

PRODUCT REVIEW SOFTWARE FOR ISO TANKS, CARGO TRAILERS, RAIL TANK CARS, 4BW TANKS AND TOTES

PURPOSE: Review requests from package engineering for product review in various containers. Advise customer of any changes that are required to get container to comply to the applicable regulations (US DOT, IMDG, ARD, RID).

HLA developed multiple spreadsheets to simplify the time consuming task of reviewing a hazardous material for shipment by road, rail or ship, to the applicable country's shipping regulations. The software has three main worksheets: 1) calculation of the required pressure relief valve venting capacity, 2) calculation of the maximum allowable working pressure (MAWP) of the container and 3) the maximum fill density of the container. This software allows the engineer to perform many scenarios in an efficient manner, instead of reviewing each regulation individually.

A	B	C	D	E	F	G	H	I	J	K	L
1	PRESSURE RELIEF VALVE VENTING CAPACITY REQUIREMENTS PER VARIOUS REGULATIONS										
2	HLA Job No.					02XXXX					
3	Tank Data:										
4	Drawing Number:										
5	Manufacturer:					XXXX					
6	Applicable regulations:					IMO1/IM101					
7	Nom. Capacity, (nc)					3537 US gallons					
8	Total exposed surface area of tank =					363.1 m ²					
9	Tank design pressure =					58 psig					
10	Tank design reference temperature =					149 F		65.0 C			
11	Relief Valve Data:										
12	Relief valve manufacturer and model:					Fort Vale 2-1/2" SuperMaxi					
13	Quantity of relief valves in parallel:					2					
14	Set pressure of relief valve:					4.400 barg		63.8 psig			
15	Vacuum setting:					N.A.		" Hg			
16	Rupture disc setting:										

A	B	C	D	E	F	G	H	I	J
1	MAWP CONFIRMATION FOR LIQUIDS. (FOR RIGID TANKS ONLY)								
2	***** User Input (Highlighted in Yellow)*****								
3	HLA Job No.					02XXXX			
4	Tank Data:								
5	Drawing Number:					N.A.			
6	Manufacturer:					XXXX			
7	Nom. Capacity, (nc)					3,537 US gallon		13,389 liters	
8	Applicable regulations:					IMO1/IM101			
9	Stamped MAWP					58 psig			
10	Product							XXXX	
11	Boiling temperature at 14.7 psia							37 C	
12	Fill temperature, (ft)							15 C	519 R
13	DOT Reference temperature, (dotrt)							48 C	574.8 R
14	IMDG Reference temperature, (imrt)								
15	Internal pressure during filling, (P1)								
16	Vacuum pressure pulled after filling / sealing								
17	Inert gas pad pressure added after vacuum								
18	Vapor pressure @ fill temp, (vpft)								
19	Vapor pressure @ DOT ref. temp, (vprt)								
20	Vapor pressure @ 65C, (vp65)								
21	Static head height, (h)								
22	Density @ fill temp, (dft)								
23	Density @ DOT ref. temp, (ddotr)								
24	Density @ IMDG ref. temp, (dimrt)								
25	Fill density, (fd), (example: 0.95 for 95% liquid)								
26	PER 49 CFR 173.32(q)(2) (for liquid hazardous materials)								
27	***** Calculated Output *****								
28	Is product a liquid or gas at 20°C and 14.7 psia?								

A	B	C	D	E	F	G	H	I	J	K
1	FILL DENSITY REQUIREMENTS FOR LIQUIDS AND LIQUIFIED GASES PER VARIOUS REGULATIONS									
2	HLA Job No.					02XXXX				
3	Tank Data:									
4	Drawing Number:									
5	Manufacturer:					XXXX				
6	Nom. Capacity, (nc)					13,388 liters		3,537 US gallons		
7	Applicable regulations:					IMO1/IM101				
8	Max. gross weight					30,480 kg		67,196 lb		
9	Tare weight					3490 kg		7,694 lb		
10	Reference Temperatures:									
11	DOT insulated tank:							41 C		
12	DOT uninsulated tank:							46 C		
13	ADR/RID tank (insulated or uninsulated):							50 C		
14	IMOS tank (insulated or uninsulated):							55 C		
15	IMO1 tank:							50 C		
16	Product Data:									
17	Product:					XXXX		***Calculated***		
18	Density @ 15C, (d15)					1.2608 kg/l		10.52178 lb/gal		
19	Density @ 41C, (d41)					1.2103 kg/l		10.10034 lb/gal		
20	Density @ 46C, (d46)					1.2000 kg/l		10.01438 lb/gal		
21	Density @ 50C, (d50)					1.1920 kg/l		9.94752 lb/gal		
22	Density @ 55C, (d55)					1.1817 kg/l		9.881663 lb/gal		
23	Density @ 60C, (d60)					1.1712 kg/l		9.774037 lb/gal		
24	***Calculated Output Data***									
25	Per DOT (173.24b(a)(1)):									
26	(for liquids and liquefied gases)									
27	Insulated tank:									
28	Outage shall be at least 1% of total capacity @ ref temp of 41 C									
29	Volume @ 99% full @ 41C = 0.99(nc) = 3,502 gallons									
30	Volume @ 95% full @ 41C = 0.95(nc) = 3,360 gallons									



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