

Detailed description of database

The dataset contains single measurements at different public sites and workplaces in Europe. The data has been used or obtained in the context of the project 15HLT03 “EarsII” from the EMPIR-programme.

For each measurement metadata is available. This includes the measurement circumstances and involved machinery, a description of the measurement location and noise reduction measures, the microphone position during measurement, the measurement procedure used to obtain the measurement data. If metadata is not available or cannot be provided univocally, fields are marked by “n/a”.

For an individual measurement, only a subset of the presented measurement quantities is assessed, depending on the measurement purpose, the measurement device and other factors. Empty cells for measurement data indicate that the corresponding quantity is not available for the considered measurement.

The presented dataset has been anonymized in a way that a deduction of the measurement location or company is not possible. Data, that has been taken out of the dataset only for anonymization reasons is marked by the entry “a”.

Measurement methods “Ears II workplace” and “Ears II public” are based on VDI 3766 [4]. Modifications to VDI 3766 include especially the interdiction of stationary measurements and an increase in the length of sample measurements for machines with pulsed operation mode. More details on the method “Ears II workplace” can be found in [1]. More details on the method “Ears II public” can be found in [2].

All sound pressure level quantities are measured in dB re $2 \cdot 10^{-5}$ Pa.

Measurements No. 1 – 139 and 152 – 274 were performed at the same machine and day but with different measurement devices and staff.

Datasets No. 155 – 263 have contributed to the evaluation of [3].

Table 1: Description of the parameters and metadata that can be associated with each single entry of the dataset.

Denomination of table column	Description
Number	Unique number for identification of each entry
Type of device	Type or category of ultrasonic machine
Manufacturer	Manufacturer or brand of ultrasonic machine
Type designation	Type designation of ultrasonic machine
operation mode	Description of the operating mode of the machine, e.g. pulsed, continuous, manually triggered, automatic
location	‘Workplace’ or ‘public site’
Noise reduction measures	Description of noise reduction measures found at the location, if any. E.g. Full encapsulation, hearing protection
Measurement method applied	Method, after which the measurement was conducted, e.g. VDI 3766, Ears II workplace, Ears II public
Measurement point	Description of the measurement point

Microphone position	Description of the exact microphone position, May contain information on height above ground, positioning at a specific side of a subjects head, and others.
Subject present during measurement	Yes: subject present at the workplace during the measurement/ subjects present during measurements at public sites No: Measurements performed at an unoccupied workplace/empty public site
Material (if applicable)	Description of basic material processed by the ultrasonic machine
Lower Cut-off frequency [Hz]	Lower frequency limit of the frequency range on which calculation of sound levels was performed
Upper Cut-off frequency [Hz]	Upper frequency limit of the frequency range on which calculation of sound levels was performed
Working frequency [Hz]	Working frequency of the ultrasonic machine either measured or declared
Subharmonics in audible frequency regime	Yes: The Z-weighted sound level of the third octave band (TOB) containing the halved working frequency is noticeably higher than the levels of the neighbouring TOB. This applies only to TOB in the audible frequency regime (16 Hz - 16 kHz). No: The Z-weighted sound level of the third octave band (TOB) containing the halved working frequency is not noticeably higher than the levels of the neighbouring TOB. This applies only to TOB in the audible frequency regime (16 Hz - 16 kHz).
LAUeq [dB]	Equivalent continuous sound pressure level in frequency weighting A combined with frequency weighting U [7] measured at the specified location
LZeq [dB]	Equivalent continuous sound pressure level in frequency weighting Z [5] measured at the specified location
LUltraeq [dB]	Equivalent continuous sound pressure level in frequency weighting Ultra [6] measured at the specified location. 'Ultra' refers to a frequency weighting complementary to the U-weighting and thus supports only frequencies higher than 16 kHz.
LAeq,afr (16Hz-16kHz) [dB]	Equivalent continuous sound pressure level in frequency weighting A [5] and restricted to the audible frequency regime between 16 Hz and 16000 Hz measured at the specified location
LZpeak [dB]	Highest peak pressure level in frequency weighting Z [5] measured at the specified location

LCpeak [dB]	Highest peak pressure level in frequency weighting C [5] measured at the specified location
LEXAU,8h [dB]	Daily noise exposure level in frequency weighting AU [4] for the considered workplace
LZThrd,20kHz [dB]	Equivalent continuous sound pressure level in frequency weighting Z [5] for TOB with center frequency 20000 Hz.
FUltraEqMaxTOB [Hz]	Center frequency of TOB that supports LUltraeqMaxTOB
LUltraeqMaxTOB [dB]	Sound pressure level of TOB with maximal equivalent continuous sound pressure level in frequency weighting Ultra
FAeq_afr_16Hz_16kHzMaxTOB [Hz]	Center frequency of TOB that supports LAeq_afr_16Hz_16kHzMaxTOB
LAeq_afr_16Hz_16kHzMaxTOB [dB]	Sound pressure level of TOB with maximal equivalent continuous sound pressure level in frequency weighting A, restricted to the audible frequency regime between 16 Hz and 16000 Hz
Date [y]	Year in which the measurement was conducted
Comment	Provides additional information on the measurement

Literature:

- [1] Ullisch-Nelken, C., Wolff, A., Schöneweiß, R., Kling, C. A measurement procedure for the assessment of industrial ultrasonic noise. Conference proceedings of the 25th International Congress on Sound and Vibration, ICSV 25, 2018.
- [2] Fletcher, Mark D., et al. "Public exposure to ultrasound and very high-frequency sound in air." The Journal of the Acoustical Society of America 144.4 (2018): 2554-2564
- [3] Kusserow, H., Wolff, A. Analysis of the noise exposure and the distribution of machine types at ultrasound-related industrial workplaces in Germany. Acta Acust united Ac Vol.105 No. 5., p. 733, 2018.
- [4] VDI 3766:2012 Ultrasound — Work place — Measurement, assessment, judgement and reduction
- [5] IEC 61672-1:2013 Electroacoustics – Sound level meters – Part 1: Specifications
- [6] Infrasound and ultrasound filter set type 1627. Instruction manual. Hrsg.: Brüel & Kjaer 1985
- [7] IEC 61012:1990 Filters for the measurement of audible sound in the presence of ultrasound