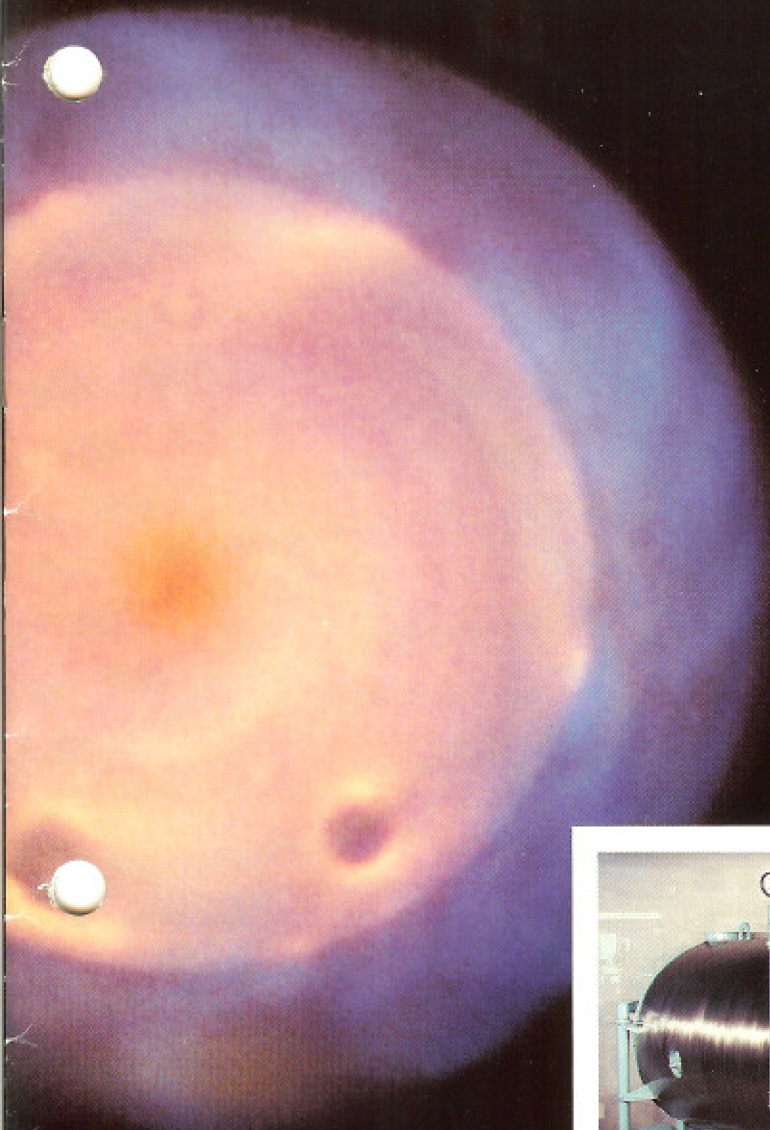

TurboFire® II

Ultra Low NOx - High Efficiency

RETROFIT BURNERS AND
OEM BURNER/BOILER PACKAGES

YORK-SHIPLEY™
A Division of DONLEE TECHNOLOGIES INC.

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Manufacturers Since 1919

York-Shipley Division of DONLEE Technologies Inc. has been a successful designer and manufacturer of firetube boilers and combustion equipment since 1919. Founded as a pioneer in the development of residential oil burners, the company grew rapidly with the introduction of pressure atomizing burners, integrated boiler/burner units and industrial rotary oil burners.

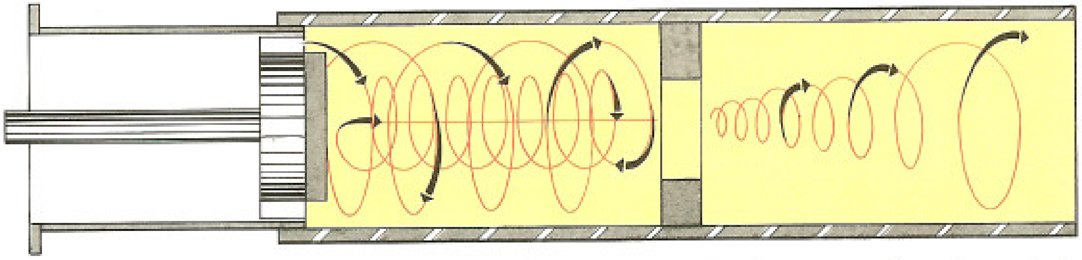
During World War II, YORK-SHIPLEY produced many products which were vital to the war effort. As a result, YORK-SHIPLEY received the Army-Navy "E" Award for Excellence. One of these products led to the design and development of the modern "Steam Pak" 3-pass Scotch marine boiler, which today is marketed worldwide for hot water and steam applications up to 1200 horsepower. Supplementing the boiler line, York-Shipley produces a large variety of burners plus auxiliary equipment that includes feedwater systems, water softeners, blowdown tanks, deaerators and superheaters.

Anticipating the challenges presented by escalating energy prices and tightening environmental regulations, the company, with support from the Southern California Gas Company, the Gas Research Institute and the U.S. Department of Energy initiated R&D programs to develop the next generation of advanced state-of-the-art combustion technologies. These include: the TurboFire® I Low NOx and High Efficiency OEM Burner/Boiler Package, and the TurboFire® II Ultra Low NOx and High Efficiency Conversion Burner and OEM Burner/Boiler Package.

TurboFire® II Nearly Doubles Steam Capacity of Conventional Boilers

Combustion gases having low velocity are an insulator between the furnace wall and the burner flame.

Conventional Flame Pattern fails to distribute heat equally



TurboFire® II's spinning cyclonic gases contact 360° of the furnace wall.

TurboFire® II Flame Pattern makes 3 passes before entering target ring

TurboFire® II - An Engineering Overview

In 1988 YORK-SHIPLEY Division of DONLEE Technologies Inc. introduced the TurboFire® I Low NO_X boiler/burner combination for firetube boilers 100 to 250 hp and steam pressures up to 200 psig. The TurboFire® I improved packaged firetube boiler performance by utilizing cyclonic combustion to increase boiler efficiency over an extended turndown range.

The company, with funding from Southern California Gas, has now developed a second generation swirl/cyclone combustor, TurboFire® II. This Ultra Low NO_X and high efficiency combustion technology is suitable for all firetube boiler applications and is designed for both OEM and retrofit applications. It combines the high efficiency and stability of the earlier TurboFire® I with NOx emissions levels less than 20 ppm* fired with natural gas at 3% O_2.

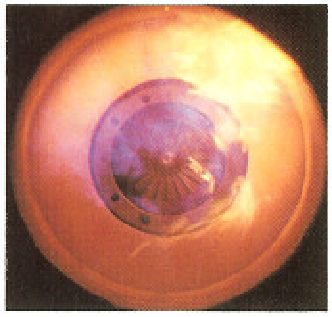
In cyclonic combustion, high tangential velocities create a swirling pattern in the combustion system as seen in the actual flame photographs taken from rear view port of a conventional and TurboFire® II boiler. This causes close contact between combustion gases and the furnace wall and adds a significant convective component to the radiant heat transfer. Better heat transfer per square foot, and hence higher boiler efficiency, results. The combination of high intensity cyclonic combustion and the convective effect of cyclonic flow can almost double the boiler's steam capacity of a boiler designed for a conventional burner.

The cyclonic combustion system has proven to be extremely stable. Under extensive testing, stable and complete combustion has been achieved at temperatures as low as 1700°F. The system operates at low excess air combustion, less than 5%, over the entire load turndown range. Firing natural gas, the TurboFire® II turndown capability of 10:1 exceeds industry norms of 3 or 4:1.

Stability, coupled with the intense internal mixing that is a natural by-product of the cyclonic process, results in very low levels of NOx production. Internal flue gas recirculation dilutes the temperature of the near-stoichiometric flame with no loss in combustion efficiency.

The Cyclonic Difference -

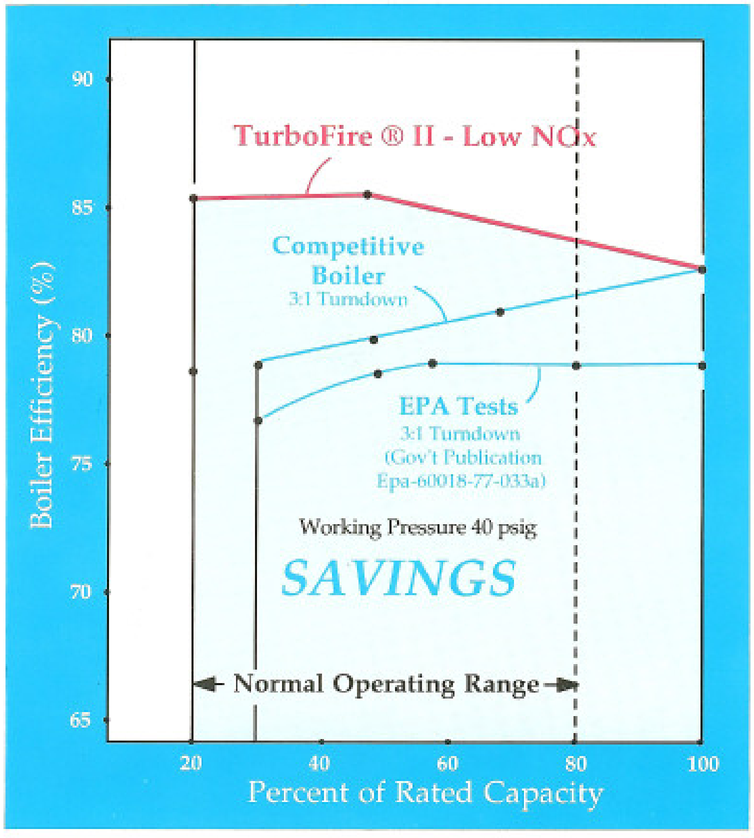
Actual Flame Photographs



Conventional Burner Flame, Low Fire - Gas

TurboFire® II Burner Flame, Low Fire - Gas

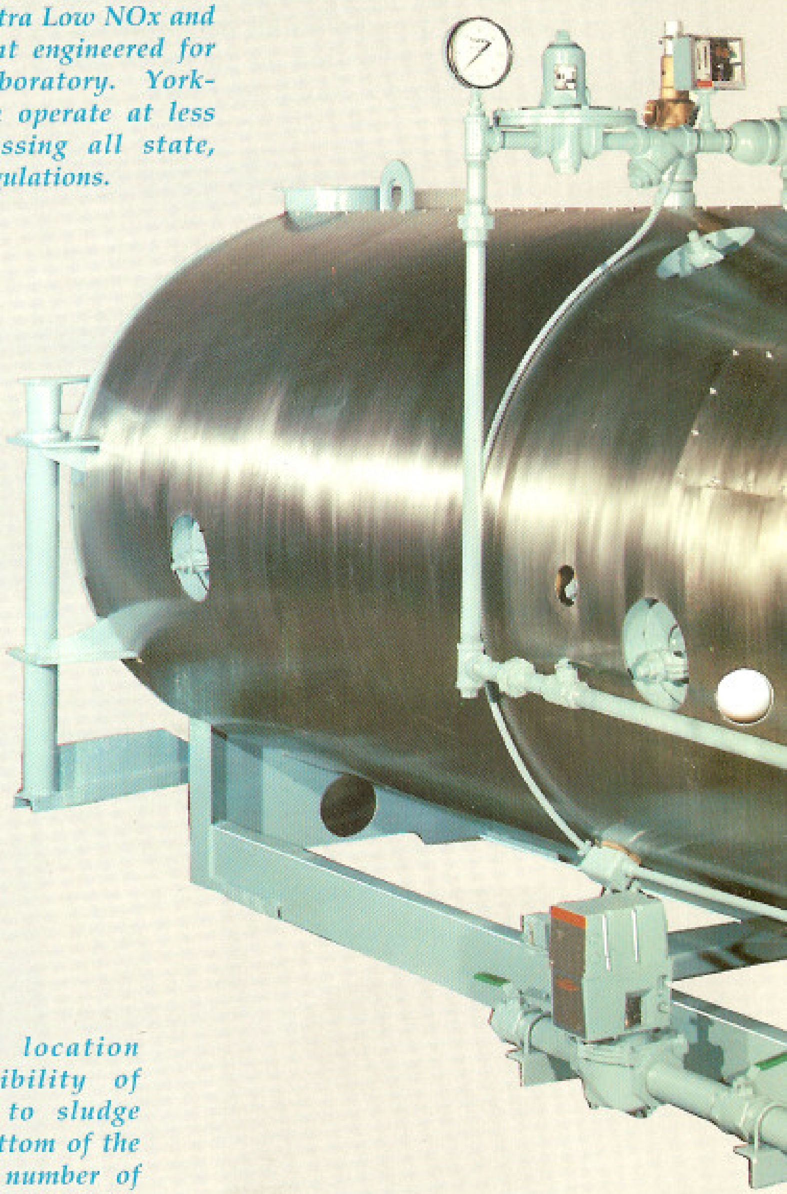
Highest Fuel-to-Steam Efficiency



* Less than 20 ppm firing natural gas (<40 ppm on oil)

ULTRA LOW NOx

TurboFire® II boilers offer Ultra Low NOx and High Efficiency in equipment engineered for the boiler room, not the laboratory. York-Shipley's TurboFire® II can operate at less than 20 ppm NOx surpassing all state, national and international regulations.*



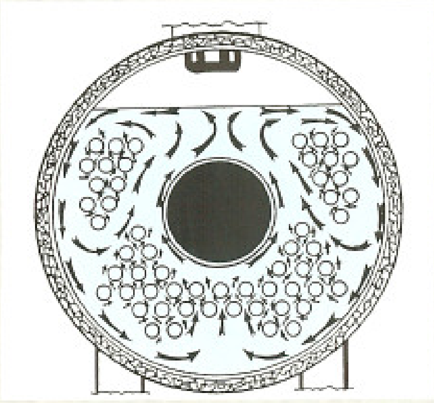
ADVANCED REAR BOILER TURNSPACE

Extensive development and engineering has yielded a rear boiler turnspace which incorporates a rear door and baffle produced with advanced ceramics.

This design, coupled with the low combustion gas temperature produced by cyclonic combustion, guarantees gas tight operation, long life and maintenance free durability. The front boiler turnspace uses no refractory baffles and is engineered to provide easy access and gas tight operation.

TURBOFIRE® II BURNER/BOILER PACKAGE

The TurboFire® II package uses a tried and tested York-Shipley Scotch marine boiler. style The boiler is a 3-pass dry back design with 5 square feet of heating surface area per boiler horsepower.



A central furnace location eliminates the possibility of furnace damage due to sludge accumulation at the bottom of the boiler shell. A large number of convective tubes, without dead space, assure quick response to load changes and fast steaming. Controlled water circulation uses the scrubbing action of the rising water flow to prevent accumulation of corrosive oxygen and carbon dioxide bubbles on the tube surfaces.

Baffles prevent direct impingement of feedwater on the heating surfaces. A steam separator, beneath the steam outlet, assures dry steam.

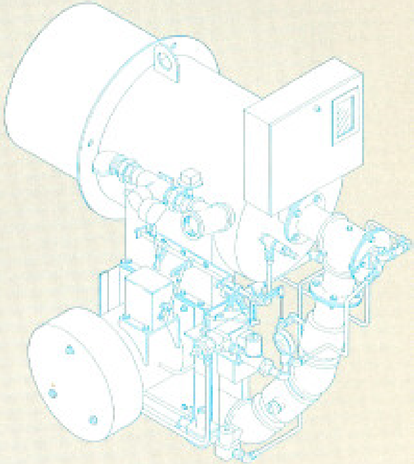
EASY ACCESS TO EQUIPMENT

The TurboFire® II package is designed with components positioned to provide easy access to all equipment requiring periodic maintenance. Components and controls are specified for safety , durability and ease of maintenance. Unnecessary complicated electronic devices are eliminated thus reducing costly maintenance and boiler downtime.

Features of TurboFire® II

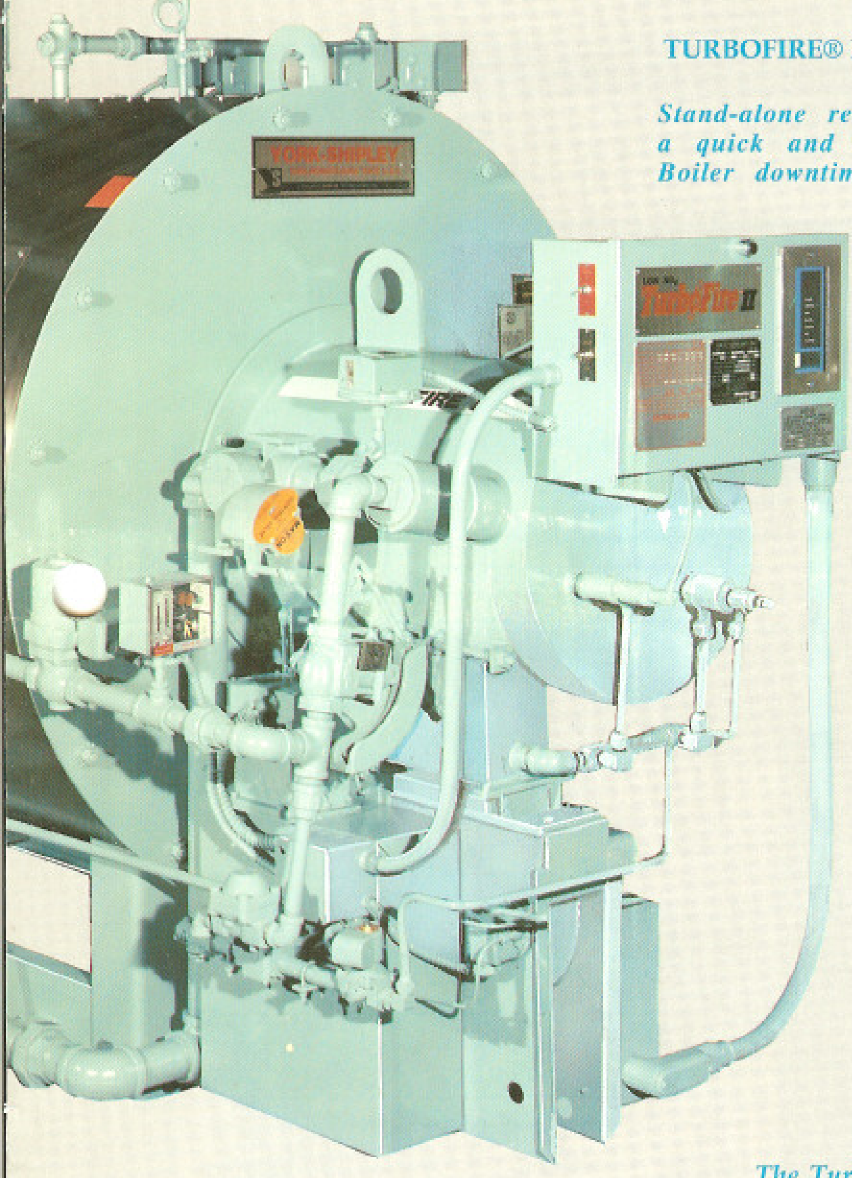
HIGH TURNDOWN

Firing natural gas, TurboFire® II turndown capabilities of 10:1 exceed industry norms of 3 or 4:1.



TURBOFIRE® II BURNER RETROFIT

Stand-alone retrofit burner provides a quick and easy bolt-on feature. Boiler downtime is minimal.



ENVIRONMENT FRIENDLY

Meets and surpasses California's *stringent South Coast Air Quality Management District's (SCAQMD) standards.*

UNDERWRITERS LABORATORY CERTIFIED

TurboFire® II boilers have been granted a U.L. "B" packaged boiler label. All TurboFire® II components and materials meet or exceed ASME boiler specifications. Every TurboFire® II boiler undergoes a complete factory fired test including the Ultra Low NO_x system.

LOW MAINTENANCE COST

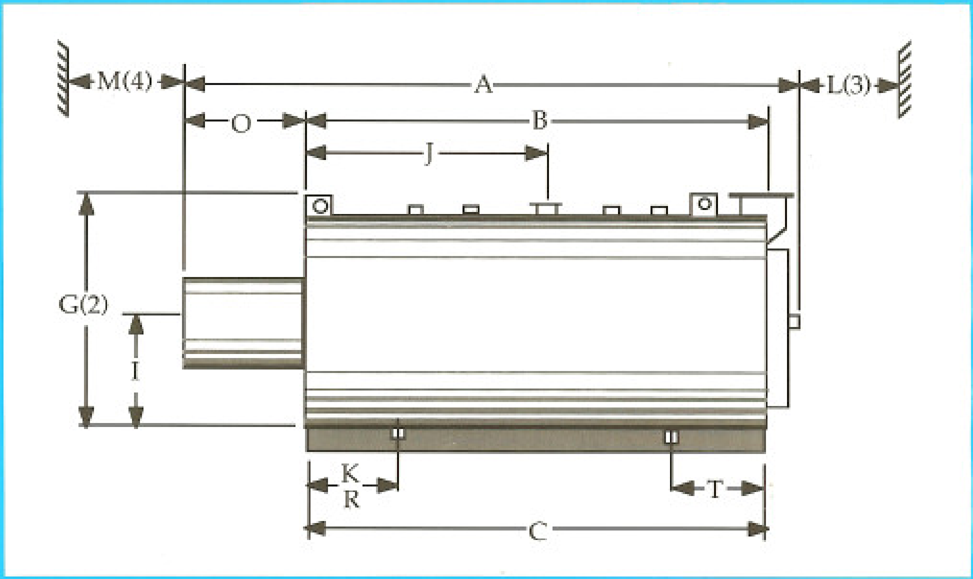
The TurboFire® II packaged boiler is designed for "real world" operation where common sense layout and simplified maintenance are essential. Ease of access and uncomplicated controls eliminate costly and unnecessary downtime. No flue gas recirculation fan or complicated controls are required.

RUGGED CONSTRUCTION

Every York-Shipley packaged boiler is engineered using the best materials and components. The TurboFire® II boiler is designed for the harsh industrial environment. Workmanship and thoughtful design give trouble-free long life service.

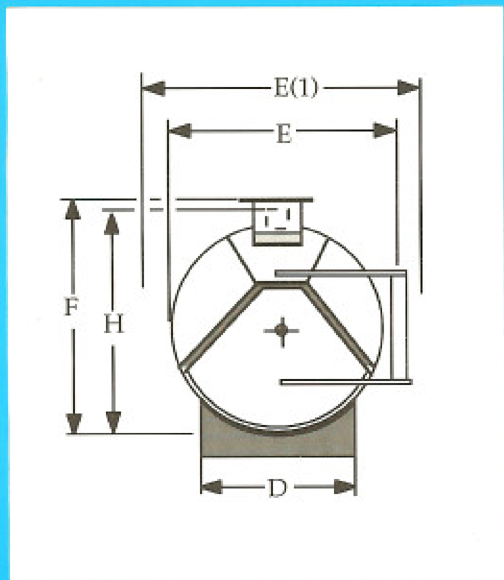
* Less than 20 ppm firing natural gas (<40 ppm on oil)

NOTE: Items shown may change depending on application.



TurboFire® II Dimensions

HORSEPOWER		60	70	80	100	125	150
A-Overall Length (1)		11' 11"	13' 1"	14' 3"	13'1"	15' 7"	17' 4"
B-Length of Shell		8' 3"	9' 5"	10' 7"	8' 9"	10' 6"	12' 3"
C-Length of Skid		8' 1"	9' 3"	10' 5"	8' 6"	10' 3"	12'
D-Width of Skid		2' 9"	2' 9"	2' 9"	3' 3"	3' 3"	3' 3"
E-Boiler Width		4' 6"	4' 6"	4' 6"	5' 5"	5' 5"	5' 5"
E1-Overall Boiler Width Max.		6' 0"	6' 0"	6' 0"	6' 11"	6' 11"	6' 11"
F-Height of Vent Conn		5' 6"	5' 6"	5' 6"	6' 5"	6' 5"	6' 5"
G-Overall Height (2)		5' 8"	5' 8"	5' 8"	6' 8"	6' 8"	6' 8"
H-Supply Height	YSL	5' 7"	5' 7"	5' 7"	6' 7"	6' 7"	6' 7"
	YSH	5' 5"	5' 5"	5' 5"	6' 5"	6' 5"	6' 5"
I-Floor to Burner		3' 1"	3' 1"	3' 1"	3' 7"	3' 7"	3' 7"
J-Steam Supply Conn	YSH	3' 2"	3' 2"	3' 2"	4' 3"	4' 3"	4' 3"
	YSL	4' 8"	4' 8"	4' 8"	4' 3"	4' 3"	4' 3"
K-Return Conn. YSL		1' 7"	1' 7"	1' 7"	1' 9"	1' 9"	1' 9"
L-Dist. Rear Tube Removal (3)		5. 5"	6' 7"	7' 9"	5' 4"	7' 1"	8' 10"
M-Dist.Front Tube Removal (3)		3' 6"	4' 8"	5' 10"	3' 5"	5' 2"	6' 11"
O-Burner Extension		3' 4"	3' 4"	3' 4"	3' 4"	4' 1"	4' 1"
R-Location Blowdown Conn., Front, YSH		N/A	N/A	N/A	N/A	N/A	N/A
T-Location Blowdown Conn.,Rear		1' 7"	1' 7"	1' 7"	1' 9"	1' 9"	1' 9"
Boiler I.D. (Inches)		48"	48"	48"	60"	60"	60"
Tube Size (Inches)		2"	2"	2"	2"	2"	2"
Bottom Shell to Floor (Inches)		13"	13"	13"	12"	12"	12"
Supply Sizes	YSL (Inches)	8"	8"	8"	8"	8"	8"
	PSI	150#Flg	150#Flg	150#Flg	150#Flg	150#Flg	150#Flg
	YSH (Inches)	2-1/2"SCR	2-1/2"SCR	2-1/2"SCR	3"SCR	3"SCR	3"SCR
Return Size YSL		4"SCR	4"SCR	4"SCR	4"SCR	4"SCR	4"SCR
Feedwater Conn Size YSH & YSL		1-1/4"SCR	1-1/4"SCR	1-1/4"SCR	1-1/4"SCR	1-1/4"SCR	1-1/4"SCR
Vent Size (Inches)		10"	10"	10"	12"	12"	12"



HORSEPOWER		175	200	250	300	350	400
A-Overall Length (1)		18' 2"	18' 8"	19' 8"	22' 2"	24' 9"	24' 11"
B-Length of Shell		12' 1"	13' 7"	14' 7"	17' 1"	19' 6"	19' 10"
C-Length of Skid		7' 5"	8' 11"	8' 11"	11' 4"	13' 9"	14' 4"
D-Width of Skid		3' 11"	3' 11"	4' 6"	4' 6"	4' 6"	5'
E-Boiler Width		5' 10"	5' 10"	6' 10"	6' 10"	6' 10"	7' 4"
E1-Overall Boiler Width Max.		7' 4"	7' 4"	8' 4"	8' 4"	8' 4"	8' 10"
F-Height of Vent Conn.		7' 1"	7' 1"	8' 3"	8' 3"	8' 3"	8' 11"
G-Overall Height (2)		7' 6"	7' 6"	8' 6"	8' 6"	8' 6"	10' 5"
H-Supply Height	YSL	7'4"	7'4"	8'8"	8'8"	8'8"	9'1"
	YSH	7'4"	7'4"	8'8"	8'8"	8'8"	9'1"
I-Floor to Burner		4' 1"	4' 1"	4' 7"	4' 7"	4' 7"	5' 2"
J-Steam Supply Conn	YSH	6'9"	7'7"	7'11"	9'1"	9'1"	9'4"
	YSL	6'9"	7'7"	7'11"	9'1"	9'1"	9'4"
K-Location Conn. YSL		1' 9"	1' 9"	1' 8"	1' 8"	1' 8"	1' 11"
L-Dist. Rear Tube Removal (3)		8' 6"	10'	10'2"	12' 7"	15' 1"	14' 11"
M-Dist. Front Tube Removal (3)		6' 10"	8' 4"	8' 10"	11' 3"	13' 8"	14' 11"
O-Burner Extension		4' 1"	4' 1"	4' 1"	4' 1"	4' 1"	4' 1"
R-Location Blowdown Conn., Front, YSH		1' 5"	1' 5"	1' 8"	1' 8"	1' 8"	1' 11"
T-Location Blowdown Conn.,Rear		1' 5"	1' 5"	1' 8"	1' 8"	1' 8"	1' 11"
Boiler I.D. (Inches)		64"	64"	76"	76"	76"	82"
Tube Size (Inches)		2"	2"	2-1/2"	2-1/2"	2-1/2"	2-1/2"
Bottom Shell to Floor (Inches)		16"	16"	16"	16"	16"	20"
Supply Sizes	YSL (Inches)	10"	10"	10"	10"	10"	12"
	PSI	150#Flg.	150#Flg	150#Flg	150#Flg	150#Flg	150#Flg
	YSH (Inches)	4"	4"	6"	6"	6"	8"
	PSI	300#Flg.	300#Flg	300#Flg	300#Flg	300#Flg	300#Flg
Return Size YSL		4" SCR.	4" SCR	4"SCR	4"SCR	4"SCR	4"SCR
Feedwater Conn. Size-YSH & YSL		1-1/2" SCR.	1-1/2"SCR	2"SCR	2"SCR	2"SCR	2-1/2"SCR
Vent Size (Inches)		14-1/2"	14-1/2"	18"	18"	18"	20"

Notes:
(1) Dimensions shown for standard gas/no.2 oil combination.
(2) Clearance for safety valve - Add 8".
(3) Use front or rear tube removal dimension, not both.
(4) Add 4" for YSH model.
Consult factory for 500 - 800HP dimensions.

It is the policy of York-Shipley to continually improve product quality. Therefore, specifications are subject to change without notice.

We view the demand for air quality and high performance as a challenge - not a crisis.

YORK-SHIPLEY™

A Division of DONLEE TECHNOLOGIES INC.

693 North Hills Road
York PA 17402 USA

(717) 755-1081
FAX: (717) 755-0020

YOUR LOCAL YORK-SHIPLEY REPRESENTATIVE IS:

ID-90-723 9/91

U.S. PATENT NO. 5,029,557