Note

Project	Develop and implement harmonised noise assessment methods		
Concerns	Source Modules Industry – Architecture		
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1. Introduction

This report gives the architecture for the implementation of the source model for industrial sources as described in Chapter V of the JRC Reference Report "Stylianos Kephalopoulos, Marco Paviotti, Fabienne Anfosso-Lédée (2012), Common Noise Assessment Methods in Europe (CNOSSOS-EU), EUR 25379 EN".

The source model calculates the source power of an industrial source for a given period of time in hours (T_0) and for a given direction relative to the source. Typically calculations are performed for day, evening and night period. Values like length of reference period differ for these periods, which length could also be influenced by different meteorological classes.
This however is outside the scope of the source model. The source model will only describe the calculation of the source power for a given hour under given conditions.

Chapter 2 gives the input and output for relevant formulas in the source model.

2. Break down of the formulas

2.1 Calculation of source power

Input values:	
• L_w	Source power per octave
• C_W	Correction for the working period [dB]
• $\Delta L_{W,dir,xyz}$	Directivity values per octave [dB]
Output values:	
• $L_{W,dir}$	

2.2 Correction for the working period

For point-, line- and area- sources:

Input values:	
• T_0	reference period of time [h]
• t	active source time per period [h]
Output values:	
• C_W	

For moving vehicles:

Input values:	
• V	Speed of the vehicle [km/h];
• n	Number of vehicles passages per period [-];
• l	Total length of the source [m];
Output values:	
• C_W	

Formula to calculate C_W for moving vehicles:

$$C_W = -10 \times lg\left(\frac{l \times n}{1000 \times V \times T_0}\right)$$

2.3 Directivity

Input values:	
• *(x, y, z)*	Vector defining the direction from the source
• ω, φ	Vertical and horizontal angle for line sources
Look-up table:	
• *DI*	Table with directivity information
Output values:	
• $\Delta L_{W,dir,xyz}$	Directivity values per octave [dB]

Remarks:

- For area source no directivity is assumed;
- For line sources directivity is related to the direction of the line source.

Look-up table with directivity information.

Most commercial software provide 2D directivity that always assumes that the source is symmetrical (rotational symmetrical directivity around an axis) which only requires values between 0° and 180° to be entered with a certain resolution (e.g. 10°).

Due to the large spread in industrial sources a higher detail for directivity should be possible, enabling the definition of a full spherical directivity requiring values for horizontal and vertical angles.