

**FM-200 GENERAL NOTES**

- THIS DRAWING HAS BEEN PREPARED FOR AND ON BEHALF OF NATIONAL & MARINE FIRE SERVICE LOCATED IN ST. CATHERINES, ONTARIO, HEREINAFTER REFERRED TO AS NAMFIS.
- NO REVISION TO THIS DRAWING SHALL BE MADE WITHOUT THE APPROVAL OF KIDDE-FENWAL, INC.
- THE DESIGN SHOWN ON THIS DRAWING SHALL BE INSTALLED AS SHOWN AND IS INTENDED SOLELY TO PROTECT THE HAZARD(S) SHOWN ON THIS DRAWING. THIS SYSTEM DESIGN SHALL NOT BE USED TO PROTECT ANY HAZARD OTHER THAN THE HAZARD(S) SHOWN ON THIS DRAWING. NOR SHALL THE SYSTEM INSTALLATION DEVIATE FROM THIS DRAWING WITHOUT THE WRITTEN APPROVAL AND CONSENT OF KIDDE-FENWAL, INC.
- KIDDE-FENWAL, INC. IS NOT RESPONSIBLE TO PROVIDE EQUIPMENT OR MATERIAL SHOWN ON THIS DRAWING THAT IS NOT LISTED IN THE BILL OF MATERIAL.
- THIS DRAWING AND THE DESIGN SHOWN ON THIS DRAWING ARE IN COMPLIANCE WITH THE APPLICABLE NFPA STANDARD(S) IN EFFECT AT THE DATE OF THIS DRAWING. NAMFIS IS RESPONSIBLE TO REVIEW THIS DRAWING IN ORDER TO INSURE COMPLIANCE WITH ANY REVISION TO THE APPLICABLE NFPA STANDARDS, OR ANY OTHER APPLICABLE CODES AND REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION (AHJ).
- THIS SYSTEM SHOULD BE INSTALLED, MAINTAINED AND TESTED BY A KIDDE-FENWAL, INC. AUTHORIZED DISTRIBUTOR (NAMFIS). PERSONNEL INSTALLING, MAINTAINING OR TESTING THIS SYSTEM SHALL BE KNOWLEDGEABLE OF AND THOROUGHLY UNDERSTAND ALL THE REQUIREMENTS IN THE NFPA STANDARD, ANY OTHER APPLICABLE CODES THEN IN EFFECT, THE CURRENT VERSION OF THE KIDDE-FENWAL, INC. DESIGN, INSTALLATION, OPERATION AND MAINTENANCE MANUALS, ANY APPLICABLE TECHNICAL BULLETINS, AND THE REQUIREMENTS OF THE AHJ.
- NAMFIS IS RESPONSIBLE TO ENSURE THAT THIS SYSTEM, AS INSTALLED, COMPLIES WITH ALL NATIONAL AND LOCAL STANDARDS AND IN ACCORDANCE WITH GOOD ENGINEERING PRACTICE. THE STRUCTURAL INTEGRITY OF THE PROTECTED ENCLOSURE AND ANY REQUIREMENT FOR FREE VENTING ARE THE RESPONSIBILITY OF THE CUSTOMER AND NOT OF KIDDE-FENWAL, INC.
- IN INSTANCES WHERE THE INFORMATION PROVIDED IN THIS DRAWING CONFLICTS WITH ANY REQUIREMENTS STATED IN THE NFPA STANDARD, THE 2000 EDITION OF THE NFPA STANDARD SHALL BE THE GOVERNING DOCUMENT.
- THE DESIGN SHOWN ON THESE DRAWINGS IS BASED UPON INFORMATION RECEIVED BY KIDDE-FENWAL, INC. FROM NAMFIS. KIDDE-FENWAL, INC. HAS NOT VERIFIED THIS INFORMATION. IT IS NAMFIS' RESPONSIBILITY TO VERIFY THE INFORMATION SUPPLIED TO KIDDE-FENWAL, INC. ANY INACCURATE INFORMATION SUPPLIED BY NAMFIS COULD CAUSE THIS FIRE PROTECTION SYSTEM TO BE INEFFECTIVE.

**FM-200 MECHANICAL NOTES**

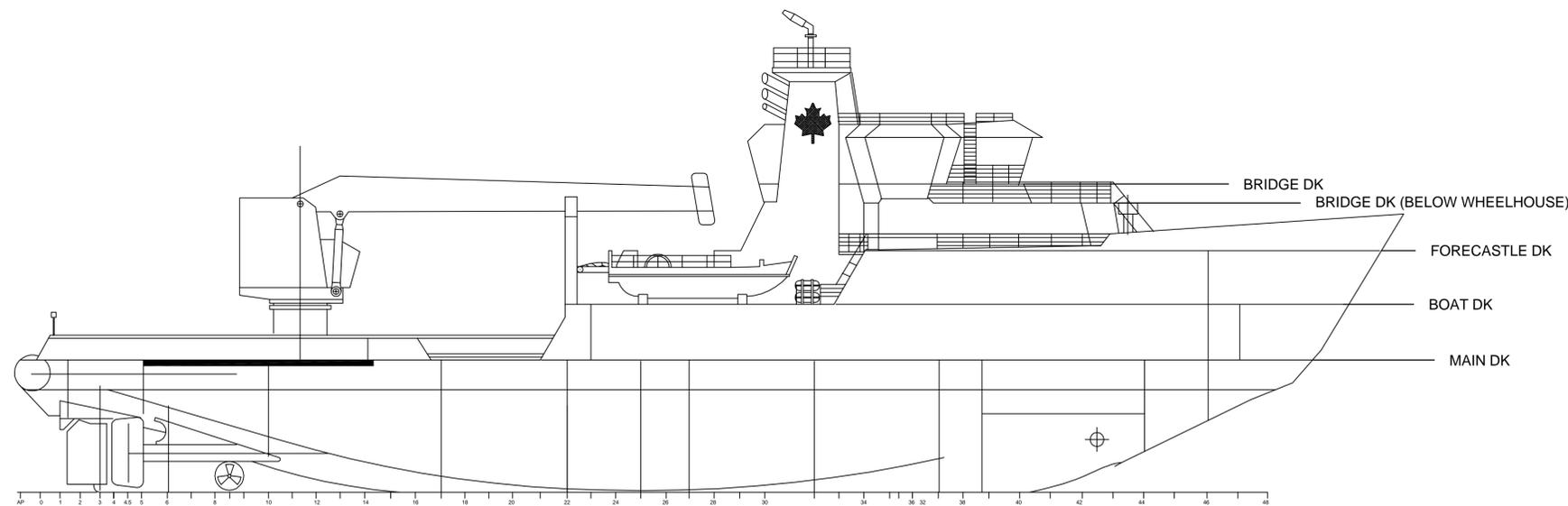
- FOR INSTALLATION REQUIREMENTS, REFER TO NFPA 2001, THE KIDDE FIRE SYSTEMS MARINE FM-200 DESIGN, INSTALLATION, OPERATION AND MAINTENANCE MANUAL, P/N 90-FM200M-021 AND THE KIDDE FIRE SYSTEMS MARINE ADS FM-200 DESIGN, INSTALLATION, OPERATION AND MAINTENANCE MANUAL, P/N 90-ADSMAR-001.
- GALVANIZED PIPE SHALL CONFORM TO ASTM A-53 SEAMLESS OR ERW GRADES A OR B, OR ASTM A-106 SEAMLESS GRADES A, B OR C. ALL PIPE SHALL BE SCHEDULE 40 MINIMUM. FITTINGS SHALL BE CLASS 300 MALLEABLE OR DUCTILE IRON FOR SIZES UP TO AND INCLUDING 80MM (3") AND 1000-LB RATED DUCTILE IRON OR FORGED STEEL FITTINGS FOR ALL LARGER SIZES. ALL FLANGED JOINTS SHALL BE CLASS 300. ALL GROOVED FITTINGS AND COUPLINGS SHALL BE 500-LB RATED AND LISTED. GROOVED COUPLINGS SHALL BE VICTAULIC STYLE 07, STYLE 77, OR EQUIVALENT.
- ALL PIPE SIZE REDUCTIONS MUST BE MADE USING CONCENTRIC REDUCING COUPLINGS DOWNSTREAM OF TEES OR REDUCING TEES. BUSHINGS SHALL NOT BE USED.
- ALL PIPE SHALL BE REAMED AND CLEANED PRIOR TO ASSEMBLY, AND AFTER ASSEMBLY THE ENTIRE PIPING SYSTEM SHALL BE BLOWN OUT USING NITROGEN OR COMPRESSED AIR PRIOR TO NOZZLE OR EQUIPMENT INSTALLATION.
- PIPE SHALL BE SECURELY BRACED TO ACCOUNT FOR DISCHARGE REACTION FORCES AND THERMAL EXPANSION/CONTRACTION. CARE MUST BE TAKEN TO ENSURE THE PIPING IS NOT SUBJECTED TO VIBRATION, MECHANICAL, OR CHEMICAL DAMAGE. ALL HANGERS MUST CONFORM TO GENERAL INDUSTRY STANDARDS FOR PIPE HANGERS AND ANSI B-31.1.
- PRIOR TO COMMISSIONING, THE PIPE NETWORK SHALL BE PRESSURE TESTED TO 2.76 BAR GAUGE (40 PSIG) FOR TEN (10) MINUTES. THE MAXIMUM ALLOWABLE PRESSURE LOSS IS 20% OF THE TEST PRESSURE.
- ALL NOZZLE DROPS SHALL BE MADE USING A CAPPED END TEE.
- PIPE OR TUBING USED FOR PRESSURE ACTUATION SHALL BE ROUTED IN THE MOST DIRECT MANNER WITH THE MINIMUM NUMBER OF FITTINGS. FITTINGS MAY BE FLARED, THREADED (PIPE ONLY), OR COMPRESSION TYPE. THE PRESSURE-TEMPERATURE RATINGS OF THE FITTING MANUFACTURER MUST NOT BE EXCEEDED.
- PREVIOUS HALON SYSTEM ALLOWED CLASS 150 FITTINGS IN 20MM (3/4") AND SMALLER PIPING. CLASS 150 FITTINGS ARE NOT APPROVED FOR USE WITH FM-200 SYSTEMS. ALL FITTINGS MUST BE IN ACCORDANCE WITH MECHANICAL NOTE #2.

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DECK HEIGHTS	
BRIDGE	3.00 METERS
UNDER BRDG	0.95 METERS
FORECASTLE	2.40 METERS
BOAT	2.70 METERS
MAIN	2.80 METERS
BELOW MAIN	6.65 METERS

**FM-200 SYSTEM DATA**

#	PIPE NETWORK DESCRIPTION	CYLINDER SIZE	CYLINDER QUANTITY	CYLINDER LOCATION	ENCLOSURE LOCATION	VOLUME (CU.M.)	MIN DESIGN CONC. (%)	MIN/MAX AMB. TEMP (°C)	MIN AGENT REQ'D (KG)	DELIVERED MASS (KG)	NOZZLE QUANTITY
1	CASING	350 LB (142 L) ECS	2	FR 34, BOAT DECK, STBD	FR 29 - 34, BOAT DECK	79.06	8.7	0 / 54.4	59.4	62.0	2
					FR 28 - 33, MAIN DECK	85.40	8.7	0 / 54.4	64.2	67.6	2
					FR 28 - 29, BOAT DECK	23.06	8.7	0 / 54.4	17.4	17.4	2
2	ELECTRONICS ROOM	20 LB (8 L) ECS	2	FR 33, FOSCLE DECK, CL	FR 30.5 - 33, FOSCLE DECK	21.89	7.6	0 / 54.4	14.2	17.0	1
3	BOSUN'S STORES	350 LB (142 L) ECS	1	FR 46, BOAT DECK, STBD	FR 46 - 49, BOAT DECK	97.83	8.7	0 / 54.4	73.5	73.5	2
4	INCINERATOR ROOM	20 LB (8 L) ECS	1	FR 34, MAIN DECK, STBD	FR 33 - 34, MAIN DECK	8.57	9.0	0 / 54.4	6.7	8.5	1
5	EMERGENCY GENERATOR ROOM	70 LB (28 L) ECS	1	FR 26, MAIN DECK, STBD	FR 26 - 29, MAIN DECK	40.43	8.7	0 / 54.4	30.4	31.0	1
6	PAINT LOCKER	20 LB (8 L) ECS	1	FR 23, MAIN DECK, PORT	FR 23 - 24, MAIN DECK	10.29	9.0	0 / 54.4	8.1	8.5	1
7	ENGINE ROOM CONTROL ROOM	200 LB (81 L) ECS	1	FR 35, BELOW MAIN DECK, PORT	FR 33 - 37, BELOW MAIN DECK	94.41	8.7	0 / 54.4	61.2	61.5	4
8	ENGINE ROOM	675 LB (245 L) ADS	4	VAR, CARGO HOLD, STBD	FR 16 - 33, BELOW MAIN DECK	1373.92	8.7	0 / 54.4	1023.8	1030	16
9	BILGE	225 LB (81 L) ADS	2	VAR, CARGO HOLD, STBD	FR 16 - 33, BELOW MAIN DECK	218.90	8.7	0 / 54.4	164.4	194.0	8
9	WORKSHOP	125 LB (51 L) ECS	2	FR 33, BELOW MAIN DECK STBD	FR 16 - 33, BELOW MAIN DECK	64.24	8.7	0 / 54.4	48.3	48.5	1

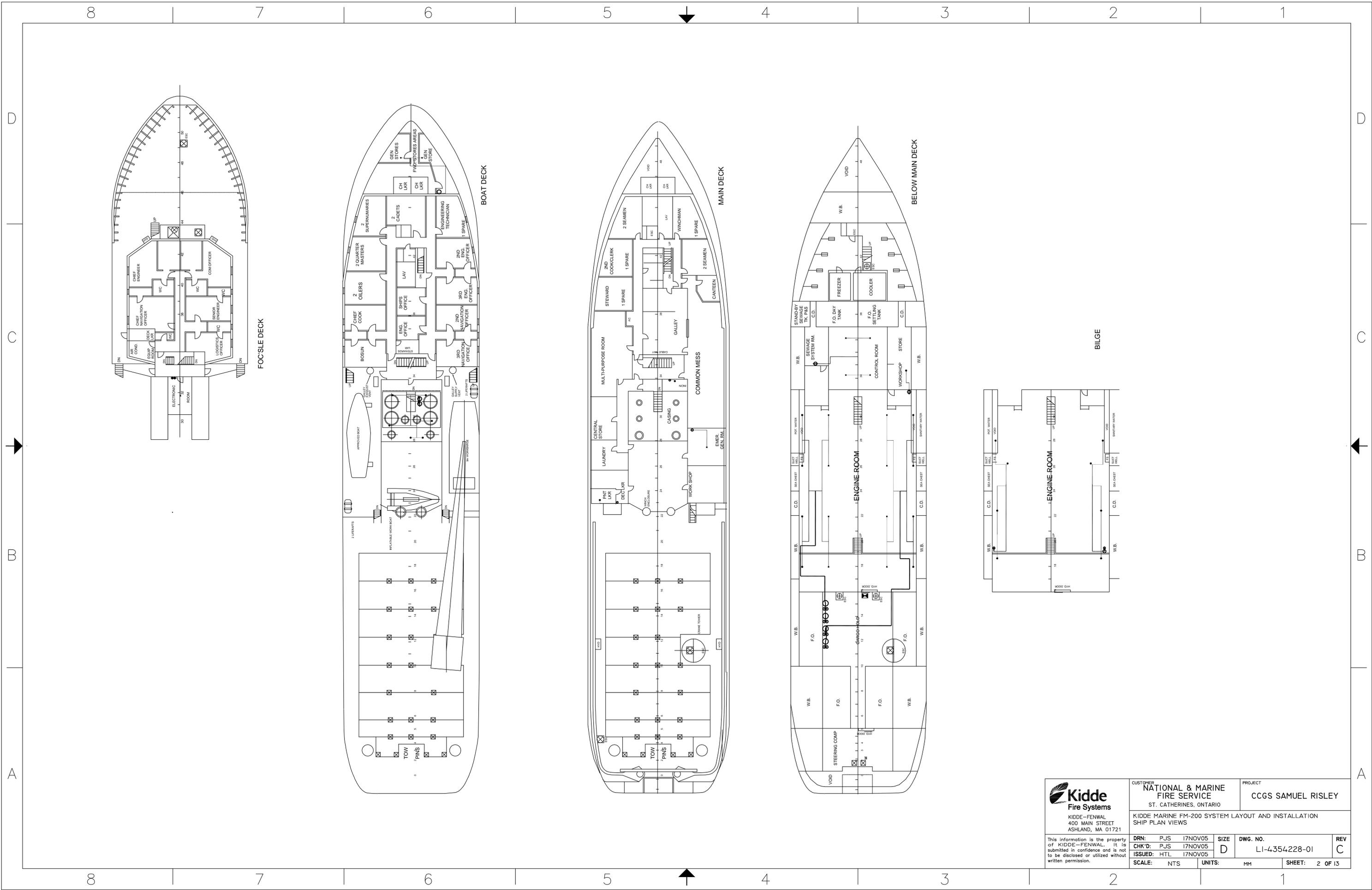


REV.	DESCRIPTION	DATE	APP'D
C	SEE RDC1-4354228-02	17NOV05	HTL
B	SEE RDC1-4354228-01	28OCT04	KLH

**REVISIONS**

<p>KIDDE-FENWAL 400 MAIN STREET ASHLAND, MA 01721</p>	CUSTOMER	NATIONAL & MARINE FIRE SERVICE ST. CATHERINES, ONTARIO	PROJECT	CCGS SAMUEL RISLEY	
	KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION INSTALLATION NOTES, SHIP PROFILE, AND SYSTEM DATA				
	DRN:	PJS 17NOV05	SIZE	DWG. NO.	REV
CHK'D:	PJS 17NOV05	SCALE:	NTS	UNITS:	MM
ISSUED:	HTL 17NOV05	SHEET:	1 OF 13		

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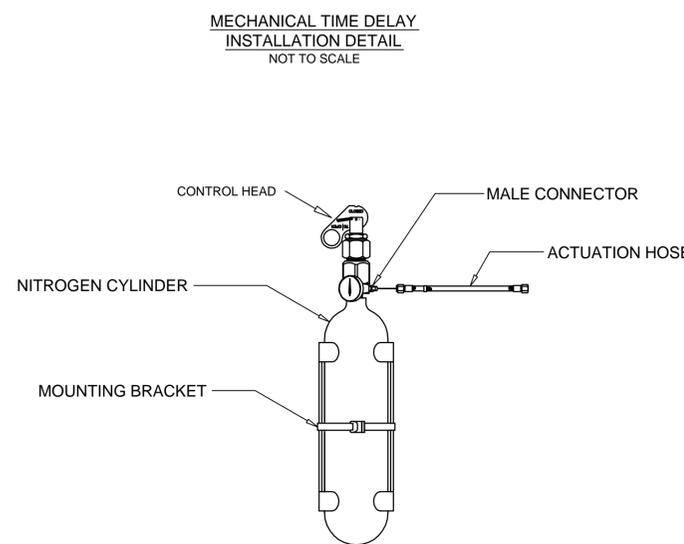
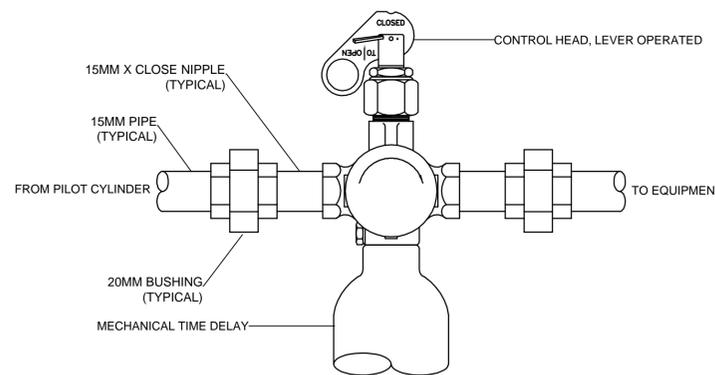


 KIDDE-FENWAL 400 MAIN STREET ASHLAND, MA 01721	CUSTOMER <b>NATIONAL &amp; MARINE          FIRE SERVICE</b> ST. CATHERINES, ONTARIO	PROJECT <b>CCGS SAMUEL RISLEY</b>
	KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION SHIP PLAN VIEWS	
DRN: PJS 17NOV05 CHK'D: PJS 17NOV05 ISSUED: HTL 17NOV05	SIZE <b>D</b>	DWG. NO. <b>L1-4354228-01</b>
SCALE: NTS	UNITS: MM	REV <b>C</b> SHEET: 2 OF 13

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# BILL OF MATERIALS SHIP SET

PART NO.	DESCRIPTION	CASING	ELECTRONICS RM	BOSJUN'S STORES	INCINERATOR RM	EMER GEN RM	PAINT LOCKER	WORKSHOP	ER CONTROL RM	ENGINE ROOM	BILGE	TOTALS
90-190000-001	FM-200 AGENT, STORED IN FACTORY FILLED CONTAINERS (LB)	324	38	162	19	68	19	107	136	2272	428	3573
90-100020-001	20 LB (8 L) ECS SERIES FM-200 CYLINDER, FILLED W/ 19 LB (8.5 KG)	-	2	-	1	-	1	-	-	-	-	4
90-100070-101	70 LB (28 L) ECS SERIES FM-200 CYLINDER W/ LLI, FILLED W/ 68 LB (31.0 KG)	-	-	-	-	1	-	-	-	-	-	1
90-100121-101	125 LB (51 L) ECS SERIES FM-200 CYLINDER W/ LLI, FILLED W/ 107 LB (48.5 KG)	-	-	-	-	-	-	1	-	-	-	1
90-100201-101	200 LB (81 L) ECS SERIES FM-200 CYLINDER, FILLED W/ 136 LB (61.5 KG)	-	-	-	-	-	-	-	1	-	-	1
90-100351-001	350 LB (142 L) ECS SERIES FM-200 CYLINDER W/ LLI, FILLED W/ 162 LB (73.5 KG)	2	-	1	-	-	-	-	-	-	-	3
90-100221-001	225 LB (81 L) ADS SERIES FM-200 CYLINDER W/ LLI, FILLED W/ 214 LB (97.0 KG)	-	-	-	-	-	-	-	-	-	2	2
90-100671-001	675 LB (245 L) ADS SERIES FM-200 CYLINDER W/ LLI, FILLED W/ 568 LB (257.5 KG)	-	-	-	-	-	-	-	-	4	-	4
283904	VALVE OUTLET ADAPTER, 1-1/2"	-	2	-	1	1	1	1	-	-	-	6
283905	VALVE OUTLET ADAPTER, 2"	2	-	1	-	-	-	-	1	-	2	6
90-102300-001	NITROGEN DRIVER CYLINDER & VALVE ASSEMBLY, (FOR USE WITH 225 LB CYL)	-	-	-	-	-	-	-	-	-	2	2
90-104070-001	NITROGEN DRIVER CYLINDER & VALVE ASSEMBLY, (FOR USE WITH 675 LB CYL)	-	-	-	-	-	-	-	-	8	-	8
06-129944-002	2 CYLINDER SET, ACTUATION ARRANGEMENT KIT (225 LB./395 LB.)	-	-	-	-	-	-	-	-	-	1	1
06-129986-004	4 CYLINDER SET, ACTUATION ARRANGEMENT KIT (675 LB./1010 LB.)	-	-	-	-	-	-	-	-	1	-	1
872450	DICHARGE HEAD, PLAIN NUT	-	-	-	-	-	-	-	-	8	2	10
06-118207-002	NITROGEN TRANSFER HOSE, 3/4" OUTLET, 14.75" OAL, (FOR USE WITH 225 LB CYL)	-	-	-	-	-	-	-	-	2	-	2
06-118207-003	NITROGEN TRANSFER HOSE, 3/4" OUTLET, 23.65" OAL, (FOR USE WITH 675 LB CYL)	-	-	-	-	-	-	-	-	8	-	8
283945	CYLINDER STRAP, ECS SERIES 20 LB	-	4	-	2	-	2	-	-	-	-	8
283934	CYLINDER STRAP, ECS SERIES 70 LB	-	-	-	-	2	-	-	-	-	-	2
WK-878760-000	CYLINDER CRADLE, ECS SERIES 70 LB	-	-	-	-	2	-	-	-	-	-	2
235317	CYLINDER STRAP, ECS SERIES 125LB & 200LB, ADS SERIES 225 LB	-	-	-	-	-	-	2	2	-	4	8
235431	CYLINDER CRADLE, ECS SERIES 125LB & 200LB, ADS SERIES 225 LB	-	-	-	-	-	-	2	2	-	4	8
281866	CYLINDER STRAP, ECS SERIES 350 LB	4	-	2	-	-	-	-	-	-	-	6
281867	CYLINDER CRADLE, ECS SERIES 350 LB	4	-	2	-	-	-	-	-	-	-	6
294651	CYLINDER STRAP, ADS SERIES 675 LB	-	-	-	-	-	-	-	-	8	-	8
294652	CYLINDER CRADLE, ADS SERIES 675 LB	-	-	-	-	-	-	-	-	8	-	8
270014	NITROGEN DRIVER CYLINDER STRAP, (FOR USE WITH 90-102300-001 DRIVER CYL)	-	-	-	-	-	-	-	-	-	4	4
06-236173-001	TWO CYLINDER STRAP, (FOR USE WITH 2 X 90-104070-001 DRIVER CYL)	-	-	-	-	-	-	-	-	8	-	8
264985	CHECK VALVE, 1/4"	-	-	-	-	-	-	-	2	-	-	2
800266	CHECK VALVE, 3/4"	-	2	-	-	-	-	-	-	-	-	2
06-118213-001	SWING CHECK, 2"	2	-	-	-	-	-	-	-	-	-	2
06-118058-001	SWING CHECK, 3"	-	-	-	-	-	-	-	-	4	-	4
877940	108 CU IN NITROGEN CYLINDER & VALVE	-	2	2	2	2	2	2	2	-	-	12
877845	MOUNTING BRACKET, 108 CU IN NITROGEN CYLINDER	-	2	2	2	2	2	2	2	-	-	12
878737	CONTROL HEAD, PRESSURE	4	2	1	1	1	1	1	1	3	1	16
870652	CONTROL HEAD, LEVER	-	5	5	5	5	5	-	5	5	-	35
69920501	MALE CONNECTOR, 1/8" NPT X 5/16" FLARE	-	4	4	4	4	4	-	4	-	-	24
264986	ACTUATION HOSE, 1/4", 30 IN	-	2	2	2	2	2	-	2	1	1	14
803242	SAFETY OUTLET, N2	-	2	2	2	2	2	-	2	2	-	14
870023	STOP VALVE, 1/2" NPT	-	-	-	-	-	-	-	-	-	-	-
486536	PRESSURE SWITCH, 3PDT	-	2	2	2	2	2	-	2	2	-	14
06-118262-001	CYLINDER SUPERVISORY PRESSURE SWITCH, 40MM, 50MM & 65MM VALVES	2	2	1	1	1	1	1	1	-	-	10
81-871072-001	TIME DELAY, 34 SECOND (FOR USE WITH 108-CU.IN N2 CYLINDER)	-	1	1	1	1	1	-	1	-	-	6
81-871072-003	TIME DELAY, 35 SECOND (FOR USE WITH 1040-CU.IN N2 CYLINDER)	-	-	-	-	-	-	-	-	-	1	1
06-129978-001	DUAL LOOP BLEED KIT	4	2	1	1	1	1	1	1	3	1	16
06-236215-001	HEAVY DUTY ACTUATION HOSE, 3/4"	4	2	1	1	1	1	1	1	2	-	14
90-101040-000	1040-CU.IN. NITROGEN PILOT CYLINDER	2	-	-	-	-	-	-	-	4	-	6
06-118207-002	3/4" NITROGEN DISCHARGE HOSE, 14.75"	2	-	-	-	-	-	-	-	4	-	6
872450	DISCHARGE HEAD, PLAIN NUT	2	-	-	-	-	-	-	-	4	-	6
270014	CYLINDER STRAP, 1040-CU.IN.	4	-	-	-	-	-	-	-	8	-	12
BY OTHERS	1/4" SCH. 80 SS PIPE (REF. TABLE 4-8, MANUAL 90-FM200M-021)	A/R	A/R	A/R	A/R	A/R	A/R	A/R	A/R	A/R	A/R	A/R
90-194129-316	ORIFICE FITTING, ADS 675 LB CYLINDERS	-	-	-	-	-	-	-	-	4	-	4
90-194129-213	ORIFICE FITTING, ADS 225 LB CYLINDERS	-	-	-	-	-	-	-	-	2	-	2
SEE TABLES	DISCHARGE NOZZLES	6	1	2	1	1	1	1	4	16	8	41



**PIPE SUPPORTS - THREADED, WELDED, OR GROOVED PIPE**  
1. ALL PIPING SHALL BE SECURELY SUPPORTED IN ACCORDANCE WITH THE FOLLOWING TABLE:

NOMINAL PIPE SIZE	10MM	15MM	20MM	25MM	32MM	40MM	50MM	65MM	80MM
MAXIMUM HORIZONTAL SPACING	2.10	2.10	2.10	2.10	2.10	2.70	3.00	3.35	3.65

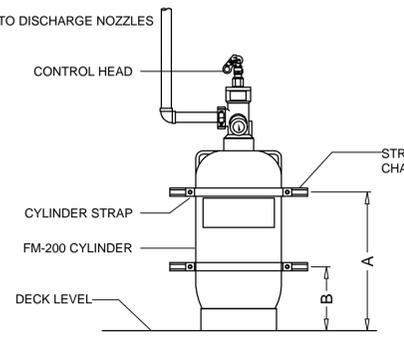
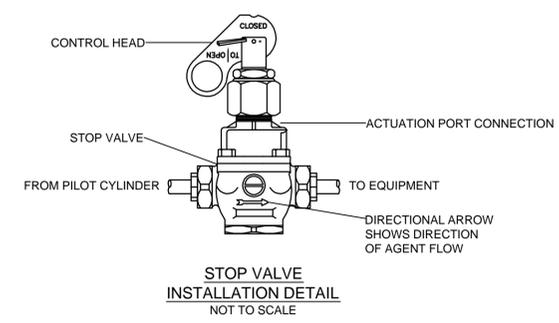
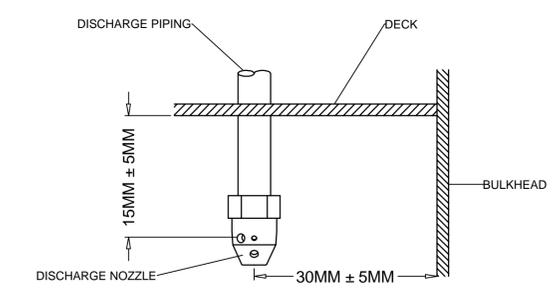
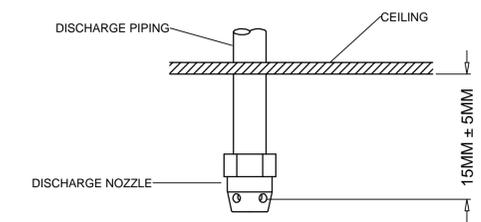
2. RISER SUPPORTS SHALL TAKE INTO CONSIDERATION THE ENTIRE WEIGHT OF THE RISER INCLUDING, BUT NOT LIMITED TO, PIPE WEIGHT, AGENT WEIGHT, VALVES, FLANGES, SPECIALTIES AND AVAILABLE SUPPORT STRUCTURE.

3. ALL CHANGES IN DIRECTION SHALL HAVE A PIPE SUPPORT WITHIN 600MM OF THE FITTING.

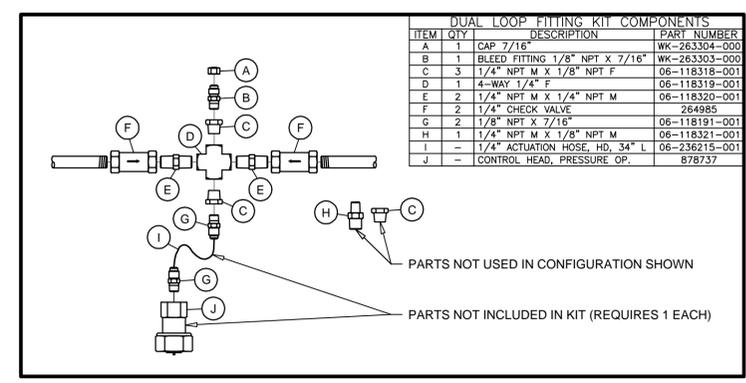
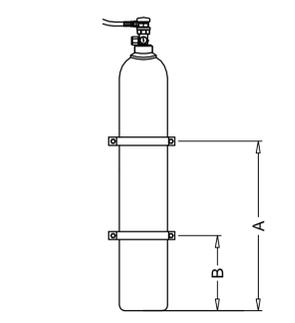
4. ALL CONCENTRATED LOADS (I.E., FLANGES, CHECK VALVES, ETC.) SHALL HAVE A PIPE SUPPORT ON BOTH SIDES OF THE LOAD, SPACED NOT MORE THAN 600MM AWAY FROM THE LOAD.

5. ALL SUPPORT COMPONENTS INCLUDING, BUT NOT LIMITED TO, PIPE ATTACHEMENT, ROD, FIXTURES, CLAMPS, BOLTS AND NUTS, AND BUILDING STRUCTURE SHALL BE PROPERLY SIZED FOR THE PIPE SUPPORT, AND IN ACCORDANCE WITH THE FOLLOWING MINIMUM RATINGS:

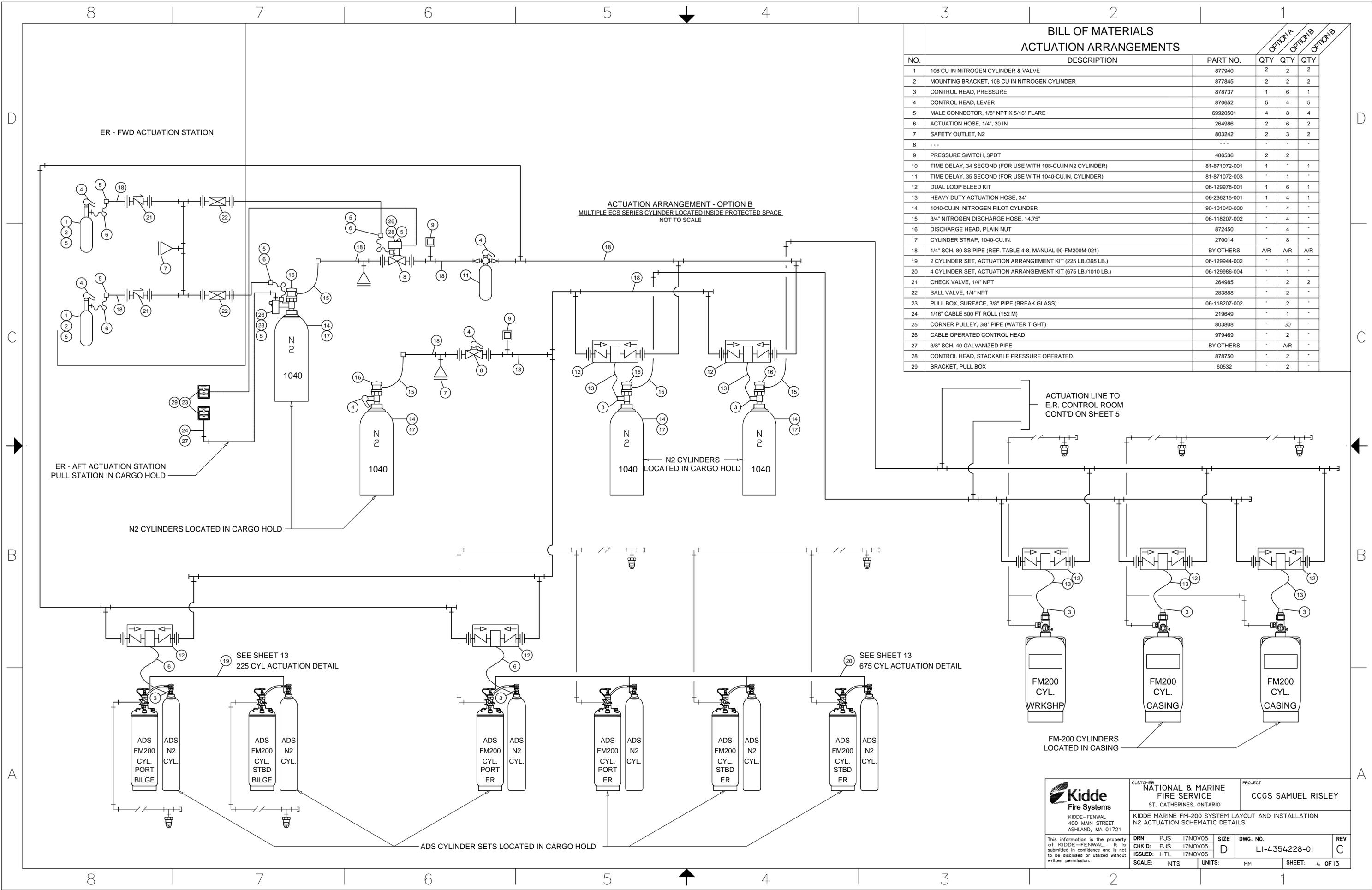
NOMINAL PIPE SIZE	10MM	15MM	20MM	25MM	32MM	40MM	50MM	65MM	80MM
MINIMUM SUPPORT RATING (KGS)	68	68	68	68	68	68	68	77	95



CYLINDER P/N	CYLINDER DESCRIPTION	A	B
90-100020-001	8 L (20-LB) CYLINDER	318	36
90-100121-001	51 L (125-LB) CYLINDER (W/ LLI)	531	211
90-100201-101	81 L (200-LB) CYLINDER (W/ LLI)	752	305
90-100351-001	142 L (350-LB) CYLINDER (W/ LLI)	914	406
90-100601-100	243 L (600-LB) CYLINDER (W/ LLI)	914	406
90-100901-001	368 L (900-LB) CYLINDER (W/ LLI)	1220	406
90-101040-001	17 L (1040-CU.IN) N2 CYLINDER	44	14



 KIDDE-FENWAL 400 MAIN STREET ASHLAND, MA 01721	CUSTOMER <b>NATIONAL &amp; MARINE FIRE SERVICE</b> ST. CATHERINES, ONTARIO	PROJECT <b>CCGS SAMUEL RISLEY</b>
	KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION SHIPSET BILL OF MATERIAL	
DRN: PJS 28OCT04 CHK'D: LM 28OCT04 ISSUED: KLH 28OCT04 SCALE: NTS	SIZE: D DWG. NO.: L1-4354228-01	REV: B SHEET: 3 OF 13



**BILL OF MATERIALS  
ACTUATION ARRANGEMENTS**

NO.	DESCRIPTION	PART NO.	QTY	OPTION A	OPTION B
				QTY	QTY
1	108 CU IN NITROGEN CYLINDER & VALVE	877940	2	2	2
2	MOUNTING BRACKET, 108 CU IN NITROGEN CYLINDER	877845	2	2	2
3	CONTROL HEAD, PRESSURE	878737	1	6	1
4	CONTROL HEAD, LEVER	870652	5	4	5
5	MALE CONNECTOR, 1/8" NPT X 5/16" FLARE	69920501	4	8	4
6	ACTUATION HOSE, 1/4", 30 IN	264986	2	6	2
7	SAFETY OUTLET, N2	803242	2	3	2
8	---	---	---	---	---
9	PRESSURE SWITCH, 3PDT	486536	2	2	---
10	TIME DELAY, 34 SECOND (FOR USE WITH 108-CU.IN N2 CYLINDER)	81-871072-001	1	---	1
11	TIME DELAY, 35 SECOND (FOR USE WITH 1040-CU.IN. CYLINDER)	81-871072-003	---	1	---
12	DUAL LOOP BLEED KIT	06-129978-001	1	6	1
13	HEAVY DUTY ACTUATION HOSE, 3/4"	06-236215-001	1	4	1
14	1040-CU.IN. NITROGEN PILOT CYLINDER	90-101040-000	---	4	---
15	3/4" NITROGEN DISCHARGE HOSE, 14.75"	06-118207-002	---	4	---
16	DISCHARGE HEAD, PLAIN NUT	872450	---	4	---
17	CYLINDER STRAP, 1040-CU.IN.	270014	---	8	---
18	1/4" SCH. 80 SS PIPE (REF. TABLE 4-8, MANUAL 90-FM200M-021)	BY OTHERS	A/R	A/R	A/R
19	2 CYLINDER SET, ACTUATION ARRANGEMENT KIT (225 LB./395 LB.)	06-129944-002	---	1	---
20	4 CYLINDER SET, ACTUATION ARRANGEMENT KIT (675 LB./1010 LB.)	06-129986-004	---	1	---
21	CHECK VALVE, 1/4" NPT	264985	---	2	2
22	BALL VALVE, 1/4" NPT	283888	---	2	---
23	PULL BOX, SURFACE, 3/8" PIPE (BREAK GLASS)	06-118207-002	---	2	---
24	1/16" CABLE 500 FT ROLL (152 M)	219649	---	1	---
25	CORNER PULLEY, 3/8" PIPE (WATER TIGHT)	803808	---	30	---
26	CABLE OPERATED CONTROL HEAD	979469	---	2	---
27	3/8" SCH. 40 GALVANIZED PIPE	BY OTHERS	---	A/R	---
28	CONTROL HEAD, STACKABLE PRESSURE OPERATED	878750	---	2	---
29	BRACKET, PULL BOX	60532	---	2	---

**ACTUATION ARRANGEMENT - OPTION B**  
 MULTIPLE ECS SERIES CYLINDER LOCATED INSIDE PROTECTED SPACE  
 NOT TO SCALE

ACTUATION LINE TO  
 E.R. CONTROL ROOM  
 CONT'D ON SHEET 5

SEE SHEET 13  
 225 CYL ACTUATION DETAIL

SEE SHEET 13  
 675 CYL ACTUATION DETAIL

FM-200 CYLINDERS  
 LOCATED IN CASING

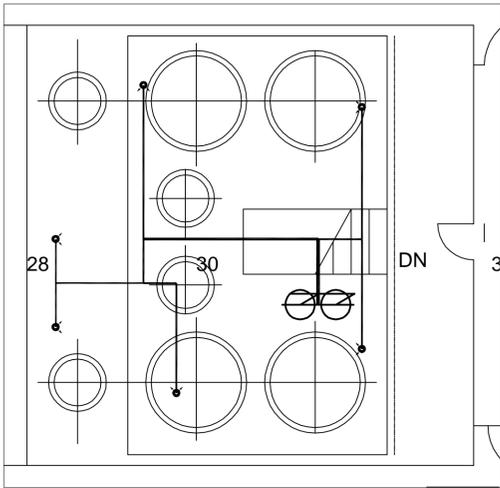
ADS CYLINDER SETS LOCATED IN CARGO HOLD

 KIDDE-FENWAL 400 MAIN STREET ASHLAND, MA 01721	CUSTOMER <b>NATIONAL &amp; MARINE          FIRE SERVICE</b> ST. CATHERINES, ONTARIO	PROJECT <b>CCGS SAMUEL RISLEY</b>
	KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION N2 ACTUATION SCHEMATIC DETAILS	
DRN: PJS 17NOV05 CHK'D: PJS 17NOV05 ISSUED: HTL 17NOV05	SIZE <b>D</b>	DWG. NO. <b>L1-4354228-01</b>
SCALE: NTS	UNITS: MM	REV <b>C</b>
SHEET: 4 OF 13		

BILL OF MATERIALS FR 34, FOSCLE DECK - CASING			
NO.	DESCRIPTION	QTY	PART NO.
1	350 LB (142 L) ECS SERIES FM-200 CYLINDER & VALVE, FILLED WITH 162 LB (73.5 KG)	2	90-100351-001
2	VALVE OUTLET ADAPTER, 2"	2	283905
3	CYLINDER STRAP, ECS SERIES 350 LB.	4	281866
4	CYLINDER CRADLE, ECS SERIES 350 LB.	4	281867
5	SWING CHECK, 2"	2	06-118213-001
6	SUPERVISORY PRESSURE SWITCH	2	06-118262-001
7	DISCHARGE NOZZLES	6	SEE TABLE

USE ACTUATION OPTION B - SEE PAGE 4

- SYSTEM NOTES:**
- 1) SYSTEM PIPING CONSISTS OF NEW PIPE, EXCEPT WHERE NOTED AS "EXISTING"
  - 2) - CYLINDER TO MANIFOLD HEADER CONNECTION  
- 2" (50mm) VALVE OUTLET ADAPTER-  
- 0.60m X 50mmØ, PLUS (1) 90° ELBOW-  
- INCLUDE A UNION INSTALL A 2" (50mm) SWING CHECK BETWEEN EACH CYLINDER AND THE MANIFOLD HEADER-
  - 3) SEE SHEET 3 FOR ECS SERIES CYLINDER DETAIL
  - 4) SEE SHEET 8 FOR N2 CYLINDER LOCATIONS



PLAN VIEW  
FR 28 - 34, BOAT DECK - CASING  
SCALE 1:50

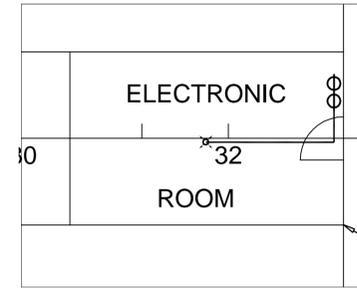
FM-200 NOZZLE TABLE FR 101 - 110, BRIDGE DECK - ICS ROOM				
NOZZLE NUMBER	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	180	305.42	90-194015-272	28.2
E1-N2	180	273.10	90-194015-257	34.6
E1-N3	180	305.42	90-194015-272	31.0
E1-N4	180	289.35	90-194015-266	30.4
E2-N1	180	177.03	90-194014-206	11.4
E2-N2	180	177.03	90-194014-206	11.4

FM-200 NOZZLE TABLE FR 30.5 - 33, FOSCLE DECK - ELECTRONICS ROOM				
NOZZLE NUMBER	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360	171.16	90-194024-206	17.0

BILL OF MATERIALS FR 30.5 - 33, FOSCLE DECK - ELECTRONICS ROOM			
NO.	DESCRIPTION	QTY	PART NO.
1	20 LB (8 L) ECS SERIES FM-200 CYLINDER & VALVE, FILLED WITH 19 LB (8.5 KG)	2	90-100020-001
2	VALVE OUTLET ADAPTER, 1-1/2"	2	283904
3	CYLINDER STRAP, ECS SERIES 20 LB.	4	283945
4	CHECK VALVE, 3/4"	2	800266
5	SUPERVISORY PRESSURE SWITCH	2	06-118262-001
6	DISCHARGE NOZZLES	1	SEE TABLE

USE ACTUATION OPTION A - SEE PAGE 4

- SYSTEM NOTES:**
- 1) SYSTEM PIPING CONSISTS OF NEW PIPE, EXCEPT WHERE NOTED AS "EXISTING"
  - 2) - CYLINDER TO MANIFOLD HEADER CONNECTION  
- 1-1/2" (40mm) VALVE OUTLET ADAPTER-  
- 0.70m X 20mmØ, PLUS (3) 90° ELBOW-  
- INCLUDE A UNION INSTALL A 3/4" (20mm) SWING CHECK BETWEEN EACH CYLINDER AND THE MANIFOLD HEADER-
  - 3) SEE SHEET 3 FOR ECS SERIES CYLINDER DETAIL
  - 4) N2 PILOT CYLINDERS LOCATED IN STAIRWELL FORWARD OF THE ELECTRONICS ROOM.



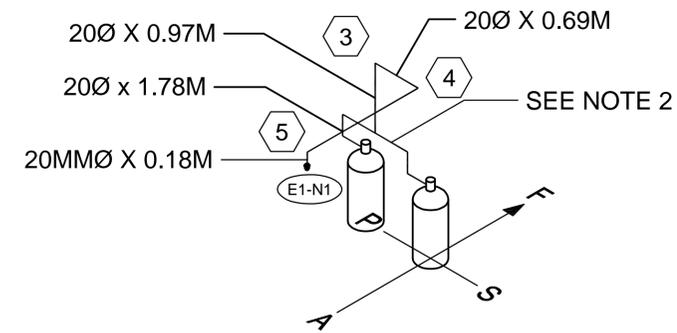
SEE NOTE 4

PLAN VIEW  
FR 30.5 - 33, FOSCLE DECK - ELECTRONICS ROOM  
SCALE 1:50

FLOW CALCULATION FILE  
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November 23, 2004 3:55:00 PM

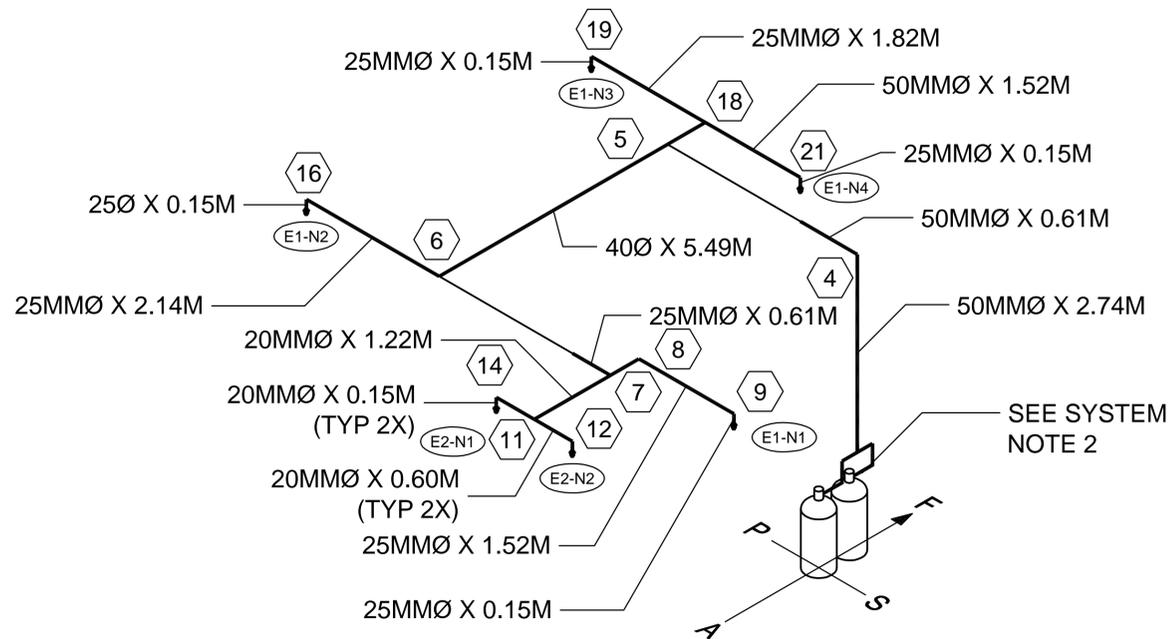
FLOW CALCULATION FILE  
RISLEYCASING  
November 18, 2004 7:27:47 AM

NOTE: ALL DIMENSIONS ARE FROM CENTERLINE TO CENTERLINE OF ELBOWS AND TEES. COUPLINGS AND UNIONS ARE INCLUDED IN THESE DIMENSIONS WHERE SHOWN.



NOTE: ALL DIMENSIONS ARE FROM CENTERLINE TO CENTERLINE OF ELBOWS AND TEES. COUPLINGS AND UNIONS ARE INCLUDED IN THESE DIMENSIONS WHERE SHOWN.

ISOMETRIC VIEW  
FR 30.5 - 33, FOSCLE DECK - ELECTRONICS ROOM  
SCALE 1:50



SEE SYSTEM NOTE 2

 KIDDE-FENWAL 400 MAIN STREET ASHLAND, MA 01721	CUSTOMER	NATIONAL & MARINE FIRE SERVICE ST. CATHERINES, ONTARIO	PROJECT	CCGS SAMUEL RISLEY
	KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION PIPING ARRANGEMENT - CASING & ELECTRONICS ROOM			
This information is the property of KIDDE-FENWAL. It is submitted in confidence and is not to be disclosed or utilized without written permission.	DRN:	PJS 17NOV05	SIZE	DWG. NO.
	CHK'D:	PJS 17NOV05	D	L1-4354228-01
	ISSUED:	HTL 17NOV05	SCALE:	NTS
			UNITS:	MM
				SHEET: 5 OF 13

BILL OF MATERIALS FR 46 - 49, BOAT DECK - BOSUN'S STORES			
NO.	DESCRIPTION	QTY	PART NO.
1	350 LB (142 L) ECS SERIES FM-200 CYLINDER & VALVE, FILLED WITH 162 LB (73.5 KG)	1	90-100351-001
2	VALVE OUTLET ADAPTER, 2"	1	283905
3	CYLINDER STRAP, ECS SERIES 350 LB.	2	281866
4	CYLINDER CRADLE, ECS SERIES 350 LB.	2	281867
5	SUPERVISORY PRESSURE SWITCH	1	06-118262-001
6	DISCHARGE NOZZLES	2	SEE TABLE

FM-200 NOZZLE TABLE FR 46 - 49, BOAT DECK - BOSUN'S STORES				
NOZZLE NUMBER	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360	249.29	90-194025-246	36.8
E1-N2	360	245.29	90-194025-246	36.7

FM-200 NOZZLE TABLE FR 33 - 34, MAIN DECK - INCINERATOR ROOM				
NOZZLE NUMBER	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	180	86.58	90-194013-144	8.5

BILL OF MATERIALS FR 33 - 34, MAIN DECK - INCINERATOR ROOM			
NO.	DESCRIPTION	QTY	PART NO.
1	20 LB (8 L) ECS SERIES FM-200 CYLINDER & VALVE, FILLED WITH 19 LB (8.5 KG)	1	90-100020-001
2	VALVE OUTLET ADAPTER, 1-1/2"	1	283904
3	CYLINDER STRAP, ECS SERIES 20 LB.	2	283945
4	SUPERVISORY PRESSURE SWITCH	1	06-118262-001
5	DISCHARGE NOZZLES	1	SEE TABLE

**USE ACTUATION OPTION A - SEE PAGE 4**

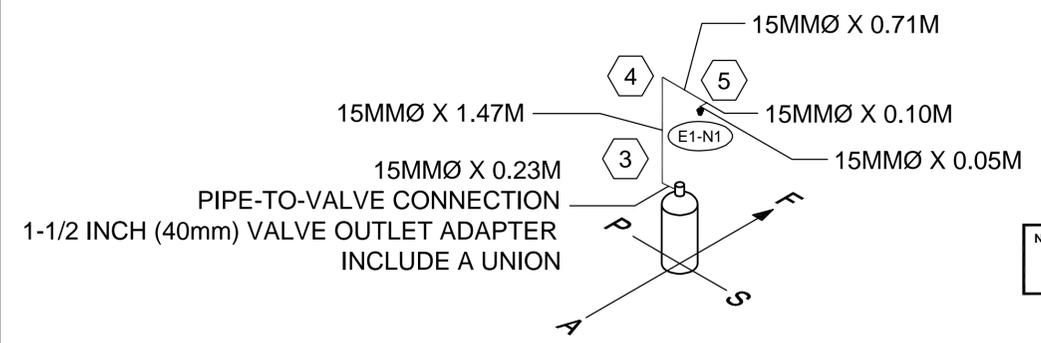
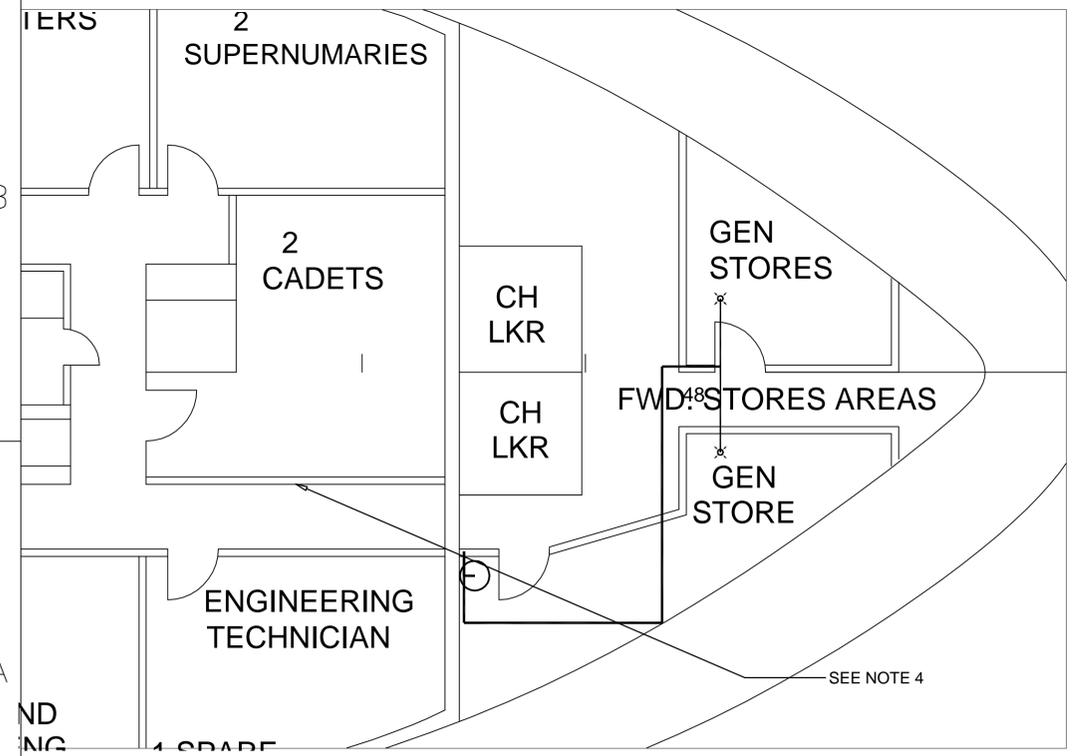
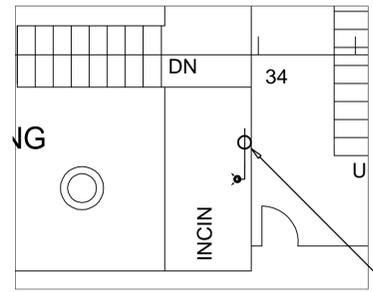
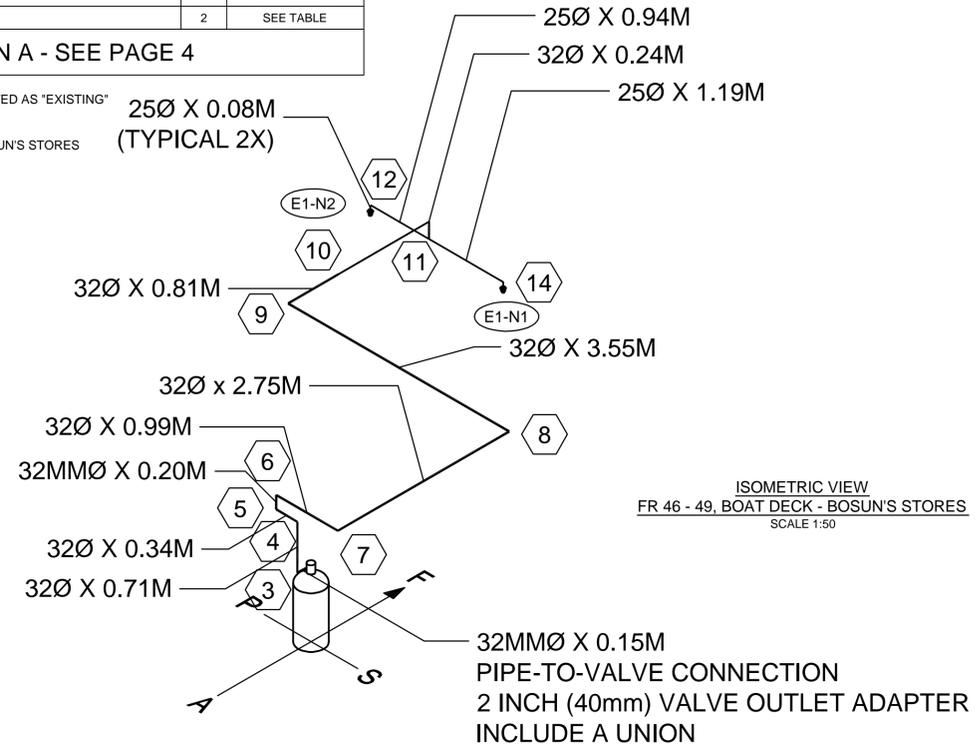
**SYSTEM NOTES:**  
 1) SYSTEM PIPING CONSISTS OF NEW PIPE, EXCEPT WHERE NOTED AS "EXISTING"  
 2) SEE SHEET 3 FOR ECS SERIES CYLINDER DETAIL  
 3) SEE SHEET 3 FOR 180 NOZZLE DETAIL  
 4) N2 PILOT CYLINDER LOCATED IN STAIRWELL AFT OF THE BOSUN'S STORES

**USE ACTUATION OPTION A - SEE PAGE 4**

**SYSTEM NOTES:**  
 1) SYSTEM PIPING CONSISTS OF NEW PIPE, EXCEPT WHERE NOTED AS "EXISTING"  
 2) SEE SHEET 3 FOR ECS SERIES CYLINDER DETAIL  
 3) SEE SHEET 3 FOR 180 NOZZLE DETAIL  
 4) N2 PILOT CYLINDERS LOCATED IN STAIRWELL FORWARD OF THE INCINERATOR ROOM

FLOW CALCULATION FILE  
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NOTE: ALL DIMENSIONS ARE FROM CENTERLINE TO CENTERLINE OF ELBOWS AND TEES. COUPLINGS AND UNIONS ARE INCLUDED IN THESE DIMENSIONS WHERE SHOWN.



NOTE: ALL DIMENSIONS ARE FROM CENTERLINE TO CENTERLINE OF ELBOWS AND TEES. COUPLINGS AND UNIONS ARE INCLUDED IN THESE DIMENSIONS WHERE SHOWN.

FLOW CALCULATION FILE  
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 November 23, 2004 3:42:17 PM

 KIDDE-FENVAL 400 MAIN STREET ASHLAND, MA 01721	CUSTOMER <b>NATIONAL &amp; MARINE FIRE SERVICE</b> ST. CATHERINES, ONTARIO	PROJECT <b>CCGS SAMUEL RISLEY</b>
	KIDDE-MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION PIPING ARRANGEMENTS - BOSUN'S STORES & INCINERATOR ROOM	
DRN: PJS 17NOV05 CHK'D: PJS 17NOV05 ISSUED: HTL 17NOV05	SIZE <b>D</b>	DWG. NO. <b>L1-4354228-01</b>
SCALE: NTS UNITS: MM	SHEET: 6 OF 13	REV <b>C</b>

BILL OF MATERIALS FR 26 - 29, MAIN DECK - EMERGENCY GENERATOR ROOM			
NO.	DESCRIPTION	QTY	PART NO.
1	70 LB (28 L) ECS SERIES FM-200 CYLINDER & VALVE, FILLED WITH 68 LB (31.0 KG)	1	90-100070-001
2	VALVE OUTLET ADAPTER, 1-1/2"	1	283904
3	CYLINDER STRAP, ECS SERIES 125 LB.	2	235317
4	CYLINDER CRADLE, ECS SERIES 125 LB.	2	235431
5	SUPERVISORY PRESSURE SWITCH	1	06-118262-001
6	DISCHARGE NOZZLES	1	SEE TABLE

FM-200 NOZZLE TABLE FR 26 - 29, MAIN DECK - EMER GENERATOR ROOM				
NOZZLE NUMBER	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360	299.93	90-194025-272	31.0

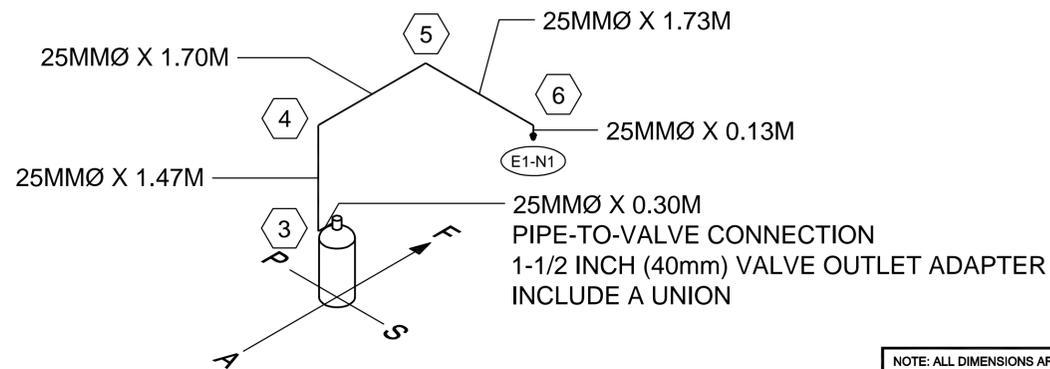
FM-200 NOZZLE TABLE FR 23 - 24, MAIN DECK - PAINT LOCKER				
NOZZLE NUMBER	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	180	86.58	90-194013-144	8.5

BILL OF MATERIALS FR 23 - 24, MAIN DECK - PAINT LOCKER			
NO.	DESCRIPTION	QTY	PART NO.
1	20 LB (8 L) ECS SERIES FM-200 CYLINDER & VALVE, FILLED WITH 19 LB (8.5 KG)	1	90-100020-001
2	VALVE OUTLET ADAPTER, 1-1/2"	1	283904
3	CYLINDER STRAP, ECS SERIES 20 LB.	2	283945
4	SUPERVISORY PRESSURE SWITCH	1	06-118262-001
5	DISCHARGE NOZZLES	1	SEE TABLE

- SYSTEM NOTES:**
- 1) SYSTEM PIPING CONSISTS OF NEW PIPE, EXCEPT WHERE NOTED AS "EXISTING"
  - 2) SEE SHEET 3 FOR ECS SERIES CYLINDER DETAIL
  - 3) SEE SHEET 3 FOR 180 NOZZLE DETAIL
  - 4) N2 PILOT CYLINDER LOCATED OUTSIDE EMERGENCY GENERATOR ROOM

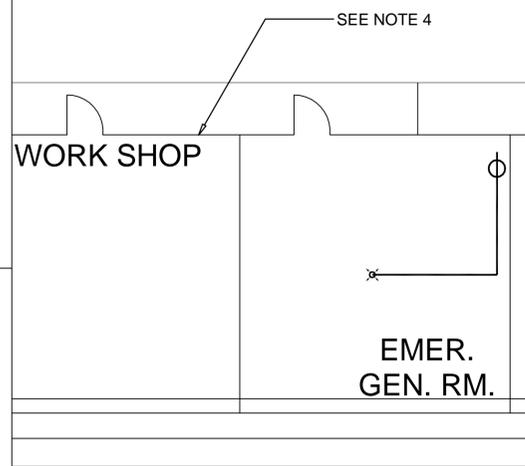
FLOW CALCULATION FILE  
C1-4354228-05B  
November 23, 2004 3:43:28 PM

- SYSTEM NOTES:**
- 1) SYSTEM PIPING CONSISTS OF NEW PIPE, EXCEPT WHERE NOTED AS "EXISTING"
  - 2) SEE SHEET 3 FOR ECS SERIES CYLINDER DETAIL
  - 3) SEE SHEET 3 FOR 180 NOZZLE DETAIL
  - 4) N2 PILOT CYLINDER LOCATED OUTSIDE PAINT LOCKER

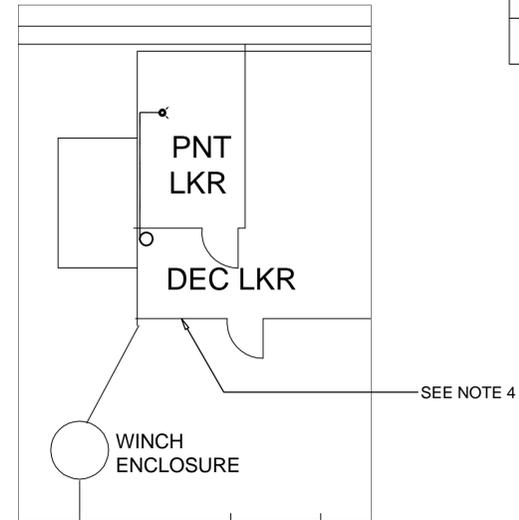


ISOMETRIC VIEW  
FR 26 - 29, MAIN DECK - EMERGENCY GENERATOR ROOM  
SCALE 1:50

NOTE: ALL DIMENSIONS ARE FROM CENTERLINE TO CENTERLINE OF ELBOWS AND TEES. COUPLINGS AND UNIONS ARE INCLUDED IN THESE DIMENSIONS WHERE SHOWN.

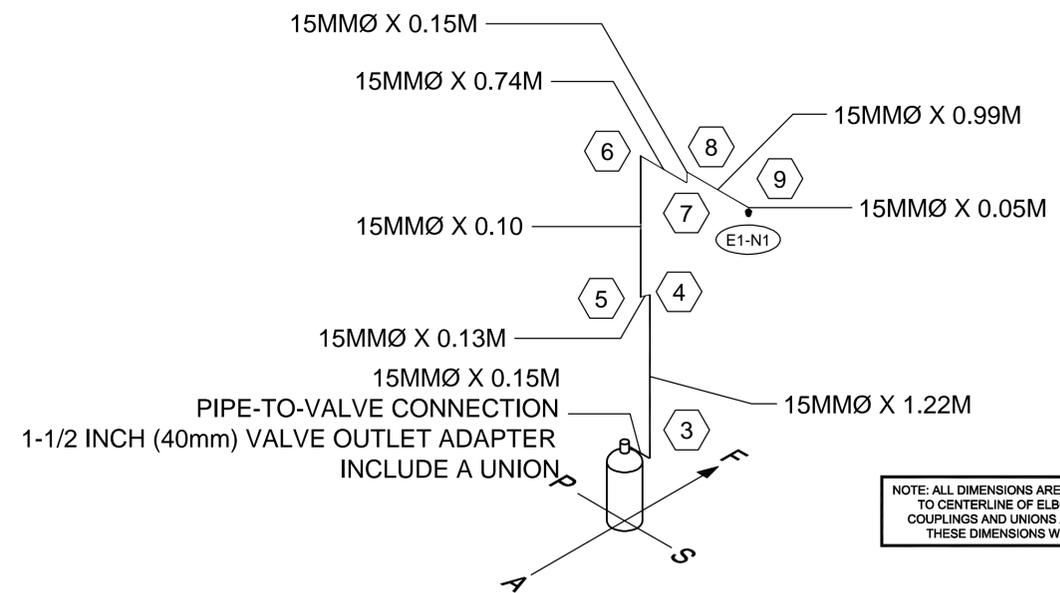


PLAN VIEW  
FR 26 - 29, MAIN DECK - EMERGENCY GENERATOR ROOM  
SCALE 1:50



PLAN VIEW  
FR 23 - 24, MAIN DECK - PAINT LOCKER  
SCALE 1:50

FLOW CALCULATION FILE  
C1-4354228-06B  
November 23, 2004 3:45:04 PM



ISOMETRIC VIEW  
FR 23 - 24, MAIN DECK - PAINT LOCKER  
SCALE 1:50

NOTE: ALL DIMENSIONS ARE FROM CENTERLINE TO CENTERLINE OF ELBOWS AND TEES. COUPLINGS AND UNIONS ARE INCLUDED IN THESE DIMENSIONS WHERE SHOWN.

 KIDDE-FENWAL 400 MAIN STREET ASHLAND, MA 01721	CUSTOMER <b>NATIONAL &amp; MARINE FIRE SERVICE</b> ST. CATHERINES, ONTARIO	PROJECT <b>CCGS SAMUEL RISLEY</b>
	KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION PIPING ARRANGEMENT - EMER GENERATOR ROOM & PAINT LOCKER	
DRN: PJS 17NOV05 CHK'D: PJS 17NOV05 ISSUED: HTL 17NOV05	SIZE D	DWG. NO. L1-4354228-01
SCALE: NTS UNITS: MM	SHEET: 7 OF 13	REV C

BILL OF MATERIALS FR 33 - 37, BELOW MAIN DECK - CONTROL ROOM			
NO.	DESCRIPTION	QTY	PART NO.
1	200 LB (81 L) ECS SERIES FM-200 CYLINDER & VALVE, FILLED WITH 136 LB (61.5 KG)	1	90-100201-101
2	VALVE OUTLET ADAPTER, 2"	1	283905
3	CYLINDER STRAP, ECS SERIES 200 LB.	2	235317
4	CYLINDER CRADLE, ECS SERIES 200 LB.	2	235431
5	SUPERVISORY PRESSURE SWITCH	1	06-118262-001
6	DISCHARGE NOZZLES	4	SEE TABLE

FM-200 NOZZLE TABLE FR 33 - 37, BELOW MAIN DECK - CONTROL ROOM				
NOZZLE NUMBER	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360	183.94 SQ.MM	90-194024-213	15.4
E1-N2	360	183.94 SQ.MM	90-194024-213	15.4
E1-N3	360	183.94 SQ.MM	90-194024-213	15.4
E1-N4	360	183.94 SQ.MM	90-194024-213	15.4

FM-200 NOZZLE TABLE FR 33 - 37, BELOW MAIN DECK - WORKSHOP				
NOZZLE NUMBER	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	180	508.64 SQ.MM.	90-194016-344	48.5

BILL OF MATERIALS FR 33 - 37, BELOW MAIN DECK - WORKSHOP			
NO.	DESCRIPTION	QTY	PART NO.
1	125 LB (51 L) ECS SERIES FM-200 CYLINDER & VALVE, FILLED WITH 107 LB (48.5 KG)	1	90-100121-001
2	VALVE OUTLET ADAPTER, 1-1/2"	1	283904
3	CYLINDER STRAP, ECS SERIES 125 LB.	2	235317
4	CYLINDER CRADLE, ECS SERIES 125 LB.	2	235431
5	SUPERVISORY PRESSURE SWITCH	1	06-118262-001
6	DISCHARGE NOZZLES	2	SEE TABLE

USE ACTUATION OPTION A - SEE PAGE 4

USE ACTUATION OPTION A - SEE PAGE 4

**SYSTEM NOTES:**  
 1) SYSTEM PIPING CONSISTS OF NEW PIPE, EXCEPT WHERE NOTED AS "EXISTING"  
 2) SEE SHEET 3 FOR ECS SERIES CYLINDER DETAIL  
 3) SEE SHEET 3 FOR 180 NOZZLE DETAIL  
 4) N2 PILOT CYLINDER LOCATED ON MAIN DECK IN CENTRAL STAIRWELL AT FRAME 34  
 5) WIRE HORNS & STROBES TO DISCHARGE PRESSURE SWITCH

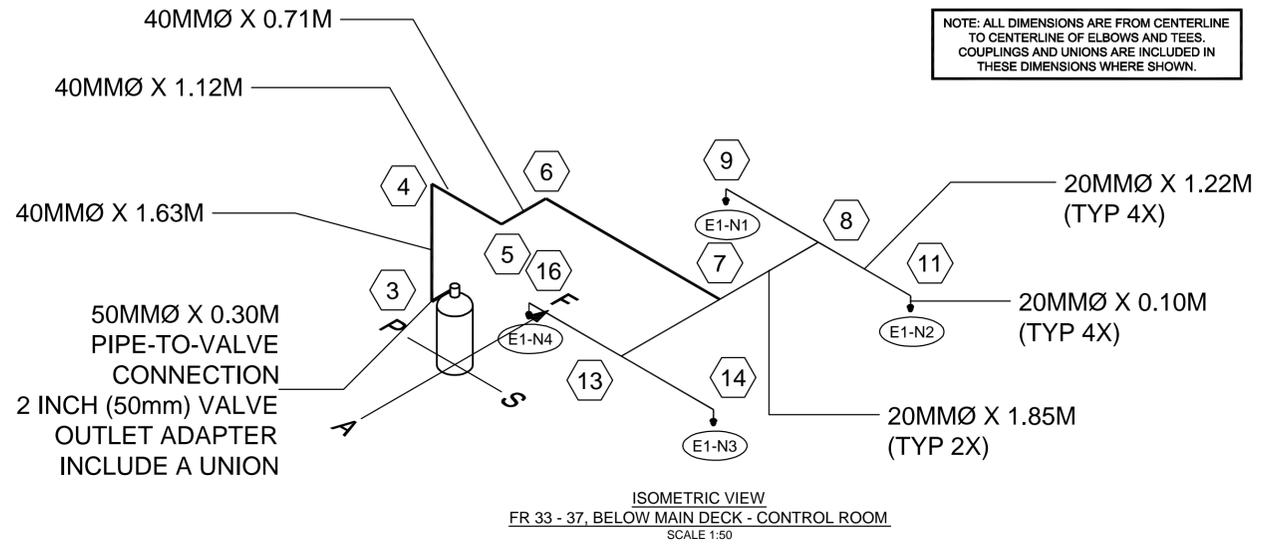
**SYSTEM NOTES:**  
 1) SYSTEM PIPING CONSISTS OF NEW PIPE, EXCEPT WHERE NOTED AS "EXISTING"  
 2) SEE SHEET 3 FOR ECS SERIES CYLINDER DETAIL  
 3) SEE SHEET 3 FOR 180 NOZZLE DETAIL  
 4) N2 PILOT CYLINDER LOCATED ON MAIN DECK IN CENTRAL STAIRWELL AT FRAME 34  
 (SEE PLAN VIEW THIS SHEET)

FLOW CALCULATION FILE  
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FLOW CALCULATION FILE  
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 November 17, 2005 11:36:49 AM

NOTE: ALL DIMENSIONS ARE FROM CENTERLINE TO CENTERLINE OF ELBOWS AND TEES. COUPLINGS AND UNIONS ARE INCLUDED IN THESE DIMENSIONS WHERE SHOWN.

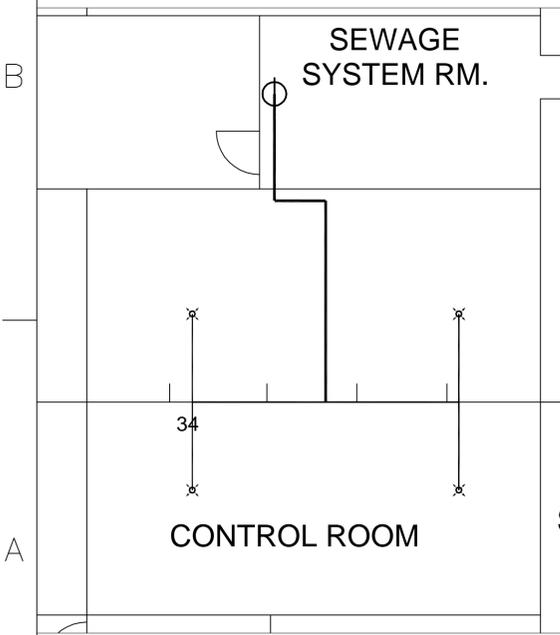
NOTE: ALL DIMENSIONS ARE FROM CENTERLINE TO CENTERLINE OF ELBOWS AND TEES. COUPLINGS AND UNIONS ARE INCLUDED IN THESE DIMENSIONS WHERE SHOWN.



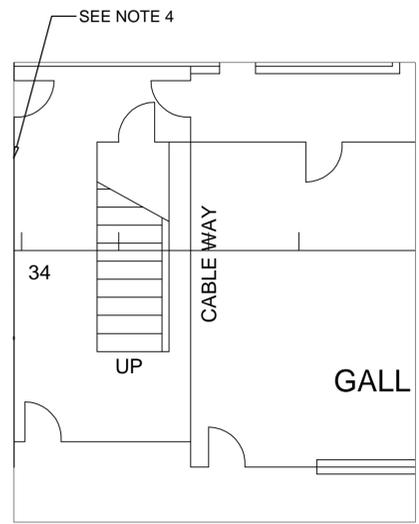
PLAN VIEW  
 FR 33 - 37, BELOW MAIN DECK - WORKSHOP  
 SCALE 1:50

ISOMETRIC VIEW  
 FR 33 - 37, BELOW MAIN DECK - CONTROL ROOM  
 SCALE 1:50

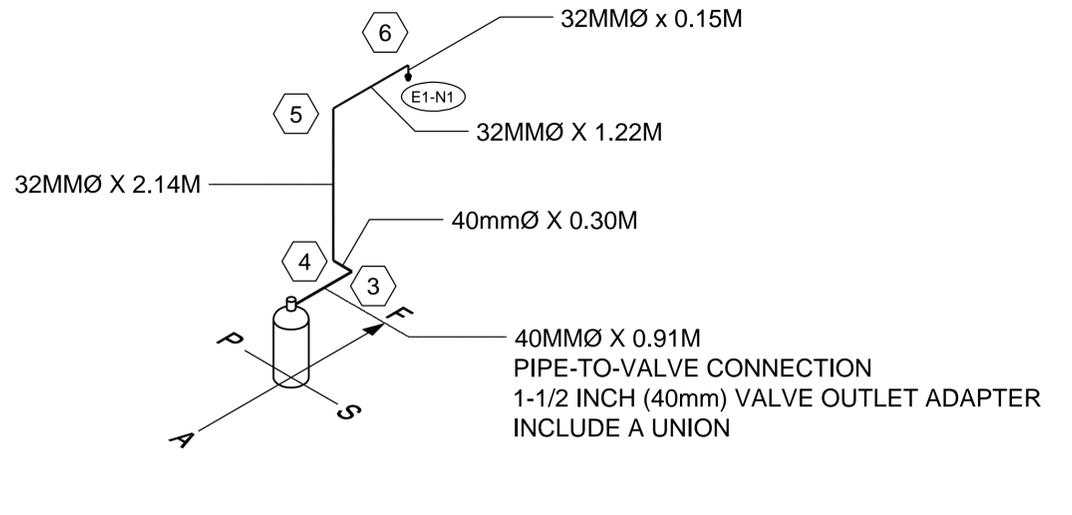
ISOMETRIC VIEW  
 FR 33 - 37, BELOW MAIN DECK - WORKSHOP  
 SCALE 1:50



PLAN VIEW  
 FR 33 - 37, BELOW MAIN DECK - CONTROL ROOM  
 SCALE 1:50



PLAN VIEW  
 FR 34, MAIN DECK - PILOT CYLINDER LOCATION  
 SCALE 1:50



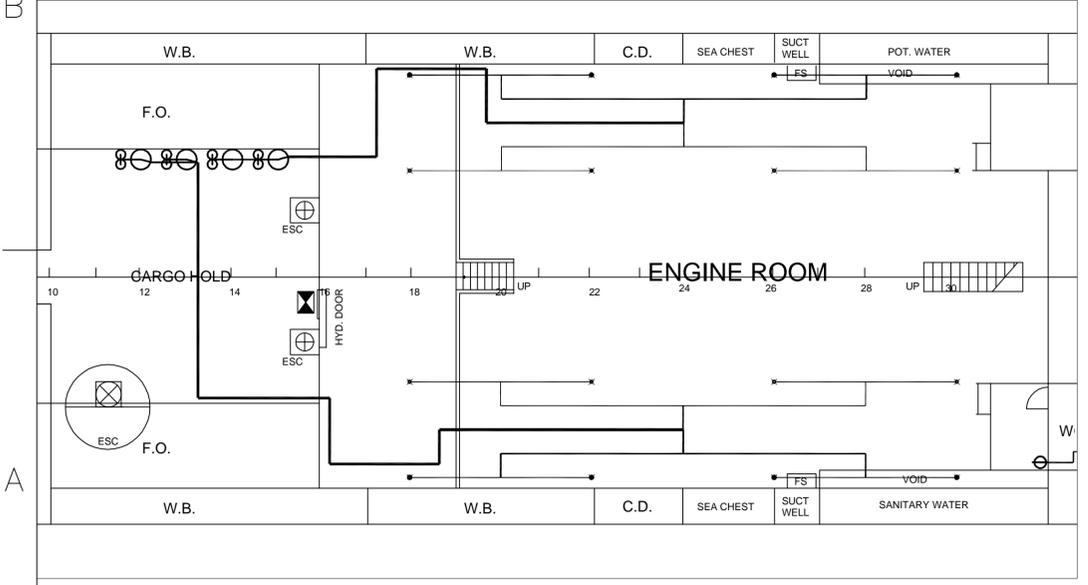
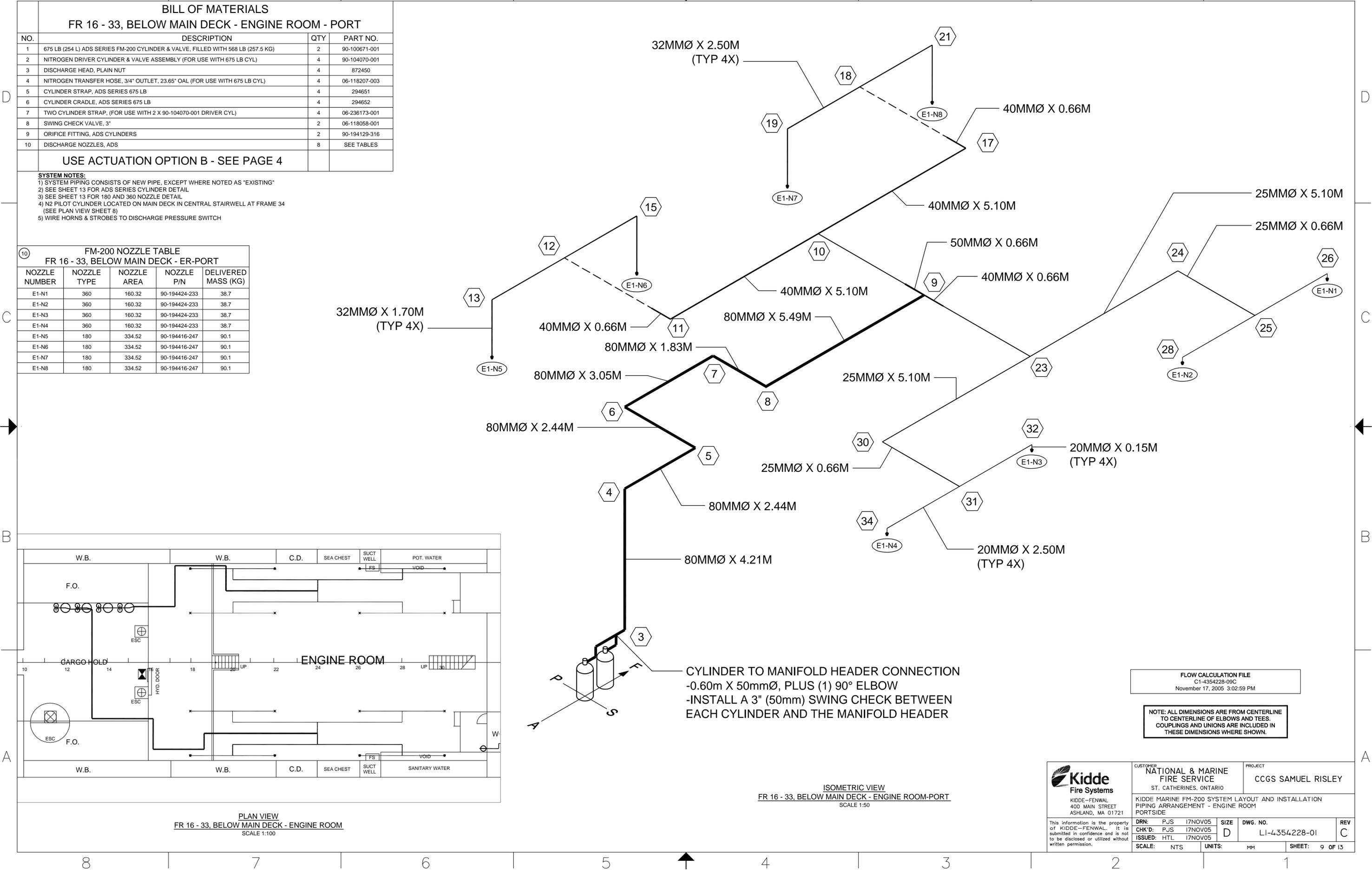
 KIDDE-FENWAL 400 MAIN STREET ASHLAND, MA 01721	CUSTOMER <b>NATIONAL &amp; MARINE FIRE SERVICE</b> ST. CATHERINES, ONTARIO	PROJECT <b>CCGS SAMUEL RISLEY</b>
	KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION PIPING ARRANGEMENT - CONTROL ROOM & WORKSHOP	
DRN: PJS 17NOV05 CHK'D: PJS 17NOV05 ISSUED: HTL 17NOV05	SIZE <b>D</b>	DWG. NO. <b>L1-4354228-01</b>
SCALE: NTS UNITS: MM	SHEET: 8 OF 13	REV <b>C</b>

BILL OF MATERIALS			
FR 16 - 33, BELOW MAIN DECK - ENGINE ROOM - PORT			
NO.	DESCRIPTION	QTY	PART NO.
1	675 LB (254 L) ADS SERIES FM-200 CYLINDER & VALVE, FILLED WITH 568 LB (257.5 KG)	2	90-100671-001
2	NITROGEN DRIVER CYLINDER & VALVE ASSEMBLY (FOR USE WITH 675 LB CYL)	4	90-104070-001
3	DISCHARGE HEAD, PLAIN NUT	4	872450
4	NITROGEN TRANSFER HOSE, 3/4" OUTLET, 23.65' OAL (FOR USE WITH 675 LB CYL)	4	06-118207-003
5	CYLINDER STRAP, ADS SERIES 675 LB	4	294651
6	CYLINDER CRADLE, ADS SERIES 675 LB	4	294652
7	TWO CYLINDER STRAP, (FOR USE WITH 2 X 90-104070-001 DRIVER CYL)	4	06-236173-001
8	SWING CHECK VALVE, 3"	2	06-118058-001
9	ORIFICE FITTING, ADS CYLINDERS	2	90-194129-316
10	DISCHARGE NOZZLES, ADS	8	SEE TABLES

**USE ACTUATION OPTION B - SEE PAGE 4**

**SYSTEM NOTES:**  
 1) SYSTEM PIPING CONSISTS OF NEW PIPE, EXCEPT WHERE NOTED AS "EXISTING"  
 2) SEE SHEET 13 FOR ADS SERIES CYLINDER DETAIL  
 3) SEE SHEET 13 FOR 180 AND 360 NOZZLE DETAIL  
 4) N2 PILOT CYLINDER LOCATED ON MAIN DECK IN CENTRAL STAIRWELL AT FRAME 34 (SEE PLAN VIEW SHEET 8)  
 5) WIRE HORNS & STROBES TO DISCHARGE PRESSURE SWITCH

FM-200 NOZZLE TABLE				
FR 16 - 33, BELOW MAIN DECK - ER-PORT				
NOZZLE NUMBER	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360	160.32	90-194424-233	38.7
E1-N2	360	160.32	90-194424-233	38.7
E1-N3	360	160.32	90-194424-233	38.7
E1-N4	360	160.32	90-194424-233	38.7
E1-N5	180	334.52	90-194416-247	90.1
E1-N6	180	334.52	90-194416-247	90.1
E1-N7	180	334.52	90-194416-247	90.1
E1-N8	180	334.52	90-194416-247	90.1



**PLAN VIEW**  
 FR 16 - 33, BELOW MAIN DECK - ENGINE ROOM  
 SCALE 1:100

CYLINDER TO MANIFOLD HEADER CONNECTION  
 -0.60m X 50mmØ, PLUS (1) 90° ELBOW  
 -INSTALL A 3" (50mm) SWING CHECK BETWEEN EACH CYLINDER AND THE MANIFOLD HEADER

**ISOMETRIC VIEW**  
 FR 16 - 33, BELOW MAIN DECK - ENGINE ROOM-PORT  
 SCALE 1:50

**FLOW CALCULATION FILE**  
 C1-4354228-09C  
 November 17, 2005 3:02:59 PM

**NOTE: ALL DIMENSIONS ARE FROM CENTERLINE TO CENTERLINE OF ELBOWS AND TEES. COUPLINGS AND UNIONS ARE INCLUDED IN THESE DIMENSIONS WHERE SHOWN.**

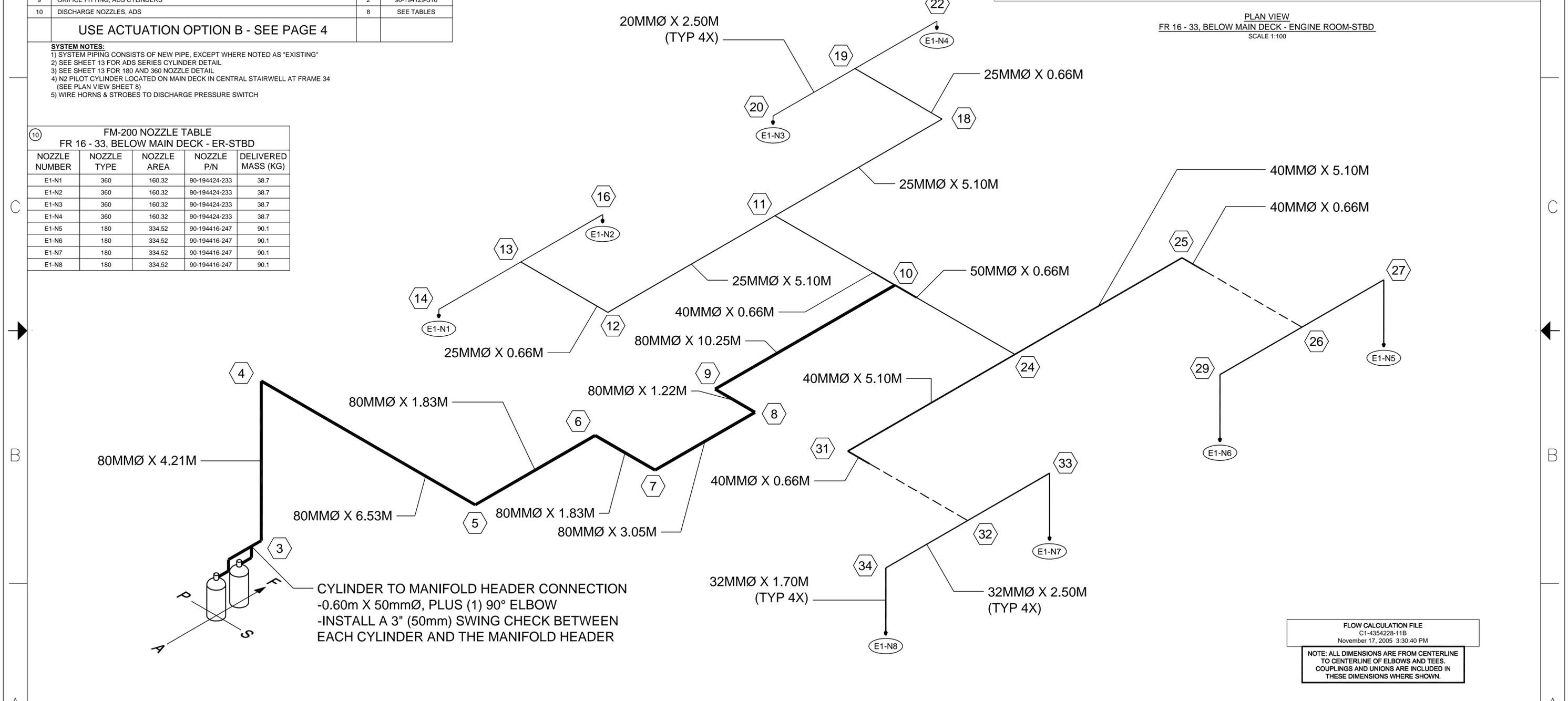
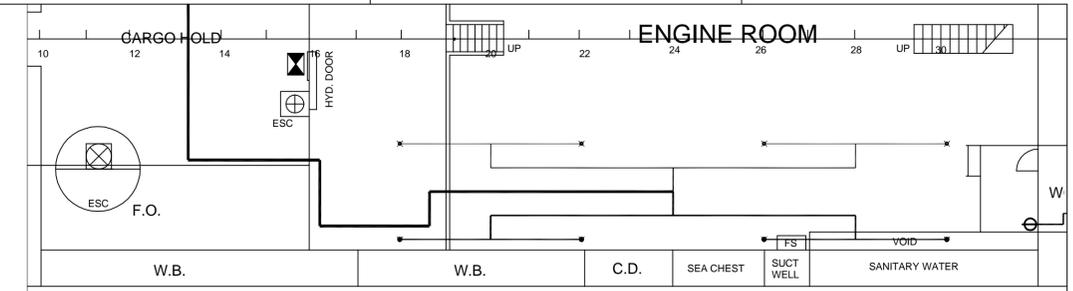
 KIDDE-FENWAL 400 MAIN STREET ASHLAND, MA 01721	CUSTOMER <b>NATIONAL &amp; MARINE FIRE SERVICE</b> ST. CATHERINES, ONTARIO	PROJECT <b>CCGS SAMUEL RISLEY</b>
	KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION PIPING ARRANGEMENT - ENGINE ROOM PORTSIDE	
This information is the property of KIDDE-FENWAL. It is submitted in confidence and is not to be disclosed or utilized without written permission.	DRN: PJS 17NOV05 CHK'D: PJS 17NOV05 ISSUED: HTL 17NOV05	SIZE: D DWG. NO.: L1-4354228-01 SCALE: NTS UNITS: MM SHEET: 9 OF 13

BILL OF MATERIALS			
FR 16 - 33, BELOW MAIN DECK - ENGINE ROOM - STBD			
NO.	DESCRIPTION	QTY	PART NO.
1	675 LB (254 L) ADS SERIES FM-200 CYLINDER & VALVE, FILLED WITH 568 LB (257.5 KG)	2	90-100671-001
2	NITROGEN DRIVER CYLINDER & VALVE ASSEMBLY (FOR USE WITH 675 LB CYL)	4	90-104070-001
3	DISCHARGE HEAD, PLAIN NUT	4	872450
4	NITROGEN TRANSFER HOSE, 3/4" OUTLET, 23.65' OAL (FOR USE WITH 675 LB CYL)	4	06-118207-003
5	CYLINDER STRAP, ADS SERIES 675 LB	4	294651
6	CYLINDER CRADLE, ADS SERIES 675 LB	4	294652
7	TWO CYLINDER STRAP, (FOR USE WITH 2 X 90-104070-001 DRIVER CYL)	4	06-236173-001
8	SWING CHECK VALVE, 3"	2	06-118058-001
9	ORIFICE FITTING, ADS CYLINDERS	2	90-194129-316
10	DISCHARGE NOZZLES, ADS	8	SEE TABLES

**USE ACTUATION OPTION B - SEE PAGE 4**

**SYSTEM NOTES:**  
 1) SYSTEM PIPING CONSISTS OF NEW PIPE, EXCEPT WHERE NOTED AS "EXISTING"  
 2) SEE SHEET 13 FOR ADS SERIES CYLINDER DETAIL  
 3) SEE SHEET 13 FOR 180 AND 360 NOZZLE DETAIL  
 4) N2 PILOT CYLINDER LOCATED ON MAIN DECK IN CENTRAL STAIRWELL AT FRAME 34 (SEE PLAN VIEW SHEET 8)  
 5) WIRE HORNS & STROBES TO DISCHARGE PRESSURE SWITCH

FM-200 NOZZLE TABLE				
FR 16 - 33, BELOW MAIN DECK - ER-STBD				
NOZZLE NUMBER	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360	160.32	90-194424-233	38.7
E1-N2	360	160.32	90-194424-233	38.7
E1-N3	360	160.32	90-194424-233	38.7
E1-N4	360	160.32	90-194424-233	38.7
E1-N5	180	334.52	90-194416-247	90.1
E1-N6	180	334.52	90-194416-247	90.1
E1-N7	180	334.52	90-194416-247	90.1
E1-N8	180	334.52	90-194416-247	90.1



FLOW CALCULATION FILE  
C1-4354228-11B  
November 17, 2005 3:30:40 PM

NOTE: ALL DIMENSIONS ARE FROM CENTERLINE TO CENTERLINE OF ELBOWS AND TEES. COUPLINGS AND UNIONS ARE INCLUDED IN THESE DIMENSIONS WHERE SHOWN.

KIDDE-FENWAL 400 MAIN STREET ASHLAND, MA 01721	CUSTOMER <b>NATIONAL &amp; MARINE FIRE SERVICE</b> ST. CATHERINES, ONTARIO	PROJECT <b>CCGS SAMUEL RISLEY</b>
	KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION PIPING ARRANGEMENT - ENGINE ROOM STARBOARDSIDE	
DRN: PJS 17NOV05 CHK'D: PJS 17NOV05 ISSUED: HTL 17NOV05	SIZE: D DWG. NO.: L1-4354228-01	REV: C
SCALE: NTS UNITS: MM	SHEET: 10 OF 13	

8 7 6 5 4 3 2 1

**BILL OF MATERIALS**  
FR 16 - 33, BELOW MAIN DECK - BILGE - PORT

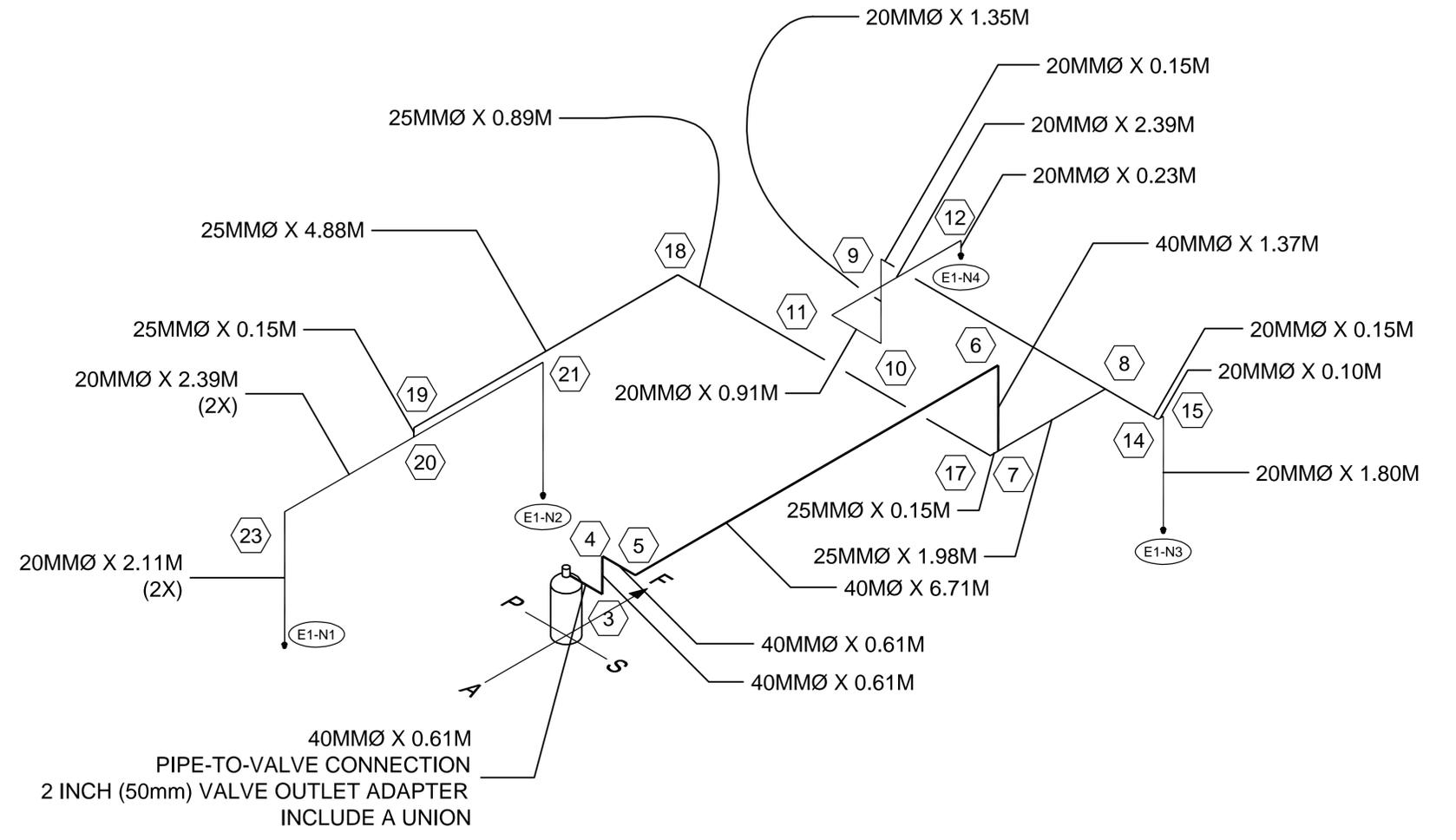
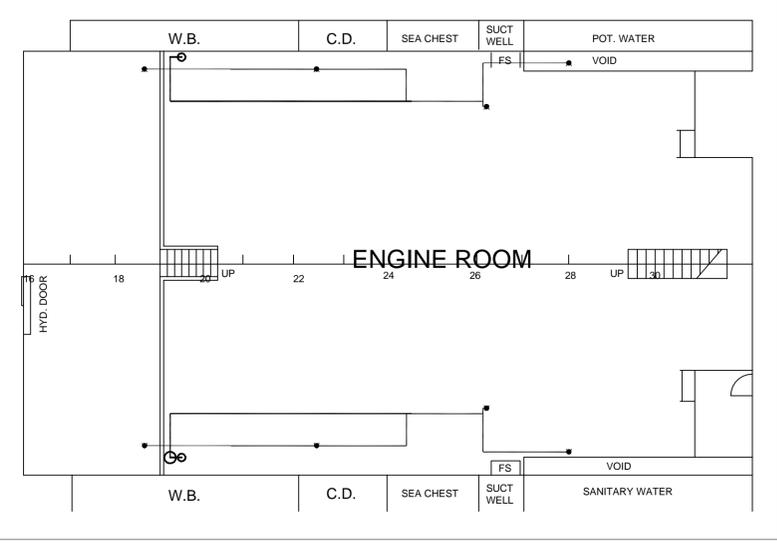
NO.	DESCRIPTION	QTY	PART NO.
1	225 LB (81 L) ADS SERIES FM-200 CYLINDER & VALVE, FILLED WITH 214 LB (97.0 KG)	1	90-100221-001
2	NITROGEN DRIVER CYLINDER & VALVE ASSEMBLY (FOR USE WITH 225 LB CYL)	1	90-102300-001
3	DISCHARGE HEAD, PLAIN NUT	1	872450
4	NITROGEN TRANSFER HOSE, 3/4" OUTLET, 14.75' OAL (FOR USE WITH 225 LB CYL)	1	06-118207-002
5	CYLINDER STRAP, ADS SERIES 225 LB	2	235317
6	CYLINDER CRADLE, ADS SERIES 225 LB	2	235431
7	NITROGEN DRIVER CYLINDER STRAP, (FOR USE WITH 90-102300-001 DRIVER CYL)	2	270014
8	ORIFICE FITTING, ADS CYLINDERS	1	90-194129-213
9	DISCHARGE NOZZLES, ADS	4	SEE TABLES

⑨ FM-200 NOZZLE TABLE  
FR 16 - 33, BELOW MAIN DECK - BILGE-PORT

NOZZLE NUMBER	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	180	72.00 SQ.MM.	90-194414-219	24.1
E1-N2	180	72.00 SQ.MM.	90-194414-219	24.1
E1-N3	180	72.00 SQ.MM.	90-194414-219	24.4
E1-N4	180	72.00 SQ.MM.	90-194414-219	24.4

USE ACTUATION OPTION B - SEE PAGE 4

- SYSTEM NOTES:**
- 1) SYSTEM PIPING CONSISTS OF NEW PIPE, EXCEPT WHERE NOTED AS 'EXISTING'
  - 2) SEE SHEET 13 FOR ADS SERIES CYLINDER DETAIL
  - 3) SEE SHEET 13 FOR 180 AND 360 NOZZLE DETAIL
  - 4) N2 PILOT CYLINDER LOCATED ON MAIN DECK IN CENTRAL STAIRWELL AT FRAME 34 (SEE PLAN VIEW SHEET 8)
  - 5) WIRE HORNS & STROBES TO DISCHARGE PRESSURE SWITCH



FLOW CALCULATION FILE  
C1-4354228-10C  
November 17, 2005 3:36:08 PM

NOTE: ALL DIMENSIONS ARE FROM CENTERLINE TO CENTERLINE OF ELBOWS AND TEES. COUPLINGS AND UNIONS ARE INCLUDED IN THESE DIMENSIONS WHERE SHOWN.

<p>KIDDE-FENWAL 400 MAIN STREET ASHLAND, MA 01721</p>	<p>CUSTOMER <b>NATIONAL &amp; MARINE FIRE SERVICE</b> ST. CATHERINES, ONTARIO</p>	<p>PROJECT <b>CCGS SAMUEL RISLEY</b></p>
	<p>KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION PIPING ARRANGEMENT - BILGE PORTSIDE</p>	
<p>This information is the property of KIDDE-FENWAL. It is submitted in confidence and is not to be disclosed or utilized without written permission.</p>	<p>DRN: PJS 17NOV05 CHK'D: PJS 17NOV05 ISSUED: HTL 17NOV05</p>	<p>SIZE: D DWG. NO.: L1-4354228-01 SCALE: NTS UNITS: MM</p>
		<p>REV: C SHEET: 11 OF 13</p>

8 7 6 5 4 3 2 1

8 7 6 5 4 3 2 1

**BILL OF MATERIALS**  
FR 16 - 33, BELOW MAIN DECK - BILGE - STBD

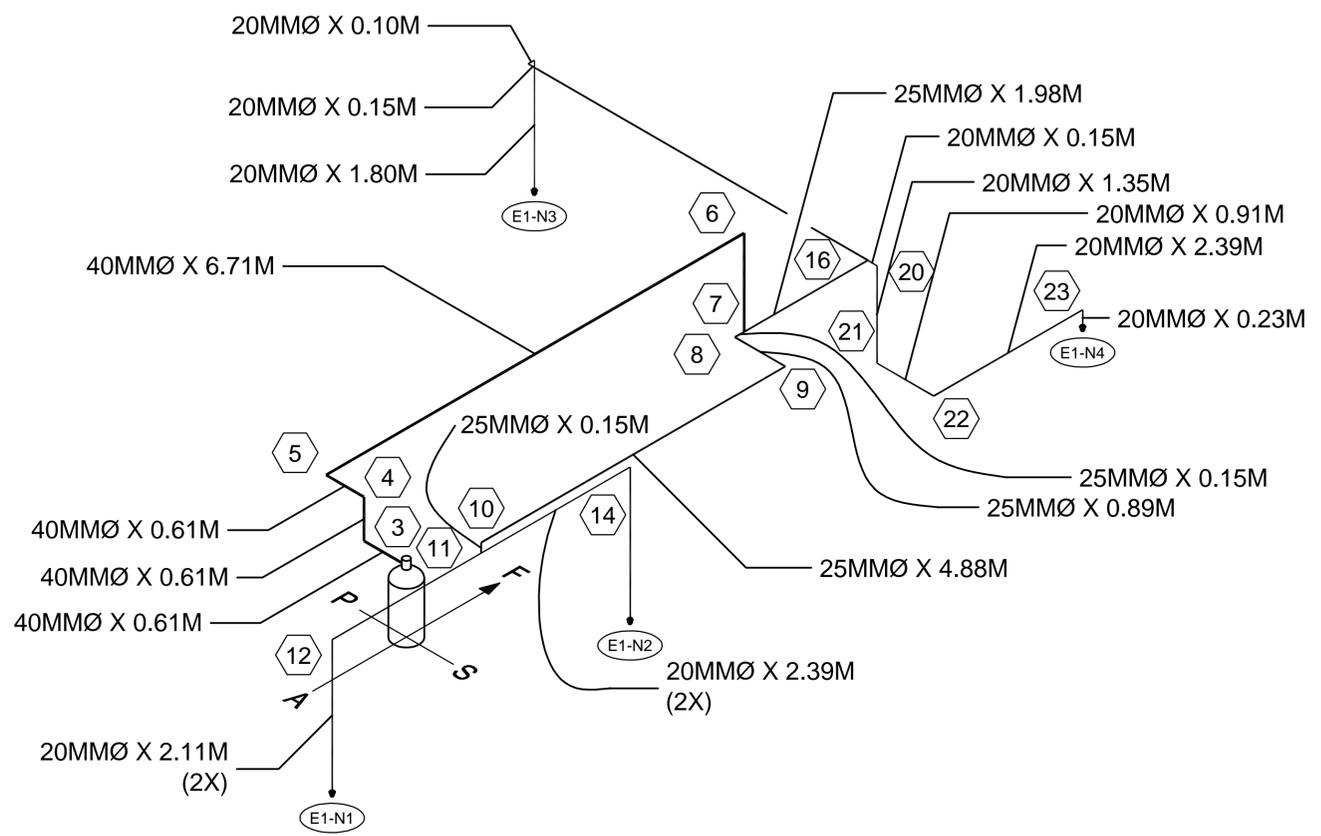
NO.	DESCRIPTION	QTY	PART NO.
1	225 LB (81 L) ADS SERIES FM-200 CYLINDER & VALVE, FILLED WITH 214 LB (97.0 KG)	1	90-100221-001
2	NITROGEN DRIVER CYLINDER & VALVE ASSEMBLY (FOR USE WITH 225 LB CYL)	1	90-102300-001
3	DISCHARGE HEAD, PLAIN NUT	1	872450
4	NITROGEN TRANSFER HOSE, 3/4" OUTLET, 14.75' OAL (FOR USE WITH 225 LB CYL)	1	06-118207-002
5	CYLINDER STRAP, ADS SERIES 225 LB	2	235317
6	CYLINDER CRADLE, ADS SERIES 225 LB	2	235431
7	NITROGEN DRIVER CYLINDER STRAP, (FOR USE WITH 90-102300-001 DRIVER CYL)	2	270014
8	ORIFICE FITTING, ADS CYLINDERS	1	90-194129-213
9	DISCHARGE NOZZLES, ADS	4	SEE TABLES

USE ACTUATION OPTION B - SEE PAGE 4

**SYSTEM NOTES:**  
 1) SYSTEM PIPING CONSISTS OF NEW PIPE, EXCEPT WHERE NOTED AS 'EXISTING'  
 2) SEE SHEET 13 FOR ADS SERIES CYLINDER DETAIL  
 3) SEE SHEET 13 FOR 180 AND 360 NOZZLE DETAIL  
 4) N2 PILOT CYLINDER LOCATED ON MAIN DECK IN CENTRAL STAIRWELL AT FRAME 34 (SEE PLAN VIEW SHEET 8)  
 5) WIRE HORNS & STROBES TO DISCHARGE PRESSURE SWITCH

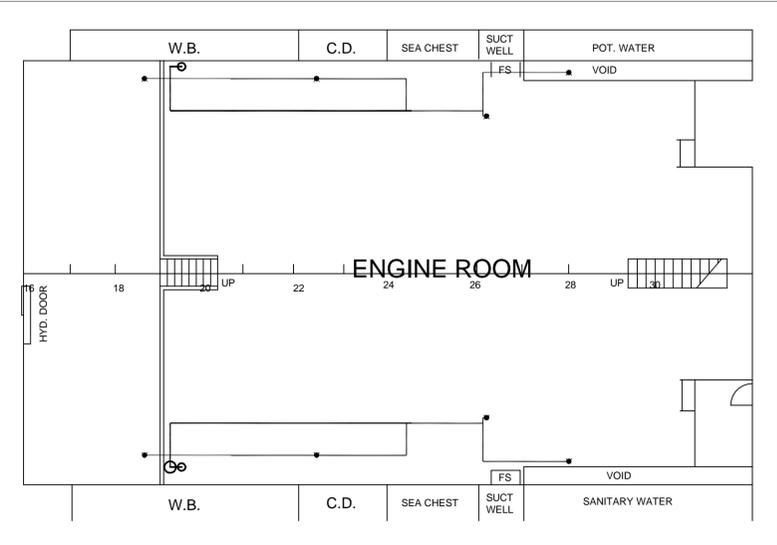
⑨ FM-200 NOZZLE TABLE  
FR 16 - 33, BELOW MAIN DECK - BILGE-STBD

NOZZLE NUMBER	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	180	72.00 SQ.MM.	90-194414-219	24.1
E1-N2	180	72.00 SQ.MM.	90-194414-219	24.1
E1-N3	180	72.00 SQ.MM.	90-194414-219	24.4
E1-N4	180	72.00 SQ.MM.	90-194414-219	24.4



ISOMETRIC VIEW  
FR 16 - 33, BELOW MAIN DECK - BILGE - STBD  
SCALE 1:50

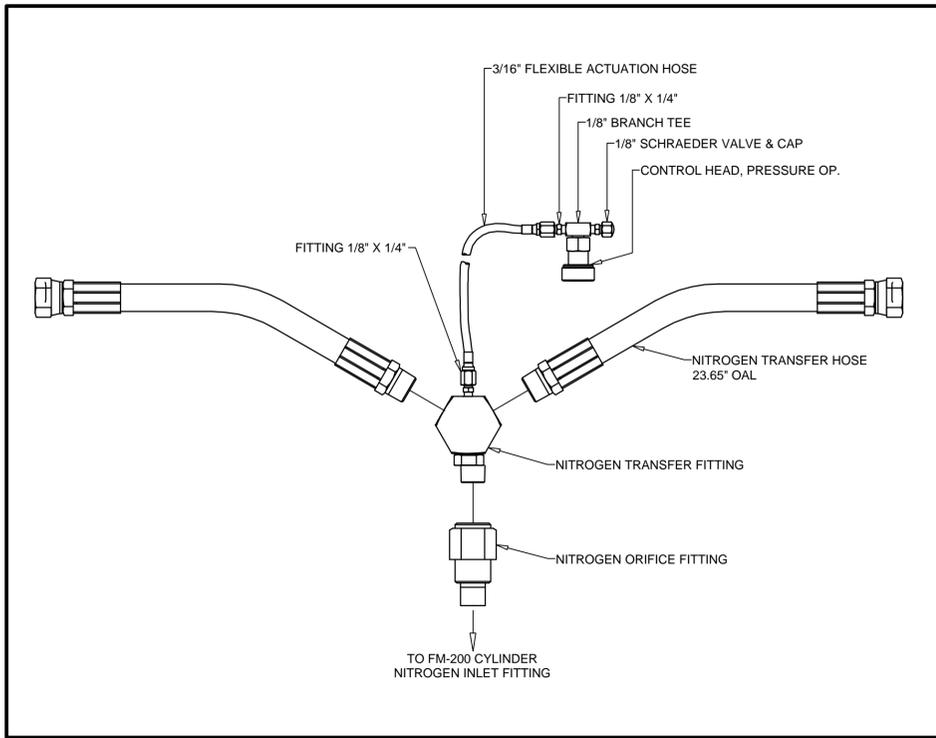
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NOTE: ALL DIMENSIONS ARE FROM CENTERLINE TO CENTERLINE OF ELBOWS AND TEES. COUPLINGS AND UNIONS ARE INCLUDED IN THESE DIMENSIONS WHERE SHOWN.



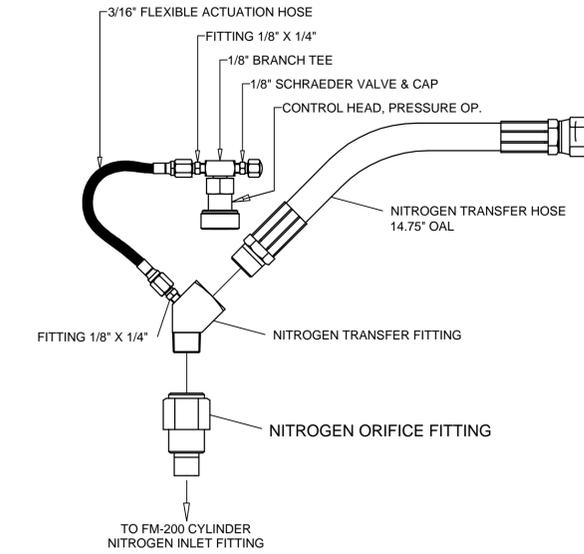
PLAN VIEW  
FR 16 - 33, BELOW MAIN DECK - BILGE-STBD  
SCALE 1:100

 KIDDE-FENWAL 400 MAIN STREET ASHLAND, MA 01721	CUSTOMER <b>NATIONAL &amp; MARINE FIRE SERVICE</b> ST. CATHERINES, ONTARIO	PROJECT <b>CCGS SAMUEL RISLEY</b>
	KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION PIPING ARRANGEMENT - BILGE STARBOARDSIDE	
This information is the property of KIDDE-FENWAL. It is submitted in confidence and is not to be disclosed or utilized without written permission.	DRN: PJS 17NOV05 CHK'D: PJS 17NOV05 ISSUED: HTL 17NOV05	SIZE: D DWG. NO.: L1-4354228-01 REV: C
SCALE: NTS	UNITS: MM	SHEET: 12 OF 13

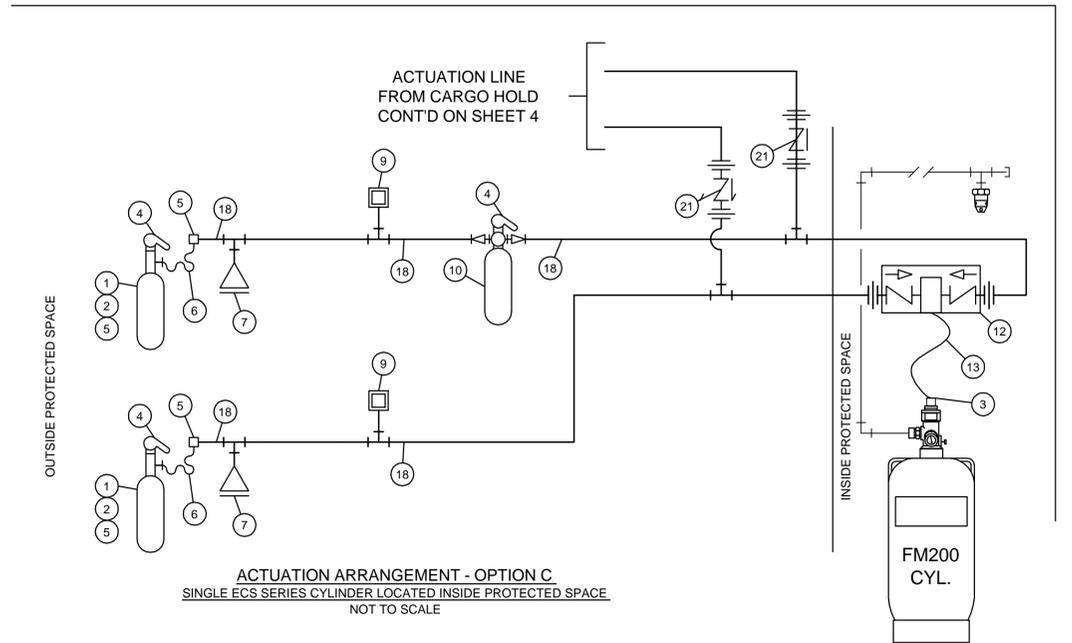
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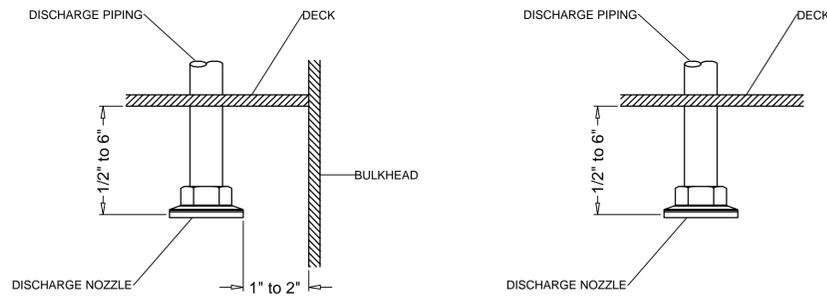
INSTALLATION DETAIL  
NITROGEN TRANSFER AND ACTUATION  
675-LB ADS SERIES CYLINDERS  
NOT TO SCALE



INSTALLATION DETAIL  
NITROGEN TRANSFER AND ACTUATION  
225-LB AND 395-LB ADS SERIES CYLINDERS  
NOT TO SCALE

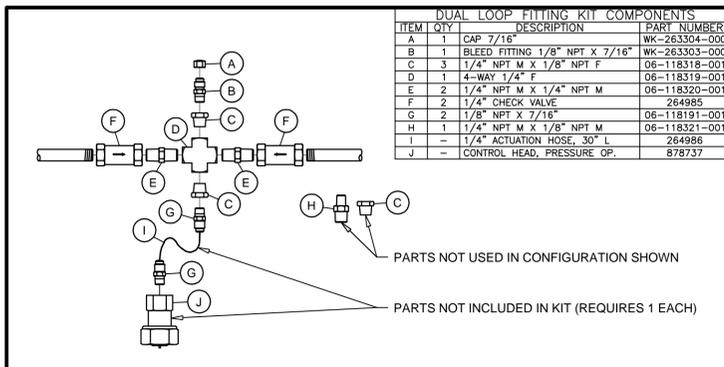


ACTUATION ARRANGEMENT - OPTION C  
SINGLE ECS SERIES CYLINDER LOCATED INSIDE PROTECTED SPACE  
NOT TO SCALE



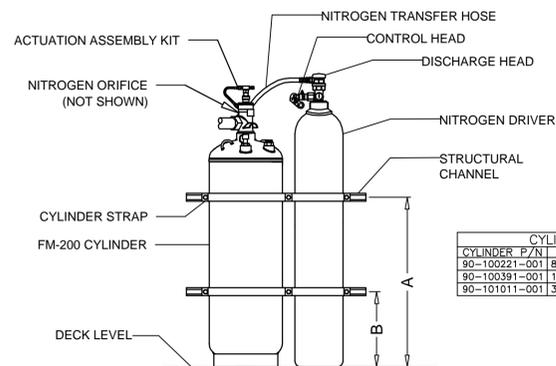
180° ADS SERIES NOZZLE LOCATION DETAIL  
NOT TO SCALE

360° ADS SERIES NOZZLE LOCATION DETAIL  
NOT TO SCALE



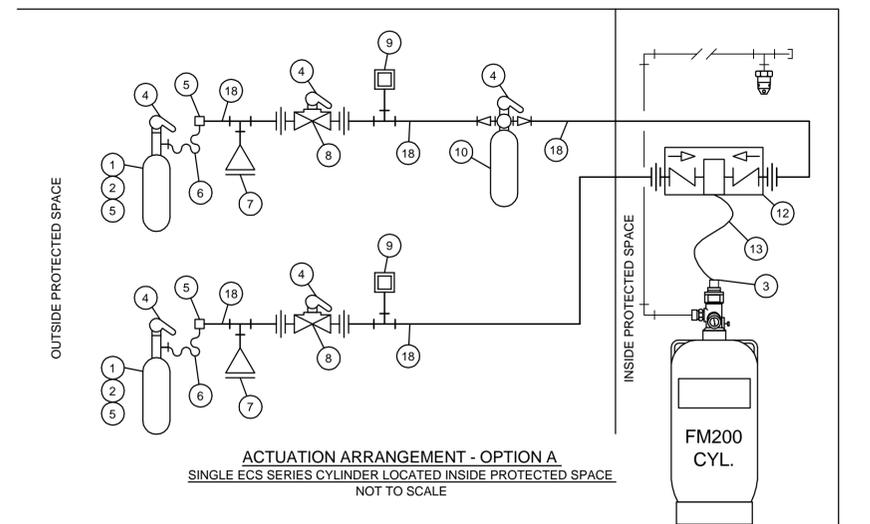
DUAL LOOP FITTING KIT INSTALLATION DETAIL  
FOR CYLINDERS OUTSIDE PROTECTED SPACE  
NOT TO SCALE

ITEM	QTY	DESCRIPTION	PART NUMBER
A	1	CAP 7/16"	WK-263304-000
B	1	BLEED FITTING 1/8" NPT X 7/16"	WK-263303-000
C	3	1/4" NPT M X 1/8" NPT F	06-118318-001
D	1	4-WAY 1/4" F	06-118319-001
E	2	1/4" NPT M X 1/4" NPT M	06-118320-001
F	2	1/4" CHECK VALVE	264985
G	2	1/8" NPT X 7/16"	06-118191-001
H	1	1/4" NPT M X 1/8" NPT M	06-118321-001
I	-	1/4" ACTUATION HOSE, 30" L	264986
J	-	CONTROL HEAD, PRESSURE OP.	878737



TYPICAL ADS SERIES FM-200 CYLINDER  
INSTALLATION DETAIL  
NOT TO SCALE

CYLINDER P/N	CYLINDER DESCRIPTION	"A"	"B"
90-100221-001	81 L (225-LB) CYLINDER (W/ LL)	752	305
90-100391-001	142 L (395-LB) CYLINDER (W/ LL)	914	406
90-101011-001	367 L (1010-LB) CYLINDER (W/ LL)	1220	406



ACTUATION ARRANGEMENT - OPTION A  
SINGLE ECS SERIES CYLINDER LOCATED INSIDE PROTECTED SPACE  
NOT TO SCALE

<p>KIDDE-FENWAL 400 MAIN STREET ASHLAND, MA 01721</p>	<p>CUSTOMER <b>NATIONAL &amp; MARINE FIRE SERVICE</b> ST. CATHERINES, ONTARIO</p>	<p>PROJECT <b>CCGS SAMUEL RISLEY</b></p>	
	<p>KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION ADS ASSEMBLY DETAILS</p>		
<p>This information is the property of KIDDE-FENWAL. It is submitted in confidence and is not to be disclosed or utilized without written permission.</p>	<p>DRN: PJS 17NOV05 CHK'D: PJS 17NOV05 ISSUED: HTL 17NOV05 SCALE: NTS</p>	<p>SIZE: D DWG. NO.: L1-4354228-01 SHEET: 13 OF 13</p>	<p>REV: C</p>