Hunter Proposed Method of Air Delivery Measurement

Introduction

Two well-known methods of air delivery measurement for ceiling fans are outlined in NEMA Standard Publication No. FM1-1951, IEC Standard 879 and Canadian Standard CSA C814 (Similar as IEC standard).

These standards are at least 30 year old and the procedures suggested in these standards are traditionally inexact, labor intensive and tedious. It utilizes a mechanical anemometer instrument and the manual readings of air velocities at various points in a standard room. The air delivery calculated by these readings are non-repetitive within a reasonable tolerance.

Another approached of measurement is outlined in AMCA 230-99 standard. This method uses a load cell to measure the thrust of the fan in axial direction. The thrust is then used to calculate the ability of the fan to circulate the air in the room in terms of CFM. We have conducted few experiments with this method and in our opinion this approach is not a suitable method for ceiling fan applications. In our evaluation, we have found that wobble of the fan and the nature of the design of the ceiling fan blades can contribute inaccuracies in the reading from the actual airflow in the room.

Hunter proposes an improved and refined method of measurement of air delivery based on NEMA or IEC method of calculation.

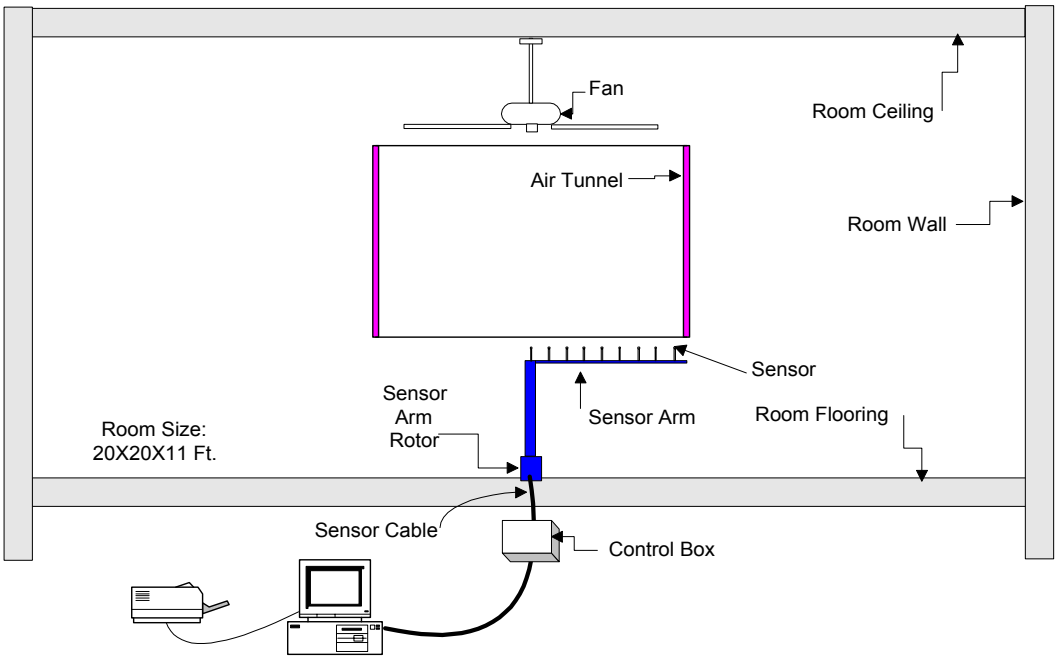
Hunter Method

The methodology suggested by Hunter is designed to increase efficiency and improve accuracy. This is an accurate representation of the air circulation created by the fan in the room. The method reduces the testing and validation time to a fraction of the time period required by NEMA or IEC standards.

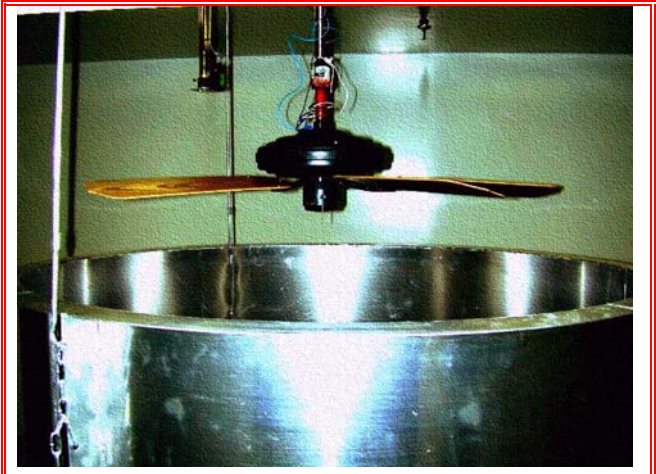
The room details and the setup for ceiling fan testing by Hunter method is explained by the attached sketch.

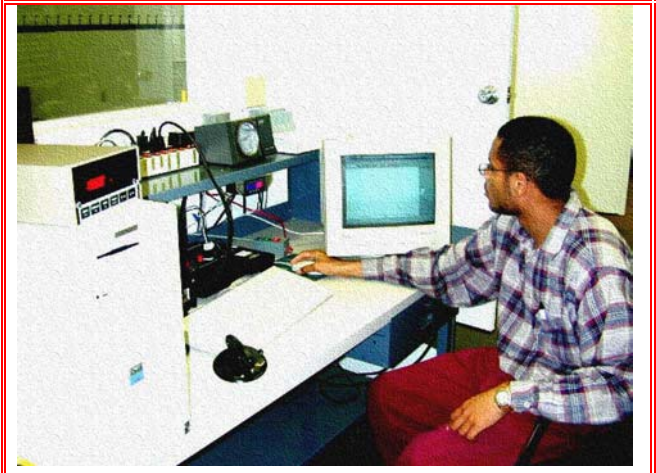
In our proposed method, a fan is hung above the predefined tunnel or a large diameter tube in a standard temperature and humidity controlled room. The air delivered by the fan is made to pass through the tunnel. At the end of the tunnel a row of velocity sensor is mounted on a rotating arm. The airflow at various points in the tube is measured simultaneously and instantaneously for several seconds. The average reading of air velocities is then used to compute the air delivery by calculations similar to IEC and NEMA suggested methods.

The important characteristic of Hunter method is the use of latest method of measurement of air velocities by multiple probes. Instead of moving a mechanical or an electronic probe from point to point to measure the airflow (velocity), this method allows you to perform simultaneous monitoring of air velocity instantly. The information is recorded in real time and can be analyzed as the measurement is being taken. The probes utilize the time-tested technology of hot wire thermister anemometry. Each probe has a temperature and cooling rate sensor. The signal from these sensors is fed into the computer via the control box. Using suitable use of the software necessary calculations are made to compute the air delivery of the fan. This multi-point measurement of airflow velocity as well as air surface temperature analysis is a crucial step in the development of this method. The complete test takes under two minutes plus the time to hang the fan.



Hunter Air Delivery Measurement Room Setup



Ceiling Fan: **<u>Air Delivery measurement method using solid state velocity sensors</u>**

Proposed by: Hunter Fan Company
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