Munters

ENGINEERING BULLETIN
EB-SA-0208

SOUND ATTENUATION PROPERTIES OF CELdek® EVAPORATIVE COOLING MEDIA

CELdek evaporative cooling media is not intended for use as a sound attenuator. However, it has been recognized that there is some benefit to be realized from the presence of this media in noise sensitive applications such as gas turbine inlets. To cover the many conditions which may be encountered in practice, several scenarios were tested. The media was tested both wet and dry and with the air flow moving in the same direction as the sound as well as counter to the direction of the sound.

Summary of Test Method

The media was tested by ETL Testing Laboratories, Cortland, New York according ASTM E477-90, "Standard Method of Testing Duct Liner Materials and Prefabricated Silencers for Acoustical and Airflow Performance".

To measure the insertion loss of the media, two separate measurements were made. The sound pressure level in the reverberation room was measured while sound entered the room through a length of straight, empty duct with the sound source at the far end. The sound pressure level in the reverberation room was measured again after a section of the empty duct was replaced with the sample of media. The insertion loss was reported as the difference between the two measured sound pressure levels. The section of empty duct was designed to have negligible attenuation at all measurement frequencies.

Pressure drop performance was obtained by measuring the static pressure at designated locations upstream and downstream of the test specimen at various airflow settings.

The insertion loss was first determined with the air moving in forward flow or the same direction as the sound. (Similar to being down stream from a loud fan.) After all measurements were recorded, the air flow was reversed such that the air was moving towards the sound. (Similar to a gas turbine inlet.) The insertion loss was determined again.

The insertion loss was determined in both air flow directions with the media dry and again with it wetted at a rate of 2 GPM/linear foot of top surface.

The procedures described are for the measurement of properties of silencing elements as installed in a laboratory facility. The insertion loss, airflow generated noise, and pressure drop of a silencer in an actual installation may differ from the values obtained from this test method due to interaction with other elements of the ventilation system.

Net Insertion Loss in dB for CELdek Media

	Air Velocity FPM	Static Pressure "H2O	Octave Band Center Frequency - Hz							
			63	125	250	500	1000	2000	4000	8000
	0	0	2	1	2	5	4	5	12	17
16" thick dry	400	0.128	3	1	3	5	4	5	12	17
forward flow	550	0.243	2	1	2	5	4	5	12	17
	750	0.452	2	1	3	5	4	5	12	17
	0	0	2	1	3	4	5	5	12	15
16" thickdry	400	0.128	3	1	3	4	5	5	12	16
reverse flow	550	0.243	4	1	3	4	5	5	12	16
	750	0.452	4	1	3	5	5	5	12	16
	0	0	1	0	3	4	3	5	6	11
16" thickwet	400	0.165	3	0	3	3	3	5	5	10
forward flow	550	0.315	3	0	3	3	3	5	5	10
	750	0.574	3	1	3	4	3	5	6	10
	0	0	2	0	3	4	5	5	6	9
16" thickwet	400	0.165	3	1	3	3	4	5	5	10
reverse flow	550	0.315	3	1	3	3	4	5	6	10
	750	0.574	4	1	3	4	5	6	6	10

	Air Velocity FPM	Static Pressure "H2O	Octave Band Center Frequency - Hz							
			63	125	250	500	1000	2000	4000	8000
	0	0	2	0	2	5	4	5	10	14
12" thick dry	400	0.109	2	1	3	5	4	5	10	14
forward flow	550	0.206	2	1	2	5	4	5	10	14
	750	0•382	2	1	3	5	4	5	10	14
	0	0	4	0	2	4	4	4	10	13
12" thick dry	400	0.109	4	1	2	4	5	4	10	13
reverse flow	550	0.206	4	1	2	4	5	4	9	13
	750	0.382	4	1	3	4	5	4	10	13
	0	0	1	0	3	4	3	4	8	13
12" thick wet	400	0.122	1	1	3	3	3	4	5	9
forward flow	550	0.232	1	0	3	3	3	4	6	9
	750	0.430	3	1	3	3	3	4	6	10
	0	0	2	0	3	3	4	4	5	8
12" thick wet	400	0.122	3	0	3	3	3	4	4	8
reverse flow	550	0.232	3	1	3	3	3	3	4	8
	750	0.430	3	1	3	3	4	3	4	8

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