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# PRODUCT SPECIFICATION GUIDE

## MODEL COMBINATION FIRE SMOKE DAMPERS

# FACILITY SERVICE SUBGROUP: DIVISION 23 HVAC (PREVIOUSLY DIVISION 15)

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Specifier Notes: This product guide specification is written according to the Construction Specifications Institute (CSI) Format.

The section must be carefully reviewed and edited by the Engineer to meet the requirements of the project and local building code. Coordinate with other specification sections and the drawings.

Delete all "Specifier Notes" when editing this section.

## \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

## PART 1 GENERAL

* 1. **WORK INCLUDED**

1. Combination fire smoke dampers with steel 3-V blades meeting requirements of UL Standard 555 7th Edition and UL Standard 555S 4th Edition.
   1. **RELATED WORK**

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Specifier Notes: Edit the following list as required for the project. List other sections with work directly related to the dampers. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

1. Section 15810 – Ducts.
2. Section 15900 – HVAC Instrumentation and Controls: Connections to actuators.

**1.3 REFERENCES**

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Specifier Notes: List standards referenced in this section, complete with designations and titles. This article does not require compliance with standards, but is merely a listing of those used. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

1. AMCA 500-D – Laboratory Methods for Testing Dampers for Ratings.
2. AMCA 511 – Certified Ratings Program for Air Control Devices.
3. IBC – International Building Code
4. NFPA 80 - Fire Doors & Other Opening Protectives
5. NFPA 90A – Installation of Air Conditioning and Ventilating Systems.
6. NFPA 92A – Smoke Control Systems
7. NFPA 92B – Smoke Control Systems in Atria, Covered Malls, and Large Areas.
8. NFPA 101 – Life Safety Code.
9. NFPA 105 – Standard for the Installation of Smoke Door Assemblies
10. UL 555 (Seventh Edition)– Standard for Safety: Fire Dampers
11. UL 555S (Fourth Edition) – Standard for safety: Leakage Rated Dampers for Use in Smoke Control Systems.

**1.4 SUBMITTALS**

1. Comply with requirements of Section 01330 – Submittal Procedures.
2. Product Data: Submit manufacturer’s product data.
3. Include UL ratings for fire resistance, leakage, velocity, differential pressure and elevated temperature.
4. Indicate materials, construction, and dimensions.
5. Verify conformance to NFPA, IBC, UL, and applicable building code as specified in Quality Assurance.
6. Include pressure drop data for all damper sizes in accordance with AMCA 500-D test figures 5.2 (Ducted Inlet, Free Outlet), 5.3 (Ducted Inlet, Ducted Outlet) and 5.5 (Free Inlet, Free Outlet).
7. Include a copy of UL Installation Instructions.
   1. **QUALITY ASSURANCE**
8. Dampers shall meet requirements for combination fire smoke dampers in accordance with:
9. NFPA 80, 90A, 92A, 92B, 101 and 105.
10. Applicable Building Codes.
11. Dampers shall be tested, rated, and labeled in accordance with:
12. UL 555 (Seventh Edition), Listing R13317
13. UL 555S (Fourth Edition), Listing R13317
14. Dampers shall bear the AMCA Certified Ratings Seal for Air Performance in accordance with AMCA 511.
    1. **DELIVERY, STORAGE, AND HANDLING**
15. Delivery: Deliver Materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly indicating manufacturer, material, and location of installation.
16. Storage: Store materials in a dry area indoor, protected from damage, and in accordance with manufacturer’s instructions.
17. Handling: Handle and lift dampers in accordance with manufacturer’s instructions. Protect materials and finishes during handling and installation to prevent damage.

## PART 2 PRODUCTS

**2.1 MANUFACTURER**

1. Greenheck India Private Limited, Off No.: 541-542, Tower B3, Spaze I-Tech Park, Sector-49, Sohna Road, Gurgaon – 122018, Haryana, India. Phone 011-91-124-4272494. Fax 011-91-124-4711263. Web Site [www.greenheck.co.in](file:///C:\Users\loeffel\AppData\Local\Microsoft\Windows\Temporary%20Internet%20Files\Content.Outlook\AppData\Local\Microsoft\Windows\Temporary%20Internet%20Files\Content.Outlook\IQ1U5XD0\www.greenheck.co.in).
   1. **COMBINATION FIRE SMOKE DAMPERS**
2. Model: FSD-200 series combination fire smoke dampers.
3. Ratings:
4. Fire Resistance:

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Specifier Notes: UL 555 provides for classification of combination fire smoke dampers with fire resistance ratings of either 1 ½ or 3 hours. NFPA 90A requires that HVAC penetrations through barriers with fire resistance ratings less than 3 hours be protected by 1 ½ hour rated dampers. Penetrations through barriers with fire resistance ratings of 3 hours or more require 3 hour rated dampers. NFPA 90A also requires that all combination fire smoke damper locations and their hourly rating requirements be shown on the project plans. Specifier, select from the following:

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1. Dampers shall have a UL 555 fire resistance rating of 1½ hours.

* Dampers shall have a UL 555 fire resistance rating of 3 hours.

1. Fire Closure Temperature:

Each combination fire smoke damper shall be equipped with a factory installed heat responsive device rated to close the damper when the temperature at the damper reaches:

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Specifier Notes: Combination fire smoke dampers qualified under UL 555 are required to be equipped with a heat responsive device to close the damper when temperature at the damper reaches some specific maximum. Heat responsive devices (usually limit controls or fusible links) rated to close combination fire smoke dampers at 165°F, 212°F, and 350°F are available. It is usually not desirable for combination fire smoke dampers to close (as fire dampers) when temperatures reach 165°F or 212°F because dampers typically are expected to remain functional for smoke control to temperatures up to 250°F or 350°F. Selection of a single temperature device to close the combination fire smoke damper at 350°F is normally recommended. Specifier, select one of the following options:

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1. 165°F
2. 212°F
3. 350°F
4. Elevated Operational Temperature:

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Specifier Notes: Elevated temperature ratings of 250°F and 350°F are allowed by UL Standard 555S. The highest temperature rating (350°F) is recommended as it provides a higher level of safety at little if any increase in cost. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

* Dampers shall have a UL 555S elevated temperature rating of 350°F.

1. Leakage:

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Specifier Notes: Leakage Class ratings of I, II, & III are allowed by UL Standard 555S. Most codes require a minimum of Leakage Class II. The lowest leakage rating (Leakage Class I) is recommended as it provides a higher level of safety at little if any increase in cost. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

* Dampers shall have a UL555S leakage rating of Leakage Class I or II.

1. Differential Pressure:

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Specifier Notes: Pressure rating level of 4-in.or 6-in. wg is allowed by UL Standard 555S. It is recommended that the lowest level consistent with the project’s HVAC system design be specified.

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1. Dampers shall have a minimum UL 555S differential pressure rating of 4 in. wg.
2. Velocity:

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Specifier Notes: Airflow velocity rating level of 2000 fpm is allowed by UL Standard 555S. It is recommended that the lowest level consistent with the project’s HVAC system design be specified. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

1. Dampers shall have a minimum UL 555S velocity rating of 2000 fpm.
2. Construction:
3. Frame:

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Specifier Note: The following requirements for frame construction provide for specific corner reinforcement. A major problem with dampers is light or flimsy construction resulting in damper operating problems because they are installed out of square or racked. Corner reinforcement required by the following specification will significantly minimize these problems.

To prevent excessive pressure loss across small dampers it is desirable to require a low profile frame to maximize the damper free area and minimize pressure loss. The following requirements address this issue be requiring a low profile frame on dampers less than 17” high.

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Damper frame shall be 1.5mm galvanized steel formed into a 5” x 1” structural hat channel. Top and bottom frame members on dampers less than 17” high shall be low profile design to maximize the free area of these smaller dampers. Frame shall be 4-piece construction with 1 ½” (minimum) integral overlapping gusset reinforcements in each corner to assure square corners and provide maximum resistance to racking.

1. Blades:

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Specifier Notes: The following requirements for blade construction incorporate a design concept known as VSB (Variable Symmetrical Blades). Many damper manufacturers utilize only one size of blade, which requires trimming one or more blades to accommodate varying damper heights. When blades are trimmed one or more of the blades become non-symmetrical resulting in operating torque that will vary significantly depending on airflow direction through the damper. Alternatively larger blade stops (top and bottom of damper) are required. This reduces damper free area and results in higher pressure loss across the damper.

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Blades: Damper blades shall be 1.5mm. galvanized steel strengthened by three longitudinal 1” deep Vee grooves running the entire length of each blade. Each blade shall be symmetrical relative to its axle pivot point, presenting identical performance characteristics with air flowing in either direction through the damper. Provide symmetrical blades of varying size as required to completely fill the damper opening.

1. Blade Stops:

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Specifier Notes: The following requirement for blade stop construction minimizes blade stop height. Large blade stops reduce damper free area and results in higher pressure loss across the damper.

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Each blade stop (at top and bottom of damper frame) shall occupy no more than ½” of the damper opening area to allow for maximum free area and to minimize pressure loss across the damper.

1. Seals:
2. Blade Edge: Blade seals shall be extruded silicone rubber permanently bonded to the appropriate blade edges.
3. Jamb: Flexible stainless steel compression type.

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Specifier Notes: Linkage concealed in the jamb of the damper reduces pressure drop across the damper and results in less maintenance than on-blade-linkage.

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1. Linkage: Concealed in jamb.

6. Axles: Minimum ½ inch dia. plated steel. Frame: Galvanized steel (in gauges required by manufacturer’s UL listing).

1. Sleeves: Damper shall be supplied as a single assembly with an integral factory sleeve.
2. Retaining Angles: Damper shall be supplied with factory retaining angles sized to provide installation overlap in accordance with the manufacturer’s UL listing.

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Specifier Notes: Extruded bearing holes provide more axle to bearing surface area. As a result, bearings will last longer and add to the life of the damper.

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1. Bearings: Axle bearings shall be sintered bronze sleeve type rotating in polished extruded holes in the damper frame.
2. Actuators:

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Specifier Notes: Specify electric actuators (stall type actuators are not acceptable). Specify external or internal mounting. Electric actuators and components are to be factory grounded to single point junction box in accordance with Part 1 of the Canadian Electrical Code, section 12-1xxx (Rigid and Flexible Metal Conduit Rules). External mounting is recommended for ease of accessing for inspection and to minimize blockage that will result in higher pressure drop across the damper. Specifier select the required actuator type and mounting location:

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1. Type:
2. Electric, 24V AC, 2-position
3. Electric, 230V AC, 2-position
4. Mounting:
5. External
6. Internal
   1. **SOURCE QUALITY CONTROL**
7. Factory Tests: Factory cycle damper and actuator assemblies to assure proper operation.

## PART 3 EXECUTION

**3.1 EXAMINATION**

1. Examine areas to receive dampers. Notify the Engineer of conditions that would adversely affect installation or subsequent utilization of dampers. Do not proceed with installation until unsatisfactory conditions are corrected.

**3.2 INSTALLATION**

1. Install dampers in accordance with manufacturer’s UL Installation Instructions, labeling, and NFPA 90A at locations indicated on the drawings. Any damper installation that is not in accordance with the manufacturer’s UL Installation Instructions must be approved prior to installation.
2. Dampers must be accessible to allow inspection, adjustment, and replacement of components. The sheet metal contractor shall furnish any access doors in ductwork or plenums required to provide this access. The general contractor shall furnish any access doors required in walls, ceilings, or other general building construction.
3. Install dampers square and free from racking.
4. The installing contractor shall provide and install bracing for multiple section assemblies to support assembly weight and to hold against system pressure.
5. Do not compress or stretch the damper frame into the duct or opening.
6. Attach multiple damper section assemblies together in accordance with manufacturer’s instructions. Install support mullions as reinforcement between assemblies as required.
7. Handle dampers using the frame or sleeve. Do not lift or move dampers using blades, actuator or jackshaft.
8. Install connections to [electric] actuators as specified in section 15900.
9. Attach multiple damper section assemblies together in accordance with manufacturer’s instructions. Install support mullions as reinforcement between assemblies as required.

# END OF SECTION