ENGINEERING REPORT

TOPIC: Testing the CD50 Blade Seals at -40°F for Leakage

Report No. 198:1 **APRIL 1998** **By Robert Van Becelaere**

PURPOSE: Ruskin model CD50 Aluminum Airfoil Control Damper has been tested with a new blade seal material. The purpose of this test was to evaluate the leakage performance of this material and effect on torque at -40°F.

Test set equipment included a thermally insulated 48" x 48" box with 1/2" x 1/2" x .063 screens mounted internally suspending dry ice cooling media equally on both sides of the damper (see figure 1).

PROCEDURE: Heavy wall ducting was installed on the bottom of the assembly and connected to an AMCA rated high pressure tunnel. A 12" x 12" inlet duct supplied outside air through the top of the box at a temperature of 40°F.

Fifty pounds of dry ice was placed on both internal screens for box cooling. Additional dry ice was inserted into a plate heat exchanger located in the outside air intake for additional cooling.

Installed between the test box cooling media is the Ruskin CD50 damper in the full open position. For one hour the damper remained static until temperature of -15°F was achieved. At that time the damper was closed with a holding torque of 40 inch lbs. of torque. The high pressure tunnel was started maintaining 4.5" of static pressure downstream of the damper and leakage across the damper was recorded.

This same procedure will be repeated at -25°F, -30°F, -40°F and findings recorded. Torque required to operate the damper at intervals will also be taken. Damper sample will be tested for leakage performance and torque prior to cryogenic testing.

RESULT(S): Low temperature exposure had no effect on bearing and side seal design. This resulted in no change of damper operational torque. Leakage across the damper at low temperatures was unchanged from ambient conditions. The new seal material maintained its integrity and physical characteristics substantiating its -40°F to 250°F design rating.

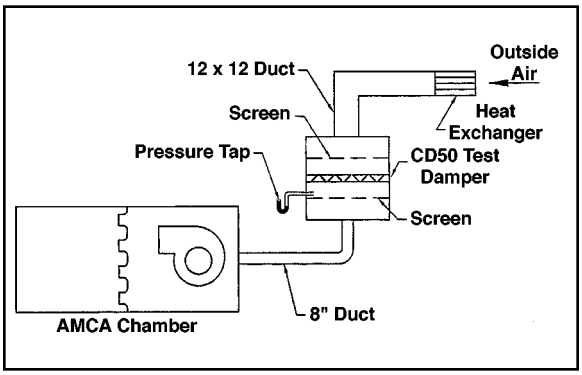

Fig. 1

STATIC PRESSURE	TEMPERATURE	LEAKAGE CFM/SQ. FT.
4.5	Ambient	1.4
4.5	-15°F	1.4
4.5	-25°F	1.4
4.5	-30°F	1.4
4.5	-40°F	1.4