



WATER SPRAY NOZZLE SCHEDULE

TYPE	SIZE	SPRAY ANGLE	K-FACTOR	FLOW Ø2.0 Bar DISCHARGE PRESSURE	QUANTITY
MV	1/2" NPT MALE	140°	51	72.12 LPM	09

AREA PROTECTED	LINE No.4	LINE No.5	LINE No.6	LINE No.7	LINE No.8
CRUDE EXPORT PUMP (530-G-0004 A/B/C)	3"-WF-9243-Q15A	3"-WF-9244-Q15A1	2"-WF-9245-Q15A1	2"-WF-9246-Q15A1	2"-WF-9247-Q15A1

DESIGN OBJECTIVE : FIRE EXTINGUISHMENT & EXPOSURE PROTECTION	
DESIGN CALCULATION	
CRUDE EXPORT PUMP SURFACE AREA TO BE PROVIDED	10 m ² OF EACH PUMP
WATER APPLICATION RATE (L/MIN/m ²)	20.4
THEORETICAL FLOW (LPM) FOR 3 PUMPS	612
HYDRAULICALLY CALCULATED FLOW (LPM) REFER 50489-530-000-CAL-1014	778

GENERAL NOTES:

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

NOTES:

- UV/IR FLAME DETECTORS AUTOMATICALLY DETECT FIRE AND WHEN ACTIVATED A SIGNAL IS SENT TO THE F&G PANEL IN THE COR.
- AIR SET IS FITTED WITH AIR FILTER, REGULATOR AND PL.
- RO SUPPLIED TO GIVE PRESSURE/LOSS CHARACTERISTICS OF THE DELUGE VALVE.
- 4 WAY SUCTION COLLECTION HEAD IS INSTALLED TO ALLOW SECONDARY
- DELUGE VALVE ARE DAMPHRAM 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
- 2 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 HYDRAULICALLY 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 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.
- SPRAY NOZZLE IS CONSTRUCTED FROM MALLEABLE IRON.
- 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 EXTENDED HOPE AS PER KOC-P004 PART 6, REV-2 WITH THE INTERNAL PHENOLIC EPOXY ON THE PIPING SHALL BE AS PER KOC-P-005 REV-1.
- THE ABOVE GROUND PIPING SECTION SHALL BE 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 DAMPHRAM OF ACTUATOR IS LIFTED AND ALLOWS THE WATER PRESSURISING 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
—○—	END CAP

REFERENCE DRAWINGS:

50489-530-000-CAL-1007	HYDRAULIC CALCULATION FOR WATER SPRAY SYSTEM FOR CRUDE EXPORT PUMPS
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	NLJ	SRA	RAK	30.09.18
Z0	ISSUED FOR AS-BUILT	PAK/DEU	NLJ	SRA	RAK	05.08.18
0	ISSUED FOR CONSTRUCTION	PAK/DEU	NLJ	SRA	RAK	13.05.16
B	RE ISSUED FOR CONSTRUCTION	PAK/DEU	NLJ	SRA	RAK	10.12.15
A	ISSUED FOR APPROVAL	JSL/DEU	NLJ	SRA	RAK	21.04.15
REV.	DESCRIPTION	DRAWN	CHECKED	HOD	PEM	DATE

CONTRACTOR REVISION

KUWAIT OIL CO. K. S. C.	 شركة نفط الكويت ش.م.ك.
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CONTRACTOR DETAILS:-	 LARSEN & TOUBRO LIMITED FARIDABAD
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PROJECT TITLE:-	NEW GATHERING CENTRE GC-30 IN NORTH KUWAIT
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DOCUMENT TITLE:-	PIPING & INSTRUMENTATION DIAGRAM DELUGE WATER SPRAY SYSTEM FOR CRUDE EXPORT PUMPS
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PROJECT NO.	DRAWING NO.	
EF1902	CONTRACTOR DRG. NO.	REV. KOC DRG. NO.
	50489-530-000-PID-1126.002	Z1
	SHEET NO. 2 OF 2	SHEET NO.
	COMPANY DRG. NO.	REV.
SHEET NO.		