

Health and Safety Executive		Operational Circular	
Field Operations Directorate		OC 283/18	
Review Date	17/08 2009	Open Government Status	Fully Open
Version No & Date	1: 17/08/1999	Author Unit/Section	FOD Safety Unit

To
 AFQ Inspectors (Bands 0-4)
 RSG Specialist Inspectors (Process Safety)(Bands 1-3)
 CHID Inspectors (Bands 1-4)

FIRE HAZARDS OF UNENCLOSED SOCK FILTERS USED IN COLLECTION OF FLAMMABLE DUSTS

This OC gives advice on the fire hazards and siting of simple filter units used for collecting flammable dusts.

INTRODUCTION

1 Many occupiers use unenclosed sock filter units for collecting wood (as chips, shavings or dust), plastic or textile waste material. At their simplest, these units comprise a metal framework to support a fan, and a filter sock held up by the airstream above a collection bag or bin. They are often located directly in the workroom, close to the plant and processes creating the dust. Such units cannot be fitted with explosion relief, but there is no history of explosions within them. A recent project completed for HSE by the Building Research Establishment (BRE) looked at the fire and explosion risks associated with this type of unenclosed unit (see [appendix](#)).

RESEARCH PROJECT CONCLUSIONS

2 These units present a low risk of fire, and the risk is less if the waste collected is relatively coarse. Larger filter units may not create a greater risk to persons because the flame emerging from a bag is more likely to be above head height. On ignition, man-made fibre (terylene, polyester) filter bags reduce the size and duration of flame compared with cotton.

3 A distance of 3 metres between a filter and any area where people are likely to be present, will reduce the risk to a very low level. A simple enclosure, such as an open-topped metal frame with metal panels on the sides and with easy access for emptying and replacing filter bags, will provide equivalent protection.

4 If ignition does occur, the fan should be stopped immediately (control switches should be safely positioned). A low pressure water spray, such as a hosepipe, can be used to extinguish any burning debris (high pressure water jets can stir collected material into the air increasing the rate of burning). Damped debris should be moved to a safe place outside the building.

ACTION BY INSPECTORS

5 The above advice applies to the collection of wood, plastic and textiles dust where a mixture of fine and coarse flammable material is collected. No specific action is required by inspectors.

17 August 1999

(220/FOD/1036/1999)

J:\Editors\intranet\ocfiles\200-299\283_18.lwp

APPENDIX
(para 1)

TEST PROGRAMME

1 Three sizes (same manufacturer) of a typical unit were examined in the test programme as below:

Fan power	0.75 hp	1.5 hp	3 hp
overall height	1.7m	2.1m	2.7m
collection capacity	0.14m ³	0.17m ³	0.28m ³

The units each had a single cotton or terylene filter bag above a single collection bag.

2 All the tests used either a 50/50 blend of fine and coarse wood dust, or fine wood dust only. In some tests, the collector was part filled with the material. Dust was continuously fed into the airstream, and ignited by a continuous electric spark.

RESULTS

3 Wood dust clouds were hard to ignite, and reliable ignition required the continuous spark system to be located inside the filter sock. This seems to be a consequence of the powerful cooling effect of the rapid airstream. The mixture of coarse and fine dust was more difficult to ignite and the resultant flames were smaller than with the fine dust.

4 None of the experiments produced a significant pressure rise outside the filter. The most common consequence of an ignition was a hole burning through the filter sock. If the dust flow continued, a jet of flame could then emerge. Cotton filter socks then continued to burn, and flames from the dust could continue to emerge until the sock had burnt away (terylene filter socks did not readily support sustained burning). Drips of molten terylene or particles of burning dust entering the collection sack did not burn through it, but if left to smoulder, a flaming fire could follow.

5 Flames emerging from a breached sock extended horizontally between one and 3 metres in most cases. With any of these units, such flames could be between waist and head height and might ignite clothing or cause direct burn injuries. With multi-bag units, flame spread would be possible by a flame from one impinging on the next, but it seems unlikely that the flames would spread within the filter system.

6 The full research report is published as Contract Research Report no. CRR176 (file 280)

ISBN 07176 15774, obtainable by the public from HSE books, price £15.

