E36. **Clean agent based Linear Pneumatic polymer tube based Automatic Fire Detection and suppression Electrical panel protection system**

CLEAN AGENT BASED LINEAR PNEUMATIC DIRECT LOW PRESSURE AUTOMATIC FIRE SUPPRESSION UNIT FOR ELECTRICAL PANEL PROTECTION

E36.2.1 General

E36.2.1.1 The scope covers Supply, Installation, Testing and Commissioning of Automatic clean agent based Local Flooding System complete for electrical panels with flexible fire detection tubing, cylinder, valves, integration with Main Fire Alarm Control Panel for status monitoring etc. The scope of work includes, but not limited to the following

- Providing Direct Panel Gas Flooding System with flexible Firetrace Linear Pneumatic Heat/fire detection/ discharge tubing inside the panels.
- Clean agent storage cylinder for flooding gas inside the panels.
- Audio-visual annunciation devices for indicating incidence of fire.
- Any other item required to the successful commissioning of the system.

E36.2.1.2 The electrical panel fire suppression system shall be complete with DOT Clean Agent storage cylinders for required capacities, extinguishing agent as specified, fire detection tubing, filling and end-of-line adaptors, pressure switches, control equipment, Clean Agent Cylinder/Valve Assembly, Cylinder Mounting Bracket and all necessary accessories to protect the Electrical panel in case of fire. The system will have an interface with Main Fire Alarm and Control Panel. In case of fire in the concerned Panel, indication of Fire / discharge status should come in Main Fire Alarm and Control Panel.

E36.2.2 Design Requirements

E36.2.2.1 All the detecting devices, alarm, indicating devices, containers and other related equipment shall have required approvals & Authorization.

E36.2.2.2 All installations shall conform to NFPA 20001 requirements.

E36.2.2.3 Clean Agent should be used with below mentioned properties

(a)The Clean Agent should have Zero Ozone Depletion Potential. (ODP = 0)

(b) The Clean Agent should not have Global Warming Potential of more than 1.

(c) The Clean Agent should be a low pressure agent and atmospheric life time of 5days

E36.2.3 System Equipment

E36.2.3.1 Linear Pneumatic Tubing should be UL Listed.

The tubing shall be installed throughout the Electrical Panel with one end connected to the top of the Clean Agent container valve. The tubing shall be pressurized with Dry Nitrogen to 195 psig and maintains the system in the “OFF” position. The tube shall burst at the hottest point at tempratures between 100-120 degree C at 13.5 Bar pressure. The tubing shall perform three functions:

- Heat Detection,
- System Activation and
- Clean Agent discharge.

E36.2.3.2 Clean agent Container

Design, fabricate, certify and stamp containers in accordance with the requirements of NFPA (DOT). Containers shall be standard model DOT4B240/360 and size of ease of replacement and addition.

Each storage container shall be equipped with a nickel–plated brass valve, a pressure gauge to monitor container pressure, and a quarter-turn ball valve that interfaces with the detection tubing. The quarter-turn ball valve shall be kept closed at all times when the container is not in service.

All container valves shall be equipped with a pressure relief valve (rupture disc) device in compliance with DOT requirements.

E36.2.4 Technical and Installation Requirements

E36.2.4.1Provide sufficient amount of Extinguishing Agent to Inert the Micro environment being protected considering the following when computing volume to verify suitability and to establish design limitations:

- Volume of hazard area.
- Specific volume of Clean Agent.

- Discharge time and flow rates.
- Design concentration and design factors.
- Detector/discharge tubing placement.
- Placement of the DOT cylinder

E36.2.4.2 System should have provision to Interface system with main control fire alarm system and BMS.

E36.2.4.3 All doors and holes in the enclosed/equipment should be closed or sealed to maintain the tightness of enclosure.

E36.2.4.4 The clean agent based Pre-Engineered automatic direct fire suppression system should be LPCB approved or /and evaluated and verified as conforming with relevant requirements criteria of FM5600 and UL 2166 standards by required International Third party approval agency & Authorization.

E36.2.4.5 Each clean agent pre-engineered automatic system is equipped with its own detection/discharge tubing.

E36.2.4.6 The unit shall be a self-contained and shall be equipped with its own non-electric automatic detection system to detect the fire and agent release system into the Electric panel to suppress the fire.

E36.2.4.7 The Clean Agent is stored in DOT steel cylinders as compressed liquid, super-pressurized with Dry Nitrogen to 195 psig at 70oF. The ambient operating temperature range for all system components should be 0 degree C to 54 degree C.

E36.2.4.8 Each container is equipped with a nickel–plated brass valve, a pressure gauge to monitor container pressure, and a quarter-turn ball valve that interfaces with the Detection Tubing. In addition, the container valve shall be equipped with a pressure relief (rupture disc) device in compliance with DOT requirements.

E36.2.4.9 Provide wall-mounted painted steel bracket to mount the container/valve assembly in a vertical (upright) position. Each bracket should be equipped with integral quick-clamp straps.

E36.2.4.10 Install equipment as indicated on the approved shop drawings, and in accordance with requirements of NFPA-70 and NFPA-2001.

E36.2.4.11 All the necessary accessories required for operation of system shall be part of supply from single OEM/Manufacturer using ed component such as Fire trace detection tube and UL listed Clean Agent and the system shall have proven track record and International Third party Approvals like UL/ FM/ CSIRO/ LPCB etc..

E36.2.4.12 Make final connections between equipment and system detection tubing under direct supervision of factory trained and certified representative of manufacturer.

E36.2.4.13 It shall be so designed that it does not affect the IP ratings of electrical panels. The Sub-Contractor has to coordinate with manufacturer of electrical panels for provision of holes to run the tube and brackets for mounting the tube. The entry of tube inside the panel shall be through suitable size of connector.

E36.2.4.14 The tubing shall be manufactured from specially processed polymer material to achieve the desired heat detection and delivery characteristics. Provide minimum two runs of fire trace tube along with any two sides of every compartment of the panel.

E36.2.4.15 The tubing shall be capable of working even when contaminated with oil, dust and debris as long as the contamination will allow the heat to pass through the tube.