

SECTION 11610 – TRUVIEW GLASS-WALLED FUME HOODS AND RELATED PRODUCTS

PART 1: DESCRIPTION OF WORK

1.0 SUMMARY AND SCOPE

- A. Section Includes:
Based on **Kewaunee Scientific Corporation's TruView Series** fume hood design, furnish and install all fume hoods, work tops, and understructures. Furnishing and installing all filler panels, knee space panels and scribes as shown on drawings.
- B. Accessorization:
Furnishing and delivering all service outlets and accessories as listed in these specifications, equipment schedules or as shown on drawings. Furnishing and delivering all service outlets, electrical receptacles and switches, as listed in these specifications, equipment schedules or as shown on drawings. Plumbing fixtures mounted on the fume hood superstructures shall be preplumbed per section 2.01.I. Electrical fixtures shall be prewired per section 2.01.J and be UL 3101 listed. Final plumbing and electrical connections are the responsibility of those contractors fulfilling requirements of Divisions 15 and 16.
- C. Removal of all debris, dirt and rubbish accumulated as a result of the installation of the fume hoods to an on-site container provided by others, leaving the premises clean and orderly.
- D. Related Divisions:
1. Division 12: Laboratory Casework.
2. Division 15: Plumbing and Exhaust Ducting
3. Division 16: Electrical Fittings and Connections
- E. Related Publications:
1. ASHRAE Standard 110.1985 Method of Testing Performance of Laboratory Fume Hoods.
2. NSF STD#49 - Photometric Method of Testing.
3. NIH03-112C National Institute of Health Specification.
4. UL 3101 - Underwriters Laboratories.
5. ASTM D552 - Bending Test.
6. NFPA-45 - National Fire Protection Association
7. ASTM C 1036

1.01 BASIS OF WORK

- A. It is the intent of this specification to use **Kewaunee Scientific Corporation, Statesville North Carolina**, as the standard of construction for laboratory fume hoods. The construction standards of the **Kewaunee TruView** product line shall provide the basis for quality and functional installation.
- B. Supply all equipment in accordance with this specification. The offering of a product differing in materials and construction from this specification requires written approval. This approval must be obtained seven (7) days before the proposal deadline. Procedures for obtaining approval for an alternate manufacturer are defined in section 1.04.B in this specification.
- C. General Contractors should secure a list of approved fume hood manufacturers from the architect as a protection against non-conformance to these specifications.
- D. The owner / architect reserves the right to reject qualified or alternate proposals and to award based on product value where such action assures the owner greater integrity of product.

- E. Submittals:
1. Manufacturer's Data: Submit manufacturer's data and installation instructions for the **TruView** fume hood. Provide data indicating compliance with ASHRAE Standard 110.1995 per section 1.02.c.
 2. Samples: Samples if called for will be reviewed for color, texture, and pattern only. Submit the following:
 - a. Tempered glass hood interior lining, 6 by 6 inches.
 - b. Hood enclosure, 6 by 6 inches, of color selected.
 - c. Operational sign(s).
 - d. Shop Drawings:
Submit shop drawings for **TruView** fume hoods showing plans, elevations, ends, cross-sections, service run spaces, location and type of service fittings.
 - 1) Coordinate shop drawings with other work involved.
 - 2) Provide roughing-in drawings for mechanical and electrical services when required.
 - 3) Provide face opening, air volume, and static pressure drop data.
 3. Non-Specified Manufacturer's Samples
A sample from each non-specified manufacturer will be required and reviewed per specification. This sample shall be delivered, at no cost to the architect or owner to a destination set forth by the architect or owner. The sample must then be tested per section 1.02.C by an independent test agency hired by the submitting company and approved by the owner/architect. A passing test and owner/architect approval of the prototype must be written and approved seven (7) days before quotation deadline as a condition of acceptance for any quotation participant.

1.02 STANDARD FUME HOOD PERFORMANCE REQUIREMENTS

- A. TruView transparent fume hoods shall be of flush-sill airfoil design to insure maximum operating efficiency. Foil sections at the front facias of the hood shall minimize eddying of air currents at the hood face and rear baffle system and air bypass shall minimize turbulence in the upper portion of the hood interior.
- B. TruView Bypass:(Choose one) :
 1. All bypass air shall pass through a horizontal perforated grille located between the interior top front liner panel and the operating plane of the top sash member. Laboratory air shall always be the source of bypass air. The front soffet panel, shall be louvered to permit this air flow.

or

 2. The fume hoods shall be of the variable air volume type in which the exhaust air volume varies proportionally to the hood opening when used with a hood face velocity controller system (provided by others). The air bypass shall be RESTRICTED PER THE VAV Manufacturer's recommendation.
- C. Containment
 1. Purpose:
The purpose of this specification is to prequalify the performance of the bidder's laboratory fume hood before award of contract. At their option, the owner or their representative may require the same tests to be performed and the same performance be achieved before acceptance of the hood after award of contract. The owner or their representative shall witness the tests. Failure to meet the performance specified shall be cause for rejection of the bidder.
 2. Test Method:
The hood shall be tested per the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Standard 110-1995.

3. Location of Tests and Test Facility:

All tests referenced herein shall be performed in the bidder's fume hood test facility. At the owner's option, test may be adopted for field-testing (testing in the owner's facility after installation is complete.).

The Manufacturer's test facility shall meet the following requirements:

- a. The test facility shall have sufficient area so that a minimum of 5 feet of clear space is available in front of and on both sides of the hood for viewing tests.
- b. The facility's ventilation system shall have adequate heating and air conditioning so that room air temperatures can be maintained within the desired ranges.
- c. Room air currents in the test area shall be less than 20 FPM.
- d. The hood exhaust system shall be properly calibrated so that the desired exhaust air volumes can be easily attained.

4. Instrumentation, Equipment, and Test Personnel:

Qualified personnel to perform the tests shall be supplied by the bidder. Instrumentation and equipment required shall be supplied by the bidder at his expense. Required instrumentation shall include but not be limited to the following items:

- a. Thermal anemometer capable of measuring air velocities from 10 to 600 ft./minute.
- b. A room-temperature smoke generator.
- c. Titanium Tetrachloride swabs.
- d. Miran or ITI tracer gas sensing equipment per ANSI/ASHRAE 110-1995.
- e. Flowmeter - 15 L/minute capacity.
- f. Two, size 3 tanks of sulfur hexafluoride with a two-stage regulator or other tracer gas suitable for detector to be used.
- g. Three-way gas valve.
- h. Mannequin, 5' 7" in height, or reasonable human proportions with arms.
- i. ASHRAE 110-1995 tracer gas ejector.

5. ASHRAE Standard 110-1995 Test:

Hood shall be tested with a face velocity of both 80 and 100 FPM at both an 18" vertical opening and a full open position. The CFM of these tests will vary based on at which of these parameters testing is done. Test readings shall be taken at right, left, and center of the opening. The hood shall have a performance rating of 4.0 AM 0.05 or better wherein:

4.0 = tracer gas release in liters/minute

AM = as manufactured

0.05 = level of control of tracer gas in parts per million (ppm).

1.03 QUALITY ASSURANCE

- A. The laboratory fume hood manufacturer shall provide fume hood work tops and casework all **manufactured or shipped from the same geographic location** to assure proper staging, shipment and single source responsibility.
- B. General Performance: Provide certification that the **TruView** fume hoods meet the performance requirements described in section 1.02.C.

PART 2 – PRODUCTS

2.0 MANUFACTURERS

- A. The basis of this specification is the **Supreme Air TruView** fume hood as manufactured by **Kewaunee Scientific**, 2700 Front Street, Statesville, North Carolina.
- B. All laboratory equipment covered by the specification **shall be the product of one manufacturer and be fabricated at one geographic location** to assure shipping continuity and single-source responsibility. All quotations from a manufacturer other than Kewaunee Scientific shall contain a review of the following capabilities:
 - 1. List of shop facilities
 - 2. List of engineering and manufacturing personnel
 - 3. Proof of financial ability to fulfill the contract
 - 4. List of a minimum of ten installations over the last five years of comparable scope
 - 5. Proof of project management and installation capabilities
- C. The selected manufacturer must warrant for a period of one-year starting (date of acceptance or occupancy, whichever comes first) that all products sold under the contract referenced above shall be free from defects in material and workmanship. Purchaser shall notify the manufacturer's representative immediately of any defective product. The manufacturer shall have a reasonable opportunity to inspect the goods. The purchaser shall return no product until receipt by purchaser of written shipping instructions from the manufacturer.

2.01 MATERIALS AND CONSTRUCTION

- A. **TruView Superstructure:**
A freestanding rigid structure of formed steel shall be provided to support ¼ inch ASTM C-1036 tempered glass panels and baffle system. To allow for maintenance and replacements, these glass panels shall be removable without disassembly of the frame structure.
- B. **Fume Hood Airfoil:**
A streamlined airfoil shall be integral at the bottom of the hood opening on the **TruView** fume hood. This foil shall be flush with work top. This formation will effectively direct an air stream across the work surface to prevent back flow of air. The foil shall be of 14-gauge steel to resist denting and flexing.
- C. **Fume Hood Grille:**
The top front panel shall be of 18 gauge cold rolled furniture grade steel. It shall contain a grille that is sight-tight to create an effective barrier against flying debris from inside the hood.
- D. **Fume Hood Baffles:**
A stable, non-adjustable baffle made from either ¼" tempered glass or fiberglass reinforced polyester shall be placed against the rear wall of single-sided units or in the middle of dual sided units. Three fixed horizontal slots shall be provided to aid in distributing the flow of air into and through the hood. The baffle shall be spaced out 2-1/4" from the back liner, or center in two-sided units. The baffle shall be removable for cleaning.
- E. **Fume Hood Duct Collar:**
30" X10" rectangular duct collar (two such collars on the 8 foot models).
- F. **Fume Hood Lighting:**
One (single-sided) or two (dual-sided) one-tube, energy-efficient, T-5 fluorescent light fixture of the size given below shall be provided in the hood roof. Illumination at 13" above the work top shall be at least 100 foot-candles.

Hood Size, Ft.	Nominal Fixture Length, Ft.
5	4
6	4
8	3 (2 Fixtures)

The light fixtures shall be isolated from the hood interior by a 1/4" thick tempered glass panel sealed from the hood cavity. Fixture shall be UL labeled.

G. Fume Hood Vertical Sashes:

An inward-slanting vertical sash system on the front of single sided hoods and both faces of double sided hoods at an 85° angle to the worktop. The sashes are frameless design of 1/4" laminated safety glass.

H. Fume Hood Plumbing Services:

Plumbing services shall consist of remote control valves as selected, located within the fume hood base cabinet. Interior fitting for gases and water shall be nylon panel flanges and angle serrated hose connectors, color coded mounted to the rear interior hood corner posts. Interior fittings for distilled water shall consist of a bronze, tin lined, white color-coded, panel flange and angle serrated hose connector. Interior fittings for steam shall consist of a cast bronze flange and angle serrated hose connector with a chemical resistant metallic bronze finish. Water goosenecks shall be cast bronze with a chemical resistant metallic bronze finish. All plumbing outlets interior to the hood shall be factory installed and piped between the stub-out and the outlet. Valves in the base cabinet shall be field-plumbed to the hood stub-outs. Stub-outs shall have a single-point connection for each outlet provided and carried to a point 1" below the work top rear corner depending on the rough-in locations shown in the drawings.

I. Fume Hood Electrical Services:

The hood electricals shall be field-wired by others. Electrical outlets and switches shall be located on the base cabinets. The duplex receptacles shall be 20 Amp, 125 volt AC, and 3-wire polarized grounded with ground fault interruption. The receptacles shall be of specification grade, side wired only, to insure a positive connection. The light switch shall be 20 Amp., 125 volt AC, and 3-wire polarized grounded. Field wiring shall terminate in one 4" X 4" service junction box located on the fume hood roof.

J. Hood Epoxy Resin Work Surface:

Hood work surface shall be 1-1/4" thick molded epoxy resin made in the form of a watertight pan, not less than 3/8" deep to contain spillage with a 6" wide safety ledge across the front edge. Top shall be manufactured at the same manufacturing location as the fume hood to assure proper cutout alignment and coordinated shipping. A cup drain flush with the recessed worksurface shall be provided. The worksurface and cup drain shall be available in either black or gray.

K. Fume Hood Dimensions

End panel thickness shall not exceed 2". Interior clear working height shall be not less than 41-3/4". Interior depth from the back of the sash to the front of the rear baffle shall be not less than 25-1/4". The sash opening shall be not less than 27" in height above the worksurface.

L. Tempered Glass:

All tempered glass panels shall be 1/4 inch ASTM C-1036 tempered glass.

M. Fume Hood Finish:

1. After the metal component parts have been completely welded together and before finishing, they shall be given a five-stage metal preparation water treatment consisting of:

- a) A caustic rinse
- b) A water rinse
- c) Iron phosphate treatment
- d) A water rinse
- e) A deionized water rinse

After this treatment, the steel shall be dried at 325 degrees Fahrenheit. The steel surfaces shall be coated with a corrosion-resistant powder coat finish 0.0023" inches thick which then shall be fused in an oven at a temperature of 375 degrees Fahrenheit for 20 minutes.

Any liquid-based paint system is unacceptable due to VOCs and other environmental issues.

2. Fume Hood Paint Finish Chemical Resistivity
All painted surfaces shall pass SEFA 8.1 Methods A or B

Test Method A: Volatile chemicals tested by placing a saturated cotton ball with the reagent in the mouth of a 1-oz. bottle and inverting the bottle on the surface of the panel.

Test Method B: Five drops of non-volatile chemicals of each reagent placed on sample, covered with watch glass, convex side down.

Each Chemical is left for one hour, then washed off with water, cleaned with detergent and naphtha and rinsed with deionized water, dried and evaluated after 24 hours at 73 ± 3°F and 50 ± 5% relative humidity.

RATING SCALE:

- Level 0 - No Detectable Change
- Level 1 - Slight Change in Color or Gloss
- Level 2 - Slight Surface Etching or Severe Staining
- Level 3 - Pitting, Cratering, Swelling, Erosion of Coating Obvious & Significant Deterioration.

TEST RESULTS

Chemical Spot Tests:

	<u>CHEMICAL</u>	<u>Test Method</u>	<u>Time In Minutes</u>	<u>Rating Scale</u>
1	Amyl Acetone	A	60	Level 0
2	Ethyl Acetate	A	60	Level 0
3	Acetic Acid 98%	B	60	Level 0
4	Acetone	A	60	Level 1
5	Acid Dichromate 5%	B	60	Level 0
6	Butyl Alcohol	A	60	Level 1
7	Ethyl Alcohol	A	60	Level 1
8	Methyl Alcohol	A	60	Level 1
9	Ammonium Hydroxide, 28%	B	60	Level 0
10	Benzene	A	60	Level 0
11	Carbon Tetrachloride	A	60	Level 0
12	Chloroform	A	60	Level 0
13	Chromic Acid 60%	B	60	Level 0
14	Cresol	A	60	Level 0
15	Dichlor Acetic Acid	A	60	Level 0
16	Dimethylformamide	A	60	Level 0
17	Dioxane	A	60	Level 0
18	Ethyl Ether	A	60	Level 0
19	Formaldehyde 37%	A	60	Level 0
20	Formic Acid 90%	B	60	Level 0
21	Furfural	A	60	Level 0
22	Gasoline	A	60	Level 0
23	Hydrochloric Acid, 37%	B	60	Level 0
24	Hydrofluoric Acid 48%	B	60	Level 2
25	Hydrogen Peroxide 28%	B	60	Level 0
26	Tincture of Iodine	B	60	Level 2
27	Methyl Ethyl Ketone	A	60	Level 1
28	Methylene Chloride	A	60	Level 0
29	Mono Chlorobenzene	A	60	Level 0
30	Napthalene	A	60	Level 0
31	Nitric Acid, 20%	B	60	Level 2

32	Nitric Acid, 30%	B	60	Level 2
33	Nitric Acid, 70%	B	60	Level 2
34	Phenol 90%	A	60	Level 0
35	Phosphoric Acid, 85%	B	60	Level 1
36	Silver Nitrate, Saturated	B	60	Level 0
37	Sodium Hydroxide, 10%	B	60	Level 0
38	Sodium Hydroxide, 20%	B	60	Level 0
39	Sodium Hydroxide, 40%	B	60	Level 0
40	Sodium Hydroxide, Flake	B	60	Level 0
41	Sodium Sulfide, Saturated	B	60	Level 0
42	Sulfuric Acid, 25%	B	60	Level 2
43	Sulfuric Acid, 85%	B	60	Level 3
44	Sulfuric Acid, 96%	B	60	Level 3
45	Sulfuric 85% & Nitric Acid 70%	B	60	Level 3
46	Toluene	A	60	Level 1
47	Trichlorethylene	A	60	Level 0
48	Xylene	A	60	Level 1
49	Zinc Chloride, Saturated	B	60	Level 0

N. Fume Hood Liners

Interior liner panels shall be 1/4" thick fiberglass reinforced polyester sheet. Interior liner panels shall be fastened using stainless steel screws with plastic covered heads.

Liner Tests - Chemical Spot Tests - 24 Hours

1. Chemical spot test shall be made by applying 10 drops (approximately 1/2 cc) of each reagent to the surface to be tested. Each reagent (except those marked **) shall be covered with a 1-1/2" diameter watch glass, convex side down to confine the reagent. Spot tests of volatile solvents marked ** shall be tested as follows: A 1" or larger ball of cotton shall be saturated with the solvent and placed on the surfaces to be tested. The cotton ball shall then be covered by an inverted 2-ounce, wide mouth bottle to retard evaporation. All spot tests shall be conducted in such a manner that the test surface is kept wet throughout the entire 24-hour test period and at a temperature of 77° F. ± 3° F.

At the end of the test period, the reagents shall be flushed from the surfaces with water and the surface scrubbed with a soft bristle brush under running water, rinsed, and dried. Volatile solvent test areas shall be cleaned with a cotton swab soaked in the solvent used on the test area. Spots where dyes have dried shall be cleaned with a cotton swab soaked in alcohol to remove the surface dye. The test panel shall then be evaluated immediately after drying.

2. Ratings/Legend:

- A = No effect or slight change in gloss.
- B = Slight change in gloss or color
- C = Slight etching or severe staining
- D = Swelling, pitting, or severe etching.

RESULTS:

- | | |
|------------------------------|---|
| 1. Acetic Acid 98% | C |
| 2. Acetone ** | A |
| 3. Acid Dichromate | B |
| 4. Ammonium Hydroxide ** 28% | A |
| 5. Amyl Acetate ** | A |
| 6. Benzene ** | A |
| 7. Butyl Alcohol ** | A |
| 8. Carbon Tetrachloride ** | B |
| 9. Chloroform ** | B |
| 10. Chromic Acid 60% | C |

11. Cresol	A
12. Dichloroacetic Acid	A
13. Dimethylformamide	A
14. Dioxane **	A
15. Ethyl Acetate **	A
16. Ethyl Ether **	A
17. Ethyl Alcohol **	A
18. Formaldehyde	A
19. Formic Acid 90%	B
20. Furfural **	C
21. Gasoline **	A
22. Hydrochloric Acid 37%	A
23. Hydrofluoric Acid 48%	A
24. Hydrogen Peroxide 30%	A
25. Methyl Ethyl Ketone **	A
26. Methyl Alcohol **	A
27. Methylene Chloride **	B
28. Monochlorobenzene **	A
29. Naphthalene **	A
30. Nitric Acid 20%	A
31. Nitric Acid 30%	B
32. Nitric Acid 70%	B
33. Phenol ** 85%	A
34. Phosphoric Acid 85%	A
35. Silver Nitrate	C
36. Sodium Hydroxide 40%	A
37. Sodium Hydroxide 20%	A
38. Sodium Hydroxide 10%	A
39. Sodium Hydroxide Flake	A
40. Sodium Sulfide	A
41. Sulfuric Acid 77%	A
42. Sulfuric Acid 96%	B
43. Sulfuric Acid 33%	A
44. Tincture of Iodine	C
45. Toluene **	A
46. Trichlorethylene **	A
47. Xylene **	A
48. Zinc Chloride	A
49. Nitric 70%/Sulfuric Acid 77%*	B

* Equal parts of Nitric Acid 70% and Sulfuric Acid 77%.

** Indicates these solvents tested with cotton and jar method

O. Accessories: (optional)

1. Filters and Housings:

When called for, a filter housing shall be provided above the hoods. The housing shall contain an absolute filter (99.97% efficient for 0.3 micron particles) and a furnace type prefilter. The housing shall form a rigid, self-supporting assembly and have a gasketed front cover to allow replacement of the filters without disturbing the ductwork. The filter housing shall be fabricated of cold rolled steel with a chemical resistant finish.

2. Low Face Velocity Alarm

When called for, TruView hoods shall come equipped with the AirAlert 300 digital velocity alarm to detect low hood face velocities. The alarm system shall sense the actual face velocity of the hood regardless of sash position. The system shall have air velocity sensing thermistor. The monitor shall have a green light activated when the face velocity is above the set point and a red light and audible alarm which are activated when the face velocity is

below the set point. The audible alarm can be acknowledged and silenced with mute switch on panel. When the mute is activated, it automatically resets itself when face velocity again rises above calibrated set point. The set point is to be factory set and calibrated at approximately 70 FPM. Field calibration is possible.

PART 3 - EXECUTION – TRUVIEW FUME HOOD AND RELATED PRODUCTS

3.00 SITE EXAMINATION

The owner and/or his representative shall certify building conditions conducive to the installation of a finished goods product, including all critical dimensions.

3.01 INSTALLATION

- A. Preparation:
Prior to beginning installation of fume hood, check and verify that no irregularities exist that would affect quality of execution of work specified.
- B. Coordination:
Coordinate the work of the Section with the schedule and other requirements of other work being performed in the area at the same time both with regard to mechanical and electrical connections to and in the fume hoods and the general construction work.
- C. Performance:
Install fume hoods, plumb, level, rigid, securely anchored to building and adjacent furniture in proper location, in accordance with manufacturer's instructions and the approved shop drawings. Provide filler panels between top of hood and ceiling. Securely attach access panels but provide for easy removal and secure re-attachment. Do not install any damaged units.
- D. Adjust and Clean:
After installations are complete, adjust all moving parts for smooth operation. Remove all packing materials and debris resulting from this work, and turn over the fume hoods to the Owner clean and polished both inside and out. Repair or remove and replace defective work, as directed by owner and/or his representative upon completion of installation.
- E. Protection:
 - 1. Provide reasonable protective measures to prevent casework and equipment from being exposed to other construction activity.
 - 2. Advise owner and/or his representative of procedures and precautions for protection of material, installed laboratory casework and fixtures from damage by work of other trades.
- F. Certification:
 - 1. Fume Hood Manufacturer shall field test a random sample of 20% of the installed units using ANSI/ASHRAE 110-1995 to a control level of AI 0.01 ppm or better.
 - 2. Project substantial completion shall be withheld until all required fume hood certification letters, tests, and reports have been submitted to and approved by the Architect.