Ventilation Requirements When using Forklifts

The forklift guidelines in Saskatchewan make the following

Ventilation guidelines are intended to help meet WCLs. Guidelines for an 8-hour workday have been suggested by the American Conference of Governmental Industrial Hygienists (ACGIH). These guidelines are:

• 5,000 cubic feet per minute (cfm) of fresh air for each propane-fuelled forklift and
• 8,000 cfm for each gasoline-fuelled forklift.

For work shift longer than 8 hours, higher ventilation rates will be required.

These guidelines are merely ‘rules of thumb’ and only apply under the following conditions:

1. A regular maintenance program is provided which uses CO analysis of exhaust gas during final engine tuning. CO gas concentrations should be limited to one percent (10,000 ppm) for propane-fuelled forklifts and two percent (20,000 ppm) for gasoline-fuelled forklifts. The above recommendation assumes that the forklift emissions are 1% CO or less for propane-powered trucks and 2% for gasoline-powered trucks. A well “tuned” propane forklift will emit 0.4% CO. However, a poorly tuned vehicle can emit up to 10% CO or more. Source: D. Jeff Burton, Control of Propane-Powered Forklift Truck Emissions, Feb 2008.

For propane-fuelled vehicles, NO2 must be analyzed in exhaust gases. Technicians trained in tuning propane-fuelled engines will use vehicle manuals to determine the recommended NO2 emission levels.

2. The periods of forklift engine operation do not exceed 50 percent of the working day (total engine operation of forklifts is equal to less than four hours in an 8-hour shift).

3. Airflow is reasonably well distributed throughout the workplace.

4. The volume of space equals at least 150,000 cubic feet (ft3) per forklift.

5. The forklift is powered by an engine of less than 60 horsepower (hp).

Where these conditions are not met, the following corrections should be made in the design of the ventilation rates:

1. For operating times greater than 50 percent of the total working time, multiply the basic ventilation rate by the actual operating time (expressed as a percent) divided by 50. For example, if a forklift were run 80 percent of a normal 8-hour workday, divide 80 by 50 and multiply by the suggested ventilation rate.

2. For forklifts with engines of more than 60 hp, multiply the ventilation rate by the actual horsepower and divide it by 60.
Another approach is Measuring the Carbon Monoxide Levels

The above guidelines are conservative. It is also sometimes hard to know how well tuned the various pieces of equipment are, how long they are running, etc. Another approach is to simply measure the carbon monoxide level in the area. A small air sampling device is located in the area where the forklifts are concerned. It measures and records the carbon monoxide level over time. The ACGH TLV (2018) is 25 ppm as an average over an 8-hour day. The graph below shows the results of such testing performed in a warehouse where propane-powered forklifts are used. The average exposure from the graph is about 10 ppm so well within the allowable.

Air monitoring is strongly recommended for poorly ventilated work areas, such as coolers, train cars, truck trailers and unventilated storage warehouses to determine if enough fresh air is being supplied to the work environment. Additional ventilation equipment, such as portable ventilators, may be needed to control exhaust in these spaces.