

Carbon monoxide

Carbon monoxide (CO) is generated during some cycles in the operation of a cupola. It is an explosion hazard if it gets into the wind boxes and blast pipes when the blowers are shut down. To eliminate this hazard, adequate natural or mechanical ventilation should be supplied in back of the cupola, and two or more tuyeres should be opened after shutdown.

The large amount of blast air in the cupola generally carries the carbon monoxide out the stack. In some cases, it is burned in the stack before it can be discharged. Sometimes, however, because of a high wind or an inversion on a foggy or smoggy day, the draft may be so low that this gas may escape through the charging door into adjoining areas and even into the general foundry area.

Carbon monoxide gives no warning and thus may overcome workers before they are aware of its presence. To prevent carbon monoxide from being picked up from the cupola stack by the suction of the ventilating system and carried back inside the plant, the ventilating suction should be located well away from the cupola stack.

CO indicators, which are designed to light a red light, ring a bell, or sound a whistle, are comparatively inexpensive and easily installed, and should be provided about the cupola, on the charging floor especially, and wherever else there may be exposure to carbon monoxide. They should not, of course, be considered a substitute for safe operating practices. Both a light and a loud whistle should be hooked up to the indicator so that adequate warning will be given to people working on the charging floor as soon as carbon monoxide enters the area.

One or more gas masks of the type approved by the U S Bureau of Mines for protection against carbon monoxide should be readily accessible, should be kept in good condition, and the men should be trained to use them.

Gas masks may not be effective where the concentration of carbon monoxide is in excess of 2 per cent, as is sometimes possible in foundry work. Moreover, gas masks give no protection against oxygen deficiency. Under these conditions, hose masks with blowers, air-supplied respirators (masks or respirators supplied with air from an uncontaminated source), or oxygen-supplied gas masks should

be provided. (See Chapter 38 for details.)

Blast gates

Blast gates and explosion doors are used successfully to prevent damage from gas explosions. They are sometimes placed in front of the tuyeres, so that they can be opened to admit fresh air when the blowers are shut down. They should never be closed until the blast has entered the wind box and driven out all gas.

Blast gates should be provided in the air blast pipe that supplies air to the melting equipment. They should be closed when the air supply fails or when the melting equipment is shut down, in order to prevent the accumulation of combustible gases in the air supply system. In the cupola, the blast gate may be omitted if alternate tuyeres are opened to permit air circulation.

Blast gates should be so located in relation to the cupola wind box that the duct volume will be kept to a minimum. Motorized dampers may be installed at centrifugal blowers so that they will close automatically when the air supply fails.

Positive-pressure blowers should be equipped with safety valves having liberal discharge areas. If these are not provided, clogging of the cupola with slag or quick closing of the gate or damper may produce sufficient pressure in the blast pipe to burst it.

Every cupola should have at least one safety-type tuyere, with a small channel 1½ or 2 in below the normal tuyere level. This channel has a fusible plate that will melt through should the slag and iron rise to an unsafe level.

Tapping out

Tapping out with safety requires skill and should be done only by experienced and dependable men. In "botting-up" the hole, the bott should not be thrust directly into the stream of molten metal or it will cause spattering. To eliminate this, place the bott immediately over the stream of metal close to the hole and aim it down toward the hole at a sharp angle.

A supply of botts ready for use should be kept within convenient reach of the man who does the tapping.

When the cupola is tapped, the back end of the tapping bar should be held below the