KXF-1	KXF-2	KXF-107	KXG-1	KXG-110	KXH-1	KXH-1	KXJ-1	KXJ-2	KXK-1	KXK-2	KXM-1	KXM-4
gpm—max 195°F		10.5	12.6	15.5	18.2	22.4	27.3	32.2	36.4	45.5	54.6	63.0	68.0	74.0	81.0
pump number		143	143	145	148	148	149	263	263	265	267	267	267	269	269
motor size, hp—rpm		½-1750	½-1750	½-1750	½-1750	¼-1750	1-1750	1½-1750	1½-1750	2-1750	2-1750	2-1750	2-1750	3-1750	3-1750
tank capacity—gal.		100	100	100	100	200	200	250	250	350	350	500	500	750	750
shipping weight—lb		500	500	500	500	700	700	950	950	1050	1050	1400	1450	2000	2050
boiler feed unit number	125 swp	KXF-11	KXF-11	KXF-12	KXF-12	KXG-20	KXG-8	KXH-20	KXH-22	KXJ-20	KXJ-20	KXK-20	KXK-3	KXM-2	KXM-5
gpm—max 195°F.		10.5	12.6	15.4	18.2	22.4	27.3	32.2	36.4	45.5	54.6	63.0	68.0	74.0	81.0
pump number		1133	1133	1141	1141	1252	1255	1255	1255	2257	2257	2283	3751	3771	3771
motor size, hp—rpm		3-3500	3-3500	3-3500	3-3500	5-3500	7½-3500	7½-3500	10-3500	10-3500	10-3500	15-3500	15-1750	15-1750	15-1750
tank capacity—gal		100	100	100	100	200	200	250	250	350	350	500	500	750	750
shipping weight—lb		650	650	650	650	850	900	1050	1150	1400	1400	1650	2000	2600	2500
boiler feed unit number	150 swp	KXF-11	KXF-21	KXF-22	KXF-22	KXG-20	KXG-21	KXH-21	KXH-21	KXJ-20	KXJ-21	KXK-21	KXK-3	KXM-3	KXM-6
gpm—max 195°F		10.5	12.6	15.4	18.2	22.4	27.3	32.2	36.4	45.5	54.6	63.0	68.0	74.0	81.0
pump number		1133	1251	1252	1252	1252	2255	2255	2255	2257	2279	2282	3751	3771	3791
motor size hp—rpm		3 3500	5 3500	5 3500	5-3500	5-3500	10-3500	10-3500	10-3500	10-3500	15-3500	20-3500	15-1750	20-1750	20-1750
tank capacity—gal		100	100	100	100	200	200	250	250	350	350	500	500	750	750
shipping weight—lb		650	650	650	650	850	1050	1200	1200	1400	1550	1700	2000	2650	2650

Authorized Service Representatives, located in local marketing areas, are trained service personnel; qualified to render prompt, efficient service on Kewanee Package Units.

The owner of a new Kewanee Forced Draft Scotch Package Unit receives Starting Service which consists of the initial startup of the unit, checking the general operation of the unit, making adjustments required by local job conditions, instructing the operator in proper maintenance procedures, and service for a period of 90 days after startup.

24371

AMERICAN-Standard
INDUSTRIAL DIVISION
SALES OFFICES IN ALL PRINCIPAL CITIES

Executive Offices: **DETROIT 32, MICHIGAN**
In Canada:
American-Standard Products (Canada) Limited,
Toronto 4, Ontario
AMERICAN RADIATOR & STANDARD SANITARY CORPORATION