

SERIES 9000 BF

THERMALLY INSULATED DAMPER
WITH THERMALLY BROKEN FRAMES & BLADES

TAMCO 



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

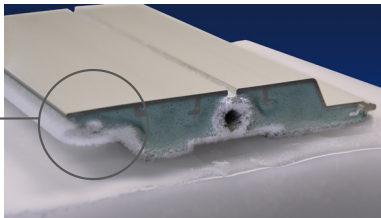
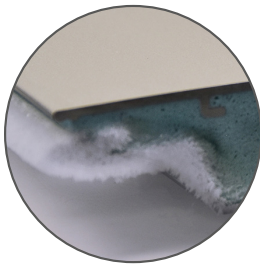
THERMAL INSULATING FEATURES & BENEFITS

ADVANCED INSULATING & THERMAL BREAK DESIGN

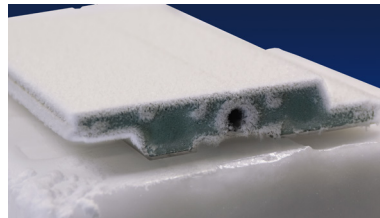
- TAMCO's Thermally Insulated Blade combines an aluminum shell, R-6.6 polyurethane foam and three thermal breaks that result in a true insulation value of R-2.29. *(An internal insulation medium with a R-value of 6.6 does not define the true R-value of the blade as a whole. The insulating material R-value is nullified if the metal shell of the blade is not thermally broken.)*
- Optimal 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

ENHANCED THERMAL PERFORMANCE

- TAMCO's Thermally Broken Frame Dampers, along with Flanged to Duct installation, are all that is required to achieve additional thermal protection, particularly for ducted exhaust, non-ducted intake and high humidity applications. *(Installed in Duct mounting type would nullify the value of the frame's thermal breaks due to thermal bridging created by duct work.)*
- TAMCO's research and ongoing development programs continue to improve and qualify damper performance, to aid in controlling the effects of conduction, radiation, convection, and infiltration. *(Our aim is to produce units that interact efficiently with the building envelope and exceed building code requirements.)*

DRY ICE TEST:

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



THERMAL INSULATING FEATURES & BENEFITS

STANDARD SILICONE SEALS

- TAMCO's Series 9000 BF dampers offer silicone blade and frame seals. *(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.)*
- 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). *(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, heat, and UV light. *(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].)*
- Silicone seals have an estimated service life of 30 years.

EXTREMELY LOW LEAKAGE RATE

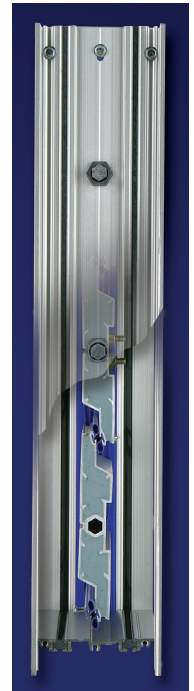
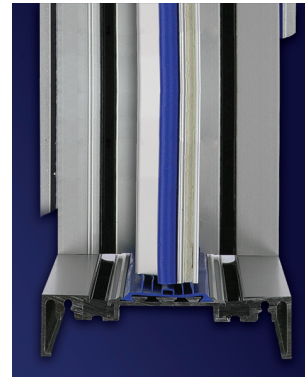
- Extremely flexible extruded silicone blade and frame seals are supplied as standard.
- Leakage rate through a 48" x 36" (1220 mm x 915 mm) TAMCO Series 9000 BF damper at 1 in. w.g. (0.25 kPa) pressure differential is no greater than 0.89 cfm/ft² (4.5 l/s/m²).
- Service temperature for the Series 9000 BF is 212 °F (100 °C) to -40 °F (-40 °C) with a minimal increase in the leakage rate as temperatures decrease.
- Service temperature for the Series 9000 BF with the ECT Option is 212 °F (100 °C) to -100 °F (-73 °C).
- TAMCO blade and frame seals provide an effective barrier to air infiltration that could reduce or nullify the effects of insulation.

ENHANCED FRAME CONDENSATION RESISTANCE

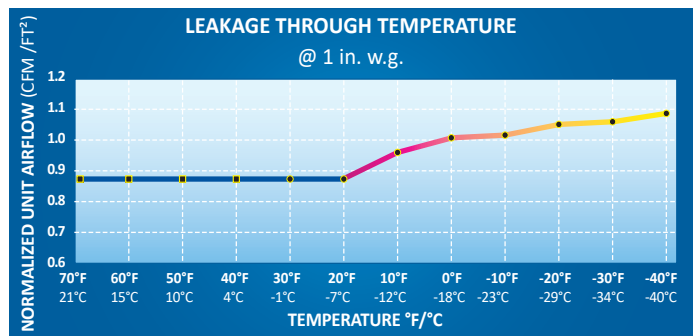
- TAMCO's Thermally Broken Frame is much more resistant to condensation and freezing than non-thermally broken frames, and are ideally suited for applications where dampers must be closed in high humidity environments (i.e., exhaust dampers or vents for pool buildings, computer rooms, museums, etc.). *Condensation will form on any surface whose temperature is below the dew point temperature of the air to which it is exposed. Relatively small changes in temperature can make a significant difference in what indoor humidity can be sustained without condensation.*

THERMAL BREAKS ARE THE KEY TO PROVIDING REAL INSULATION VALUE AND PROTECTION AGAINST CONDENSATION.

CUTAWAY VIEW OF TOP FRAME

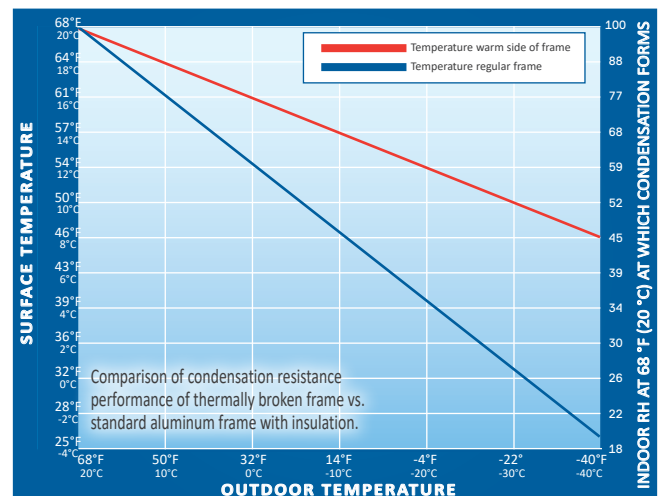


SILICONE SEALS LEAKAGE GRAPH



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).



THERMAL INSULATING FEATURES & BENEFITS

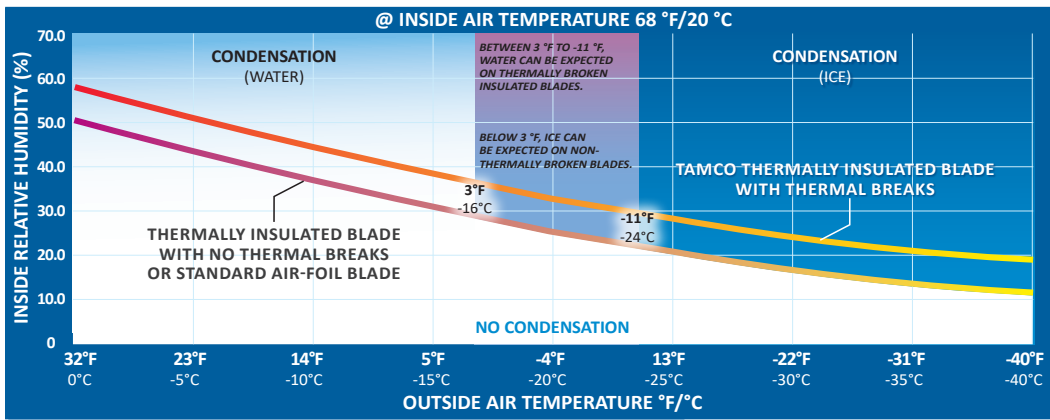
THERMALLY INSULATED BLADE CONDENSATION RESISTANCE

- 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 (T_{si}) and outside air temperature (T_o), and the difference between the inside air temperature (T_i) 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

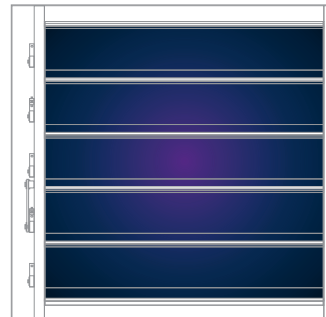


Comparison of condensation resistance performance of a thermally insulated blade with thermal breaks, versus a thermally insulated blade with no thermal breaks or a standard air foil blade.

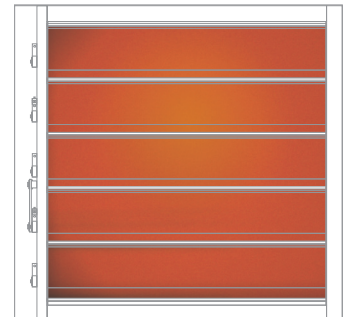
TRUE THERMAL BARRIER

- SERIES 9000 BF offers a thermally broken frame that substantially improves the insulating value of the damper unit. (Cooling of the frame and the internal duct work, which could lead to condensation, will be greatly reduced when the damper is closed.)
- Polyurethane resin isolates the warm and cold sides, yet still maintains the structural integrity of the frame.
- Resin pockets, being flush with interior of frame, do not impede airflow, or reduce free area through the damper.
- Available only as Flanged to Duct install type.

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

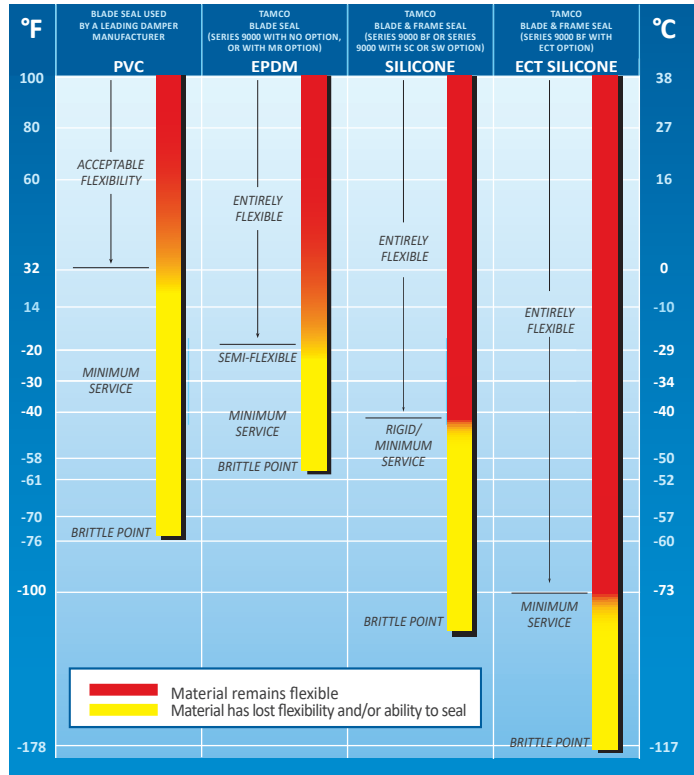
GASKETS AND SEALS EFFECTS OF COLD

- 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.*)

SEAL PERFORMANCE COMPARISON GRAPH



TAMCO PRODUCTS AND PERSONNEL ARE
YOUR GUARANTEE OF TOTAL THERMAL PERFORMANCE.

SP AND NP PROFILES | Series 9000 BF

Thermally Insulated Damper with Thermally Broken Frames & Blades

SP – STANDARD PROFILE

- Thermally Insulated control dampers with thermally broken frames and 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 frames and 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.

UPGRADE OPTIONS | SERIES 9000 BF

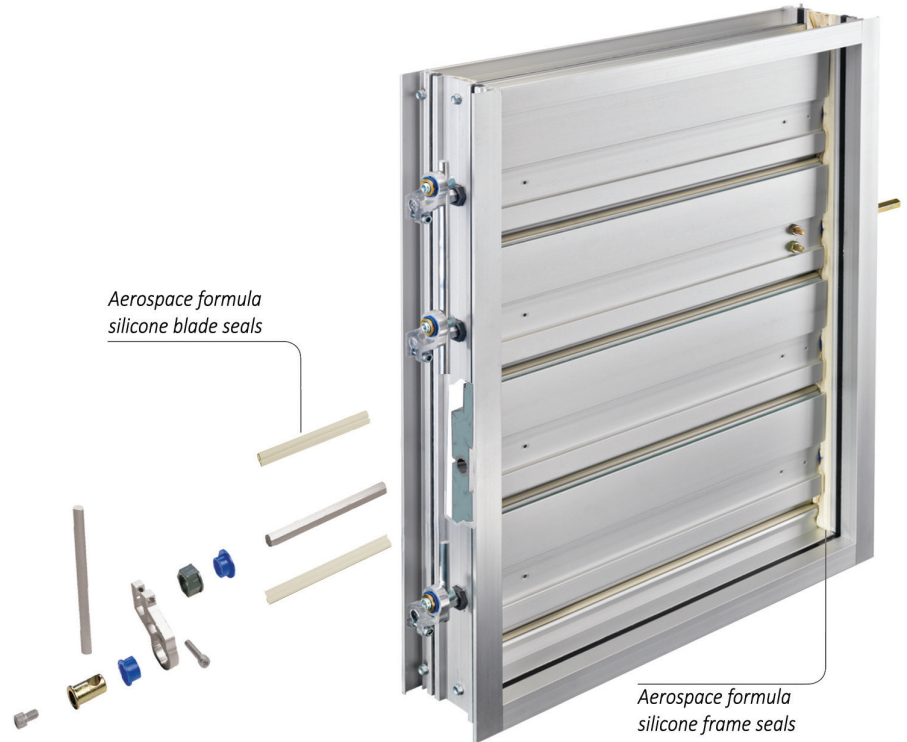
Thermally Insulated Damper with Thermally Broken Frames & Blades

EXTREME COLD TEMPERATURE ECT OPTION

- The ECT upgrade option for TAMCO Series 9000 BF dampers is specifically designed for extreme cold temperatures below $-40\text{ }^{\circ}\text{F}$ ($-40\text{ }^{\circ}\text{C}$), down to $-100\text{ }^{\circ}\text{F}$ ($-73\text{ }^{\circ}\text{C}$).
- Formula for ECT silicone seals is the same as that used by NASA for its Aerospace program.
- Leakage rate through a $48\text{''} \times 36\text{''}$ ($1220\text{ mm} \times 915\text{ mm}$) Series 9000 BF damper with the ECT Option is no greater than 0.89 cfm/ft^2 (4.5 l/s/m^2) at 1 in. w.g. (0.25 kPa) pressure differential.
- ECT silicone is virtually unaffected by cold winter temperatures down to $-100\text{ }^{\circ}\text{F}$ ($-73\text{ }^{\circ}\text{C}$).

See the Gasket and Seal Performance Comparison Graph on page 4. Cold box testing revealed no discernible change in flexibility, or compressibility of ECT silicone between $70\text{ }^{\circ}\text{F}$ ($21\text{ }^{\circ}\text{C}$) and $-100\text{ }^{\circ}\text{F}$ ($-73\text{ }^{\circ}\text{C}$).

- Silicone's superior dynamic fatigue resistance ensures prolonged sealing longevity, plus phenomenal resistance to weathering, compression set, heat, and UV light.
- Even though general-purpose silicone can withstand $500\text{ }^{\circ}\text{F}$ ($260\text{ }^{\circ}\text{C}$), the upper operating temperature of the entire damper unit is $212\text{ }^{\circ}\text{F}$ ($100\text{ }^{\circ}\text{C}$).

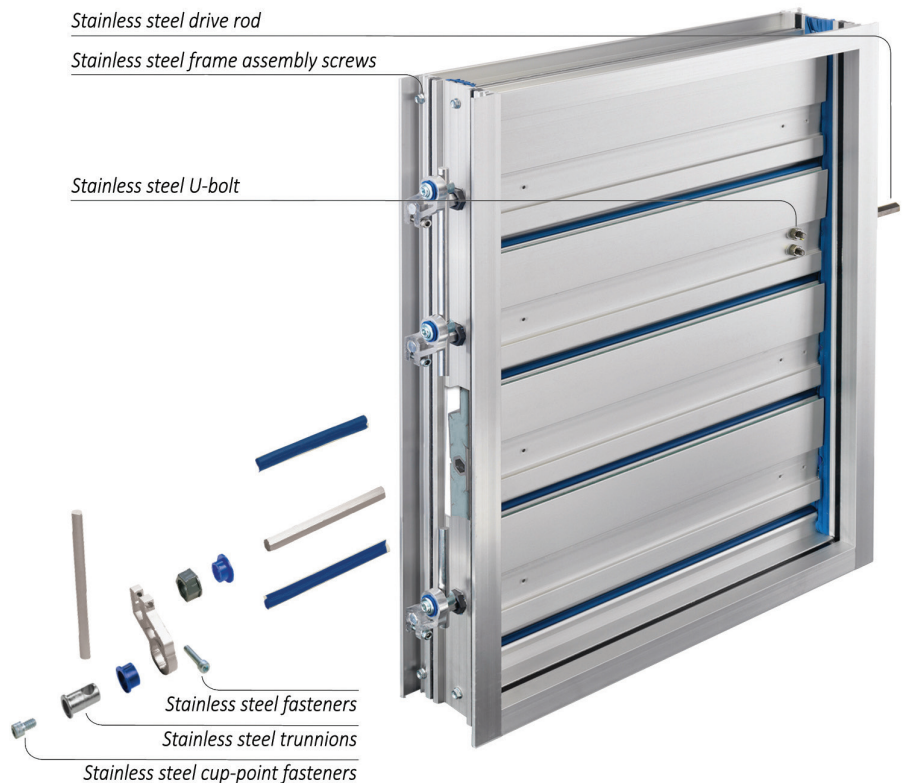


MOISTURE RESISTANCE MR OPTION

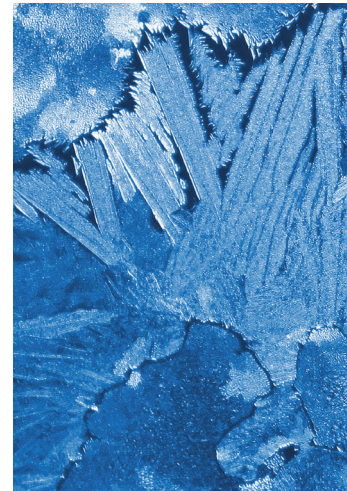
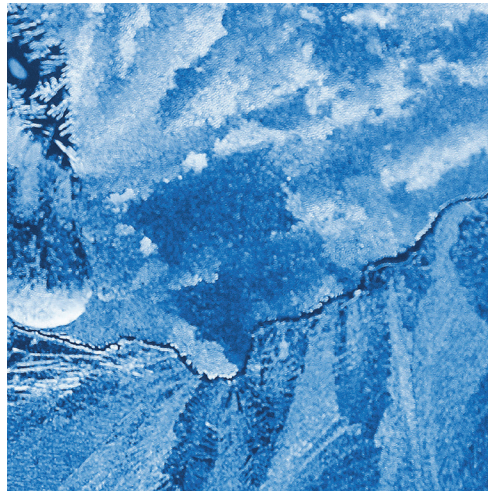
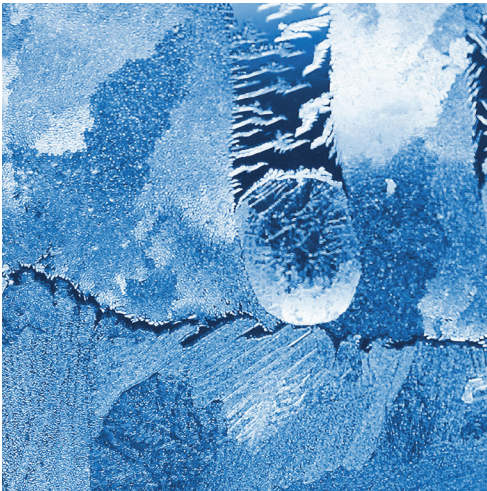
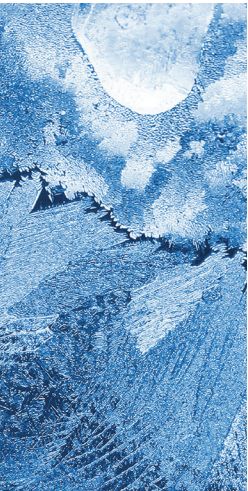
- All zinc-plated, steel hardware is replaced with stainless steel, protecting hardware from rust and corrosion.
- Excellent solution for high humidity applications such as water treatment facilities, municipal pools and greenhouses.
- The Moisture Resistance Option is a cost effective alternative to 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.



SERIES 9000 BF



SPX ENGINEERED AIR MOVEMENT

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