

IS ODOUR INTENSITY ALL IT'S CRACKED UP TO BE?

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Abstract

Odour intensity has recently found favour in some Australian state odour policies. We consider the implications of adopting odour intensity rather than odour concentration criteria for estimating the necessary separation distances to avoid odour nuisance, using source measurements at a modern integrated meat processing plant. The sources have quite different concentration-intensity relationships. Concentration criteria from various states yield a four-fold difference in the recommended buffer distances if linear addition of odour components is assumed. Odour intensity can be used as a design goal for new industries to limit the occurrence of distinct or weak odours in sensitive areas. We have found that using this distinct criterion yields generally smaller separation distances than conventional concentration criteria. Choosing weak rather than distinct odour almost doubles the separation distance. The results for the case study are relatively insensitive to the assumptions of source additivity or the use of individual or facility-average intensity relationships, as results are dominated by one source.

Whilst there are some advantages to odour intensity, the coping ability of the community and hedonic tone are also likely to be critical (otherwise laboratory intensity measurements may be misleading). An alternative approach based on community-dependent response functions and hedonic tone is outlined.

Keywords: Odour intensity, multiple sources, odour guideline, critical odour concentration.

1. Introduction

Odour intensity is the latest buzz word in the odour field, but what does it mean for industry and for the future of odour regulation in Australia? Odour intensity is not a new concept; models of the relationship between the magnitude of a stimulus and the level that is perceived by the senses date from the 1950's. Several Australian EPAs are now accepting or encouraging the use of source-specific intensity-concentration measurements to develop alternatives to their generic odour concentration criteria. Standard methods for measuring odour intensity, such as the VDI methods for field and laboratory measurement of intensity, have been around since the early 1990's.

Odour intensity is commonly cited as one of the six important dimensions of odour that determine odour annoyance, the others being frequency, duration, offensiveness and location and coping ability of the affected community. However, despite all this, most Australian odour regulations and

odour impact assessments are based on odour concentration as a surrogate for intensity. If intensity was used, would our assessments suddenly become more meaningful? We look at what odour intensity is, how it can be used and whether there are any advantages to using odour intensity in odour assessment and regulation. A case study applying odour intensity techniques to the meat processing industry is compared with a traditional odour concentration assessment.

2. What is odour intensity?

Odour intensity is the perceived strength of an odour by an "average" sense of smell. Odour intensity is equivalent to other concepts that relate the general human perception to physical measurements of the stimuli. Similar concepts include the heaviness of an object or the loudness of a sound. Odour intensity differs from odour concentration in the same way that loudness differs from the vibrational energy that produces sound waves. Humans can perceive stimuli across a very