



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

AS-BUILT
LARSEN & TOUBRO LIMITED
NAME :
DESIGNATION :
SIGNATURE :
DATE :
DEPT/ DIVISION :

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	46

DESIGN CALCULATION	
SURFACE AREA TO BE PROVIDED	117 m2
WATER APPLICATION RATE (L/MIN/m2)	10.2
THEORETICAL FLOW (LPM)	1152.6
HYDRAULICALLY CALCULATED FLOW (LPM) REFER 50489-530-000-LAL-1018	3823

AREA PROTECTED	LINE No.4	LINE No.5	LINE No.7	LINE No.8	LINE No.9	LINE No.10	LINE No.11	LINE No.12	LINE No.13
DIESEL DAY TANK & DIESEL TRANSFER PUMPS	6"-WF-9389-Q15A	6"-WF-9390-Q15A	3"-WF-9392-Q15A1	3"-WF-9393-Q15A1	3"-WF-9394-Q15A1	3"-WF-9395-Q15A	3"-WF-9399-Q15A	2"-WF-9397-Q15A1	2"-WF-9400-Q15A1

GENERAL NOTES:

- A. FOR STANDARD SYMBOLS AND NOMENCLATURE SEE DRAWINGS 50489-530-020-PID-1104.001 & 1105.001.  
B. ALL EQUIPMENT NUMBERS SHOWN ON THIS P&ID ARE PRECEDED BY 530-~.  
C. FOR ESDV, SBDV AND MOV DETAILS SEE DRAWINGS 50489-530-020-PID-1106.001 & 1107.001.  
D. FOR MISCELLANEOUS PIPING DETAILS SEE DRAWING 50489-530-020-PID-1108.001.  
E. FOR TYPICAL VALVING, DRAINAGE AND GENERAL ARRANGEMENT OF LEVEL INSTRUMENTATION, PUMPS AND CONTROL VALVES SEE DRAWING 50489-530-020-PID-1109.001.

NOTES:

- UV/IR FLAME DETECTORS AUTOMATICALLY DETECT FIRE AND WHEN ACTIVATED A SIGNAL IS SENT TO THE F&G PANEL IN THE CCR.
- AIR SET IS FITTED WITH AIR FILTER, REGULATOR AND PI.
- RO SUPPLIED TO GIVE PRESSURE/LOSS CHARACTERISTICS OF THE DELUGE VALVE.
- 4 WAY SUCTION COLLECTION HEAD IS INSTALLED TO ALLOW SECONDARY SUPPLY OF WATER TO DELUGE SYSTEM.
- DELUGE VALVE ARE DIAPHRAGM TYPE DESIGNED FOR DELUGE OPERATION AND BE UL LISTED AND FM APPROVED
- TRIGGER HEAD CONFIGURATION  
1/2" FUSABLE PLUGS OVER PROTECTED EQUIPMENT ON A GENERAL 3 x 3 METRE MATRIX
- VALVES REQUIRED IN BYPASS LINE TO PREVENT UNNECESSARY LOSS OF WATER DUE TO GATE VALVE PASSING.
- ADEQUATE DRAINAGE TO BE PROVIDED AROUND DELUGE SYSTEM TO AVOID ACCUMULATION OF WATER AROUND THE EQUIPMENT
- PROVISION SHALL BE MADE FOR PRESSURE TESTING AS PER NFPA 15 CLAUSE NO. 6.4.4 & 6.4.4.5 NEAR THE HYDRAULICALY REMOTEST NOZZLE.
- DELUGE VALVES ARE HELD CLOSED BY AIR PRESSURE SUPPLIED FROM THE INSTRUMENT AIR SYSTEM.
- 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 PENEL, LOCATED IN THE CONTROL ROOM, TO ENERGIZE A SOLENOID VALVES IN INSTRUMENT AIR SUPPLY TO DELUGE VALVE.  
B. LOCAL OPERATION OF A MECHANICAL AIR RELEASE UNIT OF DELUGE VALVE STATION.
- SPRAY NOZZLE IS CONSTRUCTED FROM MAINE BRASS.
- DELUGE VALVE STATIONS SHALL BE PROTECTED FROM RADIATED HEAT BY THE PROVISION OF METAL RADIATION SHIELDS.
- 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.
- 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.
- INTERNALLY COATED UG PIPING ARE FLANGED SPOOLS AS PER KOC-L-009.
- FLUSHING DRAIN PIT SHALL BE ACCESSIBLE FROM GROUND LEVEL.
- THE UNDERGROUND SECTION IS EXTERNALLY COATED WITH 3 LAYERS EXTRD HDPE AS PERKOC-P004 PART 6, REV-2 WITH THE INTERNAL PHENOLIC EPOXY ON THE PIPING SHALL BE AS PER KOC-P-P-005 REV-1.
- THE ABOVE GROUND PIPING SECTION IS COATED WITH SYSTEM A1-1 OF KOC-P-001 REV 3
- 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 PRESSURIZING DIAPHRAM 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
◻	REDUCER
✕	GATE VALVE
→	END CAP

REFERENCE DRAWINGS:

50489-530-000-CAL-1018	HYDRAULIC CALCULATION FOR WATER SPRAY SYSTEM FOR DIESEL DAY TANK & DIESEL TRANSFER PUMPS
KOC-L-009	KOC STANDARD FOR FIRE PROTECTION SYSTEMS
50489-530-000-LAD-1065	FIRE WATER NETWORK LAYOUT

REV.	DESCRIPTION	DRAWN	CHECKED	HOD APPRD.	PEM	DATE
Z0	ISSUED FOR AS-BUILT	PAK/DEU	NJ	SRA	RAK	25.08.18
01	RE-ISSUED FOR CONSTRUCTION	PAK/DEU	NJ	SRA	RAK	27.07.16
0	ISSUED FOR CONSTRUCTION	PAK/DEU	NJ	SRA	RAK	13.05.16
A	ISSUED FOR APPROVAL	PAK/DEU	NJ	SRA	RAK	24.09.15

CONTRACTOR REVISION



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

**شركة نفط الكويت**  
**ش.م.ك.**

CONTRACTOR DETAILS:-



**LARSEN & TOUBRO LIMITED**  
FARIDABAD

PROJECT TITLE:-  
NEW GATHERING  
CENTRE GC-30 IN NORTH KUWAIT

DOCUMENT TITLE:-  
PIPING & INSTRUMENTATION DIAGRAM  
DELUGE WATER SPRAY SYSTEM FOR DIESEL  
DAY TANK & DIESEL TRANSFER PUMP

PROJECT NO.	DRAWING NO.	
EF1902	CONTRACTOR DRG. NO.	REV. KOC DRG. NO.
	50489-530-000-PID-1130.002	Z0
	SHEET NO. 2 OF 2	SHEET NO.
	COMPANY DRG. NO.	REV.
SHEET NO.		