SECTION 233700 - AIR OUTLETS AND INLETS

This Section includes roof, wall, and floor diffusers, registers, and grilles, and louvers, louvered penthouses, and roof hoods.

Manufacturers found in SpecAgent for this Section were identified as representative and not as an endorsement for meeting the requirements of this specification.

This Section includes performance, proprietary, and descriptive type specifications. Edit to avoid conflicting requirements.

This Section includes the term Architect/Engineer. "Architect" is used in AIA contract documents; "Engineer" is used in EJCDC contract documents. Retain appropriate term.

See the Drawing Coordination Considerations for information needed to coordinate this specification Section with the Drawings.

1. GENERAL
   * + 1. SUMMARY
          1. Section Includes:

Diffusers.

Registers

Grilles.

Door grilles.

Louvers.

Louvered penthouses.

Roof hoods.

Goosenecks.

* + - * 1. Related Sections:

Section <**\_\_\_\_\_\_\_\_**> - <**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**>: Roof curb flashing.

Section <**\_\_\_\_\_\_\_\_**> - <**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**>: Roof curbs.

Section <**\_\_\_\_\_\_\_\_**> - <**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**>: Door grilles.

Section 08911600 - Louvers: Operable Wall Louvers.

Section 099000 - Painting and Coating: Execution and product requirements for Painting of ductwork visible behind outlets and inlets specified by this section.

Section 230900 - Instrumentation and Control for HVAC: Operators for adjustable louvers.

Section 230923 - Direct-Digital Control System for HVAC: Operators for adjustable louvers.

Section 230953 - Pneumatic and Electric Control System for HVAC: Operators for adjustable louvers.

Section 233300 - Air Duct Accessories: Volume dampers for inlets and outlets.

* + - 1. REFERENCES

List reference standards included within text of this section. Edit the following for Project conditions.

* + - * 1. Air Movement and Control Association International, Inc.:

AMCA 500 - Test Methods for Louvers, Dampers, and Shutters.

* + - * 1. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

ASHRAE 70 - Method of Testing for Rating the Performance of Air Outlets and Inlets.

* + - * 1. Sheet Metal and Air Conditioning Contractors:

SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

* + - 1. SUBMITTALS

Only request submittals needed to verify compliance Project requirements.

* + - * 1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
        2. Manufacturer’s installation instructions shall be provided along with product data.
        3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
        4. Section 013300 - Submittal Procedures: Submittal procedures.
        5. Product Data: Submit sizes, finish, and type of mounting. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

Include the following paragraph for submission of physical samples for selection of finish, color, texture, and other properties.

* + - * 1. Samples: Submit [**two**] <**\_\_\_\_\_\_\_\_**> of each required air outlet and inlet type.
        2. Test Reports: Rating of air outlet and inlet performance.
        3. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
        4. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
        5. Manufacturer’s installation instructions shall be provided along with product data.
        6. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
      1. CLOSEOUT SUBMITTALS
         1. Section 017000 - Execution and Closeout Requirements: Closeout procedures.
         2. Project Record Documents: Record actual locations of air outlets and inlets.
      2. QUALITY ASSURANCE
         1. Test and rate diffuser, register, and grille performance in accordance with ASHRAE 70 “Method of Testing for Rating the Performance of Air Outlets and Inlets”.
         2. Test and rate louver performance in accordance with AMCA 500 “Test Methods for Louvers, Dampers, and Shutters”.
         3. Perform Work in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Include the following paragraph only when cost of acquiring specified standards is justified.

* + - * 1. Maintain [**one copy**] [**<\_\_\_\_\_\_\_\_> copies**] of [**each**] document on site.
      1. QUALIFICATIONS
         1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years' [**documented**] experience [**, and with service facilities within [100] <\_\_\_\_\_\_\_\_> miles of Project**].
      2. MOCK-UP

Use this article for full sized erected assemblies required for review of construction, coordination of Work of several sections, testing, or observation of operation.

* + - * 1. Section 014000 - Quality Requirements: Mock-up requirements.
        2. Construct typical [**exterior**] [**interior**] ceiling module with supply and return air outlets.
        3. Locate [**where directed by Director’s Representative.**] [**where indicated on Drawings.**]
        4. Incorporate accepted mock-up as part of Work.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Remove mock-up [**when directed by Architect/Director’s Representative** **Engineer**] <**\_\_\_\_\_\_\_\_**>.
      1. PRE-INSTALLATION MEETINGS
         1. Section 013000 - Administrative Requirements: Pre-installation meeting.
         2. Convene minimum [**one**] <**\_\_\_\_\_\_\_\_**> week prior to commencing work of this section.
      2. WARRANTY

This article extends warranty period beyond one year. Extended warranties increase construction costs and Owner enforcement responsibilities. Specify warranties with caution.

* + - * 1. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.
        2. Furnish [**five**] <**\_\_\_\_\_\_\_\_**>-year manufacturer's warranty for air outlets and inlets.
      1. EXTRA MATERIALS
         1. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.
         2. Furnish <**\_\_\_\_\_\_\_\_**> [**<\_\_\_\_\_\_\_\_> percent**] extra air outlets and inlets.

1. PRODUCTS
   * + 1. ROUND CEILING DIFFUSERS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=12382) Subject to compliance with requirements, provide products by one of the following:

[Carnes Company](http://www.specagent.com/Lookup?uid=123457029254).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029258).

[Titus; brand of Johnson Controls International PLC, Global Products](http://www.specagent.com/Lookup?uid=123457029261).

Approved equivalent.

In this article, list manufacturers acceptable for this Project.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8263&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Product Description: Type: Round, [**adjustable pattern,**] stamped or spun, multi-core diffuser to discharge air in 360 degree pattern, with sector baffles where indicated. Diffuser collar not more than 1 inch (25 mm) above ceiling. [**In plaster ceilings, furnish plaster ring and ceiling plaque.**]
        2. Fabrication: Steel with baked enamel [**off-white**] <**\_\_\_\_\_\_\_\_**> finish.
        3. Accessories: [**Radial opposed-blade**] [**Butterfly**] [**Combination splitter**] damper and multi-louvered equalizing grid with damper adjustable from diffuser face.
      1. RECTANGULAR CEILING DIFFUSERS

In this article, list manufacturers acceptable for this Project.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=12383) Subject to compliance with requirements, provide products by one of the following:

[Anemostat Products; a Mestek company](http://www.specagent.com/Lookup?uid=123457029264).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029271).

[Titus; brand of Johnson Controls International PLC, Global Products](http://www.specagent.com/Lookup?uid=123457029274).

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8264&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Type: [**Square, [adjustable pattern,] stamped, multi-core**] [**Square and rectangular, [adjustable pattern,] multi-louvered**] diffuser to discharge air in [**360 degree**] [**one way**] [**two-way**] [**three-way**] [**four-way**] pattern [**with sector baffles where indicated**].
        2. Frame: [**Surface mount**] [**Snap-in**] [**Inverted T-bar**] [**Spline**] type. [**In plaster ceilings, furnish plaster frame and ceiling frame.**]
        3. Fabrication: [**Steel**] [**Aluminum**] with baked enamel [**off-white**] <**\_\_\_\_\_\_\_\_**> finish.
        4. Accessories: [**Radial opposed-blade**] [**Butterfly**] [**Combination splitter**] damper and multi-louvered equalizing grid with damper adjustable from diffuser face.
      1. PERFORATED FACE CEILING DIFFUSERS

In this article, list manufacturers acceptable for this Project.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=12384) Subject to compliance with requirements, provide products by one of the following:

[Anemostat Products; a Mestek company](http://www.specagent.com/Lookup?uid=123457029278).

[Carnes Company](http://www.specagent.com/Lookup?uid=123457029279).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029285).

[Titus; brand of Johnson Controls International PLC, Global Products](http://www.specagent.com/Lookup?uid=123457029287).

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8265&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Type: Perforated face with fully adjustable pattern and removable face.
        2. Frame: [**Surface mount**] [**Snap-in**] [**Inverted T-bar**] [**Spline**] type. [**In plaster ceilings, furnish plaster frame and ceiling frame.**]
        3. Fabrication: Steel with [**steel**] [**or**] [**aluminum**] frame and baked enamel [**off-white**] <**\_\_\_\_\_\_\_\_**> finish.
        4. Accessories: [**Radial opposed-blade**] [**Butterfly**] [**Combination splitter**] damper and multi-louvered equalizing grid with damper adjustable from diffuser face.
      1. MODIFIED LIGHT TROFFER DIFFUSERS

In this article, list manufacturers acceptable for this Project.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=12389) Subject to compliance with requirements, provide products by one of the following:

[Carnes Company](http://www.specagent.com/Lookup?uid=123457029335).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029341).

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8266&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Type: [**Single**] [**Double**] plenum constructed independent of light troffer with volume and pattern controllers, [**4**] [**5**] [**6**] inch ([**100**] [**125**] [**150**] mm) air inlet, round or oval [**top**] [**side**]. Match diffusers to light troffer for airtight connection without tools.
        2. Fabrication: Galvanized steel with welded or soldered joints and finish matte black inside.
      1. CEILING SLOT DIFFUSERS

In this article, list manufacturers acceptable for this Project.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=12387) Subject to compliance with requirements, provide products by one of the following:

[Carnes Company](http://www.specagent.com/Lookup?uid=123457029313).

[Krueger-HVAC; brand of Johnson Controls International plc, Global Products](http://www.specagent.com/Lookup?uid=123457029316).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029319).

[Titus; brand of Johnson Controls International PLC, Global Products](http://www.specagent.com/Lookup?uid=123457029322).

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8267&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Type: Continuous [**1/2**] [**3/4**] [**1**] inch ([**13**] [**19**] [**25**] mm) wide slot, [**1**] [**two**] [**three**] [**four**] slots wide, with adjustable vanes for left, right or vertical discharge [**; integral ceiling fire damper**].
        2. Fabrication: [**Aluminum extrusions**] [**Steel**] with factory [**clear lacquer**] [**off-white enamel**] [**baked enamel**] <**\_\_\_\_\_\_\_\_**> finish [**, color to be selected**].
        3. Frame: [**1-1/4**] [**1**] <**\_\_\_\_\_\_\_\_**> inch ([**32**] [**25**] <**\_\_\_\_\_\_\_\_**> mm) margin with [**countersunk screw**] [**concealed**] [**support clips for suspension system**] [**support clips for T bar**] mounting and gasket [**mitered end border.**] [**open end construction.**] [**end cap.**]
        4. Plenum: Integral, galvanized steel, [**insulated**] [**non-insulated**].
      1. CEILING SUPPLY REGISTERS/GRILLES

In this article, list manufacturers acceptable for this Project.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=12398) Subject to compliance with requirements, provide products by one of the following:

[Anemostat Products; a Mestek company](http://www.specagent.com/Lookup?uid=123457029460).

[Nailor Industries Inc](http://www.specagent.com/Lookup?uid=123457029441).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029467).

[Titus; brand of Johnson Controls International PLC, Global Products](http://www.specagent.com/Lookup?uid=123457029469).

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8268&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Type: Streamlined and individually adjustable curved blades to discharge air along face of grille, [**one-way**] [**two-way**] deflection.
        2. Frame: [**1-1/4**] [**1**] <**\_\_\_\_\_\_\_\_**> inch ([**32**] [**25**] <**\_\_\_\_\_\_\_\_**> mm) margin with [**countersunk screw**] [**concealed**] mounting and gasket.
        3. Fabrication: Aluminum extrusions with factory [**off-white enamel**] [**clear lacquer**] [**prime coat**] <**\_\_\_\_\_\_\_\_**> finish.
        4. Damper: Integral, gang-operated, opposed-blade type with removable key operator, operable from face.
      1. CEILING EXHAUST AND RETURN REGISTERS/GRILLES

In this article, list manufacturers acceptable for this Project.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=12398) Subject to compliance with requirements, provide products by one of the following:

[Anemostat Products; a Mestek company](http://www.specagent.com/Lookup?uid=123457029460).

[Nailor Industries Inc](http://www.specagent.com/Lookup?uid=123457029441).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029467).

[Titus; brand of Johnson Controls International PLC, Global Products](http://www.specagent.com/Lookup?uid=123457029469).

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8269&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Type: Streamlined blades, [**3/4 inch (19 mm)**] <**\_\_\_\_\_\_\_\_**> minimum depth, [**3/4 inch (19 mm)**] <**\_\_\_\_\_\_\_\_**> maximum spacing, with blades set at 45 degrees, [**vertical**] [**horizontal**] face.
        2. Frame: [**1-1/4**] [**1**] <**\_\_\_\_\_\_\_\_**> inch ([**32**] [**25**] <**\_\_\_\_\_\_\_\_**> mm) margin with [**countersunk screw**] [**concealed**] mounting.
        3. Fabrication: Steel with 20 gage (0.90 mm) minimum frames and 22 gage (0.80 mm) minimum blades, steel and aluminum with 20 gage (0.90 mm) minimum frame, or aluminum extrusions, with factory [**off-white enamel**] [**baked enamel**] [**prime coated**] [**clear lacquer**] <**\_\_\_\_\_\_\_\_**> finish [**, color as selected**].
        4. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face where not individually connected to exhaust fans.
        5. Gymnasiums: Furnish front pivoted or welded in place blades, securely fastened to be immobile.
      1. CEILING GRID CORE EXHAUST AND RETURN REGISTERS/GRILLES

In this article, list manufacturers acceptable for this Project.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=12398) Subject to compliance with requirements, provide products by one of the following:

[Anemostat Products; a Mestek company](http://www.specagent.com/Lookup?uid=123457029460).

[Nailor Industries Inc](http://www.specagent.com/Lookup?uid=123457029441).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029467).

[Titus; brand of Johnson Controls International PLC, Global Products](http://www.specagent.com/Lookup?uid=123457029469).

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8270&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Type: Fixed grilles of [**1/2 x 1/2 x 1 inch (13 x 13 x 25 mm)**] [**1 x 1 x 1 inch (25 x 25 x 25 mm)**] louvers.
        2. Fabrication: [**Polystyrene**] [**Acrylic**] plastic with [**off-white**] [**chrome**] <**\_\_\_\_\_\_\_\_**> finish.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Fabrication: Aluminum with factory [**clear lacquer**] [**off-white enamel**] [**baked enamel**] <**\_\_\_\_\_\_\_\_**> finish.
        2. Frame: [**[1-1/4] [1] <\_\_\_\_\_\_\_\_> inch ([32] [25] <\_\_\_\_\_\_\_\_> mm) margin with [countersunk screw mounting.] [concealed mounting.]**] [**Channel lay-in frame for suspended grid ceilings.**]
        3. Damper: Integral, gang-operated, opposed-blade type with removable key operator, operable from face.
      1. CEILING LINEAR EXHAUST AND RETURN GRILLES

In this article, list manufacturers acceptable for this Project.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=12398) Subject to compliance with requirements, provide products by one of the following:

[Anemostat Products; a Mestek company](http://www.specagent.com/Lookup?uid=123457029460).

[Nailor Industries Inc](http://www.specagent.com/Lookup?uid=123457029441).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029467).

[Titus; brand of Johnson Controls International PLC, Global Products](http://www.specagent.com/Lookup?uid=123457029469).

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8271&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Type: Streamlined blades with 90 degree [**one-way**] [**two-way**] deflection, 1/8 x 3/4 inch (3.2 x 19 mm) on [**1/4**] [**1/2**] inch ([**6**] [**13**] mm) centers.
        2. Frame: [**1-1/4**] [**1**] <**\_\_\_\_\_\_\_\_**> inch ([**32**] [**25**] <**\_\_\_\_\_\_\_\_**>mm) margin [**,extra heavy for floor mounting,**] with [**countersunk screw**] [**concealed**] mounting.
        3. Fabrication: Steel with 20 gage (0.90 mm) minimum frames and 22 gage (0.80 mm) minimum blades, steel and aluminum with 20 gage (0.90 mm) minimum frame, or aluminum extrusions, with factory [**off-white enamel**] [**baked enamel**] [**prime coated**] [**clear lacquer**] <**\_\_\_\_\_\_\_\_**> finish [**, color to be selected**].
        4. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.
      1. WALL SUPPLY REGISTERS/GRILLES

In this article, list manufacturers acceptable for this Project.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=12398) Subject to compliance with requirements, provide products by one of the following:

[Anemostat Products; a Mestek company](http://www.specagent.com/Lookup?uid=123457029460).

[Nailor Industries Inc](http://www.specagent.com/Lookup?uid=123457029441).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029467).

[Titus; brand of Johnson Controls International PLC, Global Products](http://www.specagent.com/Lookup?uid=123457029469).

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8272&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Type: Streamlined and individually adjustable blades, [**3/4 inch (19 mm)**] <**\_\_\_\_\_\_\_\_**> minimum depth, [**3/4 inch (19 mm)**] <**\_\_\_\_\_\_\_\_**> maximum spacing with spring or other device to set blades, [**vertical**] [**horizontal**] face, [**single**] [**double**] deflection.
        2. Frame: [**1-1/4**] [**1**] <**\_\_\_\_\_\_\_\_**> inch ([**32**] [**25**] <**\_\_\_\_\_\_\_\_**> mm) margin with [**countersunk screw**] [**concealed**] mounting and gasket.
        3. Fabrication: Steel with 20 gage (0.90 mm) minimum frames and 22 gage (0.80 mm) minimum blades, steel and aluminum with 20 gage (0.90 mm) minimum frame, or aluminum extrusions, with factory [**off-white enamel**] [**baked enamel**] [**prime coat**] [**clear lacquer**] <**\_\_\_\_\_\_\_\_**> finish [**, color to be selected**].
        4. Damper: Integral, gang-operated opposed blade type with removable key operator, operable from face.
        5. Gymnasiums: Furnish front pivoted or welded in place blades, securely fastened to be immobile.
      1. WALL SUPPLY REGISTERS/GRILLES

In this article, list manufacturers acceptable for this Project.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=12398) Subject to compliance with requirements, provide products by one of the following:

[Anemostat Products; a Mestek company](http://www.specagent.com/Lookup?uid=123457029460).

[Nailor Industries Inc](http://www.specagent.com/Lookup?uid=123457029441).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029467).

[Titus; brand of Johnson Controls International PLC, Global Products](http://www.specagent.com/Lookup?uid=123457029469).

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8282&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Type: Streamlined and individually adjustable curved blades to discharge air along face of grille with [**one-way**] [**two-way**] <**\_\_\_\_\_\_\_\_**> deflection.
        2. Frame: [**1-1/4**] [**1**] <**\_\_\_\_\_\_\_\_**> inch ([**32**] [**25**] <**\_\_\_\_\_\_\_\_**> mm) margin with [**countersunk screw**] [**concealed**] mounting and gasket.
        3. Fabrication: Aluminum extrusions with factory [**off-white enamel**] [**clear lacquer**] [**prime coat**] <**\_\_\_\_\_\_\_\_**> finish.
        4. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.

The difference between the following article and the previous is curved blades and aluminum construction.

* + - 1. WALL EXHAUST AND RETURN REGISTERS/GRILLES

In this article, list manufacturers acceptable for this Project.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=12398) Subject to compliance with requirements, provide products by one of the following:

[Anemostat Products; a Mestek company](http://www.specagent.com/Lookup?uid=123457029460).

[Nailor Industries Inc](http://www.specagent.com/Lookup?uid=123457029441).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029467).

[Titus; brand of Johnson Controls International PLC, Global Products](http://www.specagent.com/Lookup?uid=123457029469).

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8273&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Type: Streamlined blades, [**3/4 inch (19 mm)**] <**\_\_\_\_\_\_\_\_**> minimum depth, [**3/4 inch (19 mm)**] <**\_\_\_\_\_\_\_\_**> maximum spacing, with spring or other device to set blades, [**vertical**] [**horizontal**] face.
        2. Frame: [**1-1/4**] [**1**] <**\_\_\_\_\_\_\_\_**> inch ([**32**] [**25**] <**\_\_\_\_\_\_\_\_**> mm) margin with [**countersunk screw**] [**concealed**] mounting.
        3. Fabrication: [**Steel with 20 gage (0.90 mm) minimum frames and 22 gage (0.80 mm) minimum blades,**] [**Steel and aluminum with 20 gage (0.90 mm) minimum frame,**] [**or**] [**Aluminum extrusions,**] with factory [**off-white enamel**] [**baked enamel**] [**prime coated**] [**clear lacquer**] <**\_\_\_\_\_\_\_\_**> finish [**, color to be selected**].
        4. Damper: Integral, gang-operated, opposed-blade type with removable key operator, operable from face.
        5. Gymnasiums: Furnish front pivoted or welded in place blades, securely fastened to be immobile.
      1. WALL GRID CORE EXHAUST AND RETURN REGISTERS/GRILLES

In this article, list manufacturers acceptable for this Project.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=12398) Subject to compliance with requirements, provide products by one of the following:

[Anemostat Products; a Mestek company](http://www.specagent.com/Lookup?uid=123457029460).

[Nailor Industries Inc](http://www.specagent.com/Lookup?uid=123457029441).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029467).

[Titus; brand of Johnson Controls International PLC, Global Products](http://www.specagent.com/Lookup?uid=123457029469).

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8274&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Type: Fixed grilles of [**1/2 x 1/2 x 1/2 inch (13 x 13 x 13 mm)**] [**1/2 x 1/2 x 1 inch (13 x 13 x 25 mm)**] [**1 x 1 x 1 inch (25 x 25 x 25 mm)**] louvers.
        2. Frame: [**[1-1/4] [1] <\_\_\_\_\_\_\_\_> inch ([32] [25] <\_\_\_\_\_\_\_\_> mm) margin with [countersunk screw mounting.] [concealed mounting.]**] [**Lay-in frame for suspended grid ceilings.**]
        3. Fabrication: Aluminum with factory [**clear lacquer**] [**off-white enamel**] [**baked enamel**] finish [**, color to be selected**].
        4. Damper: Integral, gang-operated, opposed-blade type with removable key operator, operable from face.
      1. LINEAR WALL REGISTERS/GRILLES

In this article, list manufacturers acceptable for this Project.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=12398) Subject to compliance with requirements, provide products by one of the following:

[Anemostat Products; a Mestek company](http://www.specagent.com/Lookup?uid=123457029460).

[Nailor Industries Inc](http://www.specagent.com/Lookup?uid=123457029441).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029467).

[Titus; brand of Johnson Controls International PLC, Global Products](http://www.specagent.com/Lookup?uid=123457029469).

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8275&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Type: Streamlined blades with [**0**] [**15**] degree deflection, 1/8 x 3/4 inch (3.2 x 19 mm) on [**1/4**] [**1/2**] inch ([**6**] [**13**] mm) centers.
        2. Frame: [**1-1/4**] [**1**] <**\_\_\_\_\_\_\_\_**> inch ([**32**] [**25**] <**\_\_\_\_\_\_\_\_**> mm) margin with [**countersunk screw**] [**concealed**] mounting and gasket.
        3. Fabrication: Aluminum extrusions, with factory [**off-white enamel**] [**clear lacquer**] [**prime coat**] <**\_\_\_\_\_\_\_\_**> finish.
        4. Damper: Integral [**gang-operated opposed blade**] [**hinged single blade**] damper with removable key operator, operable from face.
      1. LINEAR FLOOR SUPPLY REGISTERS/GRILLES

In this article, list manufacturers acceptable for this Project.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=12398) Subject to compliance with requirements, provide products by one of the following:

[Anemostat Products; a Mestek company](http://www.specagent.com/Lookup?uid=123457029460).

[Nailor Industries Inc](http://www.specagent.com/Lookup?uid=123457029441).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029467).

[Titus; brand of Johnson Controls International PLC, Global Products](http://www.specagent.com/Lookup?uid=123457029469).

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8276&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Type: Streamlined blades with [**0**] [**15**] degree deflection, 1/8 x 3/4 inch (3 x 19 mm) on [**1/4**] [**7/16**] [**1/2**] inch ([**6**] [**11**] [**13**] mm) centers [**, assembled on expanded tubes mandrel construction**].
        2. Frame: [**1-1/4**] [**1**] <**\_\_\_\_\_\_\_\_**> inch ([**32**] [**25**] <**\_\_\_\_\_\_\_\_**> mm) [**heavy**] margin frame with [**countersunk screw mounting**] [**concealed mounting and gasket**] [**, and mounting frame.**]
        3. Fabrication: Aluminum extrusions with factory [**off-white enamel**] [**clear lacquer**] <**\_\_\_\_\_\_\_\_**> finish.
        4. Damper: Integral [**gang-operated opposed blade**] [**hinged single blade**] damper with removable key operator, operable from face.
      1. FLOOR SUPPLY REGISTERS/GRILLES

In this article, list manufacturers acceptable for this Project.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=12398) Subject to compliance with requirements, provide products by one of the following:

[Anemostat Products; a Mestek company](http://www.specagent.com/Lookup?uid=123457029460).

[Nailor Industries Inc](http://www.specagent.com/Lookup?uid=123457029441).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029467).

[Titus; brand of Johnson Controls International PLC, Global Products](http://www.specagent.com/Lookup?uid=123457029469).

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8277&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. [**Individually adjustable**] [**Fixed**] blades, wide stamped border, single or double blade damper with setscrew adjustment.
        2. Fabricate of steel, welded construction, with factory baked enamel finish.
      1. DOOR GRILLES

In this article, list manufacturers acceptable for this Project.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=12398) Subject to compliance with requirements, provide products by one of the following:

[Anemostat Products; a Mestek company](http://www.specagent.com/Lookup?uid=123457029460).

[Nailor Industries Inc](http://www.specagent.com/Lookup?uid=123457029441).

[Price Industries](http://www.specagent.com/Lookup?uid=123457029467).

[Titus; brand of Johnson Controls International plc, Global Products](http://www.specagent.com/Lookup?uid=123457029469).

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8278&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Door grilles: As specified in Section <**\_\_\_\_\_\_\_\_**>.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Type: V-shaped louvers of 20 gage (0.90 mm) thick steel, 1 inch (25 mm) deep on 1/2 inch (13 mm) centers.
        2. Frame: 20 gage (0.90 mm) steel with auxiliary frame to give finished appearance on both sides of door, with factory prime coat finish.
      1. LOUVERS

In this article, list manufacturers acceptable for this Project.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=9748) Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

Greenheck Fan Corp.

Price Industries

Titus

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8279&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Louvers: As specified in Section 08911900.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Product Description: [**[Stationary] [Adjustable] [Combination]**] [**[Drainable] [Non-Drainable] [Double drainable]**] [**Thinline**].
        2. Type: [**4**] [**6**] inch ([**100**] [**150**] mm) deep with blades on 45 degree slope [**with center baffle and return bend**], heavy channel frame.
        3. Fabrication: [**16 gage (1.50 mm) thick galvanized steel**] [**or**] [**12 gage (2.50 mm) thick extruded aluminum**], welded assembly, with factory [**prime coat**] [**baked enamel**] [**anodized**] [**fluoropolymer spray**] <**\_\_\_\_\_\_\_\_**> finish [**color to be selected**].
        4. Mounting: Furnish with [**interior**] [**exterior**] [**flat flange**] [**angle flange**] [**screw holes in jambs**] [**masonry strap anchors**] for installation.
        5. Bird Screen: Bird screen with 1/2 inch (13 mm) square mesh for exhaust and 3/4 inch (19 mm) for intake.
        6. Insect Screen: [**Aluminum**] [**Steel**] mesh, set in [**aluminum**] [**steel**] frame.
        7. Louver Operator: Refer to Section [**230900**] [**230923**] [**230953**].
      1. LOUVERED PENTHOUSE

In this article, list manufacturers acceptable for this Project.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=9748) Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

Greenheck Fan Corp.

Price Industries

Ruskin Air

Approved equivalent.

[Manufacturers](http://www.specagent.com/LookUp/?ulid=8280&mf=04&src=wd):

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Louver Penthouse: As specified in Section 089100.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Louvers: Type as specified above.
        2. Fabrication: Completely welded assembly. Fabricate with mitered corners. Structural supports rated for [**20**] <**\_\_\_\_\_\_\_\_**> psf ([**0.96**] <**\_\_\_\_\_\_\_\_**> kPa) wind and snow loading. Furnish sill water catch with 2 inch (50 mm) high water stop and depth to enclose structural supports.
        3. Roof: Aluminum construction, standing seam type with formed water baffle plates open at corners for drainage. [**Furnish with bitumastic roof undercoating.**] [**Furnish with 1 inch (25 mm) glass fiber insulation.**]
        4. Bird Screen: Interwoven wire mesh of [**steel**] [**aluminum**], [**0.063**] <**\_\_\_\_\_\_\_\_**> inch ([**1.6**] <**\_\_\_\_\_\_\_\_**> mm) diameter wire, [**1/2**] <**\_\_\_\_\_\_\_\_**> inch ([**13**] <**\_\_\_\_\_\_\_\_**> mm) open weave, [**diagonal**] [**square**] design.
        5. Insect Screen: [**18 x 16**] <**\_\_\_\_\_\_\_\_**> size [**aluminum**] [**steel**] mesh, set in [**aluminum**] [**steel**] frame.
        6. Finish: Factory [**prime coat**] [**baked enamel**] [**anodized**] [**fluoropolymer spray**] <**\_\_\_\_\_\_\_\_**> finish [**color to be selected**].
        7. Roof Curb: [**8 inch (200 mm)**] [**12 inch (300 mm)**] [**16 inch (400 mm)**] [**<\_\_\_\_\_\_\_\_> inch (<\_\_\_\_\_\_\_\_> mm)**] high [**self-flashing**] [**galvanized steel**] [**aluminum**] construction with continuously welded seams [**, built-in cant strips**]. [**, 1 inch (25 mm) insulation and curb bottom**] [**, hinged curb adapter**], and factory installed nailer strip.
      1. ROOF HOODS

In this article, list manufacturers acceptable for this Project.

* + - * 1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=8281&mf=04&src=wd): Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Greenheck

Loren Cook

York

Approved equivalent.

Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Furnish materials in accordance with [**State**] [**Municipality**] of <**\_\_\_\_\_\_\_\_**> [**Highways**] [**Public Work's**] standards.

Edit the following descriptive specifications to identify project requirements and to eliminate conflicts with manufacturer's products specified above.

* + - * 1. Fabricate air inlet or exhaust hoods in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
        2. Fabricate of reinforced galvanized steel, minimum 16 gage (1.50 mm) base and 20 gage (0.90 mm) hood, or aluminum, minimum 16 gage (1.50 mm) base and 18 gage (1.20 mm) hood. Furnish removable hood; bird screen with 1/2 inch (13 mm) square mesh for exhaust and 3/4 inch (19 mm) for intake, and factory [**prime coat**] [**baked enamel**] finish.
        3. Fabricate hood outlet area minimum of twice throat area.
        4. Roof Curb: [**8 inch (200 mm)**] [**12 inch (300 mm)**] [**16 inch (400 mm)**] [**20 inch (500 mm)**] [**24 inch (600 mm)**] [**<\_\_\_\_\_\_\_\_> inch (<\_\_\_\_\_\_\_\_> mm)**] high [**self-flashing**] [**galvanized steel**] [**aluminum**] construction with continuously welded seams [**, built-in cant strips**]. [**, 1 inch (25 mm) insulation and curb bottom**] [**, interior baffle with acoustic insulation, curb bottom**] [**, ventilated double wall**] [**, hinged curb adapter**], and factory installed nailer strip.
      1. GOOSENECKS
         1. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, of minimum 18 gage (1.20 mm) galvanized steel.

Generally, include roof curb when size exceeds 9 x 9 inches (230 x 230 mm).

* + - * 1. Roof Curb: [**8 inch (200 mm)**] [**12 inch (300 mm)**] [**16 inch (400 mm)**] [**20 inch (500 mm)**] [**24 inch (600 mm)**] [**<\_\_\_\_\_\_\_\_> inch (<\_\_\_\_\_\_\_\_> mm)**] high [**self-flashing**] [**galvanized steel**] [**aluminum**] construction with continuously welded seams [**, built-in cant strips**]. [**, 1 inch (25 mm) insulation and curb bottom**] [**, interior baffle with acoustic insulation, curb bottom**] [**, ventilated double wall**] [**, hinged curb adapter**], and factory installed nailer strip.

1. EXECUTION
   * + 1. EXAMINATION
          1. Section 013000 - Administrative Requirements: Coordination and project conditions.
          2. Verify inlet and outlet locations.
          3. Verify [**ceiling**] [**wall**] systems are ready for installation.
       2. INSTALLATION
          1. Install diffusers to ductwork with airtight connection.
          2. Install balancing dampers on duct take-off to diffusers, grilles, and registers, whether or not dampers are furnished as part of diffuser, grille, and register assembly. Refer to Section 233300.
          3. Paint visible portion of ductwork behind air outlets and inlets matte black. Refer to Section 099000.
          4. Do not locate air registers, diffusers or grilles in floors of toilet or bathing rooms.
       3. INTERFACE WITH OTHER PRODUCTS
          1. Check location of outlets and inlets and make necessary adjustments in position to conform to architectural features, symmetry, and lighting arrangement.
       4. SCHEDULES

Include schedule when Project has many types and styles of air outlets. Drawing identification may reflect service as in S for Supply and R for Return, or represent type as in D for Diffuser and R for Register.

Consider the following examples when developing Project schedule.

* + - * 1. Air Outlet and Inlet Schedule:

[**S**] [**R**] [**E**] [**T**]-1:

[**Manufacturer: <\_\_\_\_\_\_\_\_>.**]

[**Model: <\_\_\_\_\_\_\_\_>.**]

Description: <**\_\_\_\_\_\_\_\_**>.

Finish: <**\_\_\_\_\_\_\_\_**>.

Service: <**\_\_\_\_\_\_\_\_**>.

Mounting: <**\_\_\_\_\_\_\_\_**>.

Accessories: <**\_\_\_\_\_\_\_\_**>.

[**S**] [**R**] [**E**] [**T**]-2:

[**Manufacturer: <\_\_\_\_\_\_\_\_>.**]

[**Model: <\_\_\_\_\_\_\_\_>.**]

Description: <**\_\_\_\_\_\_\_\_**>.

Finish: <**\_\_\_\_\_\_\_\_**>.

Service: <**\_\_\_\_\_\_\_\_**>.

Mounting: <**\_\_\_\_\_\_\_\_**>.

Accessories: <**\_\_\_\_\_\_\_\_**>.

END OF SECTION 233700