

**SOUTH WINDSOR BOARD OF EDUCATION  
1737 MAIN STREET  
SOUTH WINDSOR, CONNECTICUT**

**SPECIFICATIONS**

**FOR**

**Bid No. 1920-002**

**SOUTH WINDSOR HIGH SCHOOL  
BOILER ROOM "B"  
BURNER REPLACEMENT  
BOILER FUEL CONVERSION**

**BIDS WILL BE RECEIVED UNTIL:**

**Thursday, August 29, 2019**

**AT**

**11:00 A.M.**

**Ms. Chris Chemerka      Director of Finance & Operations**

**Mr. Patrick T. Hankard      Director of Facility Operations**

SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

**INDEX**

<b>Section I – Invitation to Bid .....</b>	<b>3</b>
<b>Section II – Submission of Bids .....</b>	<b>4</b>
<b>Section III – Award of Contract .....</b>	<b>5</b>
<b>Section IV – General Specifications .....</b>	<b>6-8</b>
Section 15001 – Summary of Work...9-11	
Section 15400 – Gas Piping.....12-15	
Section 15635 - Gas Burners.....16-23	
Section 15645 – Boiler Controllers...24-30	
Section 03300 --Concrete work.....31-37	
<b>Section V – Additional Conditions.....</b>	<b>38</b>
<b>Section VI – Proposal Form.....</b>	<b>39-40</b>
<b>Section VII – Certificate of Insurance.....</b>	<b>41-43</b>
<b>Section VIII – Indemnity.....</b>	<b>44</b>
<b>Section IX – Affirmative Action Policy.....</b>	<b>45</b>
<b>Drawing:</b>	
<b>M-1 -Boiler Fuel Conversion Plan</b>	

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

## **SECTION I** **INVITATION TO BID**

### **SOUTH WINDSOR HIGH SCHOOL BOILER ROOM "B" BURNER REPLACEMENT- BOILER FUEL CONVERSION**

1. Specifications for the Bid No. 1920-002, SWHS Boiler Rm. "B" Burner Replacement-Boiler Fuel Conversion, may be obtained on the South Windsor Public Schools' website, <http://www.southwindsorschools.org> under "Central Office," "Business Services," "Bids and RFPs".
2. **A mandatory pre-bid walk through will be conducted on Wednesday, August 21, 2019 at 2:30 P.M.** Bidders should meet at South Windsor High School, 161 Nevers Road, SW. **Bids will not be accepted from any firm that does not attend.**
3. Sealed bids will be received at the Office of the Director of Facility Operations, Rm. 100 until **11:00 a.m. on Thursday August 29, 2019.** Bids will be publicly opened and read aloud soon after in Room 106.
4. The South Windsor Board of Education reserves the right to waive any informalities in Bids; to reject any or all bids; or to accept the one that in their judgement will be for the best interest of the South Windsor Board of Education.

Patrick T. Hankard  
Director of Facility Operations  
South Windsor Board of Education  
1737 Main Street  
South Windsor, CT 06074  
(860) 291-1220

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

## **SECTION II** **SUBMISSION OF BIDS**

1. Bids must be submitted on forms supplied in this bid document.
2. Time and date for submission is contained within this document. Bids received after the specified time and date of bid opening given shall not be considered. Bid envelopes must clearly indicate the bid number as well as the date and time of the bid opening. Name and address of the Bidder should appear in the upper left hand corner of the envelope.
3. Incomplete bids may result in the rejection of the bid. An original and one copy of the proposal schedule shall be submitted to the BOE. All bids must be signed by a person duly authorized to sign bids on behalf of the bidder. Unsigned bids shall be rejected. Errors, alterations or corrections on both the original and copy of the proposal schedule to be returned must be initialed by the person signing the bid proposal.
4. Conditional bids are subject to rejection in whole or in part. A conditional bid is defined as one which limits, modifies, expands or supplements any of the terms and conditions and/or specifications of the invitation to bid.
5. The BOE is exempt from excise, transportation and sales taxes imposed by the Federal Government and/or State. Such taxes must not be included in bid prices.
6. In the event of a discrepancy between the unit price and the extension, the unit price shall govern.
7. By its submission the Bidder represents that the bid is not made in connection with any other Bidder submitting a bid for the same commodity or service and is in all respects fair and without collusion or fraud.
8. All bids will be opened and read publicly; and upon award are subject to public inspection.
9. **References: Include the name, title, and contact information of the authorized owner's representative for at least three recent projects of similar size, scale, and timeframe.**
10. Interested parties are encouraged to submit supporting documentation that is pertinent to the thorough evaluation of the bid.
11. The lump sum price for this Project shall include all materials, equipment, labor, supervision, overhead items, profit, protection and precautions and all other incidental costs necessary for construction. Lead Time to prepare shop drawing submittals. Lead Time from date of receipt of approved shop drawing submittals to shipping date.

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

## **SECTION III** **AWARD OF CONTRACT**

1. The owner reserves the right to award the contract to the bidder offering the best value in the interest of the Owner but not necessarily award the contract to the bidder submitting the lowest bid.
2. The Owner reserves the right to reject any or all bids and to waive defects or informalities in any bid if it is deemed to be in the best interests of the Owner to do so. The Owner also reserves the right to select or reject in part or in total any and/or all the supplemental bid items and not necessarily in the order in which they appear in the proposal form.
3. The intent of this Project is to have a completed, finished, working Project whether or not any particular wording or direction is inadvertently omitted or not clearly stated.
4. Any and all reference to trade names, types, styles, models or catalogs are intended to be descriptive only and not restrictive. The intention is to indicate to bidders the type and quality of the articles and/or materials that will be satisfactory. Bids received on other makes or models with reference to other catalogs will be considered. The bidder is to clearly state in his bid exactly what he intends to furnish, and to furnish with his bid a cut or illustration or other descriptive matter which will clearly indicated and give specification as to the product he proposes to furnish. Where a bid is offered on an item other than the trade standard used in the specification, the item should be identified on the bid form by entering the i) make, ii) trade name, and iii) model number. Samples are to be submitted, if requested, at the bidder's expense. It is understood that any substitutes which might be offered are guaranteed by the bidder to be of equal or better quality than is requested in the bid. It shall be further understood that during original, as well as subsequent shipments, spot checks will be performed to insure that the items received are in fact the items offered in the bid. Should items/materials prove to be different in any way, the bidder agrees to the return of the items and agrees to supply the correct items (per bid specifications) at bidder's expense
5. All supplies and workmanship shall be subject to inspection and test after arrival at destination. In case articles are found to be defective, or otherwise not in conformity with the specification or requirements, the Board shall have the right to reject such articles, and shall incur no cost whatsoever for a reject article(s).

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

## **SECTION IV** **SPECIFICATIONS**

### **GENERAL**

- A. The South Windsor Public Schools is seeking proposals from qualified heating contractors to furnish and install new gas fired burners for three existing hot water heating boilers at the South Windsor High School at 161 Nevers Road in South Windsor, CT. The boilers included are three Weil McLain 1588-W with Powerflame Model WCR3-OB oil burners. The South Windsor Public Schools is in the process of bringing natural gas service into the facility and intends to eliminate all existing #2 fuel oil systems and equipment.
- B. The intent of this Request for Proposal is to seek a lump sum price to provide a turnkey project to furnish the required equipment and materials, receive, unload, handle and install the three new burners as specified including all required demolition, electrical work, controls interfaces, testing and commissioning, cleanup and turnover. See specification section 15001 for scope of work.
- C. The existing buried 10,000 gallon #2 fuel oil tank and the buried oil piping will be removed under separate contract.
- E. Work will occur during the summer and fall of 2019 and shall be completed by November 1, 2019.

### **PRE-BID CONFERENCE**

- A. A mandatory pre-bid conference will be held at the site on Wednesday, August 21, 2019 at 2:30 pm in order to acquaint all potential bidders with project site, typical site conditions and to field technical and administrative questions. Bids will not be accepted from any contractors who are not present at the pre-bid conference or who have not received the Contract Documents by that time. A representative (not necessarily a final approved) submittal of the specified burners will be available.

### **ADMENDMENTS**

- A. South Windsor Public Schools will post any addenda on their website, <http://www.southwindsorschools.org> under “Central Office,” “Business Services,” “Bids and RFPs”. **Each respondent is responsible for checking the websites to determine if the South Windsor Public Schools has issued any addenda and, if so, to complete its response in accordance with the RFP as modified by the addenda.**

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

## **SUBMISSION OF PROPOSALS**

A. Proposals shall include the following information:

- Total lump sum cost of materials, labor, overhead and profit (Tax exempt)
- Lead Time to prepare shop drawing submittals
- Lead Time from date of receipt of approved shop drawing submittals to shipping date.
- Acknowledgement of receipt of any and all addenda.

B. Sealed bids clearly marked Burner Replacements – South Windsor High School – Boiler Room B Fuel Conversion” in triplicate, shall be received by 11:00 am on Thursday, August 29, 2019 at:

South Windsor Public Schools  
1737 Main Street.  
South Windsor, CT 06074  
Attention: Patrick Hankard  
Director of Facility Operations

There will be a public bid opening on August 29, 2019 at 11:00 am at 1737 Main Street South Windsor Room 100. Bidders are welcome to attend the bid opening.

## **1.04 ACCEPTANCE OF PROPOSALS**

The South Windsor Public Schools reserves the right to accept or reject any or all proposals in the best interest of South Windsor Public Schools and the Town of South Windsor.

## **1.05 RELATED DOCUMENTS**

- A. General Conditions, Terms and Conditions and any other documents provided by South Windsor Public Schools at the time of documents issuance are a part of the Request for Proposal and shall apply to all equipment, materials or work specified or relating to this project.
- B. Where items of the General Conditions or other documents are repeated herein or in other Sections of the Specifications, it is merely intended to qualify or to call particular attention to them. It is not intended that any other parts of those General Conditions or other documents shall be assumed to be omitted if not repeated herein.
- C. In the event of a discrepancy between specifications and drawings, or between this section and other sections of the Contract Documents, the Owner and/or Engineer shall decide which shall prevail and such decision shall be binding.
- D. The following drawings shall be included as a part of these contract documents:

M-1 Boiler Fuel Conversion Plan – South Windsor High School

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

E. The following specification Sections are included:

Section 15001 – Summary of Work

Section 15400 – Gas Piping

Section 15635 - Gas Burners

Section 15645 – Boiler Controllers

Section 03300 --Concrete work



# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

## **PART 1 – GENERAL**

## **SECTION 15001**

### **1.01 INTENT**

- A. The intent of this section is to provide a narrative summary of work and design criteria for work to be provided in this project.

### **1.02 SECTION INCLUDES**

- A. Project description & scope of work.
- B. Related Documents.
- C. Schedule and Phasing

### **1.03 PROJECT DESCRIPTION / SCOPE OF WORK**

- A. The project involves a fuel conversion from #2 fuel oil to natural gas for the heating boilers at South Windsor High School. In general, the three existing hot water boilers in Boiler Room B at the high school will have the oil burners replaced with gas burners and new gas piping shall be provided from the Eversource gas meter to the connections to the burners.
- B. The three existing boilers are used for space heating and are as follows:
  - 1. Boilers #4, 5 & 6: Weil McLain, Model 1588-W with Powerflame Model WCR3-OB oil burners
- C. The contract will be turnkey, complete with all required electrical, piping, demolition, rigging and coordination and supervision required for the complete replacement. Included in the proposal shall be the following scope of work:
  - 1. Disconnect existing fuel oil piping, electrical power and controls wiring from existing burners and remove burners and burner mounting plates.
  - 2. Remove all accessible indoor oil piping from where the piping enters the building to the existing burners. Some of the oil piping runs in PVC pipe sleeves under the boiler room floor. If these copper lines can be pulled out of the sleeves, the Contractor shall do so. If they cannot be pulled, the pipes shall be sealed/capped at the points of entry and abandoned in place.
  - 3. Clean interior firebox/chambers and flue passages in existing boilers.
  - 4. Replace existing burner mounting plates on boilers to accept new gas burners.
  - 5. Install new gas fired burners on each boiler.
  - 6. Install new gas trains on each boiler.
  - 7. Provide new gas piping from Eversource gas meter outside boiler room to each burner as specified and indicated. (2 psig gas pressure)

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

8. Connect gas piping to burners. Fit out gas piping with required dirt legs, shutoff valves, regulators, vents and unions. Run gas regulator vents to outside the building where indicated.
9. Rewire the electric power and safety control wiring. Test and adjust safety controls.
10. Rewire existing combustion air supply fans to the combustion air interlock terminals on the new burners.
11. Furnish and install new Heat Timer Multi-Mod Boiler Sequencing and Control Panel. Provide all required control wiring and interface communications to the existing Invensys Energy Management System. Engage SNE/Invensys Controls for the communications work and to remove the existing control points, wiring and sequencing programs from the existing control panel.
12. Install new Heat Timer hot water supply temperature sensor in separable well on the existing HWS main.
13. Move the combustion air fan control from the Invensys system to the integral combustion air interlocks in the new burners.
14. Start and test units for proper operations. Perform efficiency tests and submit test reports.
15. Provide concrete pad outside on site for new gas meter. Coordinate with Eversource.
16. Regrade area in gas meter pad location to lessen the slope of the grade moderately.
17. Provide fencing outside, on site for new gas meter and electric service transformer.

## **1.04 RELATED DOCUMENTS**

- A. The General Conditions as described in the Owner's Bid Documents and General Conditions are a part of this specification and apply to all work specified or relating to this section.
- B. Where items of the other Bid Documents and General Conditions are repeated in this Section, it is intended that any other parts of the General Conditions shall not be assumed to be omitted if not repeated herein.
- C. In the event of a discrepancy between specifications and drawings, or between other sections in this Division, or between this Section and the General Conditions, the Owner or Engineer shall decide which shall prevail and such decision shall be binding.
- D. The following drawings shall be considered to be the Drawings portion of the Contract Documents. The Contractor and all subcontractors shall be bound to the requirements of every Drawing.

M-1 BOILER FUEL CONVERSION PLAN

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

- E. The following specification sections, including this Section 15001, shall be considered to be the Specifications portion of the Contract Documents. The Contractor and all subcontractors shall be bound to the requirements of every specification section.

03300	CONCRETE WORK
15400	MECHANICAL PIPING SYSTEMS
15635	GAS FIRED BURNERS
15645	BOILER CONTROLLERS

## 1.09 SCHEDULE AND PHASING

- A. The project is expected to commence immediately upon award of Contracts. Refer to the Owner's Start Schedule.
1. In general, work shall be complete with all tests and inspections completed by November 1, 2019.
- B. A complementary (and coincident) project is also underway to remove the existing fuel oil tank and outside buried piping, under a separate contract. In order to maintain uninterrupted boiler operation at the school, one boiler will be required to remain on oil firing until such time as the gas fuel conversion work is substantially complete and is commissioned and operational on gas. Once the boiler plant is satisfactorily operational on gas, the final boiler shall be converted and the fuel tank removal project will be released.

**END OF SECTION**

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

## PART 1 – GENERAL

## SECTION 15400-GAS PIPING

### 1.01 GENERAL PROVISIONS

- A. The General Conditions as described in the Owners General and Supplementary General Conditions are a part of this Section and are to be considered a part of this Contract.
- B. Where items of the General Conditions and Supplementary General Conditions are repeated in other Sections of the Specifications, it is merely intended to qualify or to call particular attention to them. It is not intended that any other parts of the General Conditions and Supplementary General Conditions shall be assumed to be omitted if not repeated therein.
- C. This Section applies equally and specifically to all Contractors supplying labor and/or equipment and/or materials as required under each Section of this Division.

### 1.02 RELATED DOCUMENTS

- A. The following Sections are also a part of this Division:
  - Section 15635 – Gas Fired Burners
- B. The following Drawings shall be included as a part of these Contract Documents:
  - Drawing M-1 – Boiler Fuel Conversion Plan
- C. All work shall be in accordance with NFPA 54 – The National Fuel Gas Code. All materials shall be listed for natural gas applications

Drawing M-1 – Boiler Fuel Conversion Plan

### 1.03 DESCRIPTION

- A. This Contract is for all labor, materials and equipment required for the construction of the natural gas piping systems.
- B. The systems shall be complete and finished in all respects, tests and ready for operation.
- C. All materials, equipment and apparatus shall be new and of first-class quality.
- D. Any apparatus, appliance, material or work not shown on Drawings but mentioned in the Specifications, or vice versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation as determined by good trade practice even if not particularly specified, shall be furnished, delivered and installed under their respective Divisions without any additional expense to the Owner.

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

## 1.04 SCOPE OF WORK

A. The following list is of materials, equipment and devices to be furnished and installed under this Contract:

1. Gas piping, fittings, valves and specialties.
2. Underground gas piping, fittings and specialties.
3. Gas Pressure Regulators.

B. The following list is of materials, equipment and devices which are to be furnished by others and installed under this Contract:

1. Gas burners and gas valve trains.

## 1.05 WORK IN OTHER DIVISIONS

A. General Contractor and/or his Subcontractors:

1. All excavation and backfill within and outside of the building
2. All chases and openings
3. All cutting and patching
4. Painting of all finished work, except as noted
5. Concrete housekeeping pads for mechanical equipment, water heaters and gas meters
6. Flashing of roof penetrations for vents.

B. Electrical Division:

1. Power wiring to motors, starters, controllers and other electrical devices furnished and installed under this Contract.
2. Disconnect switches for mechanical equipment, unless switches are provided integral with equipment.
3. Control and safety wiring for gas train pressure switches.

C. HVAC Division:

1. Hot water connections to plumbing equipment.

D. Gas Company:

1. Gas meter and pressure regulating station assembly and gas service to meter furnished by the gas company.

## 1.06 SHOP DRAWINGS

A. Submit shop drawings to the Engineer for review. No equipment may be installed prior to acceptance of shop drawings.

B. The following shop drawings shall be submitted for review:

1. Gas shutoff valves
2. Gas Piping Products

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

3. Seismic Control materials
4. Pipe labeling materials

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. Only materials listed in this following Section and on the Equipment Schedules will be permitted on this project.

### 2.02 PIPING

#### A. Gas Piping:

1. Gas piping shall be Schedule 40 ASTM A53 Grade B carbon steel pipe with Class 150 malleable threaded fittings or welded joints. Piping system shall include shutoff cocks at all pieces of equipment, divisions of mains and branch take-offs, six (6") inch drip legs on all vertical risers; and shall conform to NFPA Standard #54 and IMC 2015 for installation and testing. Gas piping 2-1/2" and larger and any piping concealed in walls, ceilings, etc., shall have welded joints.
2. Gas valves shall be plug type or listed and approved ball valves.
3. Buried gas piping on site shall be NFPA 54 approved low pressure plastic gas piping. Buried gas piping shall be high density polyethylene piping, "Gastite System" as manufactured by Titeflex Corp., manufactured from extra high molecular weight high density polyethylene resin and tested in accordance with ASTM Standard D 2513, Category 1.
  - a. Provide Anodeless Riser fittings, adapters to metallic pipe, meter adapters and other specialties to form a complete underground package of a single manufacturer.
  - b. Provide a minimum #14ga. Insulated copper tracer wire for underground piping and terminate tracer wire above grade at building wall. Secure tracer wire and label as "Gas Line Tracer Wire."
  - c. Gas piping shall be buried a minimum of 24" below grade and shall be suitably bedded and supported throughout the trench. Backfill with clean sand to 12" above pipe. No stones shall be in the gas trench backfill.

## PART 3 - EXECUTION

### 3.01 GENERAL

- A. Piping shall be run concealed in all finished areas where possible and so arranged that it can be drained at low points.
- B. Gas piping systems shall be installed to resist lateral seismic loads and forces. Pipes supported on rod hangers less than 12" long do not require lateral bracing. Pipes supported on hangers 12" and longer shall be braced with 1/4" aircraft cable braces in four directions at intervals of not less than 20'.
- C. The run and arrangement of all pipes shall be approximately as shown on the Drawings and as directed during installation, and shall be as straight and direct as possible, neatly spaced, forming right angles or parallel line with building walls and other pipes. Offsets

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

with standard fittings will be allowed only to permit pipes to follow walls. All risers shall be erected plumb and true. The work under this Section shall be coordinated with the work of the other Sections in order to avoid interferences of piping and unnecessary cutting of floors and walls. All roughing, underground or concealed in floors or walls, shall be installed and tested before the construction is closed up.

- D. All horizontal runs of piping, except where concealed in partitions, shall be kept as high as possible and close to walls. Other trades shall be consulted so that grouped lines will not interfere with each other. Where Drawings call for offsets, they shall be kept close to underside of beams and slabs and run alongside beams, girders or partitions.
- E. No pipes or devices shall be installed in such a manner as to interfere in any way with the full swing of doors or maintenance access to equipment.
- F. The arrangement, positions and connections of pipes, fixtures, drains, etc., shown on the Drawings shall be taken as a close approximation of that desired for the installation, but the right is reserved by the Engineer to make changes or revisions to accommodate any conditions arising during the progress of the work without additional compensation to the Contractor.
- G. Unions are to be used at connections to fixtures and other apparatus to allow easy removal.

## 3.02 TESTS AND ADJUSTMENTS

- A. Test all gas piping at 3 PSIG with a soap solution for ten minutes without any drop in pressure, in accordance with NFPA 54 and International Mechanical Code. Gauge increments shall be 1/10 PSIG maximum. Soap all joints.
- B. Test all equipment controls for proper performance and make all necessary adjustments in the presence of a factory-authorized representative of the equipment manufacturer.
- C. Perform any additional tests required by the local Plumbing Inspector. All tests on the plumbing system shall be performed to the satisfaction of the local Plumbing Inspector and the Owner's representative.

## 3.03 PIPING IDENTIFICATION

- A. Plumbing piping systems shall be labeled to identify fluid inside pipes, direction of fluid flow and approximate working pressure. Labeling system shall be "OPTI-CODE" with "Arrows On a Roll Tape" as manufactured by Seton Name Plate Corp., or an accepted equivalent.
- B. Piping labels shall be color coded in accordance with ANSI A13.1.
- C. The following systems shall be labeled as indicated:

<u>SYSTEM</u>	<u>LABEL TEXT</u>
Gas Piping	NATURAL GAS
- D. Pipe identification labels shall be installed in the following locations:
  - 1. In main mechanical rooms at each major section of pipe when pipe changes direction and at each branch or riser. Note: Pipe labels for straight runs in lab area shall be spaced not more than 10 feet apart.

END OF SECTION

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

## PART 1 GENERAL

## SECTION 15635-GAS FIRED BURNERS

### 1.01 GENERAL REQUIREMENTS

- A. Furnish and install four new Underwriters Labeled gas burners on existing boilers. The burner design, construction, components and installation shall meet all applicable code requirements.
- B. The new burner systems shall be installed on three existing Cast Iron type boiler(s). The existing boilers are as follows:
  - 1. Three existing Weil McLain Cast Iron Boilers, Model 1588-W with existing Powerflame Model WCR3-OB oil fired burners.
- C. The burners are to be installed in the front of the existing boilers. Include modifications or replacement of the boilers' burner mounting plates as required to meet the burner and boiler manufacturer's recommendations. The existing firing chambers and fireside flue passages shall be cleaned prior to new burner installation.
- E. Burners as specified below shall be as manufactured by Power Flame, Inc. No substitutes.

## PART 2 PRODUCTS

### 2.01 GENERAL BURNER DESCRIPTION

- A. The new gas burners shall be Power Flame forced draft flame retention model C3-G-25B. Each burner shall be capable of burning 5,250 CFH of 1000 BTU/Cu. Ft. natural gas, with a specific gravity of 0.64. Gas pressure applied to the burner gas train supply connection shall be a minimum of 1.0 PSIG at full high fire rate and a maximum of 2.0 PSIG at static conditions. Burners shall have full modulation control.
- B. Each burner shall be listed by Underwriters Laboratories and shall bear the appropriate U.L. label (in addition to the U.L. requirements, all equipment and installation procedures will meet the requirements of ASME CSD-1 codes. Each burner shall be designed and constructed as an integrated combustion system package and shall be factory fire tested.
- C. Each burner shall be of welded steel construction. The combustion head shall incorporate a multi blade, stainless steel, flame retention diffuser. The gas firing head shall be of the multiport type and constructed such as to place annular gas distribution opening between two parallel air flow streams to achieve maximum fuel/air mixing.
- E. All air required for combustion shall be supplied by a blower mounted integral to the burner. The blower wheel shall be of the forward curved centrifugal design and shall be directly driven by motors as listed below. A dual blade or radial blade damper



# SOUTH WINDSOR PUBLIC SCHOOLS

## Bid #: 1920-002

---

assembly located on the inlet side of the blower wheel shall meter the combustion air flow. Design shall permit the disconnecting and locking of either damper if firing rates are near minimum burner input ratings. Burner motor ratings shall be as follows:

1. C3-G-25B Burners: 3.0 HP, 3450 RPM, 208V-3P-60 hz.

- F. The burner ignition system, which will light either the main gas flame, or pilot shall utilize natural gas as the fuel source. The gas pilot system components shall include spark ignited pilot assembly, 10,000 Volt ignition transformer, pilot solenoid valve, pilot gas pressure regulator and manual gas shutoff cock. The flame proving system shall incorporate a Ultra-Violet flame detector, which will monitor both the pilot and main flames. The pilot assembly shall fit within the confines of the blast tube - avoiding special burner front plate pilot cut outs.

### 2.02 FUEL/AIR CONTROL SYSTEM

- A. The Burners for the 3 Weil McLain Boilers (C3-G-25B Burner) shall be controlled as follows: The main On-Off gas supply shall be controlled by a motorized gas valve. A modulating motor shall control the modulated positioning of the air inlet dampers, butterfly type gas proportioning valve to best meet varying system load conditions.
1. Provide a Honeywell "ControlLinks" Fuel Metering device, which will be an integral part of the burner fuel metering system. The system shall be U.L. listed and capable of providing an adjustable and accurately repeatable fuel/air ratio throughout the burner's full firing range. The system shall be capable of providing a constant fuel/air ratio, or a linearly adjusted fuel/air ratio, in order to satisfy individual burner application requirements.
  2. The positioning of the modulating motor shall be controlled by a 4-20 milliamp, modulating type temperature controller. When the operating control is satisfied, the burner shall shutoff and return to the low fire start position. The modulating motor shall provide an electrical interlock to insure a guaranteed low fire start position prior to the pilot trial for ignition sequence.
- B. The three space heating boilers shall be controlled through a Heat Timer Multi-Mod sequencing and modulation controller. Coordinate the installation and wiring as such.

### 2.03 GAS CONTROL TRAIN

- A. U.L. CSD-1 Requirements. The gas valve trains for the three Powerflame C3-G-25B burners shall be sized as recommended by the burner manufacturer and shall contain the following:
1. Manual Shutoff cock
  2. Main gas pressure regulator – Pietro Fiorentini - for gas pressure of 2 PSIG, with Vent Limiter.
  3. Maxitrol #325 pilot regulator with vent limiter device.
  5. Automatically operated main motorized gas valve with proof of closure interlock switch.
  6. Automatically operated auxiliary gas valve.

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

7. Manual reset Low and High Gas Pressure switches.
8. Manual leak test cock.
9. Burner manifold gas pressure gauge and gauge cock.

## 2.04 BURNER OPERATING CONTROLS

- A. The On-Off operation of the boiler burners shall be controlled by a temperature control provided with the MultiMod Controller. System temperature shall be reset between 180°F and 140°F by the Heat Timer MultiMod System.
- B. A safety manual reset type limit control shall be provided to shut the burner down in the event of excessive temperature.
  1. For the Full Modulation system on the C3-G-25B burners. The position of the modulating motor and other fuel/air components shall be controlled by a 4-20 ma, temperature control in addition to the On-Off operating control.

## 2.05 INTERLOCKS

- A. Option for the C3-G-25B burners: The burner operating circuit shall be electrically interlocked through an air proving switch located on the burner's existing combustion air fan which will ensure that the fuel/air control linkage is in the low fire start position before the ignition sequence can begin. (Typical of 3)
- B. For U.L. Modulation. The modulating motor shall be sequenced to allow for four (4) complete air changes of the combustion chamber and breaching, and through an integral end switch be electrically interlocked with the control burner circuit to ensure the fuel/air linkage is in the low fire start position before burner ignition sequence can begin.
- C. The burner control panel shall have a relay to start the existing combustion air fan when the burner is enabled (Typical of three.) A combustion air fan air proving switch electrical interlock shall be provided in the burner operating circuit which will ensure that the combustion air fan(s) are operating before the burner can operate. Boiler room freeze protection circuit shall be provided to shut down the combustion air fans in the event of a flame failure.

## 2.06 FLAME SAFEGUARD CONTROL

- A. U.L. CSD-1 Requirement:
  1. For C3-G-25B burners: The flame safeguard control system shall include Ultraviolet sensor for flame detection and provide fully automatic sequencing of pre-purge and post purge, blower motor, interrupted ignition system, and fuel/air flow components. Burner shall purge with full open-air louver at not less than 60% of high fire airflow rate for a minimum of four (4) air changes and not less than 60 seconds. Flame safeguard shall provide safety shutdown with manual reset on air flow failure. The flame safeguard control shall be Honeywell model RM7840L or equal as manufactured by Fireye.

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

## 2.07 CONTROL PANEL

- A. Each C3-G-25B burner shall be complete with an integral burner mounted control panel, which shall house all required operating electrical components. All wiring within the combustion system shall be factory pre-wired to a din rail mounted terminal strip within the control panel. Coordinate all control work with the Heat Timer MultiMod Controller.
- B. Appropriate electrical knockouts shall be provided on both sides and bottom of the panel to allow for necessary power and limit control wiring. The control panel shall be constructed of 16 gauge steel and shall be complete with a top switch and control section which shall be hinged to allow for full access to all panel mounted components. The control panel shall be painted in a color and finish identical to the burner being supplied.
- C. The control panel shall include a din rail mounted control circuit transformer with integral fuses on both the primary and secondary windings. Flame safeguard control as specified above - On-Off switch - din rail mounted motor starters, relays, terminal blocks and other electrical devices as required.
- D. Provide outside air temperature reset control action through the Heat Timer controller. Include a temperature transmitter with 4-20 ma signal to the controller. The controller will reset the set points based on the variations in the outside air temperature. The outside air temperature sensor shall be 100 ohms Platinum RTD, equipped with a stainless steel weather/sun shield. A dedicated 24 VDC loop power supply shall be furnished in the cabinet for the transmitter.
- E. Provide automatic sequencing upon boiler failure that shall enable another boiler to be brought into sequence in the event of flame failure of an on-line boiler.
- F. Provide set point scheduling of all on and off set points at a selectable time of day/week/month to implement night set back and weekend skip.
- G. The Sequences of Operation shall be controlled through the Heat Timer Boiler Controller as follows:
  - 1. Upon start-up, burners shall always start in the low-fire position. Upon release of the combustion control system, they shall modulate via the programmable controller.
  - 2. As the temperature increases, the header mounted transducer will signal the programmable controller. In turn, the programmable controller shall sequence the proportional firing rate circuits of each modulating burner in an appropriate lead/lag sequence.
  - 3. Upon still further increase in pressure/temperature, the programmable controller will - in a time response - de-energize the lag boiler(s) in the appropriate lead/lag sequence. The burners will be in the low fire position before de-energizing. Upon reaching the final pressure/temperature set point, the controller will de-energize the lead burner.

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

4. With a drop in temperature, the Boiler Controller will reverse the sequence and call the burners on line in a timed response.
5. In the event that the lead burner fails to operate, the Boiler Controller shall automatically transfer control to the lag burner without any requirement for changing aqua stat settings.

## 2.08 PRODUCT LIABILITY INSURANCE

- A. The burner manufacturer will provide an Insurance Certificate documenting his current coverage of Product Liability Insurance.

## 2.09 BURNER START UP INFORMATION AND TEST DATA

- A. On completion of the burner system start up - the installing contractor will complete the "Burner Start Up Information and Test Data" form and "Control Settings" form (both attached) and deliver to the Specifying Engineer.

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

## BURNER START UP INFORMATION & TEST DATA

The following information shall be recorded for each burner start up:

Power Flame Model \_\_\_\_\_ Job No. \_\_\_\_\_ Serial No. \_\_\_\_\_

Installation Name \_\_\_\_\_ Start Up Date \_\_\_\_\_

Start Up Contractors Name \_\_\_\_\_ Phone \_\_\_\_\_

Name of Technician doing Start Up \_\_\_\_\_

Type of Gas: Nat. ☐ LP ☐ Other ☐

### Gas Firing

	Gas Pressure at Train Inlet		Combustion Efficiency
Burner in Off Position	"W.C.	Low Fire	%
Low Fire	"W.C.	High Fire	%
High Fire	"W.C.		

	Gas Pressure at Firing Head	Windbox O <sub>2</sub>	
Low Fire	"W.C.		
High Fire	"W.C.	Low Fire	%
		High Fire	%

Tee \_\_\_\_\_ Gas Pressure at Pilot Test "W.C.

Flame Signal Readings  
D.C. Volts ☐ Micro  
Amps ☐

Pilot \_\_\_\_\_  
Low Fire \_\_\_\_\_  
High Fire \_\_\_\_\_

CO<sub>2</sub> or O<sub>2</sub> (Specify)  
Low Fire \_\_\_\_\_ %  
High Fire \_\_\_\_\_ %

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

CO		
Low Fire	_____	PPM
High Fire	_____	PPM
	Input Rate	
Low Fire		BTU/ HR
High Fire	_____	BTU/ HR
	Overfire Draft	
Low Fire	_____	"W.C.
High Fire	_____	"W.C.
NOx (Corrected to 3% O <sub>2</sub> )		
Low Fire	_____	PPM
High Fire	_____	PPM
	Stack Outlet Test Point Draft	
Low Fire	_____	"W.C.
High Fire	_____	"W.C.
	Net Stack Temperature	
Low Fire	_____	° F
High Fire	_____	° F

Bid #: 1920-002

## Operation Checklist

Page | 23

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

## PART 1 GENERAL

## SECTION 15645 BOILER CONTROL

### 1.01 SUMMARY

#### A. Section Includes:

1. Multiple modulating boiler Heating Controllers.

#### B. Related Sections:

1. Conforms to applicable building code requirements of all authorities having jurisdiction.

#### C. Scope: Furnish and install one packaged boiler sequencing, modulating and controlling panel as manufactured by Heat Timer Corp. "Multi-MOD Platinum". Panel shall control sequencing, modulation, lead lag rotation and alarm processing of four parallel hydronic heating boilers.

1. Remove the existing sequencing, programming and burner modulation controls from the existing Invensys Energy Management System. Use a new OA temperature sensor and HWS sensor furnished with the Boiler Controller to ensure compatibility. Connect all sequencing and modulation controls to the new gas burners.
2. Provide a BACNet interface and connect the communications bus to the existing Invensys panel in the boiler room. Verify BACNet MS/TP or BACNet IP protocol and set protocol selector on Heat Timer panel to correct setting.

### 1.02 REFERENCES

#### A. International Organization for Standardization (ISO)

1. Manufacturer shall be ISO 9001:2000 Quality Management Systems Certified.

#### B. Underwriters Laboratories, Inc. (UL):

1. Tested per standard 916, Temperature Indicating and Regulating Equipment.

### 1.03 QUALITY ASSURANCE

#### A. Manufacturer's Quality System:

1. Registered to ISO 9001:2000 Quality Standard, including in-house engineering for product design activities.
2. The control must be UL tested and certified per standard 916, Temperature Indicating and Regulating Equipment.

### 1.04 CONTROL OPERATION

- #### A. Description:
- The control shall operate on 120VAC, with a maximum power of 30 watts. The control shall be pre-engineered and programmed exclusively for the operation of multiple modulating hydronic heating systems based on a PID logic. It shall be capable of controlling up to four modulating boilers without any additional extra modules. However, it shall be modular and capable of controlling a total of 20 modulating boilers using a maximum of two external modulating extension controls.

- #### B. Modulating Outputs:
- The control shall have four normally open relay contacts that can be



# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

used to start/stop each burner. These relays shall be field replaceable. The control shall have four modulating outputs. Every two modulating outputs shall have the same modulating signal and be controlled by the same modulating output card. The control shall have the capability to operate modules having 0 – 5 volts, 1 - 5volts, 0 – 10 volts, 2 - 10 volts, 4 – 20 ma, and 135-ohm outputs. The control shall be capable of identifying the output module types and adjusting control output accordingly. **(Note: the specified Powerflame Burners require the 4-20ma control signal.)** Where practical, the output modules shall be protected from accidental incorrect connection. Should damage occur, where practical, damage shall be confined to the output module. HT # 056161-00 Rev F 2

- C. Sequence of Operation: When heat is required, the control PID shall activate the lead boiler and start its pre-purge cycle followed by the initiation of modulation at the Fire Start Percent. When additional heat is needed, the control shall start to increase modulation until the Modulation Start percent has been reached. That shall be followed by the lag boiler pre-purge cycle. Then, the lag boiler shall remain at the Fire Start percent and the lead boiler shall resume its modulation until it reaches full fire (100% modulation). Any additional requirements for heat shall trigger the control to increase the lag boiler. When the control PID requires reduced output, the control shall reduce the modulation of the lag boiler until it reaches its Fire Start percent. That shall be followed by the reduction of modulation of the lead boiler until it reaches 40% percent of its Modulation Start percent. This shall trigger the control to turn off the lag boiler.
1. Remove boiler sequencing, lead-lag rotation, burner modulation, primary pump interlocks, combustion air fan interlocks and other burner functions from the Invensys system and transfer over to the new MultiMod Controller.
  2. Whenever a given boiler is enabled in the lead-lag sequence, its associated primary boiler pump shall start and its associated combustion air fan shall start. These components have existing current sensors that provide proof of flow and they shall be wired into the burner's main safety circuit to prevent burner operation in the event of no water or combustion air flow.
  3. Correct the following existing conditions: The existing burner emergency switches and Firematic controllers are presently wired in the boiler's operating and limit circuit. These functions shall be re-wired into the main Line Circuit in the control circuits.
- D. Features:
1. Outdoor Reset or Set Point: The control shall provide an integral sensor set point adjustment. The set point shall be adjustable either through the control menu or remotely using a 4-20mA input signal. In addition, when in temperature mode and equipped with an outdoor sensor, the control shall be capable of varying the set point based on an outdoor reset curve. The outdoor reset curve parameters shall be field adjustable.
  2. Fire Start Percent: Adjustable from 1 to 100%. This setting shall set the firing percent at which the burner shall start at when energized or de-energized. There shall be an independent adjustment of this setting for each burner.
  3. Modulation Start Percent: Adjustable from 0 to 100%. This setting shall set the

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

percent of modulation the lead boiler must achieve before the lag boiler is activated. There shall be an independent adjustment of this setting for each burner.

4. Gain: Adjustable from -10 to +10. This setting shall increase or decrease the amount of modulation based on the rate of change in system sensor reading and the set point.
5. Purge Time: Adjustable from 0- 10.0 minutes. This setting shall set the delay time between a boiler being energized and the beginning of modulation.
6. Last Stage Hold: Adjustable from 0 to 30 minutes. The last stage hold shall keep the last boiler at low fire for an additional degrees/lbs of pressure to reduce short cycling of the lead boiler.
7. Lag delay: Adjustable from 0 to 60 minutes. The lag boiler in the rotation shall not be fired until the lead boiler has remained in high fire for the period of time set by the Lag Stage delay.
8. Rotation: The control shall be capable of rotating the boilers either based on an adjustable time period, Last-On/Last-Off, or manually.
9. Parallel Modulation: The control shall have an option for parallel modulation where multiple boilers can modulate upward or downward together with increase or decrease modulation. **(NOTE: This is the desired control strategy.)**
10. Memory: The control shall store all configuration and settings on EE-Prom. In case of power failure the control should be able to retrieve all of its latest settings.
11. Display: The control shall have a four line by eighty-character alphanumeric display capable of displaying both numbers and characters. The display shall be visible with no ambient light. All control operation information shall be available for display. During times of inactivity, or 10 minutes after last user entry, the display shall enter a lower power mode. In this mode the control should display date and time of day, cycle status, outdoor temperature, system temperature, and valve opening percentage. In this mode, the display shall reduce visible light output. The control shall exit this mode whenever button or digital encoder activity is sensed.
12. Boiler Lockout Input: The control shall have a dry contact input for boiler failure. The control shall not include failed boilers in its modulation sequence.
13. Domestic Hot Water Mode: The controller shall be capable of providing domestic hot water control through the indirect fired water heater(s). Connect the DHW heaters aquastats to the DHW input terminals in the Heat Timer. When the DHW calls for heating, the DHW circulating pump shall start and the outdoor reset setpoint shall be ignored and a preset DHW heating setpoint (180°F, adjustable) shall be established. The boilers shall operate at the fixed DHW setpoint until DHW demand is satisfied and then revert back to the OA reset schedule.

## E. Input Points:

1. Outdoor Temperature: This shall be the value read from the outdoor sensor placed on the north side of the building at least 10 Ft. above the ground.

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

2. System Temperature (Hydronic Systems): This shall be the value read from the system sensor placed on the hot water system pipe to measure hot water circulating temperature.
3. External Shutdown: The control shall be capable of accepting a dry closure type shutdown input. This shall prevent any boilers or pumps from activating when the contact is closed.
4. Prove Input: The control shall be capable of accepting a dry contact closure type for system prove input. This shall prevent any boilers from activating until the contact is closed. (Combustion air fan and boiler primary pump current sensors.)
5. Lockout Input: The control shall be capable of accepting dry contact closure for boiler failure. HT # 056161-00 Rev F3
6. System Set Point (4-20mA Signal): The control shall be capable of accepting a 4-20mA remote signal as a set point.

## F. Output Points/Relays:

1. Burner relay output
2. Burner modulation output: 135 Ohm, **4-20mA**, 0-5V, 1-5V, 0-1V, 2-10V
3. System relay output

## G. Data Points:

1. Burner Modulation Percent: This shall indicate the percent of modulation status each boiler has.
2. Fire Start Percent: This shall be the percent at which a boiler will start its modulation. Each boiler shall have a separate configurable value.
3. Last Stage Hold: Adjustable from 0 to 30 minutes. The last stage hold shall keep the last boiler at low fire for an additional degrees/lbs of pressure to reduce short cycling of the lead boiler.
4. Lag Delay: Adjustable from 0 to 60 minutes. The lag boiler in the rotation shall not be fired until the lead boiler has remained in high fire for the period of time set by the Lag Stage delay.
5. Modulation Start Percent: Adjustable from 0 to 100%. This setting shall set the percent of modulation the lead boiler must achieve before the lag boiler is activated. There shall be an independent adjustment of this setting for each burner.
6. Rotation Mode: Auto, Manual, Last-On/Last-Off
7. Setback: The control shall have a dry contact input to initiate a setback.
8. Standby Delay: This shall be the set to the amount of time for all automatically controlled boilers to be at high fire before starting boilers set to standby.
9. System Run-On: This shall be the value at which the system relay shall remain energized for after all boilers have turned off.

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

10. System Set Point/Target. This shall be either set to the desired system design temperature / pressure. If the control is set to outdoor temperature reset, this value should change dynamically based on the outdoor temperature and other reset ratio parameters.

## 1.05 INCLUDED ITEMS

- A. Control Relays. Control relays shall be plug-in type, UL listed, and shall have dust cover and LED "energized" indicator. Contact rating, configuration, and coil voltage shall be suitable for application. Only one relay is included for the system output. Additional relays are required for each boiler and must be ordered separately.
- B. Outdoor Temperature Sensor shall be of the Thermistor type capable of measuring between -30°F to 250°F. It shall have a weather shield to protect it from moisture and direct sun. Mount on north side of building.
- C. System Temperature Sensor shall be of the Thermistor type capable of measuring between -30°F to 250°F. Use the existing immersion well for the sensor. The Invensys EMS system should be able to monitor the system temperature through the BACNet interface.

## 1.07 COMMUNICATION

- A. BACnet IP Communication: The control shall be BACnet IP capable. It shall provide the user with BACnet IP communication Interface to an Energy Management System (EMS) or Building Management System (BMS) on the same BACnet network. The control shall be designed to be BACnet Application Specific Controller (B-ASC). The control shall manage the boilers and their modulation and the system pump through direct wiring to the equipment and not through the BACnet network.

OR: (Verify exact protocol with existing Invensys EMS)

- B. BACnet MSTP Communication: The controller shall be furnished with a BACnet interface card capable of providing the user with BACnet MSTP communication Interface to the existing Invensys Energy Management System (EMS) on its existing BACnet network. The control shall be designed to be a compliant BACnet Application Specific Controller (B-ASC). The control shall manage the boilers and their modulation and the system pump through direct wiring to the equipment and not through the BACnet network. Coordinate with SNE

## 1.08 SECURITY

- A. Control Local Security:
  - 1. The control shall have a secure password to deter unauthorized users. The password shall be optionally activated.
  - 2. The controller shall have a key-locked enclosure.
- B. Control Remote Internet Security
  - 1. To access an Internet communication control remotely, the control, web server, or

SOUTH WINDSOR PUBLIC SCHOOLS  
Bid #: 1920-002

---

proprietary software shall deter unauthorized users by requiring a secure password for logging to the control interface.

END OF SECTION

SOUTH WINDSOR PUBLIC SCHOOLS  
Bid #: 1920-002

---

This page intentionally left blank

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

## PART 1 - CONCRETE

### 1.01 DESCRIPTION:

- A. Work includes furnishing all labor, supervision, materials, tools and equipment necessary for or reasonably incidental to completion of all cast-in-place concrete as indicated or described, including all footings, floor slab repairs, housekeeping pads, etc., and as follows:
- B. Pads, containment curbs and miscellaneous concrete as required for Mechanical and Electrical Divisions.
- C. Set anchor bolts and leveling plates specified in Division 5, Structural Steel.

### 1.02 SUBMITTALS:

- A. Report of tests shall be submitted to the engineer and shall include: name of job, date and location of placement, class of concrete, mix data, slump, air content, compressive strength, age and condition of test cylinders, type of fracture, and method of curing. A copy of all test reports shall be promptly forwarded by the testing laboratory to the Engineer, plus one (1) copy each to the Owner, Contractor and concrete supplier.

### 1.03 MATERIALS

- A. Cement – Domestic Portland Cement conforming to ASTM C150, Type I or Type II. Use one brand of cement from one source throughout.
- B. Fine aggregate – natural and consisting of clean, hard, durable uncoated particles. Organic content shall be determined according to ASTM C40. Sand shall conform to the requirements and grading of ASTM C 33.
- C. Coarse aggregate – crushed stone or crushed washed gravel from approved source, free of dirt and organic materials, conforming to the requirement and grading of ASTM C33.
- D. Water – from approved source; clean, potable, and free from oils, salt, alkali or organic matter.

### 1.04 ADMIXTURE:

- A. Each admixture shall be approved by the Engineer. Each manufacturer shall submit a written notarized statement to the Engineer of the chloride content of each admixture. Formulate admixtures to avoid an increase in water-cement ratio or loss of strength.
- B. Air entraining agent – shall conform to ASTM C-260.
- C. Retarder – Densifier – shall conform to ASTM C-494, Type D.
- D. Accelerator – Shall conform to ASTM C-494, Type C.
- E. Water-reducing Agent – Shall conform to ASTM C-494, Type A.

### 1.05 ACCESSORIES:

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

- A. Non-shrink grout under column bases and bearing plates shall be non-metallic, the approved equal of Master Builder's Masterflow 713, Sonneborn's Sono Grout, Upcon 262, or Euclid Chemical's Euco N-S.
- B. Curing and sealing compound shall be the approved equal of Master Builder's Masterseal or Euclid Chemical Co.'s Super Floor Coat that conforms to Fed. Spec. TT-C-800A Type I. Curing compound shall have a maximum water loss of 0.035 GMS/Sq.Cm.
- C. Polyethylene film shall be white opaque reinforced 6 mils thick.
- D. Curing paper shall be the approved equal of Sisalkraft Paper "Orange Label" that conforms with ASTM C171, Type I.

## 1.06 PROPORTIONS:

- A. Concrete mix proportions shall be selected to produce an average compressive strength exceeding the required 28-day compressive strength (fc) in accordance with ACI 318 Section 4.3, proportioning on basis of field experience; or laboratory trial batches, Section 4.4. The Contractor shall submit to the Engineer the concrete strength to which the materials were proportioned, and copies of any records that the concrete supplier may have showing standard deviations in previous mixes.
- B. Mix proportions shall be made in accordance with Method 2, as outlined in ACI 301 by the testing laboratory.
- C. Contractor shall submit the following data:
  - 1. Fine aggregate – organic content, sieve analysis, fineness modulus and specific gravity.
  - 2. Coarse aggregate – sieve analysis and average weighted loss in accordance with ASTM C-33.
  - 3. Mix design, including cement brand, proportions of aggregate by weight, slump, water-cement ration, percentage of air.
  - 4. Thirty (30) 28-day compressive test results on proposed mix that comply with Section 2.02C.
  - 5. Admixture-types, brand and quantity.

## 1.07 SPECIFIC REQUIREMENTS

- A. Concrete for all the parts of the work shall be 5,000 psi at 28 days and meet the values shown in the following table:

Min. compressive strength @ 28 days (psi)	5,000
Slump (inches)	2½-4
Max. Size coarse aggregate (inches)	1"
Min. cement factor (sacks per C.Y.)	6

- 1. Water content shall include surface water in aggregates.
- B. All pumped concrete and concrete exposed to the weather, including site work, shall be air-entrained as follows:

Air Content



# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

Maximum Size Aggregate	% by Volume
1 inch	4.5 – 7.5
¾ inch	4.5 – 7.5
½ inch	5.5 – 8.5
3/8 inch	6 – 9

- C. Variations of proportions may be permitted to produce more workable materials on approval by the Engineer.

## 1.08 FORMWORK

- A. Design of formwork shall conform to ACI 318 Chapter 6 and ACI 347, Chapter 1.
- B. Formwork shall be mortar tight, sufficiently rigid and strong to prevent sagging or springing between supports and to maintain true position and shape during and after placing of concrete, without waves, bulges, or other defects in finished concrete surfaces.
- C. Unexposed surfaces may be formed with dressed matched lumber, free from loose knots or major defects. Exposed concrete surfaces shall be formed with three-quarter (3/4") inch thick sound plywood without patches, A.P.A. Plyform Ext. B-B, using a minimum of pieces and placed symmetrically.
- D. Chamfer strips shall be new half-inch (1/2") 45 degree wood strips, nailed six (6") inches on center, and installed in inside corners of forms.
- E. Form releasing agent shall be a clear, non-staining material the approved equal of Nox-Crete.
- F. All forms shall be coated with a non-staining form release agent compound before the reinforcement is placed.
- G. Construct forms to shape, grade and dimensions shown, sufficiently tight to prevent leakage. Joints shall be placed on true vertical and horizontal axis.
- H. Erect formwork and adequately support, brace and maintain so as to safely support construction loads and to remain in correct position during and after placing concrete without displacement.
- I. Forms for external corners of exposed members shall be accurately fitted and securely fastened. Install beveled chamfer strips nailed at six (6") inches on center, in corners of all exposed members to provide a three-quarter (3/4") inch chamfer, measured at the diagonal face.
- J. Forms shall be recessed to receive anchor bolts and bearing plates.
- K. The Contractor shall be solely responsible for construction during and after form removal.
- L. Formwork for housekeeping pads may be removed twenty-four (24) hours after placing of concrete.

## 1.09 PRIOR TO PLACING CONCRETE:

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

- A. Soil bottoms for footings, pads and slabs shall be accepted by the Engineer before placing concrete. The subgrade shall be free of frost before concrete placing begins.
- B. All debris, sawdust, ice, etc., is to be cleaned from place of deposit before concrete is placed.
- C. All water is to be removed from place of deposit before concrete is placed. Provide drainage or pumping as required to maintain dry excavation until concrete has taken initial set.
- D. All conduits and piping are to be dug into sub-grade sufficiently so as to provide uniform slab thickness.
- E. Prior to placing any concrete, the Contractor shall notify the Engineer 24 hours in advance so that formwork and reinforcing may be inspected. Do not place concrete until inspection has been made or waived.
- F. All dowels, anchor bolts, sleeves, inserts and other embedded items shall be set with the aid of templates and shall be securely positioned in place prior to the placement of concrete.

## 1.10 MIXING:

- A. Concrete shall be ready-mixed in conformance with the requirements of ASTM C94 for measurement of materials, batching, mixing and delivery, and shall be discharged within 1½ hours after water is first added to the mix, except that in unusually hot weather, this maximum time may be reduced.
- B. Mixing and conveying equipment shall be thoroughly clean and free from hardened concrete and foreign materials before concrete operation is started.
- C. All materials including water shall be added to ready-mixed concrete at the batching plant. Water shall not be added to the mix on the project site. Mixing shall be continued for at least 1½ minutes prior to its use.
- D. Mixer shall produce thoroughly mixed, uniform mass, and discharge mixture without segregation. Entire batch shall be discharged before mixer is recharged.
- E. Partially hardened concrete shall not be retempered or used.
- F. One (1) copy of all concrete delivery tickets shall be furnished to the Engineer on request. Contractor shall note on tickets location of placement. Delivery tickets shall provide the following information:
  - 1. Date and truck number.
  - 2. Name of ready-mix batch plant
  - 3. Contractor and job location
  - 4. Cement brand, type mix number and weight in pounds
  - 5. Fine aggregate weight in pounds
  - 6. Maximum size of aggregate
  - 7. Coarse aggregate weight in pounds
  - 8. Water in gallons
  - 9. Admixture, name and amount in concrete, if any

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

10. Amount of concrete in cubic yards

11. Time mix left plant

## 1.11 DEPOSITING CONCRETE:

- A. Depositing of all concrete shall be in accordance with ACI 304.
- B. Concreting shall conform to the requirements of ACI 305 or ACI 306 in hot or cold weather as required. See Section 3.08.
- C. All Contractors whose work is related to the concrete or must be supported by it shall be given ample notice and opportunity to introduce and/or furnish embedded items before the concrete is placed.
- D. Unless adequate protection is provided, and approved by the Engineer, concrete shall not be placed during rain, sleet, or snow.
- E. Concrete shall be conveyed from the mixer to the place of final deposit in a practically continuous flow by methods, which will prevent the separation or loss of the ingredients. It shall be placed in the forms or on grade as nearly as practicable to its final position and shall be thoroughly vibrated around all reinforcing bars and mesh to assure complete absence of voids. Under no circumstances shall partially hardened concrete be placed in the work. Concrete shall be prohibited from freefalling in excess of four (4') feet.
- F. Concrete may be pumped. Use of aluminum alloys in the pumping train is prohibited.
- G. Concrete shall be deposited continuously, and in layers of such thickness that no concrete will be deposited on concrete that has hardened sufficiently to cause formation of seams and planes of weakness within section.
- H. Unless otherwise permitted, the work shall be so executed that a section begun on any day shall be completed in daylight on the same day.
- I. Cold joints, particularly in exposed concrete, including "honeycomb," are unacceptable. If they occur in concrete surfaces exposed to view, Engineers may require that entire section in which blemish occurs be removed and replaced with new materials at Contractor's expense.

## 1.12 SLAB FINISHING:

- A. All exterior concrete pads shall have a broom finish, unless noted otherwise, in accordance with ACI 301.

## 1.13 CURING:

- A. All concrete shall be kept constantly moist and protected against any drying action for not less than seven (7) days after placing of the concrete, and shall be accomplished in the following manner:
  - 1. All slabs, either slab on grade, shall be cured by one of the following methods and in accordance with the provisions of ACI 301, Section 12:

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

- a. Wet covering such as burlap
  - b. Sprinkling, ponding
  - c. Curing compounds
  - d. Polyethylene film
  - e. Waterproof curing paper
3. Where concrete is cured by employing polyethylene film or curing paper, cover surface immediately after finishing. Joints shall be lapped twelve (12") inches and all joints taped securely. Repair all rips and tears until end of curing period.
  4. The use of curing compounds on exterior slab on grade construction (sidewalks) is not permitted.

## 1.14 CONCRETING PRECAUTION FOR EXTREME WEATHER:

- A. Hot Weather: Precautions shall be taken when the temperature is at or above 75 F, or 70 F and rising, in accordance with "Recommended Practice for Hot Weather Concreting," ACI 305. No concrete shall be placed when the air temperature is above 90 F, unless the air is still and relative humidity is above 80%.
  1. Set up proper windbreakers for concrete surfaces wherever the relative humidity is less than 70% for slight air motion or 80% for light breezes.
  2. Provide shade for placements otherwise exposed to the sun.
  3. Concrete is to be at a temperature of 80 F, or less when placed. If necessary, the batching plant shall cool the aggregate by spraying or by using chilled water or ice. All such water shall be accounted for as part of the mixing water.
  4. Use an admixture with a retarded set.
  5. All forms shall be thoroughly wetted at least daily, and more often when the relative humidity is low.
  6. For slabs, maintain the required materials for curing at hand so they may be placed immediately upon slab finish. When the concrete temperature of any slab goes above 100 F, place a layer of sand on it and keep it continuously wet until the temperature is below 90 F.

## 1.15 CONCRETE MOUNTS FOR MECHANICAL EQUIPMENT:

- A. Furnish and place all concrete platforms, curbs, piers, etc., required for mechanical equipment as called for in the Mechanical Drawings. Set all anchor bolts, etc., as required.
- B. Housekeeping pads for mechanical and electrical equipment shall be doweled into the surrounding floor slab and set with a suitable bonding agent, where applicable. Pads shall be of thickness as indicated on plans, or where not indicated, a minimum of 4" high. Pads shall have a 1" chamfer all around and shall extend a minimum of 6" beyond the perimeter of the equipment served.

## 1.16 GROUTING:

- A. Install non-shrink grout under all structural steel column base plates, leveling plates and bearing plates. Non-shrink grout shall be mixed in accordance with the manufacturer's printed instructions. Bedding grout shall be placed solidly between the bearing surface

SOUTH WINDSOR PUBLIC SCHOOLS  
Bid #: 1920-002

---

and base or plate to ensure that no voids remain. Finish edges at 45 bevel and properly cure grout.

END OF SECTION

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

## **SECTION V** **ADDITIONAL CONDITIONS**

The execution of a contract binds the vendor to all applicable State labor laws and regulations. All such standards, laws and regulations shall be binding to the same extent as if they were copied at length herein.

Each contractor shall be subject to, and shall comply with, the following requirements, included herein by reference, to insure, through affirmative action, that qualified employees and applicants for employment are not discriminated against because of race, religious creed, national origin, age, sex, marital status, sexual orientation or disability.

Said requirements shall include compliance with all applicable, federal, state, and local statutes, ordinances, and regulations relating to discrimination in employment. It shall be the responsibility of the contractor to be familiar with and knowledgeable about the above.

The apparent successful contractor may be required to undergo a pre-award compliance review for the purpose of ascertaining whether, in the opinion of the Board, the contractor is willing and/or capable of complying with the above.

SOUTH WINDSOR PUBLIC SCHOOLS  
Bid #: 1920-002

---

**SECTION VI**  
**PROPOSAL FORM**

DATE \_\_\_\_\_

**SOUTH WINDSOR BOARD OF EDUCATION  
1737 MAIN STREET  
SOUTH WINDSOR, CT 06074**

Pursuant to and in compliance with your "Advertisement" for bids and "Instructions to Bidders"; relating thereto, the undersigned,

\_\_\_\_\_  
(Name of Bidder)

Having carefully examined the premises, and complete specifications together with all addenda issued and received prior to scheduled closing time for receipt of bids hereby offers and agrees as follows:

To provide all materials, labor and equipment necessary in accordance with the attached specifications.

Bidders shall not include Federal Excise Taxes nor State of Connecticut Sales Taxes for which South Windsor Public Schools are exempt.

The right is reserved to purchase either by the item or the total items indicated.

After the opening of bids, all bids will stand available for a period of sixty (60) days.

All work shall be in accordance with the attached specifications.

The Contractor is expected to furnish all labor and materials and all costs applicable will be shown as the total Bid.

SOUTH WINDSOR PUBLIC SCHOOLS  
Bid #: 1920-002

---

**Total Cost:** \$ \_\_\_\_\_

Lead Time to prepare shop drawing submittals \_\_\_\_\_

Lead Time from date of receipt of approved  
shop drawing submittals to shipping date. \_\_\_\_\_

**Addenda Receipt**

Receipt of the following Addenda is hereby acknowledged:

Addendum No. \_\_\_\_\_ Dated \_\_\_\_\_ Addendum No. \_\_\_\_\_ Dated \_\_\_\_\_

Addendum No. \_\_\_\_\_ Dated \_\_\_\_\_ Addendum No. \_\_\_\_\_ Dated \_\_\_\_\_

NAME OF BIDDER: \_\_\_\_\_

AUTHORIZED SIGNATURE: \_\_\_\_\_

CONTACT PERSON: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY & STATE: \_\_\_\_\_

PHONE: \_\_\_\_\_

E-Mail: \_\_\_\_\_

**All Bid Envelopes must be sealed and marked with Bid Title, Opening Date, and Time.**



# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

## **SECTION VII** **CERTIFICATE OF INSURANCE**

The Contractor shall carry insurance under which the South Windsor Board of Education shall be named as an additional insured for the whole duration of this work, including the maintenance period provided herein, with an insurance company or companies licensed to write such insurance in Connecticut, against the following risks in not less than the amounts as here indicated:

**A. STATUTORY WORKMEN'S COMPENSATION INSURANCE:**

With Coverage B, Employer's Liability, Limit of at least \$100,000.00.

The Contractor shall maintain, for the duration of the Contract and for the protection, of all employees engaged there under, workmen's compensation as required by the Labor Laws of the States, and all Municipal and Federal Liability Laws.

**B. COMPREHENSIVE GENERAL LIABILITY INSURANCE**

Including completed operations, and coverage for the explosion, collapse, and underground hazards, with at least the following limits:

**BODILY INJURY AND PROPERTY DAMAGE COMBINED SINGLE LIMIT**

\$1,000,000 Each Occurrence

\$2,000,000 Aggregate

**C. COMPREHENSIVE AUTOMOBILE LIABILITY INSURANCE:**

With at least the following limits including non-ownership and hired car coverage as well as owned vehicle:

**BODILY INJURY AND PROPERTY DAMAGE COMBINED SINGLE LIMIT**

\$1,000,000.00

\$1,000,000.00 Aggregate

## **SECTION VII** **CERTIFICATE OF INSURANCE (Continued)**

**D. UMBRELLA/EXCESS COVERAGE**

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

Minimum \$2,000,000 Each Occurrence and Aggregate

**E. OWNER'S PROTECTIVE LIABILITY INSURANCE:**

The Contractor shall procure, pay for, and maintain Owner's Protective Liability Insurance in the following limits, naming the Owner and the Engineer as Named Insured's and furnishing the Owner with a copy of the Policy:

**BODILY INJURY**

\$ 500,000 Each Person  
\$1,000,000 Each Accident

**PROPERTY DAMAGE**

\$100,000 Each Accident  
\$500,000 Aggregate

It is further understood and agreed that any liability of the South Windsor Board of Education, or its agents concerning any and all work and material necessary is covered within policy limits set forth in this certificate. Certificates of Insurance of this Agreement to assume aforementioned liability of Owners shall be filed with Owner and be subject to his approval, prior to commencement of any work.

The above liabilities shall include not only all damages that may result to any person or property by reason of operations and/or construction, but also during the maintenance period as defined elsewhere in the Contract, where condition of construction is a factor.

The insurance policy or policies shall be delivered to the Board, for the Board to examine and rule on acceptability of the policies and of any endorsements. All premiums or other insurance carrier' charges for such policies shall be paid by the Contractor.

Failure to provide the required insurance and certificates may, at the option of the Board of Education, be held to be a willful violation of the Contract and subject to the provisions of Contract paragraph "Abandonment of Work".

SOUTH WINDSOR PUBLIC SCHOOLS  
Bid #: 1920-002

---

**SECTION VII**  
**CERTIFICATE OF INSURANCE (Continued)**

The Contractor agrees to indemnify and to hold the Board of Education and its employees as well as the Town of South Windsor and its employees harmless and defend in any and all liability of every nature and description which may be suffered through Bodily Injuries, including death of any persons, or damage to any property arising out of or in any manner connected with the operations to be performed under this Contract, whether or not due in whole or in part of any act, omission, or by reason of negligence of the Contractor, his agents, employees, his Subcontractors or employees or equipment of the South Windsor Board of Education and/or the Town of South Windsor.

All Policies shall be maintained for the duration of the contract.

In the event of any change in or cancellation of any one or more of said policies, the

\_\_\_\_\_  
Insurance Company will give not less than fifteen (15) days written notice to party to whom this Certificate is issued of such cancellation or change.

The above Insurance requirements shall also apply to all Subcontractors, and the Contractor shall not allow any Subcontractor to commence work until the Subcontractor' insurance has been so obtained and approved.

DATED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_ 20 \_\_\_\_\_

\_\_\_\_\_  
(INSURING AGENT)

BY \_\_\_\_\_  
(AUTHORIZED AGENT)

**SECTION VIII**  
**INDEMNITY**

The contractor named below, to the fullest extent permitted by law, shall indemnify and hold harmless the South Windsor Public Schools and all of its agents and employees from and against any and all claims, damages, losses, costs and expenses (including attorneys' fees, consequential damages punitive damages and damages arising out of strict liability in tort) arising out of or resulting from the Contractors performance or failure to perform its work including, but not limited to, any claim, damage, loss or expense which is (a) attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting there from, and (b) caused in whole or in part by any negligent or intentional act or omission of the Subcontractor or anyone directly or indirectly employed by him or anyone for whose acts he may be liable, regardless of whether it is caused in part by a party indemnified here under.

**Signature:**

**Title:**

**Contractor:**

**Date:**

# SOUTH WINDSOR PUBLIC SCHOOLS

Bid #: 1920-002

---

## **SECTION IX** **AFFIRMATIVE ACTION**

**SOUTH WINDSOR PUBLIC SCHOOLS**  
**1737 Main Street**  
**South Windsor, CT 06074**

TO: All Contractors

FROM: Chris M. Chemerka, Director of Finance & Operations

SUBJECT: Affirmative Action

The South Windsor Public Schools is an Equal Opportunity Employer. The Board of Education has made it a matter of policy that it will not transact business with firms, which are not in compliance with all Federal and State Statutes and Executive Orders pertaining to non-discrimination.

A copy of the Board of Education Affirmative Action Statement is printed on the bottom of this letter.

In order to have your firm listed on our acceptable vendor's list and thereby be eligible for consideration as a source for goods and services, please complete and return the following Statement of Policy with your bid response.

### **STATEMENT OF POLICY**

It is the employment policy of \_\_\_\_\_ that there will be no discrimination against anyone on the basis of race, color, religion, age, sex, marital status, sexual orientation, national origin, ancestry, disability, pregnancy, genetic information, or gender identity or expression in making employment decisions (including decisions related to hiring, assignment, compensation, promotion, demotion, disciplinary action and termination.)

In addition, this form is in full compliance with the letter and intent of the various Equal Employment Opportunities and Civil Rights Statutes noted above.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Telephone #

\_\_\_\_\_  
Fax #

\_\_\_\_\_  
Signed (Name/Title of Company Officer)

\_\_\_\_\_  
Street Address

\_\_\_\_\_  
City/State