DYNACOM
Designing Clean Air Solutions

Application Review: Cold Heading

What is cold heading?

Cold heading, or cold forming, is an industrial process that serves as the primary method for manufacturing metal threaded fittings and fasteners. The process involves high speed forging where feedstock (coiled wire) at room temperature is precisely sheared to length then moved through progressive tool and die cavities to displace and shape the working metal into the desired component. The process can be used to increase or decrease feedstock length and diameters as well as remove small amounts of material by trimming or piercing. All operations are performed in a continuous process.

What contaminants does this process produce?

To prevent die wear and distortion, oil is typically used as a lubricant to dissipate the heat being generated. The process heat vaporizes these lubricants resulting in an oil smoke.

The amount of oil smoke generated by cold heading machines depends on the size of the stock (diameter), type of operations performed (amount of material removed), the speed of the machine operation, and the type of metal being used. Typically, cold heading machines operate faster and remove more metal when larger stock is being processed. This results in heavier smoke emissions.

Capture:

Whenever possible, capturing the oil smoke at the source is the recommended approach for controlling cold heading machining emissions. Source capture requires addressing the three smoke producing areas of this type of machinery: the die area, the parts chart and the parts basket or bin.

The die area is where the part is formed and where the oil smoke is generated. Most cold heading machines will have the die area completely enclosed, and ducting can be directly attached into the enclosure to ventilate the die area. On older cold heading machines, the die area can be open and the only practical approach to collect the smoke is with an overhead canopy hood with curtains.

As the finished parts are discharged from the die area, they travel down a conveyor or chute. These parts are extremely hot, and they emit oil smoke. In most cases, this chute can be completely encased with a sheet metal enclosure and a ventilation duct attached to the casing. On some cold heading machines, this chute is enclosed so well that the ventilation from the die area is enough air to keep the part chute under a negative pressure.

When the finished parts have traveled down the chute, they typically drop into a parts bin or basket. The parts are still hot enough to produce smoke as the bin fills. A canopy hood with curtains dropped around the bin should address this last smoke source.

Convey:

- Per the Industrial Ventilation Manual "fumes" should be conveyed at a minimum of 2000-2500 fpm.
- Ducting to the collector should be oil tight. Oil tight duct systems include welded with flanged fittings, lock seam pipe with flanged fittings and clamp together duct with "sealed" elbows with gasketed connections.

Collect:

- Electrostatic precipitators (ESP's) are very efficient on particulate as small as 0.01 microns which makes them good for filtration of smoke. This is an ideal application for ESP's.
- Long life media systems can be utilized but will require HEPA post filtration.
- Centrifugal mist collectors are NOT applicable for this application.

Clean:

- ESP's require periodic water washing of the aluminum collection components. Typically, every 1-3 months.
- Media systems have filters which require changing. Filter life has a very large range (1-6 months) dependent upon the specifics of the application.

Combustibility:

- Cold heading applications typically do not present any type of explosion or fire issue. However, when using a straight oil there is a potential for "flare ups" or fires. Some companies may choose to install a fire suppression system or utilize a fire damper in these instances.