

Humidifying to Preserve an 80-year-old Museum Building

The Hangar Flight Museum in Calgary, AB



Canadian winters without humidification caused dry rot in roof trusses

Calgary's seasonal humidity changes have been almost too much for this World War II building. Dry rot and cracks were discovered in several of the building's wooden roof trusses during a recent inspection. Repairing and replacing damaged beams would be expensive. Just as importantly, preventing further damage would require a humidification system maintaining 35% relative humidity (RH).

ROCKY MOUNTAIN AIR AND WATER BRING CHALLENGES

Calgary's famous Chinook winds burst down the east face of the Rocky Mountains and strip the prevailing air currents of their moisture from November to May. Accounting for their dryness, design conditions for the museum are 5% RH at -40°F outside air. Maintaining 35% RH with up to 100% outside air would require over 400 pounds per hour of humidification. In other words, the museum needed a humidification system capable of evaporating over 1100 gallons of water per day.

Calgary's watershed is also a product of the Rockies. Two mountain rivers flow to the city dissolving calcium and magnesium along the way. During some months, they arrive in Calgary with over 16 grains per gallon of hardness.¹ This water chemistry is notorious for forming hard scale on surfaces when boiled.

HUMIDIFY THE AIR, BUT FIRST TREAT THE WATER

Herb Grieder, the museum's operations manager, contacted Western Air and Power, DriSteem's rep for southern Alberta, to discuss humidification options. Based on the low cost of natural gas, the large humidification load, and the fact that the museum HVAC system already had air ducts, the rep's engineer recommended a GTS® LX-500 gas-fired humidifier and a duct-mounted Rapid-sorb® steam dispersion assembly.

Western Air and Power is headquartered in Calgary and aware of the water chemistry and its ability to coat humidifier tanks and heat exchangers with scale. The engineer recommended a Hydrotrue® duplex water softener upstream from the humidifier to lengthen service intervals and simplify humidifier maintenance.



The building became a museum in 1985. Before that it was a hangar and a training facility for British pilots in World War II.



Wooden trusses support the roof and several suspended aircraft displays.



Several dry rotted and cracked trusses were repaired in early 2021.



The museum has already received over \$36,000 in donations from visitors and the flight community.

1. Water hardness in Calgary, City of Calgary. <https://www.calgary.ca/uep/water/drinking-water/annual-water-quality-report/water-quality-parameters.html>
2. Canada Helps, Humidity System and Truss Repairs, July 28, 2021. <https://www.canadahelps.org/en/charities/the-aero-space-museum-association-of-calgary/campaign/humidity-system-and-truss-repairs/>
3. Image courtesy of CTV News, Calgary's Hangar Flight Museum hopes to raise the roof with new campaign. March 19, 2021. <https://calgary.ctvnews.ca/mobile/calgary-shangar-flight-museum-hopes-to-raise-the-roof-with-new-campaign-1.5354655>

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"The DriSteem water treatment and humidification systems were installed while the trusses were being repaired," said Grieder. "The technical sales rep at Western Air showed me how to operate the equipment, and both systems performed flawlessly during our first humidification season, the winter of 2020-21. We have been able to maintain 43% RH in the building."

VISITORS AND THE FLIGHT COMMUNITY TO THE RESCUE

Before truss repair and humidification system installation, the museum determined that the project would cost \$250,000. The City of Calgary promised the museum \$200,000 from its capital infrastructure budget if the museum could raise the first \$50,000. The museum launched a fund raising campaign, citing humidification as a main feature of sustainability going forward.

Contributions from visitors and the flight community had already exceeded \$36,000 by the end of July 2021.²

DriSteem and Western Air and Power are pleased to be helping a city preserve one of its treasured institutions, as evidenced by the generous public and municipal support.



Operations manager Herb Grieder wakes up the display on a DriSteem GTS® humidifier LX series, which maintains 43% RH throughout the Main Hangar.³

RESOURCES:

Find your local DriSteem representative: dristeem.com/find-a-rep

Learn about the following equipment installed in The Hangar Flight Museum:

GTS® Humidifier LX series:

dristeem.com/products/steam-generation/gas-steam-humidifier/gts-humidifier-lx-series

Steam dispersion:

<https://www.dristeem.com/products/steam-dispersion/non-pressurized-steam-dispersion>

Hydrotrue® water treatment systems:

dristeem.com/products/water-treatment