



Safety Hi-Tech Global HFC-227ea Flow Calculation SHTM4.00 (HFC-227ea UHEDS)
UL: EX27878

File Name: PROCESS CONTROL ROOM.FC4

Consolidated Report Customer Information

Company Name:
Address:

Phone:
Contact:
Title:

Project Data

Project Name:
Designer: Ramoncito D. Dizon
Number:
Account:
Location:
Description: PROCESS CONTROL ROOM

Enclosure Report

Elevation: 0 m (relative to sea level)
Atmospheric Correction Factor: 1 (Manual Override)

Enclosure 1 ROOM VOID

Enclosure Temperature:	Number of Nozzles:	2
Minimum: 20.0 C	Width:	12.31 m
Maximum: 20.0 C	Length:	8.85 m
Max. Concentration: 0.00 %	Height:	3.00 m

Calculation Date/Time: Sunday, December 23, 2018, 2:28:32 PM
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Consolidated Report

Design Concentration:	Volume:	326.83 m ³
Adjusted: 8.65 %	Non-permeable:	0.00 m ³
Minimum: 7.00 %	Total Volume:	326.83 m ³
Min. Agent Required: 179.70 kg		
Adjusted Agent Required: 225.99 kg		

Enclosure 2 FALSE CEILING

Enclosure Temperature:	Number of Nozzles:	2
Minimum: 20.0 C	Width:	12.31 m
Maximum: 20.0 C	Length:	8.85 m
Max. Concentration: 0.00 %	Height:	2.85 m
Design Concentration:	Volume:	310.49 m ³
Adjusted: 8.65 %	Non-permeable:	0.00 m ³
Minimum: 7.00 %	Total Volume:	310.49 m ³
Min. Agent Required: 170.72 kg		
Adjusted Agent Required: 214.69 kg		

Enclosure 3 RAISED FLOOR

Enclosure Temperature:	Number of Nozzles:	1
Minimum: 20.0 C	Width:	12.31 m
Maximum: 20.0 C	Length:	8.85 m
Max. Concentration: 0.00 %	Height:	1.00 m
Design Concentration:	Volume:	108.94 m ³
Adjusted: 8.65 %	Non-permeable:	0.00 m ³
Minimum: 7.00 %	Total Volume:	108.94 m ³
Min. Agent Required: 59.90 kg		
Adjusted Agent Required: 75.32 kg		

Agent Source Report

Agent: HFC-227ea/ Propellant N2
Cylinder Name: 175L Agent Cylinder Assembly

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Cylinder Part Number: SHG150180
Agent Per Cylinder: 129.00 kg
Cylinder Pressure: 24.821 bar
Fill Density: 0.737 kg / l
Number of Main Cylinders: 4
Number of Reserve Cylinders: 0

Cylinder Empty Weight: 122.20 kg
Weight, All Cylinders + Agent: 1004.80 kg
Floor Area Per Cylinder: 0.16 m²
Floor Loading Per Cylinder: 1580 kg /m²

Nitrogen Cylinder Name: 68L N2 Cylinder (80 Bar)
Nitrogen Cylinder Part Number: SHG080N70
Number of Main Nitrogen Cylinders: 4
Number of Reserve Nitrogen Cylinders: 0

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Consolidated Report Parts Report

Total Agent Required: 516.00 kg

Cylinder Name: 175L Agent Cylinder Assembly (Part: SHG150180)

Number of Cylinders: 4

Nitrogen Cylinder Name: 68L N2 Cylinder (80 Bar) (Part: SHG080N70)

Number of Nitrogen Cylinders: 4

Nitrogen Restrictor Plate: 58.90 mm² (Part: N/A)

Number of Nitrogen Restrictor Plates: 4

Nozzle	Type	Nozzle Diameter	Nozzle Area	Part Number
E1-N1	360°	50A	1075.21 mm ²	SHG-50-370
E1-N2	360°	50A	1075.21 mm ²	SHG-50-370
E2-N1	360°	50A	804.25 mm ²	SHG-50-320
E2-N2	360°	50A	804.25 mm ²	SHG-50-320
E3-N1	180°	32A	593.96 mm ²	SHG-R32-275

Nozzle	Drill Diameter	Drill Size
E1-N1	37.0000 mm	37 mm
E1-N2	37.0000 mm	37 mm
E2-N1	32.0000 mm	32 mm
E2-N2	32.0000 mm	32 mm
E3-N1	27.5000 mm	27.5 mm

Pipe & Fittings	Type	Diameter	Length	Elbows (90)	Elbows (45)	Tees	Unions
	40W	15A	0.45 m	0	0	0	0
	40W	32A	6.00 m	1	0	0	0
	40W	50A	11.90 m	4	0	0	0
	40W	80A	10.00 m	1	0	3	0
	40W	100A	29.90 m	5	0	3	0

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Consolidated Report

40W 125A 5.45 m 2 0 6 0

Other Objects	Name	Quantity	Part Number
	50 mm Flexible Hose	4	SHG0050FH
	50 mm Union Elbow	4	SHG0125UE
	50 mm Check Valve	4	SHG0050CV
	End Cap	2	N/A
	65 mm Selector Valve (Open)	1	SHG0065SV
	100 mm Selector Valve (Open)	1	SHG0100SV
	125 mm Selector Valve (Open)	2	SHG0125SV
	65 mm Selector Valve (Closed)	1	SHG0065SV
	100 mm Selector Valve (Closed)	1	SHG0100SV
	125 mm Selector Valve (Closed)	2	SHG0125SV

System Acceptance Report

System Discharge Time: 9.9 seconds
Percent Agent In Pipe: 110.6%
Percent Agent Before First Tee: 88.9%
Dead Volume: 6.8% (32.70 kg)

Enclosure Number: 1
Enclosure Name: ROOM VOID
Minimum Design Concentration: 7.00%
Adjusted Design Concentration: 8.65%
Predicted Concentration: 9.09%
Maximum Expected Agent Concentration: 9.09% (At 20.0 C)

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Nozzle	Minimum Agent Required	Adjusted Agent Required	Predicted Agent Delivered	Average Nozzle Pressure
E1-N1	89.85 kg	112.99 kg	119.37 kg	10.168 bar
E1-N2	89.85 kg	113.00 kg	119.36 kg	10.167 bar

Enclosure Number: 2
Enclosure Name: FALSE CEILING
Minimum Design Concentration: 7.00%
Adjusted Design Concentration: 8.65%
Predicted Concentration: 7.46%
Maximum Expected Agent Concentration: 7.46% (At 20.0 C)

Nozzle	Minimum Agent Required	Adjusted Agent Required	Predicted Agent Delivered	Average Nozzle Pressure
E2-N1	85.36 kg	107.34 kg	91.41 kg	10.477 bar
E2-N2	85.36 kg	107.35 kg	91.41 kg	10.477 bar

Enclosure Number: 3
Enclosure Name: RAISED FLOOR
Minimum Design Concentration: 7.00%
Adjusted Design Concentration: 8.65%
Predicted Concentration: 7.20%
Maximum Expected Agent Concentration: 7.20% (At 20.0 C)

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Nozzle	Minimum Agent Required	Adjusted Agent Required	Predicted Agent Delivered	Average Nozzle Pressure
E3-N1	59.90 kg	75.32 kg	61.75 kg	10.245 bar

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Consolidated Report

Pipe Network Report

Description	Pipe Section	Start Node	End Node	Pipe Type	Pipe Diameter	Pipe Length	Union	Total Elevation Change	Total Equivalent Length	Nozzle Name	Nozzle Size	Nozzle Type	Nozzle Area
Cylinder - On	ManR.	0	27		50A	1.30 m	0	1.30 m	6.00 m				
Flex Hose	ManR.	27	28		50A	0.24 m	0	0.20 m	3.36 m				
Flex Hose	ManR.	28	29		50A	0.50 m	0	0.50 m	10.00 m				
Check Valve ->	ManR.	29	30		50A	0.16 m	0	0.16 m	5.00 m				
Tee	Man.	30	31	40W	125A	-----	0	-----	5.12 m				
Pipe	Man.	31	32	40W	125A	0.55 m	0	-----	0.55 m				
Tee	Man.	32	33	40W	125A	-----	0	-----	1.68 m				
Pipe	Man.	33	34	40W	125A	0.55 m	0	-----	0.55 m				
Tee	Man.	34	35	40W	125A	-----	0	-----	1.68 m				
Pipe	Man.	35	36	40W	125A	0.55 m	0	-----	0.55 m				
Tee	Man.	36	37	40W	125A	-----	0	-----	1.68 m				
Pipe	Man.	37	38	40W	125A	0.60 m	0	-----	0.60 m				
Elbow (90)	Man.	38	39	40W	125A	-----	0	-----	4.08 m				
Pipe	Man.	39	40	40W	125A	1.50 m	0	-1.50 m	1.50 m				
Elbow (90)	Man.	40	41	40W	125A	-----	0	-----	4.08 m				
Pipe	Man.	41	42	40W	125A	0.50 m	0	-----	0.50 m				
Tee	Man.	42	43	40W	100A	-----	0	-----	1.34 m				
Pipe	Man.	43	44	40W	100A	0.40 m	0	-----	0.40 m				
Tee	Man.	13	45	40W	100A	-----	0	-----	4.08 m				
Pipe	Man.	12	13	40W	125A	0.40 m	0	-----	0.40 m				
Tee	Man.	11	12	40W	125A	-----	0	-----	1.68 m				
Pipe	Man.	10	11	40W	125A	0.40 m	0	-----	0.40 m				
Tee	Man.	9	10	40W	125A	-----	0	-----	1.68 m				
Pipe	Man.	8	9	40W	125A	0.25 m	0	-----	0.25 m				
End Cap	Man.	7	8		125A	0.10 m	0	-----	999.00 m				
Tee	Man.	6	10	40W	125A	-----	0	-----	5.12 m				
Pipe	Man.	5	6	40W	15A	0.15 m	0	-0.15 m	0.15 m				
Select Closed	Man.	4	5		125A	0.36 m	0	-----	11.50 m				
Tee	Man.	3	12	40W	125A	-----	0	-----	5.12 m				
Pipe	Man.	2	3	40W	15A	0.15 m	0	-0.15 m	0.15 m				
Select Closed	Man.	1	2		65A	0.21 m	0	-----	5.20 m				
Tee	Man.	44	45	40W	100A	-----	0	-----	4.08 m				

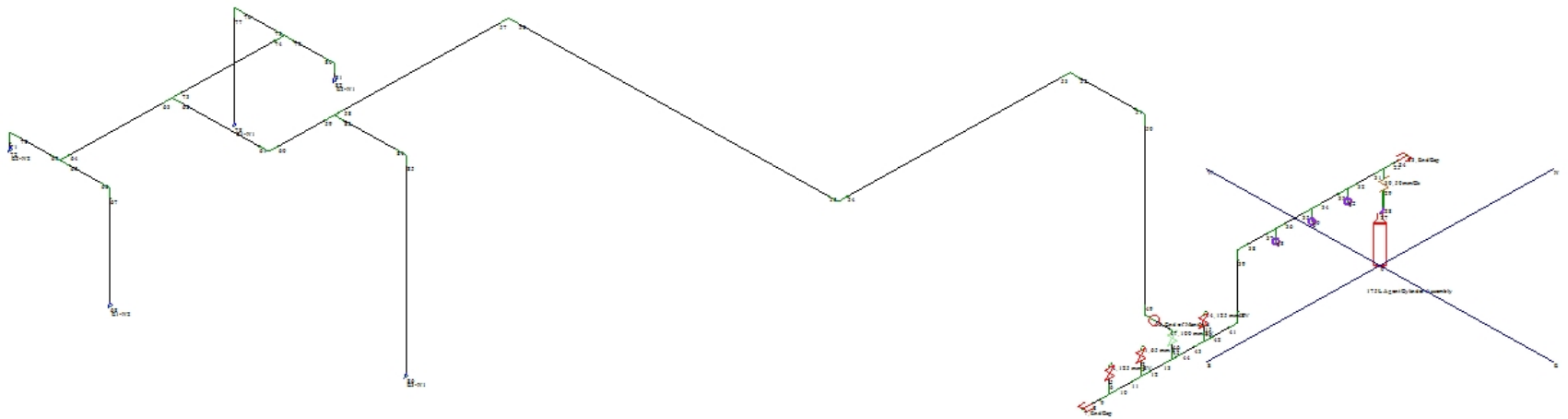
Consolidated Report

Description	Pipe Section	Start Node	End Node	Pipe Type	Pipe Diameter	Pipe Length	Union	Total Elevation Change	Total Equivalent Length	Nozzle Name	Nozzle Size	Nozzle Type	Nozzle Area
Pipe	Man.	45	46	40W	100A	0.15 m	0	0.15 m	0.15 m				
Select Open	Man.	46	47		100A	0.31 m	0	-----	7.50 m				
Pipe	Man./End	47	48	40W	100A	0.50 m	0	-----	0.50 m				
Elbow (90)	System	48	49	40W	100A	-----	0	-----	3.30 m				
Pipe	System	49	50	40W	100A	5.20 m	0	5.20 m	5.20 m				
Elbow (90)	System	50	51	40W	100A	-----	0	-----	3.30 m				
Pipe	System	51	52	40W	100A	1.80 m	0	-----	1.80 m				
Elbow (90)	System	52	53	40W	100A	-----	0	-----	3.30 m				
Pipe	System	53	54	40W	100A	6.85 m	0	-----	6.85 m				
Elbow (90)	System	54	55	40W	100A	-----	0	-----	3.30 m				
Pipe	System	55	56	40W	100A	10.00 m	0	-----	10.00 m				
Elbow (90)	System	56	57	40W	100A	-----	0	-----	3.30 m				
Pipe	System	57	58	40W	100A	5.00 m	0	-----	5.00 m				
Tee	System	58	59	40W	80A	-----	0	-----	1.01 m				
Pipe	System	59	60	40W	80A	1.50 m	0	-----	1.50 m				
Elbow (90)	System	60	61	40W	80A	-----	0	-----	2.50 m				
Pipe	System	61	62	40W	80A	2.50 m	0	-----	2.50 m				
Tee	System	62	63	40W	80A	-----	0	-----	3.11 m				
Pipe	System	63	64	40W	80A	3.00 m	0	-----	3.00 m				
Tee	System	64	65	40W	50A	-----	0	-----	2.10 m				
Pipe	System	65	66	40W	50A	1.00 m	0	-----	1.00 m				
Elbow (90)	System	66	67	40W	50A	-----	0	-----	1.71 m				
Pipe&Nozzle	System	67	68	40W	50A	3.00 m	0	-3.00 m	3.00 m	E1-N2	50A	360°	1075.21 mm ²
Tee	System	64	69	40W	50A	-----	0	-----	2.10 m				
Pipe	System	69	70	40W	50A	1.00 m	0	-----	1.00 m				
Elbow (90)	System	70	71	40W	50A	-----	0	-----	1.71 m				
Pipe&Nozzle	System	71	72	40W	50A	0.10 m	0	-0.10 m	0.10 m	E2-N2	50A	360°	804.25 mm ²
Tee	System	62	73	40W	80A	-----	0	-----	3.11 m				
Pipe	System	73	74	40W	80A	3.00 m	0	-----	3.00 m				
Tee	System	74	75	40W	50A	-----	0	-----	2.10 m				
Pipe	System	75	76	40W	50A	1.00 m	0	-----	1.00 m				
Elbow (90)	System	76	77	40W	50A	-----	0	-----	1.71 m				
Pipe&Nozzle	System	77	78	40W	50A	3.00 m	0	-3.00 m	3.00 m	E1-N1	50A	360°	1075.21 mm ²

Consolidated Report

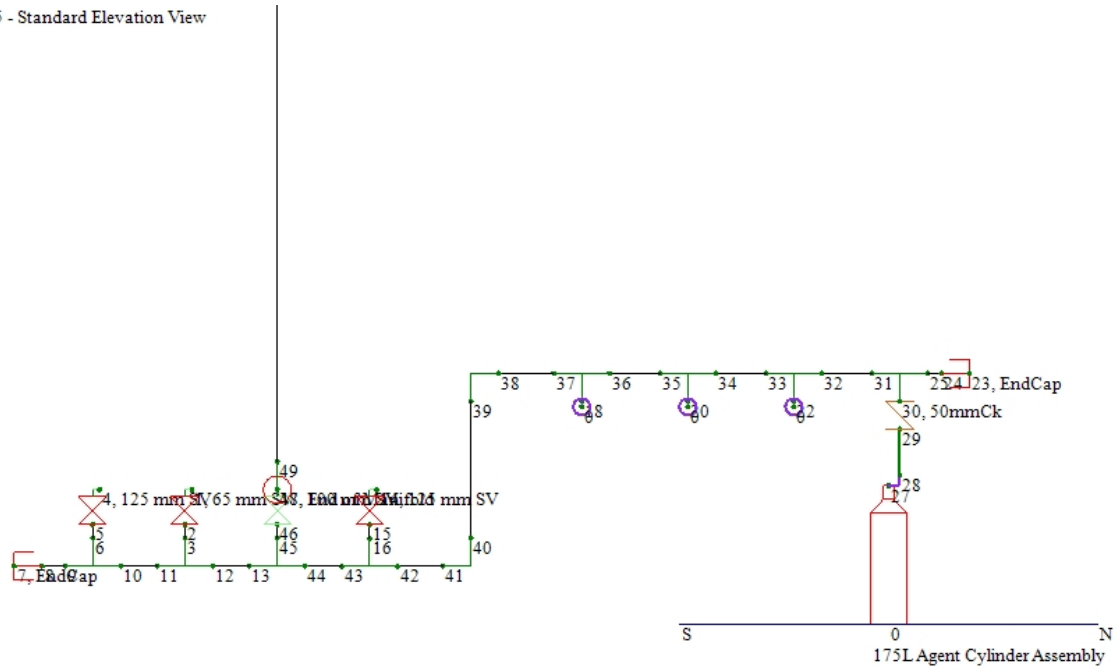
Description	Pipe Section	Start Node	End Node	Pipe Type	Pipe Diameter	Pipe Length	Union	Total Elevation Change	Total Equivalent Length	Nozzle Name	Nozzle Size	Nozzle Type	Nozzle Area
Tee	System	74	79	40W	50A	-----	0	-----	2.10 m				
Pipe	System	79	80	40W	50A	1.00 m	0	-----	1.00 m				
Elbow (90)	System	80	81	40W	50A	-----	0	-----	1.71 m				
Pipe&Nozzle	System	81	82	40W	50A	0.10 m	0	-0.10 m	0.10 m	E2-N1	50A	360°	804.25 mm ²
Tee	System	58	83	40W	50A	-----	0	-----	2.10 m				
Pipe	System	83	84	40W	50A	1.70 m	0	-----	1.70 m				
Elbow (90)	System	84	85	40W	32A	-----	0	-----	1.10 m				
Pipe&Nozzle	System	85	86	40W	32A	6.00 m	0	-6.00 m	6.00 m	E3-N1	32A	180°	593.96 mm ²
Tee	Man.	16	43	40W	100A	-----	0	-----	4.08 m				
Pipe	Man.	15	16	40W	15A	0.15 m	0	-0.15 m	0.15 m				
Select Closed	Man.	14	15		125A	0.36 m	0	-----	11.50 m				
Tee	Man.	18	37	40W	125A	-----	0	-----	5.12 m				
Cylinder +	Man.	0	18		50A	2.20 m	0	2.16 m	6.00 m				
Tee	Man.	20	35	40W	125A	-----	0	-----	5.12 m				
Cylinder +	Man.	0	20		50A	2.20 m	0	2.16 m	6.00 m				
Tee	Man.	22	33	40W	125A	-----	0	-----	5.12 m				
Cylinder +	Man.	0	22		50A	2.20 m	0	2.16 m	6.00 m				
Tee	Man.	25	31	40W	125A	-----	0	-----	1.68 m				
Pipe	Man.	24	25	40W	125A	0.15 m	0	-----	0.15 m				
End Cap	Man.	23	24		125A	0.10 m	0	-----	999.00 m				

View: 1 - 1 - General View/Draw



Consolidated Report

View #: 5 - Standard Elevation View



Consolidated Report

View #: 9 - Standard Plan View

