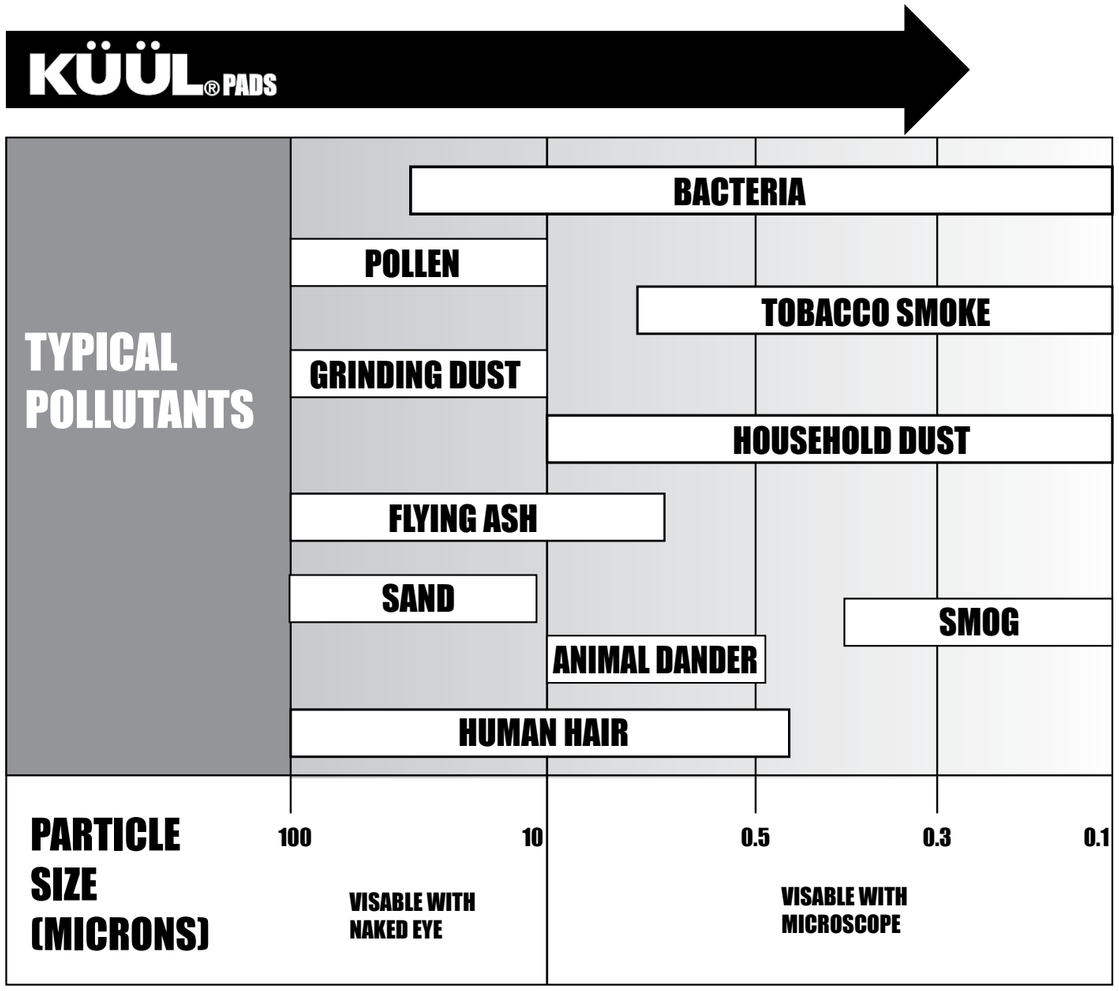


The data and suggestions contained in the bulletin are basesd on information that Port-A-Cool, LLC collected from testing and sources the manufacturer believes to be reliable. These results are offered in good faith to assist readers in making more informed buying decisions, but without guarantee. Conditions and methods of use are beyond the control of the product manufacturer and may cause the results contained here to vary. Port-A-Cool, LLC, the manufacturer of KÜÜL® pads media, recommends that those researching these products determine the sustainability of the evaporative cooling media in the particular environment in which they will be used before implementing this or any other product for full-scale commercial use.

KÜÜL® PADS

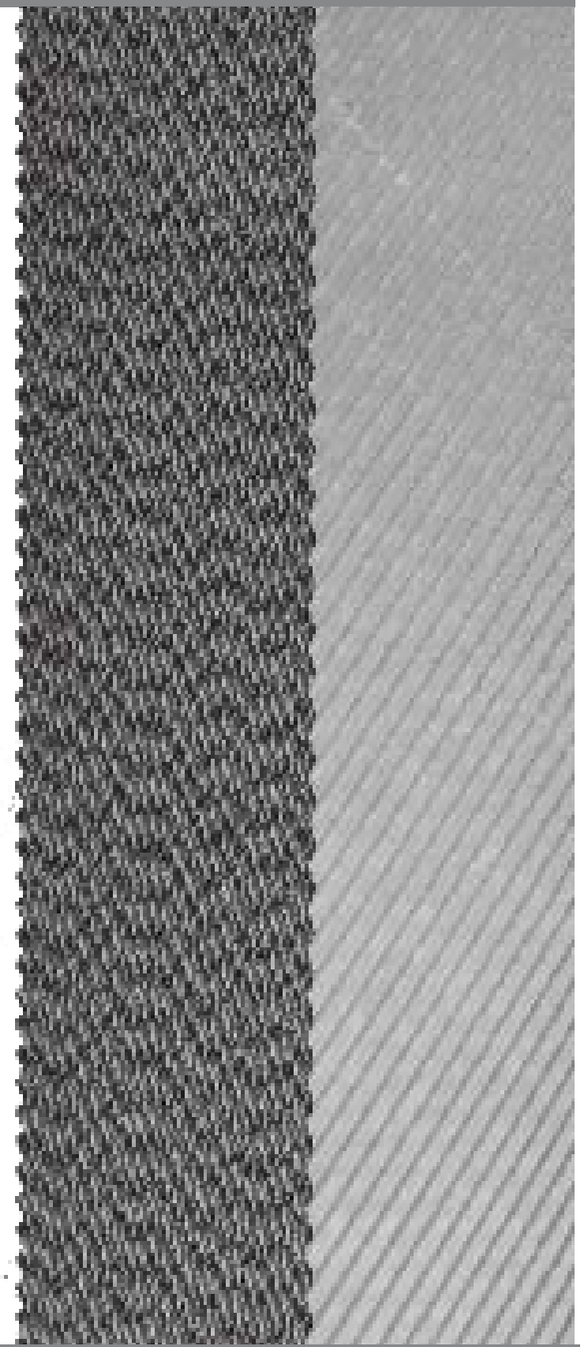
KÜÜL® pads are manufactured in the U.S.A. by:
Port-A-Cool, LLC
P.O. Box 2167
Center, Texas 75935
936-598-5651
1-800-695-2942 (toll-free)
www.kuulpads.com

Scan this QR code with your smart phone for more information.

KÜÜL

ENGINEERING BULLETIN
KP-BULLETIN-0710

PARTICULATE REMOVAL CAPABILITIES OF KÜÜL® PADS EVAPORATIVE COOLING MEDIA



A KÜÜL® pad is the highest quality rigid cooling media on the market today. Specifically, KÜÜL® pads are constructed with a heavier, virgin quality kraft paper containing a higher resin content which provides effective and efficient cooling while giving KÜÜL® pads greater durability, strength and longevity.

KÜÜL® pads are cellulose cooling cells constructed of a specially formulated paper impregnated with insoluble resin. It is designed with a cross-fluted configuration, which induces highly turbulent mixing between the water and the air inside the pad. The air is bent at angles designed to maximize the evaporative efficiency while offering the least restriction of airflow. The cross-fluted design makes the pad strong, self-cleaning and self-supporting with high evaporative efficiency and low-pressure drop (resistance to airflow). The unique system used for manufacturing KÜÜL® pads allows the manufacture of custom flute angle designs as well as the standard angles.

KÜÜL® pads also provide particulate filtration for evaporative cooling systems or for portable units. The special angle configuration of KÜÜL® pads evaporative cooling media insures the pads are self-cleaning, so the build-up of particulate will not interfere with efficient cooling.

Testing Filter Efficiency

ASHRAE Standard 52-76 describes three tests for determining a filter's efficiency at capturing particles. None of these tests measures a filter's ability to remove gaseous pollutants.

Standard 52.1-1992 provides three important evaluation criteria, one of these being dust spot efficiency.

Standard 52.2-1999 provides a filter's initial efficiency as a function of particle size.

The charts in this bulletin represent the results of a seriers of tests performed by **Air Filter Testing Laboratories** in Buckner, Kentucky. The tests were performed based on ASHRAE standard method 52.1-1992, ***Airflow vs. Initial Resistance and Initial Atmopheric Dust Spot Efficiency.***

Tests were conducted in an environment of 23.0 degrees C with 50 percent relative humidity and fans with three speeds were used, measuring the particle removal and dust spot efficiency with a CI-500 particle analyzer laser. Airflow speeds ranged from 417 FPM to 650 FPM. Waterflow through pads was 1.7 gallons/minute during testing.

Results of ASHRAE Standard 52-76 "Dust Spot Efficiency"			
	Wet - 1.7 GPM/Sq. Ft.		
	417 FPM	**550 FPM**	**650 FPM**
KÜÜL® Pads 6" Depth	8.50%	8.10%	6.90%

Upstream Particle Count

These bar charts illustrate a typical breakdown by size of particles, which were drawn in the tunnel for separation efficiency. Note that the largest percentage of particles were less than 0.5 microns in size. The actual distributions will vary from test to test. Also note that this is the particulate count by size "range," before the airstream passes through the media.

An engineering analytic of KÜÜL® pads media indicates that the particulate removal method that would dominate would be inertial impaction. If this is the case, one could expect the efficiency to increase as the particulate size increases (it would remove progressively more of the larger size particles.) The results of these test show some variations that can be attributed to statistical error or the fact that other mechanisms are taking place.

Average Particle Size Efficiency for 6" KÜÜL® Pads Cooling Media