

FIRE SUPPRESSION SYSTEM MECHANICAL AND FLOW DATA DRAWING

1. REFER TO SYSTEM OPERATION AND INTEGRATION DRAWING FOR DATA ON CLASS/REGULATORY DESIGN AND COMPLIANCE.
2. THIS DRAWING DETAILS THE FOLLOWING DATA ITEMS:

2.1. LIST OF PROTECTED SPACE(S) WITH VOLUME, CONCENTRATION, AGENT REQUIREMENT, CYLINDER SIZE(S) AND CYLINDER LOCATION(S).

2.2. BILL OF MATERIAL, FOR KIDDE SUPPLIED SYSTEM COMPONENTS AND ASSEMBLIES.

2.3. ARRANGEMENT DRAWINGS FOR SYSTEM HARDWARE INCLUDING AGENT CYLINDERS AND ACTUATION HARDWARE.

2.4. GENERAL ARRANGEMENT DRAWING SHOWING PROTECTED SPACES WITH AGENT CYLINDER LOCATIONS, PIPING NETWORKS AND ACTUATION STATIONS.
3. GENERAL NOTES

3.1. THIS DRAWING HAS BEEN PREPARED FOR AND ON BEHALF OF NATIONAL & MARINE FIRE SERVICE LOCATED IN ST. CATHARINES, ONTARIO, HEREINAFTER REFERRED TO AS NAMFS.

3.2. NO REFERENCE TO THIS DRAWING SHALL BE MADE WITHOUT THE APPROVAL OF KIDDE FIRE SYSTEMS.

3.3. THE DESIGN SHOWN ON THIS DRAWING SHALL BE INSTALLED AS SHOWN AND IS INTENDED SOLELY TO PROTECT THE HAZARDOUS 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 FIRE SYSTEMS.

3.4. KIDDE FIRE SYSTEMS IS NOT RESPONSIBLE TO PROVIDE EQUIPMENT OR MATERIAL SHOWN ON THIS DRAWING THAT IS NOT LISTED IN THE BILL OF MATERIAL.

3.5. THIS DRAWING AND THE DESIGN SHOWN ON THIS DRAWING ARE IN COMPLIANCE WITH THE APPLICABLE REGULATORY STANDARDS IN EFFECT AT THE DATE OF THIS DRAWING. NAMFS IS RESPONSIBLE TO REVIEW THIS DRAWING IN ORDER TO ENSURE COMPLIANCE WITH ANY REVISION TO THE APPLICABLE STANDARDS OR ANY OTHER APPLICABLE CODES AND REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION (AHJ).

3.6. THIS SYSTEM SHOULD BE INSTALLED, MAINTAINED AND TESTED BY A KIDDE FIRE SYSTEMS AUTHORIZED DISTRIBUTOR (NAMFS), PERSONNEL INSTALLING, MAINTAINING OR TESTING THIS SYSTEM SHALL BE KNOWLEDGEABLE OF AND THOROUGHLY UNDERSTAND ALL THE REQUIREMENTS OF THE REGULATORY BODY, ANY OTHER APPLICABLE CODES THEN IN EFFECT, THE CURRENT VERSION OF THE KIDDE FIRE SYSTEMS DESIGN, INSTALLATION, OPERATION AND MAINTENANCE MANUALS, ANY APPLICABLE TECHNICAL BULLETINS, AND THE REQUIREMENTS OF THE AHJ.

3.7. NAMFS IS RESPONSIBLE TO ENSURE THAT THIS SYSTEM AS INSTALLED COMPLIES WITH THE GOVERNING REGULATORY 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 FIRE SYSTEMS.

3.8. IN INSTANCES WHERE THE INFORMATION PROVIDED IN THIS DRAWING CONFLICTS WITH ANY REQUIREMENTS STATED BY THE REGULATORY STANDARDS (THE LATEST EDITION OF THE STANDARDS) SHALL BE THE GOVERNING DOCUMENT.

3.9. THE DESIGN SHOWN ON THESE DRAWINGS IS BASED UPON INFORMATION RECEIVED BY KIDDE FIRE SYSTEMS FROM NAMFS. KIDDE FIRE SYSTEMS HAS NOT VERIFIED THIS INFORMATION. IT IS NAMFS RESPONSIBILITY TO VERIFY THE INFORMATION SUPPLIED TO KIDDE FIRE SYSTEMS AND INACCURATE INFORMATION SUPPLIED BY NAMFS COULD CAUSE THIS FIRE PROTECTION SYSTEM TO BE INEFFECTIVE.
- FM-200 PIPING INSTALLATION NOTES

1. UNLESS OTHERWISE REQUIRED BY THE AUTHORITY HAVING JURISDICTION (AHJ), USUALLY THE CLASSIFICATION SOCIETY OR FLAG ADMINISTRATION, THE PIPING SYSTEM SHALL BE INSTALLED PER THE KIDDE FIRE SYSTEMS MARINE FM-200 DESIGN, INSTALLATION, OPERATION AND MAINTENANCE MANUAL, PN 90-FM200M-021 (LATEST EDITION)

2. FOR SITUATIONS NOT COVERED IN THE KIDDE DDIOM REFER TO THE DESIGN REQUIREMENTS OF THE RESPONSIBLE CLASSIFICATION SOCIETY. REFER TO NFPA 2001 (LATEST EDITION) AND/OR THE FSSA PIPING HANDBOOK FOR FURTHER GUIDANCE ON PIPE AND FITTING DESIGN AND MATERIAL, PIPING SUPPORT, AND PENETRATIONS.

3. GENERAL GUIDANCE NOTES:

3.1. 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 VICTALUC STYLE 07, STYLE 77, OR EQUIVALENT

3.2. ALL PIPE SIZE REDUCTIONS MUST BE MADE USING CONCENTRIC REDUCING TEES. BUSHINGS SHALL NOT BE USED.

3.3. ALL PIPE SHALL BE OLEAMED 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.

3.4. 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 SUBJECT TO VIBRATION, MECHANICAL, OR CHEMICAL DAMAGE. ALL HANGERS MUST CONFORM TO GENERAL INDUSTRY STANDARDS FOR PIPE HANGERS AND ANSI B-31.1.

3.5. PRIOR TO COMMISSIONING, THE PIPE NETWORK SHALL BE PRESSURE TESTED TO 276 BAR GUAGE (40 PSIG) FOR TEN (10) MINUTES. THE MAXIMUM ALLOWABLE PRESSURE LOSS IS 20% OF THE TEST PRESSURE.

3.6. 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.

4. WARNINGS AND CAUTIONS

4.1. REFER TO THE KIDDE FIRE SYSTEMS MARINE FM-200 DESIGN, INSTALLATION, OPERATION AND MAINTENANCE MANUAL, PN 90-FM200M-021 (LATEST EDITION), FOR FULL DETAILS OF APPLICABLE WARNINGS AND CAUTIONS.

4.2. NOTE THAT ONLY INDIVIDUALS THAT ARE FACTORY TRAINED OR SUPERVISED SHOULD PERFORM WORK ON THE SYSTEM(S) DESCRIBED IN THESE DRAWINGS.
- CO2 MECHANICAL NOTES

1. FOR INSTALLATION REQUIREMENTS, REFER TO THE KIDDE FIRE SYSTEMS MARINE CO2 DESIGN, INSTALLATION, OPERATION AND MAINTENANCE MANUAL, PN 220030. FOR FURTHER GUIDANCE REFER TO NFPA 12, 2006 ED. OR OTHER RECOGNIZED STANDARD.

1.0 PIPE

1.1 1/2" AND SMALLER PIPE DIAMETERS SHALL BE SCHEDULE 40. PIPE DIAMETERS 1" AND GREATER SHALL BE SCHEDULE 80.

1.2 ASTM A 120 AND ORDINARY CAST-IRON PIPE SHALL NOT BE USED.

1.3 GALVANIZED STEEL PIPE SHALL BE EITHER ASTM A 53 SEAMLESS OR ELECTRIC WELDED GRADE A OR B OR ASTM A 106, GRADE A, B OR C, ASTM A 120 AND ORDINARY CAST-IRON PIPE SHALL NOT BE USED.

1.4 STAINLESS STEEL SHALL BE TYPE 304 OR 316 STAINLESS STEEL. THROUGH-IF-FORGED (PER ASTM A-182) CLASS 3000 FOR ALL PIPE SIZES THROUGH 4".

1.5 WELDED JOINTS AND SCREWED OR FLANGED FITTINGS MALLEABLE IRON OR DUCTILE IRON SHALL BE PERMITTED TO BE USED.

1.6 MECHANICAL GROOVED COUPLINGS AND FITTINGS SHALL BE PERMITTED TO BE USED IF THEY ARE SPECIFICALLY LISTED FOR CARBON DIOXIDE SERVICE.

1.7 FLUSH BUSHINGS SHALL NOT BE USED.

1.8, WHERE HEX BUSHINGS ARE USED FOR ONE PIPE SIZE REDUCTION, A 3000-LB STEEL BUSHING SHALL BE PROVIDED TO MAINTAIN ADEQUATE STRENGTH.

1.9 SUITABLE FLARED, COMPRESSION-TYPE, OR BRAZED FITTINGS SHALL BE USED WITH COMPATIBLE TUBING.

2.10 WHERE BRAZED JOINTS ARE USED, THE BRAZING ALLOY SHALL HAVE A MELTING POINT OF 1000°F (538°C) OR HIGHER.
- 3.0 PIPE SUPPORTS

3.1 THE PIPING SYSTEM SHALL BE SECURELY SUPPORTED WITH DUE ALLOWANCE FOR AGENT THRUST FORCES AND THERMAL EXPANSION AND CONTRACTION, AND SHALL NOT BE SUBJECT TO MECHANICAL, CHEMICAL, OR OTHER DAMAGE, WHERE EXPLOSIONS ARE POSSIBLE. THE PIPING SYSTEM SHALL BE HUNG FROM SUPPORTS THAT ARE LEAST LIKELY TO BE DISPLACED.

3.2 PIPING SHALL BE SECURED USING RIGID SUPPORTS PLACED NOT MORE THAN 7 FT. APART ON STRAIGHT RUNS. PIPING SHALL BE SUPPORTED AT EVERY CHANGE IN DIRECTION. ALL PIPE SUPPORTS SHALL COMPLY WITH NFPA 112, 2005 EDITION.

4.0 ARRANGEMENTS

4.1 THE AMBIENT STORAGE TEMPERATURES FOR MARINE TOTAL FLOODING SYSTEMS SHALL NOT EXCEED 130°F (54.4°C), NOR BE LESS THAN 0°F (-17.8°C).

4.2 STORAGE CONTAINERS AND ACCESSORIES SHALL BE SO LOCATED AND ARRANGED TO FACILITATE INSPECTION, MAINTENANCE, AND RE-CHARGING. INTERRUPTION TO PROTECTION SHALL BE HELD TO A MINIMUM.

4.3 STORAGE CONTAINERS SHALL BE LOCATED AS NEAR AS POSSIBLE TO THE HAZARD OR HAZARDS THEY PROTECT, BUT THEY SHALL NOT BE LOCATED WHERE THEY WILL BE EXPOSED TO FIRES AND EXPLOSIONS ORIGINATING FROM THE PROTECTED HAZARD. WEATHER CONDITIONS OR DAMAGE FROM MECHANICAL, CHEMICAL, OR OTHER MEANS.

4.4 THE NORMAL MANUAL CONTROL FOR ACTUATION SHALL BE LOCATED FOR EASY ACCESSIBILITY AT ALL TIMES INCLUDING THE TIME OF FIRE. THE MANUAL CONTROL SHALL BE OF DISTINCT APPEARANCE AND CLEARLY RECOGNIZABLE FOR THE PURPOSE INTENDED.

5.0 QUALITY

5.1 CARBON DIOXIDE SHALL HAVE THE FOLLOWING MINIMUM PROPERTIES:

1) THE VAPOR PHASE SHALL BE NOT LESS THAN 99.5 PERCENT CARBON DIOXIDE WITH NO DETECTABLE OIL-TASTE OR ODOR.

2) THE WATER CONTENT OF THE LIQUID PHASE SHALL COMPLY WITH SPECIFICATION FOR CARBON DIOXIDE.

3) OIL CONTENT SHALL BE NOT MORE THAN 10 PPM BY WEIGHT.

6.0 TESTING & OPERATIONS

6.1 SEE THE KIDDE CO2 SUPPRESSION SYSTEM TESTING & MAINTENANCE TABLE ON THIS SHEET FOR PREVENTATIVE MAINTENANCE AND TESTING REQUIREMENTS AND SCHEDULES.

7.0 SAFETY

7.1 CONSIDERATION SHALL BE GIVEN TO THE POSSIBILITY OF CARBON DIOXIDE DRIFTING AND SETTLING INTO ADJACENT PLACES OUTSIDE OF THE PROTECTED SPACE. CONSIDERATION SHALL ALSO BE GIVEN TO WHERE THE CARBON DIOXIDE CAN MIGRATE OR COLLECT IN THE EVENT OF A DISCHARGE FROM A SAFETY RELIEF DEVICE OF A STORAGE CONTAINER.

7.2 PERSONNEL TRAINING SHALL BE PROVIDED TO ENSURE PROPER EVACUATION, TO PREVENT ENTRY INTO CO2 DISCHARGES, AND TO PROVIDE MEANS FOR PROMPT RESCUE OF ANY TRAPPED PERSONNEL.

7.3 APPROPRIATE WARNING, LABEL, AND INSTRUCTION SIGNS AS REQUIRED BY NFPA 12 AND THIS DRAWING, ARE THE RESPONSIBILITY OF THE OWNER AND SHALL BE LOCATED IN CONSPICUOUS LOCATIONS.

7.4 ALL PERSONS THAT CAN AT ANY TIME ENTER A SPACE PROTECTED BY CARBON DIOXIDE SHALL BE WARNED OF THE HAZARDS INVOLVED, GIVEN AN ALARM SIGNAL, AND PROVIDED WITH SAFE EVACUATION PROCEDURES.

7.5 ALL PERSONNEL SHALL BE INFORMED THAT DISCHARGE OF CARBON DIOXIDE GAS FROM EITHER HIGH-OR-LOW-PRESSURE SYSTEMS DIRECTLY AT A PERSON WILL ENDANGER THE PERSON'S SAFETY BY CAUSING EYE INJURY, EAR INJURY, OR EVEN FATAL DUE TO LOSS OF BALANCE. UPON THE IMPINGEMENT OF THE HIGH VELOCITY DISCHARGING GAS, CONTACT WITH CARBON DIOXIDE IN THE FORM OF DRY ICE CAN CAUSE FROSTBITE.

7.6 WHEN PERSONS NOT FAMILIAR WITH THIS SYSTEM AND ITS OPERATION ARE PRESENT IN THE PROTECTED SPACE, THIS SYSTEM'S LOCK-OUT FEATURES SHALL BE ENGAGED AND THE SAFETY REQUIREMENTS IN NFPA 12, 2006 EDITION OR ANY SUBSEQUENT REVISION THEREOF SHALL BE FOLLOWED.

2.0 PIPE FITTINGS

2.1 CLASS 150 AND CAST-IRON FITTINGS SHALL NOT BE USED.

2.2 CLASS 300 MALLEABLE OR DUCTILE IRON FITTINGS SHALL BE USED THROUGH 2 IN. INTERNAL PIPE SIZE (IPS) AND FORGED STEEL FITTINGS IN ALL LARGER SIZES.

2.3 STAINLESS STEEL FITTINGS SHALL BE TYPE 304 OR 316. WROUGHT/FORGED (PER ASTM A-182) STANDARD FORGED FITTINGS, AND VALVES AND PARTS FOR HIGH-TEMPERATURE SERVICE, CLASS 3000, THREADED OR SOCKET WELD, FOR ALL SIZES, 1/8 INCH THROUGH 4 INCH. STAINLESS SHALL BE TYPE 304 OR 316 STAINLESS STEEL.

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2.7 FLUSH BUSHINGS SHALL NOT BE USED.

2.8, WHERE HEX BUSHINGS ARE USED FOR ONE PIPE SIZE REDUCTION, A 3000-LB STEEL BUSHING SHALL BE PROVIDED TO MAINTAIN ADEQUATE STRENGTH.

2.9 SUITABLE FLARED, COMPRESSION-TYPE, OR BRAZED FITTINGS SHALL BE USED WITH COMPATIBLE TUBING.

2.10 WHERE BRAZED JOINTS ARE USED, THE BRAZING ALLOY SHALL HAVE A MELTING POINT OF 1000°F (538°C) OR HIGHER.

4.0 ARRANGEMENTS

4.1 THE AMBIENT STORAGE TEMPERATURES FOR MARINE TOTAL FLOODING SYSTEMS SHALL NOT EXCEED 130°F (54.4°C), NOR BE LESS THAN 0°F (-17.8°C).

4.2 STORAGE CONTAINERS AND ACCESSORIES SHALL BE SO LOCATED AND ARRANGED TO FACILITATE INSPECTION, MAINTENANCE, AND RE-CHARGING. INTERRUPTION TO PROTECTION SHALL BE HELD TO A MINIMUM.

4.3 STORAGE CONTAINERS SHALL BE LOCATED AS NEAR AS POSSIBLE TO THE HAZARD OR HAZARDS THEY PROTECT, BUT THEY SHALL NOT BE LOCATED WHERE THEY WILL BE EXPOSED TO FIRES AND EXPLOSIONS ORIGINATING FROM THE PROTECTED HAZARD. WEATHER CONDITIONS OR DAMAGE FROM MECHANICAL, CHEMICAL, OR OTHER MEANS.

4.4 THE NORMAL MANUAL CONTROL FOR ACTUATION SHALL BE LOCATED FOR EASY ACCESSIBILITY AT ALL TIMES INCLUDING THE TIME OF FIRE. THE MANUAL CONTROL SHALL BE OF DISTINCT APPEARANCE AND CLEARLY RECOGNIZABLE FOR THE PURPOSE INTENDED.

5.0 QUALITY

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1) THE VAPOR PHASE SHALL BE NOT LESS THAN 99.5 PERCENT CARBON DIOXIDE WITH NO DETECTABLE OIL-TASTE OR ODOR.

2) THE WATER CONTENT OF THE LIQUID PHASE SHALL COMPLY WITH SPECIFICATION FOR CARBON DIOXIDE.

3) OIL CONTENT SHALL BE NOT MORE THAN 10 PPM BY WEIGHT.

6.0 TESTING & OPERATIONS

6.1 SEE THE KIDDE CO2 SUPPRESSION SYSTEM TESTING & MAINTENANCE TABLE ON THIS SHEET FOR PREVENTATIVE MAINTENANCE AND TESTING REQUIREMENTS AND SCHEDULES.

7.0 SAFETY

7.1 CONSIDERATION SHALL BE GIVEN TO THE POSSIBILITY OF CARBON DIOXIDE DRIFTING AND SETTLING INTO ADJACENT PLACES OUTSIDE OF THE PROTECTED SPACE. CONSIDERATION SHALL ALSO BE GIVEN TO WHERE THE CARBON DIOXIDE CAN MIGRATE OR COLLECT IN THE EVENT OF A DISCHARGE FROM A SAFETY RELIEF DEVICE OF A STORAGE CONTAINER.

7.2 PERSONNEL TRAINING SHALL BE PROVIDED TO ENSURE PROPER EVACUATION, TO PREVENT ENTRY INTO CO2 DISCHARGES, AND TO PROVIDE MEANS FOR PROMPT RESCUE OF ANY TRAPPED PERSONNEL.

7.3 APPROPRIATE WARNING, LABEL, AND INSTRUCTION SIGNS AS REQUIRED BY NFPA 12 AND THIS DRAWING, ARE THE RESPONSIBILITY OF THE OWNER AND SHALL BE LOCATED IN CONSPICUOUS LOCATIONS.

7.4 ALL PERSONS THAT CAN AT ANY TIME ENTER A SPACE PROTECTED BY CARBON DIOXIDE SHALL BE WARNED OF THE HAZARDS INVOLVED, GIVEN AN ALARM SIGNAL, AND PROVIDED WITH SAFE EVACUATION PROCEDURES.

7.5 ALL PERSONNEL SHALL BE INFORMED THAT DISCHARGE OF CARBON DIOXIDE GAS FROM EITHER HIGH-OR-LOW-PRESSURE SYSTEMS DIRECTLY AT A PERSON WILL ENDANGER THE PERSON'S SAFETY BY CAUSING EYE INJURY, EAR INJURY, OR EVEN FATAL DUE TO LOSS OF BALANCE. UPON THE IMPINGEMENT OF THE HIGH VELOCITY DISCHARGING GAS, CONTACT WITH CARBON DIOXIDE IN THE FORM OF DRY ICE CAN CAUSE FROSTBITE.

7.6 WHEN PERSONS NOT FAMILIAR WITH THIS SYSTEM AND ITS OPERATION ARE PRESENT IN THE PROTECTED SPACE, THIS SYSTEM'S LOCK-OUT FEATURES SHALL BE ENGAGED AND THE SAFETY REQUIREMENTS IN NFPA 12, 2006 EDITION OR ANY SUBSEQUENT REVISION THEREOF SHALL BE FOLLOWED.

2.0 PIPE FITTINGS

2.1 CLASS 150 AND CAST-IRON FITTINGS SHALL NOT BE USED.

2.2 CLASS 300 MALLEABLE OR DUCTILE IRON FITTINGS SHALL BE USED THROUGH 2 IN. INTERNAL PIPE SIZE (IPS) AND FORGED STEEL FITTINGS IN ALL LARGER SIZES.

2.3 STAINLESS STEEL FITTINGS SHALL BE TYPE 304 OR 316. WROUGHT/FORGED (PER ASTM A-182) STANDARD FORGED FITTINGS, AND VALVES AND PARTS FOR HIGH-TEMPERATURE SERVICE, CLASS 3000, THREADED OR SOCKET WELD, FOR ALL SIZES, 1/8 INCH THROUGH 4 INCH. STAINLESS SHALL BE TYPE 304 OR 316 STAINLESS STEEL.

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2.7 FLUSH BUSHINGS SHALL NOT BE USED.

2.8, WHERE HEX BUSHINGS ARE USED FOR ONE PIPE SIZE REDUCTION, A 3000-LB STEEL BUSHING SHALL BE PROVIDED TO MAINTAIN ADEQUATE STRENGTH.

2.9 SUITABLE FLARED, COMPRESSION-TYPE, OR BRAZED FITTINGS SHALL BE USED WITH COMPATIBLE TUBING.

2.10 WHERE BRAZED JOINTS ARE USED, THE BRAZING ALLOY SHALL HAVE A MELTING POINT OF 1000°F (538°C) OR HIGHER.

4.0 ARRANGEMENTS

4.1 THE AMBIENT STORAGE TEMPERATURES FOR MARINE TOTAL FLOODING SYSTEMS SHALL NOT EXCEED 130°F (54.4°C), NOR BE LESS THAN 0°F (-17.8°C).

4.2 STORAGE CONTAINERS AND ACCESSORIES SHALL BE SO LOCATED AND ARRANGED TO FACILITATE INSPECTION, MAINTENANCE, AND RE-CHARGING. INTERRUPTION TO PROTECTION SHALL BE HELD TO A MINIMUM.

4.3 STORAGE CONTAINERS SHALL BE LOCATED AS NEAR AS POSSIBLE TO THE HAZARD OR HAZARDS THEY PROTECT, BUT THEY SHALL NOT BE LOCATED WHERE THEY WILL BE EXPOSED TO FIRES AND EXPLOSIONS ORIGINATING FROM THE PROTECTED HAZARD. WEATHER CONDITIONS OR DAMAGE FROM MECHANICAL, CHEMICAL, OR OTHER MEANS.

4.4 THE NORMAL MANUAL CONTROL FOR ACTUATION SHALL BE LOCATED FOR EASY ACCESSIBILITY AT ALL TIMES INCLUDING THE TIME OF FIRE. THE MANUAL CONTROL SHALL BE OF DISTINCT APPEARANCE AND CLEARLY RECOGNIZABLE FOR THE PURPOSE INTENDED.

5.0 QUALITY

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2) THE WATER CONTENT OF THE LIQUID PHASE SHALL COMPLY WITH SPECIFICATION FOR CARBON DIOXIDE.

3) OIL CONTENT SHALL BE NOT MORE THAN 10 PPM BY WEIGHT.

6.0 TESTING & OPERATIONS

6.1 SEE THE KIDDE CO2 SUPPRESSION SYSTEM TESTING & MAINTENANCE TABLE ON THIS SHEET FOR PREVENTATIVE MAINTENANCE AND TESTING REQUIREMENTS AND SCHEDULES.

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2.8, WHERE HEX BUSHINGS ARE USED FOR ONE PIPE SIZE REDUCTION, A 3000-LB STEEL BUSHING SHALL BE PROVIDED TO MAINTAIN ADEQUATE STRENGTH.

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4.0 ARRANGEMENTS

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5.0 QUALITY

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6.0 TESTING & OPERATIONS

6.1 SEE THE KIDDE CO2 SUPPRESSION SYSTEM TESTING & MAINTENANCE TABLE ON THIS SHEET FOR PREVENTATIVE MAINTENANCE AND TESTING REQUIREMENTS AND SCHEDULES.

7.0 SAFETY

7.1 CONSIDERATION SHALL BE GIVEN TO THE POSSIBILITY OF CARBON DIOXIDE DRIFTING AND SETTLING INTO ADJACENT PLACES OUTSIDE OF THE PROTECTED SPACE. CONSIDERATION SHALL ALSO BE GIVEN TO WHERE THE CARBON DIOXIDE CAN MIGRATE OR COLLECT IN THE EVENT OF A DISCHARGE FROM A SAFETY RELIEF DEVICE OF A STORAGE CONTAINER.

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7.5 ALL PERSONNEL SHALL BE INFORMED THAT DISCHARGE OF CARBON DIOXIDE GAS FROM EITHER HIGH-OR-LOW-PRESSURE SYSTEMS DIRECTLY AT A PERSON WILL ENDANGER THE PERSON'S SAFETY BY CAUSING EYE INJURY, EAR INJURY, OR EVEN FATAL DUE TO LOSS OF BALANCE. UPON THE IMPINGEMENT OF THE HIGH VELOCITY DISCHARGING GAS, CONTACT WITH CARBON DIOXIDE IN THE FORM OF DRY ICE CAN CAUSE FROSTBITE.

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2.0 PIPE FITTINGS

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2.2 CLASS 300 MALLEABLE OR DUCTILE IRON FITTINGS SHALL BE USED THROUGH 2 IN. INTERNAL PIPE SIZE (IPS) AND FORGED STEEL FITTINGS IN ALL LARGER SIZES.

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2.10 WHERE BRAZED JOINTS ARE USED, THE BRAZING ALLOY SHALL HAVE A MELTING POINT OF 1000°F (538°C) OR HIGHER.

4.0 ARRANGEMENTS

4.1 THE AMBIENT STORAGE TEMPERATURES FOR MARINE TOTAL FLOODING SYSTEMS SHALL NOT EXCEED 130°F (54.4°C), NOR BE LESS THAN 0°F (-17.8°C).

4.2 STORAGE CONTAINERS AND ACCESSORIES SHALL BE SO LOCATED AND ARRANGED TO FACILITATE INSPECTION, MAINTENANCE, AND RE-CHARGING. INTERRUPTION TO PROTECTION SHALL BE HELD TO A MINIMUM.

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4.4 THE NORMAL MANUAL CONTROL FOR ACTUATION SHALL BE LOCATED FOR EASY ACCESSIBILITY AT ALL TIMES INCLUDING THE TIME OF FIRE. THE MANUAL CONTROL SHALL BE OF DISTINCT APPEARANCE AND CLEARLY RECOGNIZABLE FOR THE PURPOSE INTENDED.

5.0 QUALITY

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1) THE VAPOR PHASE SHALL BE NOT LESS THAN 99.5 PERCENT CARBON DIOXIDE WITH NO DETECTABLE OIL-TASTE OR ODOR.

2) THE WATER CONTENT OF THE LIQUID PHASE SHALL COMPLY WITH SPECIFICATION FOR CARBON DIOXIDE.

3) OIL CONTENT SHALL BE NOT MORE THAN 10 PPM BY WEIGHT.

6.0 TESTING & OPERATIONS

6.1 SEE THE KIDDE CO2 SUPPRESSION SYSTEM TESTING & MAINTENANCE TABLE ON THIS SHEET FOR PREVENTATIVE MAINTENANCE AND TESTING REQUIREMENTS AND SCHEDULES.

7.0 SAFETY

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7.6 WHEN PERSONS NOT FAMILIAR WITH THIS SYSTEM AND ITS OPERATION ARE PRESENT IN THE PROTECTED SPACE, THIS SYSTEM'S LOCK-OUT FEATURES SHALL BE ENGAGED AND THE SAFETY REQUIREMENTS IN NFPA 12, 2006 EDITION OR ANY SUBSEQUENT REVISION THEREOF SHALL BE FOLLOWED.

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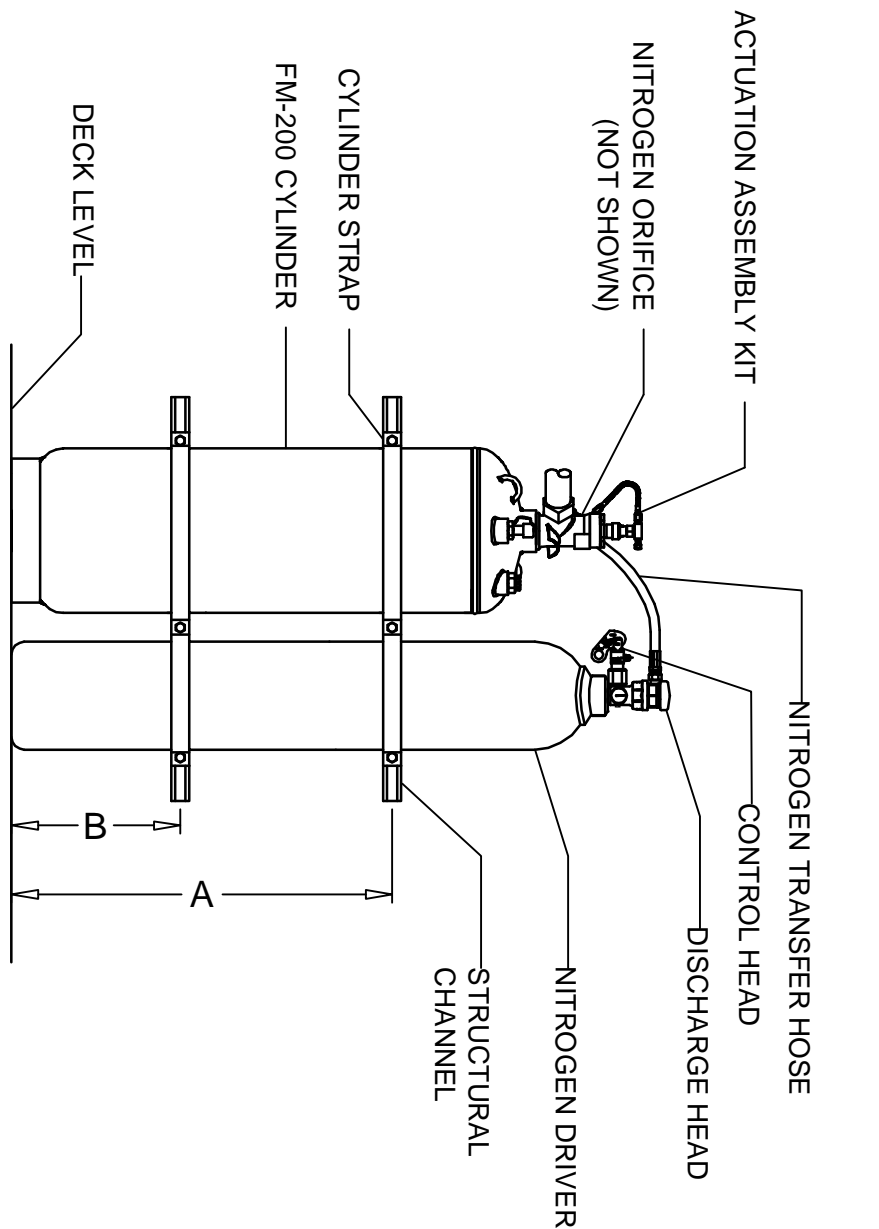
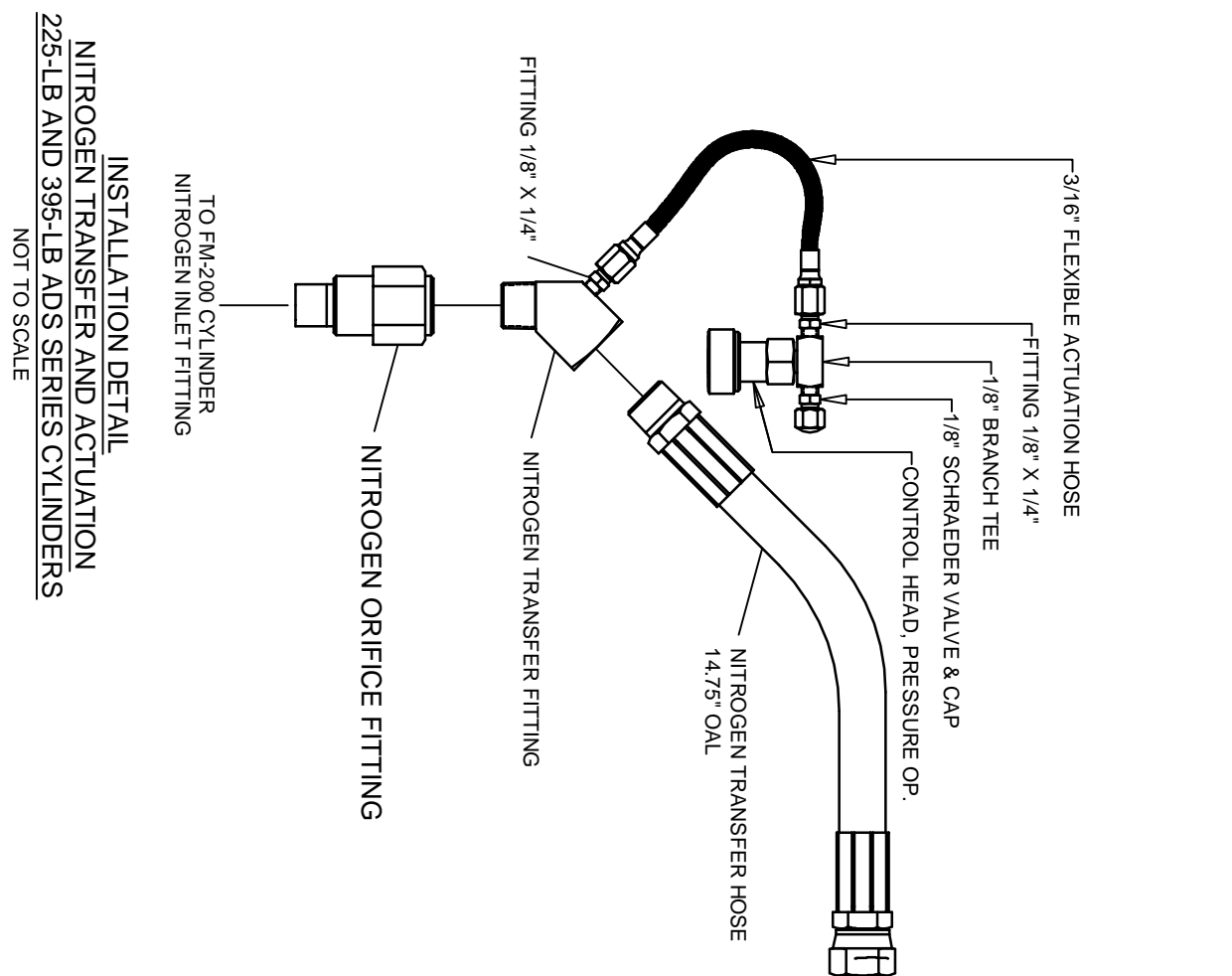
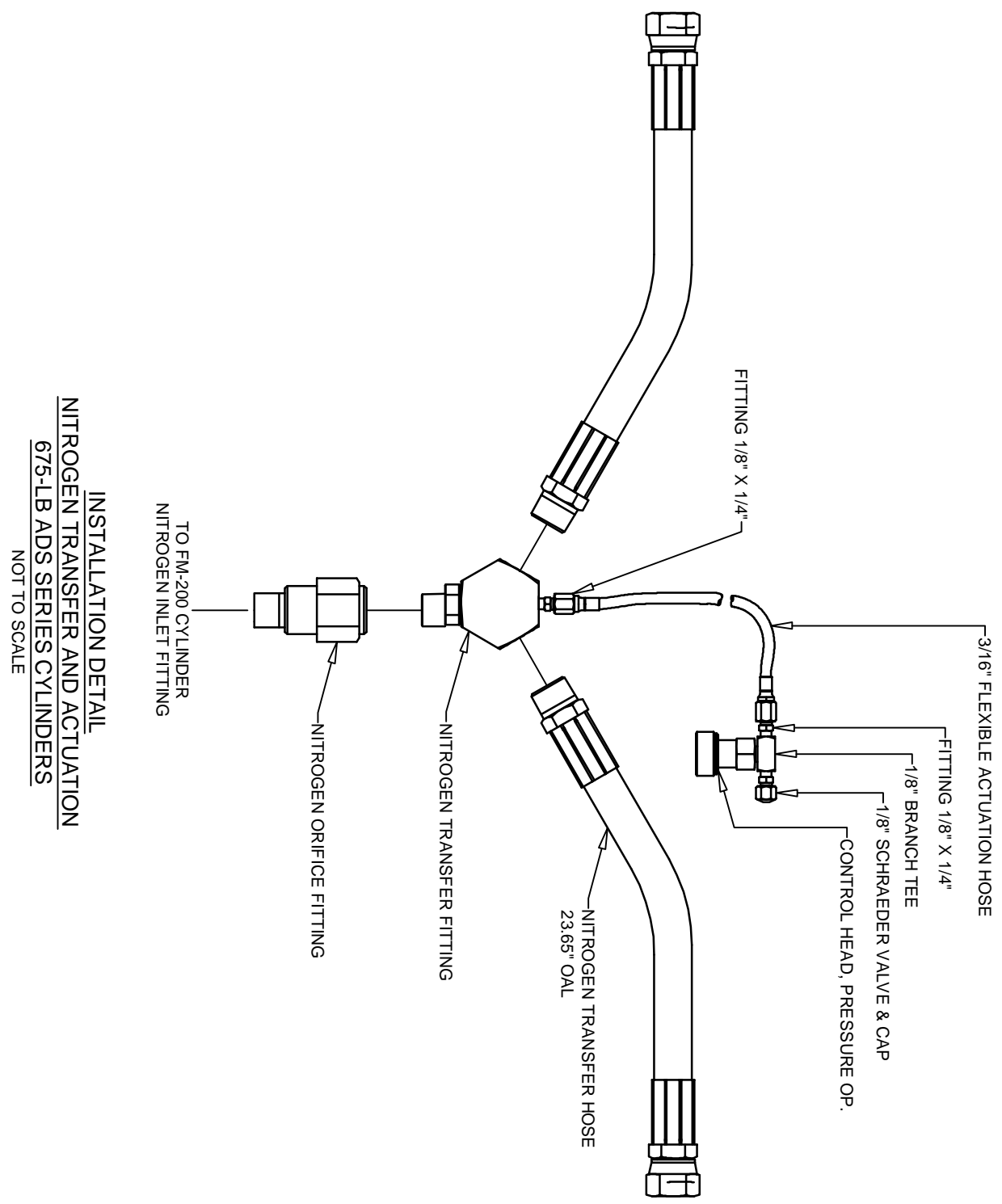
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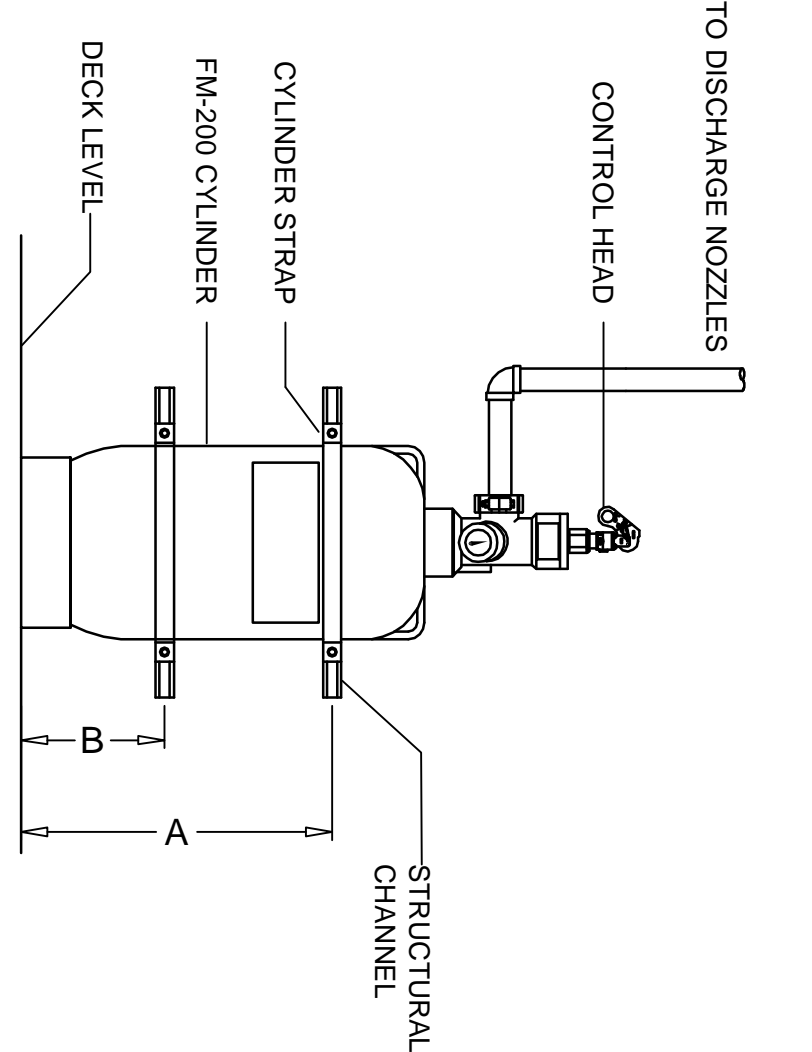
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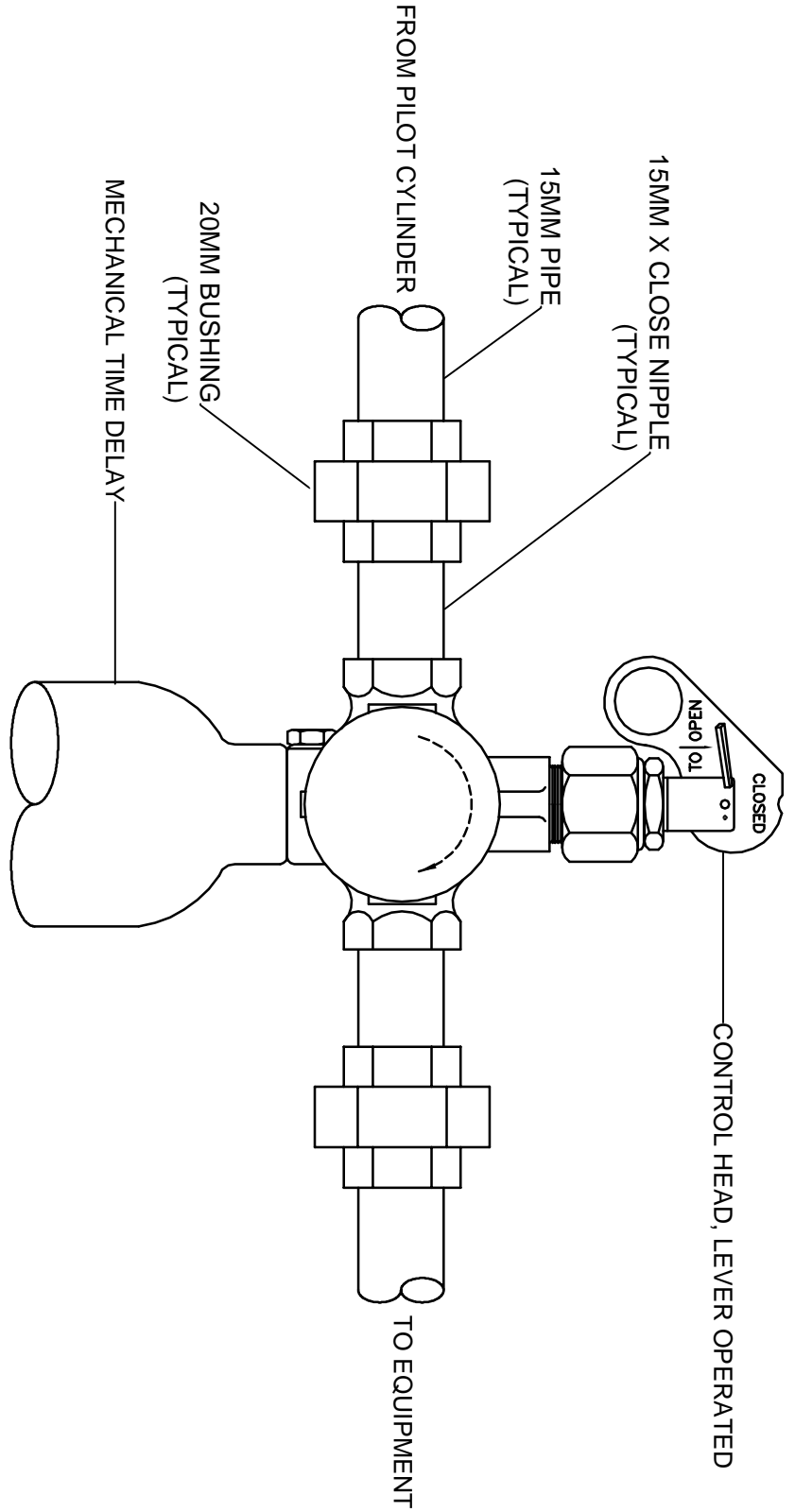
CYLINDER P/N	CYLINDER DESCRIPTION	A"	B"
90-100201-001	81 L (20-LB) CYLINDER (W/ LU)	218	35
90-100201-101	81 L (200-LB) CYLINDER (W/ LU)	752	305
90-100201-101	81 L (200-LB) CYLINDER (W/ LU)	914	406
90-100201-101	81 L (200-LB) CYLINDER (W/ LU)	1220	406

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

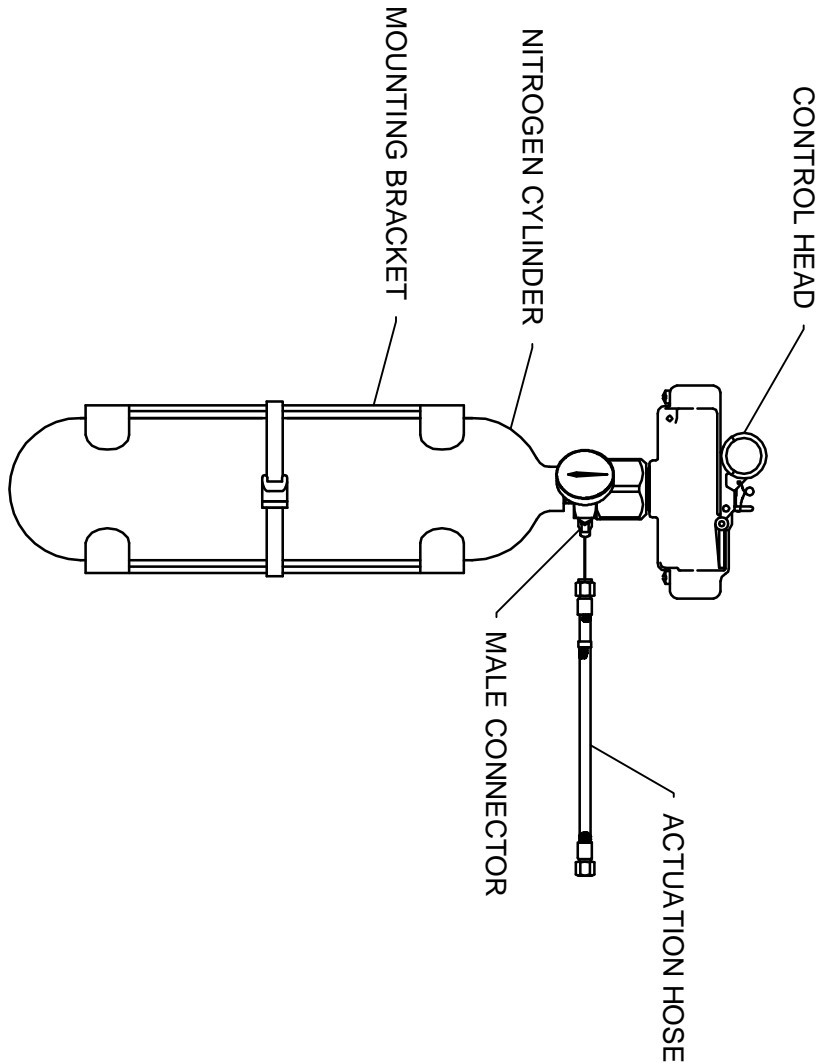


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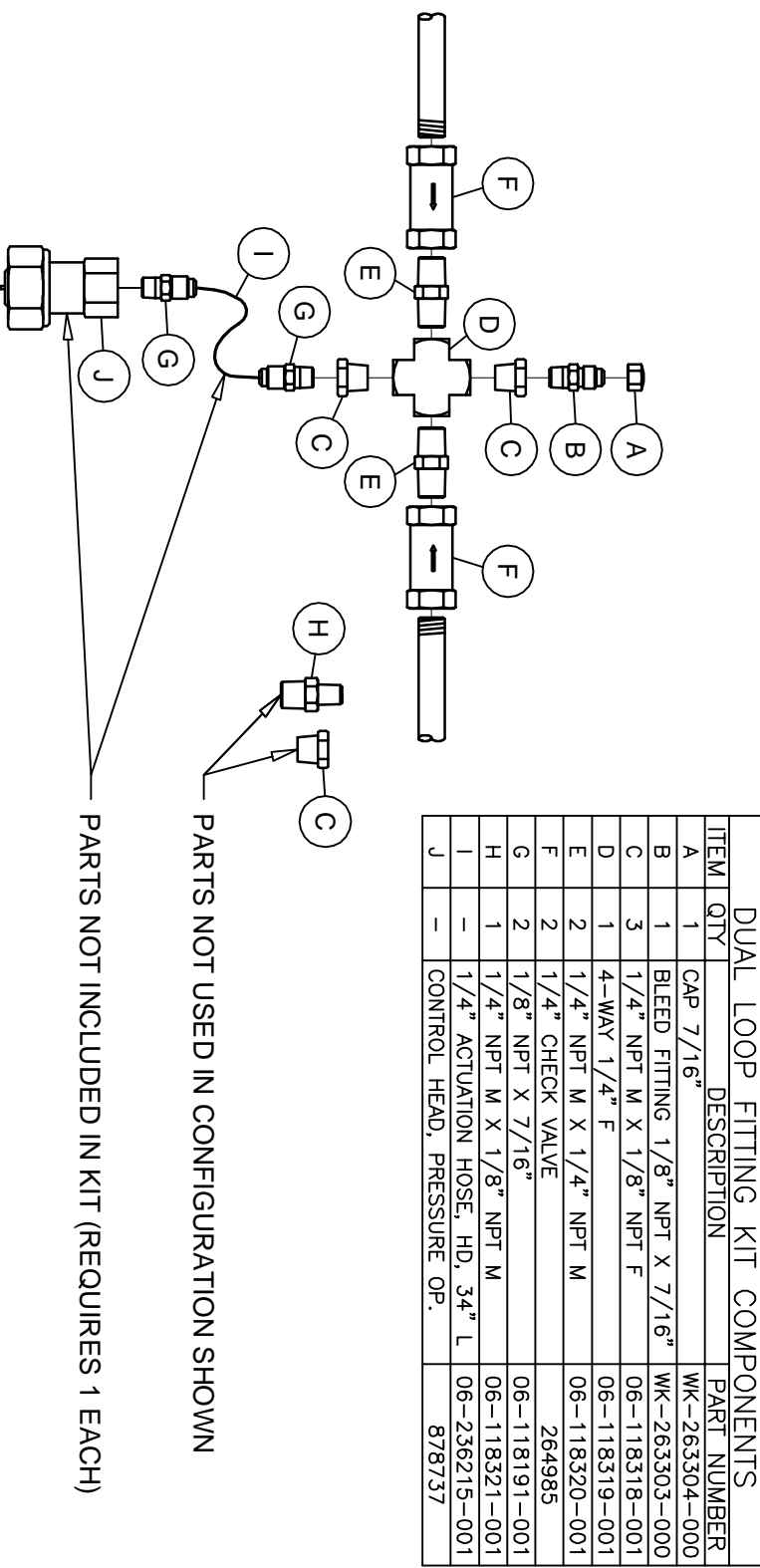
**TYPICAL ECS SERIES FM-200 CYLINDER
INSTALLATION DETAIL**
NOT TO SCALE



**MECHANICAL TIME DELAY
INSTALLATION DETAIL**
NOT TO SCALE

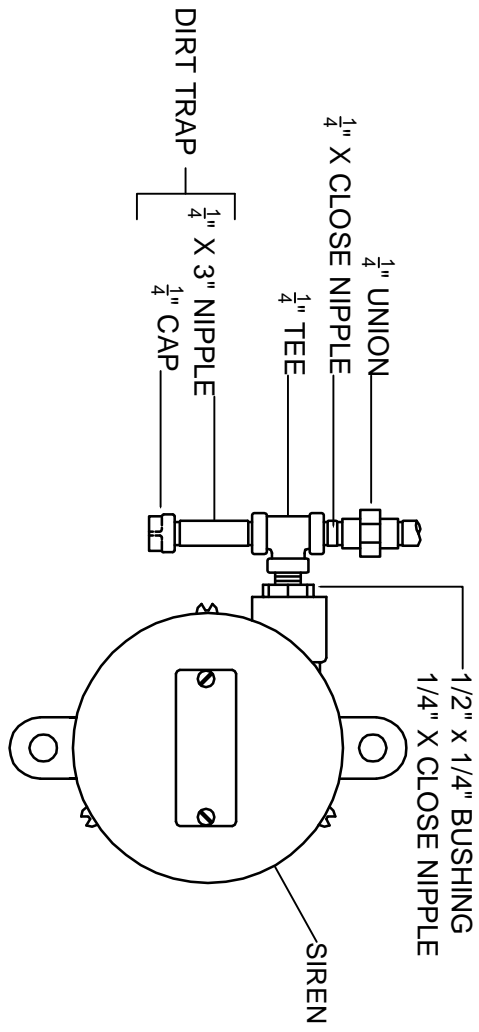


**108 CU IN NITROGEN CYLINDER
INSTALLATION DETAIL**
NOT TO SCALE



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

**PRESSURE OPERATED SIREN
INSTALLATION DETAIL**
NOT TO SCALE



PIPE SUPPORTS - THTREADED, 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.

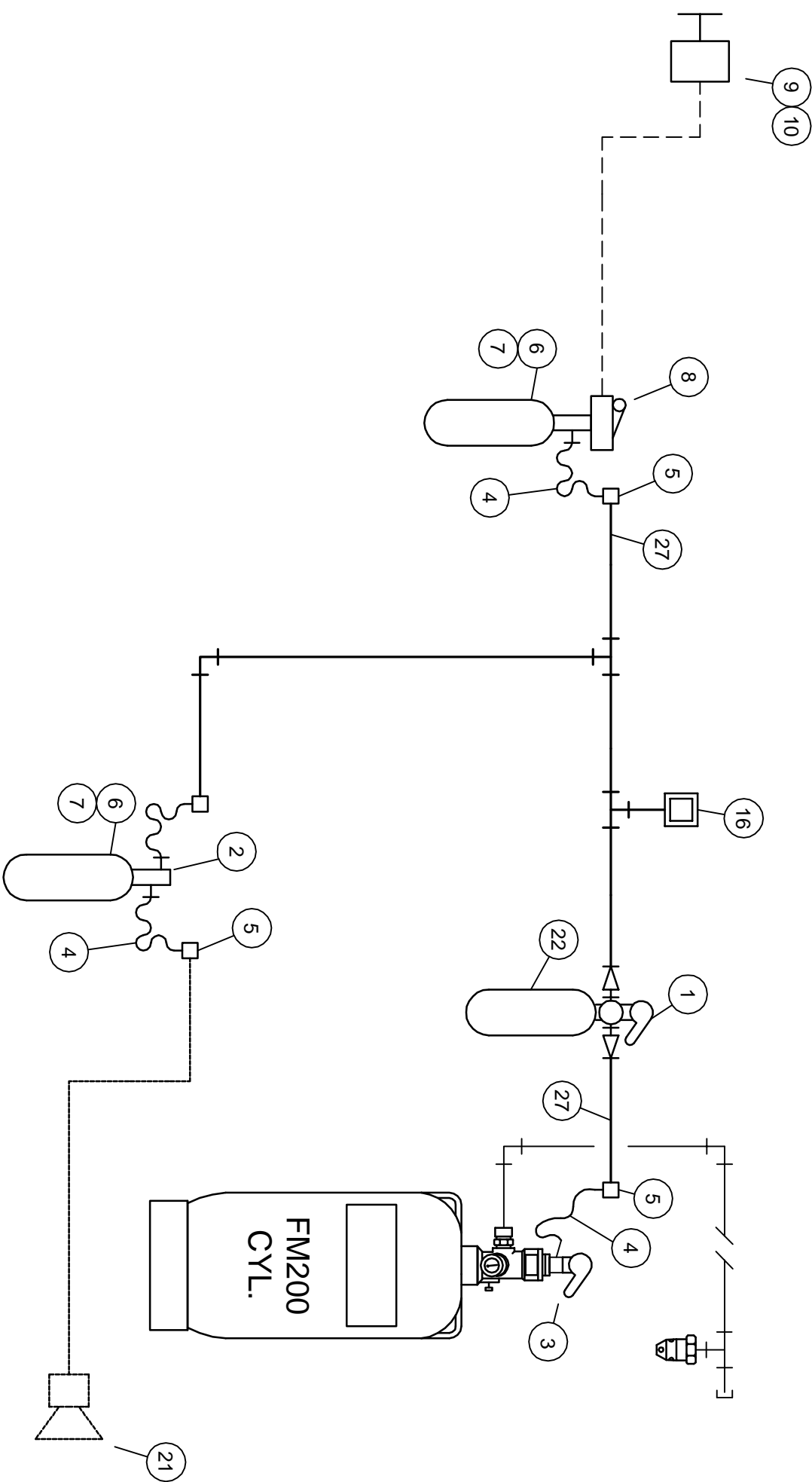
5. ALL SUPPORT COMPONENTS INCLUDING, BUT NOT LIMITED TO, PIPE ATTACHMENT, ROD, FIXTURES, CLAMPS, BOLTS AND NUTS, AND BUILDING STRUCTURE SHALL BE PROPERLY SIZED FOR THE PIPE SUPPORT, AND IN ACCORDANCE WITH THE FOLLOWING MINIMUM RATINGS:

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

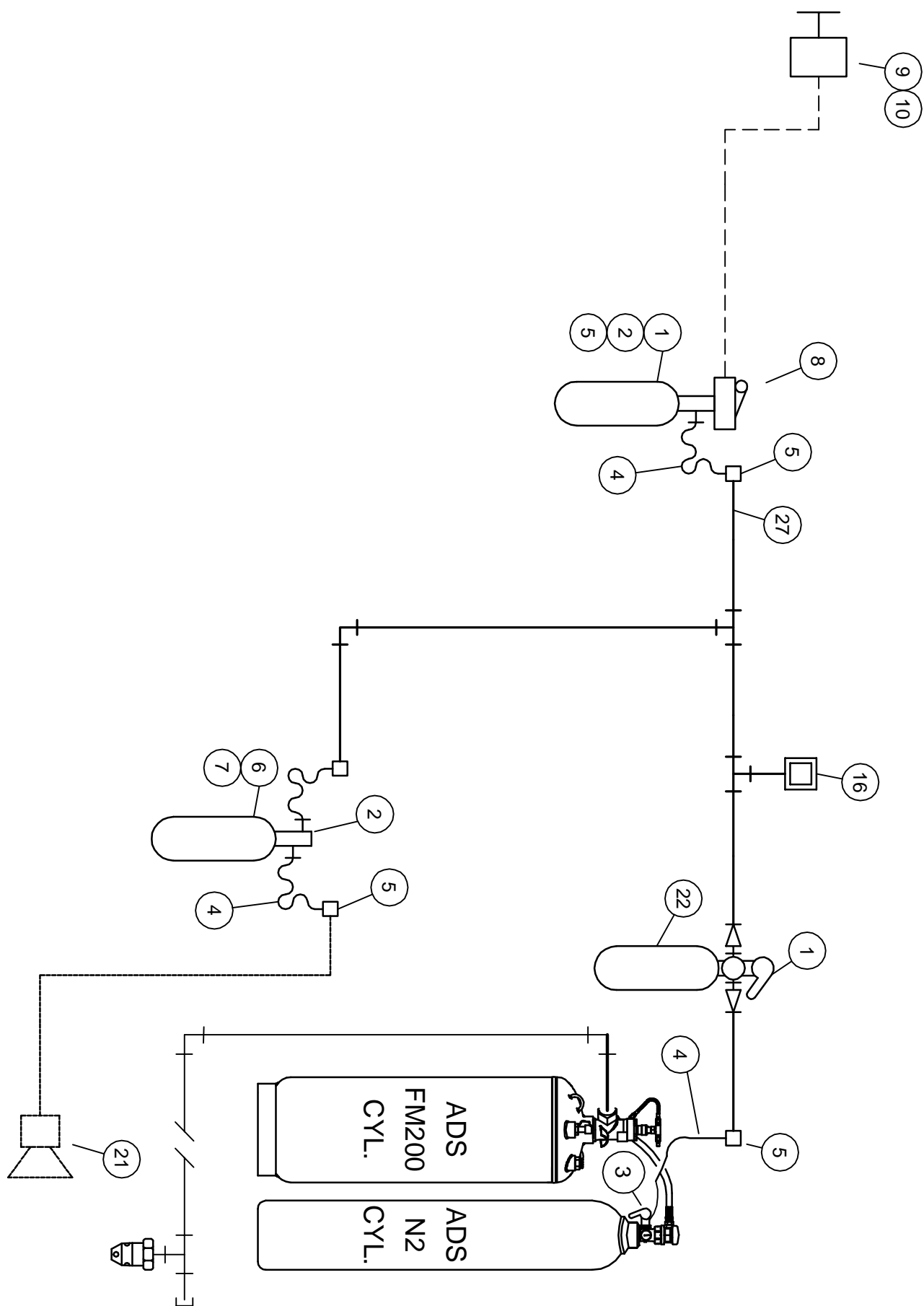
ACTUATION

BILL OF MATERIALS

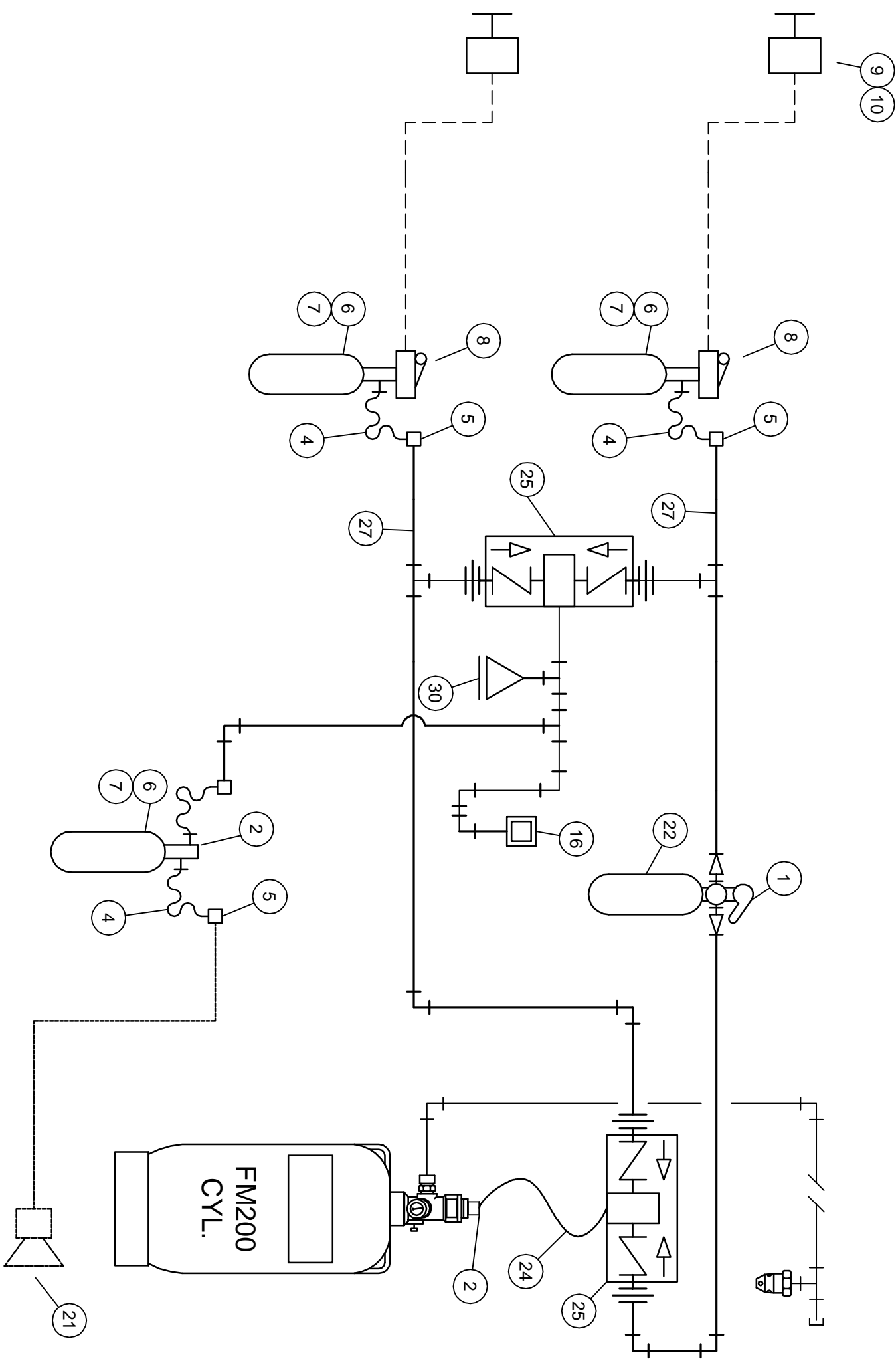
ACTUATION									
BILL OF MATERIALS									
No.	Part Number	Description	Options						
			OPTION A	OPTION B	OPTION C	OPTION D	OPTION E	OPTION F	OPTION G
1	WK-870952-000	Lever Operated Control Head	1	1	1	1	1	1	-
2	82-879372-000	Pressure Operated Control Head	1	4	2	2	4	10	-
3	82-879151-000	Lever and Pressure Operated Control Head	-	-	-	-	-	-	-
4	WK-268989-000	Actuation Hose, 50' (350 x 500 bu. Chambers)	8	4	4	4	4	-	-
5	WK-268989-010	Male Connector, 5/16" Flare X 1/8" NPT	4	6	10	10	10	24	-
6	WK-871945-000	Mounting Bracket, Nitrogen Pilot Cylinder	2	2	3	3	2	-	-
7	WK-871945-000	Nitrogen Pilot Cylinder, 108 cu.in. (17.0 cu. cm.) w/Switch-In-Gauge	2	2	3	3	2	-	-
8	81-871949-000	Cable Operated Control Head	1	1	2	2	2	2	1
9	81-871403-000	Pull Box Surface, 3/8" Pipe (Black Glass)	1	1	2	2	2	2	1
10	81-805520-000	Pull Box Bracket (871.403)	1	1	2	2	2	2	1
11	81-803008-000	Cone Puller, .987" Pipe, Water Tight (Max. 6 per Cable Line)	6	6	12	12	12	12	6
12	81-840058-000	Dual Pull Mechanism, 3/8" Pipe	1	1	2	2	2	2	-
13	WK-219849-000	1/6" Cable 500 ft. (152 m)	A/R	A/R	A/R	A/R	A/R	A/R	A/R
14	***	***	-	-	-	-	-	-	-
15	***	***	-	-	-	-	-	-	-
16	81-486536-000	Pressure Switch, 3 Pole Double Throw	1	1	1	1	1	1	1
17	90-101040-200	100d-cu.in Nitrogen Pilot/Solen Driver Cylinder w/pressure switch	-	-	-	-	-	1	5
18	90-102300-200	230d-cu.in Nitrogen Solen Drive Cylinder w/pressure switch	-	-	-	-	-	-	-
19	WK-872450-000	Discharge Head, Plain Nut	-	-	-	-	-	1	2
20	06K-118207-001	3/4" Nitrogen Discharge Hose, 18.00'	-	-	-	-	-	1	2
21	90-981514-001	Solen Nitrogen Pressure Operated	-	-	-	-	-	1	8
22	81-871072-001	Nitrogen Time Delay, for use with 108 cu.in. Pilot Cylinder 34-s delay	1	1	1	1	1	1	1
23	81-871072-003	Nitrogen Time Delay, for use with 100d-cu.in. Pilot Cylinder 35-s delay	1	1	1	1	1	1	-
24	06-239215-001	Heavy Duty Actuation Hose 34"	-	-	1	1	3	8	-
25	06K-128978-001	Dual Loop Bleed Kit	-	-	2	2	3	2	-
26	WK-270014-000	1 Cylinder Strip, 50 bu CO ₂ , 100x202300 cu.in N ₂	-	-	-	-	-	2	4
27	BV OTHERS	5/16" X 0.032 SS tubing or 1/4" SS Pipe	A/R	A/R	A/R	A/R	A/R	A/R	A/R
28	81-262219-000	Flexible Hose, 1/2" Outlet	-	-	-	-	-	-	-
29	81-934711-000	Wave, 1/2" NPT Leak Outlet	-	-	-	-	-	-	5
30	81-803242-000	Safety Outlet, 3/4" NPT 2400-2800 psi. (165-193 bars)	-	-	-	-	-	-	10



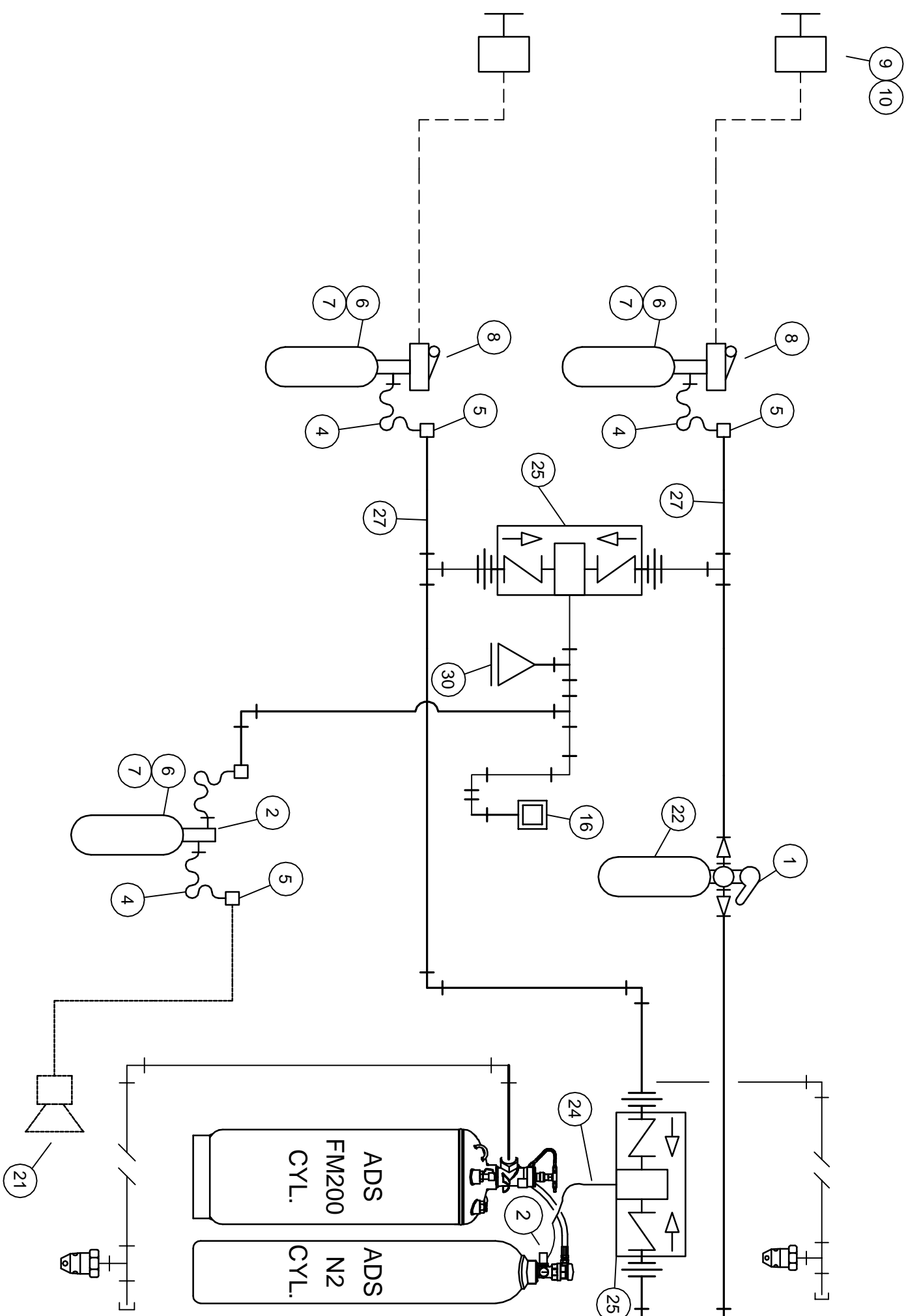
TYPICAL ACTUATION ARRANGEMENT - OPTION A
SINGLE ECS SERIES CYLINDER LOCATED OUTSIDE PROTECTED SPACE
NOT TO SCALE




TYPICAL ACTUATION ARRANGEMENT - OPTION B
SINGLE ADS SERIES CYLINDER LOCATED OUTSIDE PROTECTED SPACE
NOT TO SCALE

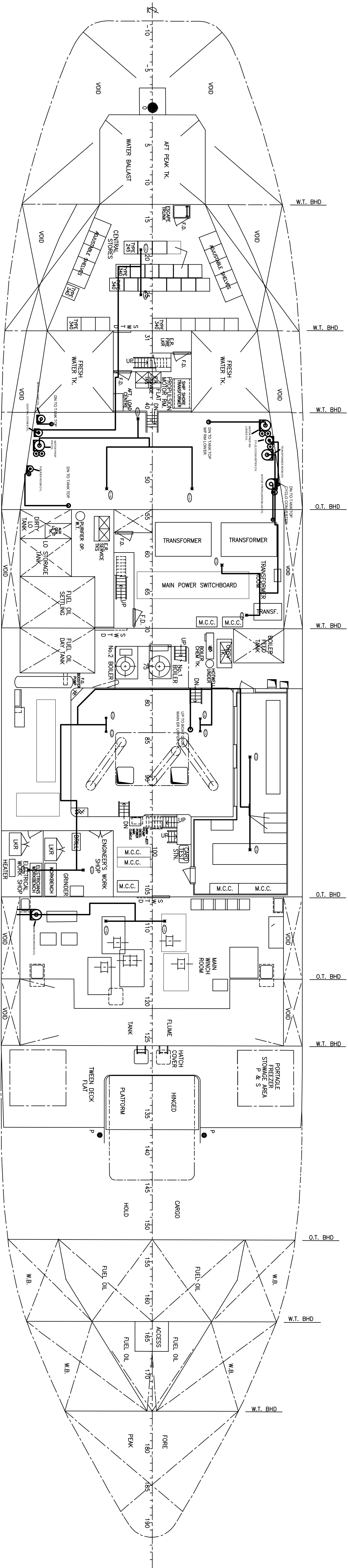


TYPICAL ACTUATION ARRANGEMENT - OPTION C
SINGLE ECS SERIES CYLINDER LOCATED INSIDE PROTECTED SPACE
NOT TO SCALE

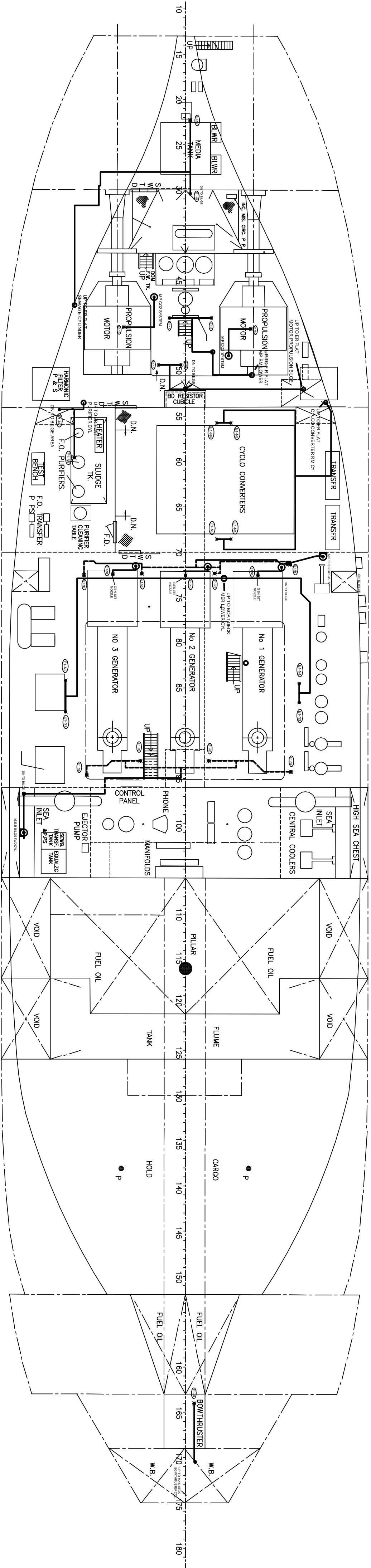


TYPICAL ACTUATION ARRANGEMENT - OPTION D
SINGLE ADS SERIES CYLINDER LOCATED INSIDE PROTECTED SPACE
NOT TO SCALE


 Kiddie Fire Systems 459-4011 / 1-800-361-2000 ASB/AM/2000	CUSTOMER		PROJECT	
	NATIONAL & MARINE FIRE SERVICE 571, CAMDENHURST, ONTARIO		CCOS ANN HARVEY 11-2726365-01	
KIDDE MARINE FV-200 SYSTEM LAUOYF AND INSTALLATION ACTIVATION ARRANGEMENTS A, B, C, & D				
This information is the property of Kiddie Fire Systems and is not to be distributed outside without their permission.	DPN: AT DATE: 01/11/09 ORDER: MK ISSUE: 090C/09	SIZE: D DWG. NO.: 11-2726365-01	REV 15	RBY C
CHG: NOTED UNITS: NOTED SHEET: 3 OF 15				

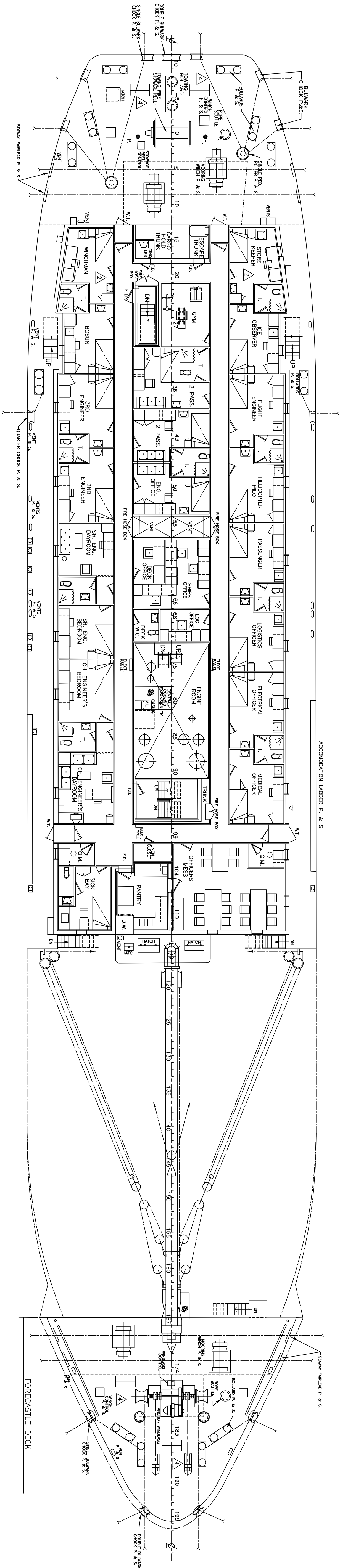


E.R. FLAT

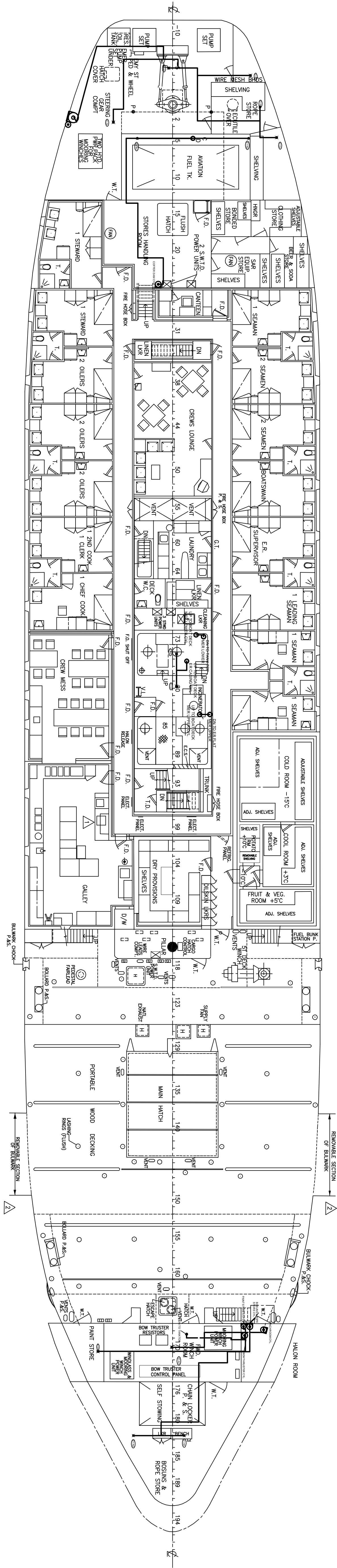


TANK TOP


 Kiddie Fire Systems		CUSTOMER NATIONAL & MARINE FIRE SERVICE ST. CATHERINES, ONTARIO		PROJECT CCGS ANN HARVEY	
450 MAIN STREET ST. CATHERINES, ONTARIO (519) 881-2000		KIDDE MARINE FH-200 SYSTEM LAYOUT AND INSTALLATION		REV	
This information is the property of Kiddie Fire Systems and is not to be disclosed or utilized without written permission.		DATE: 01/11/02	SIZE: DWG. NO.	REV	
		CRKD: K.A.	2002/02	C	
		ISSUED: K.K.	09/02/02		
		SCALE: NOTED	UNITS: NOTED	SHEET: 5 OF 15	

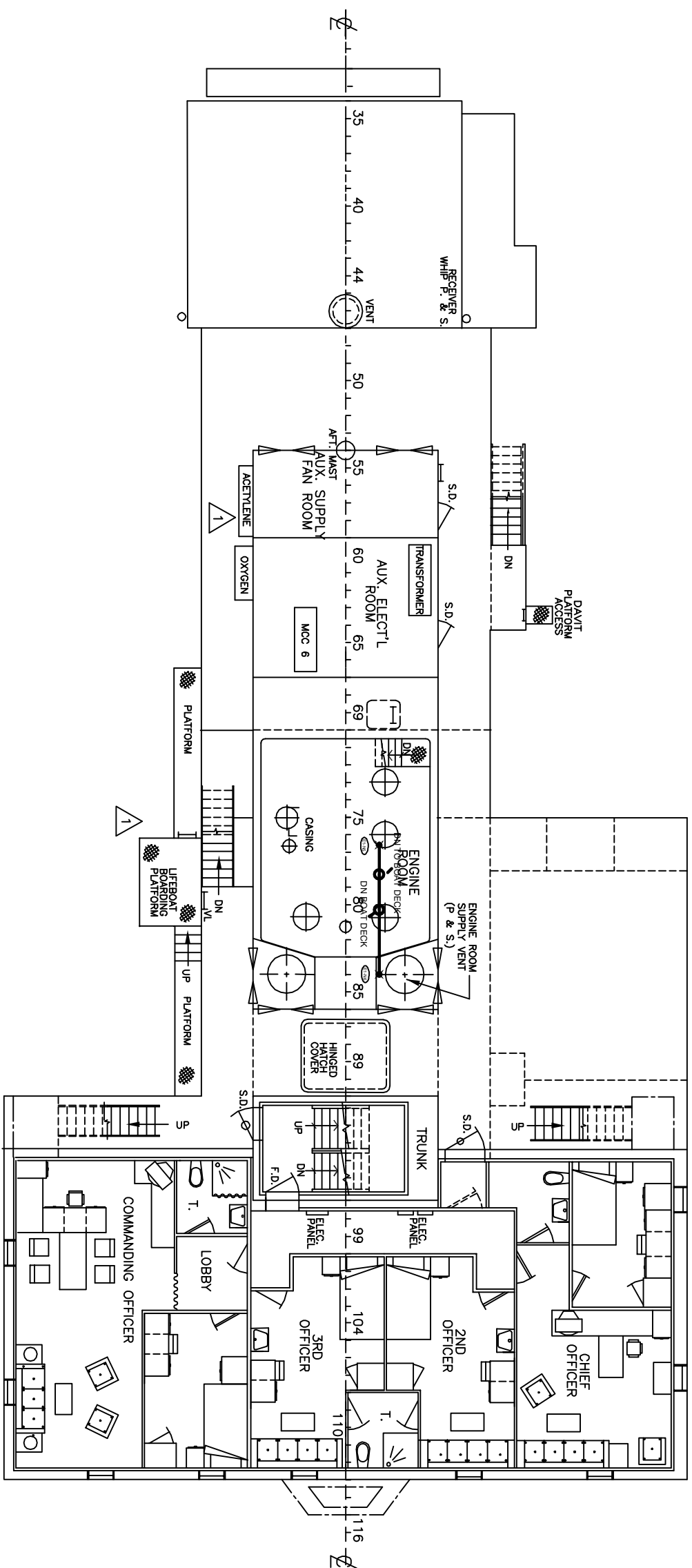


UPPER DECK

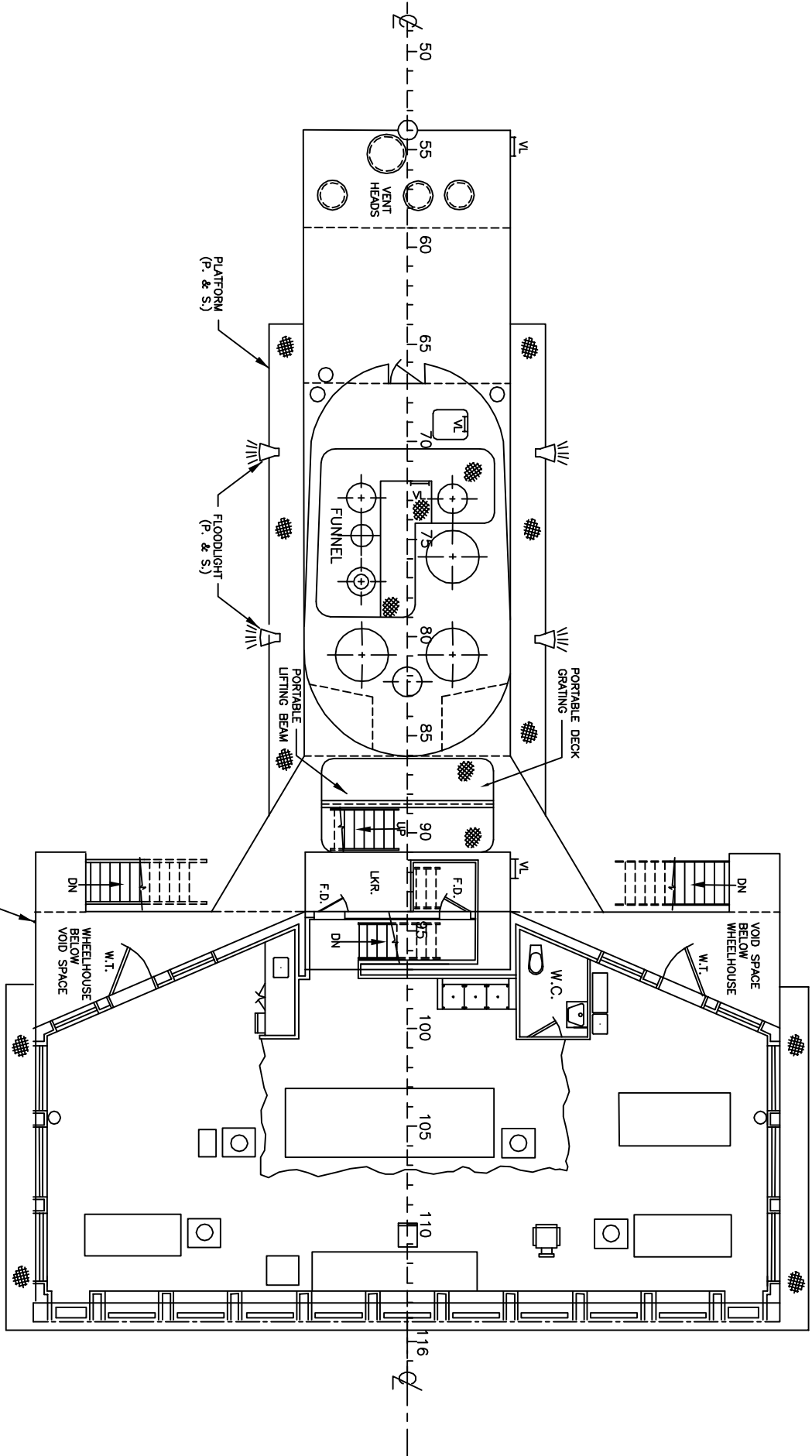


MAIN DECK

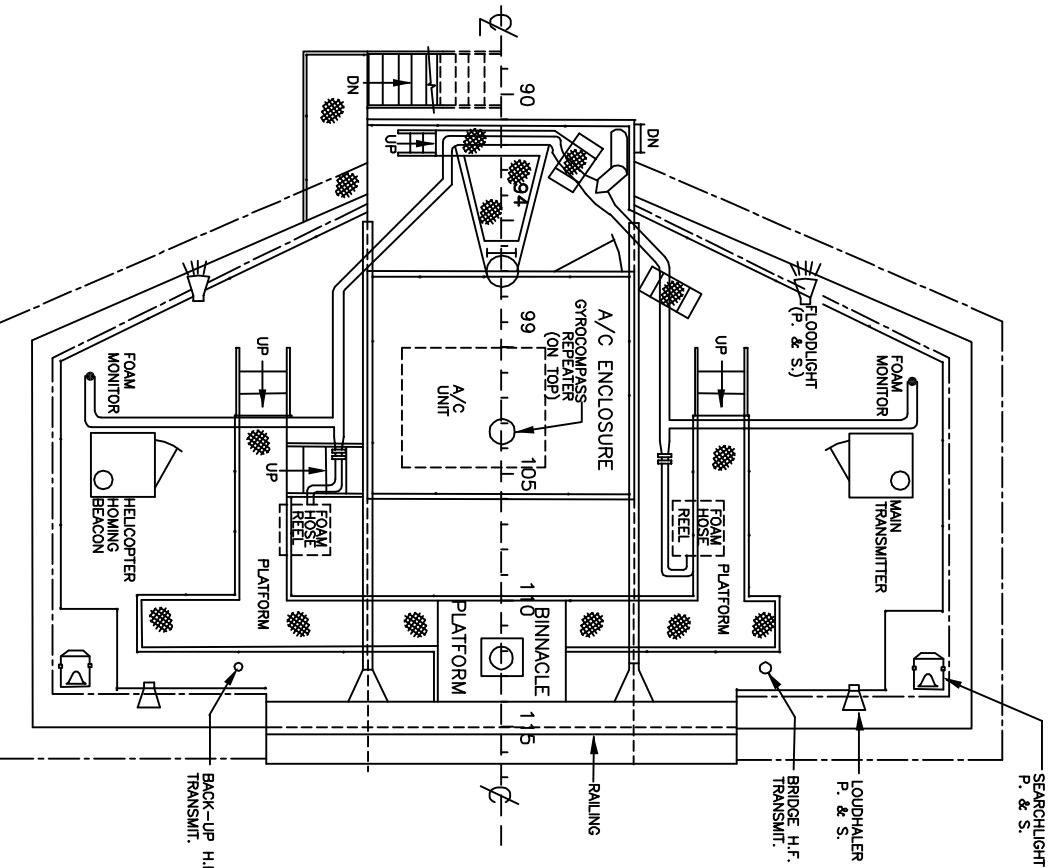
 Kidde Fire Systems		CUSTOMER NATIONAL & MARINE FIRE SERVICE ST. CATHARINES, ONTARIO		PROJECT CCGS ANN HARVEY	
PROJECT 450 MAIN ST. W. #1721 (519) 881-2000		SHIP PLAN VIEWS - MAIN DECK & UPPER DECK		REV C	
This information is the property of Kidde Fire Systems and is not to be disclosed or utilized without written permission.		P.N. AT 0111103 C.R.D. M.A. 1200102 ISSUED: KK 090C102		SIZE DWG. NO. D L1-2726365-01	
SCALE: NOTED		UNITS: NOTED		SHEET: 6 OF 15	



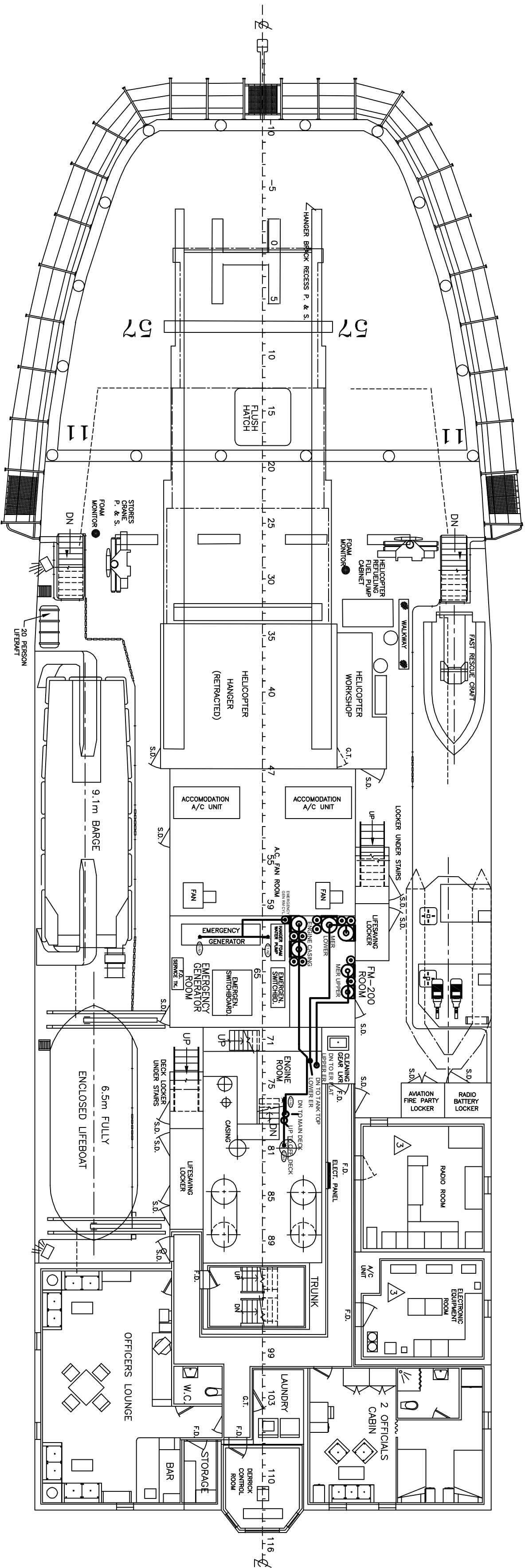
OFFICERS DECK



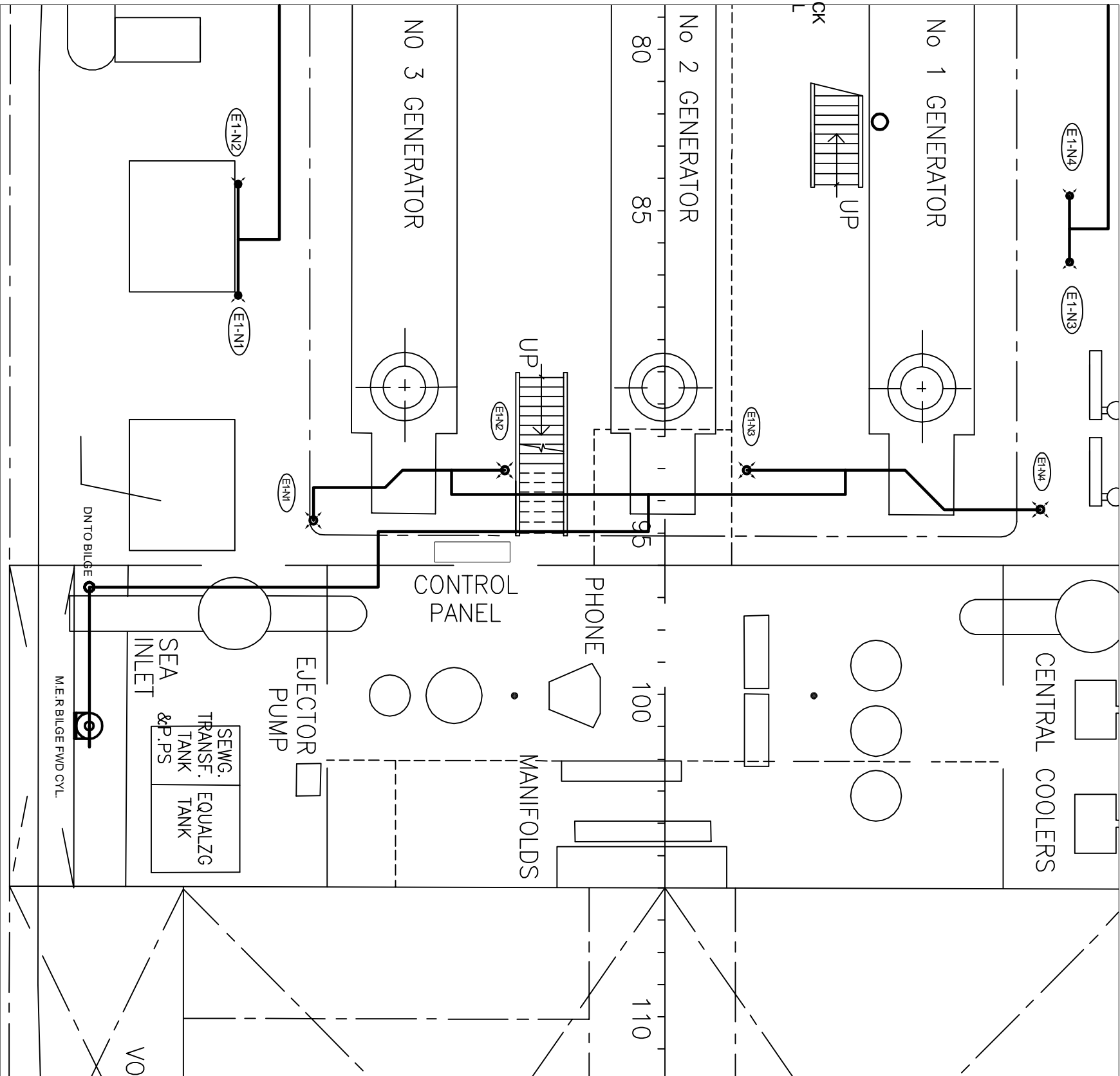
WHEELHOUSE FLOOR



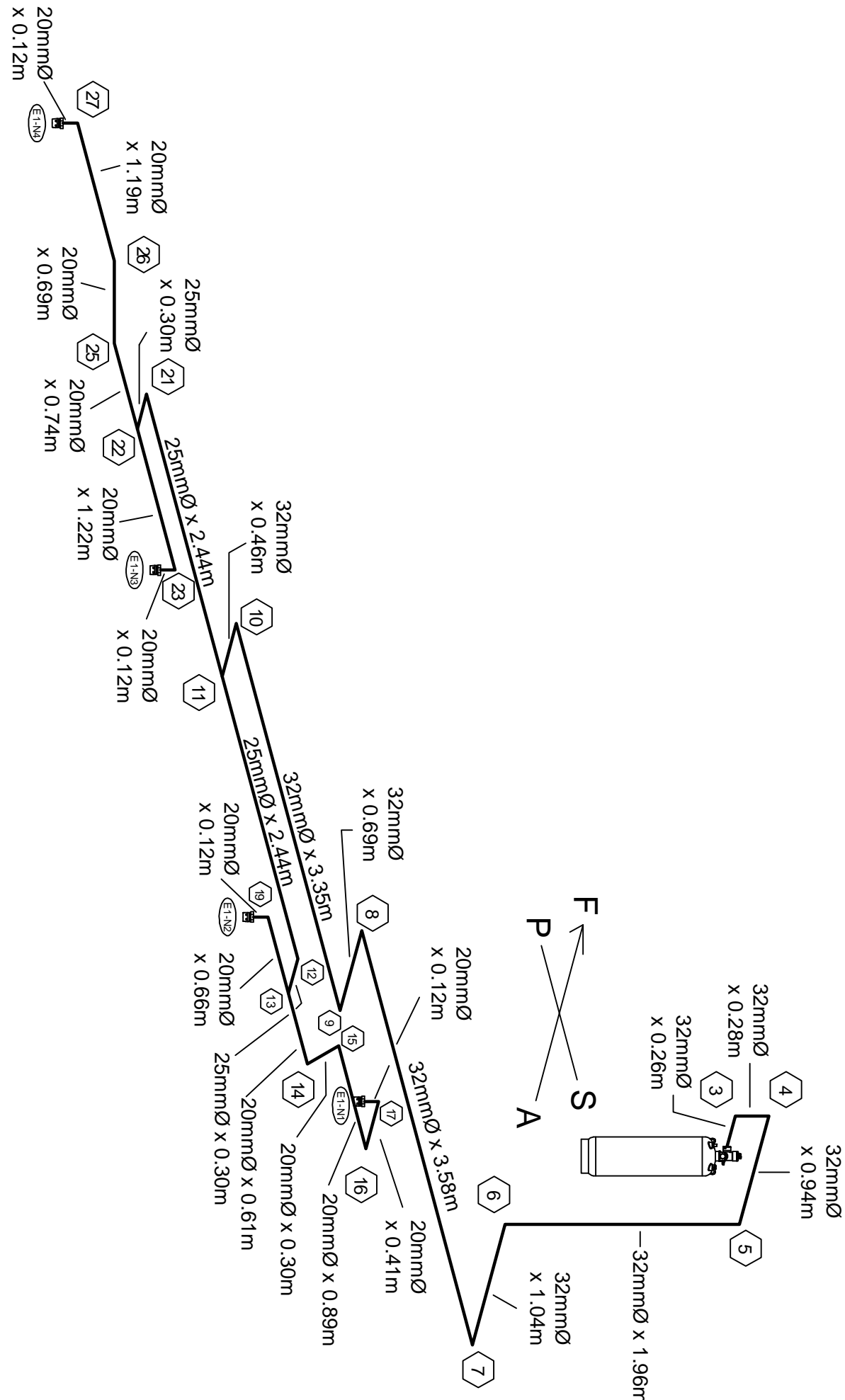
WHEELHOUSE TOP



BOAT DECK



FR 70 - 85 TANK TOP - MAIN E.R. BILGE AFT



FR 70 - 85 TANK TOP - MAIN E.R. BILGE AFT

BILL OF MATERIALS
BANK TOP - MAIN E.R.

NO	DESCRIPTION	PART NO.	QTY
1	1 FM-200 Agent in Storage Containers Filled At Factory	90-1900000-001	51.3
2	Cylinder Assembly, 200 lb. (90.7 kg). WILLI	90-102001-101	1
3	Valve Outlet Adapter, 2"	1WR-23590-000	1
4	Strap, 125/200/225 lb. Cylinder	06-255317-001	2
5	Candle, 125/200/225 lb. Cylinder	06-255413-001	2
6	DISCHARGE NOZZLES		4
		SEE TABLE BELOW	

USE ACTUATION OPTION F - SEE PAGE 4

NOZZLE NO	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E-I-N1	180°	140.45	90-194014-182	12.7
E-I-N2	180°	136.32	90-194014-180	13.0
E-I-N3	180°	142.9	90-194014-185	12.3
E-I-N4	180°	140.45	90-194014-182	13.2

BILL OF MATERIALS

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	51.3	90-196000-001
2	Cylinder Assembly, 200 lb. (90.7 kg), WILL		90-100201-101
3	Valve Outlet Adapter, 2"	1	VW-K-283905-000
4	Strap, 125/200/225 lb. Cylinder	2	06-256317-001
5	Crate, 125/200/225 lb. Cylinder	1	06-256317-001
6	DISCHARGE NOZZLES	4	SEE TABLE BELOW

USE ACTUATION OPTION F - SEE PAGE 4

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E-I-N1	360°	119.74	90-194024-172	12.6
E-I-N2	360°	119.74	90-194024-172	13.0
E-I-N3	360°	119.74	90-194024-172	13.0
E-I-N4	360°	119.74	90-194024-172	12.6

PLAN VIEW

FR 85 - 97 TANK TOP - MAIN E.R. BILGE FWD

ISOMETRIC VIEW
LINK TOP - MAIN E.R. BILGE AFT


FLOW CALCULATION FILE

C1-2726365-01
July 13, 2009 8:52:48 AM

ISOMETRIC VIEW
FR 85 - 97 TANK TOP - MAIN E.R. BILGE FWD

FLOW CALCULATION FILE

C1-2726365-02
July 13, 2009 8:58:15 AM

 Kidd's Fire Systems 400 MAIN STREET ASHLAND, MA 01721 (508) 881-2000	CUSTOMER NATIONAL & MARINE FIRE SERVICE ST. CATHERINES, ONTARIO		PROJECT CCGS ANN HARVEY	
	KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION MAIN ENGINE ROOM BILGE AT AND MAIN ENGINE ROOM BILGE FWD			
THIS INFORMATION IS THE PROPERTY OF KIDDE'S FIRE SYSTEMS. IT IS NOT TO BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, WITHOUT WRITTEN PERMISSION.	DRY: AT 01JUL09 CHG.D: MA 020CT09 ISSUED: KK 090CT09	SIZE D	DWG. NO. LI-2726355-01	REV C
SCALE: NOTED UNITS:	NOTED	SHEET: 8 OF 15		

BILL OF MATERIALS

FR 106 - 121 E.R. FLAT - MAIN WINCH ROOM

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers	162.4	90-19000-001
2	Cylinder Assembly, 600 lb. (272.1 kg). w/LLI	1	90-100501-100
3	Not Used	-	-
4	Strap, 600/675 lb. Cylinder	2	WK-294651-000
5	Cradle, 600/675 lb. Cylinder	2	WK-294652-000
6	Discharge Nozzles	2	SEE TABLE BELOW

USE ACTUATION OPTION C - SEE PAGE 3

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P.I.N.	DELIVERED MASS (KG)
ET-1-N1	360°	890.71	90-194027-469	81.8
ET-1-N2	360°	891.71	90-194027-470	80.8

BILL OF MATERIALS

FR 13 - 30 E.R. FLAT - CENTRAL STORES

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled at Factory	123.8	90-19000-001
2	Cylinder Assembly, 350 lb. (158.7 kg) Capacity 2" Valve	1	90-100351-001
3	Valve Outlet Adapter, 2"	1	WK-283905-000
4	Strap, 350/395 lb. Cylinder	2	WK-281866-000
5	Cradle, 350/395 lb. Cylinder	2	WK-281867-000
6	DISCHARGE NOZZLES	2	SEE TABLE BELOW

USE ACTUATION OPTION A - SEE PAGE 3

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P.I.N.	DELIVERED MASS (KG)
ET-1-N1	360°	890.71	90-194027-469	62.2
ET-1-N2	360°	890.71	90-194027-470	61.7

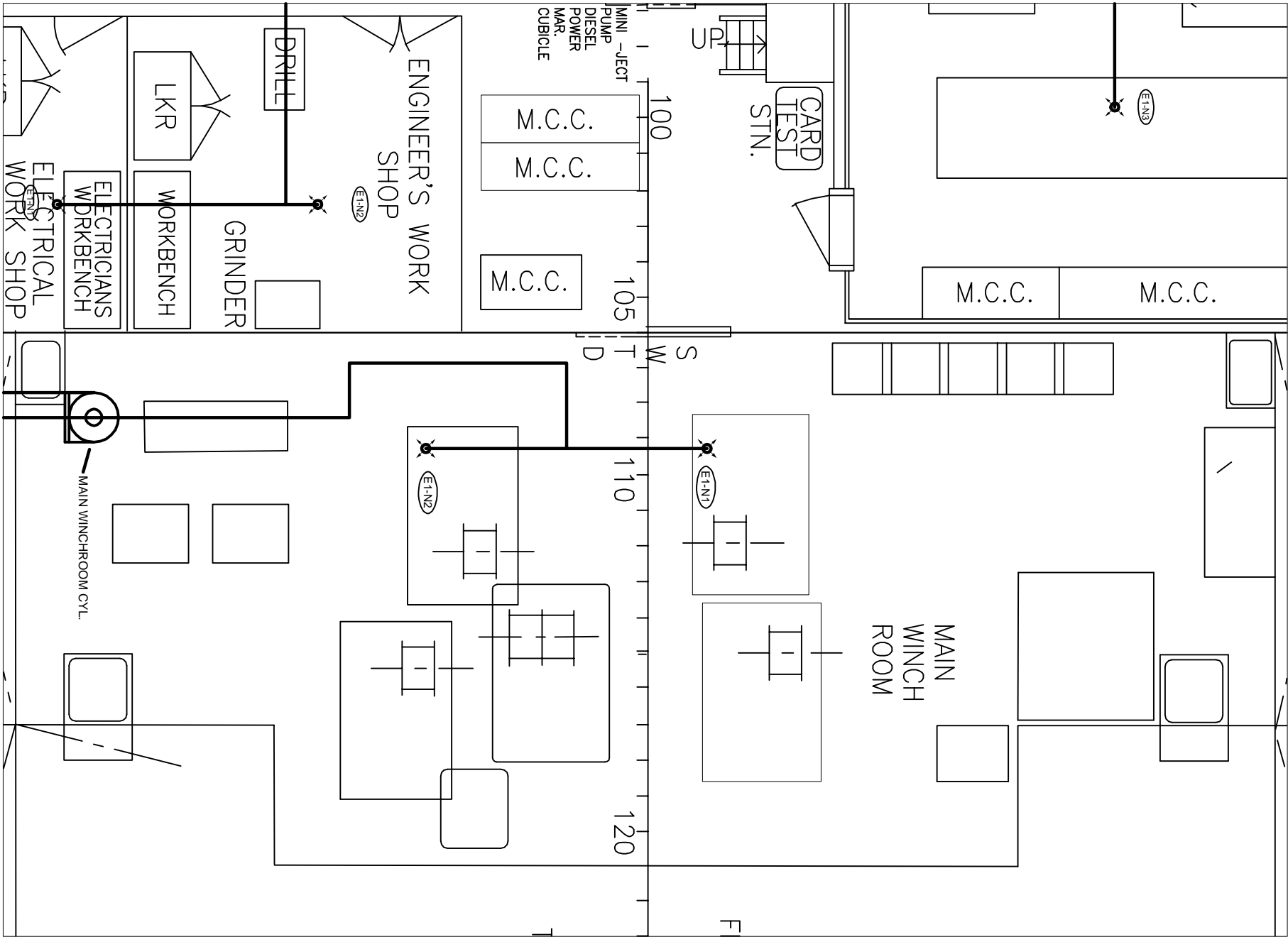
BILL OF MATERIALS

FR 15 - 35 TANK TOP - SEWAGE COMPARTMENT

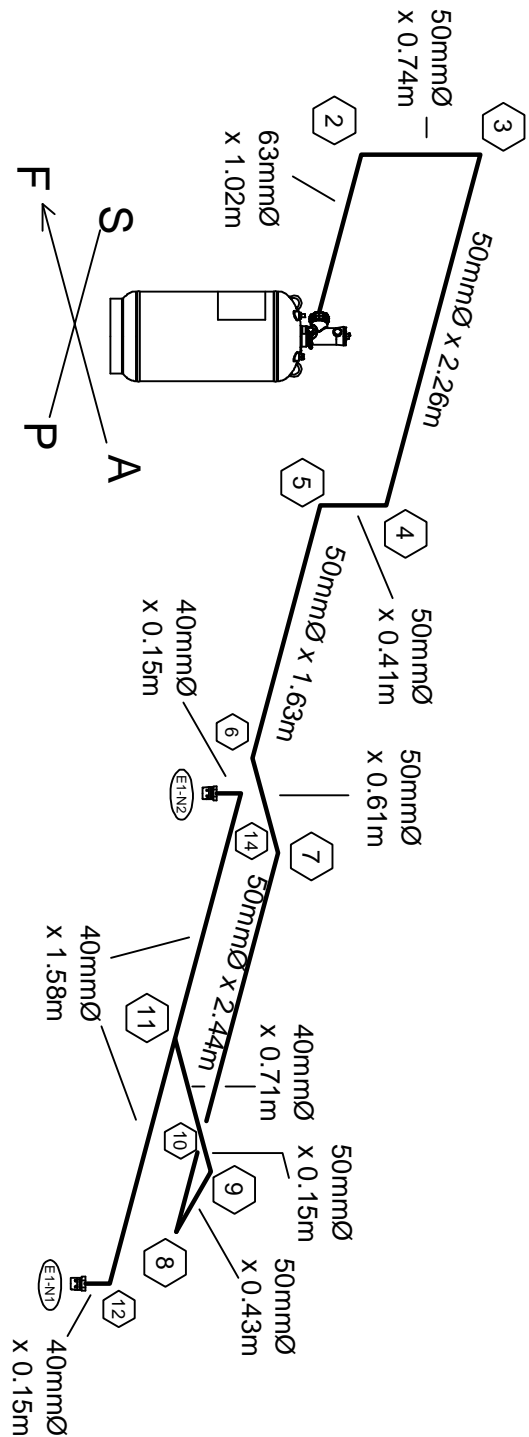
NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers	122.0	90-19000-001
2	Cylinder Assembly, 350 lb. (158.7 kg). w/LLI	1	90-100351-001
3	Valve Outlet Adapter, 2"	1	WK-283905-000
4	Strap, 350/395 lb. Cylinder	2	WK-281866-000
5	Cradle, 350/395 lb. Cylinder	2	WK-281867-000
6	DISCHARGE NOZZLES	2	SEE TABLE BELOW

USE ACTUATION OPTION A - SEE PAGE 3

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P.I.N.	DELIVERED MASS (KG)
ET-1-N1	180°	787.23	90-194017-438	80.2
ET-1-N2	360°	890.71	90-194027-469	61.8

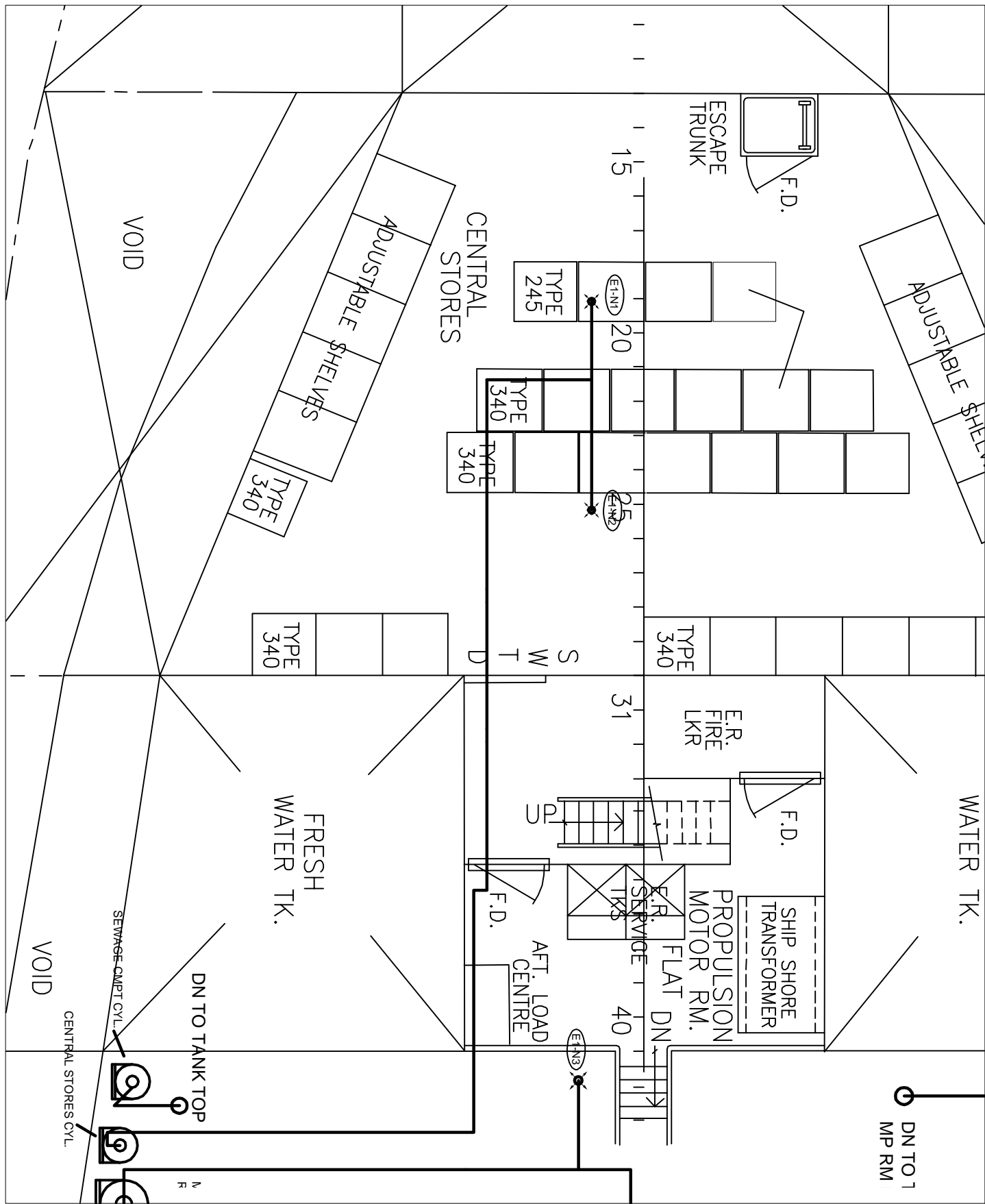


PLAN VIEW
FR 106 - 121 E.R. FLAT -MAIN WINCH ROOM

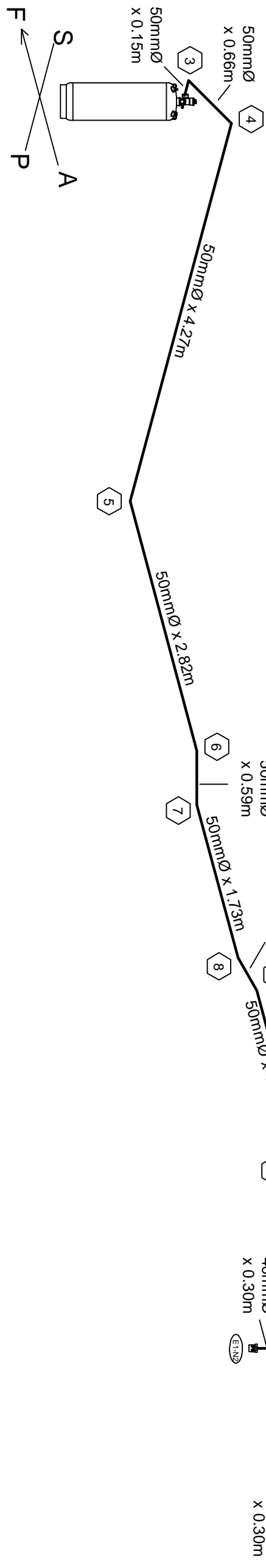


ISOMETRIC VIEW
FR 106 - 121 E.R. FLAT -MAIN WINCH ROOM

FLOW CALCULATION FILE
C1-2726365-04
July 13, 2009 8:38:09 AM

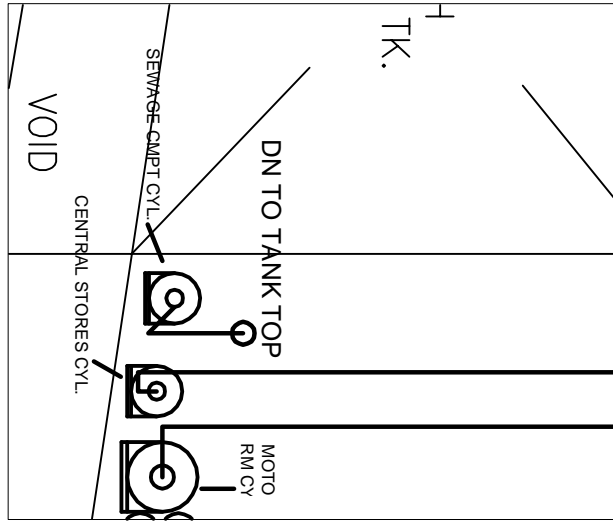


PLAN VIEW
FR 13 - 30 E.R. FLAT - CENTRAL STORES

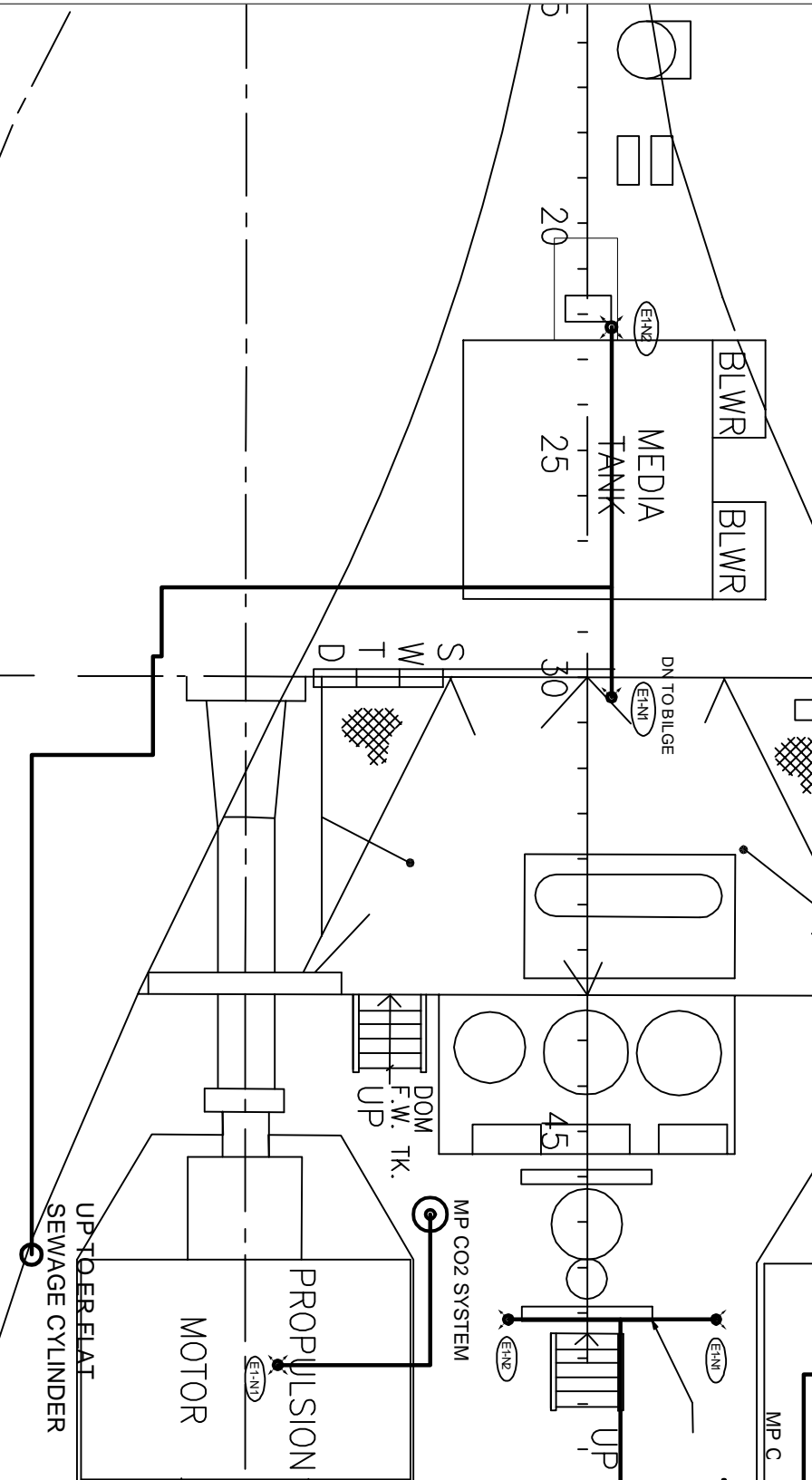


ISOMETRIC VIEW
FR 13 - 30 E.R. FLAT - CENTRAL STORES

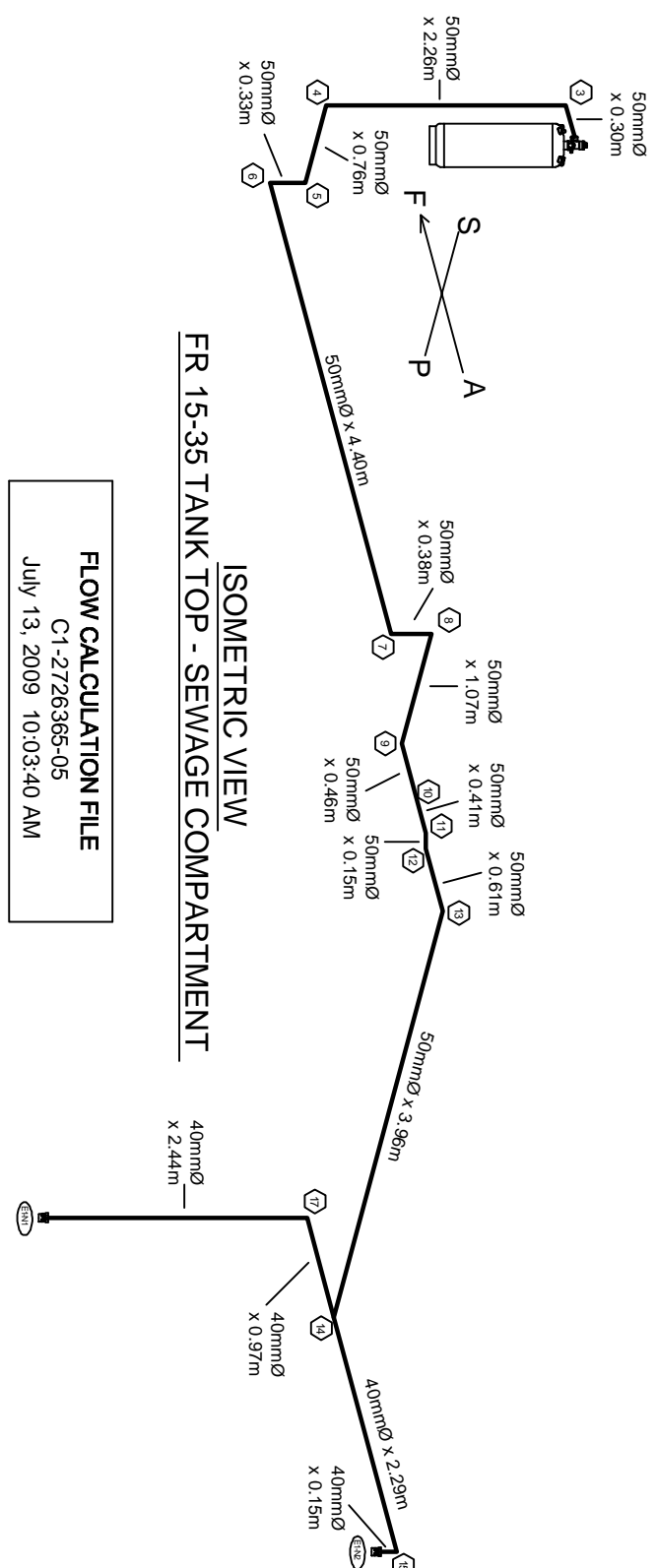
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C1-2726365-04
July 13, 2009 9:47:45 AM



PLAN VIEW
FR 47 E.R. FLAT - SEWAGE COMPARTMENT




PLAN VIEW
FR 15-35 TANK TOP - SEWAGE COMPARTMENT



ISOMETRIC VIEW
FR 15-35 TANK TOP - SEWAGE COMPARTMENT

FLOW CALCULATION FILE
C1-2726365-05
July 13, 2009 10:03:40 AM

 Kide Fire Systems 4400 MAIN STREET AGINCOURT, ONTARIO (905) 881-2000		CUSTOMER NATIONAL & MARINE FIRE SERVICE ST. CATHERINES, ONTARIO		PROJECT CCGS ANN HARVEY	
This information is the property of KIDDE-FENVAL. It is to be used only for the project and is not to be disclosed or utilized without written permission.		DRN: AT	DATE: 04 JUL 09	SIZE: DWG NO.	REV
KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION		CHK'D: MA	02 OCT 09	D	L1-2726365-01
MAIN WINCHROOM, CENTRAL STORES, & SEWAGE COMPARTMENT		ISSUED: KK	09 OCT 09		C
SCALE: NOTED		UNITS: NOTED		SHEET: 9 OF 15	

BILL OF MATERIALS

FR 167 - 176 MAIN DECK - FWD WINCH ROOM

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers	44.0	90-190000-001
2	Cylinder Assembly, 125 lb. (56.7 kg), w/LLI	1	90-100121-001
3	Valve Outlet Adapter, 1-1/2"	1	WK-283904-000
4	Strap, 125/200/225 lb. Cylinder	2	06-235317-001
5	Cradle, 125/200/225 lb. Cylinder	2	06-235431-001
6	DISCHARGE NOZZLES	1	SEE TABLE BELOW

USE ACTUATION OPTION A - SEE PAGE 3

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	180°	360°	519.55	44.0

BILL OF MATERIALS

FR 167 - 176 MAIN DECK - PAINT STORES

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers	6.8	90-190000-001
2	Cylinder Assembly, 20 lb. (9.0 kg)	1	90-100020-001
3	Valve Outlet Adapter, 1-1/2"	1	WK-283904-000
4	N1 Used	-	-
5	Bracket, 20 lb. Cylinder Wall	2	82-485486-000
6	DISCHARGE NOZZLES	1	SEE TABLE BELOW

USE ACTUATION OPTION A - SEE PAGE 3

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360°	111.88	90-194022-166	6.8

BILL OF MATERIALS

FR 163 - 169 TANK TOP - BOWTHRUSTER

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers	25.9	90-190000-001
2	Cylinder Assembly, 125 lb. (56.7 kg), w/LI	1	90-100121-001
3	Valve Outlet Adapter, 1-1/2"	1	WK-283904-000
4	Strap, 125/200/225 lb. Cylinder	2	06-235317-001
5	Cradle, 125/200/225 lb. Cylinder	2	06-235431-001
6	DISCHARGE NOZZLES	1	SEE TABLE BELOW

USE ACTUATION OPTION A - SEE PAGE 3

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360°	198.00	90-194024-221	25.9

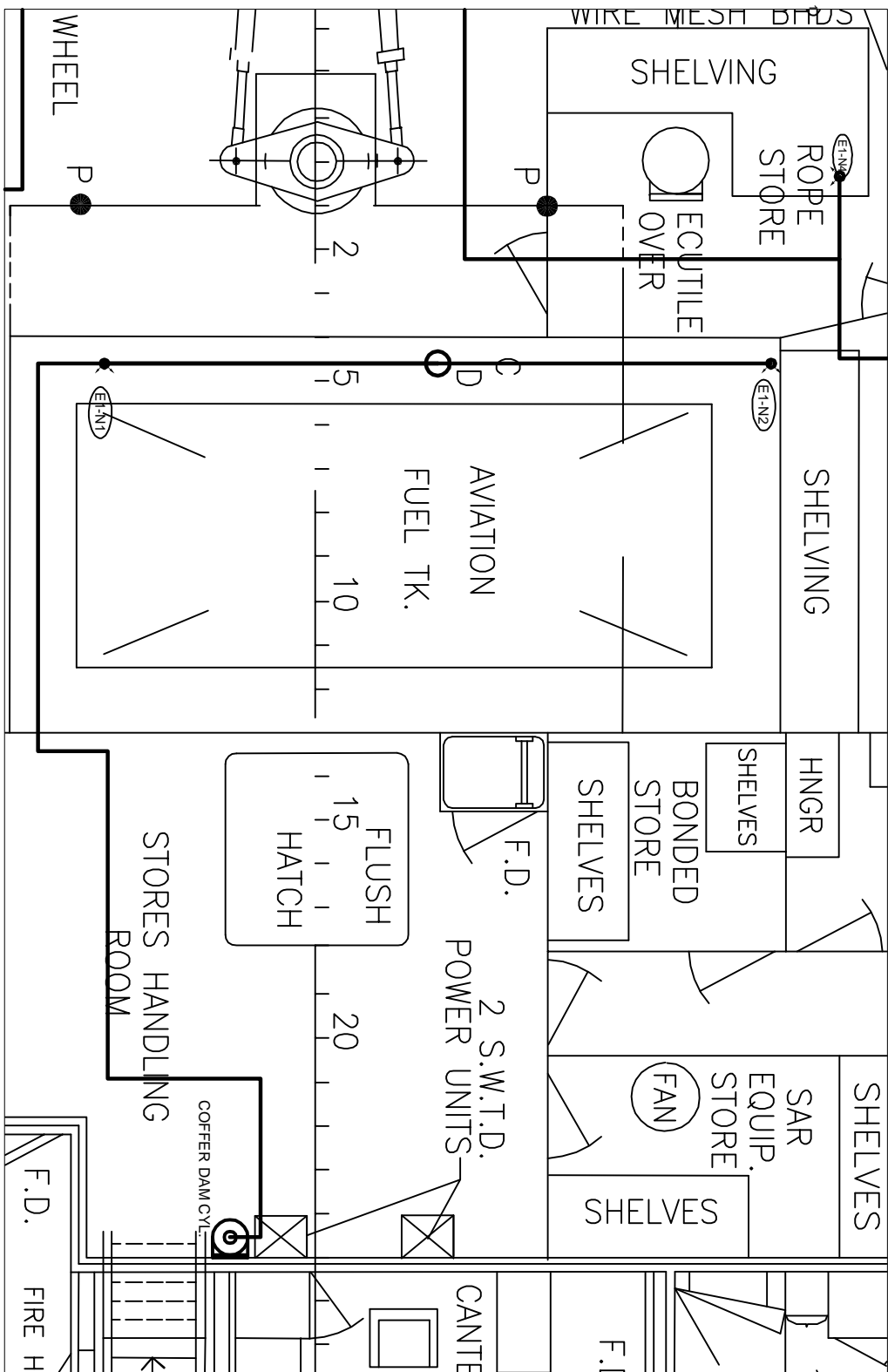
BILL OF MATERIALS

FR 4 - 13 MAIN DECK - AVIATION FUEL COFFER DAM

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	35.4	90-190000-001
2	Cylinder Assembly, 125 lb. (56.7 kg), w/LLI	1	90-100121-001
3	Valve Outlet Adapter, 1-1/2"	1	WK-283904-000
4	Strap, 125/200/225 lb. Cylinder	2	06-235317-001
5	Cradle, 125/200/225 lb. Cylinder	2	06-235431-001
6	DISCHARGE NOZZLES	2	SEE TABLE BELOW

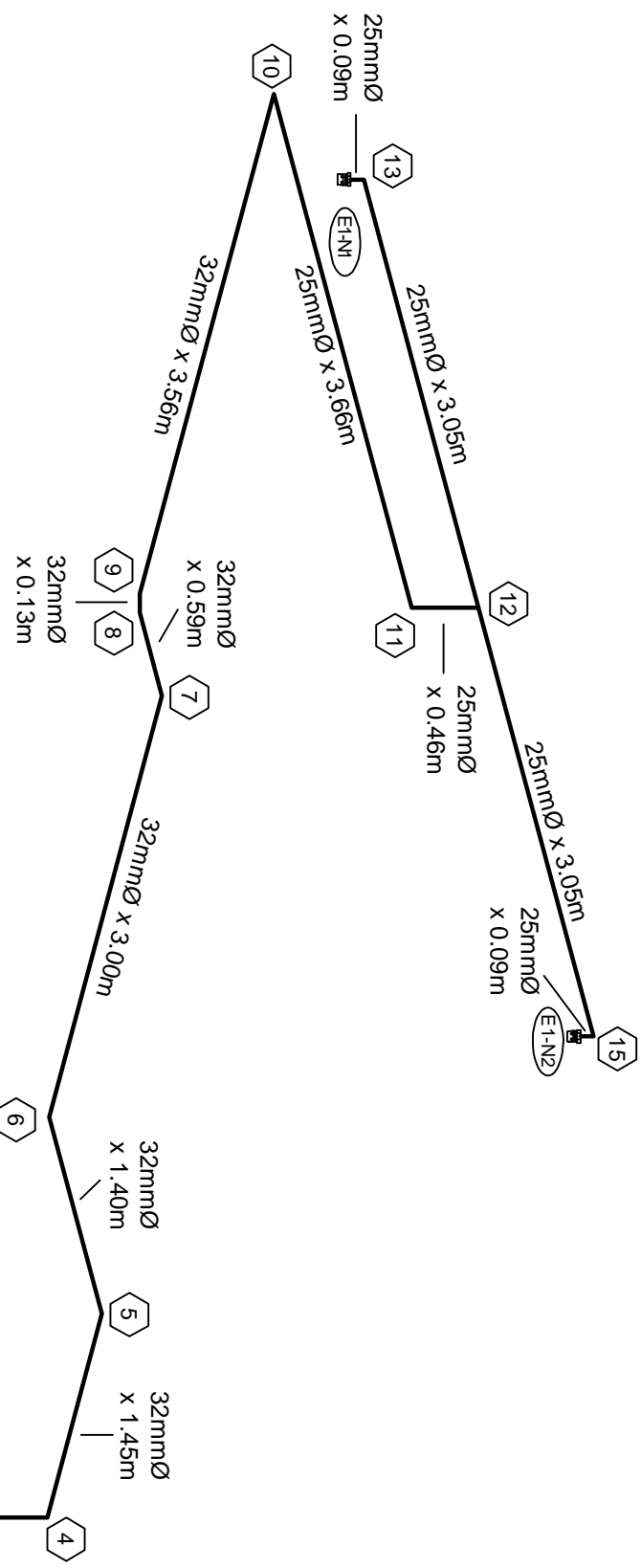
USE ACTUATION OPTION A - SEE PAGE 3

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	180°	273.10	90-194015-257	17.7
E1-N2	180°	273.10	90-194015-257	17.7



PLAN VIEW

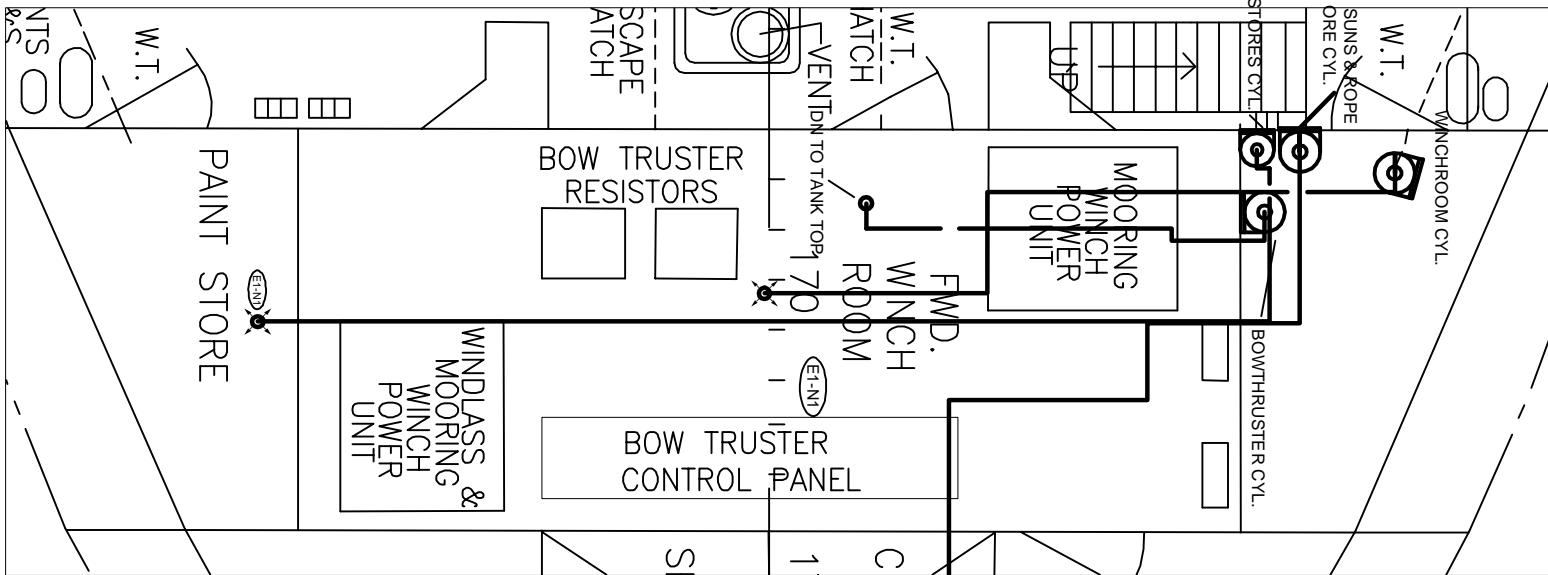
FR 4 - 13 MAIN DECK - AVIATION FUEL COFFER DAM



ISOMETRIC VIEW

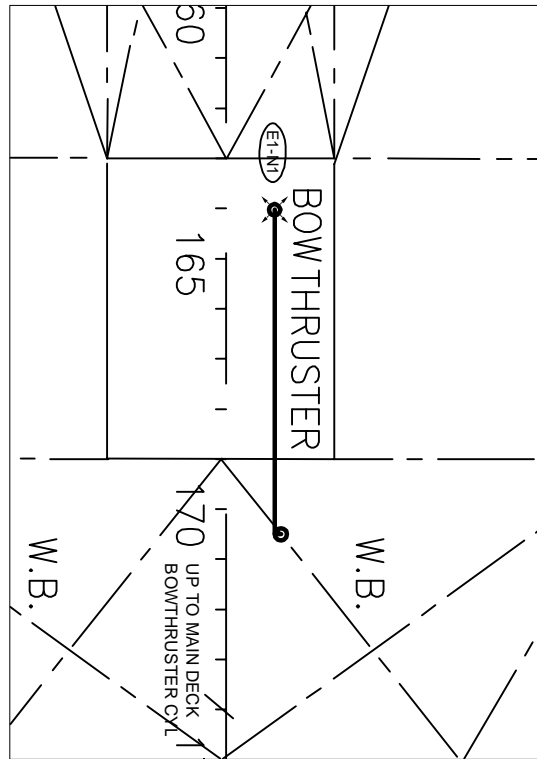
FR 4 - 13 MAIN DECK - AVIATION FUEL COFFER DAM

FLOW CALCULATION FILE
C1-2726365-08
July 13, 2009 10:08:32 AM



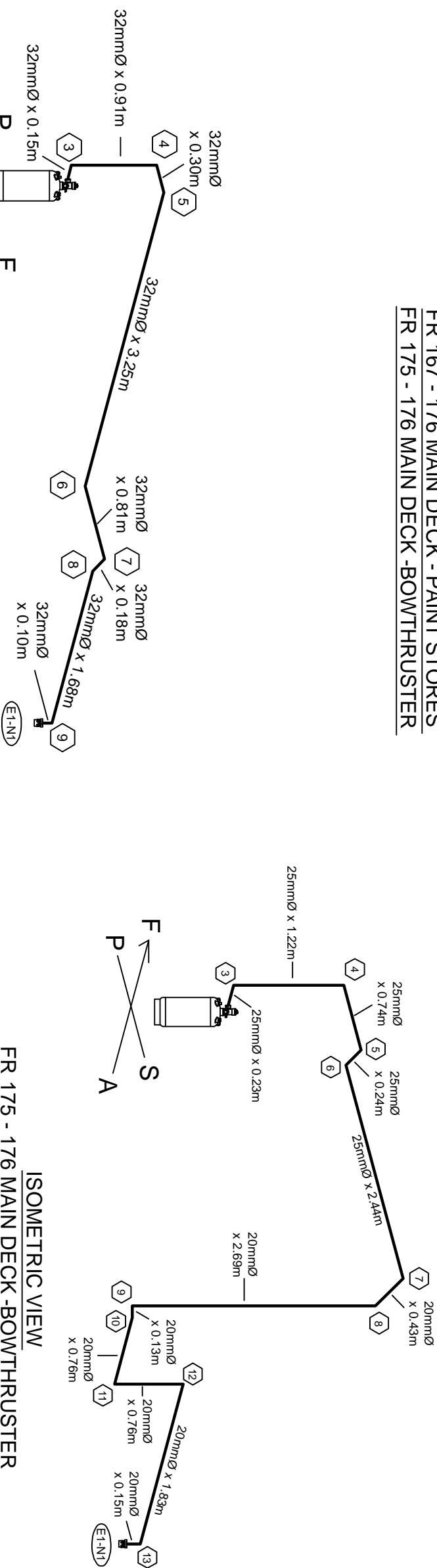
PLAN VIEW

FR 167 - 176 MAIN DECK - FWD WINCH ROOM
FR 167 - 176 MAIN DECK - PAINT STORES
FR 175 - 176 MAIN DECK - BOWTHRUSTER



ISOMETRIC VIEW

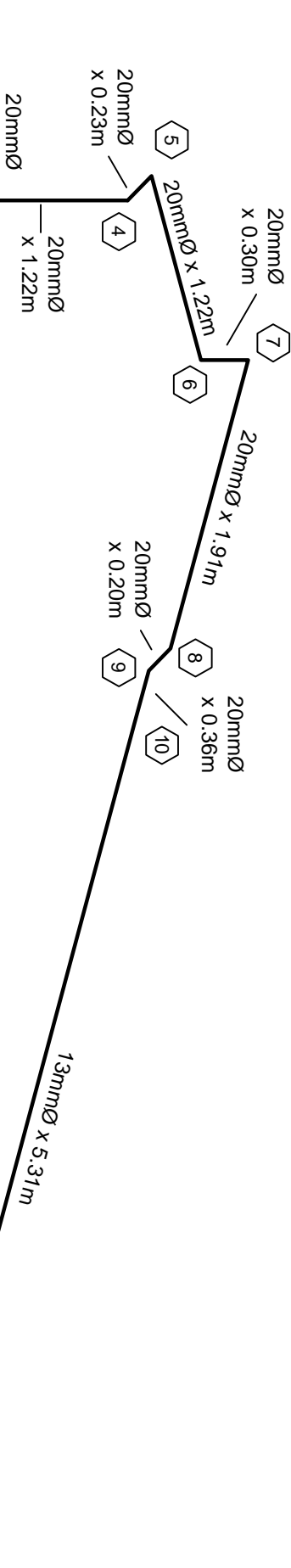
FR 163 - 169 TANK TOP - BOWTHRUSTER



PLAN VIEW

FR 175 - 176 MAIN DECK - BOWTHRUSTER
FR 163 - 169 TANK TOP - BOWTHRUSTER

FLOW CALCULATION FILE
C1-2726365-09
July 13, 2009 10:55:16 AM



ISOMETRIC VIEW

FR 167 - 176 MAIN DECK - PAINT STORES

FLOW CALCULATION FILE
C1-2726365-08
October 08, 2009 8:44:31 AM

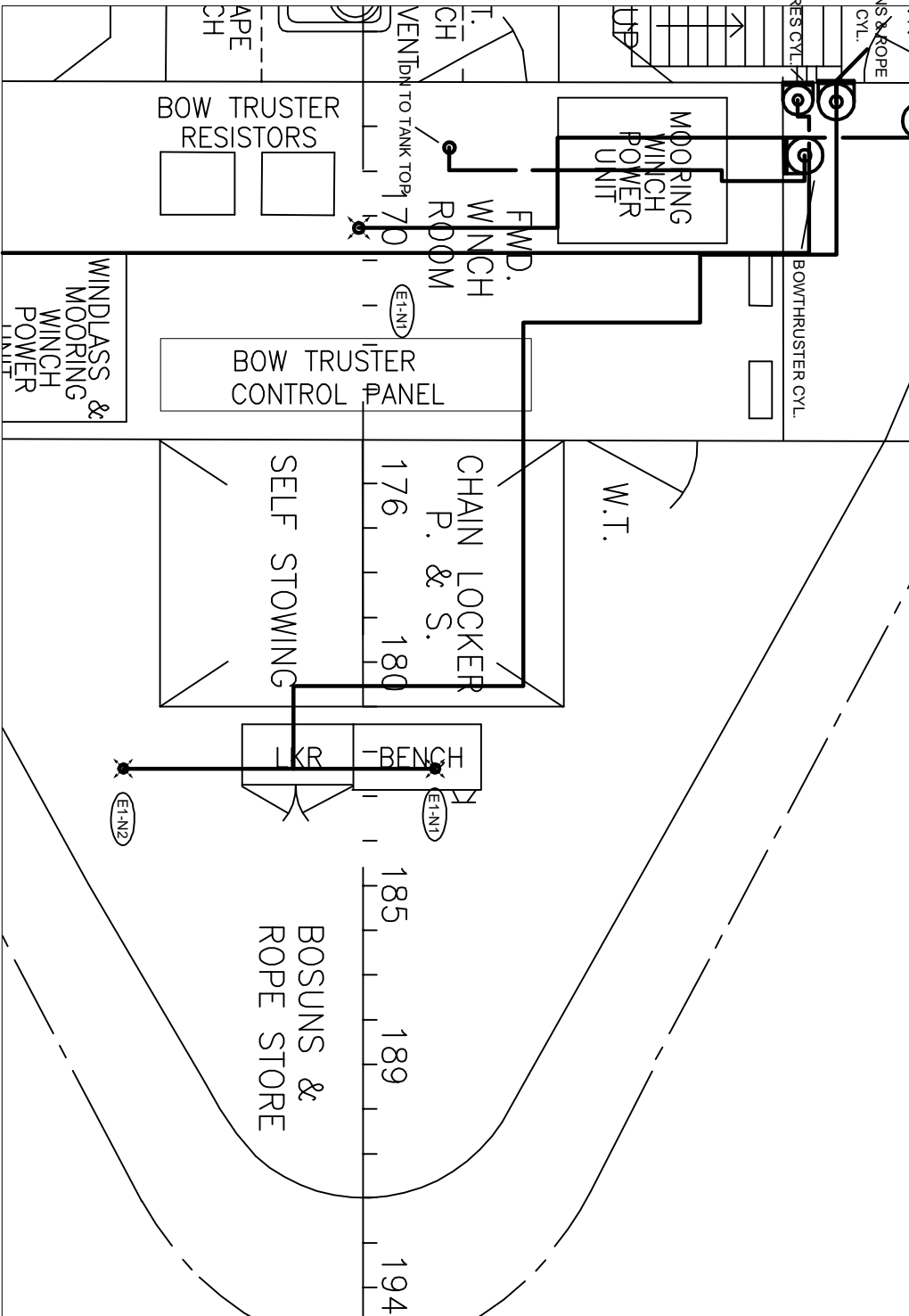
BILL OF MATERIALS

FR 176 - 192 MAIN DECK - BOSUNS & ROPE STORE

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers	64.4	90-190000-001
2	Cylinder Assembly, 200 lb. (90.7 kg), w/LI	1	90-100201-001
3	Valve Outlet Adapter, 2"	1	WK-283905-000
4	Strap, 125/200/225 lb. Cylinder	2	06-235317-001
5	Cradle, 125/200/225 lb. Cylinder	2	06-235431-001
6	DISCHARGE NOZZLES	2	SEE TABLE BELOW

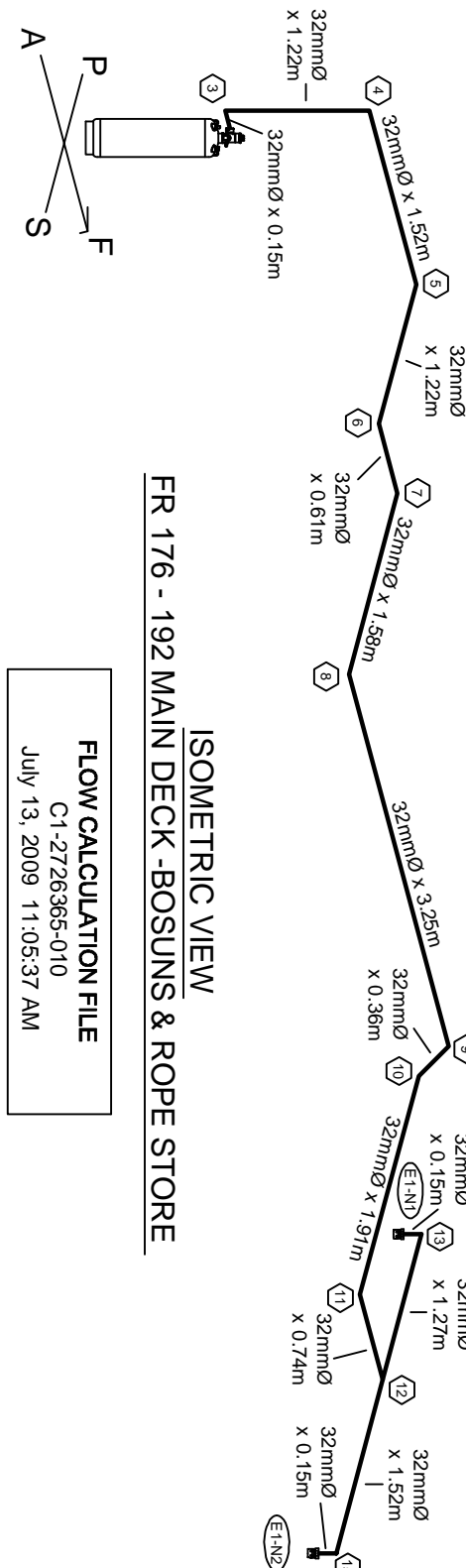
USE ACTUATION OPTION A - SEE PAGE 3

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360°	455.87	90-194026-339	32.2
E1-N2	360°	455.87	90-194026-339	32.2



PLAN VIEW


FR 176 - 192 MAIN DECK - BOSUNS & ROPE STORE



ISOMETRIC VIEW

FR 176 - 192 MAIN DECK - BOSUNS & ROPE STORE

FLOW CALCULATION FILE
C1-2726365-010
July 13, 2009 11:03:37 AM

<div>  <p>Kidde Fire Systems</p> <p>400 MAIN STREET ASHLAND, MA 01721 (508) 880-2000</p> </div>				<div> <p>CUSTOMER</p> <p>NATIONAL & MARINE FIRE SERVICE</p> <p>ST. CATHERINES, ONTARIO</p> </div>				<div> <p>PROJECT</p> <p>CCGS ANN HARVEY</p> </div>			
<div> <p>KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION, AVIATION FUEL COFFERDAY, FWD WINCH ROOM, PAINT STORES, BOWTHRUSTER, AND BOSUNS & ROPE STORE</p> </div>				<div> <p>DRN: AT</p> <p>CHK'D: MA</p> <p>ISSUED: KK</p> <p>SCALE: NOTED</p> </div>				<div> <p>DATE: 020CT09</p> <p>SIZE: D</p> <p>DWG. NO.: L1-2726365-01</p> <p>REV: C</p> </div>			
<div> <p>This information is the property of KIDDE - FENVAL. It is to be used for the project and no other use without the written permission.</p> </div>				<div> <p>UNITS: NOTED</p> <p>SHEET: 10 OF 15</p> </div>							

BILL OF MATERIALS

NO.	DESCRIPTION	QTY	PART NO.
1	FW-200 Agent in Storage Containers Filled At Factory	31.8	96-190000-001
2	Valve Assembly, 70 lb. (66.7 kg), w/L	1	96-100070-001
3	Valve Outlet Adapter, 1-1/2"	1	WK-283994-000
4	Strap 40 x 70 lb. Cylinder	2	WK-283994-000
5	Not Used	-	
6 DISCHARGE NOZZLES		2	
			SEE TABLE BELOW

USE ACTUATION OPTION C - SEE PAGE 3

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	180°	167.55	90-194014-139	15.8
E1-N2	180°	167.55	90-194014-139	15.9

BILL OF MATERIALS

NO.	DESCRIPTION	QTY	PART NO
1	135 lb. (15.8 kg) Cylinder & Valve Assembly, Bent Siphon	2	81-982547-000
2	Discharge Head - Plain Nut	2	WM-934202-000
3	Flexible Hose, 1/2" Outlet	2	WM-872450-000
4	Cylinder Strap	4	WM-270014
5	Flange and Cover Assembly, Type Vent Nozzles	1	81-944492-000
6	DISCHARGE NOZZLES	2	SEE TABLE BELOW

USE ACTUATION OPTION G - SEE PAGE 4

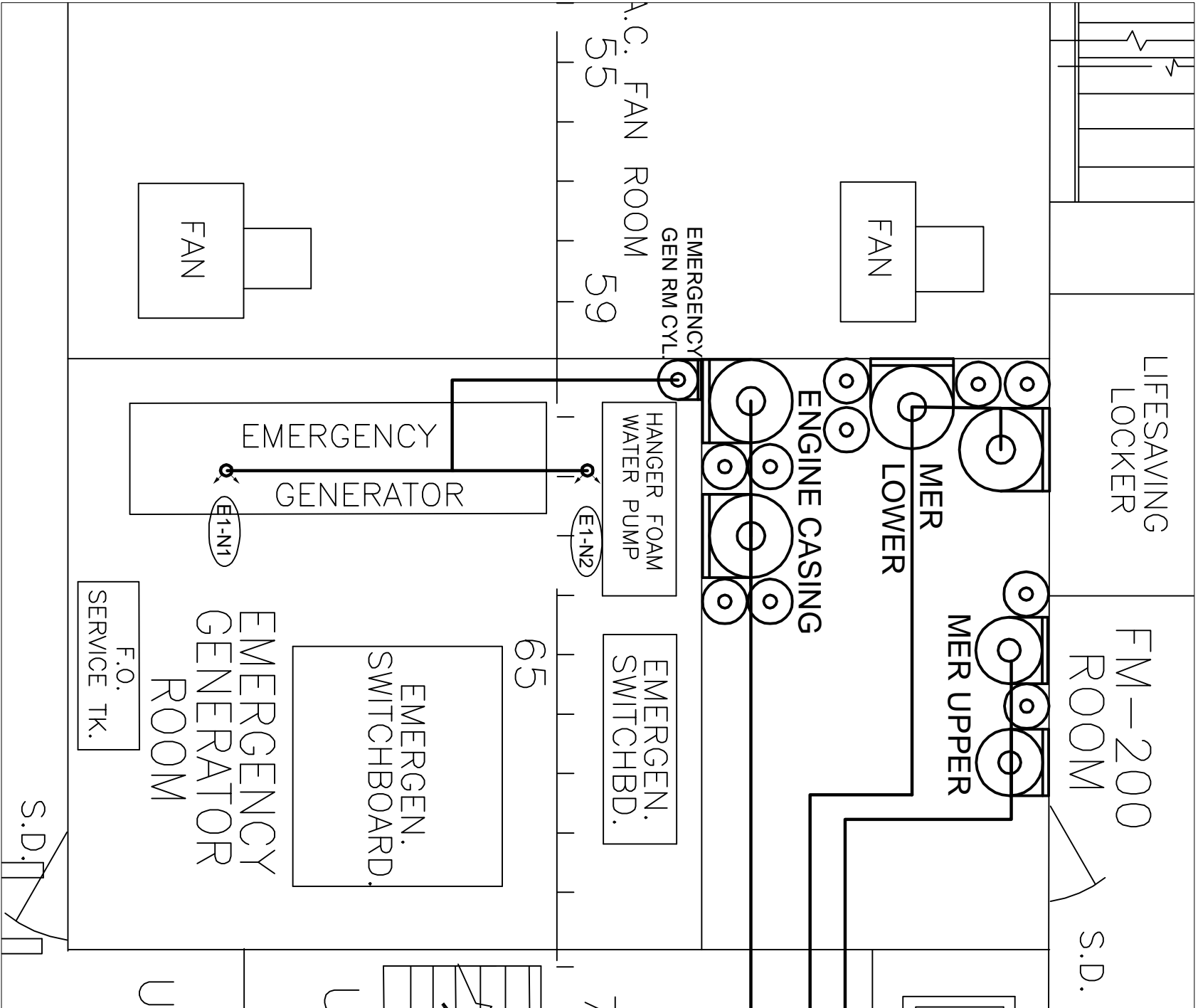
NOZZLE NO.	NOZZLE TYPE	NOZZLE CODE	NOZZLE P/N	DISCHARGE TIME
E1-N1 PORT	V-TYPE	2.00	919309	2.7 MINUTES
E1-N1 STBD	V-TYPE	2.00	919309	2.7 MINUTES

BILL OF MATERIALS

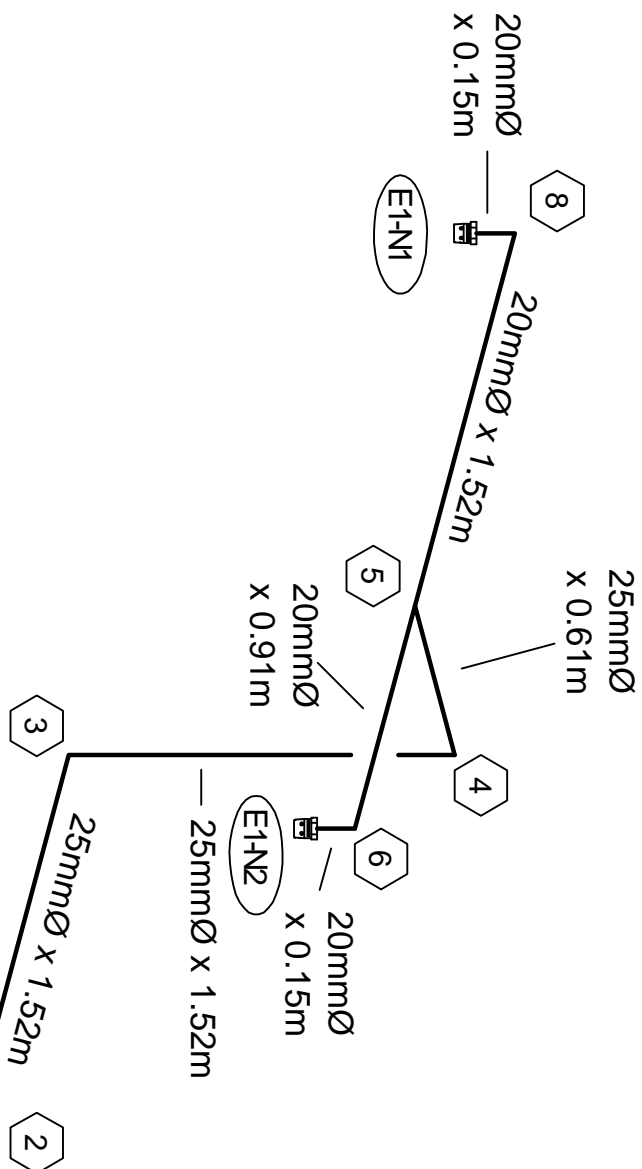
NO.	DESCRIPTION	QTY	PART NO.
1	125 lb. (11.3 kg) Cylinder & Valve Assembly, Bent Siphon	1	81-870486-000
2	Discharge Head - Plain Nut	3	WK-872450-000
3	Flexible Hose, 1/2" Outlet	1	81-252184-000
4	Cylinder Strap	3	WK-270014-000
5	Flange and Cover Assembly, Type Vent Nozzles	6	81-844929-000
6	DISCHARGE NOZZLES	3	SEE TABLE BELOW

USE ACTUATION OPTION G - SEE PAGE 4

NOZZLE NO.	NOZZLE TYPE	NOZZLE CODE	NOZZLE P/N	DISCHARGE TIME
E-I-11 PORT	V-TYPE	2.00	919309	2.7 MINUTES
E-I-11 CENTER	V-TYPE	2.00	919309	2.7 MINUTES
E-I-11 STBD	V-TYPE	2.00	919309	2.7 MINUTES



PLAN VIEW



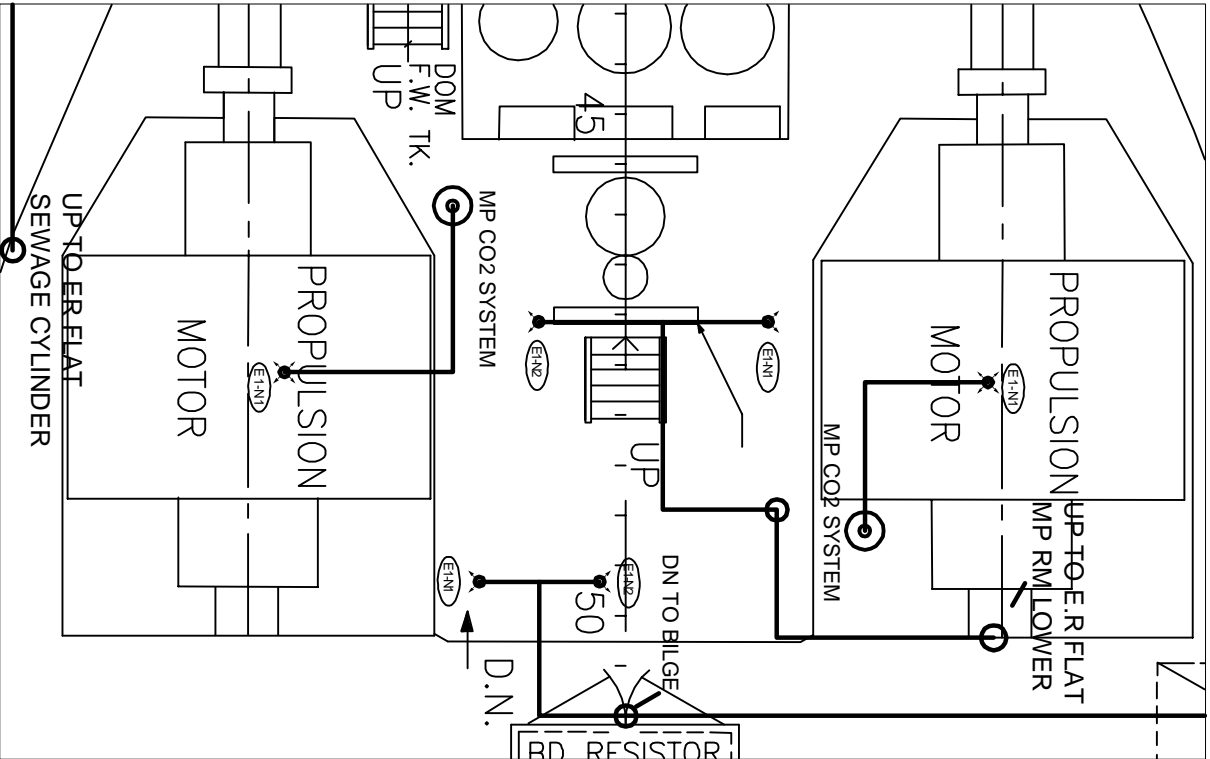
ISOMETRIC VIEW

FR 60 - 70 BOAT DECK - EMERGENCY GENERATOR RM

FLOW CALCULATION FILE

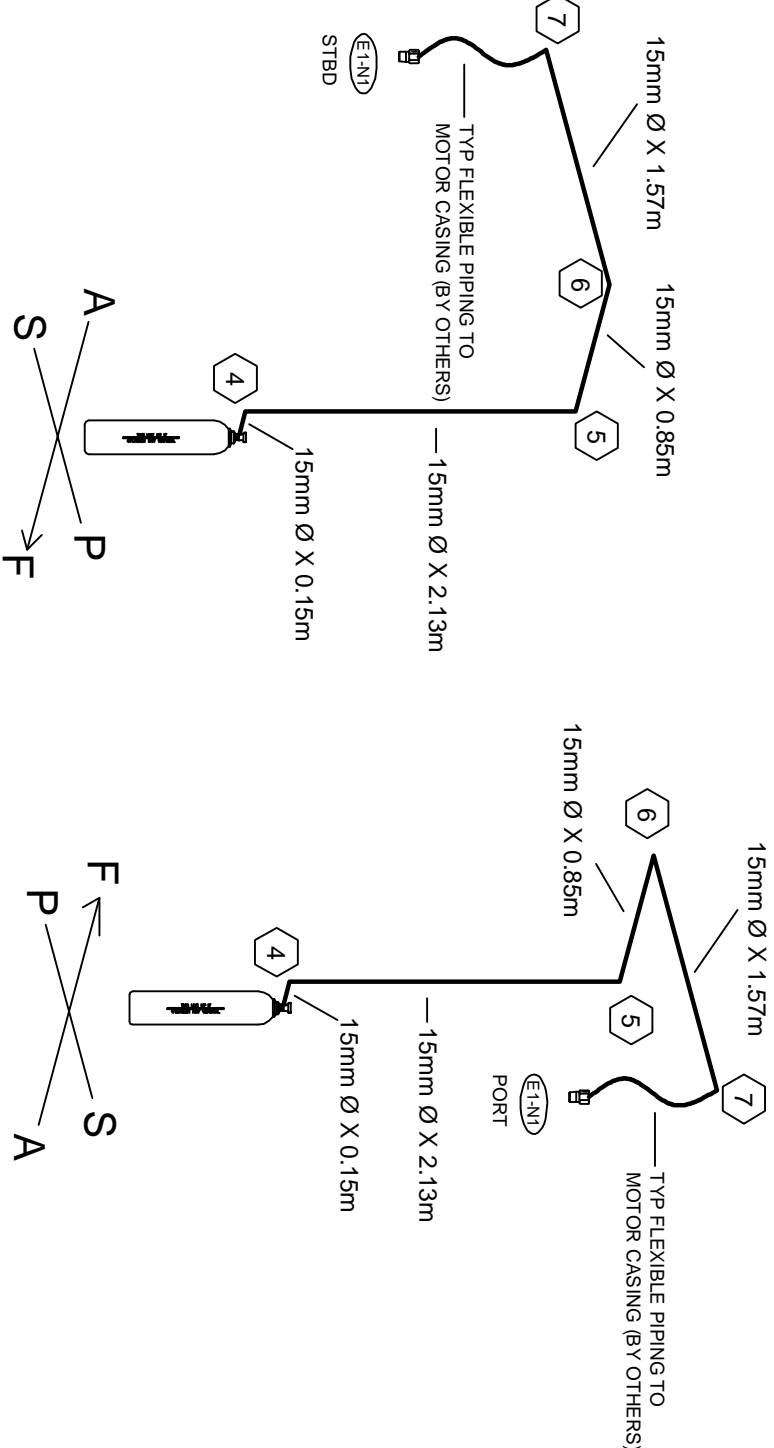
July 13, 2009 11:13:27 AM

PLAN VIEW



FR 48 - 50 TANK TOP - MOTOR PROP CASING

PLAN VIEW



ISOMETRIC VIEW

FR 70 - 79 TANK TOP - GENERATOR STARTERS

FLOW CALCULATION FILE

July 13, 2009 2:38:54 PM

ISOMETRIC VIEW

FR 70 - 79 TANK TOP - GENERATOR STARTERS

FLOW CALCULATION FILE
C1-2726365-25 (Bot)

July 13, 2009 2:20:16 PM

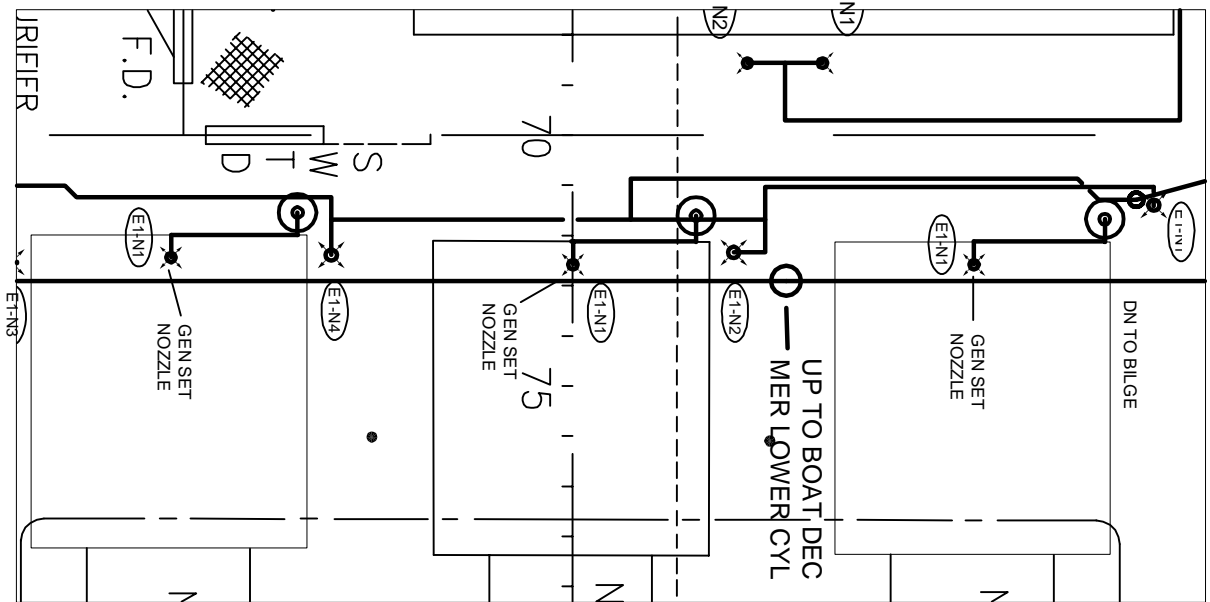
70 TANK TOP GENERATOR STARTERS

NO.	DESCRIPTION	QTY	PART NO.
1	125 lb. (11.3 kg) Cylinder & Valve Assembly, Bent Siphon	1	81-870486-000
2	Discharge Head - Plain Nut	3	WK-872450-000
3	Flexible Hose, 1/2" Outlet	1	81-252184-000
4	Cylinder Strap	3	WK-270014-000
5	Flange and Cover Assembly, Type Vent Nozzles	6	81-844929-000
6	DISCHARGE NOZZLES	3	SEE TABLE BELOW

USE ACTUATION OPTION G - SEE PAGE 4

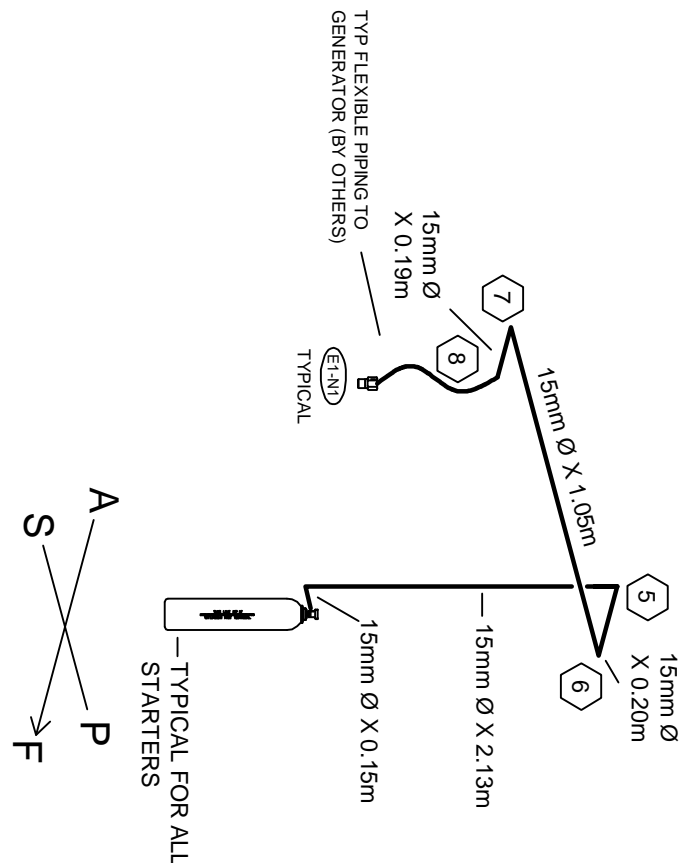
NOZZLE NO.	NOZZLE TYPE	NOZZLE CODE	NOZZLE P/N	DISCHARGE TIME
E-I-11 PORT	V-TYPE	2.00	919309	2.7 MINUTES
E-I-11 CENTER	V-TYPE	2.00	919309	2.7 MINUTES
E-I-11 STBD	V-TYPE	2.00	919309	2.7 MINUTES

PLAN VIEW




FR 70 - 79 TANK TOP - GENERATOR STARTERS

ISOMETRIC VIEW



FR 70 - 79 TANK TOP - GENERATOR STARTERS

FLOW CALCULATION FILE
C1-2726365-22 (TYP)
October 9, 2009 9:12:52 AM

 <p>Kidd's Fire Systems</p> <p>400 MAIN STREET ASHLAND, MA 01721 (508) 881-2000</p>	<p>CUSTOMER</p> <p>NATIONAL & MARINE FIRE SERVICE</p> <p>ST. CATHERINES, ONTARIO</p>		<p>PROJECT</p> <p>CCGS ANN HARVEY</p>	
	<p>KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION, EMERGENCY GENERATOR ROOM, MOTOR PROPUSSION CASING, GENERATOR STARTERS</p>			
<p>THIS INFORMATION IS THE PROPERTY OF KIDDE'S FIRE SYSTEMS. IT IS NOT TO BE DISCLOSED OR UTILIZED WITHOUT TO WRITTEN PERMISSION.</p>	<p>DRAWN: AT</p> <p>CHK'D: MA</p> <p>ISSUED: KK</p>	<p>DATE: 04JUL09</p> <p>TIME: 090CT09</p> <p>DWG. NO. L-1-2726365-01</p>	<p>SIZE</p> <p>D</p>	<p>REV</p> <p>C</p>
<p>SCALE: NOTED</p>	<p>UNITS:</p>	<p>NOTED</p>	<p>SHEET: 11 OF 15</p>	

BILL OF MATERIALS

FR 42 - 54 TANK TOP - MOTOR PROPUSSION BLGE

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	137.9	90-190000-001
2	Cylinder Assembly, 395 lb. (179 kg) w/LI	1	90-100391-001
3	N2 Driver Assy, 4070 cu. in. Capacity w/ Supervisory Switch	1	90-104070-001
4	Actuation Assembly Kit	1	06-129882-001
5	Valve Outlet Adapter, 2"	1	WK-283905-000
6	Discharge Head, Plain Nut	1	WK-872450-000
7	Combined Strap - (395 lb. FM-200 and 4070-cu.in Nitrogen)	2	06-236126-001
8	Not Used	-	-
9	Not Used	-	-
10	Office Fitting, custom drilled	1	90-194129-234
11	DISCHARGE NOZZLES	2	SEE TABLE BELOW

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	180°	250.52	90-194415-241	68.9
E1-N2	180°	250.52	90-194415-242	68.9

USE ACTUATION OPTION E - SEE PAGE 4

BILL OF MATERIALS

FR 42 - 54 TANK TOP - MOTOR PROPUSSION LOWER

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	244.9	90-190000-001
2	Cylinder Assembly, 675 lb. (306 kg) w/LI	1	90-100671-001
3	N2 Driver Assy, 4070 cu. in. w/ Supervisory Switch	2	90-104070-101
4	Actuation Assembly Kit	1	06-129985-001
5	Not Used	-	-
6	Discharge Head, Plain Nut	2	WK-872450-000
7	Strap, 600/675 lb. Cylinder	2	WK-294651-000
8	Candle, 600/675 lb. Cylinder	2	WK-294652-000
9	Two Cylinder Strap	4	06-236173-001
10	Office Fitting, custom drilled	1	90-194129-316
11	DISCHARGE NOZZLES	2	SEE TABLE BELOW

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360°	659.22	90-194427-261	122.5
E1-N2	360°	659.22	90-194427-261	122.4

USE ACTUATION OPTION E - SEE PAGE 4

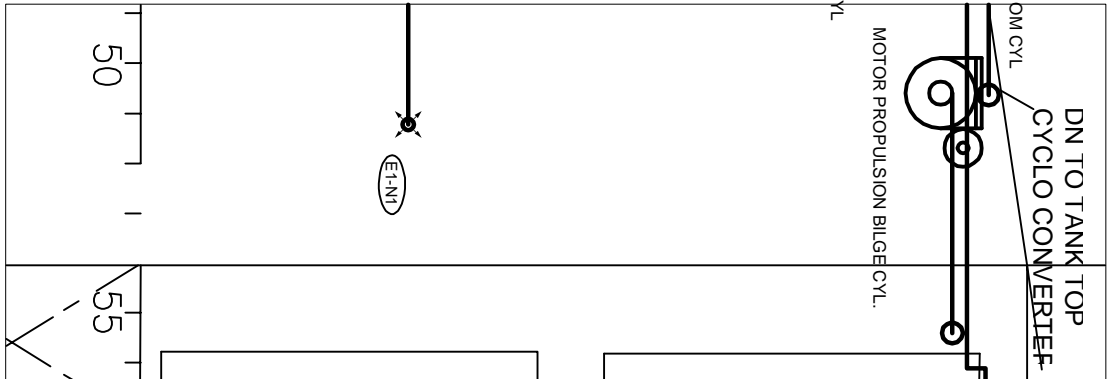
BILL OF MATERIALS

FR 30 - 54 ER FLAT - MOTOR PROPUSSION UPPER

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	226.3	90-190000-001
2	Cylinder Assembly, 675 lb. (306 kg) w/LI	1	90-100671-001
3	N2 Driver Assy, 4070 cu. in. w/ Supervisory Switch	2	90-104070-101
4	Actuation Assembly Kit	1	06-129985-001
5	Not Used	-	-
6	Discharge Head, Plain Nut	2	WK-872450-000
7	Strap, 600/675 lb. Cylinder	2	WK-294651-000
8	Candle, 600/675 lb. Cylinder	2	WK-294652-000
9	Two Cylinder Strap	4	06-236173-001
10	Office Fitting, custom drilled	1	90-194129-281
11	DISCHARGE NOZZLES	3	SEE TABLE BELOW

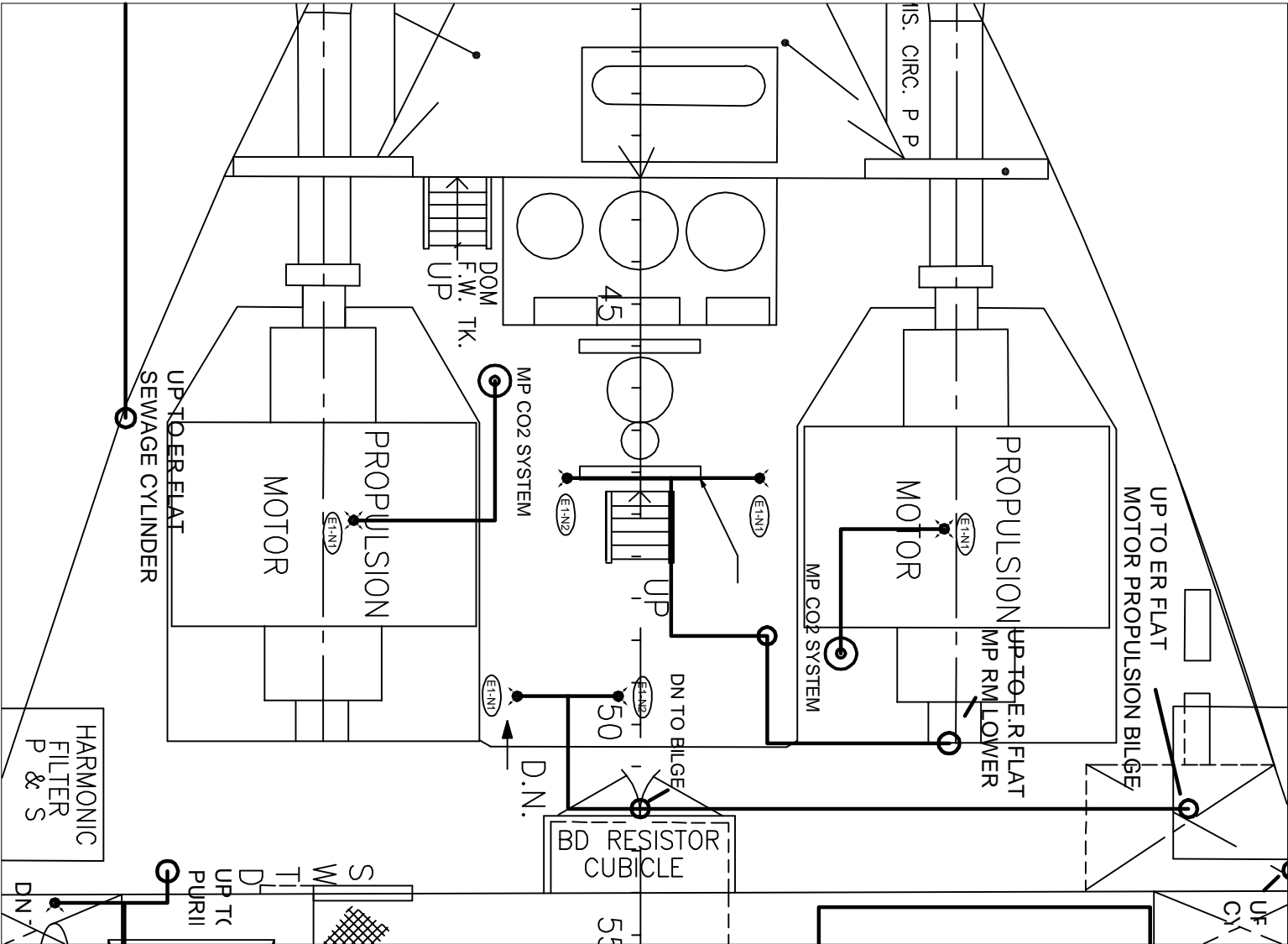
NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360°	374.26	90-194427-250	94.6
E1-N2	360°	374.26	90-194427-250	94.6
E1-N3	360°	126.64	90-194427-262	37.1

USE ACTUATION OPTION E - SEE PAGE 4



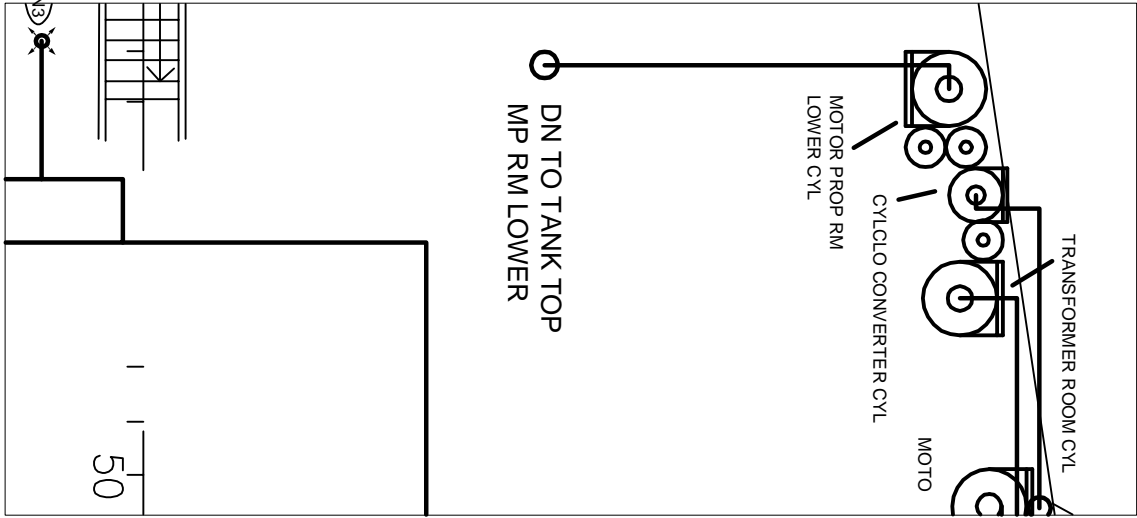
PLAN VIEW

FR 50- 52 ER FLAT - MOTOR PROPUSSION BLGE



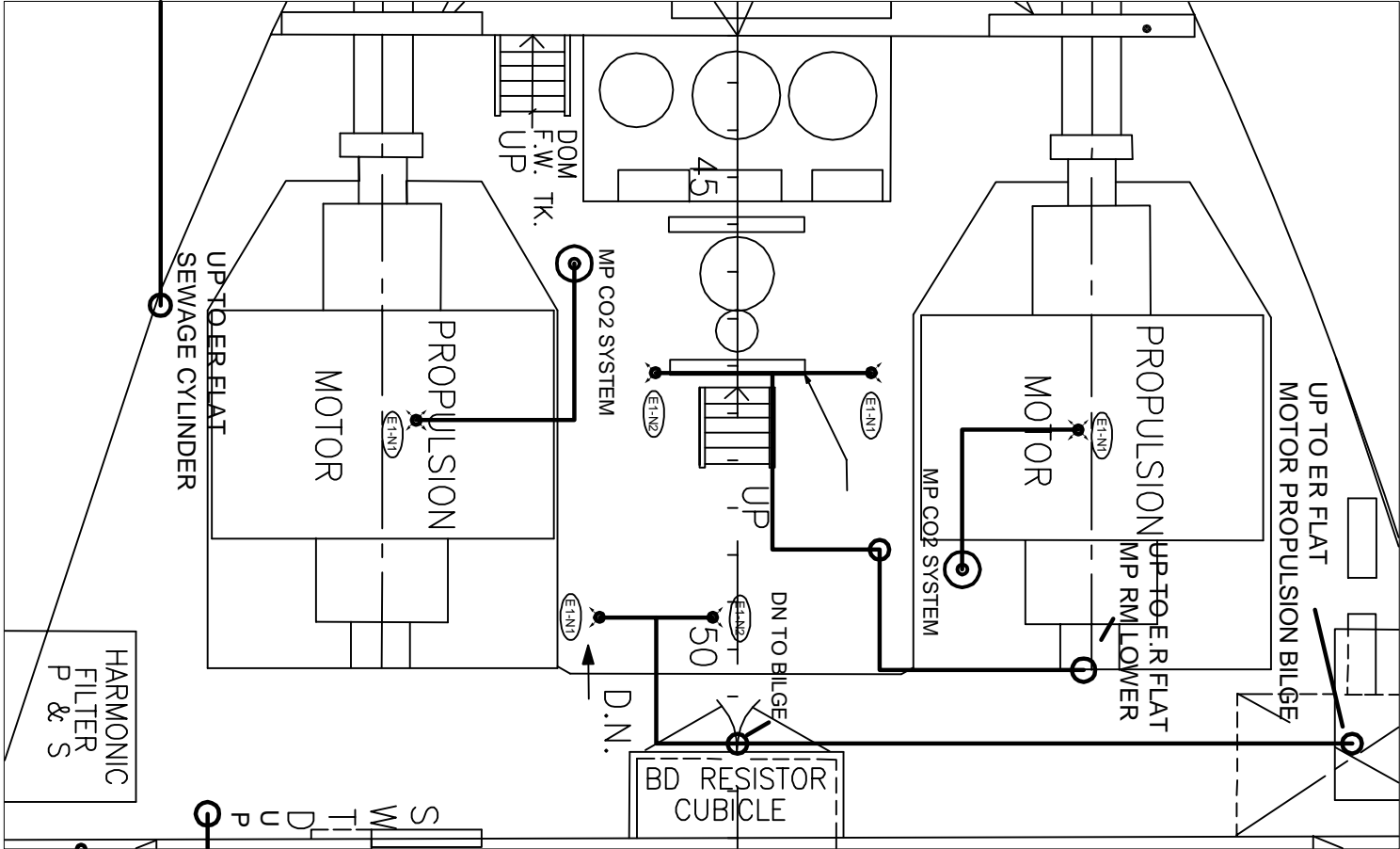
PLAN VIEW

FR 42 - 54 TANK TOP - MOTOR PROPUSSION BLGE



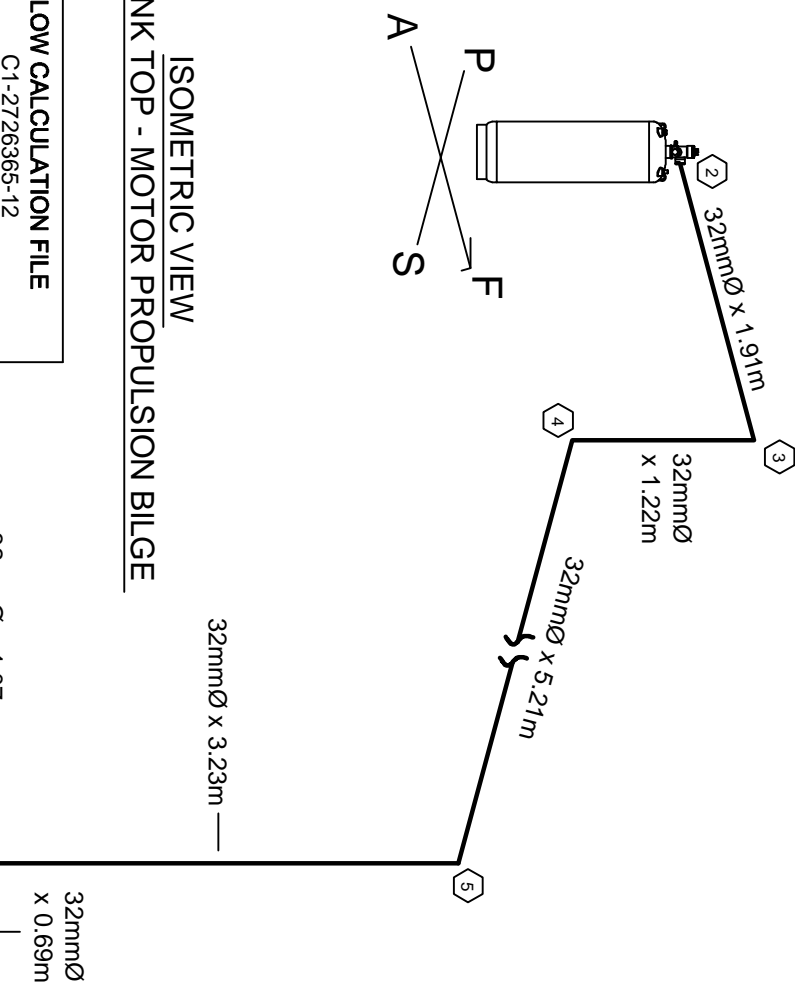
PLAN VIEW

FR 50- 52 ER FLAT - MOTOR PROPUSSION LOWER



PLAN VIEW

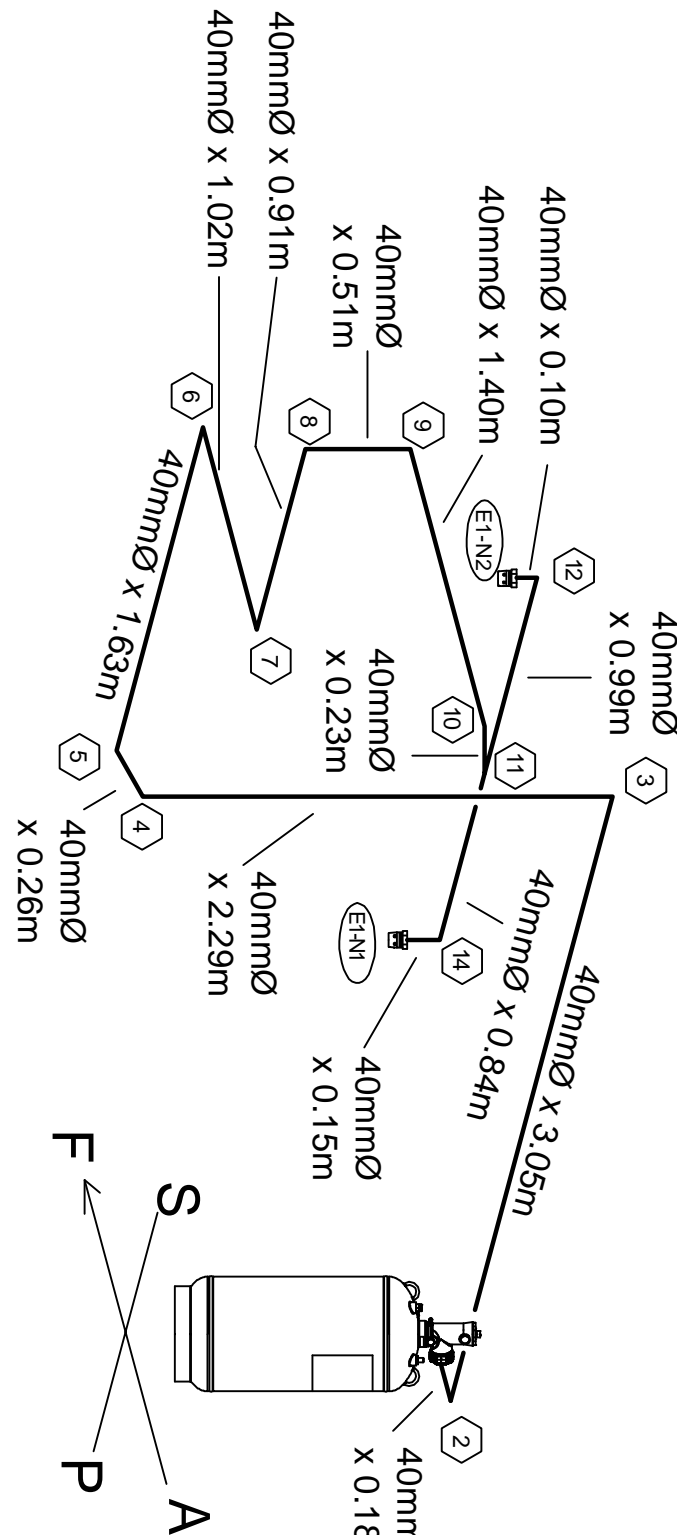
FR 42 - 54 TANK TOP - MOTOR PROPUSSION LOWER



ISOMETRIC VIEW

FR 42 - 54 TANK TOP - MOTOR PROPUSSION BLGE

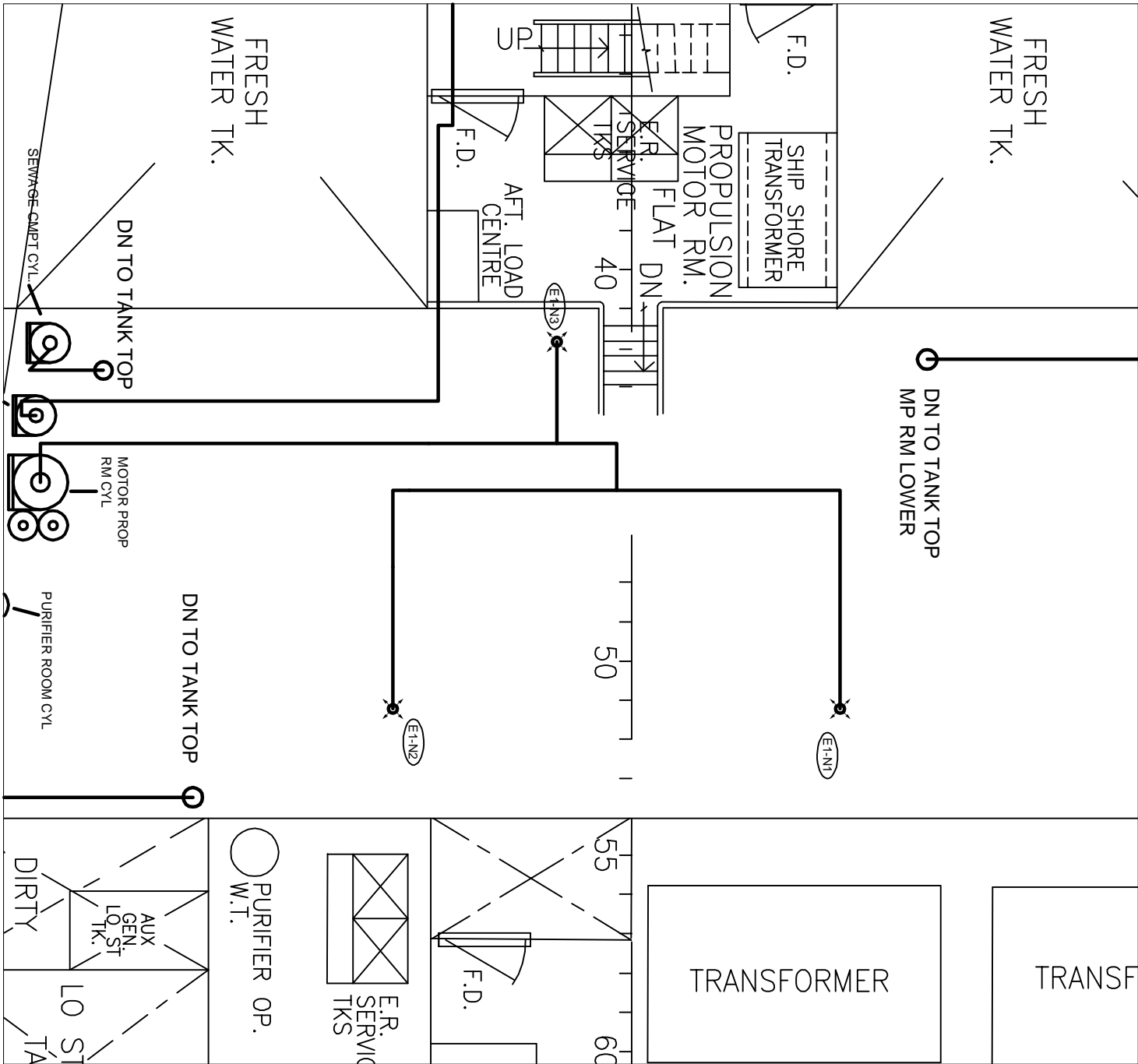
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C1-2726365-12
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ISOMETRIC VIEW

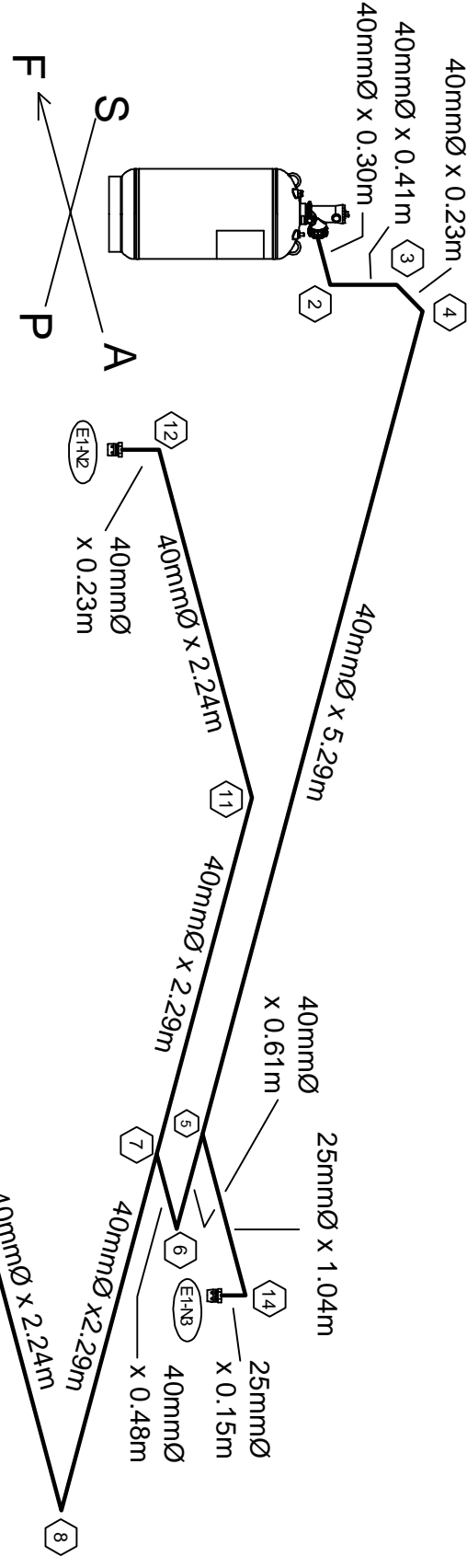
FR 42- 54 TANK TOP - MOTOR PROPUSSION LOWER

FLOW CALCULATION FILE
C1-2726365-13
July 13, 2009 11:31:37 AM



PLAN VIEW


FR 30 - 54 ER FLAT - MOTOR PROPUSSION ROOM UPPER



ISOMETRIC VIEW

FR 30 - 54 ER FLAT - MOTOR PROPUSSION ROOM UPPER

FLOW CALCULATION FILE
C1-2726365-14
July 13, 2009 11:37:06 AM

 Kidde Fire Systems 400 MAIN STREET ASHLAND, MA 01721 (508) 881-2000	CUSTOMER NATIONAL & MARINE FIRE SERVICE ST. CATHERINES, ONTARIO	PROJECT CCGS ANN HARVEY	DRN: AT	DATE: 04.01.09	SIZE: DWG. NO.	REV: C
			CHK'D: MA	DATE: 02.02.10	D	L1-2726365-01
			ISSUED: KK	DATE: 09.02.10		
			SCALE: NOTED	UNITS:	NOTED	SHEET: 12 OF 15

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BILL OF MATERIALS

FR 70 - 96 TANK TOP - MAIN ENGINE ROOM LOWER

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	415.5	90-19000-001
2	Cylinder Assembly, 675 lb. (306 kg) w/LL	2	90-10067-1001
3	IN2 Diner Assy. 4070 cu. in. w/ Supervisory Switch	4	90-104073-101
4	Activation Assembly Kit	2	06-129895-001
5	Not Used	-	-
6	Discharge Head, Plain Nut	4	WK-872450-000
7	Strap, 600/675 lb. Cylinder	4	WK-294651-000
8	Cradle, 600/675 lb. Cylinder	4	WK-294652-000
9	Two Cylinder Strap	8	06-236173-001
10	Office Filing, custom drilled	2	90-194129-316
11	DISCHARGE NOZZLES	4	SEE TABLE BELOW

USE ACTUATION OPTION F - SEE PAGE 4

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (kg)
E1-N1	180°	491.03	90-194416-255	102.9
E1-N2	180°	491.03	90-194416-256	102.9
E1-N3	180°	460.32	90-194416-254	104.9
E1-N4	180°	460.32	90-194416-254	104.9

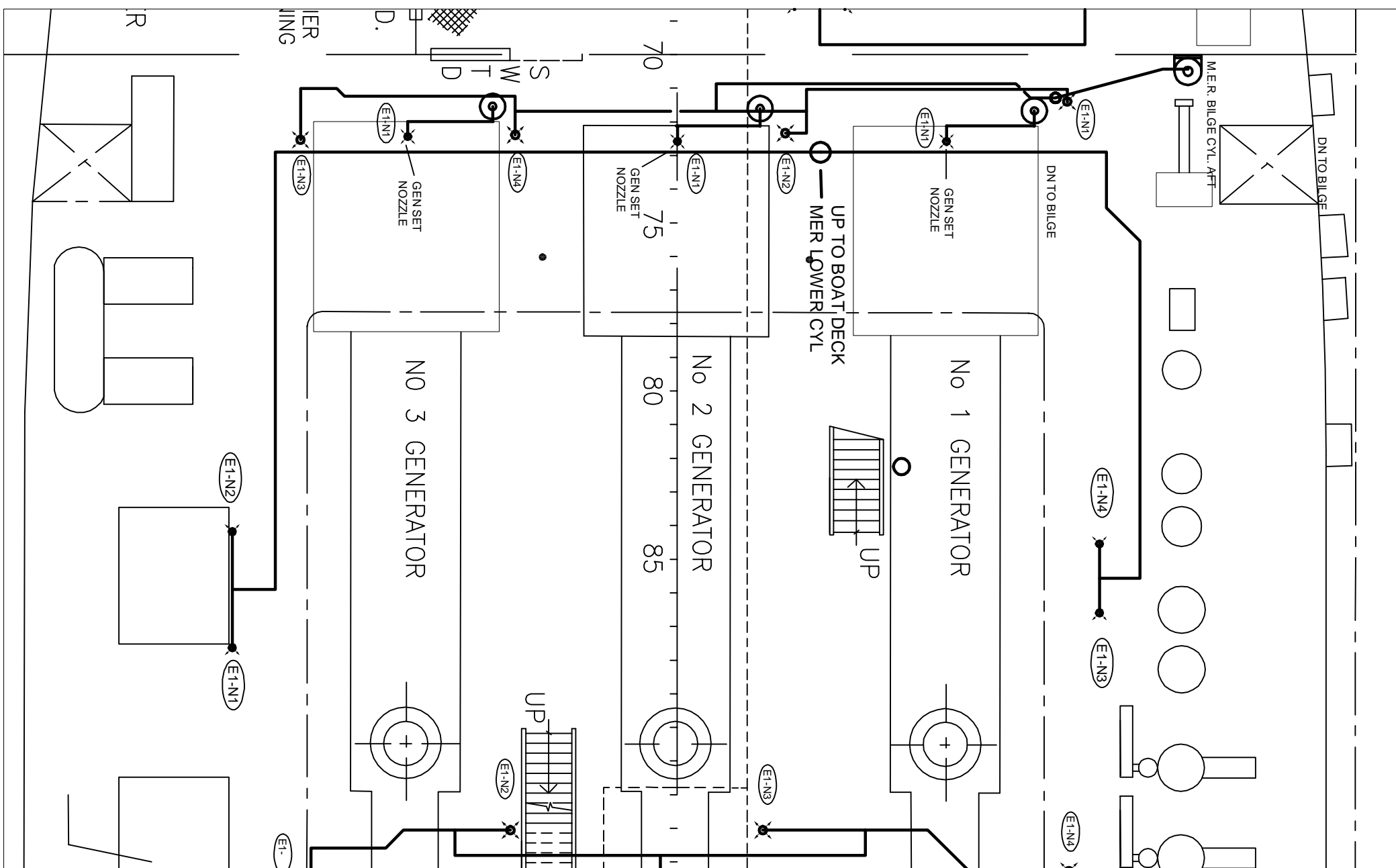
BILL OF MATERIALS

FR 78 - 106 ER FLAT - MAIN ENGINE ROOM UPPER

NO.	DESCRIPTION	QTY	PART NO.
1	FW-200 Agent in Storage Containers Filled At Factory	307.5	90-19000-001
2	Cylinder Assembly, 395 lb. (179 kg.) WILLI	2	90-10041-001
3	3/2" Diner Assy. 4070 cu. in. Capacity w/ Supervisory Switch	2	90-10040-001
4	Actuation Assembly Kit	2	06-129892-001
5	Valve Outlet Adapter, 1/2"	2	VW-283905-000
6	Discharge Head, Plain Nut	2	WM-872450-000
7	Combined Strap - (395 lb. FW-200 and 4070-cu.in Nitrogen)	4	06-26196-001
8	1/4" In. Used	-	-
9	1/4" In. Used	-	-
10	Orifice Fitting custom drilled	2	90-194129-234
11	DISCHARGE NOZZLES	8	SEE TABLE BELOW

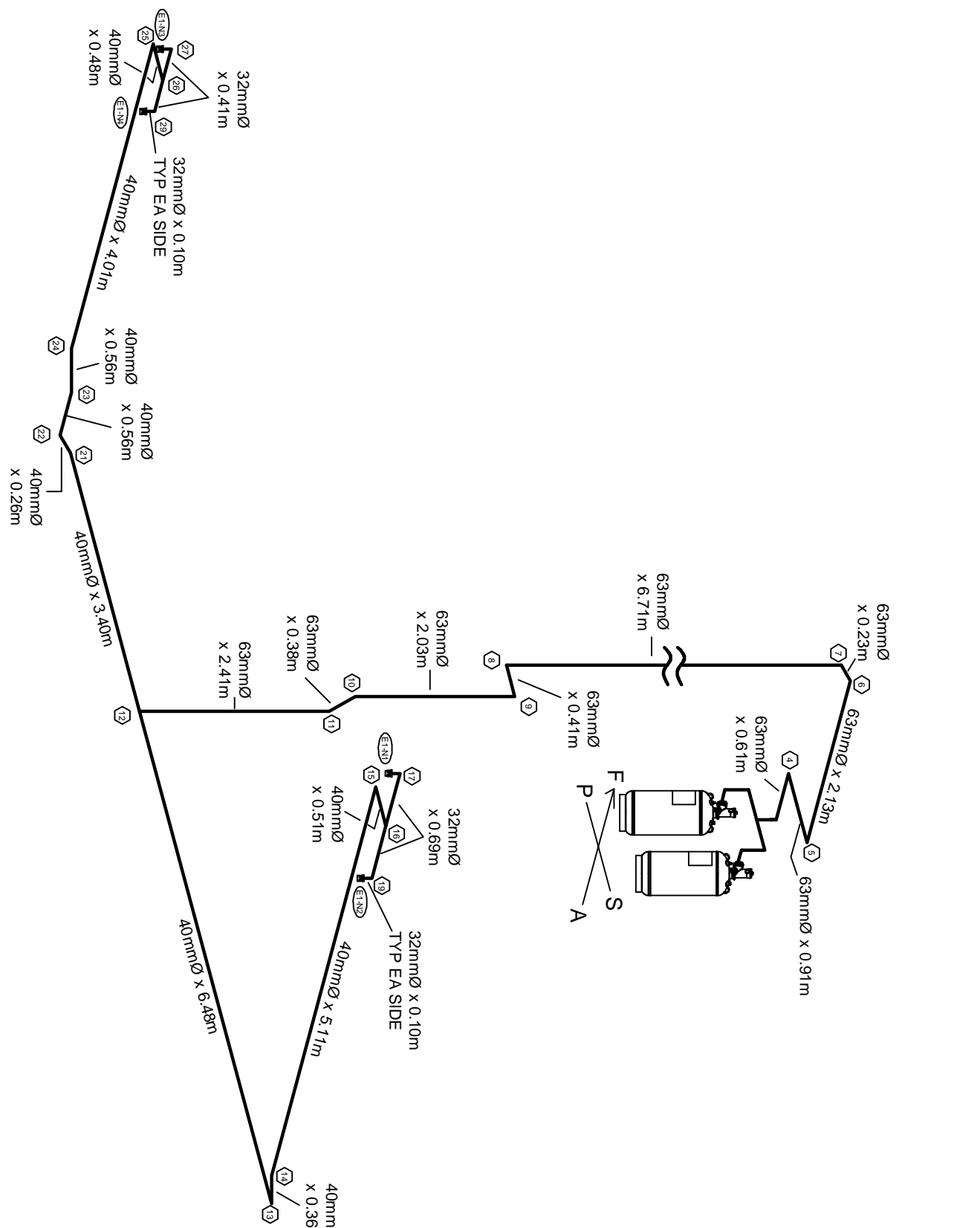
USE ACTUATION OPTION F - SEE PAGE 4

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS
E-1N1	360°	72.00	90-19442-219	23.3
E-1N2	360°	90.19	90-19442-224	28.3
E-1N3	360°	207.94	90-19445-238	31.4
E-1N4	360°	207.94	90-19445-238	31.4
E-1N5	180°	169.55	90-194415-234	48.4
E-1N6	180°	169.55	90-194415-234	48.4
E-1N7	180°	188.19	90-194415-238	48.1
E-1N8	180°	188.19	90-194415-238	48.1



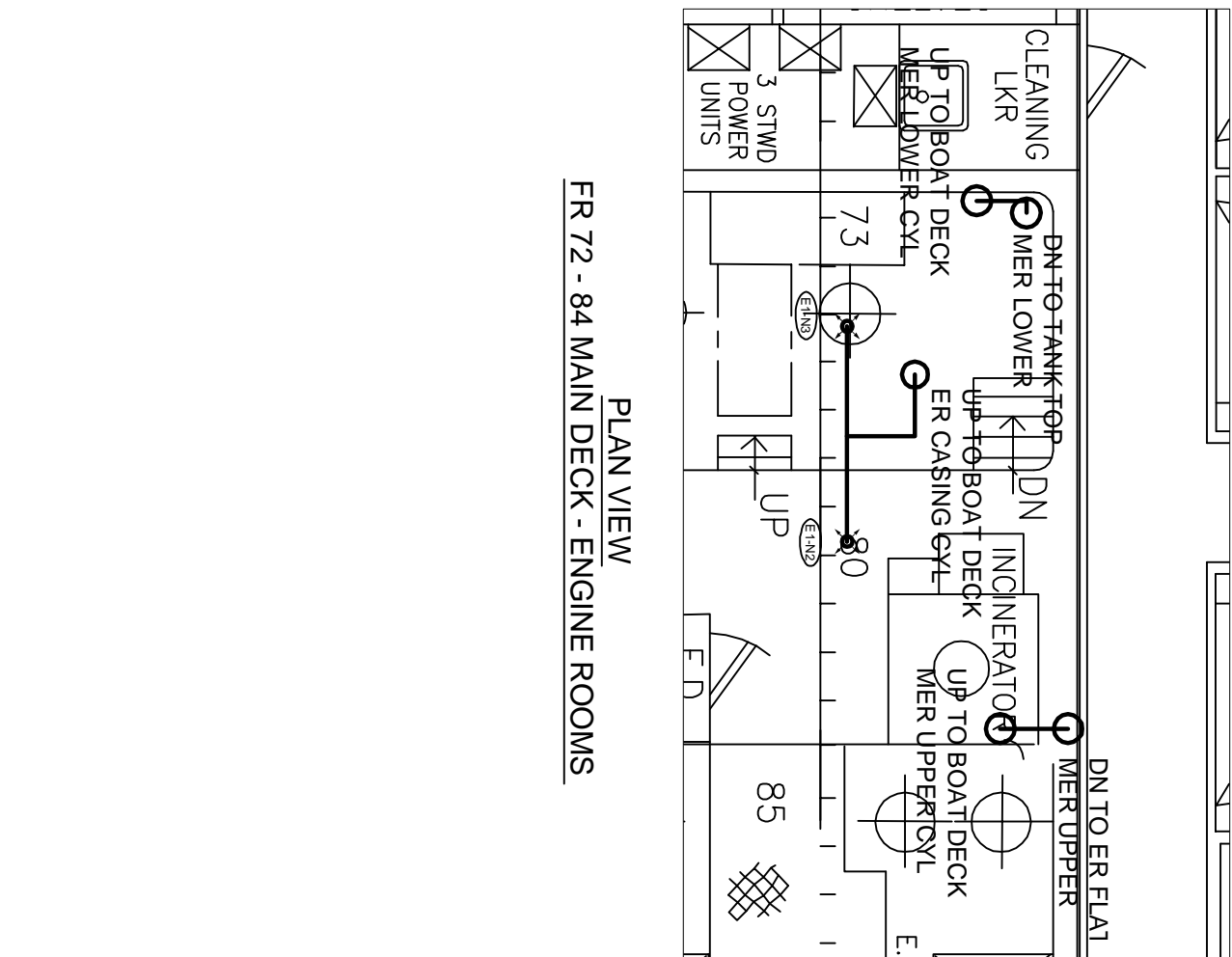
PLAN VIEW

FR 70 - 96 TANK TOP - MAIN ENGINE ROOM LOWER



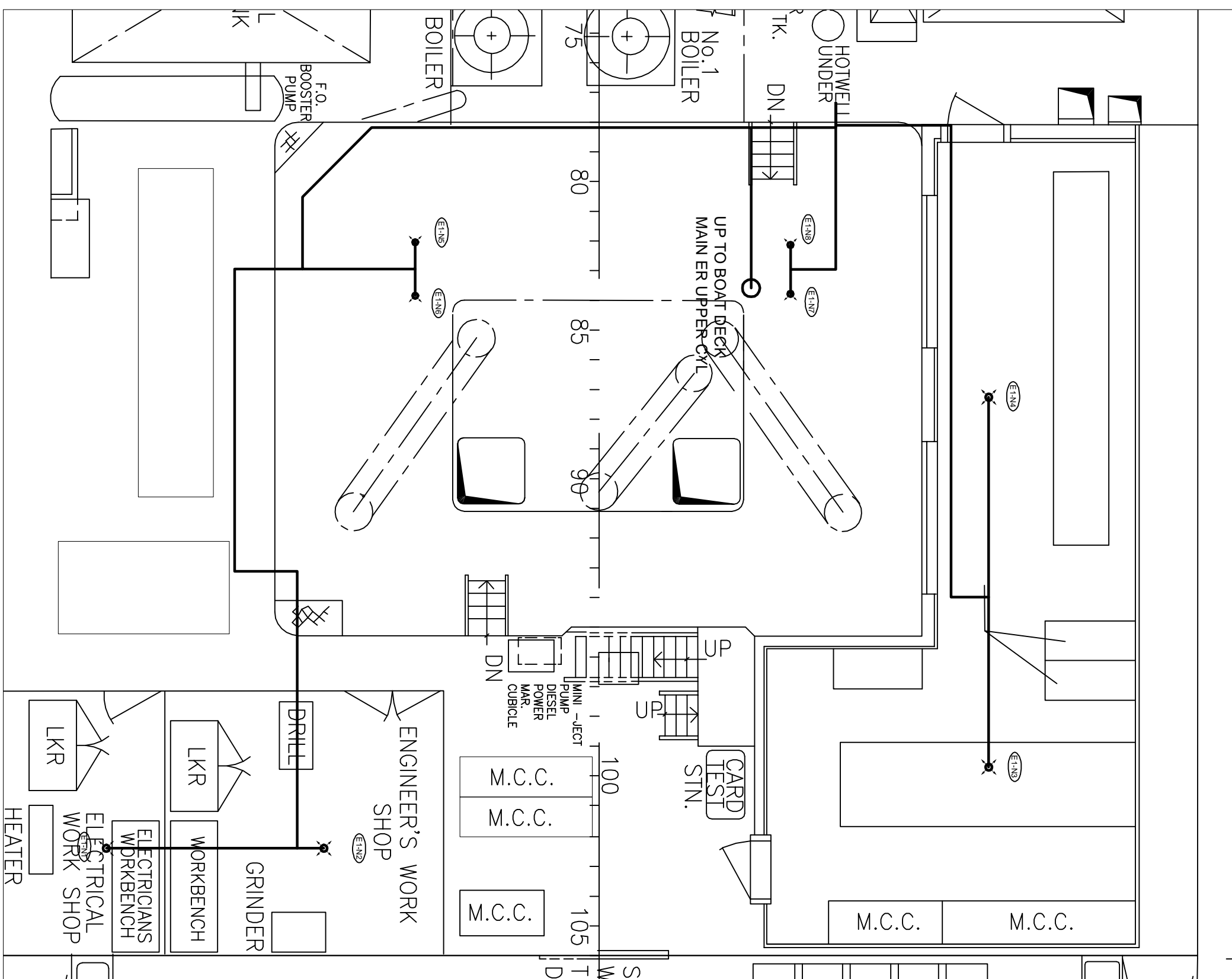
ISOMETRIC VIEW

FR 70 - 96 TANK TOP - MAIN ENGINE ROOM LOWER



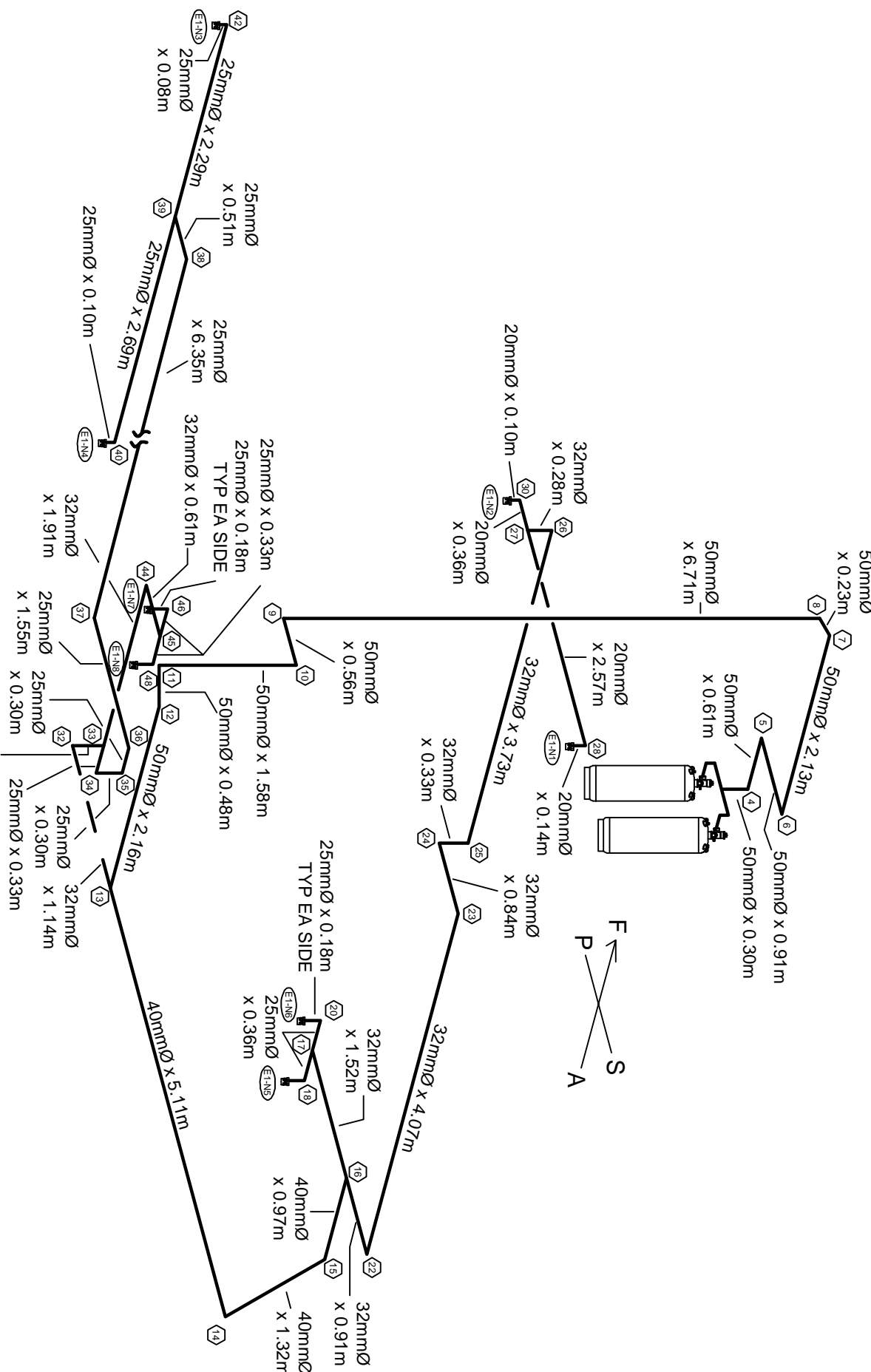
PLAN VIEW

FR 72 - 84 MAIN DECK - ENGINE ROOMS




PLAN VIEW

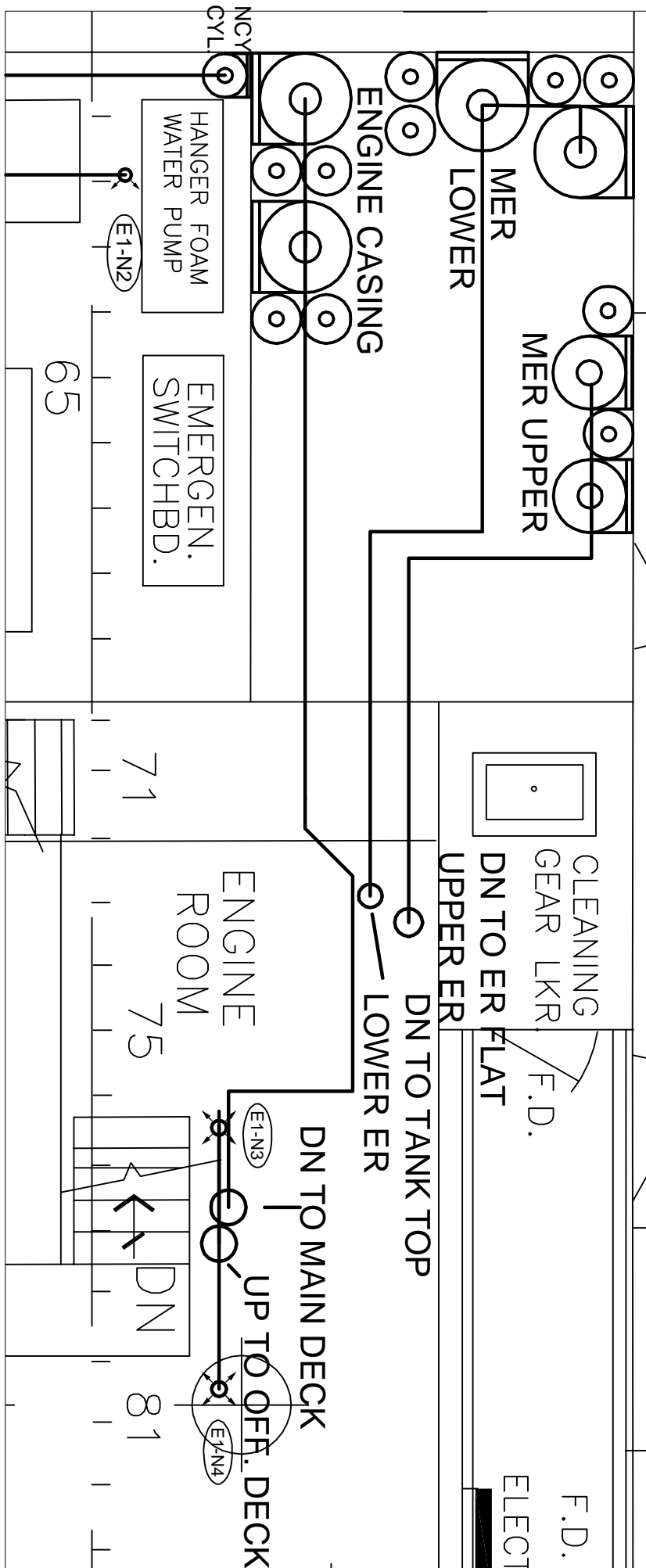
FR 78 - 106 ER FLAT - MAIN ENGINE ROOM UPPER



ISOMETRIC VIEW


FR 78 - 106 ER FLAT - MAIN ENGINE ROOM UPPER

 Kiddie Fire Systems 400 MAIN STREET ASHLAND, MA 01721 (508) 881-2000	CUSTOMER		PROJECT		
	NATIONAL & MARINE FIRE SERVICE		CCGS ANN HARVEY		
	ST. CATHERINES, ONTARIO				
	KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION MAIN ENGINE ROOM LOWER & MAIN ENGINE ROOM UPPER				
	DRI:	AT	01JUL09	SIZE	DWG. NO.
This information is the property of Kiddie Fire Systems and is not to be disclosed or utilized without written permission.	CHK'D:	MA	02OCT09		
	ISSUED:	KR	09OCT09	D	L1-2726355-01
	SCALE:	NOTED	UNITS:	NOTED	SHEET: 13 OF 15



PLAN VIEW

FR 63 - 84 BOAT DECK - MAIN ENGINE ROOM CYLS

 Kiddie Fire Systems 400 MAIN STREET ASHLAND, MA 01721 (508) 881-2000	CUSTOMER		PROJECT		
	NATIONAL & MARINE FIRE SERVICE		CCGS ANN HARVEY		
	ST. CATHERINES, ONTARIO				
	KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION MAIN ENGINE ROOM LOWER & MAIN ENGINE ROOM UPPER				
	DRI:	AT	01JUL09	SIZE	DWG. NO.
This information is the property of Kiddie Fire Systems and is not to be disclosed or utilized without written permission.	CHK'D:	MA	02OCT09		
	ISSUED:	KR	09OCT09	D	L1-2726355-01
	SCALE:	NOTED	UNITS:	NOTED	SHEET: 13 OF 15

BILL OF MATERIALS

FR 61 - 81 BOAT DECK - ENGINE CASING & STACK

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	388.3	90-19000-001
2	Cylinder Assembly, 675 lb. (306 kg) w/LLI	2	90-100671-001
3	N2 Driver Assy, 4070 cu. in. w/ Supervisory Switch	4	90-104070-101
4	Actuation Assembly Kit	2	06-129985-001
5	Not Used	-	
6	Discharge Head, Plain Nut	4	WK-872450-000
7	Strap, 600/675 lb. Cylinder	4	WK-294651-000
8	Grade, 600/675 lb. Cylinder	4	WK-294652-000
9	Two Cylinder Strap	8	06-236173-001
10	Office Fitting, custom drilled	2	90-194129-316
11	DISCHARGE NOZZLES	6	SEE TABLE BELOW

USE ACTUATION OPTION F - SEE PAGE 4

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360°	273.29	90-194427-243	65.3
E1-N2	360°	273.29	90-194427-243	65.4
E1-N3	360°	285.03	90-194427-244	63.8
E1-N4	360°	285.03	90-194427-244	63.6
E1-N5	360°	297.03	90-194427-245	65.1
E1-N6	360°	297.03	90-194427-245	65.1

BILL OF MATERIALS

FR -12 - 13 MAIN DECK - STEERING GEAR

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	155.1	90-19000-001
2	Cylinder Assembly, 395 lb. (179 kg) w/LLI	1	90-100391-001
3	N2 Driver Assy, 4070 cu. in. Capacity w/ Supervisory Switch	1	90-104070-001
4	Actuation Assembly Kit	1	06-129882-001
5	Valve Outlet Adapter, 2"	1	WK-283905-000
6	Discharge Head, Plain Nut	1	WK-872450-000
7	Combined Strap - (395 lb. FM-200 and 4070-cu.in Nitrogen)	2	06-236126-001
8	Not Used	-	
9	Not Used	-	
10	Office Fitting, custom drilled	1	90-194129-213
11	DISCHARGE NOZZLES	5	SEE TABLE BELOW

USE ACTUATION OPTION D - SEE PAGE 3

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360°	54.52	90-194423-213	12.0
E1-N2	360°	111.35	90-194424-227	21.3
E1-N3	360°	197.94	90-194425-237	45.7
E1-N4	180°	142.97	90-194414-231	26.9
E1-N5	360°	207.94	90-194425-238	49.2

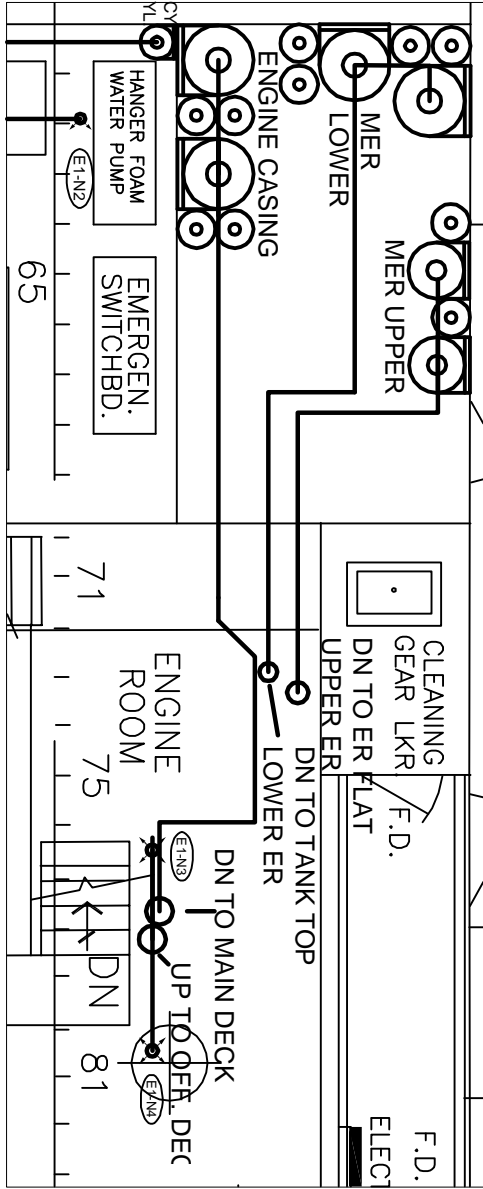
BILL OF MATERIALS

FR 54 - 70 TANK TOP - PURIFIER ROOM

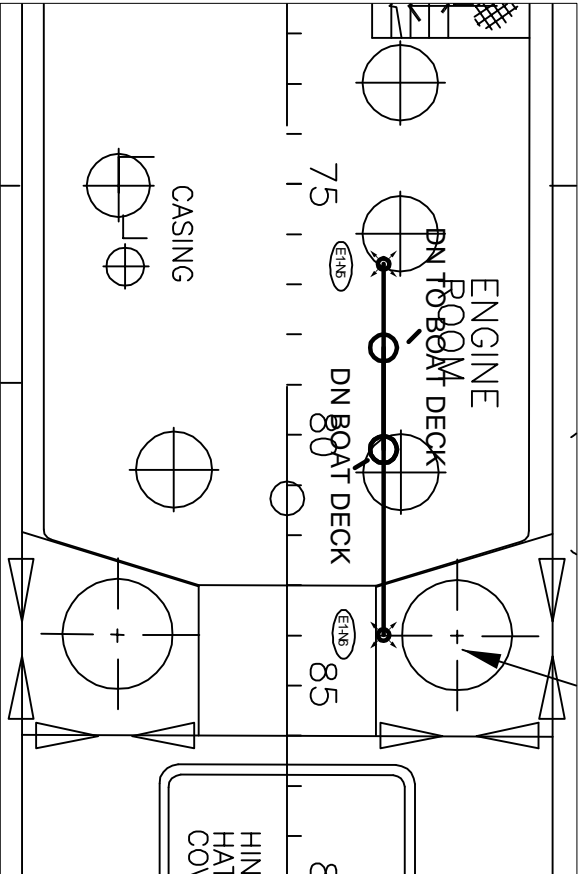
NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	68.5	90-19000-001
2	Cylinder Assembly, 225 lb. (102 kg) w/LLI	1	90-100221-001
3	N2 Driver Assy, 2300 cu. in. w/ Supv. Switch	1	90-102300-101
4	Actuation Assembly Kit	1	06-129882-001
5	Valve Outlet Adapter, 2"	1	WK-283905-000
6	Discharge Head, Plain Nut	1	WK-872450-000
7	Combined Strap - (225 lb FM-200 and 2300-cu.in Nitrogen)	2	06-236127-001
8	Not Used	-	
9	Not Used	-	
10	Office Fitting, custom drilled	1	90-194129-196
11	DISCHARGE NOZZLES	2	SEE TABLE BELOW

USE ACTUATION OPTION B - SEE PAGE 3

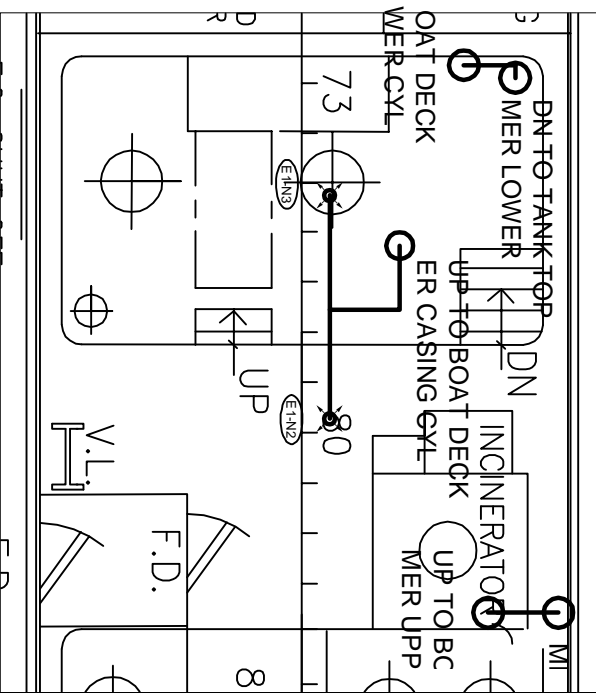
NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360°	273.29	90-194425-243	51.8
E1-N2	180°	72.00	90-194414-219	16.7



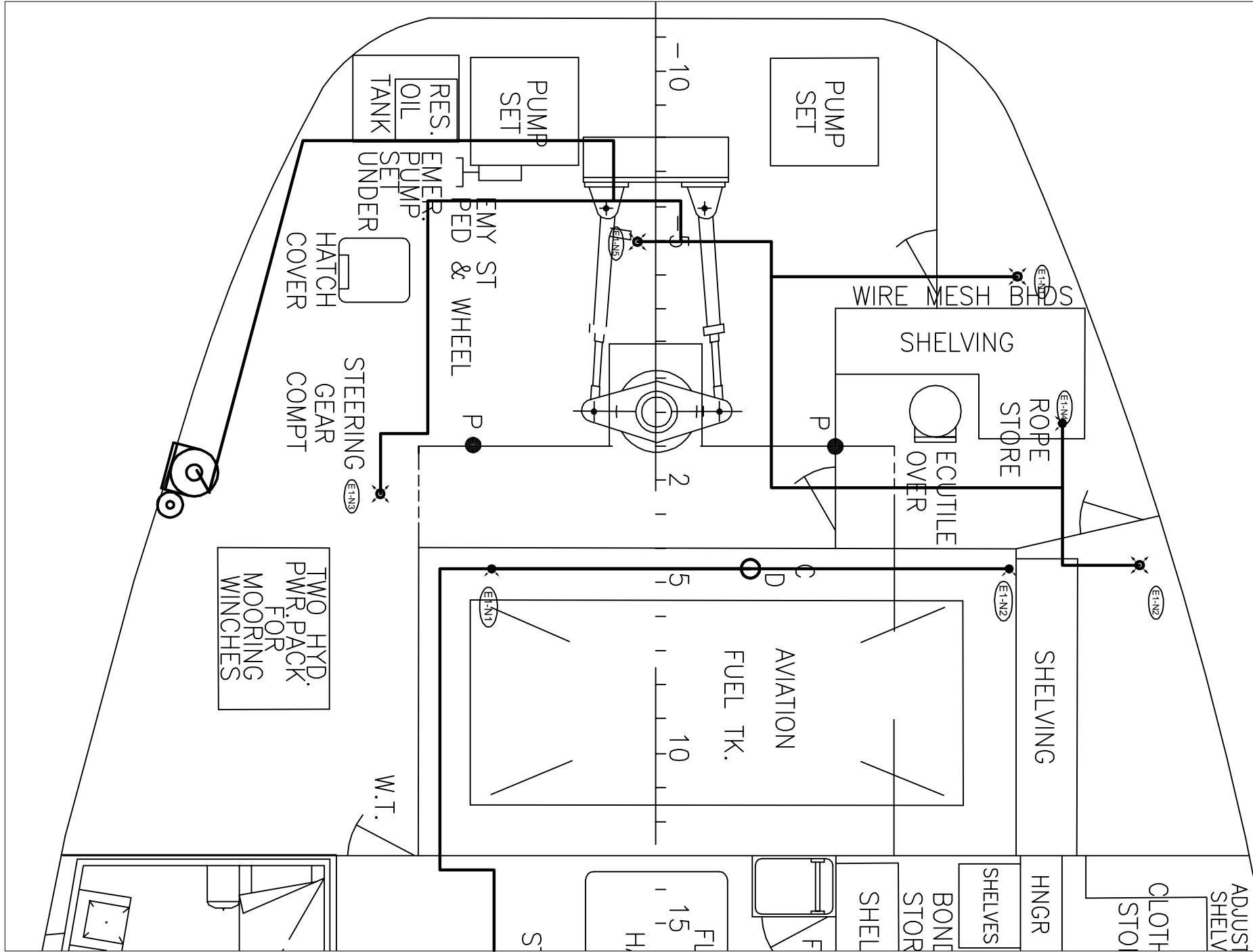
FR 61 - 81 BOAT DECK - ENGINE ROOM STACK



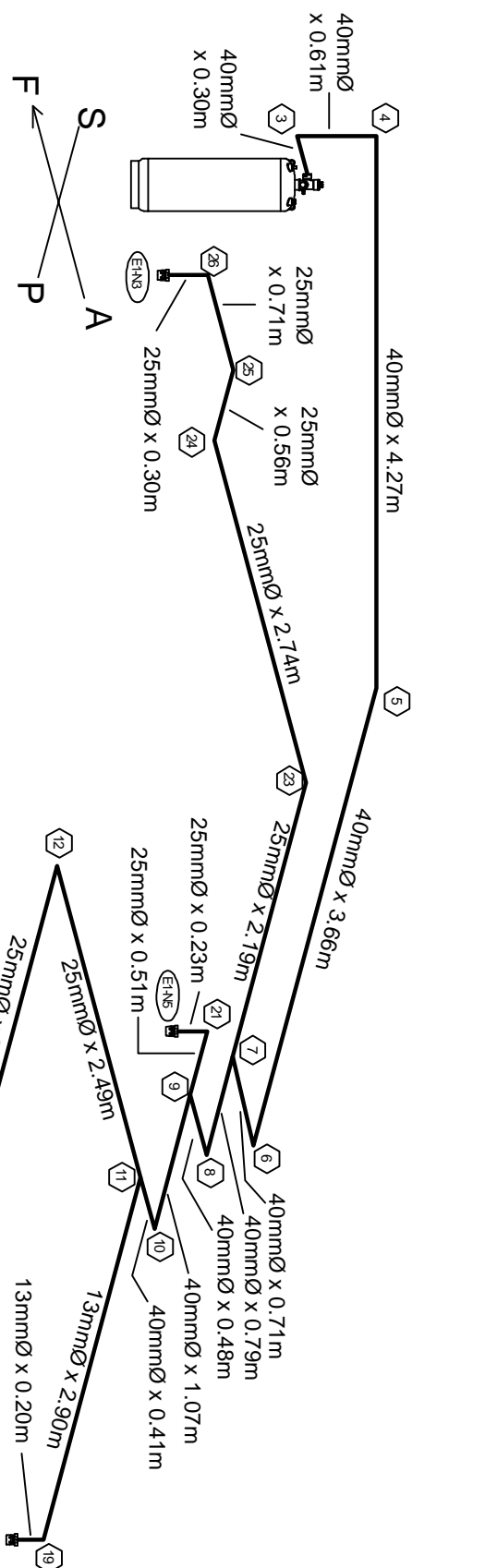
FR 71 - 86 OFFICERS DECK - ENGINE ROOM STACK



FR 72 - 84 MAIN DECK - ENGINE ROOM STACK

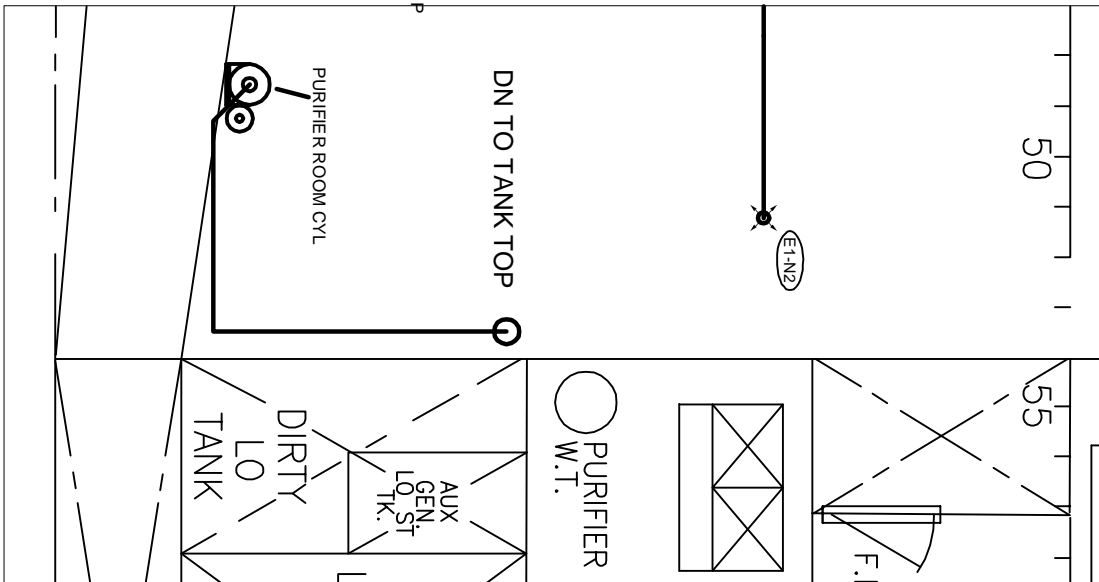


FR -12 - 13 MAIN DECK - STEERING GEAR

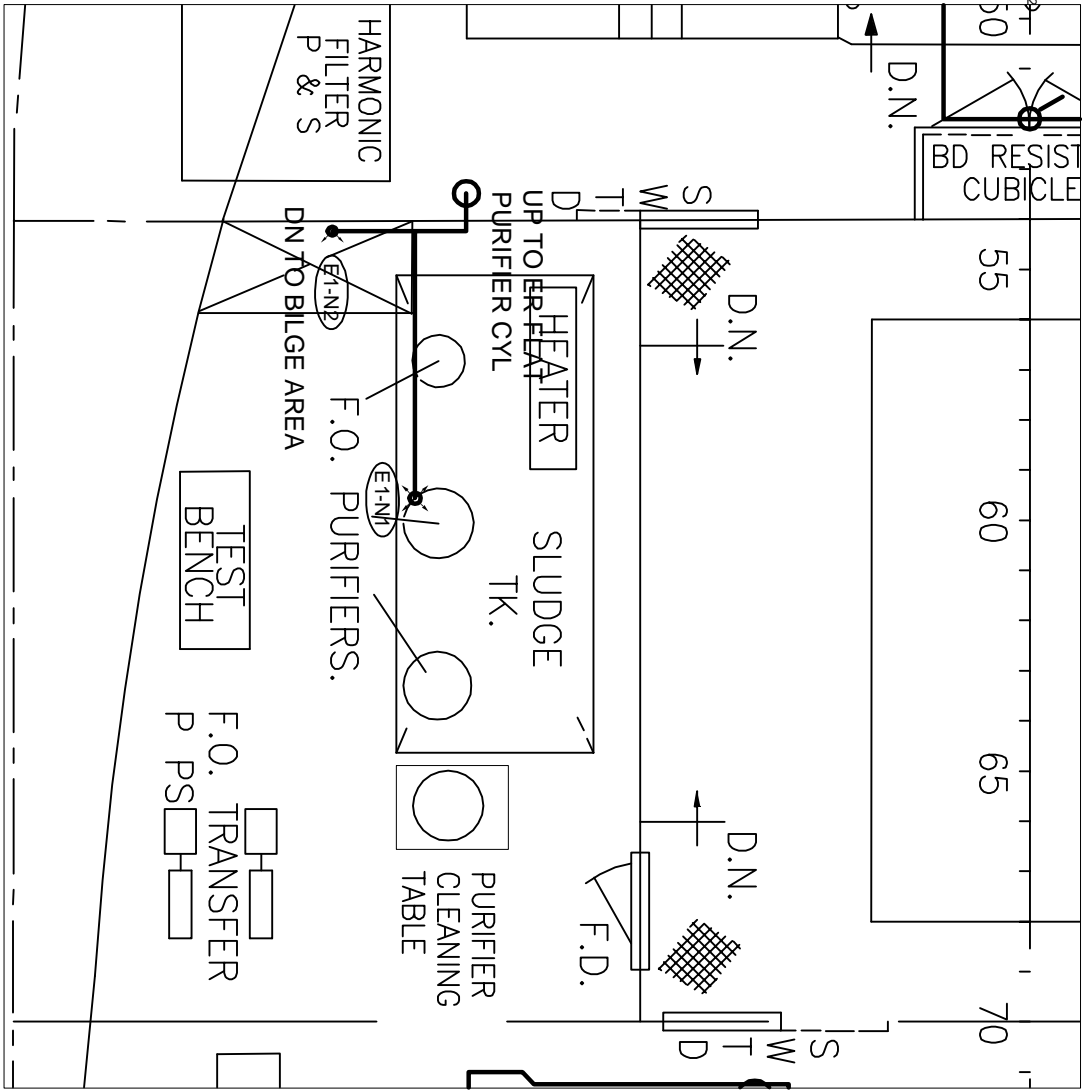


FR -12 - 13 MAIN DECK - STEERING GEAR

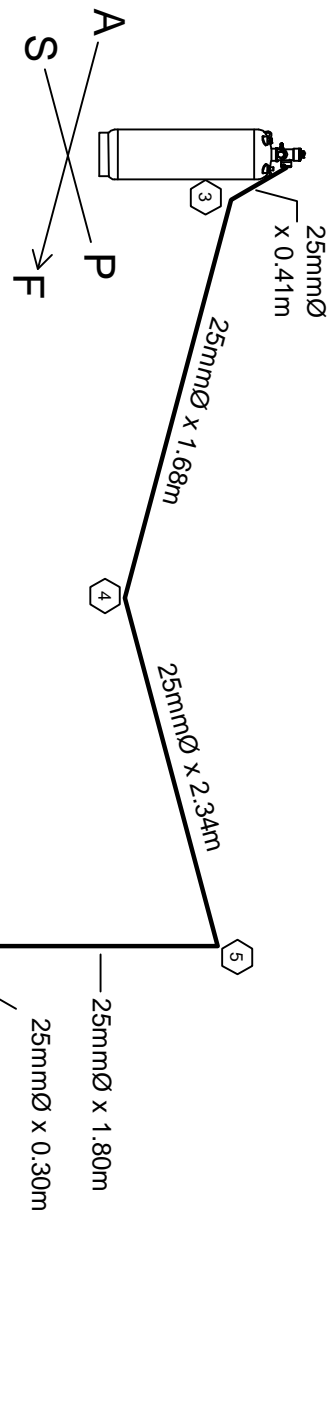
FLOW CALCULATION FILE
C1-2726365-18
July 13, 2009 12:21:55 PM



FR 48 - 53 ER FLAT - PURIFIER ROOM



FR 54 - 70 TANK TOP - PURIFIER ROOM



FR 54 - 70 TANK TOP - PURIFIER ROOM

FLOW CALCULATION FILE
C1-2726365-19
July 13, 2009 12:20:53 PM

BILL OF MATERIALS

FR 61 - 81 BOAT DECK - ENGINE CASING & STACK

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	388.3	90-19000-001
2	Cylinder Assembly, 675 lb. (306 kg) w/LLI	2	90-100671-001
3	N2 Driver Assy, 4070 cu. in. w/ Supervisory Switch	4	90-104070-101
4	Actuation Assembly Kit	2	06-129985-001
5	Not Used	-	
6	Discharge Head, Plain Nut	4	WK-872450-000
7	Strap, 600/675 lb. Cylinder	4	WK-294651-000
8	Grade, 600/675 lb. Cylinder	4	WK-294652-000
9	Two Cylinder Strap	8	06-236173-001
10	Office Fitting, custom drilled	2	90-194129-316
11	DISCHARGE NOZZLES	6	SEE TABLE BELOW

USE ACTUATION OPTION F - SEE PAGE 4

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360°	273.29	90-194427-243	65.3
E1-N2	360°	273.29	90-194427-243	65.4
E1-N3	360°	285.03	90-194427-244	63.8
E1-N4	360°	285.03	90-194427-244	63.6
E1-N5	360°	297.03	90-194427-245	65.1
E1-N6	360°	297.03	90-194427-245	65.1

BILL OF MATERIALS

FR 61 - 81 BOAT DECK - ENGINE CASING & STACK

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	388.3	90-19000-001
2	Cylinder Assembly, 675 lb. (306 kg) w/LLI	2	90-100671-001
3	N2 Driver Assy, 4070 cu. in. w/ Supervisory Switch	4	90-104070-101
4	Actuation Assembly Kit	2	06-129985-001
5	Not Used	-	
6	Discharge Head, Plain Nut	4	WK-872450-000
7	Strap, 600/675 lb. Cylinder	4	WK-294651-000
8	Grade, 600/675 lb. Cylinder	4	WK-294652-000
9	Two Cylinder Strap	8	06-236173-001
10	Office Fitting, custom drilled	2	90-194129-316
11	DISCHARGE NOZZLES	6	SEE TABLE BELOW

USE ACTUATION OPTION F - SEE PAGE 4

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360°	273.29	90-194427-243	65.3
E1-N2	360°	273.29	90-194427-243	65.4
E1-N3	360°	285.03	90-194427-244	63.8
E1-N4	360°	285.03	90-194427-244	63.6
E1-N5	360°	297.03	90-194427-245	65.1
E1-N6	360°	297.03	90-194427-245	65.1

BILL OF MATERIALS

FR 61 - 81 BOAT DECK - ENGINE CASING & STACK

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	388.3	90-19000-001
2	Cylinder Assembly, 675 lb. (306 kg) w/LLI	2	90-100671-001
3	N2 Driver Assy, 4070 cu. in. w/ Supervisory Switch	4	90-104070-101
4	Actuation Assembly Kit	2	06-129985-001
5	Not Used	-	
6	Discharge Head, Plain Nut	4	WK-872450-000
7	Strap, 600/675 lb. Cylinder	4	WK-294651-000
8	Grade, 600/675 lb. Cylinder	4	WK-294652-000
9	Two Cylinder Strap	8	06-236173-001
10	Office Fitting, custom drilled	2	90-194129-316
11	DISCHARGE NOZZLES	6	SEE TABLE BELOW

USE ACTUATION OPTION F - SEE PAGE 4

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360°	273.29	90-194427-243	65.3
E1-N2	360°	273.29	90-194427-243	65.4
E1-N3	360°	285.03	90-194427-244	63.8
E1-N4	360°	285.03	90-194427-244	63.6
E1-N5	360°	297.03	90-194427-245	65.1
E1-N6	360°	297.03	90-194427-245	65.1

BILL OF MATERIALS

FR 61 - 81 BOAT DECK - ENGINE CASING & STACK

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	388.3	90-19000-001
2	Cylinder Assembly, 675 lb. (306 kg) w/LLI	2	90-100671-001
3	N2 Driver Assy, 4070 cu. in. w/ Supervisory Switch	4	90-104070-101
4	Actuation Assembly Kit	2	06-129985-001
5	Not Used	-	
6	Discharge Head, Plain Nut	4	WK-872450-000
7	Strap, 600/675 lb. Cylinder	4	WK-294651-000
8	Grade, 600/675 lb. Cylinder	4	WK-294652-000
9	Two Cylinder Strap	8	06-236173-001
10	Office Fitting, custom drilled	2	90-194129-316
11	DISCHARGE NOZZLES	6	SEE TABLE BELOW

USE ACTUATION OPTION F - SEE PAGE 4

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360°	273.29	90-194427-243	65.3
E1-N2	360°	273.29	90-194427-243	65.4
E1-N3	360°	285.03	90-194427-244	63.8
E1-N4	360°	285.03	90-194427-244	63.6
E1-N5	360°	297.03	90-194427-245	65.1
E1-N6	360°	297.03	90-194427-245	65.1

BILL OF MATERIALS

FR 61 - 81 BOAT DECK - ENGINE CASING & STACK

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	388.3	90-19000-001
2	Cylinder Assembly, 675 lb. (306 kg) w/LLI	2	90-100671-001
3	N2 Driver Assy, 4070 cu. in. w/ Supervisory Switch	4	90-104070-101
4	Actuation Assembly Kit	2	06-129985-001
5	Not Used	-	
6	Discharge Head, Plain Nut	4	WK-872450-000
7	Strap, 600/675 lb. Cylinder	4	WK-294651-000
8	Grade, 600/675 lb. Cylinder	4	WK-294652-000
9	Two Cylinder Strap	8	06-236173-001
10	Office Fitting, custom drilled	2	90-194129-316
11	DISCHARGE NOZZLES	6	SEE TABLE BELOW

USE ACTUATION OPTION F - SEE PAGE 4

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360°	273.29	90-194427-243	65.3
E1-N2	360°	273.29	90-194427-243	65.4
E1-N3	360°	285.03	90-194427-244	63.8
E1-N4	360°	285.03	90-194427-244	63.6
E1-N5	360°	297.03	90-194427-245	65.1
E1-N6	360°	297.03	90-194427-245	65.1

BILL OF MATERIALS

FR 61 - 81 BOAT DECK - ENGINE CASING & STACK

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	388.3	90-19000-001
2	Cylinder Assembly, 675 lb. (306 kg) w/LLI	2	90-100671-001
3	N2 Driver Assy, 4070 cu. in. w/ Supervisory Switch	4	90-104070-101
4	Actuation Assembly Kit	2	06-129985-001
5	Not Used	-	
6	Discharge Head, Plain Nut	4	WK-872450-000
7	Strap, 600/675 lb. Cylinder	4	WK-294651-000
8	Grade, 600/675 lb. Cylinder	4	WK-294652-000
9	Two Cylinder Strap	8	06-236173-001
10	Office Fitting, custom drilled	2	90-194129-316
11	DISCHARGE NOZZLES	6	SEE TABLE BELOW

USE ACTUATION OPTION F - SEE PAGE 4

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360°	273.29	90-194427-243	65.3
E1-N2	360°	273.29	90-194427-243	65.4
E1-N3	360°	285.03	90-194427-244	63.8
E1-N4	360°	285.03	90-194427-244	63.6
E1-N5	360°	297.03	90-194427-245	65.1
E1-N6	360°	297.03	90-194427-245	65.1

BILL OF MATERIALS

FR 61 - 81 BOAT DECK - ENGINE CASING & STACK

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	388.3	90-19000-001
2	Cylinder Assembly, 675 lb. (306 kg) w/LLI	2	90-100671-001
3	N2 Driver Assy, 4070 cu. in. w/ Supervisory Switch	4	90-104070-101
4	Actuation Assembly Kit	2	06-129985-001
5	Not Used	-	-
6	Discharge Head, Plain Nut	4	WK-872450-000
7	Strap, 600/675 lb. Cylinder	4	WK-294651-000
8	Cartridge, 600/675 lb. Cylinder	4	WK-294652-000
9	Two Cylinder Strap	8	06-236173-001
10	Orifice Fitting, custom drilled	2	90-194129-316
11	DISCHARGE NOZZLES	6	SEE TABLE BELOW

USE ACTUATION OPTION F - SEE PAGE 4			
NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N
E-NT1	360°	273.29	90-194427-243
E-NT2	360°	273.29	90-194427-243
E-NT3	360°	285.03	90-194427-244
E-NT4	360°	285.03	90-194427-244
E-NT5	360°	297.03	90-194427-245
E-NT6	360°	297.03	90-194427-245
			65.1
			65.1

Bill of Materials

FR 53 - 70 TANK TOP - CYCLO CONVERTER ROOM

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	168.3	90-190000-001
2	Cylinder Assembly, 395 lb. (179 kg) w/LLI	1	90-100391-001
3	N2 Drier Assy, 4070 cu. in. Capacity w/ Supervisory Switch	1	90-104070-001
4	Actuation Assembly Kit	1	06-129882-001
5	Valve Outlet Adapter, 2"	1	WK-283905-000
6	Discharge Head, Plain Nut	1	WK-872450-000
7	Combined Strap - (395 lb. FM-200 and 4070-cu.in Nitrogen)	2	06-236126-001
8	Not Used	-	-
9	Not Used	-	-
10	Orifice Fitting, custom drilled	1	90-194129-213
11	DISCHARGE NOZZLES	4	SEE TABLE BELOW

USE ACTUATION OPTION B - SEE PAGE 3

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	180°	228.77	90-194415-240	41.8
E1-N2	180°	228.77	90-194415-240	41.8
E1-N3	180°	228.77	90-194415-240	42.3
E1-N4	180°	228.77	90-194415-240	42.3

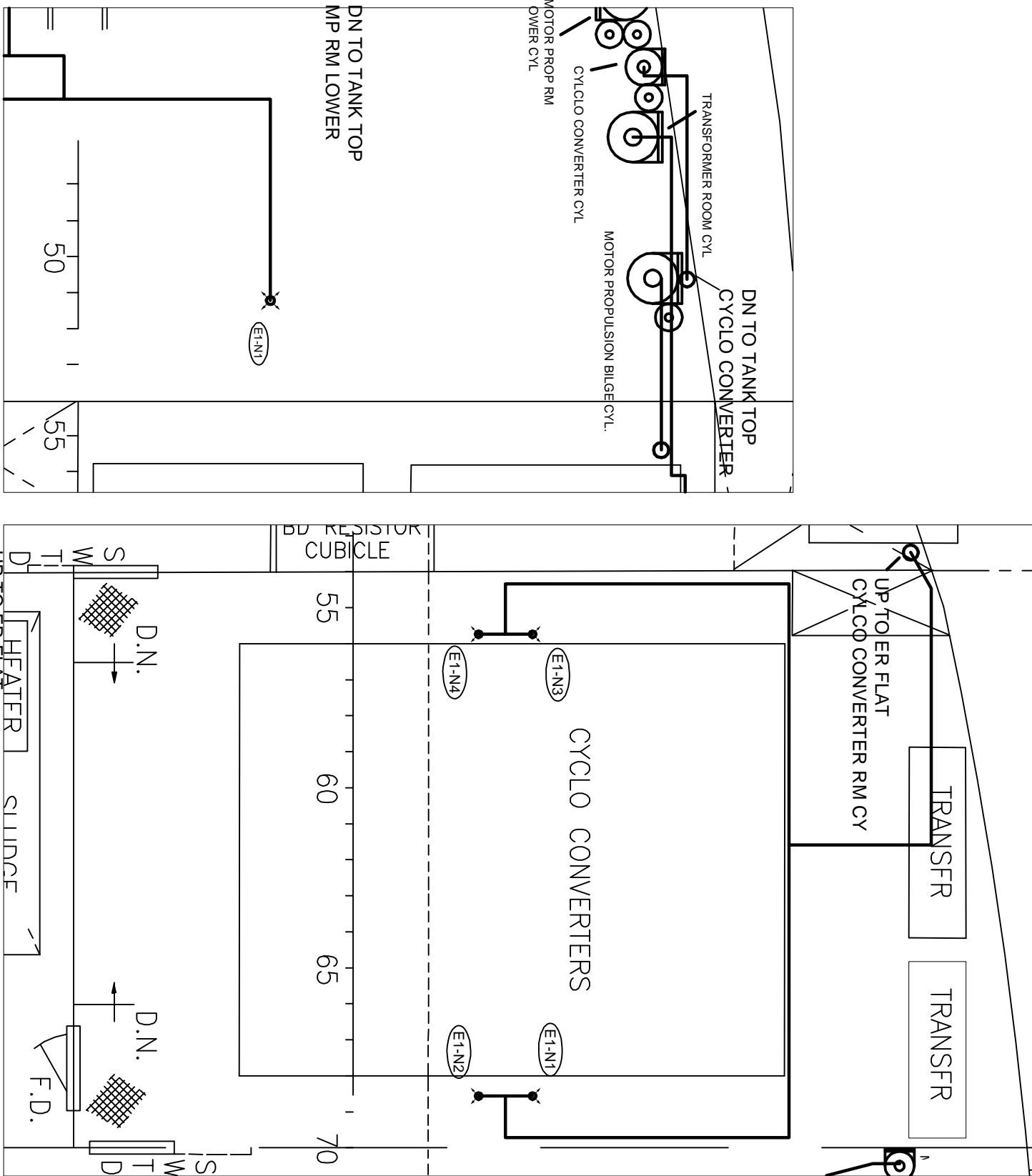
Bill of Materials

FR 45 - 70 ER FLAT - TRANSFORMER ROOM

NO.	DESCRIPTION	QTY	PART NO.
1	FM-200 Agent in Storage Containers Filled At Factory	107.0	90-190000-001
2	Cylinder Assembly, 395 lb. (179 kg) w/LLI	1	90-100391-001
3	N2 Drier Assy, 4070 cu. in. Capacity w/ Supervisory Switch	1	90-104070-001
4	Actuation Assembly Kit	1	06-129882-001
5	Valve Outlet Adapter, 2"	1	WK-283905-000
6	Discharge Head, Plain Nut	1	WK-872450-000
7	Combined Strap - (395 lb. FM-200 and 4070-cu.in Nitrogen)	2	06-236126-001
8	Not Used	-	-
9	Not Used	-	-
10	Orifice Fitting, custom drilled	1	90-194129-182
11	DISCHARGE NOZZLES	2	SEE TABLE BELOW

USE ACTUATION OPTION B - SEE PAGE 3

NOZZLE NO.	NOZZLE TYPE	NOZZLE AREA	NOZZLE P/N	DELIVERED MASS (KG)
E1-N1	360°	297.03	90-194427-245	52.9
E1-N2	360°	297.03	90-194427-245	54.2



PLAN VIEW

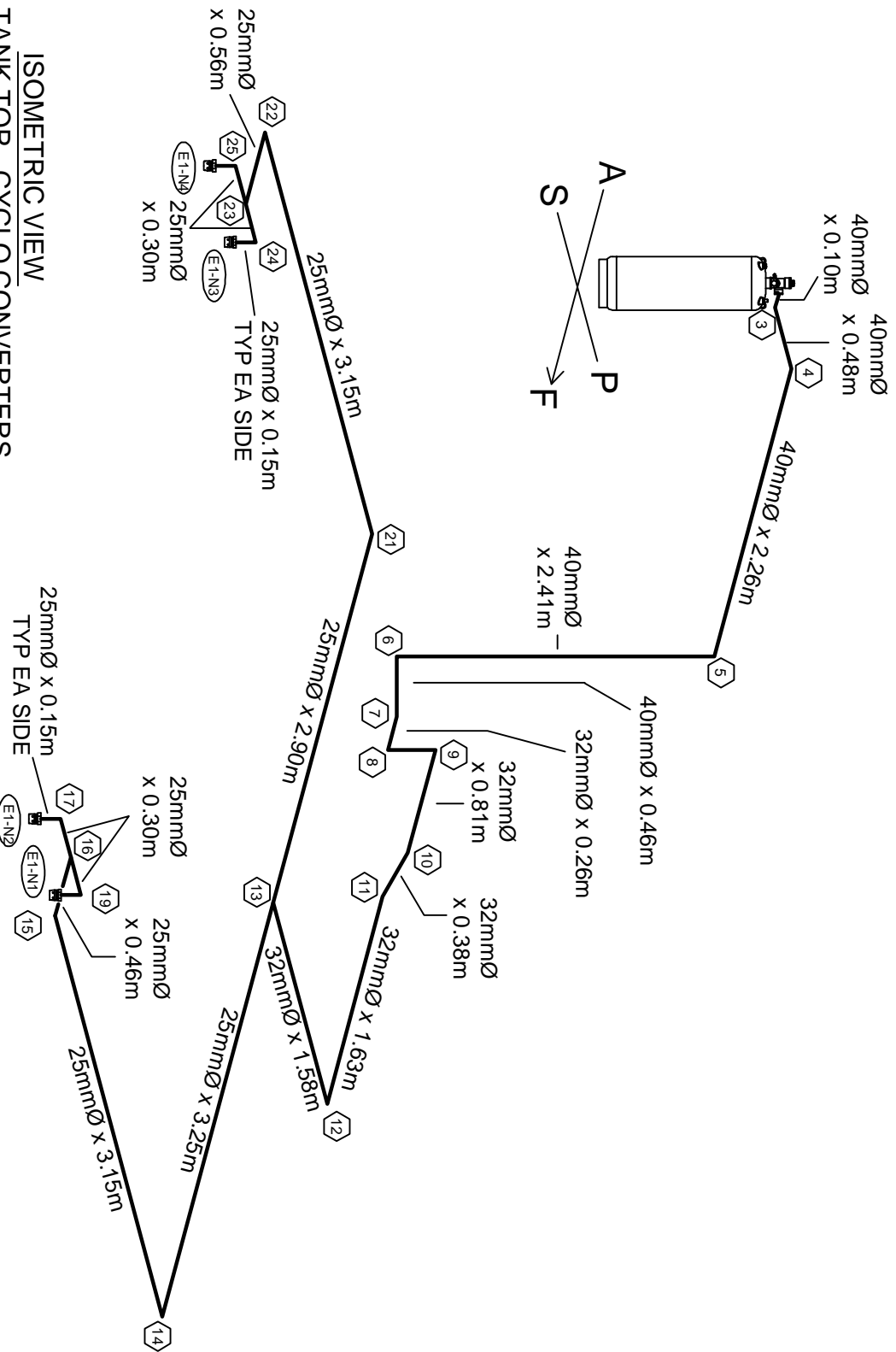
FR 48 - 54 ER FLAT - CYCLO CONVERTERS

PLAN VIEW

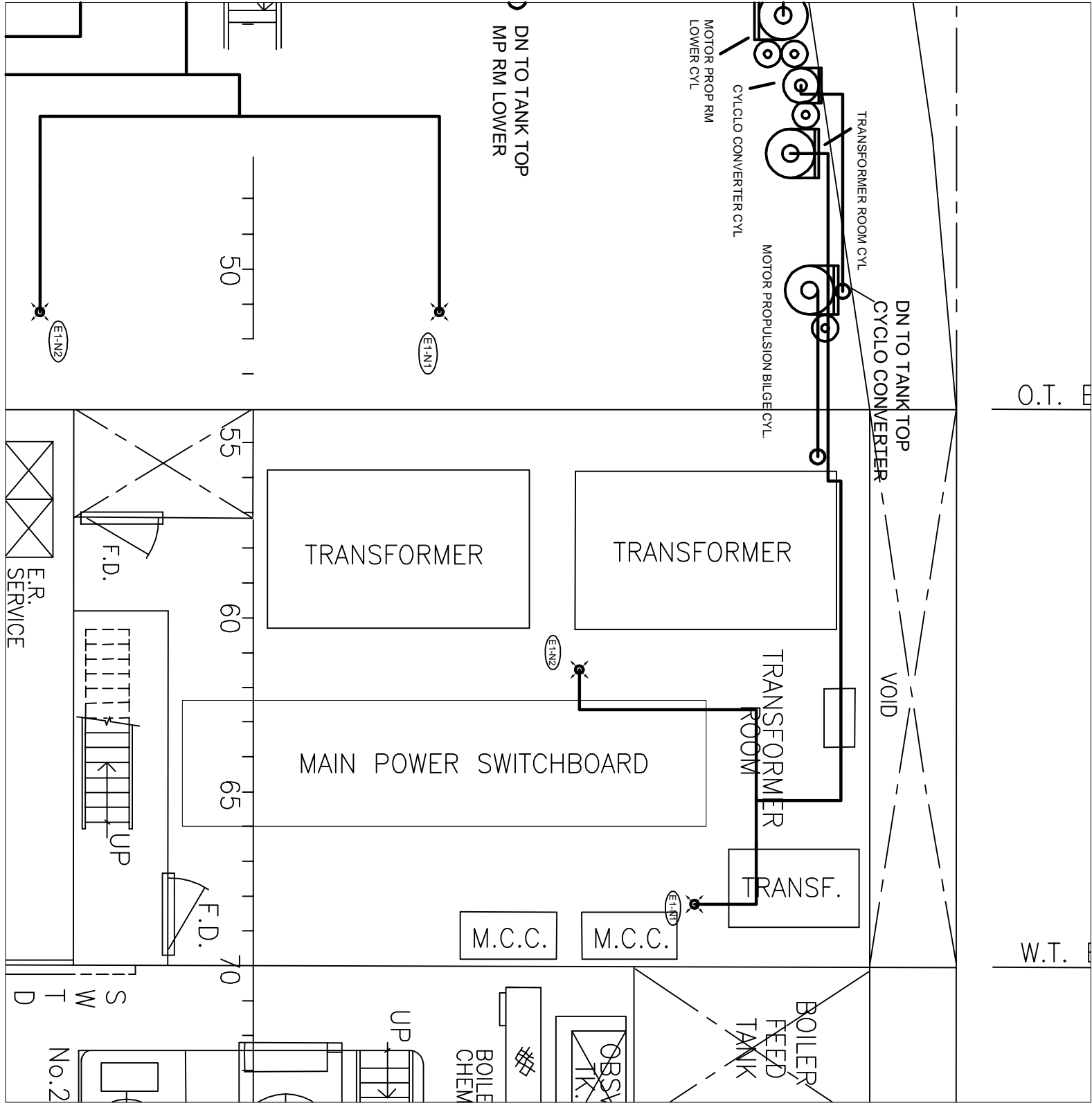
FR 53 - 70 TANK TOP - CYCLO CONVERTERS

Isometric View

FR 53 - 70 TANK TOP - CYCLO CONVERTERS



FLOW CALCULATION FILE
C1-2726365-01
July 13, 2009 12:50:48 PM

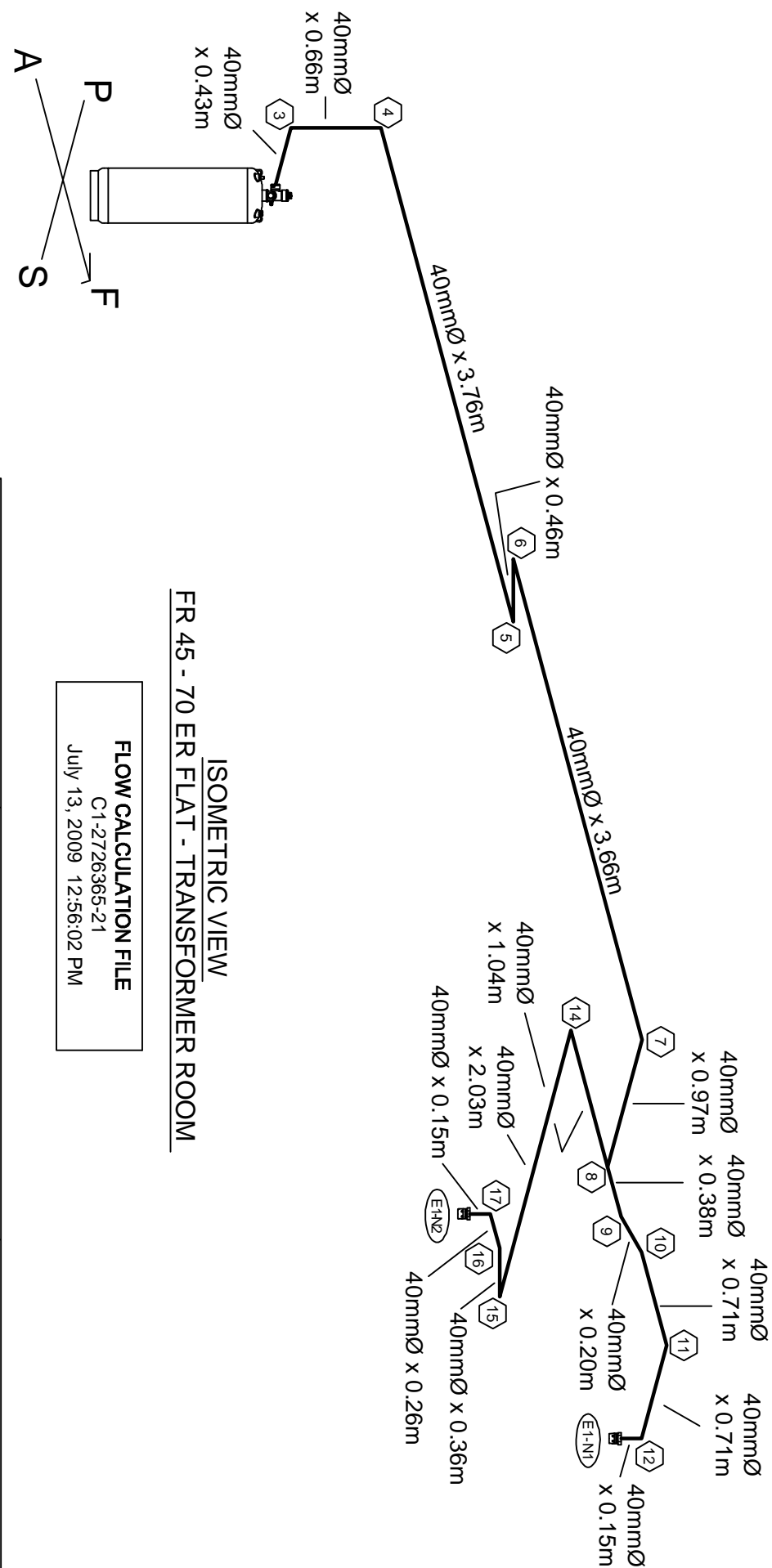


PLAN VIEW


FR 45 - 70 ER FLAT - TRANSFORMER ROOM

Isometric View

FR 45 - 70 ER FLAT - TRANSFORMER ROOM



FLOW CALCULATION FILE
C1-2726365-01
July 13, 2009 12:56:02 PM

 400 MAIN STREET ASHLAND, MA 01721 (508) 881-2000	CUSTOMER		PROJECT	
	NATIONAL & MARINE FIRE SERVICE		CCGS ANN HARVEY	
	ST. CATHERINES, ONTARIO			
	KIDDE MARINE FM-200 SYSTEM LAYOUT AND INSTALLATION		CYCLO CONVERTER ROOM & TRANSFORMER ROOM	
DRN: AT	01JUL09	SIZE	DWG. NO.	REV
CHK'D: FENWAL	02OCT09	D	LI-2726365-01	C
ISSUED: KK	09OCT09			
SCALE: NOTED	UNITS:	NOTED	SHEET: 15 OF 15	