International Standard 7337

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Asbestos reinforced cement products — Guidelines for on-site work practices

Produits en amiante-ciment — Principes directeurs pour le travail sur chantier

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 7337 was developed by Technical Committee ISO/TC 77, *Products in fibre reinforced cement*, and was circulated to the member bodies in August 1982.

It has been approved by the member bodies of the following countries :

Australia	Germany, F. R.	Portugal
Austria	Greece	Romania
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Finland	New Zealand	Venezuela
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The member body of the following country expressed disapproval of the document on technical grounds :

United Kingdom

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Contents

Page

1 Scope and field of application 1

2 References 1

3 Preliminary remarks 1

4 Working processes and recommended tools 2

4.1 Profiled sheets and fittings 2

4.2 Flat sheets 3

4.3 Low density sheets 3

4.4 Roofing slates, siding shingles 4

4.5 Pipes 4

4.6 Moulded goods 5

5 Tool specification 5

5.1 Power driven saws such as circular saws, jig saws, band saws, etc. 5

5.2 Power-driven nibblers 6

5.3 Tools for working pipes 6

5.4 Dust-extraction equipment 8

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Asbestos reinforced cement products — Guidelines for on-site work practices

1 Scope and field of application

This International Standard gives guidelines for tools and working methods to be used on site with a view to maintaining the dust emission at the lowest practicable level while taking into account working efficiency and quality of work.

It applies to asbestos-cement products such as profiled sheets, flat sheets, low density sheets, roofing slates, siding shingles, pipes, moulded goods, etc.

Methods of handling and fixing are not within the scope. The use of certain high-speed cutting equipment not equipped with dust extractors (e.g. abrasive disc cutter) producing excessive amounts of airborne fine dust which may also contain respirable fibres is not recommended and therefore not included in this International Standard.

2 References

ISO 160, *Asbestos-cement pressure pipes and joints.*

ISO 391, *Building and sanitary pipes in asbestos-cement.*

ISO 393/1, *Asbestos-cement products — Part 1 : Corrugated sheets and fittings for roofing and cladding.*

ISO 393/2, *Asbestos-cement products — Part 2 : Cellulose-asbestos-cement corrugated sheets and fittings for roofing and cladding.* 1)

ISO 393/3, *Asbestos-cement products — Part 3 : Asymmetrical section corrugated sheets and fittings for roofing and cladding.*

ISO 395, *Asbestos-cement slates.*

ISO 396/1, *Products in fibre reinforced cement — Part 1 : Asbestos-cement flat sheets.*

ISO 396/2, *Products in fibre reinforced cement — Part 2 : Silica-asbestos-cement flat sheets.*

ISO 396/3, *Products in fibre reinforced cement — Part 3 : Cellulose-asbestos-cement flat sheets.*

ISO 880, *Asbestos-cement siding shingles.*

ISO 881, *Asbestos-cement pipes, joints and fittings for sewerage and drainage.*

ISO/R 1896, *Thermal insulating asbestos boards.*

3 Preliminary remarks

For special products not covered in the following tables, advice shall be given by the manufacturers as to how they are to be worked on site.

The tables in clause 4 refer to known tools and methods. Others equally suitable may exist or be developed in future. Therefore, the tables are not exclusive.

1) At present at the stage of draft.

4 Working processes and recommended tools

4.1 Profiled sheets and fittings

See ISO 393/1-3.

Table 1

	a) Mitring	b) Cross-cutting	c) Longitudinal cutting	d) Cut outs	e) Drilling
4.1.1 Generally all profiles	handsaw jig saw[1] hand-guided bandsaw low speed circular saw	jig saw[1] nibbler low speed circular saw	jig saw[1] nibbler (handsaw)[2] low speed circular saw	jig saw[1] (handsaw)[2] low speed circular saw	hand- or power-operated drill
4.1.2 Profiles with height less than 100 mm, thickness up to 6,5 mm	handsaw scriber nipper jig saw[1] hand-guided bandsaw low speed circular saw	handsaw jig saw[1] nibbler low speed circular saw	scriber jig saw[1] (handsaw)[2] (nibbler)[2] low speed circular saw	handsaw jig saw[1] low speed circular saw	hand- or power-operated drill

1) Or other mechanically operated saws. Special precautions may be required. Circular high speed saws are not recommended.

2) The tools indicated in brackets may be used but are recommended for special work involving small quantities of material.

4.2 Flat sheets

See ISO 396/1-3.

Table 2

	a) Cutting[2]	b) Drilling	c) Sanding	d) Cut outs[2]
4.2.1 General[1]	handsaw nibbler up to 10 mm (depending on design) circular saw with diamond disc and dust-extraction equipment jig saw low speed circular saw	hand- or power-operated drills[3] hole cutter for diameters 30 to 110 mm (appr.)	power-driven sanders with dust-extraction equipment	handsaw jig saw hand- or power-operated drills low speed circular saw
4.2.2 Thickness up to 6 mm[1]	scriber nibbler hammer shears low speed circular saw	hand- or power-operated drills[3] hole cutter for diameters 30 to 110 mm (appr.)	power-driven sanders with dust-extraction equipment	handsaw nibbler jig saw hand- or power-operated drills low speed circular saw

1) Compressed and autoclaved sheets are harder than air-cured sheets. Only specially designed handsaws are suitable for these; diamond blade power-driven saws (circular and jig saws) with efficient dust-extraction equipment are recommended. This also applies to sheets above 20 mm thickness.

2) After cutting, a final cleaning or trimming operation using planes, rasps, sandpaper, etc. may be considered.

3) Dust extraction equipment is required if power drills are used continously or for overhead work.

4.3 Low-density sheets

See ISO/R 1896.

Table 3

	a) Cutting	b) Drilling	c) Cut outs
General[1]	handsaw low speed circular saw with tungsten carbide tipped blade and dust-extraction equipment low speed circular saw with hardmetal teeth	power-driven drill with dust-extraction equipment	handsaw jig saw with dust-extraction equipment low speed circular saw with hardmetal teeth

1) Low-density sheets tend to emit higher amounts of respirable dust when worked. Special precautions are therefore indicated.

4.4 Roofing slates, siding shingles

See ISO 395, ISO 880.

Table 4

	a) Cutting	b) Cut outs	c) Punching
General	scriber nipper slater's hammer hand-operated shears or nibbler	horse and slater's hammer nipper	slater's hammer hammer shears

4.5 Pipes

See ISO 160, ISO 391, ISO 881.

Table 5

	a) Cutting	b) Turning	c) Drilling, Cut outs
4.5.1 Diameter up to 600 mm	handsaw (small diameters) hand-operated lathe cutter power-driven lathe cutter jig saw (+ guiding device for diameter 350 to 600 mm) chain cutter hand-guided bandsaw low speed circular saw	hand-operated lathe power-operated lathe	handsaw jig saw with carbide tipped blade hand drill power drill hand-operated hole cutter power-driven hole cutter with milling head power drill with hardmetal bit
4.5.2 Diameter above 600 mm	hand operated lathe cutter power drive lathe cutter chain cutter up to diameter 800 mm hand-guided bandsaw low speed circular saw	hand-operated lathe power-operated lathe	jig saw with carbide tipped blade power drill hand-operated hole cutter power-driven hole cutter with milling head power drill with hardmetal bit

4.6 Moulded goods

For hand-moulded and injection-moulded goods, the same tools and methods as described for sheets are to be used.

Extruded goods being autoclaved are considerably harder than air-cured ones. When cutting is required, a hand-guided band saw with hardmetal tipped blade or a low speed circular saw is suitable.

5 Tool specification

5.1 Power-driven saws such as circular saws, jig saws, band saws, etc.

When working asbestos reinforced cement products with power-driven equipment such as saws, jig saws and band saws, the fineness of the dust produced depends primarily on the geometry of the saw blade as well as on the blade speed (number of strokes, number of revolutions, etc.) of the machine.

With a machine operating at a high frequency together with a fine saw blade, an excessive amount of respirable fine dust is produced due to the grinding action. Dust extraction is therefore mandatory.

With a coarse-toothed saw and a low frequency, a chip-cutting action takes place which produces mainly coarse dust. Under certain conditions, dust extraction is unnecessary.

Low speed circular saws with milling action produce coarse chips and do not require dust extraction.

The type of machinery is assessed by the following formulae :

$$d = \frac{v\,a}{k}$$

$k = H f$ for reciprocating movement

$k = w R = 2\pi R f$ for radial movement

where

d is the calculated chip thickness, in millimetres;

v is the rate of feed, in millimetres per minute;

k is the speed of the cutting teeth, in millimetres per minute;

a is the tooth spacing, in millimetres;

H is the length of stroke, in millimetres;

R is the radius of circular saw blade, in millimetres;

f is the frequency (number of strokes or revolutions), in revolutions per minute;

w is the angular velocity, in revolutions per minute.

When working without dust extraction, the feed rate shall be so chosen that the required chip thickness is reached under normal operating conditions. For a given frequency of the machine and a given saw blade, the feed rate depends principally on the shearing force as well as the thickness and the properties of the material being cut.

For various reasons, a certain proportion of fine dust will be produced even when operating with a thick chip. For this reason, the required thickness of chip lies considerably above the dimensions of respirable dust particles.

The working process with a rotating saw blade is exactly the same as that of the working stroke of a machine with a reciprocating motion. However, on the return stroke a grinding effect occurs which produces fine dust. The proportion of fine dust produced during the working stroke must therefore be reduced, that is, coarser chips must be produced, in order to maintain a similar average dust concentration. Less fine dust is produced on the return stroke when using thick saw blades because of the reduced surface pressure.

The cooling air for a jig saw is often so directed that the fine dust falling from the saw blade is blown away. This sort of air flow is not permissible for the working of asbestos reinforced cement products.

The fine dust produced when a jig saw works with a grinding action shall be removed by means of concentrated suction apparatus.

Empirical criteria for working with or without dust extraction	
Saws with rotating blades :	
$d > 100$ µm	extraction usually not required
$d < 50$ µm	extraction required
$50 < d < 100$ µm	extraction not required for occasional use extraction required for continuous use
Saws with reciprocating blades :	
$d > 200$ µm	extraction usually not required
$d < 100$ µm	extraction required
$100 < d < 200$ µm	extraction not required for occasional use extraction required for continuous use