



# Customer Focus

## on Loss Control

*Innovative Safety and Health Solutions<sup>SM</sup>*

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## Carbon Monoxide: *Control of Emissions From Lift Trucks*

It can be difficult to maintain good air quality in manufacturing and warehouse operations. In particular, high levels of carbon monoxide (CO) contribute to poor air quality and can cause illness in workers. In many cases, lift trucks are the greatest generators of carbon monoxide. Review these strategies to reduce CO emissions from lift trucks.

1. Consider the *type of fuel* used in lift trucks. LPG is the most common. Gasoline powered lift trucks generally produce much higher levels of carbon monoxide. Diesel fuel produces significantly lower levels of carbon monoxide emissions, all other factors being equal.<sup>1</sup> Diesel does produce more "soot" (nitrogen oxides, sulfur dioxide, etc.), so it isn't the perfect fuel. Commercially available "soot traps" do a good job of catching the soot. The traps are cleaned through a regeneration process which burns off the collected soot. This cleaning process may require five minutes in each 8-hour shift.<sup>2</sup> Electric lift trucks are cleanest, but they have several disadvantages, including higher initial costs for batteries, slower speeds, difficulty with long steep ramps, and long recharge times. Consider using a few electric lift trucks to do some of the lighter work (for example, at the loading dock) and so reduce overall emissions.
2. Keep lift trucks *tuned up and in good running condition* to reduce emissions from as much as 50,000 PPM TO 50 PPM.<sup>3</sup> Always include some type of gas analyzer to evaluate CO levels. This tends to be a "balancing act," since extremely low emissions can be achieved but at a loss of performance. A suggested goal for LP Gas would be a .2% (2,000 PPM) CO level under load.
3. *Most lift trucks can be retrofitted* with catalytic converters, which have been shown to reduce CO emissions by 90-97%. However, these devices are costly (\$450-\$1,200). Other after-market devices are being developed, including air fuel ratio controllers and computer driven fuel management systems. Original equipment may have electronic fuel injection to reduce emissions.
4. Some believe that *compressed natural gas (CNG)* produces lower CO emissions. Recent (1994) tests have not verified these claims. CO levels were only slightly lower than those produced by LP gas.
5. *Good driving techniques* can reduce CO emissions. Cold starts, jerky operations, and racing the engine all generate increased levels of carbon monoxide.
6. The building may require *increased or improved ventilation*.

### References

1. Mahoney, D. "Carbon monoxide exposures from fork truck exhaust." *Professional Safety*, September 1990.
2. Gould, L. "Special report: Lift trucks and indoor air quality." *Modern Materials Handling*, February, 1994.
3. Long, D "Lift truck maintenance tests show cost savings potential." *Materials Management and Distribution*, September, 1974.

