

Compaction equipment

Managing user and public safety



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Summary

This guidance gives advice on:

- the main safety issues at compactors (sometimes referred to as compactor units or packer units); and
- how the risks can be controlled.

It is aimed at employers, managers and supervisors at premises where compactors are used to process materials from a number of different sources. It may also be relevant to users, suppliers, hirers and leasers of this equipment.

It focuses on both the risks to users and members of the public as these units are often placed in areas open to the public.

Introduction

This guidance was produced by the Health and Safety Executive in consultation with the Waste Industry Safety and Health (WISH) Forum.

There is a history of accidents at compactors, involving the public and other users. The guidance identifies the main safety risks associated with these machines, ie machinery safety and container/skip exchange activities, and what should be done to control them. It focuses on compactors on sites open to the public, such as retail premises, offices and civic amenity sites.

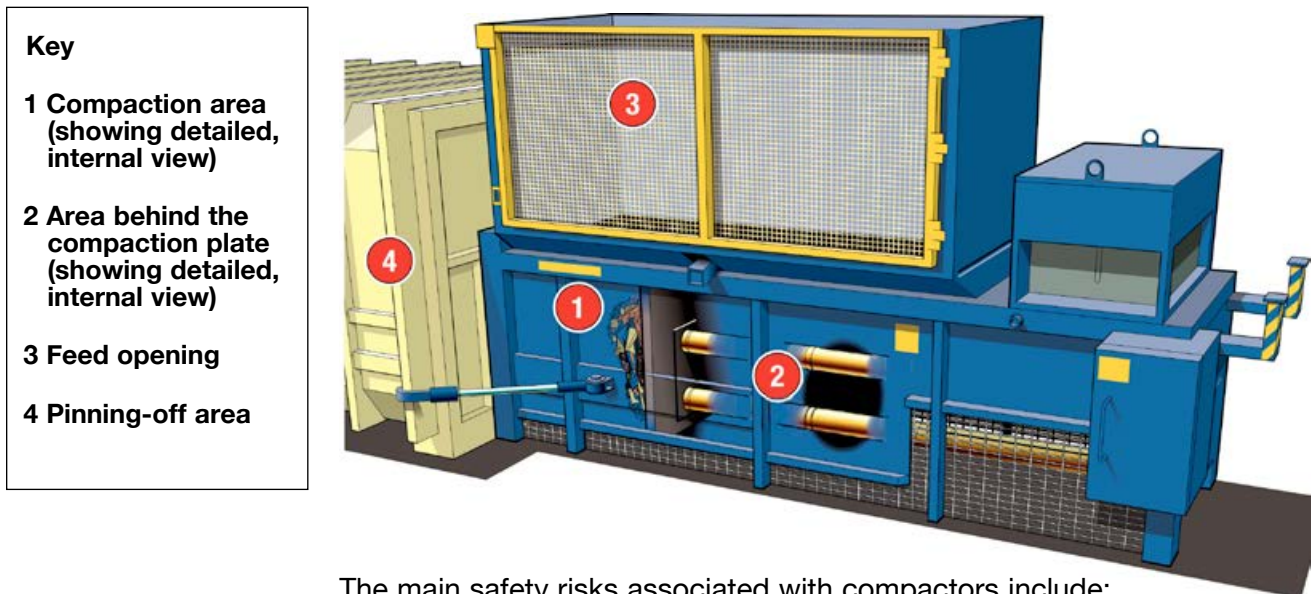
This guidance does not aim to cover all the risks associated with these machines, but does give other sources of information and guidance.

What are the main safety risks?

Compactors normally include a feed inlet, a compaction chamber and an outlet to a container/skip that receives the waste. A reciprocating ram compresses material under automatic or manual control into a container/skip which is later removed for emptying off site. On some portable compactors the waste container is integral to the compaction unit. The feed inlet to the compaction chamber usually includes a hopper that can be loaded by:

- hand;
- lift truck;
- bin lift mechanism for lifting and tipping wheeled bins containing waste;
- conveyor system; or
- chute.

Figure 1 The principal danger areas of a typical compactor



Key

- 1** Compaction area (showing detailed, internal view)
- 2** Area behind the compaction plate (showing detailed, internal view)
- 3** Feed opening
- 4** Pinning-off area

The main safety risks associated with compactors include:

- machinery safety risks from:
 - compaction rams;
 - moving parts;
 - bin lifts;
 - closing lids/doors;
- container/skip exchange activities, ie the risk of being:
 - struck by the vehicle or container;
 - trapped or crushed between the container and a fixed object, eg a wall, particularly if the container is in a restricted area.

If compactors are sited in areas remote from frequent and direct supervision these risks can increase.

Other issues to consider include risks from:

- electrical systems (eg poorly maintained electrics or electrical systems that are not designed to be used in a particular environment, eg outside in the rain);
- ejection of material;
- the materials being compressed (eg pressurised containers, asbestos);
- falls from height;
- slips and trips;
- manual handling;
- noise;
- environmental factors (eg lighting, weather conditions).

For guidance on controlling these risks see 'Further reading' and 'Useful links'.

Who is at risk?

The following people are at risk:

- employees (eg operators, engineers);
- contractors (eg service engineers, container/skip delivery drivers);
- members of the public – authorised (eg placing rubbish in compactors at a civic amenity site) or unauthorised (eg in a shopping centre service area).

How can they be injured?

The main ways in which people can be injured are:

- by falling into the compactor chamber;
- while reaching or climbing into the chamber to retrieve or clear material, the compactor starts up unexpectedly, eg because:
 - sensors register materials or a person in the chamber and automatically start the machine;
 - the machine may appear to have stopped, but when the blockage clears the machine carries on its cycle;
 - the compactor may be operating on a timer and cycle automatically;
 - the compactor was not isolated properly after a malfunction;
- through unauthorised use of the machine (eg by members of the public or untrained employees);
- during compactor or container exchange:
 - being struck by a vehicle;
 - being struck by the container;
 - the container striking overhead power lines;
 - the uncontrolled release of doors;
 - bales of compacted waste falling.

Control measures

Safe site

To ensure a site is safe:

- locate and position compactors to avoid or minimise transport risks and access by unauthorised people (this is particularly important if the unit is located in a public area, such as a shopping centre service area);
- site compactors away from overhead power lines;
- provide lockable fencing around compactors to prevent unauthorised access (the fencing height and design should reflect the risks particular to the unit's location);
- provide adequate lighting (this will help with safe operation and may deter unauthorised access);
- in areas where the public have access, lock the doors to containers/skips at all times when they are not in use, especially 'out of hours';
- keep areas immediately around the unit free from obstructions, accumulated rubbish and other items which may interfere with container/skip exchange activities, or may enable people to use them to access the dangerous parts.

Safe equipment

To keep equipment safe:

- prevent access to dangerous parts of machinery:
 - provide guarding that takes account of routine use, foreseeable problems and misuse;
 - use fixed guards (this includes distance guards on access openings) where possible, but when regular access is required interlocked guards should be fitted;
 - the compactor chamber is a particularly high risk area and interlocked guards should be to a high standard (eg single channel interlock may not be appropriate);
 - eliminate any unnecessary footholds, such as those created by the structure of the compactor, eg by the stiffening ribs;
 - where the equipment is situated in public areas additional precautions may need to be taken, eg reduce gaps in guarding to prevent children gaining access to dangerous parts of machinery;
- keep all guarding and any interlocking devices adequately maintained;
- secure the controls effectively so that unauthorised operation is prevented (eg with effective electrical isolation, lockable controls (lock-off) and/or dedicated key operation);
- ensure that any internal controls (ie inside a building) cannot override external controls; this is particularly important during container exchange;
- where a bin lift is used to load the unit:
 - fix guards to the hoistway to prevent access to the danger zone (guards should be high and wide enough to prevent access to the danger zone from the control panel when the bin lift is operating);
 - fit an interlocked gate in this enclosure to allow the bin to be put in place and removed;
 - controls should be 'hold-to-run' (where release of the controls at any time during the lifting cycle should stop the movement of all machinery immediately) and located outside the enclosure, away from bin lift movement;
- there should be instructions on basic use on the compactor unit itself – users may not have access to operating manuals;
- signs and instructions on the units should be simple and bold (eg pictograms) to take account of possible use by people who don't have English as their first language;
- all signs and instructions on units should be kept clear and legible.



Safe working procedures

Safe working procedures should be put in place taking account of:

- information from the compactor manufacturer and/or supplier on safe use;
- the compactor type and construction;
- the compactor's location;
- the environmental conditions;
- who will use it;

- who will maintain it;
- any other relevant circumstances for dealing with routine and non-routine activities, especially container/skip exchange and clearing blockages.

Safe procedures for container/skip exchange activities

Access to the compactor is required to collect the container or lift the whole unit (porta-packers). Safe working procedures should include arrangements for:

- segregating vehicles and pedestrians where possible;
- keeping the area around the units clear (eg free from parked cars, bins and waste):
 - by providing fencing, bollards, painted lines etc to help keep the area clear for collection;
 - before the servicing vehicle arrives, if necessary, temporarily keeping the area clear by using cones, bunting, signs, etc;
- excluding members of the public and any non-essential staff from the area during this activity – if possible, choose a time of day when no-one is around;
- ensuring that any workers who help with reversing activities:
 - are trained **banksmen** (signallers) or **reversing assistants** (see below);
 - wear high visibility clothing;
 - agree with the driver their positioning and their system of signalling;
 - remain in clear view of the vehicle driver at all times. If the driver loses sight of them at any time the driver should **stop**.

A **trained banksman (signaller)** can be used both to keep the reversing area free from pedestrians and to guide drivers, particularly where lifting operations are also involved. More information on the use of a banksman/signaller can be found on HSE's website at www.hse.gov.uk/workplacetransport/information/reversing.htm.

A **reversing assistant** is a trained employee who plays an active part in reversing manoeuvres by giving pre-arranged hand signals to drivers. Their role is to stop collisions by preventing the vehicle colliding with people and other road users. More information on the use of reversing assistants can be found in the HSE waste information sheet *Waste and recycling vehicles in street collection* (see 'Further reading').

Safe procedures for clearing blockages

Dealing with blockages should be well thought out, practiced and subject to a written safe working procedure. If access is required to the compaction chamber, ram and other dangerous parts of machinery, some companies find it useful to use a permit-to-work as part of the safe system of work. This identifies:

- the work to be done;
- who is trained and authorised to carry out the work;
- the precautions to take, including procedures to ensure that stored energy is dissipated and that parts that may descend under gravity are propped or secured;
- a properly trained and authorised person who will authorise, check and sign off the permit-to-work.

You may decide that you do not have sufficient expertise in house and have to rely on specialist contractors, the machinery supplier or another competent external party to deal with blockages. As an employer, you

still have a responsibility to manage the health and safety of those contractors on site.

Safe user

To keep users safe:

- ensure compactors are operated only by suitably trained staff;
- ensure training covers safe working procedures including:
 - how to operate all the equipment (including any 'add-ons' such as bin-lifts);
 - identifying and reporting defects;
 - what can cause blockages (ie which materials are suitable/unsuitable as feedstock);
 - what to do if a defect or blockage is found;
 - the use of a reversing assistant or banksman if drivers need help when containers/skips are exchanged;
- take into account the special training needs of temporary or part-time workers, and those who may not have English as their first language;
- provide refresher training periodically;
- regularly monitor and review operations to ensure that safe working procedures are being carried out correctly and remain effective.

Further reading

BS EN ISO 14119:2013 *Safety of machinery. Interlocking devices associated with guards Principles for design and selection* British Standards Institution

BS EN ISO 13857 *Safety of machinery. Safety distances to prevent hazard zones being reached by upper and lower limbs* British Standards Institution

BS EN 16252:2012 *Machines for compacting waste materials or recyclable fractions. Horizontal baling presses. Safety requirements* British Standards Institution

BS EN 16486:2014 *Machines for compacting waste materials or recyclable fractions. Compactors. Safety requirements* British Standards Institution

Guidance on permit-to-work systems: A guide for the petroleum, chemical and allied industries HSG250 HSE Books 2005
ISBN 978 0 7176 2943 5 www.hse.gov.uk/pubns/books/hsg250.htm

Practical guidance on lock off Issue 1 Environmental Services Association August 2013 www.esauk.org/esa_policies/people_health_and_safety/ESA_Machinery_Lockoff_Guidance_FINAL.pdf

Recover paper safely: Guidance for the recovered paper industry Leaflet INDG392 HSE Books 2004 www.hse.gov.uk/pubns/indg392.htm

Safe transport in waste management and recycling facilities Waste09 HSE Books 2004 www.hse.gov.uk/pubns/waste09.htm

Safe use of work equipment. Provision and Use of Work Equipment Regulations 1998. Approved Code of Practice and guidance L22 (Third edition) HSE Books 2008 ISBN 978 0 7176 6295 1
www.hse.gov.uk/pubns/books/l22.htm

Safety at 'bring-sites' in the waste management and recycling industry
Waste11(rev1) HSE Books 2013 www.hse.gov.uk/pubns/waste11.htm

Providing and using work equipment safely: A brief guide Leaflet
INDG291(rev1) HSE Books 2013 www.hse.gov.uk/pubns/indg291.htm

Waste and recycling vehicles in street collection Waste04(rev1)
HSE Books 2014 www.hse.gov.uk/pubns/waste04.htm

Workplace transport safety: A brief guide Leaflet INDG199(rev2)
HSE Books 2013 www.hse.gov.uk/pubns/indg199.htm

A guide to workplace transport safety HSG136 (Third edition) HSE
www.hse.gov.uk/pubns/books/hsg136.htm

Useful links

HSE's waste website: www.hse.gov.uk/waste.

HSE's website at www.hse.gov.uk also has information about managing for health and safety, risk, work at height, workplace transport, slips and trips, manual handling and noise.

British Standards can be found at <http://shop.bsigroup.com>

Further information

Cover photograph courtesy of Capitol Compactors Ltd.

For information about health and safety, or to report inconsistencies or inaccuracies in this guidance, visit www.hse.gov.uk/. You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops.

This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory, unless specifically stated, and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance.

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The Waste Industry Safety and Health (WISH) forum 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.

www.hse.gov.uk/waste/wish.htm