

**Contract To Install Boiler at
69 Bank Street
New York, New York**

Contractor agrees to install a boiler and perform related heating-system work at 69 Bank Street in New York, New York for the sum shown below, to be paid by 69 Bank Street Condominium ("Owner"). (Note: these prices will hold for thirty days from the date of Contractor's signature). Prices given are inclusive of any applicable sales tax.

The work is specified in the attached pages of this Contract. The Work does not include asbestos abatement. Any changes to the Work resulting in extra costs will require a change order, to be signed by both the Owner and the Contractor. No substitution of specified equipment or materials shall be allowed without the prior written approval of the Construction Manager. Contractor shall have general-liability and workman's compensation insurance. The Owner and Jonathan Flothow shall each be named as additionally insured parties. All labor and materials will be warranted for a period of one year commencing with receipt of all signoffs. All equipment shall be installed in strict conformance with the manufacturers' recommendations, requirements, and instructions. The work shall conform to all applicable laws, codes, and standards. Contractor is responsible for confirming all site conditions, and for immediately reporting all problems, discrepancies, errors, or omissions relating to the site or this specification to the Construction Manager.

A COPY OF THE ATTACHED SPECIFICATION SHALL BE MAINTAINED ON THE JOBSITE AT ALL TIMES THAT WORK IS BEING PERFORMED!

COST FOR ALL WORK:

\$ _____

Offered By:

Accepted By:

Date

Date

("Contractor")

69 Bank Street
Condominium

Revisions

29 June 2012

- Install water heater shutoff switches.
- Install a 24" x 24" fire-damper over the fresh air inlet.
- Install a strap-on thermometer onto the DHW mixing valve.
- The following work will be done by others, and is excluded: remove breeches, Extend chimney, install chimney cleanout, replace water-heater flues.

General

Filing

Engineering fees are excluded. Owner is responsible for filing boiler replacement application. Contractor shall obtain permit to install boiler.

Carting

Remove from the premises all debris generated by the work.

Miscellaneous

Piping

All hydronic piping can be steel, Type L copper, or any mixture.

Valves

All shutoff- and isolation-valves shall be domestic-quality full-port ball-valves.

Pipe Insulation

- Insulate all bare heat and hot-water piping, new and old.
- Pipe insulation shall be rigid fiberglass. Use insulated fitting covers on elbows and Tee's, or use Smooth Kote and gauze.
- Insulation thickness shall be as per code.

Pipe Hangers

All pipe hangers shall be strut or threaded rod, not band metal.

Demo Oil Piping

Remove all oil piping from the boiler room, and fill the holes in the wall. Remove the Petrometer and tubing.

Seal Boiler Room Openings

Seal all openings in the ceiling and walls, including behind the chimney.

Boiler

Make and Model

- Boiler shall be Laars PNC-H 0750 N A C K 2 C J X
- Boiler shall be CSD-1-compliant.
- Boiler shall have **no pump**.
- Boiler shall come with 75 PSI safety valve.
- This boiler is approximately 60" wide x 30" deep.

Startup

Startup shall be by factory-authorized technician.

Support Gas Main

Properly support the existing gas main, and remove the concrete chunks from under the drip-leg.

Chimney & Breech

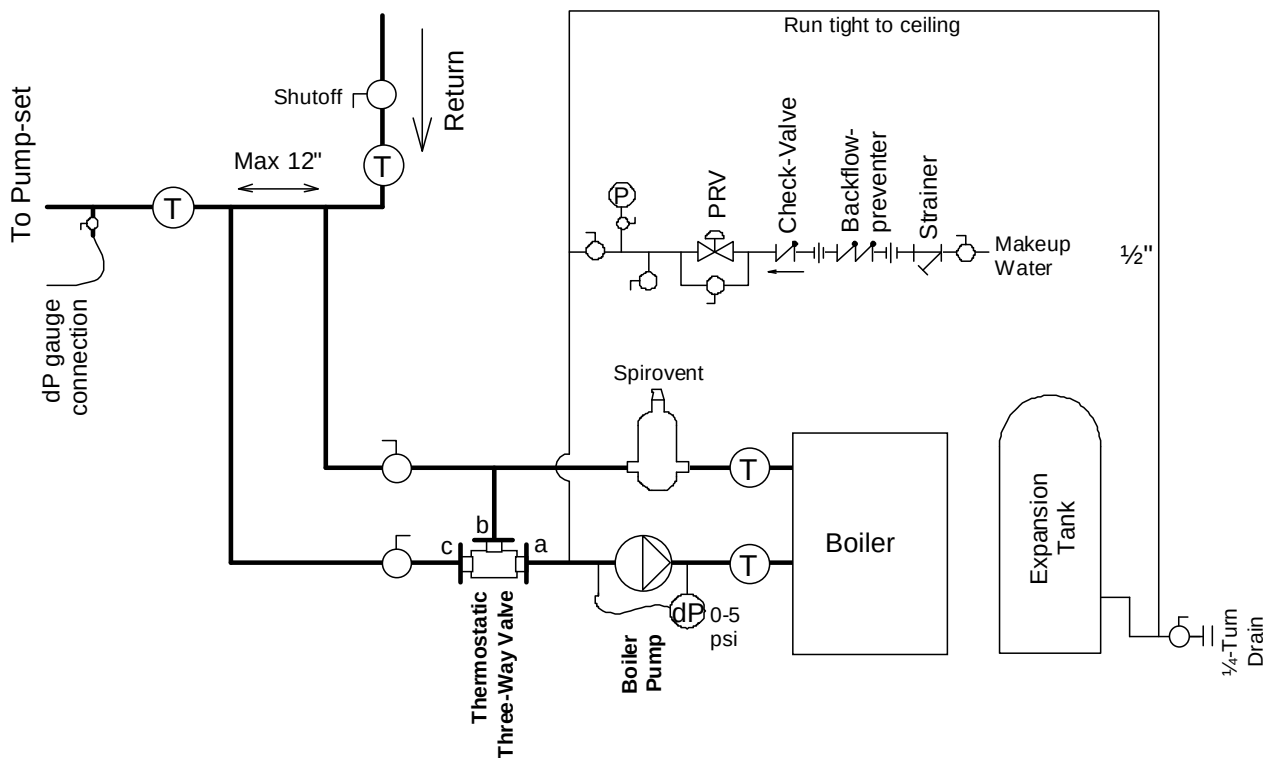
- ~~Remove the existing boiler breech. Remove the elbow at the base of the chimney.~~
- ~~Extend the chimney down, and install a cleanout. Leave a 10" connection for the new boiler breech.~~
- ~~Insulate the new chimney portion.~~
- Breech shall be 10" Type-B double-wall.
- Install a 10" Field M+MG2 barometric damper. Install it as high as possible in the vertical run of breech above the boiler.
- Install a resettable spill-switch onto the bottom of the barometric damper.
- Breeching shall have a minimum positive pitch of ½" per foot. Contractor is responsible for all necessary adjustments and changes to breech to meet DAR requirements.

Piping

Hydronic Piping

- New hydronic piping shall be 2". (Note: existing mains are 2½".)
- Drain the system.
- Remove the motorized three-way valve, the Tee next to it, the gate-valve, and the boiler connections.
- Reconnect the piping as shown, piping in a main shutoff, and a pair of Tee's within 12" of each other.
- Also pipe in thermometers and a valved dP gauge connection as shown.
- Connect the boiler in a primary/secondary arrangement as shown.

Piping Diagram



Thermostatic Three-Way Valve

- This valve protects the boiler against low-temperature return water, by bleeding boiler outlet water into the inlet until it reaches 120°. The valve is about 7" x 10".
- Valve shall be by Fluid Power Energy, model #A2010-120.
- Also supply and leave on site valve repair kit 2000-120.
- Follow the valve's port designations. Port A connects to the boiler-pump suction. Port C connects to the return takeoff. Port B (the bull) is the bypass from the boiler outlet.

Re-use Spirovent

Re-install the existing Spirovent where shown. Remove the leaking ½" plug from the bottom. Replace it with a brass shoulder nipple and a valve.

Boiler Pump

- Boiler pump shall be cast iron Grundfos UPS 50-80/4, single-phase (three-phase can be used if control wiring is changed accordingly). This pump is ± 50 lbs, 14" flange to flange.
- The pump's axis of rotation shall be horizontal.
- Flow shall be sideways or up, not down.
- Pipe a minimum 20" straight run into the pump, and a minimum 10" straight run out of it.
- Install a differential-pressure gauge across the pump (details below).

Expansion Tank

- Remove the existing expansion tank and its support structure.
- Install an Amtrol SX160V expansion tank. Support it on blocks or pads. Locate it in either corner.
- Connect the tank just upstream of the boiler pump. Use $\frac{1}{2}$ " piping, and offset to the ceiling as shown. Pipe on a quarter-turn drain valve.
- Install no shutoff valve into the tank piping.

Feed Line

- Repipe the feed-line as shown in the piping diagram, including new shutoffs. All piping shall be $\frac{1}{2}$ ".
- Install a new Watts 9D backflow preventer. Pipe a strainer before it and a check-valve after it. Pipe the blowoff to the floor.
- After the check-valve, install a new pressure-reducing valve with no thermal bypass (Watts 25AUB-Z3 or equal). Pipe a bypass around the PRV. After the bypass, pipe a blowoff and a 4" 0-100 PSI liquid-filled pressure-gauge. Then pipe another shutoff-valve.
- Connect the feed line to the expansion tank piping.
- Use the pressure-gauge to accurately set the pressure-reducing valve as follows: close shutoffs before and after the PRV, open the blowoff, and crank down the PRV. Then close the blowoff, open the first shutoff, and open the PRV until the pressure-gauge shows 40 PSI. Then open the second shutoff.

Differential Pressure Gauges

- These gauges show how much head a pump is making. They have two connections. One goes before the pump, one goes after.
- Connect the "LO" gauge connection before the pump, and the "HI" connection after the pump.
- At each gauge, hard-pipe one connection. The second connection can be made using $\frac{1}{4}$ " flexible copper tubing. Install valves in both. See photo at right.
- Install the 0-5 dP gauge at the boiler pump.
- Install the 0-20 dP gauge at the system pump-set. Pipe the high-pressure connection in place of the HWR sensor well, and mount the gauge there. Pipe the low-pressure connection just after the new Tee's.
- Differential pressure gauges shall be by Differential-Pressure Plus at (203) 481-2545 www.differentialpressure.com. Part numbers are given in the Parts Takeoff.

**Miscellaneous**

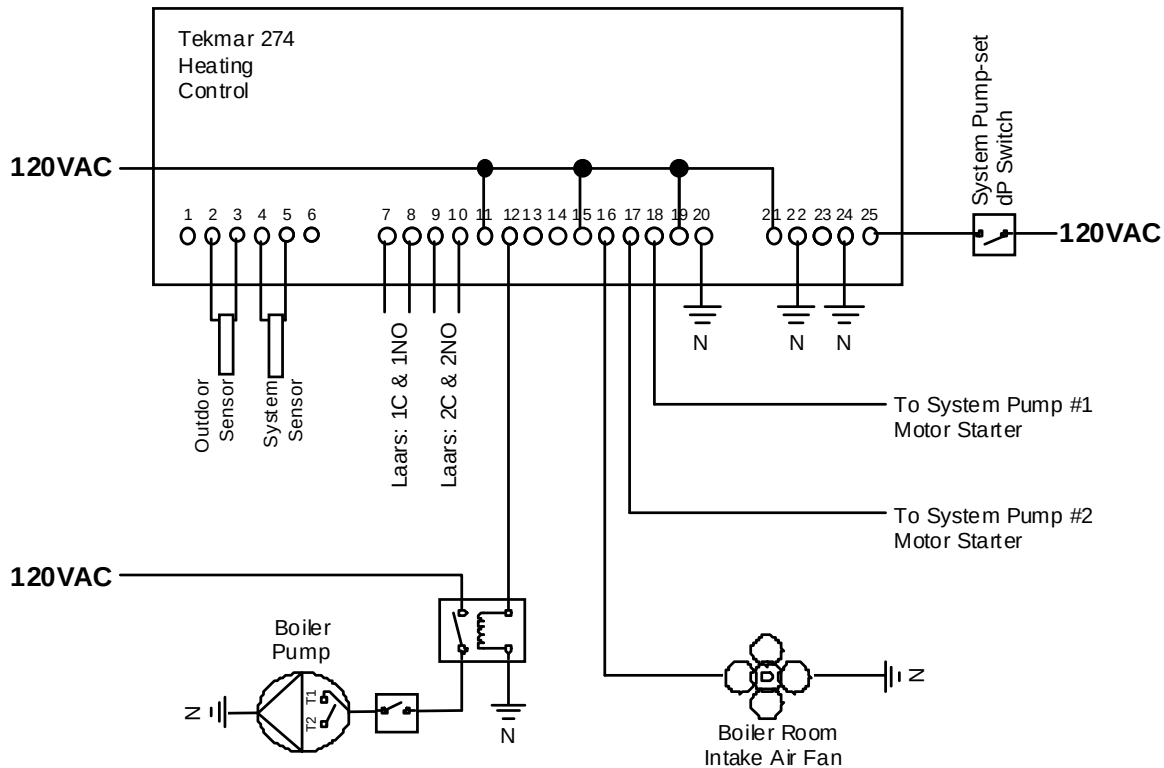
- Above the pump-set, remove the old thermometer, and replace it with a thermal well.
- Install thermometers as shown. Hydronic thermometers shall be well-type glass thermometers (not dial).
- Install a strap-on thermometer onto the DHW supply main.
- Pipe the boiler relief valve down to within 8" of the floor, in a location visible from the boiler room door. Support the piping with hangers.

Wiring and Controls

Heat Control

- Install a Tekmar 274 heat control. Leave the HWR in place, but disconnect and de-energize it.
- Energize the fan (or fan relay) from Tekmar Terminal 16.
- Install the system sensor into the new thermal well above the pump-set.
- Install the outdoor sensor in place of the HWR's sensor (in the Apartment #102 backyard).

Heat Control Wiring Diagram



dP Switch

- The system pump-set dP-gauge has an internal switch, which provides proof-of-flow.
- Supply 24VAC or 120VAC to the switch, and connect it to Tekmar terminal 25.
- Adjust the switch so that it makes when one pump is running.

System Pumps

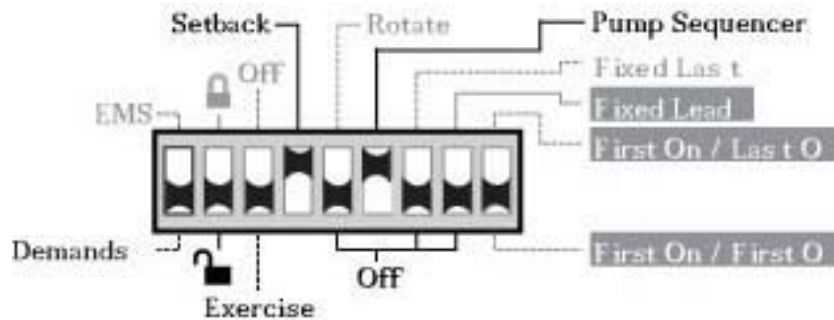
- Energize the system-pump motor starters from Tekmar terminals 17 & 18.
- Confirm that the starter pilot-lines go through the pumps' internal thermal switches.

Boiler Pump

- Install a switch and contactor for the boiler pump ($\frac{3}{4}$ HP).
- Energize the pilot line from Tekmar contact 12.
- Run the pilot line or hot line through the pump's internal thermal-protection switch (terminals T1 & T2).
- Set the pump to Speed 2.

Tekmar DIP Switches

Set the DIP switches as follows:

**Tekmar Settings**

ACCESS	ADV	Boil DIFF	Au
MODE	4	RELAY	DMPR
ROOM Occ	70	PROOF DEM	FP
ROOM Unocc	67	PROOF DLY	:30
BOOST	:30	STG DLY	AUTO
BOILER	AUTO	FIRE DLY	:10
BOILER 2	CP1	Boil MASS	Lo
OUT DSGN	0°	PURGE Boiler	:20
TERMINAL	CONV	WWSD Occ	55°
Boil INDR	70	WWSD UnOcc	40°
Boil DSGN	150°	ROTATE	96 hr
Boil MIN	100°	PURGE Primary	Off
Boil MAX	190°		

Water Heater Shutoff Switches

Install an emergency shutoff switch for each water heater. Locate it as required by code.

Boiler Connections

- Cut the sail switch and the spill switch into the connection to Laars terminal NO. This will put them in series with the boiler's other limit devices.
- Connect the Laars staging contacts 1C, 1NO, 2C, and 2NO to the heat control's contacts as shown.
- Leave the jumper that connects Ht D and Com D.

Settings In Boiler

- Set the boiler's AUTO/MAN switch to MAN
- Set MODE to 6

Bleed Air from Pumps

With the system full, open each pump's inspection screw. Allow water to flow out for thirty seconds. Then energize the pump, and let it run for an additional thirty seconds before reinstalling the screw.

Miscellaneous

- Replace the sail switch.
- Replace the outlet next to the light switch with a GFI outlet.
- Cover the open junction box.

Equipment Takeoff

This information is given to assist the Contractor in bidding, and is not to be considered a comprehensive list of contractually required materials. Pipe, tubing, fittings, ball-valves, wire, conduit, paint, and general supplies are not included.

<u>Count</u>	<u>Item</u>	<u>Make</u>	<u>Model</u>	
1	Boiler	Laars	PNCH0750NACK2CJX 75 PSI	_____
1	Barometric Damper	Field	10" M+MG2	_____
1	Spill Switch	Field or equal		_____
1	Pump	Grundfos	Grundfos UPS 50-80/4 Cast-iron, 1 or 3 phase	_____
1	Expansion Tank	Amtrol	SX160V	_____
1	½" Backflow Preventer	Watts or equal	9D	_____
1	Pressure reducer valve	Watts or equal	25AUB-Z3	_____
1	Liquid-filled pressure-gauge	Weiss or equal	4" dial, 0-100 PSI	_____
4	Glass thermometers	Weiss or equal		_____
1	Heat Control	Tekmar	274	_____
1	Sail Switch	Honeywell or equal		_____

Direct Purchase

- Differential Pressure Plus (203) 481-2545 www.differentialpressure.com.

1	dP Gauge for boiler pump	Differential Pressure Plus 200DPG-GS-A-2.5-4N-1-SS-F-B-6-(0-5psid)-A	_____
1	dP Gauge for system pumpset	Differential Pressure Plus 200DPG-GS-A-4.0-4N-1-SS-F-B-6-(0-20psid)-A	_____

- Fluid Power Energy (www.fpevalves.com, 920-787-2842 or johnnc@fpevalves.com)

1	3-way thermostatic valve	Fluid Power Energy	A2010-120	_____
1	3-way valve repair kit	Fluid Power Energy	2000-120	_____