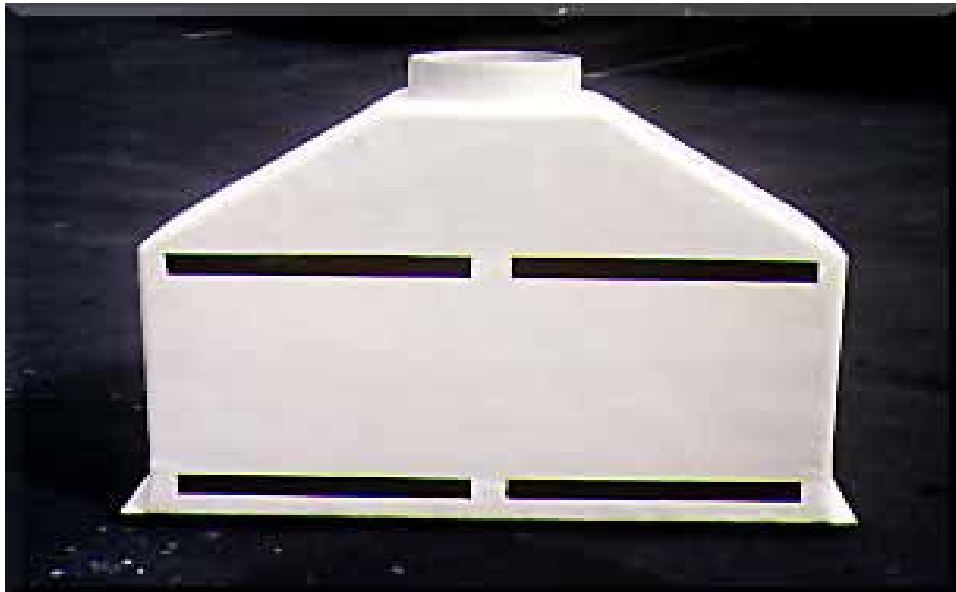


# ***air chem engineered systems LLC***

## **HOODS**



**AIR CHEM ENGINEERED SYSTEMS** (aka Air Chem Systems) manufactures an extensive line of fiberglass reinforced plastic (FRP) air pollution control equipment for the electronic, metal finishing, plating, sewage treatment, and other industries that generate nonflammable corrosive fumes and odors.

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## **Ventilation Systems**

The *Industrial Ventilation, A Manual of Recommended Practice* published by the American Conference of Governmental Industrial Hygienists (ACGIH) has established hazard classifications for chemical substances used in the work environment. These classifications are known as Threshold Limit Values (TLV) and range from A-1 for very hazardous to D-4 where general room ventilation is adequate.

Based on the hazard classification (TLV) and tank size and shape (aspect ratio), a ventilation rate expressed in CFM (Cubic Feet per Minute) is calculated to provide the necessary control velocities to protect personnel in the workplace.

This is the first step in determining the size of the ventilation system and the hood design.

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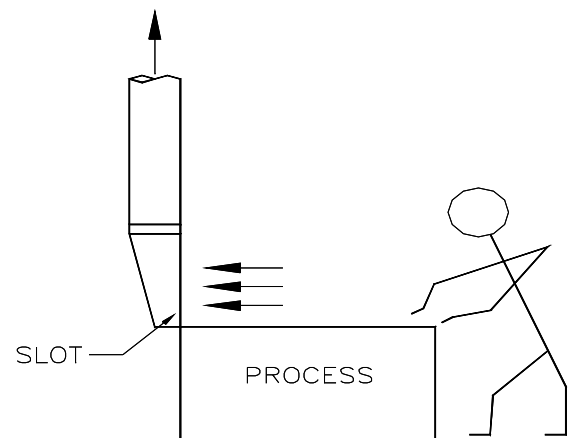
## **ACS Hood Designs**

The hood is the capture device used to collect fumes being emitted from a process tank. There are three basic types of hood systems: lateral exhaust hoods, canopy hoods and enclosing hoods. The following pages discuss these three types of hood and their applications as generally found in industry.

## The Lateral Exhaust Hood

The lateral exhaust hood is the most common type of hood used for open process tanks. It is designed to create an evenly distributed lateral flow of air across the tank and away from the operator. There should also be a high zone of air flow to capture rising steam and vent the parts as they are raised out of the process tank. To assure proper draw, a lateral exhaust hood must be sized for the volume of air required, therefore, a specific amount of space around the tank must be allocated for the desired hood. A properly designed ventilation system must be designed at the same time as the tank line. If you have an existing line but not enough space for lateral exhaust hoods, contact **ACES** for assistance.

On large tanks where you cannot put hoods on opposite sides or where there is insufficient room for finger hoods between tanks, you can provide adequate ventilation with a push air system on the operator side of the tank, which blows fresh air toward a lateral exhaust hood at the rear of the tank. The down side of this application is that it can expose the operator to a higher risk of contamination. In processing large parts in the tank, the push air is deflected off the parts and out of the hood's capture zone toward the operator.

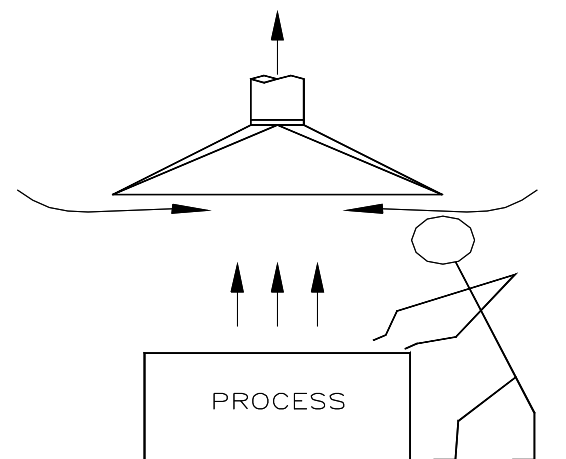


## The Canopy Hood

The canopy hood is located over a tank and is used primarily for capturing steam. This hood is not practical for toxic fumes for two reasons:

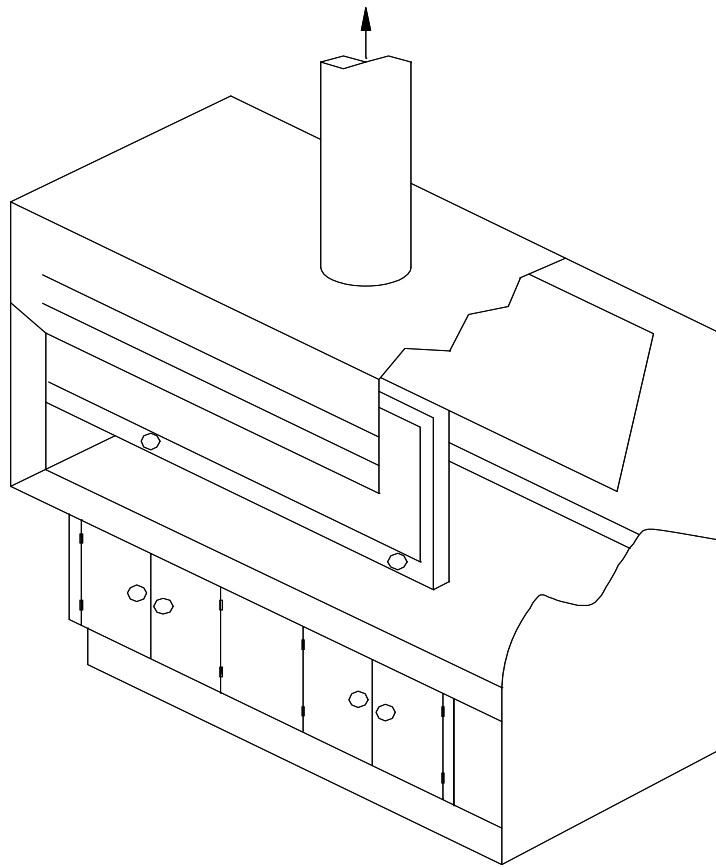
1. The fumes are drawn past the operator who may be leaning over the tank.
2. A very large air volume is needed to satisfy the minimum air velocity requirements for various hazard classifications.

If there are no alternatives, a possible solution is to enclose as many sides of the tank as possible thereby reducing air volume and the effect of cross drafts.



## The Enclosing Hood

The enclosing hood encloses the tank operation. This can be a laboratory hood, a localized tank enclosure or a total enclosure over a complete tank line. These hood systems can greatly reduce the air volume required to maintain control velocities.





## **Hood Specifications**

### **1.0 MATERIALS**

- A. **Resins:** All hoods are fabricated using a premium grade, vinyl ester, fire-retardant resin with antimony to achieve a flame spread rating of 25 or less unless otherwise specified.
- B. **Interior Surface:** The interior surface shall have two layers of c-glass or synthetic veil to suit the chemicals the hood is being exposed to on the corrosion layer for maximum chemical resistance.
- C. **Finish:** The finish shall have a gel-coated outside finish of a commercially available resin with pigment for color.
- D. **Fittings:** All hoods shall have a 1" or larger female threaded drain fitting.
- E. **Hardware:** All hardware required to mechanically attach hoods to the tank shall be 316 stainless steel.

Except for clean room applications, it is always desirable to keep the process room under negative pressure to prevent fumes from entering adjacent rooms, office spaces and/or escaping the facility.

When venting large volumes of air in a facility you should consider how the air is to be replaced. Large doors and windows, poorly located in relation to the tank line, may create cross drafts at the tanks and destroy the lateral flow of the hood system. If this is the case, you can alleviate the cross draft problem by powering in up to 90% of the air vented through a return air duct system.

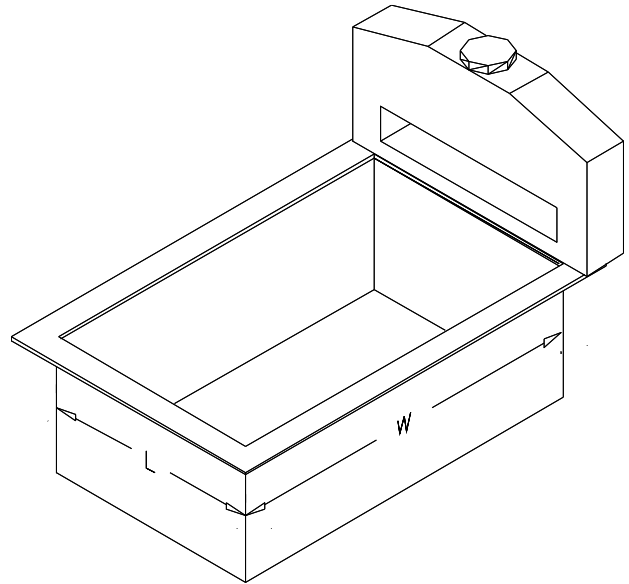
Ideally, you should introduce this makeup air somewhere behind the operator side of the tank with sufficient diffusion to avoid blowing directly at the operator or the tanks. Consult your local air conditioning company for help in your makeup air system.

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**Specific ACES hood types are described on the following pages.**

## **HOF – Open-Face Lateral Exhaust Hood**

The open-face lateral exhaust hood is the most economical type of hood for small hand dipping tanks that are generally no more than 4 feet wide and have an aspect ratio ( $W + L$ ) of less than 1. The large face opening creates a high capture zone which captures more of the fumes emitted off parts as they are lifted out of the tank. Air distribution over the length of the hood is by internal slot velocity. This hood can be installed in the downdraft position for below tank duct systems.

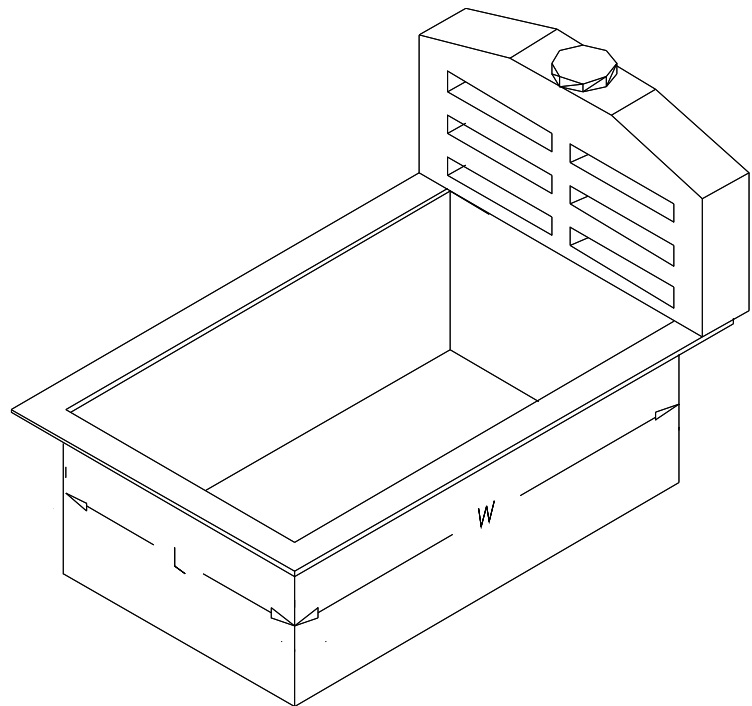


## **HMS – Multi-Slotted Lateral Exhaust Hood**

The multi-slotted lateral exhaust hood allows for a much higher capture zone as the openings are divided and distributed over a much larger area of the hood face. The HMS-type hood is used for larger tanks where an automated or hand operated hoist lifts parts high out of the tank.

This multi-slotted hood can also be in the downdraft configuration.

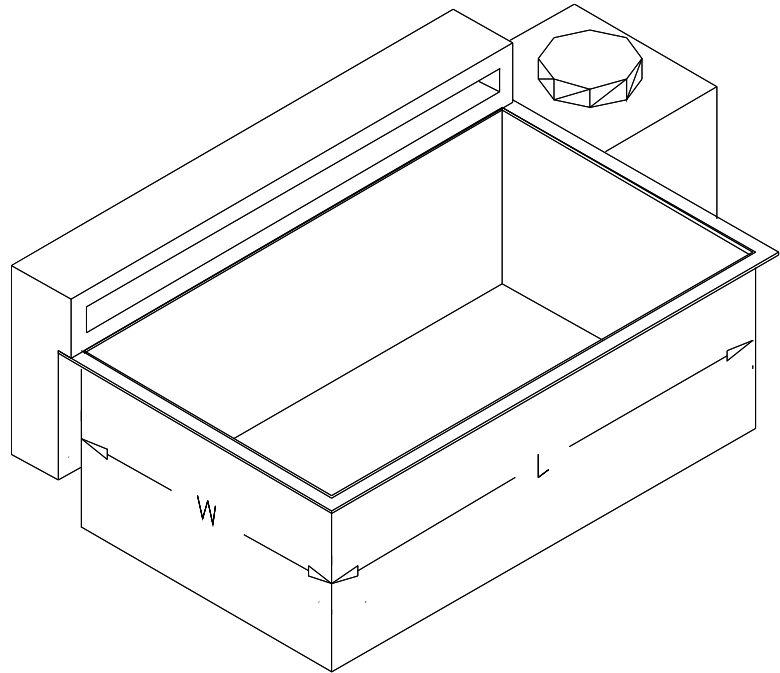
Air distribution is either slot velocity or face velocity with adjustable faceplates.



## **HSF – Single Finger Lateral Exhaust Hood**

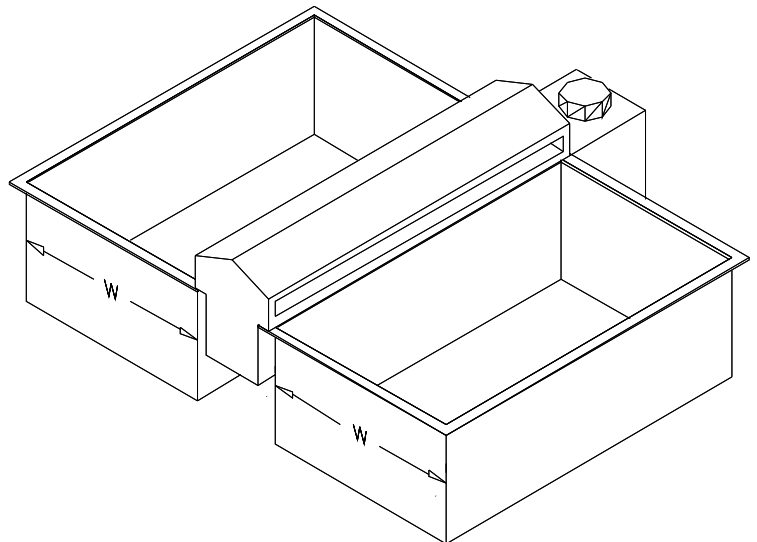
The single finger lateral exhaust hood is used on large tanks with an (L) dimension of six feet or longer and the short side of the tank (W) on the operator side. This hood has a low profile allowing parts to be lifted by crane over the hood.

Though this hood will adequately vent the tank, its low profile and slot opening allows fumes to escape off parts that have been lifted past the hood capture zone. It may not capture all the steam from tanks having an elevated solution temperature and high aspect ratio. On tanks wider than four feet, two hoods opposite each other are recommended.



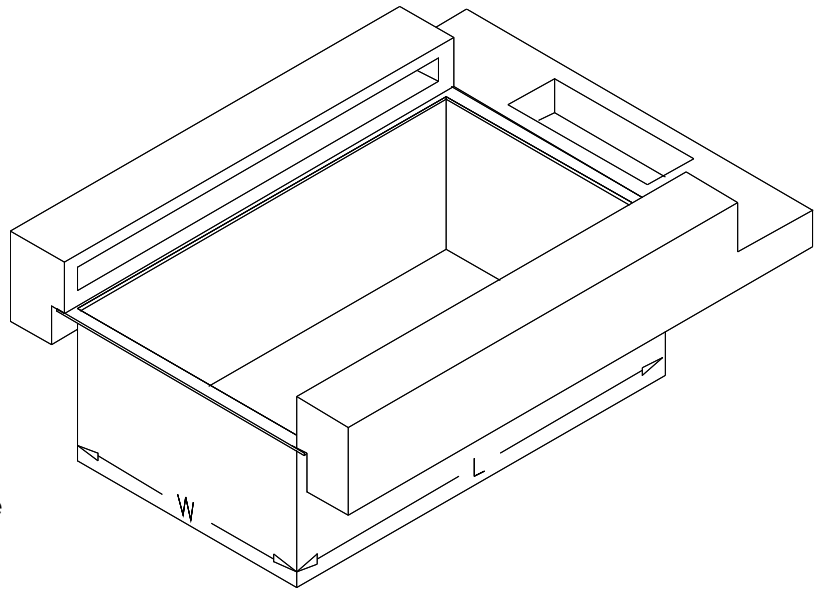
## **HDF – Double Finger Lateral Exhaust Hood**

The double finger lateral exhaust hood is similar to the single finger hood but it draws air from both sides. Most tank lines will have a mixture of single and double finger hoods. One double finger hood costs less than two single finger hoods. A double finger hood can be designed to draw different ventilation rates from each side when the associated tanks have different ventilation rates. Air distribution over the length of the hood is by slot velocity and splitter veins.



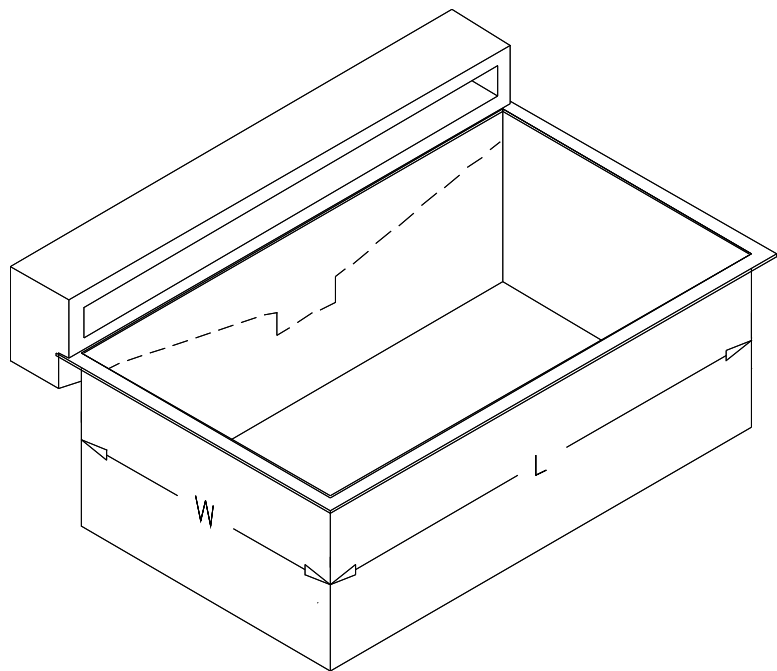
## **HUF – U-Finger Lateral Exhaust Hood**

The U-finger lateral exhaust hood is, basically, two single finger hoods connected by a common plenum at the rear. This type of hood is used on relatively square tanks up to four feet in either direction and where an updraft type hood cannot be used. Usually this tank is isolated and not in a tank line. This type of hood is more expensive to make than two single finger hoods connected with duct. Air distribution over the length of the hood is by slot velocity.



## **HLE – Lip Exhaust Lateral Exhaust Hood**

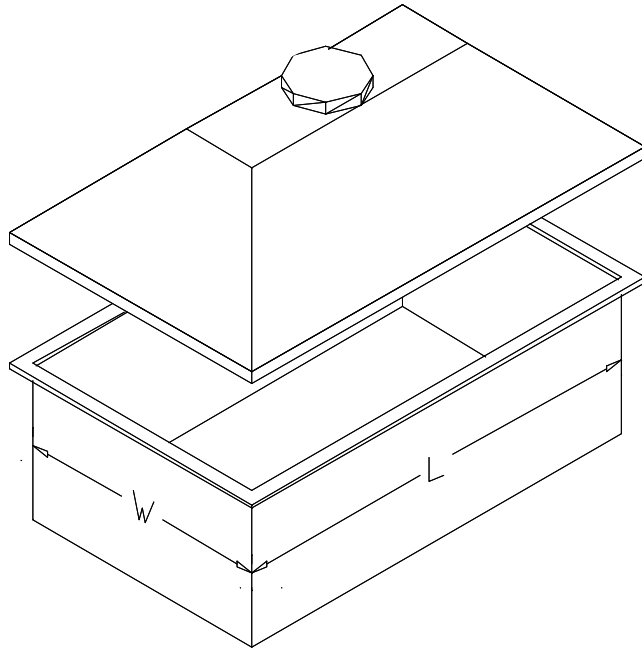
The lip exhaust lateral exhaust hood is similar to the single finger type hood except that its collection point is centered on the slot. This type of hood is used for below-tank duct systems. Two or more of these types of hoods can be mounted on the sides of long tanks for multiple take off points. This allows closer tank spacing since the plenum width will be narrower than a finger hood. Air distribution over the length of this hood is by slot velocity.





## **HCAN – Canopy Hood**

The canopy hood is used primarily for steam vapor or other innocuous materials. This hood is not recommended for toxic fumes or where workers must lean over the source of toxins.

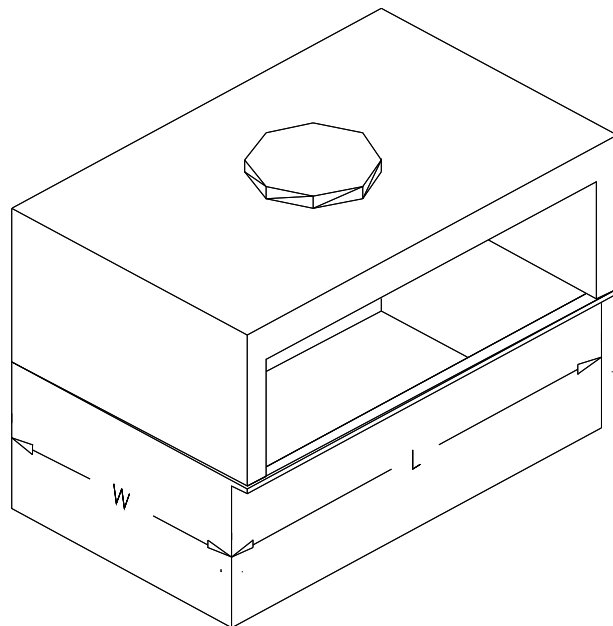


## **HENC – Enclosed Hood**

The enclosed hood is most often used to vent a tabletop operation or a specific tank process at a greatly reduced air flow.

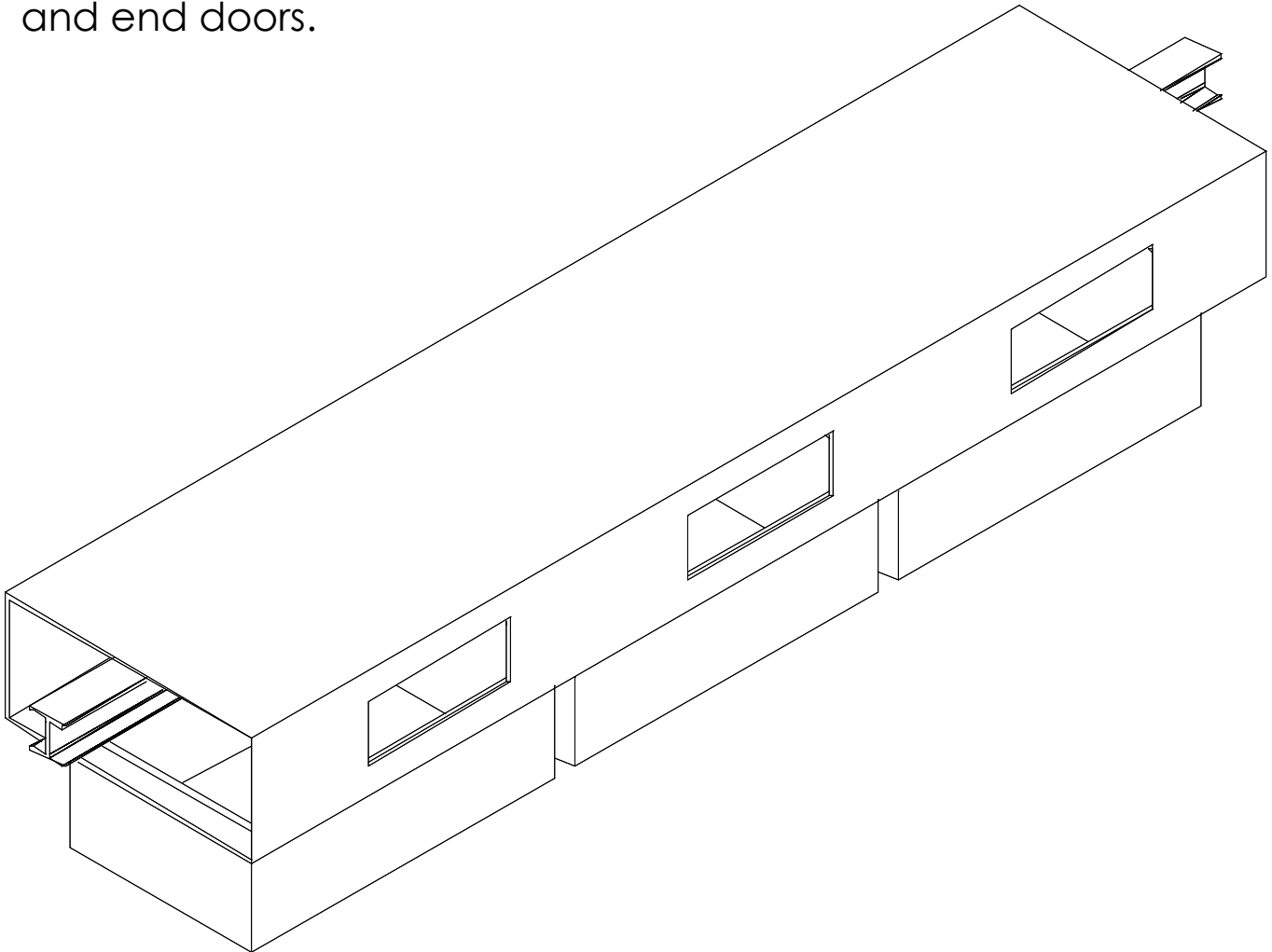
Because this hood is enclosed on three sides and the top it requires less air than a lateral flow hood to maintain a control velocity.

A sliding sash or doors can be added to further reduce air requirements.



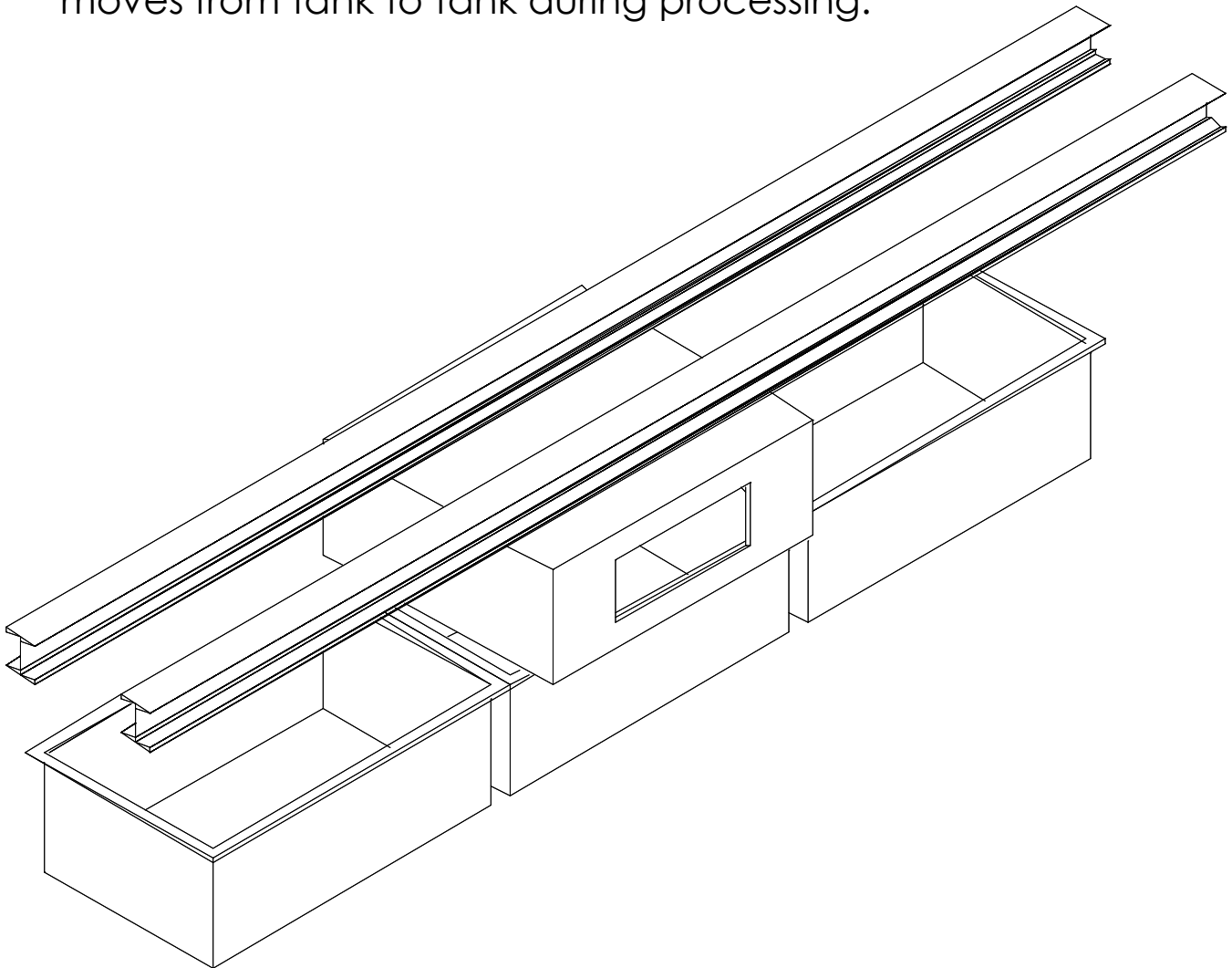
## Tank Line Enclosure

The tank line enclosure is a full enclosure over the tank line. It is custom fabricated and can be fitted with viewing windows and end doors.



## Hoist Enclosure

The hoist enclosure is frequently used in conjunction with a lateral exhaust hood or tank cover. It vents only the parts as they are raised up into the enclosure. It is not intended to vent the tank as it moves from tank to tank during processing.





Hoods

Scrubbers

Duct & Fittings

Air Strippers

Radial Fans

Centrifugal Fans

Special Systems

Process Tanks

Inline Fans

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Odor Control

Ventilation Systems

Chrome Systems

SOx Systems

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NOx Systems

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