

Reducing ‘kerbside’ glass collection noise risks in the waste and recycling industry

Introduction

1 This guidance was written in consultation and with the support of the Waste Industry Safety and Health Forum (WISH). It is aimed at:

- managers who decide which collection methods are to be used;
- managers with responsibilities for the operational aspects of glass collection;
- designers and manufacturers of glass collection equipment;
- buyers of such equipment.

2 The document focuses on reducing the noise risks associated with the kerbside collection of glass for recycling. Although it does not cover the bulk ‘trade collection’ of glass, some of the principles outlined should be considered and could be used when carrying out such collections.

3 Workers carrying out kerbside collection of glass for recycling can be exposed to high levels of noise. It is highly likely that workers’ daily personal noise exposures will exceed 85 dB (the upper exposure action value of the Control of Noise at Work Regulations 2005)¹ and in some cases daily personal noise exposures may be as high as 100 dB.

4 Workers exposed to these levels of noise are at a high risk of developing **permanent** hearing damage. The law requires that employers must:

- put in place technical and/or organisational measures to eliminate or minimise risks from noise; and
- reduce noise exposure to the lowest reasonably practicable level.

Factors affecting the level of noise exposure

5 Workers collecting recyclable material from households can be exposed to noise from a number of sources, including the running noise of the collection vehicle and noise from any auxiliary equipment. However, when glass is collected into dedicated receptacles, this noise is likely to be the dominant source of exposure. Examples include the manual tipping of glass items into collection receptacles such as:

- troughs on a sideloader vehicle; or
- stillages on a collection vehicle; or
- wheeled bins used as intermediate (slave) receptacles.

6 Levels of noise exposure for individual employees will depend primarily on the amount (volume/weight) of glass processed, and also on the speed of working.

Legal duties: Control of Noise at Work Regulations 2005.¹

7 Employers should aim to eliminate or minimise risks from noise exposure so far as is reasonably practicable. Where any employee's daily personal noise exposure exceeds the upper exposure action value (85 dB), employers should use organisational or technical measures to reduce noise exposure to as low a level as is reasonably practicable.

8 Where daily personal noise exposures are found to be at or above 87 dB (the exposure limit value set out in the above Regulations) you must take immediate action to prevent this level of exposure being exceeded again. Work should not continue until you can ensure that effective daily personal noise exposures are below 87 dB, through organisational and technical noise control measures and the use of personal hearing protection.

9 The Regulations place further duties in respect of personal hearing protection, information, instruction and training for employees, and health surveillance. Further information on the requirements of the Control of Noise at Work Regulations can be found in the free leaflet *Noise at work: Guidance for employers*² and in the priced publication *Controlling noise at work*.³

Risk assessment

10 Employers engaged in kerbside collection of glass for recycling should carry out a risk assessment for noise, which should include an estimate of daily personal noise exposure of employees for comparison with the action and limit values set out in the Control of Noise at Work Regulations 2005.

11 Where glass is being collected and manually tipped or sorted into collection vehicles employees will almost certainly be exposed to noise in excess of the upper exposure action value.

12 Noise levels associated with glass tipping 'events' are shown in Table 1, with corresponding daily personal noise exposures for various numbers of events. The values in the table have been gathered from field studies of kerbside glass collection activities, and represent the noise level at the ear of the worker. In this context, 'event' means the act of emptying a single kerbside container in to the collection receptacle; it does not include the emptying of the trough into the body of the vehicle.

13 A range of levels is shown for each type of event since the amount of glass in each container may vary, and the mix of materials in a container will affect the working method adopted by the employee (see below). The 'typical' value is considered to be representative of the activity.

14 The data in Table 1 should be sufficient for you to estimate noise exposure based on your collection type and number of noise events that each employee is exposed to per day. You can make your own measurements of noise for the purposes of confirming noise exposure at your operations especially if they vary significantly from those described.

Table 1 Typical noise levels from glass collection activities and personal noise exposure based on number of events

Glass collection type		Typical single event noise level (L_{AE}), dB	Daily noise exposure $L_{EP,d}$, dB (noise exposure points*)			
			50 events/day	100 events/day	200 events/day	500 events/day
Co-mingled glass/ plastic/cans, sorted at vehicle	Collection to metal troughs on sideloader vehicle	111 (range: 102–116)	83 (65)	86 (130)	89 (250)	93 (630)
	Collection to metal stillages on collection vehicle	110 (range: 98– 114)	82 (50)	85 (100)	88 (200)	92 (500)
Glass only	Collection to metal troughs on sideloader vehicle	117 (range: 111–119)	89 (250)	92 (500)	95 (1000)	99 (2500)
	Collection to 'slave' wheeled bins (glass only)	115 (range: 104–120)	87 (160)	90 (320)	93 (630)	97 (1600)

* Noise exposure points provide a simple way of expressing personal noise exposure. Exposure points for individual tasks can be added together. For example, in the table above, noise exposure from 300 events per day can be found by adding the exposure points for 100 and 200 events. The total exposure points for a working day can be converted to daily personal noise exposures ($L_{EP,d}$) as follows: $L_{EP,d}$ 80 dB/32 points; 85 dB/100 points; 87 dB/160 points; 90 dB/320 points; 95 dB/1000 points.

Measures to eliminate or reduce risks

Employer

15 The Control of Noise at Work Regulations 2005 require the elimination of noise risks, or reduction of noise risks and noise exposures to as low a level as reasonably practicable. Employers should consider the following measures and should implement them as far as is reasonably practicable.

- **Alternative working methods.** Employers should consider alternative working methods and collection strategies which eliminate or reduce the risks from noise. Remember that changing glass collection systems may have implications other than on the health and safety of employees. Methods of collecting glass that do not require the glass to be manually tipped or sorted at the kerbside will remove a significant source of noise exposure, and employers should consider these in developing recyclable collection strategies. Field studies suggest that glass-only collection can result in significantly higher noise exposures than co-mingled, kerbside-sorted collection using existing methods. It is likely that changing from glass-only to multi-material collection would reduce noise exposure for employees. However, kerbside-sorted collection is itself a significantly noisy activity and further measures to reduce exposure, such as described below, would probably be required.
- **Choice of work equipment.** Where possible, choose equipment that produces the least amount of noise. Discuss noise with your plant/machinery suppliers, and take account of the likely noise levels produced under conditions of intended use.

Suppliers of machinery have a legal duty to design their machinery for lowest noise emissions, and to provide information on the noise emitted (see below). Note that some recycling vehicles may be marked with sound power levels as required by legislation relating to environmental noise emissions. These noise values are not meaningful in relation to occupational noise exposure arising from use of the vehicles in roadside glass collection. Suppliers should provide useful, representative noise information for users, based on a suitable noise test method, which may be of their own devising.

- **Modifications to existing work equipment.** The noise has been shown to be dominated by glass-glass impacts, so the most effective engineering modifications to existing work equipment would be those that reduce impact noise (slowing speed of collisions between glass items) or provide barriers to airborne sound.

Some employers have reported success in lining collection receptacles with resilient material, and providing flaps that reduce the speed of glass as it enters the receptacle. Tests under controlled conditions⁴ have shown that modifications of these types when combined, and used in conjunction with good practice working methods, can give reductions in overall noise level of 5 to 9 dB, when compared with standard metal collection receptacles. This represents a reduction in noise level of approximately 70 to 85%.

Modifications of this type are likely to result in slightly reduced capacities of collection receptacle, both because the volume of the receptacle will be reduced and because of the reduced amount of breakages.

Employers adopting these type of engineering control measures should ensure that such modifications are used and maintained (eg replace linings if they wear out, and make sure employees make use of any measures put in place).

- **Work rotation.** Reducing the number of glass collection operations carried out by an employee can also lower their exposure to noise. This method is not likely to produce significant benefits on its own, but may be a useful additional option. Reducing the number of operations carried out by 30% would lower noise exposure by approximately 2 dB. A 50% reduction would lower exposure by 3 dB.

- **Working methods.** The working method adopted by employees can affect noise exposure.

Depositing of glass to the collection receptacle can be done in a rapid/forceful ('fast') or more controlled ('slow') manner. 'Fast' depositing produces generally higher noise levels than 'slow' depositing, becoming increasingly higher for individual deposits as the collection receptacle becomes fuller. Tests under controlled conditions have shown that the benefits of resilient linings and flaps on collection receptacles are not fully realised where a 'fast' depositing method is used.

Employers should instruct employees to avoid 'fast' depositing methods and ensure, through supervision, that recommended working methods for reduced noise exposure are used.

Supplier

16 Suppliers of machinery for use at work have duties, under the Supply of Machinery (Safety) Regulations 1992, as amended,⁵ to design and construct machinery so that noise emissions are reduced to the lowest level, taking account of technical progress and the availability of means to reduce noise at source. The supplier should anticipate the intended use of the machinery, and provide features in the design that aim to minimise the noise generated during use.

17 Where it is known that recycling collection vehicles and equipment will be used to collect glass and other materials that are liable to generate noise in their collection, then this should be taken account of in the design. For example, the engineering modifications to existing machinery described above (resilient linings to collection receptacles etc) will be equally applicable to the design of new

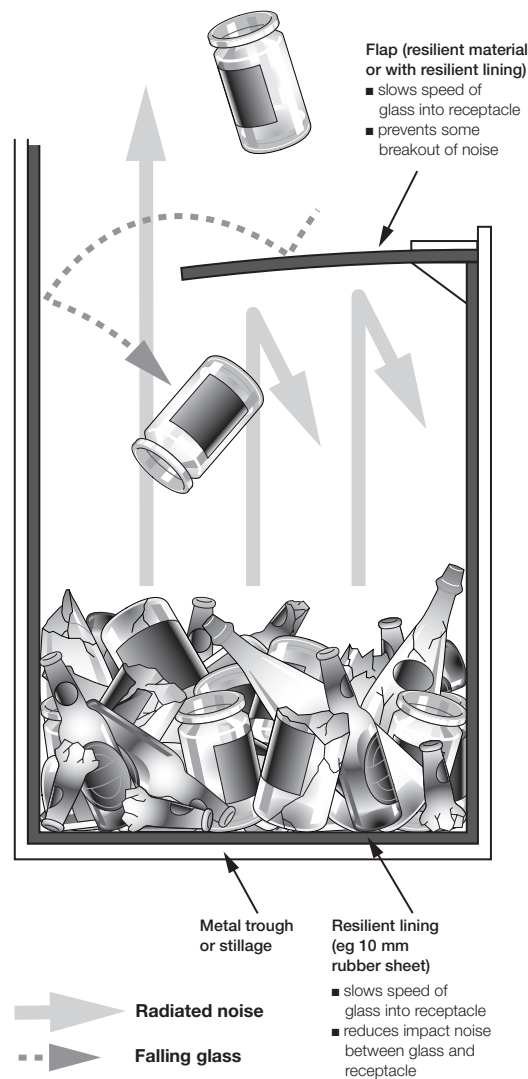


Figure 1 Design of collection receptacles for reduced noise

machinery. Information should be provided on the noise emitted by the machinery or equipment under condition of typical use in order to inform potential purchasers of risks, and allow decisions to be made on the suitability of equipment.

18 Buyers of machinery (including vehicles) for kerbside glass collection should expect suppliers to have incorporated design features which reduce the noise generated by glass bottles, jars etc being deposited into collection compartments.

19 Ask potential suppliers about the design features that have been incorporated, and whether they have information about anticipated noise levels during the activity. If they have discharged their legal duties, they will have such information to hand. Their answers may influence your confidence as to whether you will be able to carry out your work activities while fulfilling your legal duties to ensure the health of employees.

Personal hearing protection

20 Where employees' daily personal noise exposure exceeds 85 dB, they must be supplied with personal hearing protection, which must be worn fully and properly.

21 The law does not allow hearing protection to be used as an alternative to controlling noise exposure by other means (as described above). It should be used to protect employees' hearing while noise control measures are being developed, and it may be still be necessary to rely on hearing protection after noise exposures have been reduced to as low as reasonably practicable through other means.

22 The working environment during kerbside collection presents a number of risks to safety, including working around moving vehicles and working on the public highway. The use of personal hearing protection has the potential to increase these risks by masking important sounds, and by inducing a sense of isolation from the general working environment. It is therefore necessary to consider these issues, both when selecting personal hearing protection and devising systems of work. Consider the following issues:

- Choose hearing protection that reduces daily personal noise exposures to at least below 85 dB, and ideally below 80 dB – the level of protection required depends on the actual noise exposure.
- Provide systems of work to ensure that hearing protection is only worn during noisy activities and is not worn when it is not needed.
- Assess the risk of introducing broken glass into the ear, and minimise it by selecting an appropriate type of protector and through systems of work, instructions and training.
- Where it is not possible to avoid crossing designated roads, you can minimise additional risks from the use of personal hearing protection by considering and implementing, as appropriate, the following options:
 - introduce a system of work that includes a requirement to remove hearing protection prior to attempting to cross a road;
 - in conjunction with the system of work above, provide hearing protectors that are simple to remove and replace as required, for example canal caps or earmuffs;
 - provide 'level-dependent' (sometimes called 'amplitude-sensitive') hearing protectors which are designed to protect against hazardous noise while permitting quieter sounds to be relayed to the wearer in the absence of high noise levels;
 - provide 'flat frequency response' hearing protectors which can, in some situations, improve the ability of wearers to hear certain sounds such as speech communication, warning signals and other informative sounds.
- In all cases, employees using personal hearing protection must be given information, instruction and training that should cover how to obtain personal hearing protection from the employer, its correct use and requirements for maintenance.
- Employees should also receive training in any systems of work designed to facilitate the full and proper use of hearing protection in the particular working environment. This training should be in addition to any other training provided with regard to noise, as described above.
- Employers should provide appropriate supervision to ensure that hearing protection is being worn, and that systems of work are being followed.

Health surveillance

23 All employees whose daily personal noise exposure frequently exceeds 85 dB, or whose hearing is at risk, should be provided with health surveillance for hearing damage. This should include a baseline hearing check on first entering a noisy job, annual checks for two years, and then regular checks at three-yearly intervals. Further advice on health surveillance can be found in the HSE publication *Noise at work: Guidance for employers on the Control of Noise at Work Regulations 2005*.²

References

- 1 *Control of Noise at Work Regulations 2005* SI 2005/1643 The Stationery Office
- 2 *Noise at work: Guidance for employers on the Control of Noise at Work Regulations 2005* Leaflet INDG362(rev1) HSE Books 2005 (single copy free or priced packs of 10 ISBN 978 0 7176 6165 7) www.hse.gov.uk/pubns/indg362.pdf
- 3 *Controlling noise at work. The Control of Noise at Work Regulations 2005. Guidance on Regulations* L108 (Second edition) HSE Books 2005 ISBN 978 0 7176 6164 0
- 4 *Glass recycling: Noise exposure from simulated roadside collection: Follow-up measurements* RR651 HSE Books 2008 www.hse.gov.uk/research
- 5 *Supply of Machinery (Safety) Regulations 1992* SI 1992/3073, as amended by SIs 1994/2063 and 2004/693 The Stationery Office 1992

The Stationery Office publications are available from The Stationery Office, PO Box 29, Norwich NR3 1GN Tel: 0870 600 5522 Fax: 0870 600 5533 e-mail: customer.services@tso.co.uk Website: www.tso.co.uk (They are also available from bookshops.) Statutory Instruments can be viewed free of charge at www.opsi.gov.uk.

Further reading

HSE's noise at work website: www.hse.gov.uk/noise/index.htm

'Glass recycling: noise exposure from simulated roadside collection of recyclable glass' Health and Safety Laboratory HSL/2007/21 www.hse.gov.uk/research/hsl_pdf/2007/hsl0721.pdf

The Waste Industry Safety and Health forum (WISH) exists to communicate and consult with key stakeholders, including local and national government bodies, equipment manufacturers, trade associations, professional associations and trade unions. The aim of WISH is to identify, devise and promote activities that can improve industry health and safety performance.

Further information

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This document contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do.

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