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KLM Technology Group #03-12 Block Aronia, Jalan Sri Perkasa 2 Taman Tampoi Utama 81200 Johor Bahru Malaysia	SPECIFICATION FOR HANDLING OF AIR HYDROCARBON AND PYROPHORIC SUBSTANCES (PROJECT STANDARDS AND SPECIFICATIONS)	

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SCOPE

This Project Standards and Specification covers the minimum requirements to provide relevant technical standards for reducing fire hazards of air / hydrocarbon mixtures and pyrophoric substances. It also illustrates the nature and origin of air hydrocarbon mixtures and pyrophoric substances and is applicable to petroleum production, refining and marketing installations.

REFERENCES

Throughout this Standard, the following dated and undated standards and codes are referred to. These referenced documents shall, to the extent specified herein to form a part of this standard.

- API 2015 - Recommended Practice for Cleaning Petroleum Storage Tanks
- API RP 2001 - Fire Protection in Refineries

DEFINITIONS AND TERMINOLOGY

- Lower Explosive Limit (LEL) - the lowest concentration of the hydrocarbon present in air-hydrocarbon mixture below, which the mixture will not ignite.
- Higher Explosive Limit (HEL) - the highest concentration of the hydrocarbon present in the air-hydrocarbon mixture above, which the mixture will not ignite.

GENERAL

Most of the refined petroleum products are used as sources of heat energy by combustion with air in engines or heaters. The same type of combustion can occur on a larger scale in petroleum refining or handling units with disastrous effects, if air mixes with petroleum fractions in the wrong place and in right proportions. Process units which use air for regeneration or reaction, provide many opportunities for forming flammable combinations of air and hydrocarbon mixtures. Hence, the handling of air and hydrocarbons should be done in a safe manner to prevent the formation of flammable mixtures which can cause a disaster.

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Also there are some substances which catch fire spontaneously when exposed to air under atmospheric conditions. These are basically compounds of iron sulphides and are known as Pyrophoric substances. The Pyrophoric character depends upon the chemical reactivity of the substance and the physical condition of the surface. It can also be affected by the presence of foreign materials which may catalyse the thermal characteristics of the substance.

ELEMENTS OF FIRE

All fires have three constituents with combustible substances like hydrocarbon, air or oxygen which should be present in the right proportions and a source of ignition. If any one of the three constituents is removed, fire will not be able to occur. Therefore, it is important to prevent the combination of these constituents by eliminating any one of them at all times.

Hydrocarbon or pyrophoric substances at temperature above auto-ignition point will ignite by itself without any source of ignition. The auto-ignition point is the lowest temperature at which the material will ignite by itself in contact with oxygen or air without any source of ignition. Hence, the contact of oxygen or air to these materials available at and above their auto-ignition temperatures should be eliminated.

The hydrocarbon and air present in the right proportions, means that the concentration of hydrocarbon in air is between the LEL and HEL. The explosive limits and auto-ignition temperatures of some commonly handled flammable liquids, gases and solids are listed in Table I. These flammability limits are valid only under atmospheric conditions. The range of explosive limit is wider at higher pressure and temperature or oxygen is substituted for air.