Fan Facts

Understanding Cool Blast and HartKool® Fans

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Hartzell Fan

WHY USE COOL BLAST AND HARTKOOL® FANS?

The amount of heat given off a warm "body" is a function of the air velocity over the body, surface areas exposed to air movement, and the temperature difference between the air and the "body." An increased cooling rate can be obtained by using a fan to increase the air velocity over the object. Similarly a fan can be used to improve the drying time of wet objects.

Proper use of air velocity can provide major benefits to operations with cooling or drying requirements. Proper use of air velocity requires an accurate determination of a fan's ability to move air over a given distance (throw) and flow width (spread) and achieve the desired air velocity at the critical location.

CONTROLLABLE, PREDICTABLE VELOCITIES

Calculation of spread, throw, and air velocities for any given fan is neither a straight forward or accurate procedure. This is the reason that Hartzell Fan set up an extensive series of tests on Cool Blast and HartKool fans to determine actual spread, throw, and air velocities in an industrial environment.

Empirical procedures were then determined for the calculation of spread, throw, and air velocity for any Hartzell propeller in a cool blast fan housing. The calculation procedure shown below is a result of those efforts.

Air velocity at distances less than 10 feet from the fan is usually not considered important due to fan location necessities.

FORMULAE FOR DETERMINING THE SPREAD & THROW OF A FAN

While these values are influenced greatly by the presence or absence of walls, floors, and obstruction, the following formulae will give a good approximation for most cases.

SPREAD: $W = .36L + d/12$

W = Maximum width in feet of airstream perpendicular to axis or rotation of the fan
L = Distance from fan in feet
d = Fan diameter in inches

VELOCITY (Not less than 10 feet from fan):

(1) $k = 5\ (2.5 \times CFM/d)^2$
(2) $v_{La} = 1.15 \sqrt{k/L}$
(3) $v_{max} = (d/73 + 1)v_{La}$

Series 23 Portable Utility Fan

k = Fan constant
v_{La} = Average velocity across the width of the spread. L feet from the fan (fpm)
v_{max} = Maximum velocity L feet from the fan (feet per minute)
CFM = Free Air Delivery of fan

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SEALING IN EFFICINCY

The spread and throw formulae shown on Page 1 only apply to Hartzell Fan's Cool Blast and Utility Fans and Hartzell's HartKool® Fans. Hartzell's unique method of sealing the air flow at the propeller prevents back flow of the air and allows the powerful tip vortices to pull the air through the fan more efficiently and in a more controllable flow pattern.

Series HKA HartKool Fan

Fans that use only wire guards to enclose the blades allow air to recirculate thru the fan at the tips. This further distorts the air flow pattern through the propeller and reduces the effective spread and throw characteristics of the fan.

Based on experimental evidence air velocities of 1200-1700 ft/min are about optimum for cooling metal pieces when cooling rate and fan brake horsepower are considered. Air quenching work can require velocities up to 4000 ft/min. Keeping people comfortable can require air velocities of from 50 ft/min in an office to as much as 4000 ft/min in a steel mill.

The proper use of air velocity and the proper Hartzell Cool Blast Fan or HartKool® fan can make a big difference.

Call your local Hartzell sales representative to order your Cool Blast and HartKool fans from our HRS stocking program or call 800.336.3267 to learn more!

HRS (Hartzell Rapid Ship) and Surplus Fans for Sale

Hartzell Fan has HRS fans in stock and ready for immediate shipment, as well as surplus stock fans that are in inventory and ready for shipment. Please reference the Hartzell Fan website (www.hartzellfan.com) and select "HRS/Rapid Ship" for more information on the HRS fans in stock or select the "Surplus Stock" link at the bottom of the page to see the surplus fans available.

A limited selection of HRS fans can also be purchased on the FansInStock website. Go to www.FansInStock.com to see what is available.

You can also contact your local sales rep for more information. You can find your local rep by selecting the "Find a Local Rep./Dist." link.

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