

AS-BUILT	
KOC APPROVAL	
NAME / KOC No:	
DESIGNATION :	
GROUP / TEAM :	
SIGNATURE :	
DATE :	

AS-BUILT	
LARSEN & TOUBRO LIMITED	
NAME :	VAIBHAV VERMA
DESIGNATION :	AGM
SIGNATURE :	
DATE :	30-SEP-2018
DEPT/ DIVISION :	ENGINEERING

WATER SPRAY NOZZLE SCHEDULE

TYPE	SIZE	SPRAY ANGLE	K-FACTOR	FLOW @2.0 Bar DISCHARGE PRESSURE	QUANTITY
MV	1/2" NPT MALE	140°	51	72.12 LPM	21 OF EACH COMPRESSOR

DESIGN OBJECTIVE : FIRE EXTINGUISHMENT & EXPOSURE PROTECTION	
DESIGN CALCULATION	
COMPRESSOR SURFACE AREA TO BE PROVIDED	54.4 m2
WATER APPLICATION RATE (L/MIN/m2)	20.4
THEORETICAL FLOW (LPM)	1497
HYDRAULICALLY CALCULATED FLOW (LPM)	1654.6
REFER 50489-530-000-LAL-1015	

COMPRESSOR	LINE No.4	LINE No.5	LINE No.6	LINE No.7	LINE No.8
530-K-101	4"-WF-9263-Q15A	4"-WF-9264-Q15A	3"-WF-9265-Q15A1	2"-WF-9266-Q15A1	2"-WF-9267-Q15A1
530-K-201	4"-WF-9272-Q15A	4"-WF-9273-Q15A	3"-WF-9274-Q15A1	2"-WF-9275-Q15A1	2"-WF-9276-Q15A1
530-K-301	4"-WF-9281-Q15A	4"-WF-9282-Q15A	3"-WF-9283-Q15A1	2"-WF-9284-Q15A1	2"-WF-9285-Q15A1

GENERAL NOTES:

- A. FOR STANDARD SYMBOLS AND NOMENCLATURE SEE DRAWINGS 50489-530-020-PID-1104.001.  
B. ALL EQUIPMENT NUMBERS SHOWN ON THIS PID ARE PRECEDED BY 530--.  
C. FOR ESDV, SBDV AND MOV DETAILS SEE DRAWINGS 50489-530-020-PID-1106.001.  
D. FOR MISCELLANEOUS PIPING DETAILS SEE DRAWING 50489-530-020-PID-1108.001.  
E. DELETED.

NOTES:

1. UV/IR FLAME DETECTORS AUTOMATICALLY DETECT FIRE AND WHEN ACTIVATED A SIGNAL IS SENT TO THE F&G PANEL IN THE COR.  
2. AIR SET IS FITTED WITH AIR FILTER, REGULATOR AND PI.  
3. RO SUPPLIED TO GIVE PRESSURE/LOSS CHARACTERISTICS OF THE DELUGE VALVE.  
4. 4 WAY SUCTION COLLECTION HEAD IS INSTALLED TO ALLOW SECONDARY SUPPLY OF WATER TO DELUGE SYSTEM.  
5. DELUGE VALVE ARE DIAPHRAGM TYPE DESIGNED FOR DELUGE OPERATION AND BE UL LISTED AND FM APPROVED  
6. TRIGGER HEAD CONFIGURATION  
7. 2 VALVES REQUIRED IN BYPASS LINE TO PREVENT UNNECESSARY LOSS OF WATER DUE TO GATE VALVE PASSING.  
8. ADEQUATE DRAINAGE TO BE PROVIDED AROUND DELUGE SYSTEM TO AVOID ACCUMULATION OF WATER AROUND THE EQUIPMENT  
9. PROVISION SHALL BE MADE FOR PRESSURE TESTING AS PER NFPA 15 CLAUSE NO. 6.4.4 & 6.4.4.5 NEAR THE HYDRAULICALLY REMOTEST NOZZLE.  
10. DELUGE VALVES ARE HELD CLOSED BY AIR PRESSURE SUPPLIED FROM THE INSTRUMENT AIR SYSTEM.  
11. DELUGE VALVES SHALL FULLY OPEN WITHIN 10 SECONDS ON REMOVE OF INSTRUMENT AIR BY:  
A. REMOTE OPERATION OF A PUSH BUTTON AT THE MAIN FIRE AND GAS PANEL, LOCATED IN THE CONTROL ROOM, TO ENERGISE A SOLENOID VALVES IN INSTRUMENT AIR SUPPLY TO DELUGE VALVE.  
B. LOCAL OPERATION OF A MECHANICAL AIR RELEASE UNIT OF DELUGE VALVE STATION.  
12. SPRAY NOZZLE IS CONSTRUCTED FROM MALLEABLE BRASS.  
13. DELUGE VALVE STATIONS SHALL BE PROTECTED FROM RADIATED HEAT BY THE PROVISION OF METAL RADIATION SHIELDS  
14. PIPE MOC (AS PER KOC-L-009):  
3" SIZE AND BELOW : 90-10 COPPER NIKEL TO ASTM B 466 UNS.  
4" SIZE AND ABOVE : CARBON STEEL API 5L GRB WITH PHENOLIC EPOXY COATING.  
15. FLANGE INSULATION KITS ARE PROVIDED AT DISSIMILAR METAL JUNCTIONS HAVING ELECTROMOTIVE POTENTIAL DIFFERENCE GREATER THAN 0.05V AS PER CLAUSE 7.3.1.17 OF KOC-L-009.  
16. INTERNALLY COATED UG PIPING ARE FLANGED SPOOLS AS PER KOC-L-009.  
17. FLUSHING DRAIN PIT SHALL BE ACCESSIBLE FROM GROUND LEVEL  
18. THE UNDERGROUND SECTION IS EXTERNALLY COATED WITH 3 LAYERS EXTREND HOPE AS PERKOC-P004 PART 6, REV-2 WITH THE INTERNAL PHENOLIC EPOXY ON THE PIPING SHALL BE AS PER KOC-P-000 REV-1.  
19. THE ABOVE GROUND PIPING SECTION IS COATED WITH SYSTEM A1-1 OF KOC-P-001 REV 3  
20. TOP CHAMBER OF DELUGE VALVE IS CONNECTED TO WATER LINE & TO WATER INLET OF ACTUATOR WHEN THE AIR PRESSURE DROPS DUE TO DETECTION OF FIRE THE DIAPHRAGM OF ACTUATOR IS LIFTED AND ALLOWS THE WATER PRESSURISING DIAPHRAGM OF DELUGE VALVE TOP CHAMBER TO DRAIN. THIS RELEASES THE PRESSURE IN THE TOP CHAMBER OF DELUGE VALVE ALLOWING THE DELUGE VALVE TO OPEN.

LEGENDS:

SYMBOL	DESCRIPTION
FW	FIRE WATER PIPING
SPRAY NOZZLE	SPRAY NOZZLE
REDUCER	REDUCER
GATE VALVE	GATE VALVE
END CAP	END CAP

REFERENCE DRAWINGS:


50489-530-000-CAL-1015	HYDRAULIC CALCULATION FOR WATER SPRAY SYSTEM FOR TANK VAPOUR COMPRESSOR
KOC-L-009	KOC STANDARD FOR FIRE PROTECTION SYSTEMS
50489-530-000-LAD-1065	FIRE WATER NETWORK LAYOUT

Z1	RE-ISSUED FOR AS-BUILT	PAK/DEU	NLI	SRA	RAK	30.09.18
Z0	ISSUED FOR AS-BUILT	PAK/DEU	NLI	SRA	RAK	05.08.18
01	RE-ISSUED FOR CONSTRUCTION	PAK/DEU	NLI	SRA	RAK	16.07.16
0	ISSUED FOR CONSTRUCTION	PAK/DEU	NLI	SRA	RAK	13.05.16
B	RE ISSUED FOR APPROVAL	PAK/DEU	NLI	SRA	RAK	10.12.15
A	ISSUED FOR APPROVAL	PAK/DEU	NLI	SRA	RAK	20.04.15
REV.	DESCRIPTION	DRAWN	CHECKED	HOD	PEM	DATE

CONTRACTOR REVISION

**KUWAIT OIL CO.**  
**K. S. C.**

**شركة نفط الكويت**  
**ك. س. ك.**

CONTRACTOR DETAILS:-	
 <b>LARSEN &amp; TOUBRO LIMITED</b> FARIDABAD	
PROJECT TITLE:- NEW GATHERING CENTRE GC-30 IN NORTH KUWAIT	
DOCUMENT TITLE:- <b>PIPING &amp; INSTRUMENTATION DIAGRAM</b> <b>DELUGE WATER SPRAY SYSTEM FOR TANK VAPOUR COMPRESSOR (530-K-101/201/301)</b>	
PROJECT NO.	DRAWING NO.
CONTRACTOR DRG. NO. <b>50489-530-000-PID-1127.002</b>	REV. KOC DRG. NO. <b>Z1</b>
SHEET NO. <b>2 OF 2</b>	SHEET NO.
COMPANY DRG. NO.	REV.
SHEET NO.	