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Portal > > News > 5 Enhanced Methods for Calculating Noise Using SuperChems™ v10.5

5 Enhanced Methods for Calculating Noise Using SuperChems™ v10.5

2021-10-06 - Corporate Communications - 0 Comments - in News

What are the consequences of noise emissions? The conversion of flow mechanical energy to noise can lead to possible fatigue failure of relief and/or process piping, and potential hearing loss or damage. The costs for additional piping supports and engineering may also increase. Noise can have a negative impact on workers, such as hearing loss, physical and psychological stress, and reduced productivity. Noise can also interfere with plant communication, and contribute to accidents and injuries by making it difficult to hear warning signals.

[Process Safety Office® SuperChems™ v10.5](#) users now enjoy enhanced methods for calculating sound power level and sound pressure level (noise):

1. Sound power level is calculated for single phase and multiphase flow in complex piping geometries
2. Sound pressure level is calculated for single phase and multiphase discharges to atmosphere from process and/relief systems piping
3. Multiple sound pressure levels frequency weighting options are available (A, B, C, D)
4. Multiple acoustic efficiency methods are available (API, IEC, and ASME)
5. Sound pressure levels can be calculated at specific frequencies or over the entire frequency range with atmospheric attenuation

Flexible Noise Options Added

The noise definition object adds acoustic efficiency and frequency weighting options to sound pressure level. The A weighting frequency scale is widely used, as it shows the best correlation between sound pressure level and potential hearing damage.

Define Noise Criteria / Working Scenario = DEFAULT COPY

	A	B	C	D	E	F
1	Name	DEFAULT				
2						
3	Description	Default Noise Criteria				
4						
5	Receptor elevation	5 m			Noise Limit	
6		(dB)				
7	Frequency Weighting	A	A		70	
8						
9	Acoustic Efficiency Method	API	API		85	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						

New Enhancements for Jet Noise

SuperChems™ single phase and two-phase jet models include the new enhancements.

Gas/Vapor Jet Dispersion Model

	A	B	C	D
1				
2	<input checked="" type="checkbox"/> Generate noise contours			
3				
4	Reflecting surfaces near flow exit	None	None	
5				
6	Select one noise spectrum frequency, Hz	-1	<<< Use -1 for all	
7				
8	Source to flow exit pressure ratio	-1 <input checked="" type="checkbox"/> Use flow conditions		
9				
10	Frequency profiles distance, m	30		
11				
12				
13				
14				
15				
16				
17				
18				

New Enhancements for Flame Jet Noise

SuperChems™ single phase and two-phase flame jet models also include the new enhancements.

Gas Flame Jets/Flares Model					
Input / Noise					
	A	B	C	D	
1					
2	<input checked="" type="checkbox"/> Generate noise contours				
3					
4	Reflecting surfaces near flow exit	Two		Two	
5					
6	Select one noise spectrum frequency. Hz			-1	<<< Use -1 for all
7					
8	Source to flow exit pressure ratio			-1	<input checked="" type="checkbox"/> Use flow conditions
9					
10	Combustion peak frequency. Hz			500	
11	Combustion acoustic efficiency			5E-08	
12	Steam assist mass flow ratio			0	
13					
14	Frequency profiles distance. m			10	
15					
16					
17					
18					

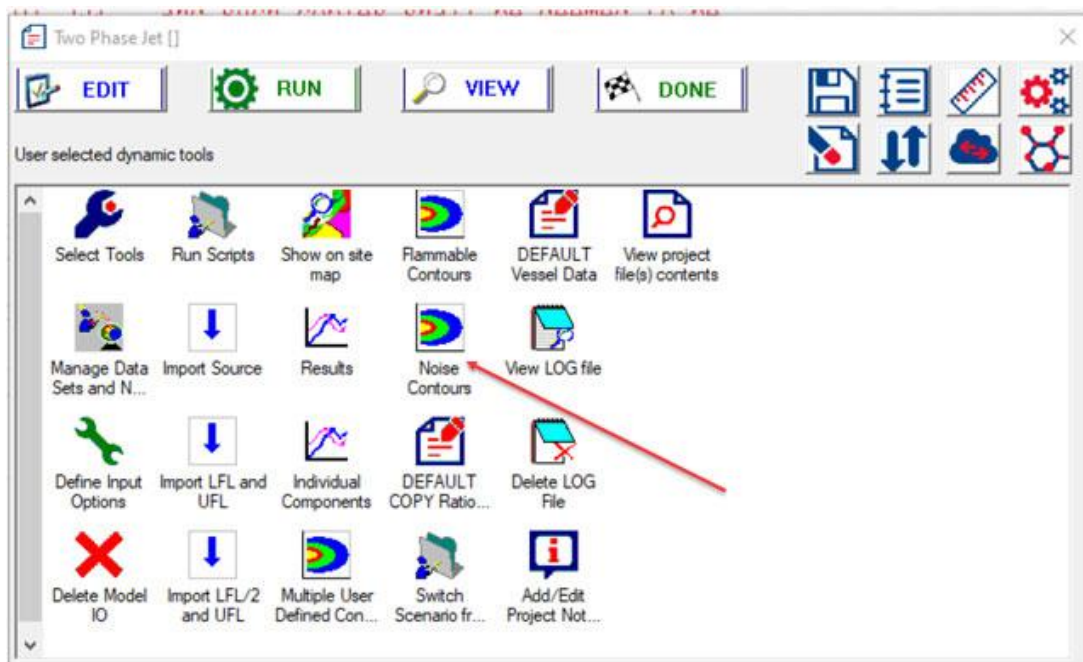
New Reporting Enhancements

A noise summary is added to all the jet and flame jet models with exposure time limits highlighted.

Two-phase jet						
Results Summary / Noise Summary						
	A	B	C	D	E	F
1						
2	Downwind Distance. m	Crosswind Distance. m	Elevation. m	Sound Pressure Level. dBA	OSHA Maximum Allowable Exposure Time. hr	Duration Check
3	5.00	0.00	0.00	116.70	0.20	Exceeded
4	10.00	0.00	0.00	114.64	0.26	Exceeded
5	50.00	0.00	0.00	103.26	1.27	Ok
6	100.00	0.00	0.00	97.05	3.01	Ok
7	200.00	0.00	0.00	90.48	7.48	Ok
8	300.00	0.00	0.00	86.42	13.14	Ok
9	400.00	0.00	0.00	83.41	19.95	Ok
10						
11	Sound Pressure Level. dBA	Distance. m	OSHA Maximum Allowable Exposure Time. hr	Duration Check		
12	70.00	1239.36	128.00	Ok		
13	85.00	344.27	16.00	Ok		
14	90.00	210.30	8.00	Ok		
15	115.00	12.61	0.25	Exceeded		
16	125.00	1.00	0.06	Exceeded		
17	135.00	1.00	0.02	Exceeded		
18	150.00	1.00	0.00	Exceeded		
19						
20						

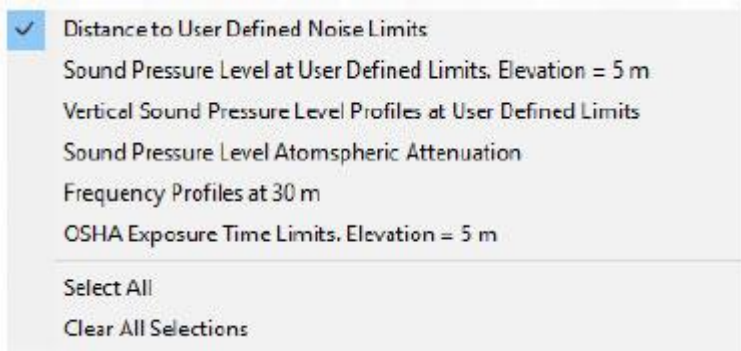
Additional Visual Tools

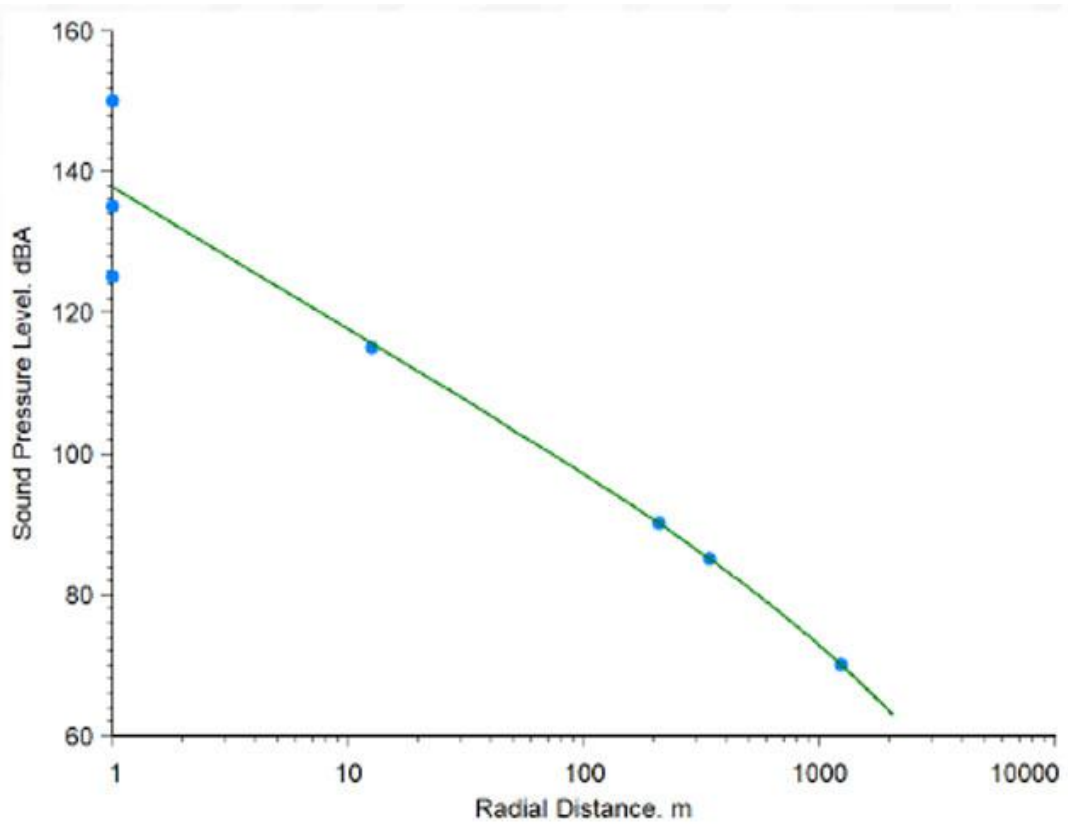
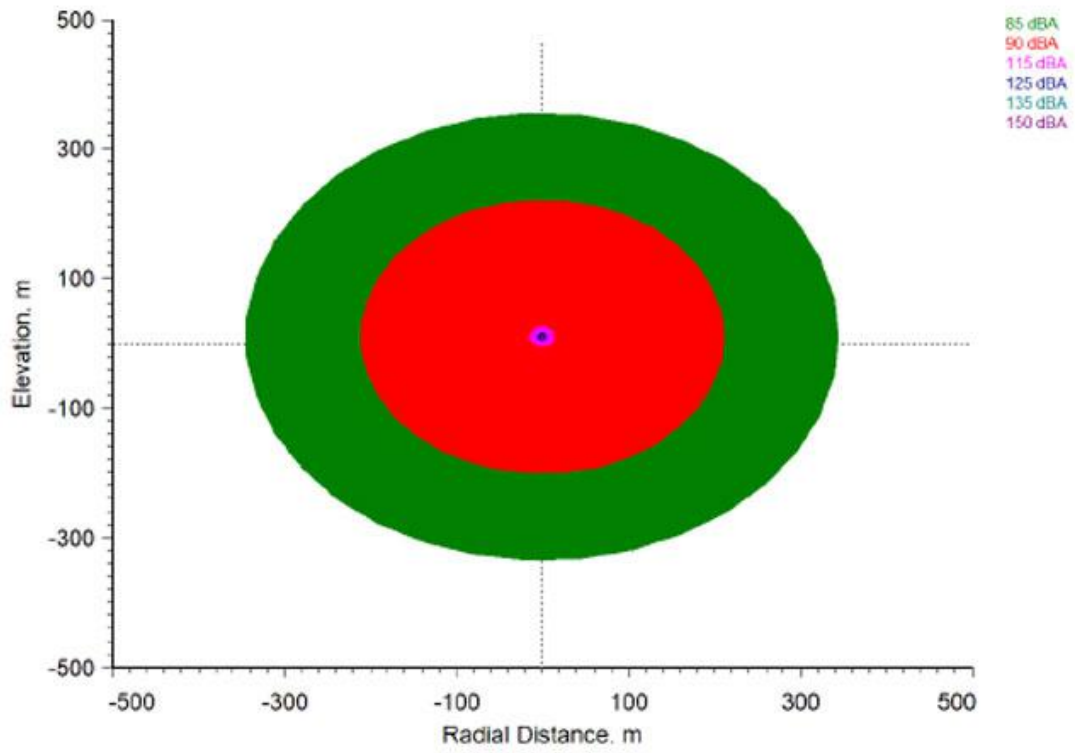
Noise contours display options are provided for all the jet and flame jet models.

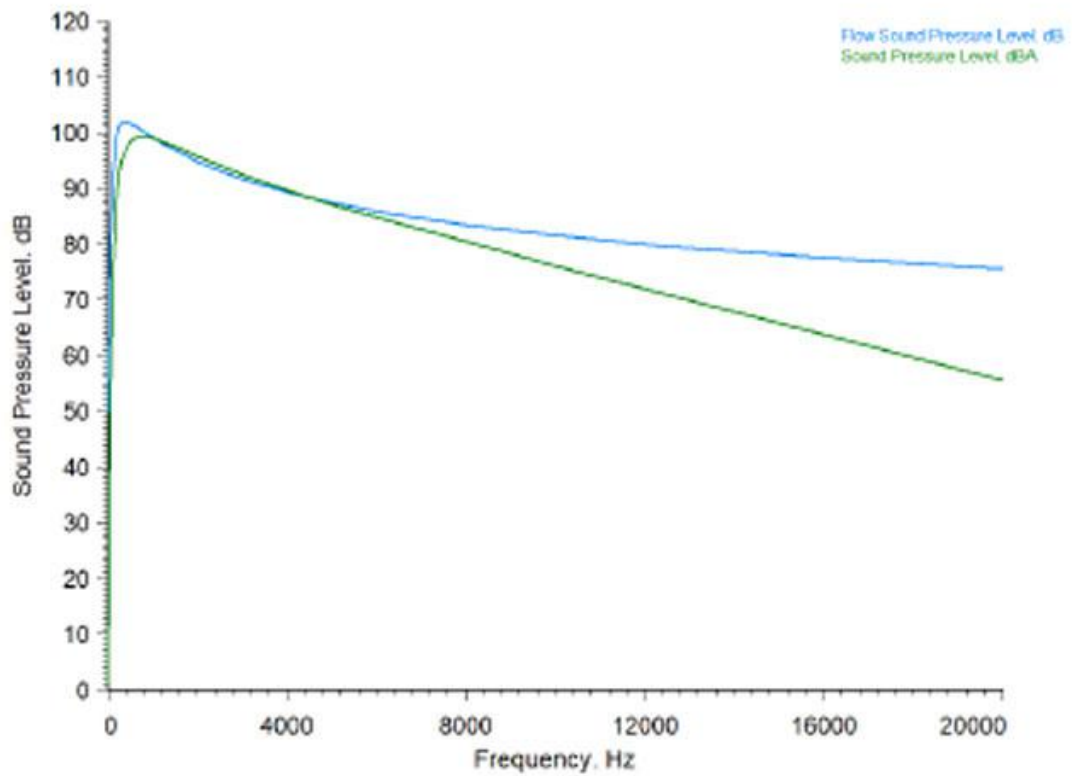


Drill Down into Noise Sources and Attenuation

The noise contours provide multiple displays including vertical profiles, frequency profiles, and attenuation.







Questions?

To ask questions or get help from our highly trained technical support experts, please contact us at 1.844.ioMosaic or submit a ticket to our online support center. We'll be glad to assist.

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