



# Power-fed mobile wood chippers - Operator protection at infeed chutes

## Agriculture Information Sheet No 38

### Introduction

In 1992, the Health and Safety Executive (HSE) made available an information document on the design of infeed chutes on power-fed mobile wood chippers. The document recommended, on certain designs, fitting a safety trip bar along the lower front edge of the infeed chute to protect operators from being drawn into the powerful infeed rollers. Recent investigated accidents have strengthened the case for fitting such a protection device<sup>1</sup> and other measures to reduce the risk of injury to operators. Manufacturers and suppliers of wood chippers agreed, from 31 October 2000, to make retrofit kits available for existing machines and increase the length of infeed chutes on new machines supplied after this date.

**If your wood chipper does not meet the guidance set out in this sheet, then you should contact the supplier or manufacturer of the machine who should have a retrofit kit available to bring your machine up to standard.**

In general terms, operators should be protected from contact with the infeed rollers by a combination of reach-distance guarding (created by the shape and dimensions of the infeed chute) and a correctly positioned protection device which, when activated, stops the infeed rollers.

The height of the lower edge of the infeed chute, in the working position, determines the size of the chute and how the protection device is arranged. This height should be measured with the machine on level ground and with the chute in its working position.

**All machines where the lower edge of the infeed chute is below 600 mm**

If, in the correct level working position, the height of the lower edge of the infeed chute is less than 600 mm from the ground, then all of the following criteria should be met (see Figure 1):

- the distance from any chute edge to the infeed rollers should be at least 1200 mm;
- the height from the centre line of the protection device (located along the top edge of the infeed chute) to the lower edge of the chute should be no greater than 1000 mm;
- from the infeed rollers, the floor of the chute should slope downwards to the bottom edge of the chute.

If the chute has an additional extension attached to the lower edge beyond the 1200 mm of the fully enclosed chute, the total distance from the centre line of the protection device at the top edge of the infeed chute via the outermost edge of the extension to the ground (A+B) should not exceed 1600 mm. Also, for chutes of this design the protection device must be located at the **sides and at the upper edge** of the chute (see Figure 2). The protection device should operate by stopping the infeed action when pushed in the feeding direction and by stopping or reversing the infeed action when pulled against the feeding direction.

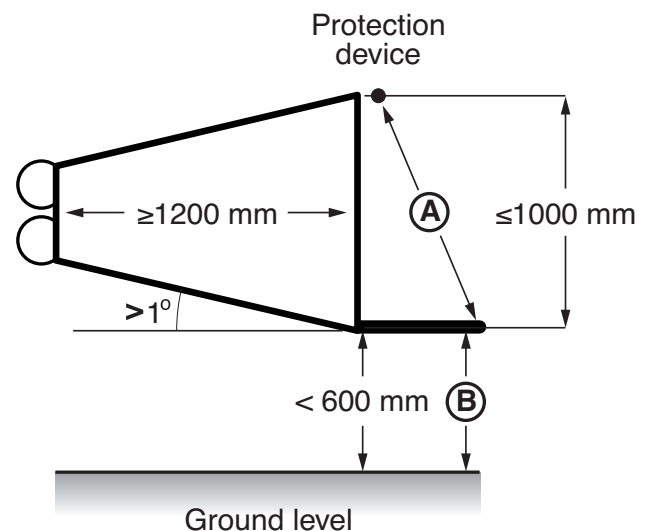


Figure 1 Dimensions for infeed chutes below 600 mm from ground level

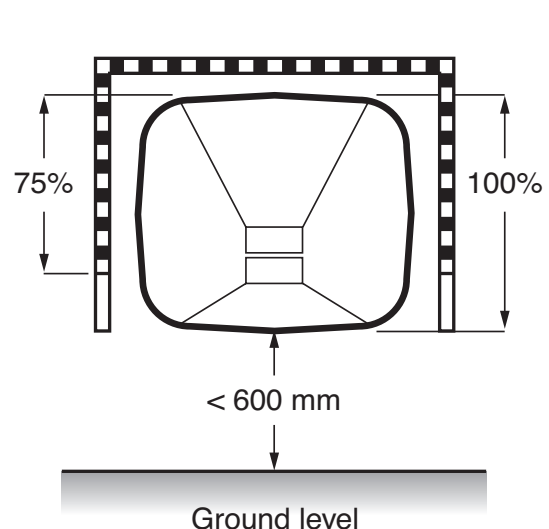
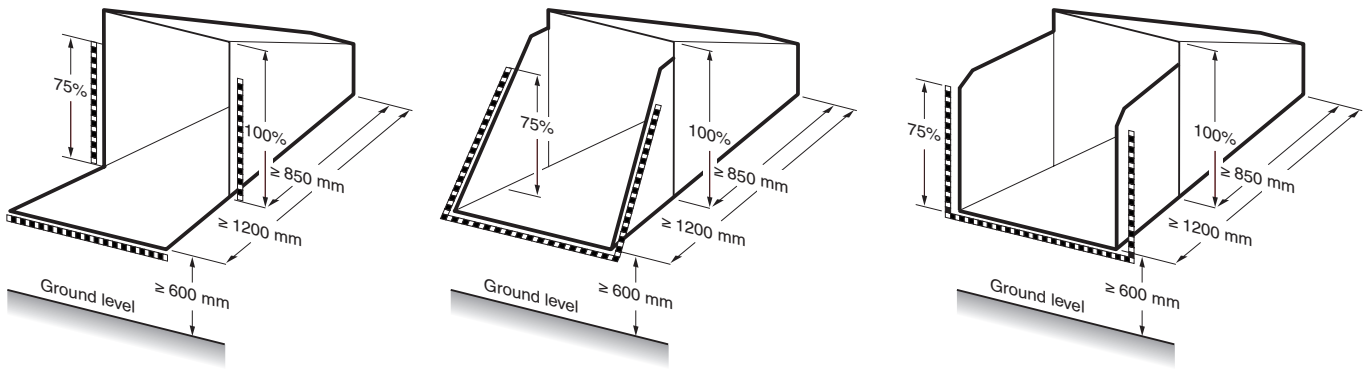


Figure 2 Position of protection devices on infeed chutes below 600 mm from ground level



**Figure 3** Chute dimensions and position of protection devices on machines over 600 mm from ground level

**Machines supplied before 31 October 2000 where the lower edge of the infeed chute is 600 mm or higher**

If, in the correct level working position, the height of the lower edge of the infeed chute is 600 mm or more above the floor, then all of the following criteria should be met (see Figure 3):

- the distance from the infeed rollers to the lower edge of the infeed chute should be at least 1200 mm;
- the distance from the infeed rollers to either side or the top of the infeed chute should be at least 850 mm (this distance may be slightly reduced at the top of the infeed chute if there are sloping side panels extending from the top edge to the outermost lower edge - see BS EN 294: 1992<sup>2</sup> Tables 3 and 6).

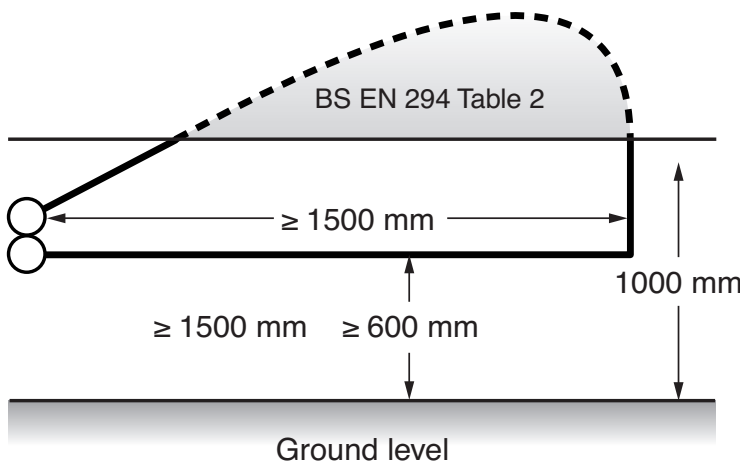
For chutes of this design the protection device should be located at the **sides and at the lower edge** of the chute (see Figure 3). The protection device should operate by stopping the infeed action when pushed in the feeding direction.

**New machines supplied between 1 November 2000 and 26 June 2005 where the lower edge of the infeed chute is 600 mm or higher**

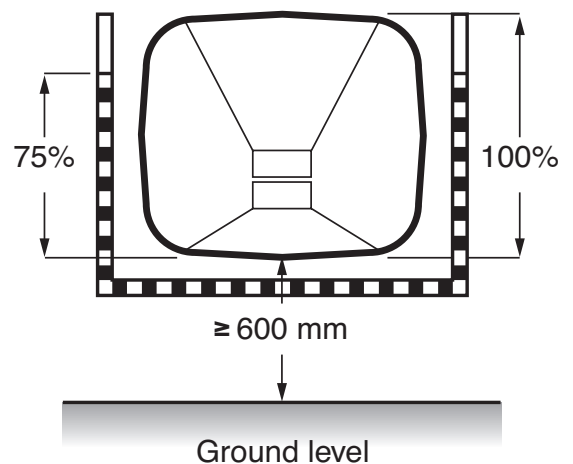
If, in the correct level working position, the height of the lower edge of the infeed chute is more than 1000 mm from the ground, then the minimum horizontal distance from any chute edge to the infeed rollers should be according to Table 2 of BS EN 294: 1992<sup>2</sup> (see Figure 4).

If, in the correct level working position, the height of the lower edge of the infeed chute is between 600 mm and 1000 mm from the ground, the minimum horizontal distance from the infeed rollers to any part of the chute outer edges below 1000 mm from the ground should be at least 1500 mm. Where the outer edges extend above 1000 mm, BS EN 294: 1992 Table 2<sup>2</sup> applies (see Figure 4).

For chutes of this design the protective device should be located at the **sides and at the lower edge** of the chute (see Figure 5). The protection device should operate by stopping the infeed action when pushed in the feeding direction.



**Figure 4** Dimensions for infeed chutes at 600 mm and above



**Figure 5** Position of protection devices on infeed chute at 600 mm and above

## Protection devices - design, position and function

Protection devices can be either a dedicated stopping device (with the controls for operating the infeed rollers elsewhere) or combined with the control system for the infeed rollers.

The design and position of protection devices should allow the operator to stop the infeed of wood in the direction of feed by using parts of his/her body other than the hands (eg elbow, hip, torso etc). This will be possible if the protection device:

- can be pushed to the stop position without any interference by the edge of the chute;
- covers a minimum of 75% of each vertical projection at the sides of the chute and 100% of the horizontal projection at the top or bottom of the chute as appropriate for the machine according to the height of the outermost lower edge, ie below 600 mm or 600 mm and higher (see Figures 2, 3 and 5);
- does not require a force greater than 150 N on the horizontal part of the device(s) and 200 N on any point of the 75% projection as shown in Figures 2, 3 and 5 (this can be measured using a spring balance - 10 N equals approximately 1 kg of pulling force);
- where combined with the control system for the infeed rollers, the stop position is located between any other function and the chute edge.

On all sides of the chute, the result of actuating the device should be identical.

Protection devices should be robustly constructed and mounted so they remain operational in daily use (eg adequate points for lubrication and protection against dirt etc). They should also be designed to reduce the collection of debris in areas which would impede the full movement of the device. They should not be easily defeated or disconnected.

## Restarting after activation of the protection device to the stop position

The crucial function of the protection device is to stop the infeed rollers. It must only be possible for the operator to restart the rollers by using a secondary control provided for the purpose. Ways of achieving this include:

- a mechanical device such as a latch to hold the protective device in its stop position until released by the operator (such a device should not be easily defeated);
- a detent at the stop position requiring force in more than one direction for its disengagement (eg lift and pull by the operator);

- configuring the control system for the infeed rollers so the stop condition is maintained until a separate reset control is activated by the operator.

## Feeding the wood chipper safely

Operators must be adequately trained to use the machine safely. For safe feeding of the wood chipper this should include:

- how to position the machine so the outermost lower edge of the infeed chute is the correct height above the ground to ensure the proper function of the protection device;
- instruction on the correct operation of the machine's controls and protection devices;
- an understanding of the safety features fitted to the machine, why they are needed and how they should be checked;
- instruction on safe work practices to avoid and remove blockages, eg keeping the chipping knives sharp and correct setting of the infeed roller and chipping component speed;
- how to feed the chipper safely.

NB There may be other aspects of the machine on which operators need to be trained. The above only relates to safe feeding.

Operating instructions for your machine will be given in the machine handbook. Make sure it is kept with the machine.

In general, when feeding a wood chipper:

- wear close-fitting clothing without any loose cuffs, straps or strings and suitable personal protective equipment to protect eyes and ears - gloves should have long, close-fitting cuffs that can be tucked into the sleeves;
- operate the chipper from a position where the protection device can be readily activated;
- feed branches butt first, releasing the wood when it is gripped by the rollers;
- always use a long branch as a push-stick to feed short material;
- never jam, disable or remove any safety device on the machine;
- never reach into the infeed chute without stopping the infeed rollers;
- never do any adjustment, maintenance, repair or cleaning with the power unit running or before all the machine components are at a complete standstill.

**All new machines supplied after 26 June 2005 should comply with BS EN 13525: 2005 (incorporating amendment no 1)<sup>3</sup>**

**References**

- 1 *Safe use of work equipment. Provision and Use of Work Equipment Regulations 1998. Approved Code of Practice and guidance* L22 HSE Books 2008 ISBN 978 0 7176 6295 1
- 2 *BS EN 294: 1992 Safety of machinery - Safety distances to prevent danger zones being reached by upper limbs* British Standards Institution 1992
- 3 *BS EN 13525: 2005 + A1: 2007 Forestry machinery - Wood chippers - Safety* British Standards Institution
- 4 *Wood chippers* Leaflet AFAG604 HSE Books 2003 (single copy free or priced packs of 15 ISBN 978 0 7176 2655 7) [www.hse.gov.uk/pubns/afag604.pdf](http://www.hse.gov.uk/pubns/afag604.pdf)
- 5 *Training and certification* Leaflet AFAG805 HSE Books 2003 (single copy free or priced packs of 15 ISBN 978 0 7176 2668 7) [www.hse.gov.uk/pubns/afag805.pdf](http://www.hse.gov.uk/pubns/afag805.pdf)

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