



Building Construction: Smoke Dampers

No. FP-2010-32 August 10, 2010

Learning Objective: The student shall be able to explain smoke damper installation requirements.

Smoke dampers are installed in an air-distribution system to control the movement of smoke. These dampers are intended for use when air ducts pass through smoke barriers or are installed as a component of a building's smoke control system.

Smoke dampers are controlled by an automatic alarm initiating device (smoke detector) and also are permitted to be positioned manually from a firefighting command station.

Smoke dampers are required by either the model building or mechanical codes or National Fire Protection Association (NFPA) 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems* and NFPA 92A, *Standard for Smoke-Control Systems Utilizing Barriers and Pressure Differences*.

Smoke dampers are tested to measure air leakage through the closed blades. Leakage ratings for dampers are categorized as Class I, II, or III. The rates are determined at static air pressures, and different classifications are based on how much cubic feet per minute of air leakage occurs per each square foot of damper area in the closed position. Class I allows the least infiltration.

Leakage ratings for smoke dampers are determined at ambient temperature after exposing the dampers to temperature degradation at elevated temperatures. The selected temperatures are in increments of 100 °F (37.8 °C) with the minimum degradation temperature being 250 °F (121 °C). Smoke dampers are not rated as fire dampers unless they have been subjected to fire damper testing criteria.



This smoke damper is closed to demonstrate its operational characteristics.

Smoke Damper Leakage Ratings by Class

LEAKAGE CLASS	MAXIMUM LEAKAGE		MINIMUM DEGRADATION TEMPERATURE	
	(CFM/FT ² at 4" W.G.)	(M ³ /S/M ² at 0.995 kPa)	°F	°C
I	8	0.041	250	121
II	20	0.102	250	121
III	80	0.408	250	121

Smoke dampers must comply with the requirements of Underwriters Laboratories (UL) 555S, *Standard for Smoke Dampers*, and have the label of the testing agency attached to the damper. The label indicates the class of damper along with the degradation test temperature.

