

SERIES 9000

THERMALLY INSULATED DAMPER
WITH THERMALLY BROKEN BLADES

TAMCO 



EXPERIENCE TRUE EXCELLENCE IN SERVICE, QUALITY,
AND MAINTENANCE-FREE PERFORMANCE.

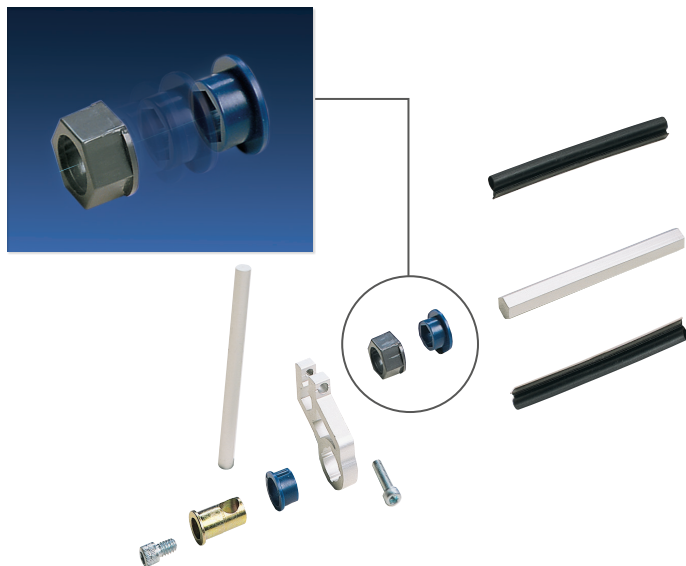
SERIES 9000 | Low Leakage / Thermally Insulated Damper With Thermally Broken Blades

ALUMINUM STRENGTH AND DURABILITY

- Aluminum extrusions allow for intricate design features not possible with roll or brake formed galvanized steel.
- Aluminum construction allows for additional strength by extruding internal supports and thicker radii.
- Aluminum dampers provide a prolonged and rust-free operational life over galvanized steel types.
- Aluminum oxidizes to form a protective film. If the surface is scratched, the film reforms.
(Standard damper is produced with a mill finish.)

DEPENDABLE "DUAL BEARING SYSTEM"

- TAMCO bearings consist of polycarbonate and acetal copolymer (*Celcon*) engineered thermal plastic resins.
- Dual bearing system is self-sealing, self-lubricating, and non-absorbent, which results in a totally maintenance-free performance.
- Bearing materials meet or exceed tensile strength of 8,800 psi (60,674 kPa) and flexural strength of 12,000 psi (82,738 kPa).
- Tensile impact strength of Celcon is 70 ft-lb/in² (147.1 kN-m/m²) and 145 ft-lb/in² (304.7 kN-m/m²) for polycarbonate.
- TAMCO's bearing-to-bearing arrangement eliminates action between metal-on-metal and metal-on-plastic riding surfaces. *(Metal-on-metal, bronze or oil-lite bearings and metal-on-plastic nylon bearings have traditionally been one of the weakest links in damper operation, requiring regular lubrication or eventual replacement.)*
- TAMCO's "Dual Bearing System" has a service life of over 20 years under normal conditions and operation, and when installed in accordance with TAMCO Installation Guidelines.



MAINTENANCE-FREE PERFORMANCE ACHIEVED

- Dampers are assembled using slip-proof linkage components that keep blades aligned as per factory adjustment.
- Hexagon design feature of linkage and pivot elements allow for flat-on-flat press fits that eliminate play and wear.
- Hard alloy aluminum (6005-T5) linkage crank arm and pivot pin are doubly secured by pincer-action and fastener.
- Large diameter ($1\frac{1}{32}$ " [8.73 mm]) hard alloy aluminum (6005-T5) linkage rod connects the crank arms, which allows for a penetrating grip by the cup-point fastener.
(Cup-point trunnion set screw creates a compression hard spot where it secures to the linkage rod.)
- Trunnions are zinc-plated to provide a hard, smooth and long-lasting rotating surface.



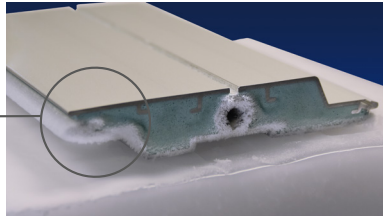
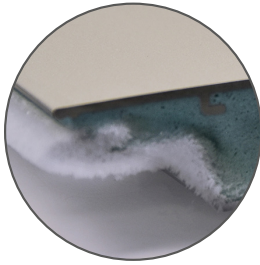
TAMCO, THE ONLY PROVEN MAINTENANCE-FREE DAMPERS ON THE MARKET.

THERMAL INSULATING FEATURES & BENEFITS

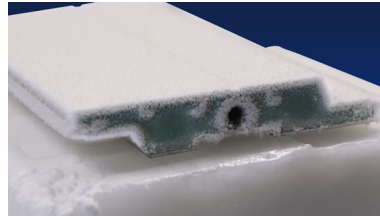
ADVANCED INSULATING & THERMAL BREAK DESIGN

- TAMCO's Thermally Insulated Blade combines an aluminum shell, R-6.6 polyurethane foam and three thermal breaks that result in a true insulation value of R-2.29. *(An internal insulation medium with a R-value of 6.6 does not define the true R-value of the blade as a whole. The insulating material R-value is nullified if the metal shell of the blade is not thermally broken.)*
- Optimum placement of thermal breaks isolates the warm and cold sides, yet still maintains the blade's structural integrity.
- Insulating foam is intrinsic to the aluminum blade extrusion and is therefore shielded from the airstream.
- Thermally insulated dampers should not be installed or stored in locations where insulation is in direct line of sight to UV light.
- Silicone frame seals effectively resist providing a path for the conduction of heat from one side of the blade to the other. *(Stainless steel or aluminum frame seals create a thermal bridge for the conduction of heat.)*

DRY ICE TEST: DRY ICE: -109 °F (-80 °C) / ROOM AIR: +70 °F (+21 °C) ▼



**THERMALLY BROKEN,
THERMALLY INSULATED BLADE**



**THERMALLY INSULATED BLADE
WITH NO THERMAL BREAK**

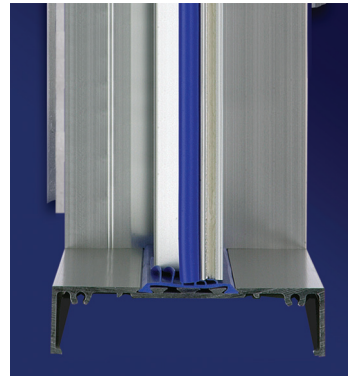


**BLADE WITH NO INSULATION
AND NO THERMAL BREAKS**

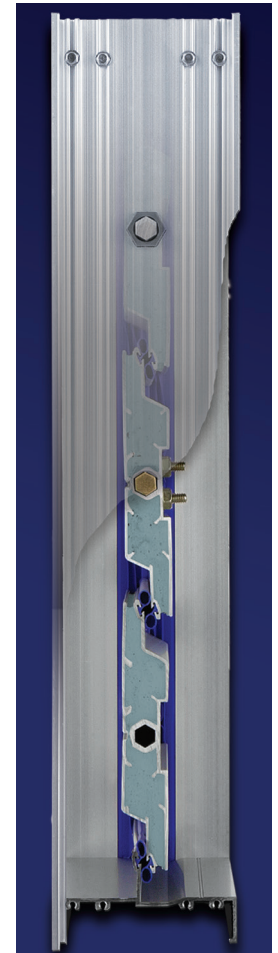
**THERMAL BREAKS IN ADDITION TO THERMALLY INSULATING FOAM
ARE KEY TO PROVIDING REAL INSULATION VALUE.**

LOW LEAKAGE RATE

- Extremely flexible extruded silicone frame seals and peroxide cured EPDM blade seals are supplied as standard. *(EPDM is a terpolymer of ethylene, propylene and a diene. Peroxide cure helps to limit compression.)*
- Leakage rate through a 36" x 36" (915 mm x 915 mm) TAMCO Series 9000 Damper with no Option or with the MR Option does not exceed 0.99 cfm/ft² (5.0 l/s/m²) at 1 in. w.g. (0.25 kPa) pressure differential.
- Service temperature of the damper is 212 °F (100 °C) to -40 °F (-40 °C) with a modest increase in the leakage rate as temperatures decrease. *(See the SC – Severe Cold Upgrade Option on page 6, and the Gasket and Seal Performance Comparison Graph on page 3.)*
- Silicone and EPDM provide outstanding dynamic fatigue resistance that ensures sealing longevity, plus excellent resistance to weathering, compression set, and UV rays.
- Silicone frame seals have an approximate service life of 30 years and EPDM blade seals have an approximate service life of 25 years.
- TAMCO blade and frame seals provide an effective barrier to air infiltration that could reduce or nullify the effects of insulation.



**CUTAWAY VIEW OF
TOP FRAME**



THERMAL INSULATING FEATURES & BENEFITS

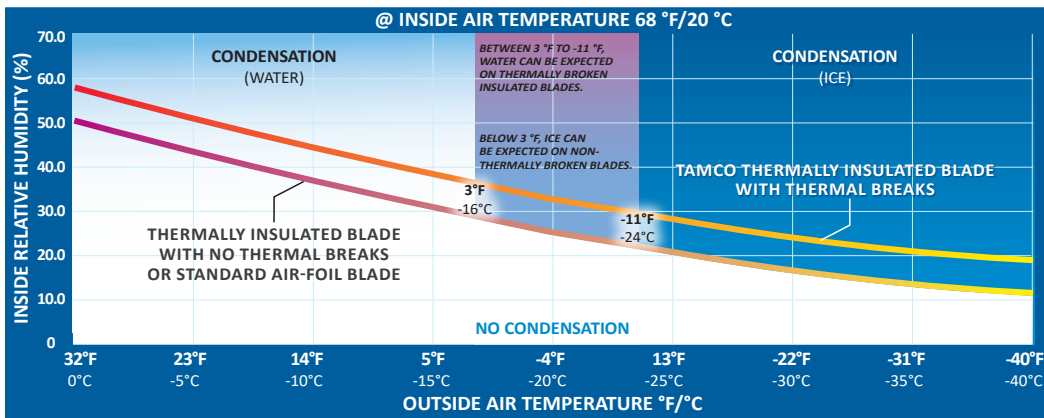
THERMALLY INSULATED BLADE CONDENSATION RESISTANCE

- TAMCO's Thermally broken insulated blade damper was tested to provide a blade temperature index of 55, which is analogous to both the condensation resistance factor (CRF) of AAMA 1502.7 Test Method for Condensation Resistance of Windows, Doors and Glazed Wall Sections and the Window Temperature Index (I), used to specify window condensation resistance under CAN/CSA-A440-M90 Windows, a National Standard of Canada.
- Temperature index (I) is the ratio of the difference between the inside surface temperature (Tsi) and outside air temperature (To), and the difference between the inside air temperature (Ti) and outside air temperature. $I = [T_{si} - T_o] / [T_i - T_o] \times 100 = 55$. This equation can be used to calculate the surface temperature for any combination of inside and outside air temperatures. The resulting surface temperature can be compared to the dew point temperature of indoor air to determine if condensation will occur.

(Condensation is a function of the damper surface temperature, the inside environment temperature and the inside humidity levels. The inside surface temperature is affected by the amount of heat loss through the blade [see temperature index number], and outside cold air infiltration.)

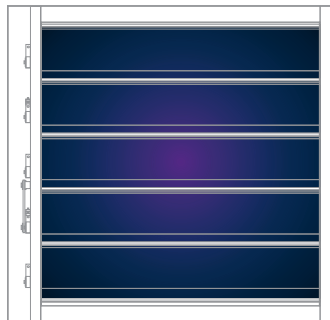
- An effective thermal break keeps the inside surfaces warmer. This permits a higher indoor humidity without causing condensation.
- When condensation does occur, in cases of very high humidity, it is significantly reduced and this inhibits icing to colder outdoor temperatures.
- Aluminum components, foam insulation and sealing gaskets are not affected by moisture.

CONDENSATION RESISTANCE COMPARISON GRAPH

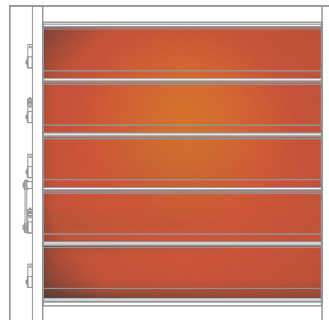


Comparison of condensation resistance performance of a thermally insulated blade with thermal breaks, versus a thermally insulated blade with no thermal breaks or a standard air foil blade.

NON-INSULATED DAMPER



TAMCO THERMALLY INSULATED DAMPER



Thermograms, taken from the warm side of the damper (70 °F/21 °C), illustrate the high heat loss to the chilling chamber (0 °F/-18 °C) of a non-insulated damper, versus the TAMCO Thermally Insulated Damper.

THERMAL INSULATING FEATURES & BENEFITS

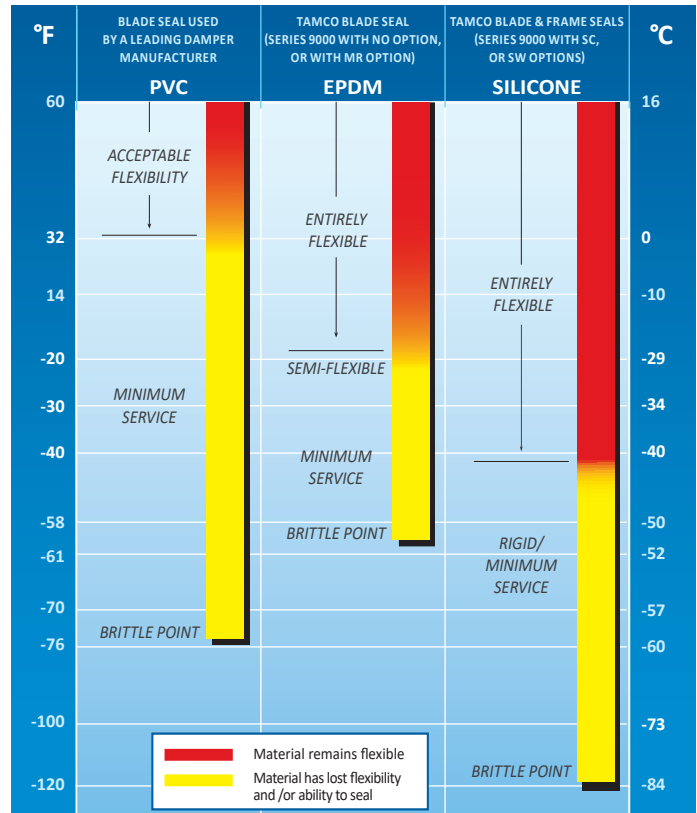
GASKETS AND SEALS EFFECTS OF COLD

- Minimum service temperatures and brittle points, are as published by material manufacturers. Flexibility, rigidity, and suitability status of various materials were determined by observation and operation of dampers in both cold room and cold box environments.

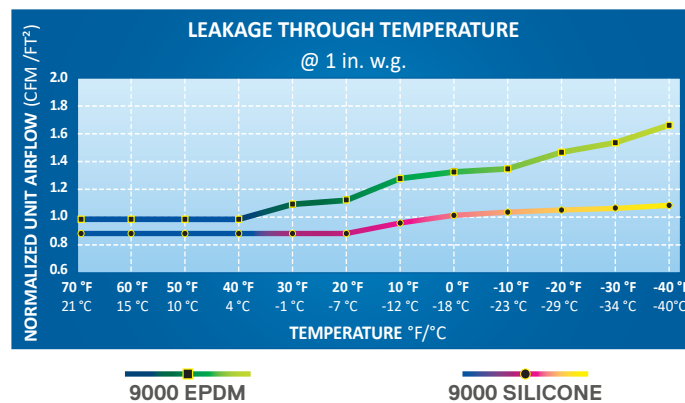
TOTAL THERMAL PERFORMANCE

- TAMCO's blade insulation and broken frame technology effectively control the forces of radiation, convection, conduction and infiltration. (*R-value of TAMCO's insulated damper blades falls between that of double-glazed and triple-glazed thermal windows.*)
- TAMCO's design and material matrix provide for durable and dependable components.
- TAMCO's exacting quality control and sound workmanship ensure product integrity.
- TAMCO provides installation guidelines, technical support and a toll-free customer service number. (*Each and every TAMCO damper displays the 1-800-561-3449 customer service number.*)
- TAMCO products and personnel are your guarantee of total thermal performance.

SEAL PERFORMANCE COMPARISON GRAPH



EPDM VS. SILICONE UPGRADE OPTION BLADE SEALS LEAKAGE COMPARISON GRAPH



Damper tests were conducted in a laboratory cold room to determine the effects of severe cold temperatures, down to -40 °F (-40 °C) on sealing gaskets and leakage rates.

NOTE: Leakage rates shown in this graph are not licensed to bear the AMCA Seal. There is no AMCA standard dealing with the testing of leakage in temperatures below 32 °F (0 °C).

**TAMCO SILICONE SEALS PROVIDE EXTREMELY LOW LEAKAGE RATES
AND HIGH FLEXIBILITY AT SEVERE COLD TEMPERATURES**

UPGRADE OPTIONS | Series 9000

Thermally Insulated Damper with Thermally Broken Blades

SEVERE COLD TEMPERATURE SC OPTION

- The SC upgrade option for TAMCO Series 9000 dampers is designed for severe cold temperatures, down to -40°F (-40°C).
- Blade and frame seals are extruded silicone, replacing the standard EPDM components. This ensures minimal change in leakage rates as temperature drops, making this damper ideal for severe cold weather applications. (*Silicone combines features of silica, silicate minerals, and organic compounds which result in an inertness towards deteriorating effects of ozone, corona, weathering, and other forces, yet incorporates an extraordinary flexibility.*)
- Leakage rate through a 48" x 36" (1220 mm x 915 mm) SERIES 9000 damper at 1 in. w.g. (0.25 kPa) pressure differential to be no greater than 0.89 cfm/ft² (4.5 l/s/m²).
- Silicone is virtually unaffected by cold winter temperatures. Air leakage tests performed in a cold chamber revealed that silicone seals allowed only a minimal increase in the leakage rate from 40°F (4°C) to -40°F (-40°C). (See TAMCO Severe Cold Damper Testing graphs on page 5.) Cold box testing revealed no discernible change in flexibility, or compressibility of silicone between 70°F (21°C) and -40°F (-40°C).
- Silicone's superior dynamic fatigue resistance ensures prolonged sealing longevity, plus phenomenal resistance to weathering, compression set, and heat. (Even though general-purpose silicone can withstand 500°F (260°C), the upper operating temperature of the entire damper unit is 212°F (100°C).



MOISTURE RESISTANCE MR OPTION

- All zinc-plated, steel hardware is replaced with stainless steel, protecting hardware from rust and corrosion.
- Excellent solution for high humidity applications such as water treatment facilities, municipal pools and greenhouses.
- The Moisture Resistance Option is a cost effective alternative to the Salt Water Resistance Option for applications where salt spray is not a concern.

NOTE:

When multiple-section dampers are ordered with MR or SW Options, stainless steel jumpers and SW Option horizontal jackshafts replace standard jumpers or horizontal jackshafts.



UPGRADE OPTIONS | Series 9000

Thermally Insulated Damper with Thermally Broken Blades

SALT WATER RESISTANCE SW OPTION

- The extruded aluminum frames and blades are all clear anodized to a minimum thickness of 0.7 mil (18 microns) deep.
- The frame is assembled with stainless steel screws.
- Stainless steel hardware, linkage parts and screws replace all zinc-plated steel components.
- All aluminum linkage hardware parts are clear anodized.
- Blade and frame seals used for dampers with the Salt Water Resistance Option are extremely flexible, extruded silicone.
- Ideally suited for coastal climates.
- Recommended for inland applications, where tire spray from winter-salted roads has been known to corrode dampers installed in close proximity to roads or highways.
- Excellent solution for high humidity applications such as water treatment facilities, municipal pools and greenhouses.

Stainless steel drive rod

Stainless steel frame assembly screws

Stainless steel U-bolt

Anodized frames and blades

Silicone blade seals

Anodized crank arm

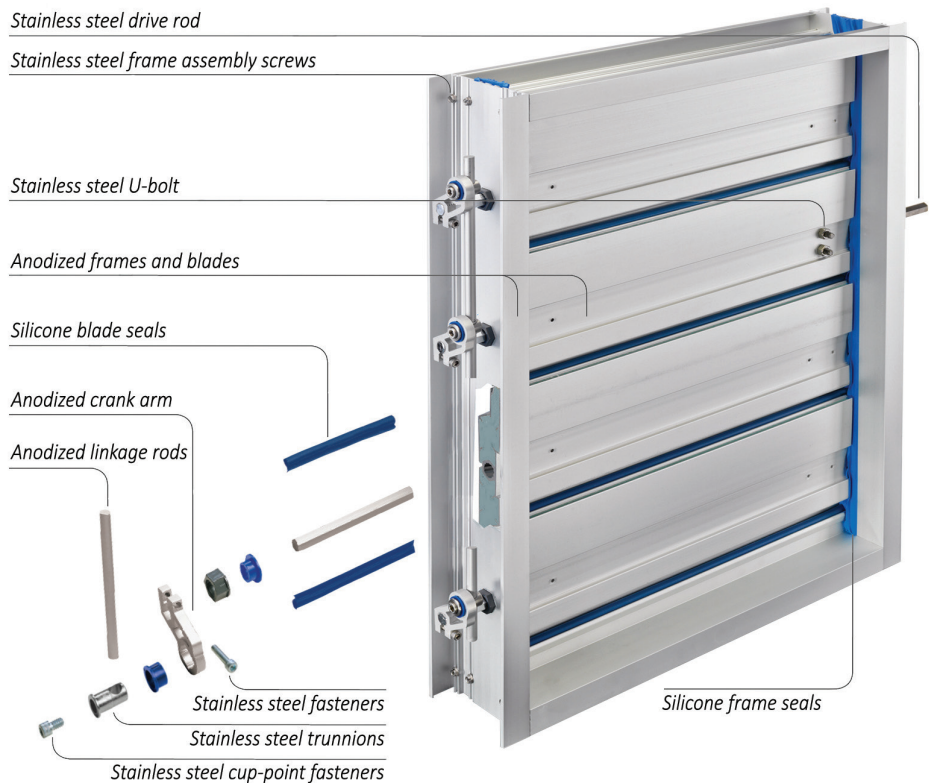
Anodized linkage rods

Stainless steel fasteners

Stainless steel trunnions

Stainless steel cup-point fasteners

Silicone frame seals



SP, NP, AND WP PROFILES | Series 9000

Thermally Insulated Damper with Thermally Broken Blades

SP – STANDARD PROFILE

- Thermally Insulated control dampers with thermally broken blades, ordered with SP – Standard Profile, are manufactured with 4" (101.6 mm) deep frames. Blades are a maximum 6" (152.4 mm) deep.

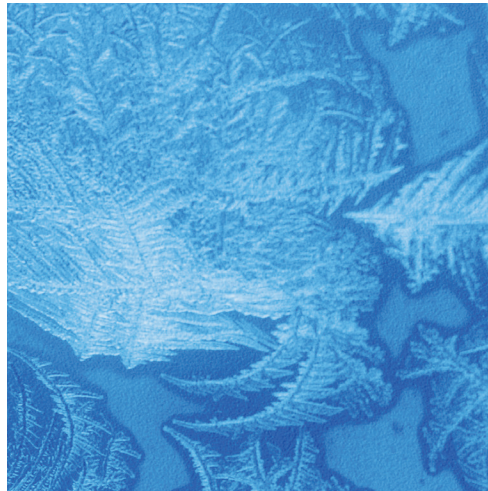
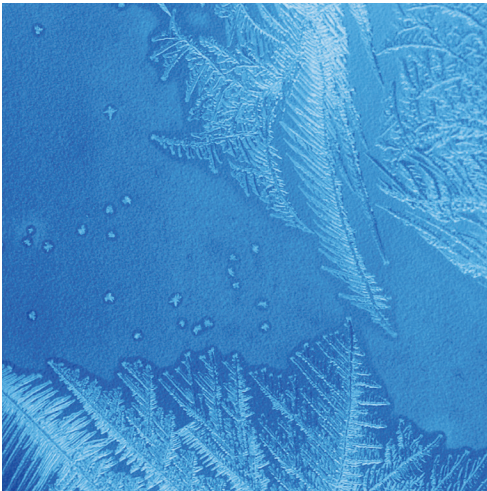
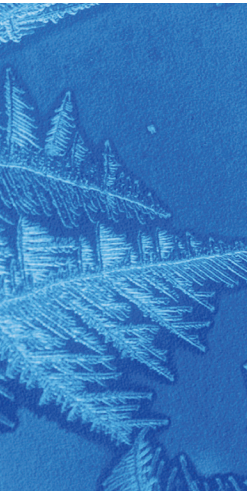
NP – NARROW PROFILE

- Thermally Insulated control dampers with thermally broken blades, ordered with NP – Narrow Profile, are manufactured with 4" (101.6 mm) deep frames. Blades are a maximum 4" (101.6 mm) deep.
- Space-saving narrow profile is ideal for space restrictive installations.
- Options offered with NP – Narrow Profile dampers are the same as those offered with SP – Standard Profile dampers.

WP – WIDE PROFILE

- Thermally Insulated control dampers with thermally broken blades, ordered with WP – Wide Profile, are manufactured with 6.5" (165.1 mm) deep frames. Blades are a maximum 6" (152.4 mm) deep.
- Options offered with WP – Wide Profile dampers are the same as those offered with SP – Standard Profile dampers.

SERIES 9000



SPX ENGINEERED AIR MOVEMENT

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