

DYNACOM

Designing Clean Air Solutions

How to Design an Effective Capture Hood for Contaminant Collection

To effectively design a good dust collection hood or capture device is a multi-step process.

The first step is to consider the type of dust, mist or smoke to be collected. When designing a capture device, we want to use the natural gravity or convection of the contaminant to make collection easier. For example, smoke tends to rise. Therefore, it is easier to collect smoke with an overhead hood in most instances. On the other hand, some dusts such as those from metal grinding are heavier than air and will almost immediately settle. Therefore, a downdraft type of system may achieve better results.

Step number 2 is to understand what the purpose of the system is. While this may seem obvious there are several different reasons to incorporate dust and/or smoke filtration systems. Most often the primary cause is to keep the dust out of the operators breathing zone. However, housekeeping and protecting process equipment are a couple of other possible intentions of a system.

Hood location is critical to good capture. Use the natural tendencies of the contaminant and how it is generated to help with the capture. For example, a surface grinder throws the dust in the exact same spot over and over. In this case, the hood location should be in the path of the dust spray.

Enclose, enclose, enclose! The better the source of dust or smoke is enclosed; or the closer the hood is to the source, the easier it is to contain it and then capture it. To help in the design of a hood refer to the table "Hood Types" out of the Industrial Ventilation Manual.

Once the hood and/or enclosure is designed determine the amount of open area. The table "Range of Capture Velocities" out of the Industrial Ventilation Manual will help you determine the capture velocity. The capture velocity is the speed of the air needed across the open area to either redirect the contaminant in the hood or contain it within the enclosure. Follow the calculations for the hood design and this will help you determine the air volume requirement for that capture device.

Hoods in general should taper towards the duct opening to promote good airflow in the hood. This will also minimize any dead zones where dust can potentially settle within the hood.

If downdraft benches or backdraft hoods are required, the use of side walls and/or a top will significantly help contain the dust/smoke. Whether to draw from the top, back or bottom will depend on the type of contaminant.

The Industrial Ventilation Manual is a great resource and documents many hood designs with drawings for specific applications. However, if in doubt, contact your dust collection professional for guidance.

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