

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

This specification shall be read in conjunction with EM-02-01 for Chlorine Plant - 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 which is 100kPa normally. The automatic changeover shall prevent 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 provide the following operation modes:

(a) Auto-changeover mode

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

However, automatic changeover shall not be initiated if the pressure of the standby container(s) is below 100kPa. Under such circumstances, the valves controlling the supply from both the exhausted duty container(s) and the standby container(s) shall be closed simultaneously.

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 mode

A 3-position manual changeover selector switch shall be provided to enable selection among Unit 1 Duty/ Off/ Unit 2 Duty for overriding the automatic changeover.

Manual changeover shall not be initiated if the pressure of the selected source is

below 100kPa.

(c) All-duty mode (for gas chlorine cylinder 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 separate sets of chlorinators. The chlorinators and the supply sources shall be inter-connected with an isolation valve 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 chlorinators shall be put into operation. Once this operation mode is selected on the changeover panel, the control valve of each supply source shall be opened simultaneously. Upon detection of low chlorine supply pressure in any one of the sources, the control valve on the respective manifold shall be closed to isolate the chlorine supply to the corresponding chlorinator and an alarm for changing the empty containers shall be initiated.

(d) Shut off mode

The shut off mode shall be designed to shut down the system completely. When this operation mode is selected, the valves controlling the duty and standby sources shall be closed to stop the chlorine supply to the downstream. The system shall provide appropriate time delay such that before the valves are closed completely, the operation mode cannot be changed.

2.2 Emergency Shut Off

Emergency shut down feature shall be incorporated in all operation modes to close the control valves of the duty container(s) and the standby container(s) automatically on receipt of any one of the following alarms:-

- (a) Chlorine leak alarm
- (b) Emergency alarm
- (c) Manual call point alarm
- (d) Rupture of any burst disc in a liquid chlorine system

2.3 Monitoring and Control

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

- (a) Power On/ Off switch
- (b) Selector switch(es) for Auto-changeover/ Shut off/ Manual changeover/ All-duty operation modes
- (c) Selector switch for Unit 1 Duty/ Off/ Unit 2 Duty in the manual changeover

operation mode

- (d) Spring-return selector switch for manual changeover of duty chlorine supply in the auto-changeover operation mode
- (e) Indicating lamp
 - (i) “Power On” (green)
 - (ii) Duty and standby 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 close the valves controlling the duty and standby sources in case of emergency as described in clause 2.2
- (i) Control circuitry for automatic changeover of duty/ standby sources
- (j) Volt-free contacts for remote indication of the open/ close status of valves, 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. It shall have a degree of protection of IP65 to IEC 60529.

4. AUXILIARIES

Chlorine pressure gauges conforming to WSD Standard Specification EM-02-09 shall be provided to monitor the pressure of the chlorine sources.

- End of this Specification -