

SOUND EMISSIONS REDUCTION

Cooling Towers

Sound emissions reduction

The increasing demand for acoustic impact reduction (both in the civil and industrial fields) in recent years has led us to the development of several technical solutions to reduce noise emissions from their units.



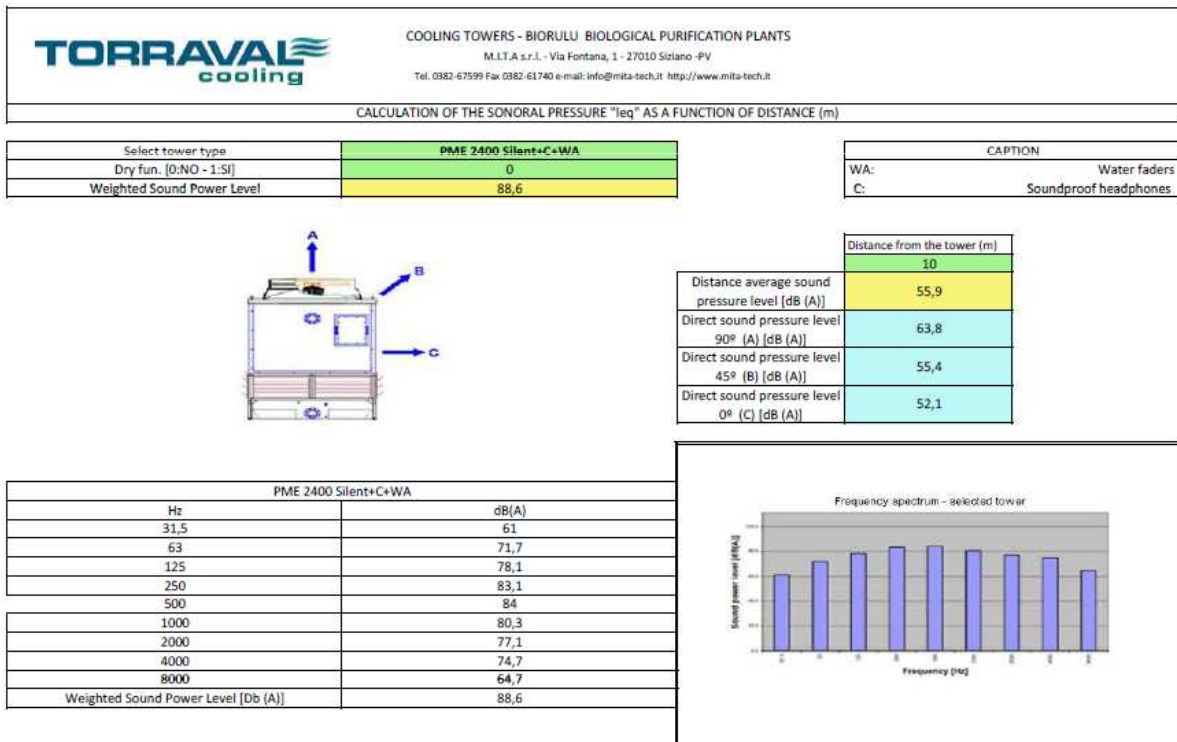
The values related to the sound emissions of all the cooling towers of TORRAVAL are collected and measured in



accordance with **ISO 3744** and **EN 13487** (*) standards. The measurements and been made in cooperation with an acoustical consulting firm enrolled in the "**Assoacustici**" register.

MITA Group makes use of a computer program especially developed for its cooling towers in cooperation with a company experienced in developing noise reduction solutions and software for vibro-acoustic analysis.

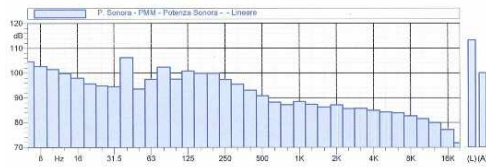
Software for the calculation of sound levels



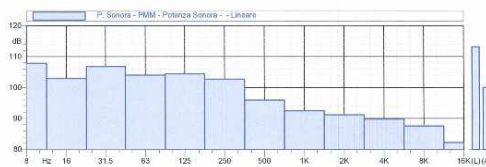
Sound power level measured in accordance with ISO 3744; Surveys conducted in the free field and in the absence of background noise, with medium hydraulic load. Average sound pressure levels at the indicated distance, calculated according to EN 13487. Tolerance in values +/- 2 dB (A)

Measured sound power level report

 	Data: 17.11.2008	Mita S.p.A. - Torre PMM	Rif. 488 rev. A
	Area: Torre PMM - Calcolo Potenza sonora 9-2152 m ²		
POTENZA SONORA lineare LW: 113,2 dB			



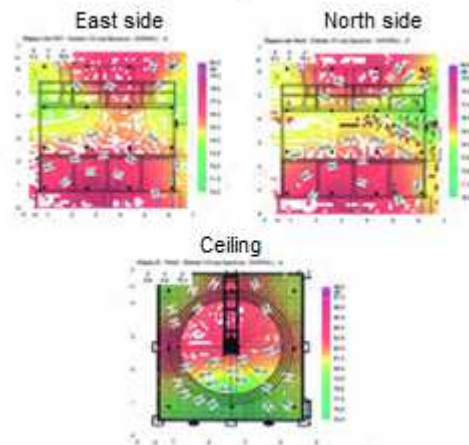
P. Sonora - PMM Potenza Sonora - Lineare							
Hz	dB	Hz	dB	Hz	dB	Hz	dB
8 Hz	102,7 dB	10 Hz	101,5 dB	12,5 Hz	99,8 dB	16 Hz	98,1 dB
20 Hz	99,8 dB	31,5 Hz	98,9 dB	40 Hz	100,2 dB	50 Hz	97,6 dB
63 Hz	102,3 dB	100 Hz	97,6 dB	125 Hz	100,9 dB	160 Hz	99,9 dB
200 Hz	97,4 dB	315 Hz	95,5 dB	400 Hz	93,1 dB	500 Hz	90,8 dB
630 Hz	87,9 dB	1000 Hz	86,5 dB	1250 Hz	87,4 dB	1600 Hz	86,3 dB
2000 Hz	85,7 dB	3150 Hz	85,7 dB	4000 Hz	85,0 dB	5000 Hz	84,2 dB
6300 Hz	82,7 dB	10000 Hz	81,6 dB	12500 Hz	80,1 dB	16000 Hz	77,2 dB
						20000 Hz	71,8 dB



P. Sonora - PMM Potenza Sonora - Lineare							
Hz	dB	Hz	dB	Hz	dB	Hz	dB
8 Hz	102,7 dB	10 Hz	101,5 dB	12,5 Hz	99,8 dB	16 Hz	98,1 dB
20 Hz	99,8 dB	31,5 Hz	98,9 dB	40 Hz	100,2 dB	50 Hz	97,6 dB
63 Hz	102,3 dB	100 Hz	97,6 dB	125 Hz	100,9 dB	160 Hz	99,9 dB
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2000 Hz	85,7 dB	3150 Hz	85,7 dB	4000 Hz	85,0 dB	5000 Hz	84,2 dB
6300 Hz	82,7 dB	10000 Hz	81,6 dB	12500 Hz	80,1 dB	16000 Hz	77,2 dB
						20000 Hz	71,8 dB

Colled sound emissions

— South side (bombs)



The main noise sources of a cooling tower are:

- The motor-fan group
- The circulating water

The motor-fan group produces low-frequency sound emissions that spread in the distance; while the circulating water produces high-frequency noise which can be heard above all near the towers.

TORRAVAL offers specific solutions suitable to reduce the sound emissions produced by both these noise sources.

The silenced version of cooling towers are equipped with:

- Low rpm electrical motors, directly coupled with special aerodynamic profile blades impellers.
- Soundproof sheathing
- Water attenuators (polypropylene panels)
- Air inlet silencers.

Motor-fan group

Low rpm electrical motors (with subsequent tip speed reduction of the blades).

Impellers (fans) with special blades profiles.



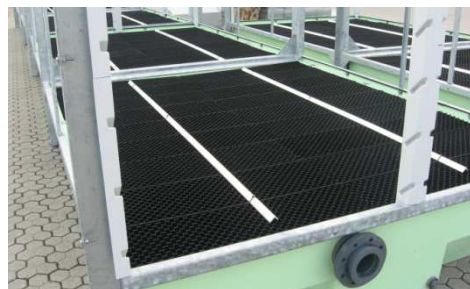
Soundproof sheathing

Internal tower lining, sound proof material consisting of high density vulcanized rubber grains.



Water attenuators

Polypropylene panels, to deaden the noise of the falling water, fixed on a suitable hot dip galvanized frame.



Air inlet silencers

Air inlet silencers with soundproof material. Stainless steel frame. Silencers made of galvanized steel sheets or stainless steel; easy to remove.

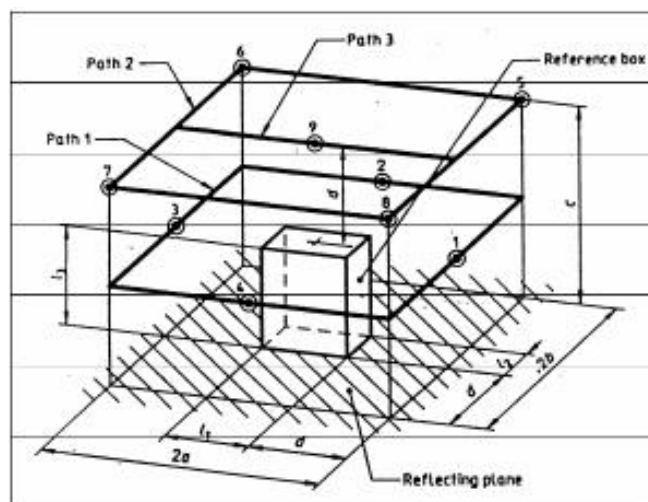


UNI EN ISO 3744 – Sound Power Level Assessment of the noise sources by means of measurements of sound pressure:

The standard requires that the unit leans on a reflecting plane surface and that the field is essentially free.

These test conditions can be easily achieved outdoor, far from walls and obstacles.

The method provides for a measurement of the sound pressure level gathered on a special given surface (grid) around the unit, in order to determine the sound power level.



UNI EN 13487 – Heat exchangers – Forced convection air cooled refrigerant condensers and dry coolers – Sound measurement – Annex C Standard method for calculating the sound pressure level.

The standard provides for the rules to calculate the average sound pressure level of the unit at a given distance.



TORRAVAL
cooling

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