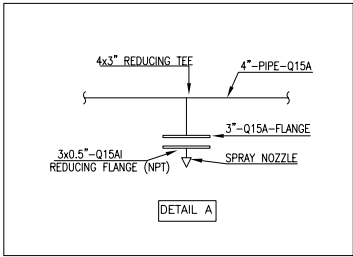
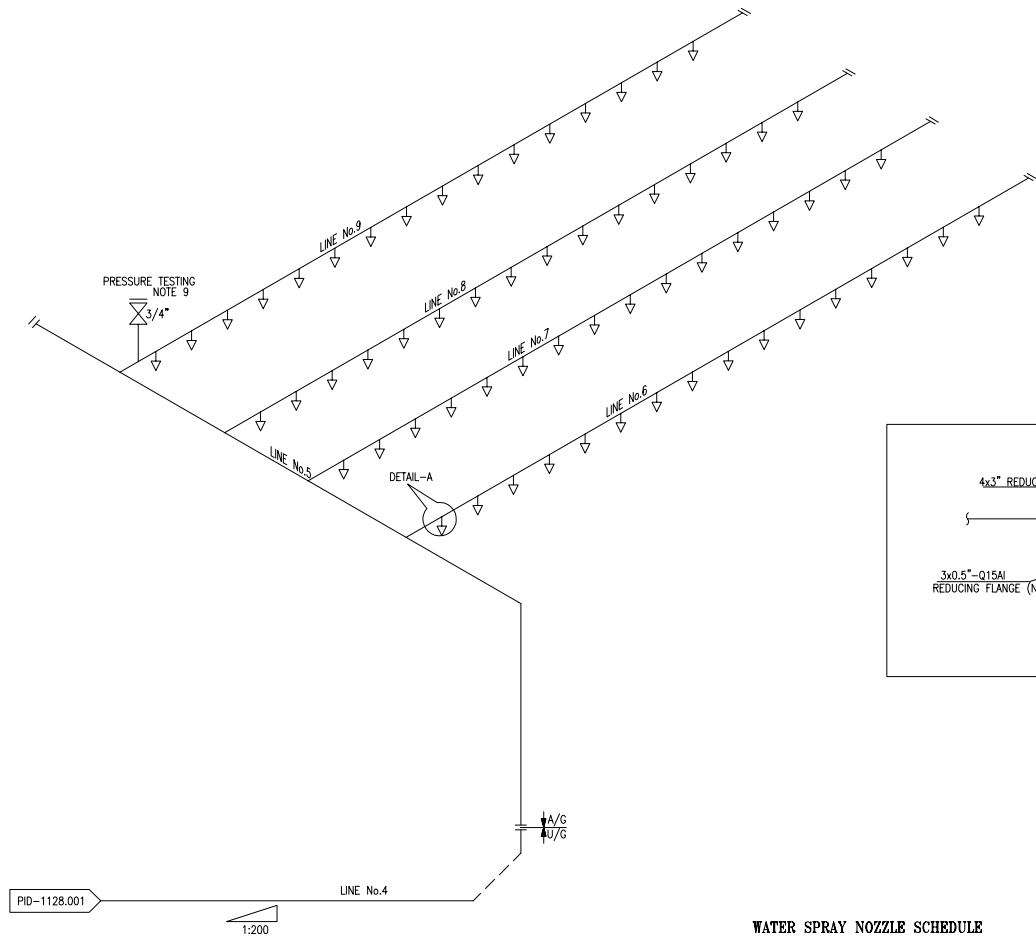


BULK CHEMICAL STORAGE AREA



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°	79	111.7 LPM	64

DESIGN OBJECTIVE : FIRE EXTINGUISHMENT & EXPOSURE PROTECTION	
DESIGN CALCULATION	
TV FLARE KOD SURFACE AREA TO BE PROVIDED	804 m2
WATER APPLICATION RATE (L/MIN/m2)	6.1
THEORETICAL FLOW (LPM)	4904
HYDRAULICALLY CALCULATED FLOW (LPM) REFER 50489-530-000-CAL-1016	8310

AREA PROTECTED	LINE No. 5	LINE No. 6	LINE No. 7	LINE No. 8	LINE No. 9
530-G-101 A/B/C	10"-WF-9253-Q15A	4"-WF-9255-Q15A	4"-WF-9256-Q15A	4"-WF-9257-Q15A	4"-WF-9258-Q15A

GENERAL NOTES:

- A. FOR STANDARD SYMBOLS AND NOMENCLATURE SEE DRAWINGS 50489-530-020-PID-1104.001.
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.
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 PL.
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 DAMPHRAM THE 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 ENERGIZE 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 IRON.
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 EXTENDED HOPE AS PER KOC-PID-A PART 6, REV-2 WITH THE INTERNAL PHENOLIC EPOXY ON THE PIPING SHALL BE AS PER KOC-P-005 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 DAMPHRAM OF ACTUATOR IS LIFTED AND ALLOWS THE WATER PRESSURIZING DAMPHRAM 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
—D	END CAP

REFERENCE DRAWINGS:


50489-530-000-CAL-1016	HYDRAULIC CALCULATION FOR WATER SPRAY SYSTEM FOR BULK CHEMICAL STORAGE AREA
KOC-L-009	KOC STANDARD FOR FIRE PROTECTION SYSTEMS
50489-530-000-LAD-1065	FIRE WATER NETWORK LAYOUT

REV.	DESCRIPTION	DRAWN	CHECKED	HOOD	PEM	DATE
21	ISSUED FOR AS-BUILT	PAK/DBU	NIJ	SRA	RAK	30.09.18
20	ISSUED FOR AS-BUILT	PAK/DBU	NIJ	SRA	RAK	05.08.18
01	ISSUED FOR CONSTRUCTION	PAK/DBU	NIJ	SRA	RAK	16.07.16
0	ISSUED FOR CONSTRUCTION	PAK/DBU	NIJ	SRA	RAK	13.05.16
A	ISSUED FOR APPROVAL	PAK/DBU	NIJ	SRA	RAK	15.10.15

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 WATER SPRAY SYSTEM FOR BULK CHEMICAL STORAGE AREA	
PROJECT NO.	DRAWING NO.
CONTRACTOR DRG. NO. 50489-530-000-PID-1120.002	REV. KOC DRG. NO. 21
SHEET NO. 2 OF 2	SHEET NO.
COMPANY DRG. NO.	REV.
SHEET NO.	