

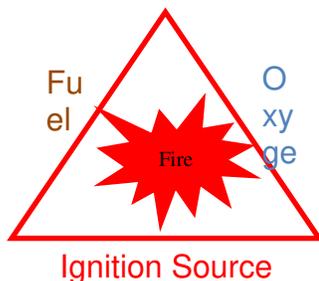
Hazardous Area Classification for Wastewater Treatment Facilities

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NFPA 820 standard defines wastewater as: "Wastewater is principally the spent water supply of the community. It is used to flush and transport human wastes and the liquid wastes of commerce, industry and institutions. Groundwater, surface water and storm water might also be present". This wastewater must be treated before it is discharged into the waterways otherwise health and well-being of the community will be at risk.

Wastewater Treatment involves a number of complex processes. Some of these processes pose hazards of fire and explosion due to presence of flammable materials, e.g. Methane. Based on the severity and duration of the flammable material(s) the different areas are classified and accordingly only special approved equipment can be used in these areas.

At this point it is worthwhile to mention the "Hazard Triangle", which depicts the three conditions that are required for explosion or fire.



Section 18 of the Canadian Electrical Code (CEC) specifies the rules for classifying hazardous locations. CEC classifies hazardous locations into three classes based on the nature of hazards as follows:

- a- **Class I** locations are those in which flammable gases or vapours are or may be present in the air in quantities sufficient to produce explosive gas atmospheres.
- b- **Class II** locations are those that are hazardous because of the presence of combustible or electrically conductive combustible dusts,
- c- **Class III** locations are those that are hazardous because of the presence of easily ignitable fibers or flyings, but in which such fibers or flyings are not likely to be in suspension in air in quantities sufficient to produce ignitable mixtures.

It is to be noted here that, generally, wastewater treatment facilities fall under **Class I**, i.e. hazards due to presence of flammable gases or vapours.

CEC further divides Class I locations into three zones based on frequency of occurrence and duration of an explosive gas atmosphere as follows:

- a- **Zone 0**, consisting of Class I locations in which explosive gas atmospheres are present continuously or are present for long periods;
- b- **Zone 1**, consisting of Class I locations in which (i) explosive gas atmospheres are likely to occur in normal operation; or (ii) the location is adjacent to a Class I, Zone 0 location, from which explosive gas atmospheres could be communicated;
- c- **Zone 2**, consisting of Class I locations in which (i) explosive gas atmospheres are not likely to occur in normal operation and, if they do occur, they will exist for a short time only; or (ii) the location is adjacent to a Class I, Zone 1 location, from which explosive gas atmospheres could be communicated, unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air, and effective safeguards against ventilation failure are provided.

CEC refers to the NFPA 820 standard for Hazardous Area classification for Sewage lift and treatment plants. NFPA 820 standard establishes the Hazardous Area Classification of all the major components of the wastewater collection and treatment facilities by dividing them in three sections as under:

- a- **Collection Systems** (including sewers, pump stations, dry and wet wells etc.)
- b- **Liquid Stream Treatment Processes** (including screen facilities, tanks, UV disinfection, odour control etc.)
- c- **Solid Treatment Processes** (including sludge and scum handling, dewatering, Digesters etc.)

NFPA 820 also provides additional information regarding how to 'declassify' a Hazardous area so that standard equipment can be used there.

Once the proper area classification is done, it is possible to select the properly rated equipment and electrical wiring methods suitable for that area; hence, the safety of the equipment and personnel can be ascertained.

It is very important that decisions regarding Hazardous Area Classification must be made only by qualified personnel who are familiar with the relevant codes, standards and principles that apply.

Editor: David Dias, P.Eng.

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