

**WATER SUPPLIES DEPARTMENT**  
**STANDARD SPECIFICATION EM-02-03**  
**CHLORINE AUTOMATIC CHANGEOVER PANEL**

This specification shall be read in conjunction with EM-02-01 for Chlorination System - General and Design, and EM-02-09 for Chlorine Pressure Gauges.

1. **GENERAL**

The chlorine automatic changeover panel shall be used to maintain continuous chlorine gas or liquid supply to the chlorination equipment by switching over the draw off from duty container(s) to standby container(s) upon detection of a low chlorine supply pressure normally set at 100kPa. The automatic changeover shall prevent the excessive draw-off and avoid creating a negative pressure in the duty container(s).

2. **DESIGN**

2.1 **Modes of Operation**

The changeover panel shall be designed to meet with the following operation modes :-

(a) Auto changeover operation mode

In this operation mode, two sets of chlorine container(s) with one duty and one standby shall be connected to a single manifold via the control valves under the control of the changeover panel. Upon detection of a low pressure in the chlorine supply on the duty source, the changeover panel shall initiate switching over of the supply source to the standby container(s).

The changeover shall be actuated electrically. However, the changeover shall not be initiated if a low pressure is detected from the standby source. Under such circumstances, the exhausted duty container(s) shall be shut off also.

A spring-return duty change switch shall be provided in the changeover panel for the operator to change over the supply source from the duty container(s) to the standby container(s) when necessary.

(b) Manual changeover operation mode

A manual changeover 3-position selector switch shall be provided to enable selection among Unit 1 Duty/ Off/ Unit 2 Duty for overriding the automatic system to be in line with Clause 4.1 of EM-02-01.

The manual changeover shall not be initiated if a low pressure is detected from the selected source.

(c) All-duty operation mode (for chlorine cylinders gas draw-off only)

Where specified, the all-duty operation mode shall be provided to enable two sets of chlorine cylinders to serve as the supply source to two separated chlorinators. The chlorinators and the supply sources shall be inter-connected together with an isolation valve provided at the cross-connection. The number of chlorinators in operation and the cross-connection valve shall be manually controlled. Under this operation mode, the cross-connection valve shall be closed and both the chlorinators shall be put into operation. The changeover panel shall be switched to "ALL DUTY" operation mode to inhibit the changeover mechanism and to open the motorized control valve of each supply source simultaneously. Upon detection of low chlorine supply pressure in any source, the motorized control valve on the respective manifold will be closed to shut off the chlorine supply to the corresponding chlorinator and an alarm will be initiated for changing of empty containers.

(d) Shut off mode

The shut off mode shall be designed to shut down the system completely. When the shut off is selected, both the duty and standby motorized valves shall be closed to stop the chlorine supply to the downstream. Suitable time delay shall be required to ensure both duty and standby motorized valves are closed before different operating mode is selected.

## 2.2 Emergency Shut Off

Emergency shut down feature shall be incorporated in all the above operation modes to close both the duty and standby motorized control valves automatically on receipt of the following alarms :-

- (a) Chlorine leak alarm
- (b) Emergency alarm
- (c) Manual call point alarm
- (d) Rupture of burst disc of the evaporator for liquid chlorine system where appropriate

### 2.3 Monitoring and Control

The changeover panel shall be equipped with the incorporation of the following monitoring and control facilities :-

- (a) Power On/ Off switch
- (b) Selector switch(es) for Auto/ Shut-off/ Manual/ All Duty changeover operation modes
- (c) Selector switch for Unit 1 Duty/ Off/ Unit 2 Duty operation mode
- (d) Spring-return selector switch for manual changeover of duty chlorine supply at the auto changeover operation mode
- (e) Indicating lamp
  - (i) "Power On" (green)
  - (ii) Duty and standby motorized valves "Open" (white) and "Close" (blue)
  - (iii) Cross-connection valve "Open" (white) and "Close" (blue)
  - (iv) Duty and standby supply "Pressure Low" (red)
  - (v) "Chlorine Leak" (red)
  - (vi) "Chlorine Container(s) Changed" (red)
- (f) "Chlorine Container(s) Changed" audible alarm
- (g) Pushbutton
  - (i) "Alarm Accept"
  - (ii) "Alarm Reset" after empty container(s) has been replaced
  - (iii) "Lamp Test"
- (h) Control circuitry to shut off both duty and standby motorized valves in case of emergency as described in clause 2.1 (b)
- (i) Control circuitry for automatic chlorine supply Duty/ Standby changeover
- (j) Volt-free contacts for remote indication of motorized valves open/close status, supply pressure low and chlorine container(s) changed

3. CONSTRUCTION

The changeover panel shall be wall-mounted and fabricated with fire-resistant, corrosion-proof reinforced plastic material of a degree of protection IP65 to IEC 60529.

4. AUXILIARIES

Chlorine pressure gauges shall be provided and the gauges shall meet the requirements as required in EM-02-09.