WATER SUPPLIES DEPARTMENT

STANDARD SPECIFICATION EM-02-09

CHLORINE PRESSURE GAUGES

1. GENERAL

This specification covers the technical requirements for chlorine pressure gauges used in chlorination systems and shall be read in conjunction with EM-02-02 for Chlorinator.

2. DESIGN AND CONSTRUCTION

2.1 Position of Chlorine Pressure Gauges in Chlorination Systems

Unless otherwise specified, chlorine pressure gauges shall be provided at the following positions of a chlorination system:

(a) Liquid Draw-off System

(i) Two chlorine pressure gauges (P1 and P2) for the automatic changeover system, one on each of the chlorine supply pipes for indication of chlorine supply pressure from the drum, each complete with one alarm contact provided for initiation of container changeover;

(ii) One chlorine pressure gauge (P3) at the evaporator inlet for indication of chlorine supply pressure to the evaporator, with one alarm contact provided for initiation of "Container Nearly Empty" alarm;

(iii) One chlorine pressure gauge (P4) at the evaporator outlet for indication of chlorine outlet pressure; and

(iv) One chlorine pressure gauge (P5) after the pressure reducing valve and before the vacuum regulator-check unit for indication of chlorine pressure with two alarm contacts provided for initiation of "PRV Pressure Low" and "PRV Pressure High" alarms respectively.

(b) Gas Draw-off System

(i) Two chlorine pressure gauges (P6 and P7) for the automatic changeover system, one on each of the chlorine supply pipes for indication of chlorine supply pressure from the cylinder(s), each complete with one alarm contact provided for initiation of container changeover; and

(ii) One chlorine pressure gauge (P8) before the vacuum regulator-check unit.

2.2 General Requirements

The design and construction of the chlorine pressure gauges shall comply with the following requirements:

(a) Type	Diaphragm sealed with inert fluid as specified in item (h) below filled in the tube of the gauge and the upper part of the diaphragm
(b) Dial diameter	150mm
(c) Dial marking	Aluminium, white with black markings : "Testing on Clean, Dry Oil Free Air" and "Use No Oil"
(d) Case	- Stainless steel or reinforced plastic case with fire-resistant material or equivalent - With blow-out vent, or blow-out disc for ease of leakage checking
(e) Window	Laminated glass, transparent polycarbonate or equivalent
(f) Pointer	Stainless steel grade 304 or aluminium alloy
(g) Tube and socket	Stainless steel grade 316L
(h) Filled fluid	Perfluoropolyether (PFPE) or equivalent for oxygen-chlorinated products filled with internal capillary snubber to reduce pulsations
(i) Diaphragm	Tantalum
(j) Connection	Flanged to ANSI B16.5 Class 300 raised face, nominal pipe size 0.5-inch with screwed connection plus welding between gauge and upper flange to eliminate the risk of the joint being accidentally unscrewed
(k) Gauge accuracy	Better than ±1.5% of the scale range
(l) Alarm contact	- Alarm contact(s) if required shall be integrated with the pressure gauge or provided by a separated pressure switch for each alarm contact - Alarm contact(s) shall make contact on pressure rising (MOR) or pressure falling (MOF) as specified in Clause 2.3 - Each pair of the alarm contact(s) integrated with the pressure gauge shall be dial-mounted, volt-free and rated at 220V 50Hz 18VA a.c. and 10W d.c. - Each pair of the alarm contact(s) in a separated pressure switch shall be at least single-pole double-throw and rated at 1A 220V 50Hz a.c. and 1A 24V d.c. - Setting range : 0-100% of the scale range, adjustable through key switch - Alarm accuracy : 2% of the scale range

2.3 Other Requirements

Apart from the requirements specified in Clause 2.2 of this specification, the chlorine pressure gauges at various locations shall also comply with the following specific requirements:

(a) Liquid Draw-off System

Chlorine Pressure Gauge	P1 and P2	P3	P4	P5
Measuring Range (in kPa)	0 - 1600		0 - 2100	0 - 500
Flange connection material	Monel for bottom flange housing in contact with chlorine and stainless steel for other parts		Stainless steel	
Additional dial marking	Liquid Chlorine		Gas Chlorine	
Requirement of alarm contact	Yes		No	Yes
Type of contact	One pair of MOF contact			One pair of MOR contact + one pair of MOF contact
Alarm setting (in kPa)	110	300		300 (MOR) 100 (MOF)
Gauge testing pressure	At 2400 kPa gauge pressure (minimum) and at full vacuum		At 2900 kPa gauge pressure (minimum) and at full vacuum	At 750 kPa gauge pressure (minimum) and at full vacuum
Seal withstand pressure	At least 7500 kPa			At least 3000 kPa

(b) Gas Draw-off System

Chlorine Pressure Gauge	P6 and P7	P8
Measuring Range (in kPa)	0 - 1600	
Flange connection material	Stainless steel	
Additional dial marking	Gas Chlorine	
Requirement of alarm contact	Yes	No
Type of contact	One pair of MOF contact	
Pressure setting (in kPa)	110	
Gauge testing pressure	At 2400 kPa gauge pressure (minimum) and at full vacuum	
Seal withstand pressure	At least 7500 kPa	

- End of this Specification -