



# Exposure of calves to noise in dairy farms

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Young calves need rest even 70-80 % of their daily time.

Noise control is needed?

## Introduction

In Northern Europe, calves are usually housed in same stalls as dairy cows. Noise levels in modern highly automated stalls are increasing, which may be a risk to animals' welfare. Young calves need rest even 70-80 % of their daily time. Noise may affect sleep and increase nervousness and inappetance. Scientific knowledge and e.g. Finnish legislation suggest that farm animals should not be continuously exposed to noise over 65 dBA. We measured noise exposure of 1-3 months old dairy calves at in modern production environments.

Farm animals should not be continuously exposed to noise over 65 dBA. But ... !

## Methods

The study was conducted in ten randomly selected free stalls of 40 to 80 cows. Equal sound pressure levels in third-octave bands between 20 Hz and 20 kHz and A-weighted for every 1s, 10s, 1min, 10min (Figure 1) were measured using a calibrated sound analyser (Nor 121; Norsonic) with a 1/2" condenser microphone. In the sound level calculations, C-weighting ( $L_C$ ) and H-weighting ( $L_H$ ) were also used. These weightings are based on the audiograms and hearing thresholds of the cow ( $L_C$ ) and human ( $L_H$ ). The occurrence of high frequency sounds (>20 kHz) were also studied.

Calves were exposed to noise of over 65 dBA for 30 % of the day!

## Results

Most parts of noise bouts lasting ten seconds were between 60 – 65 dBA (Table 1). The average background noise levels were 62.1 dBL<sub>H</sub> and 58.7 dBL<sub>C</sub>. The levels were 59.3 dBL<sub>H</sub> and 56.5 dBL<sub>C</sub> for ventilation, 87.3 dBL<sub>H</sub> and 80.8 dBL<sub>C</sub> for feeding, 61.4 dBL<sub>H</sub> and 62.4 dBL<sub>C</sub> for milking, and 59.0 dBL<sub>H</sub> and 58.0 dBL<sub>C</sub> for manure removal. At high frequencies (2 – 10 kHz)  $L_H$  gives lower sound level compared to  $L_C$ . Calves were exposed to noise of over 65 dBA for 30 % of the day. The spectra of sounds decreased sharply close in high frequencies.

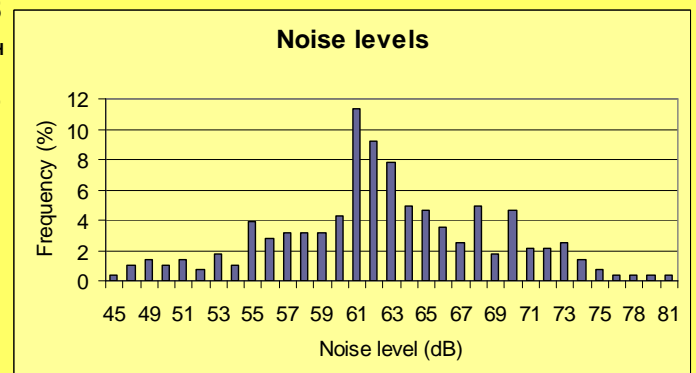


Table 1. C-weighting ( $L_C$ ) and H-weighting ( $L_H$ ) noise levels in calf pens calculated from 1 s lasting noise bouts.

Noise-source	$L_H$ (dBA)	$L_C$ (dBC)	Min	Max	SD
Background	62,1	58,7	46	74	5,0
Ventilation	59,3	56,5	46	67	5,0
Feeding	87,3	80,8	54	90	8,0
Milking	61,4	62,4	56	72	3,0
Manure handling	59,0	58,0	50	70	4,2

Figure 1. Equal H-weighted (audiogram and hearing threshold of human) noise pressure levels in free stall measured 10 min bouts.

Noise level in calf pens was so high that noise control should be put into action. The occurrence of high frequency noise was rare in the stalls.