# DATA SHEET

DATE 01.06.15
VERSION 01

## Technical data summary

| No | Property | Standard | Unit | Value |
|---|---|---|---|---|
| 1 | Modulus of Elasticity in flexure<br>- Parallel to fiber<br>- Perpendicular to fiber | ASTM C-120 | <br>$N/mm^2$<br>$N/mm^2$ | <br>3000-<br>3500 |
| 2 | Shear Strength | ASTM D-732 | $N/mm^2$ | 10 |
| 3 | Compressive Strength<br>- General value<br>- Parallel to surface | ASTM C-170 | <br>$N/mm^2$<br>$N/mm^2$ | <br><br>55 |
| 4 | Modulus of Rupture in flexure<br>- Parallel to fiber<br>- Perpendicular to fiber | ASTM C-1037 | <br>$N/mm^2$<br>$N/mm^2$ | <br>8<br>12 |
| 5 | Tensile Strength<br>- General value<br>- Normal to surface<br>- Parallel to surface<br>- Perpendicular to fiber | ASTM C-209 | <br>$N/mm^2$<br>$N/mm^2$<br>$N/mm^2$<br>$N/mm^2$ | <br><br><br>7 |
| 6 | Impact Strength | ASTM D-256 | N | 30 |
| 7 | Nail/Screw Head Pull Through<br>Nail Pull Resistance<br>— 8D Nail<br>— #8x 1/4" Tek Screw<br>— #8x 1" Bugle Head Screw | <br>ASTIVI C-473<br>ASTM D-1037<br>ASTM D-1037<br>ASTM D-1037 | <br>Kg<br>$N/mm^2$<br>$N/mm^2$<br>$N/mm^2$ | <br>125<br>2.5<br>2.5<br>2.7 |
| 8 | Thermal Conductivity | ASTM C-518 | $W/m^{\circ}C$ | 0.2 |
| 9 | Coefficient of Lineal Thermal<br>Expansion (°C)<br>Expansion (°F) | ASTM D-696 | <br>m/°F<br>mrc | <br>$3.7 \times 10^{-6}$<br>$6.5 \times 10^{-6}$ |
| 10 | Density | ASTM D-1037 | | 1.00-1.05 |
| 11 | Weight | | $kg/m^2v$ | 5.7 |
| 12 | Moisture Content | ASTM D-1037 | % | 7-10 |
| 13 | Water Absorption, by weight<br>Water Absorption, by volume | | % | 30 |
| 14 | Acid-base | ASTM D-1037 | pH_ | 10-12 |
| 15 | Delamination[1] | | $N/mm^2$ | 1.2 |
| 16 | Linear variation with change in moisture<br>— Parallel to fiber (30-90%RH)<br>— Perpendicular to fiber (30-90%RH) | | <br>%<br>% | <br>0.10<br>0.09 |
| 17 | Length change with water absorption | Totally Dry to<br>Totally Wet | % | 0.3-0.4 |
| 18 | Expansion at water soaked 24 hr | Totally Dry<br>to Wet | % | 0.25-0.35 |
| 19 | Fire resistance (MEA) | ASTM E-119 | hrs | 2.0 |
| 20 | Sound deduction (at 2000 Hz) | | Db | 49-55 |
| 21 | Contraction | Totally Wet to<br>Totally Dry | % | 0.35-0.50 |
| 22 | Installation rate | | | |
| 23 | Flame spread<br>Developed smoke | ULMEA | | 0<br>0 |

**[1]Our product does not show any Delamination.**

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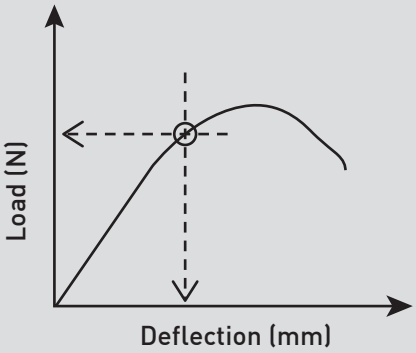
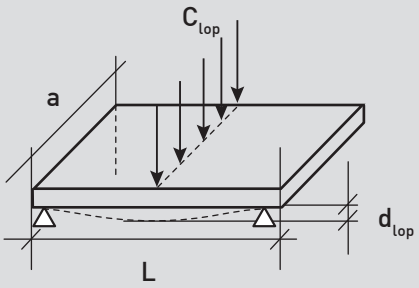
## 1 Modulus of elasticity in flexure




$$E_{lop} = \frac{c_{lop} \times L^3}{4 \times d_{lop} \times a \times e^3}$$

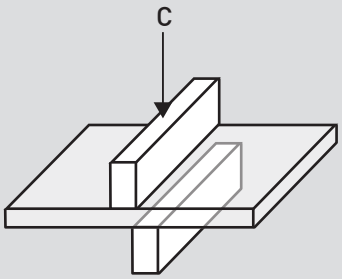
Regular values, for densities ranging from 1.0 to 1.1 g/cm, are:
Minimum Flexural Modulus of Elasticity **3000 N/mm**
Maximum Flexural Modulus of Elasticity **3500 N/mm**

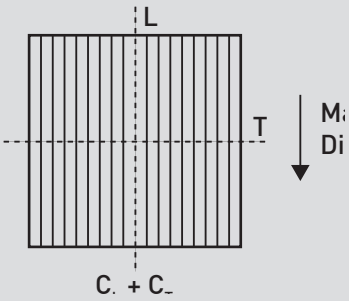
## 2 Shear - strength (ASTM D-732)

For product with a density of 1.2 g/cm³:

| | |
|---|---|
| 12mm | 11.3 N/mm² |
| 17mm | 8.9 N/mm² |

Average Shear Strength, for densities 1.00 to 1.05 g/cm³ = 10 N/mm²



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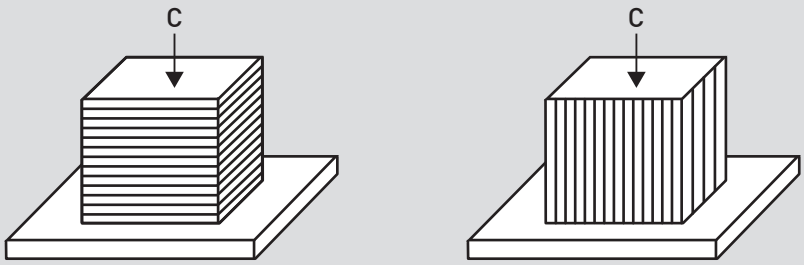
## 3 Compressive strength (ASTM C-170)

For product with a density of 1.2 g/cm³:

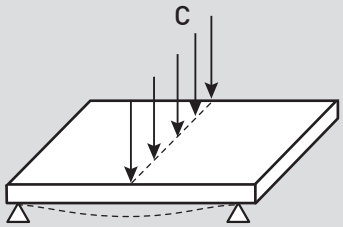
| | | |
|---|---|---|
| 12 mm | 9640 psi x 0.00689 | = 66.4 N/mm² |
| 17 mm | 5840 psi x 0.00689 | = 40.2 N/mm² |




Parallel to surface  Perpendicular to surface

Table value for density 1.2 g/cm³ is 66 N/mm²
Average compressive strength, for densities 1.00-1.05 g/cm³ =55 N/mm² for 11 mm.

## 4 Static bending - modulus of rupture (ASTM D-1037)




| Modulus of Rupture (N/mm²)[1] | | |
|---|---|---|
| | 12 mm | 17mm |
| Parallel<br>Perpendicular | 15.1<br>10.0 | 8.1<br>10.8 |
| Average[2] | 12.5 | 9.5 |

**[1] For product with density 1.2 g/cm³**
**[2] General orientation factor = 0.75**

These values are too high.

Current results with Dukkaboard XL of densities ranging from 1.00-1.05 g/cm³.

| | |
|---|---|
| Parallel modulus of rupture | 8.0 N/mm² |
| Perpendicular modulus of rupture | 12,0 N/mm² |
| Average modulus of rupture | 10.0 N/mm² |
| Orientation Factor | 0.66 |

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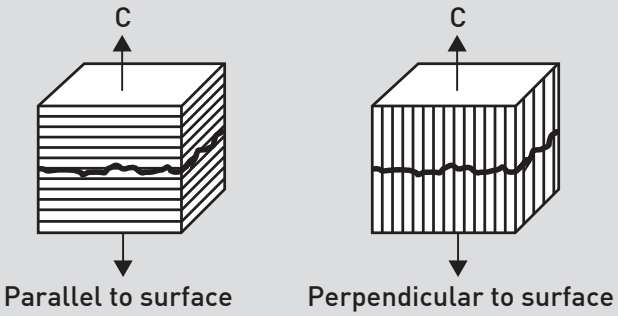
## 5 Tensile strength (ASTM C-209)



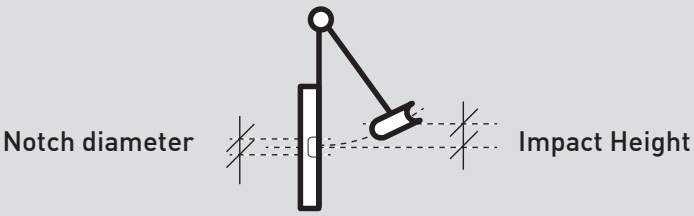

| Tensile Strength (N/mm²)[1] | | |
|---|---|---|
| | 12 mm | 17mm |
| Parallel | 1.17 | 0.92 |
| Perpendicular | 7.3 | 6.5 |

**[1] For product with density 1.2 g/cm³**
**[2] To low, there must have been delamination**

To report tensile strength use, as general value, 7 N/mm²

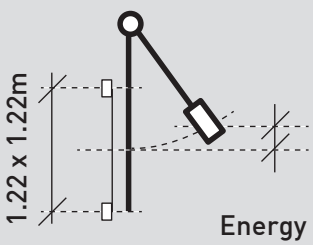
## 6 Impact strength (ASTM D-256)

ASTM D-256 is a standard for plastic materials.
Average impact strength ~ 0.6 ft lb/inch of notch.




The most representative standard for Dukkaboard XL is ASTIVI E-695 in which the energy of rupture is measured. The impact is by a bag as in ASTM E-661.

| | |
|---|---|
| 6, 8 & 11 mm | 24 Kg |
| 14 mm | 36 Kg |




Energy = Weight (W) x Height (H) in Nm

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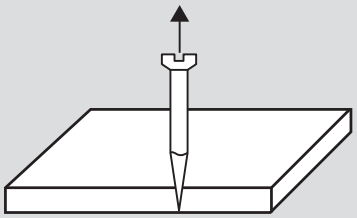
## 7 Nail - pull resistance

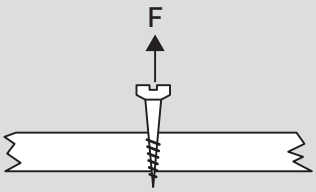
7.1 ASTIVI D-473 Extraction of a nail from a 12 mm board.



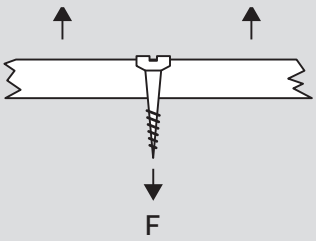
- Extraction of NAIL 8D 360 LB = 163 Kg
- Extraction of TEK-SCREW #8x 1/4" 362 LB = 165 Kg
- Extraction of BUGLE-HEAD SCREW #8x 1" 395 LB = 180 Kg

7.2 ASTIU1 D-1037

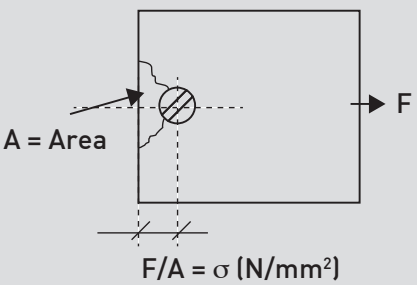
a) PULL OUT 1131 N = 110 Kg




b) PULL IN 1936 Na = 200 Kg




7.3 Results on 14 mm board pulling from one edge at a fixed axis, perpendicular to the both edges, with the nail placed at several distances from the opposite edge




| X | Average F Cross Machine Direction) | |
|---|---|---|
| (mm) | (N) | (Kg) |
| 6 | 1132 | 115 |
| 9 | 1043 | 106 |
| 12 | 1083 | 110 |
| 18 | 2109 | 215 |

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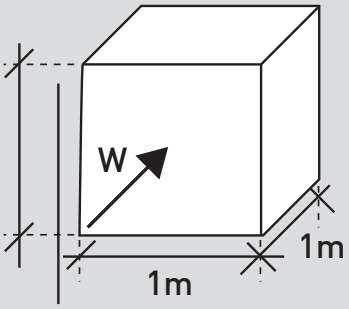
## 8 Thermal conductivity (ASTM C-518)

W = Heat that goes through a $1m^3$ cube in one hour.
Thermal conductivity = 0.2 W / $m^2$ x °C




| COMPARATIVE TABLE | |
|---|---|
| MATERIAL | THERMAL CONDUCTIVITY (W / $m^2$ x °C)[1] |
| CONCRETE | 1.6 |
| CELLULAR CONCRETE | 0.21 |
| WHOLE BRICK | 0.8 |
| GYPSUM | 0.5 |
| MINERAL WOOL | 0.05 |
| WOOD | 0.2 |
| DUKKABOARD XL | 0.2 |

**[1] Conversion Factor : 1 Kcal = 1.163 x $10^{-3}$ KWh.**

## 9 Lineal thermal coefficient (ASTM D-6)

Approximate lineal thermal coefficient: ~ 6.5 x $10^{-6}$ per °C and lineal meter
~ 3.7 x $10^{-6}$ per °F and lineal meter

Example: For a 6m long wall and a temperature increase from 15°C to 55°C

$$AL = \frac{6m \times 1000 \times (55°C - 15°C) \times 6.5}{10^6} = 1.6 \text{ mm}$$

$$AL = \frac{1.6}{6} = 0.27 \text{ mm/m}$$

## 10 Density (ASTM D-1037)

Group density standard: 1.00-1.05 g/$cm^3$

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## 11 Weight

For a density of 1.05 g/cm$^3$.

| | |
|---|---|
| Dry solids | 5.25 kg/m$^2$v |
| Moisture (10%) | 0.50 ka/m$^2$v |
| Total Weight/m$^2$v | 5.75 kg |

(1m$^2$v =1m x 1m x 5mm)

## 12 Moisture content (ASTM D-1037)

The finished product moisture is variable depending on the equilibrium humidity.
Moisture range: 7-10%

## 13 Water absorption by weight

It is the relative increment in weight of a totally submerged probe due to the water it absorbs, until it reaches a constant weight, and will depend on its density.

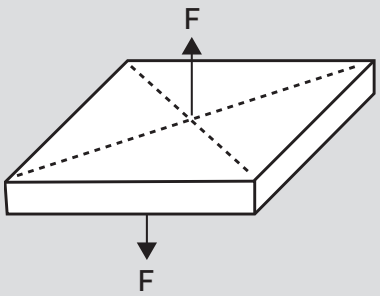
Average water absorption - 30%

## 14 Acid-base pH

pH of freshly manufactured product ~ 12

pH of carbonated product – 6 to 12 months old ~ 11

## 15 Delamination (ASTM D-209)




Layer separation (see 5).

Approximate value ~ 1.2 N/mm$^2$

There are no delaminating problems in our process.

## 16 Linear variation with change in moisture (ASTM D-10)

Also know as Moisture Movement from 30%RH to 90%RH (Dilatation)

| | |
|---|---|
| Parallel dilatation | ~ 0.10% = 1.0 mm/m |
| Perpendicular dilatation | ~ 0.09% = 0.9 mm/m |

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## 17 Length change with water absorption

Dilatation from totally dry to totally water-saturated (until constant weight is achieved).

Dilatation due to water absorption ~ 0.3 ~ 0.4% = 3 - 4 mm/m

## 18 Expansion due to water soaked for 24 hour

(It is quite possible that soaking for 24 hours a thick board or hidrofugated products will not result in complete saturation).

Dilatation due to soaking 24 h in water ~ 0.25 ~ 0.35% = 2.5 - 3.5 mm/m

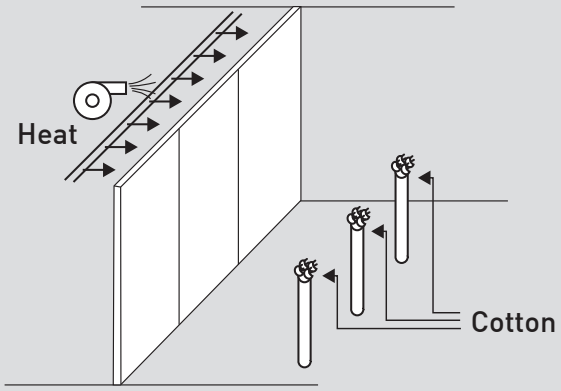
**IMPORTANT NOTE:** It is better not to report values for 17 and 18 since they are not representative in this application although they are quite useful as internal control parameters.

## 19 Fire resistance (ASTM E-119)

It is important for building systems, either walls or sub floors.

Measured parameters are:

- Heat transmission to the opposite side of the flame application.
  The temperature increment should not exceed 250°F = 139°C.
- Gas transmission to the opposite side of the flame application.
  Cotton balls placed on the opposite side should not ignite.
- Contribution to the generation of toxic smoke, fumes and gases.
- Destruction of the structural elements.




**TEMPERATURE INCREASE**

| TIME | TEMP (°C) |
|---|---|
| 30min | 843°C |
| 1 hour | 927°C |
| 2 hours | 1010°C |

Maximum increment in temperature + 139°C
Approved for 1.5 hs (2 hs)

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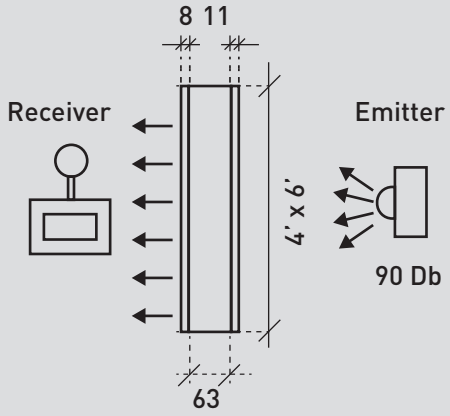
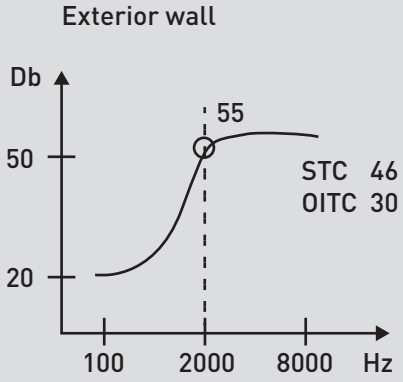
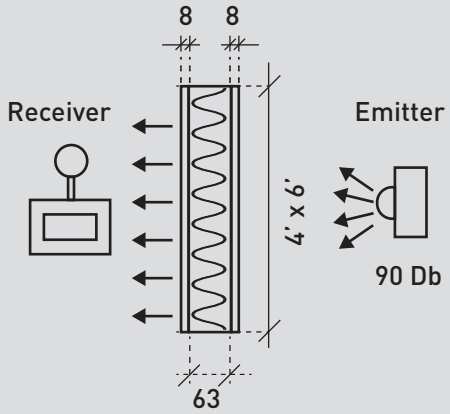
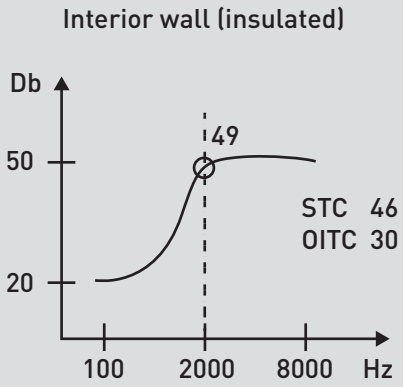
## 20 Sound deduction (ASTM 90-90)

STC SOUND TRANSMISSION CLASS
OITC OUTDOOR/INDOOR TRASMISSION CLASS




## 21 Contraction

Contraction from totally water-saturated to totally dry - 0.35-0.50%,
See comments on 18.

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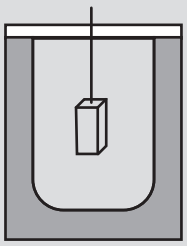
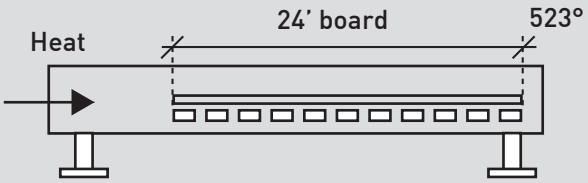
## 22 Flame spread/smoke developed (ASTM 84-89a, 136-82/ E 136-99, 84-00a)



Oven at 75° C
15 min




- Board Temperature Increment < 30°C
- No ignition after 30 seconds
- Weight loss < 50%
- Advance of the specimen destruction by fire in comparison to a Red Oak specimen
- Smoke development

| **Results:** | Classificiation |
|---|---|
| No smoke development | 0 |
| No contribution to the development of flames | 0 |

See comments on 18.

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## 23 Environmental policy

Dukkaboard XL fibre cement board is regarded as an environmentally friendly, pollution free product

Dukkaboard XL fibre cement board is 100% free of asbestos as shown in the results below

Asbestos identification test results:

| | | | |
|---|---|---|---|
| Location | n/a | n/a | n/a |
| Element | Dukkaboard XL | Dukkaboard XL | Dukkaboard XL |
| Asbestos Identification:<br>Type:<br>Level | <br>NAD<br>Nil | <br>NAD<br>Nil | <br>NAD<br>Nil |
| Other Fibres: | Organic Fibre | Organic Fibre | Glass & Organic Fibre |

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## 24 COSHH monitoring report on occupational exposure to dust from Dukkaboard XL board

### 1. Introduction

An investigation into operative exposure to hazardous airborne substances has been conducted on this cement board. The survey investigated the nuisance dust and respirable crystalline silica exposure levels in the workplace. Throughout the monitoring period a study was made of the working practices of the operatives such that the exposures could be explained and recommendations would be specific to the processes.

The results of this monitoring programme are the subject of the following report. The report discusses the methods employed and provides a summary of the results. Conclusions and recommendations based on the findings of the survey can be found In sections 4 and 5 of this report.

### 2. Methodology & Apparatus

The results for occupational exposure for all methods were calculated using the procedures provided in the methods below and then each expressed as an 8-hour TWA exposure for the normal working shifts (as specified in Health & Safety Executive's Guidance Note EH 40/05) before comparison with the Workplace Exposure Limits (WEL) 2005 values for the relevant substances as shown in section 2.3 below. Where there is no relevant WEL other guidance limits have been suggested instead.

### 2.1 Nuisance Dust Monitoring & Respirable Crystalline Silica

Static and personal monitoring for respirable dust exposure was carried out as described in the HSE's MDHS-14/3 "General Methods for the Gravimetric Determination of Respirable and Total Inhalable Dust."

The respirable dust sampling was carried out using pumps with a cyclone head fitted with a 25mm filter PVC filter. The respirable cyclone samplers were set at a flow rate as close to 2.2L/min. as possible. All samplers were calibrated using a rotameter prior to and after the sampling period to obtain an average flow rate.

Sampling took place over about 2-3 hours, which was a significant part of the 8-hour normal shift. Any break times were removed from the sampling time if the pump was not worn or the break was taken at a distance from the working area. Following sampling the filters were analysed gravimetrically according to the procedures specified in MDHS -14/3. All gravimetric determinations were carried out using a five-figure balance i.e. to 0.01 mg. X-ray diffraction (XRD) analysis of the respirable crystaliine silica samples was carried out according to MDHS method 51/2 to determine the crystalline silica content of the samples.

### 2.2 Sampling Strategy

Three samples were taken to assess nuisance dust exposure during the unloading and stacking of the boards. Two of the samples were located within close proximity to the operation as static samplers. A personal sample was carried out to ascertain exposure for the employee carrying out the activities. This personal sample was sent for X-ray diffraction to ascertain respirable crystalline silica content of the sample.

### 2.3 Relevant Workplace Exposure Limits /WEUs

The 8-hour TWA, Workplace Exposure Limits (WELs) for the substances under investigation are shown overleaf:

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| Substance | Long Term WEL 8hr TWA mg/m³ | Notation |
|---|---|---|
| **Dusts** | | CHAN |
| General Nuisance Dust, respirable | 4 | |
| Respirable Crystalline Silca (RCS) | 0.1 | CHAN |

(taken from Guidance Note EH 40/05, published by the Health and Safety Executive (HSE).)
CHAN - Respirable Crystalline Silica (RCS) has a CHAN (no.35) (chemical hazard afert notice)
Long-term exposures to high levels can also lead to an increased risk of developing lung cancer.

The table below shows the significance leve! of the results described when compared to the relevant exposure limit.

| %ofWEL | Phrase |
|---|---|
| <10% | Insignificant |
| 10-35% | Significant but low |
| 36-60% | Significant |
| 61-100% | Highly significant |
| >100% | Over the limit |

These limits have been used as the basis of interpretation of the results of the monitoring programme.

**2.4 Implications of Working Hours**

In all of the results tables an 8-hr TWA has been expressed for the 8.5 hours of actual work, excluding breaks that is the normal working day shift. The normal working day is 07:30 -16:30 with breaks totalling 30 minutes, which are taken away from the work area.

From discussions with operatives it is understood that a period of no more than 3 hours will be worked stacking the cement board that are under investigation in this report. The remaining time is spent working in the shop, preparing customers and other operations that do not generate high levels of dust.

A longer working period has been added to the report in order to show the effect of working for a longer period on the stack operations. This has been shown to be 4 hours and 5.5 hours carrying out other tasks.

**3. Results and discussion**

**3.1 General**

The results of the monitoring are shown in Table 1 - Dust & Respirable Crystalline Silica, showing the dust concentrations measured which are then converted to 8-hr TWA values. This latter calculation allows the measured concentration to be corrected for different work periods other than 8 hours. There is also a calculation that allows for a longer shift (final column on tables).

The operation involves stacking cement board onto pallets. Dust is created when it is expelled from between the cement board. This dust is a by-product of the cutting operations that takes place prior to receiving Dukkaboard boards. Different operators have different techniques for moving the cement board, however dust will always been expelled and expose employees. Where cement board boards are slid from the original paUet onto smaller pallets it is believed to create less dust and is also preferable due to the reduction in manual handling and should therefore be the chosen method of stacking cement board.

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Dust masks are available to operatives and were observed being used by one of the employees whilst carrying out the operation. The type of dust mask is a type FFP1 and provides a protection factor of approximately 4 times the WEL

The implications of these results will now be discussed by substance and unless stated relate to the result for the normal shift length.

**3.2 Nuisance Respirable Dust**

All of the samples were found to be below the WEL for respirable dust when the results are compared with an 8.5 hour shift which is worked by employees on site. As stated in section 2.4, the shift has been split into time spent stacking the cement board and time spent carrying out other tasks that tend not expose employees to high levels of dust. The personal sample when 3 hours are spent stacking the cement board returned a result at 28% of the WEL This can be classed as significant but low.

The two static samplers (ref.nos.2 & 3) were found to have been exposed to higher level of dust than the persona! sample; this may be due to the dispersion of the dust whilst the cement board are dropped onto the stack. From observation, the cloud is dispersed away from the employee working on the process. The two samples were found to be between 30-35%, which can also be classed as significant but low.

**3.3 Respirabte Crystalline Silica**

One of the samples was sent for further analysis in order to ascertain what amount of the dust collected from the sample was respirable crystalline silica. Ref.no.RCS1 - the persona! sample - was sent for analysis. Despite nuisance dust levels of approximately 25% of the WEL for respirable dust the results for respirable crystalline silica were found to be below the level of detection (0.02mg).

When this result is compared with the WEL for respirable crystalline silica it is found to be 30% which can be classed as significant but low. If the test were carried out for a longer sampling period (which was not possible at the time of the survey) it is highly likely that the concentration (personal exposure) would be lower than that found during this survey.

**4. Conclusions**

- 3 respirable dust samples were taken during the survey. All were found to be below the WEL for respirable dust. It is understood that employees may spend approximately 2-3 hours per day stacking the “Dukkaboard XL” boards; the rest of their time is spent carrying out tasks that are unlikely to expose them to high levels of dust. Personal exposure can be classed as significant but low at 25% or less of the WEL.
- The static samplers placed to the sides of the stacking operation returned the highest results. This is due to the dispersion of the dust during stacking operations.
- When respirable crystalline silica analysis is examined, the result was below the current WEL of 0.1 mg/m$^3$.
- The results indicate that despite moderate levels of respirable particulate, the more hazardous components of silica were not found.
- The suitable RPE that is worn should minimise dust exposure levels further to well below the respirable dust WEL, providing that it is worn correctly.
- There is some use of dust masks during stacking, however it is not uniform.

## 24 COSHH monitoring report on occupational exposure to dust from Dukkaboard XL board - continued

**5. Recommendations**

- It should be noted that as Respirable Crystalline Silica has been issued a Chemical Hazard Alert Notice (CHAN35) and it is recommended that exposure be reduced to 0.1 mg/m$^3$ or less as a 8hr TWA.
- As laid down in the new regulations under the principles of good practice employees working with the substance should be given information, instruction and training on the use of control measures used to control the risks.
- Other work practices, such sweeping dust with a dustpan and brush where more airborne dust is created, should be minimised and replaced by the use of vacuum techniques where possible.
- All personnel should be made aware of the fact that by improving their own working practises, it may be possible to reduce their own exposure to dust e.g. by improving general housekeeping in their own work area.
- Encourage operatives not to eat or drink at their workstations, but to use clean welfare areas instead.

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## 25 APPENDIX I - Calculation of dust exposures with regard to the 8-hour reference period.

Taken from 'Calculation Methods' Section. Schedule Part 1, of HSE Guidance Notes EH 40/05.

**The 8-hour reference period.**

1. The term "8-hour reference period" relates to the procedure whereby the occupationalexposures in any 24-hour period are treated as equivalent to a single uniform exposure for 8 hours (the 8-hour time-weighted average (TWA) exposure).

2. The 8-hour TWA may be represented mathematically by:

$$\frac{C_1T_1 + C_2T_2 + \ldots\ldots\ldots C_nT_n}{8}$$

where C is the occupational exposure and T is the associated exposure time in hours in any 24-hour period.
(It has been assumed that the dust exposure level during lunch and breaks was zero.)

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## 26 APPENDIX II - The Control of Substances Hazardous to Health /Amendment Regulations 2005

The new COSHH regulations fully came into force on 6 April 2005 and have set a number of changes to the exposure limit system and approach to adequate control as outlined below. A single type of exposure limit - the 'Workplace exposure limit (WEL)' replaces the previous 'maximum exposure limit (MEL) and occupational exposure standard (OES). The new system was developed to make it easier for duty holders to understand and comply with the limits. It also takes into account the fact that in reality, a "safe" limit cannot be guaranteed. This new limit system will be used to incorporate Indicative Occupational Exposure Limit Values (IQELVs). The new regulations apply the principles of good practice to form the basis for the control of exposure to substances hazardous to health as set out in the new schedule 2A. Duty holders will have achieved adequate control if the WEL approved for a substance is not exceeded and they apply the principles outlined in Schedule 2A below:

**SCHEDULE 2A**

**Regulation 7(7)**

**PRINCIPLES OF GOOD PRACTICE FOR THE CONTROL OF EXPOSURE TO SUBSTANCES HAZARDOUS TO HEALTH**

a) Design and operate processes and activities to minimise emission, release and spread of substances hazardous to health.

b) Take into account all relevant routes of exposure - inhalation, skin absorption and ingestion, when developing control measures.

c) Control exposure by means that are proportionate to the health risk.

d) Choose the most effective and reliable control options which minimise the escape and spread of substances hazardous to health.

e) Where adequate control of exposure cannot be achieved by other means, provide, in combination with other control measures, suitable personal protective equipment.

f) Check and review regularly all elements of control measures for their continuing effectiveness.

g) Inform and train all employees on the hazards and risks from the substances with which they work and the use of control measures developed to minimise the risks.

h) Ensure that the introduction of control measures does not increase the overall risk to health and safety."

In addition to the above, for a substance:

i) which carries the "risk phrase" as assigned in regulation 2(1) of the CHIP Regulations, R45, R46, or R49, or for a substance or process which is listed in Schedule 1; or

ii) which carries the risk phrase R42 or R42/43, or which is listed in section C or HSE publication "Asthmagen? Critical assessments of the evidence for agents implicated in occupational asthma" as updated from time to time, or any other substance which the risk assessment has shown to be a potential cause of occupational asthma,

exposure is reduced to as low a level as is reasonably practicable.

R42 - May cause sensitisation by inhalation
R42/43 - May cause sensitisation by inhalation and skin contact
R43 - May cause sensitisation by skin contact
R45 - May cause cancer (carcinogen)
R46 - May cause heritable genetic damage (mutagen)
R49 - May cause cancer by inhalation (carcinogen)

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## 27 Cement particle board Dukkaboard XL submitted for tests (B.Hicks 17/03/05)

The Adhesive used 1Keraquick and 2Mapegrip D2 on primed and unprimed boards.
The results are as follows

1 Keraquick grey No primer
- a) 50.0 N
- b) 80.0 N
- c) 80.0 N
- d) 100.0 N

**Average = 77.5 N which = 0.31 N/mm²**

2 Keraquick grey Eco Prim R
- e) 160.0 N
- f) 360.0 N
- g) 300.0 N
- h) 340.0N

**Average = 290.0 N which = 1.16 N/mm²**

3 Mapegrip D2 No primer
- i) 80.0 N
- j) 160.0 N
- k) 1700.0 N
- 1) 170.0 N

**Average = 145.0 N which = 0.58 N/mm²**

4 Mapegrip D2 Eco Prim R
- m) 50.0 N
- n) 70.0 N
- o) 230.0 N
- p) 270.0 N

**Average = 155.0 N which = 0.62 N/mm²**

**Conclusion**
The dusty nature of these boards makes it essential to prime when using cement based adhesive like Keraquick. When using D2 the difference is not so prominent but priming with ECO prim R would be preferable. Thus when priming with Eco Prim R Keraquick or D2 could be used.

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## 28 Product guidance

This is the basis upon which we, Dukkaboard), will deal with our Dukkaboard XL tile backing board product ("the Product" once we have sold it ("the Product ) to you, our customer.

We will subject to the remaining provisions of this document, warrant that the Product will be of satisfactoty quality and fit for its intended purpose.

We will not be liable to you or to any other person for any loss or damage caused as a result of:-

1. you or any other person failing to use the Product strictly in line with any and all instructions of which you are made aware;
2. without limiting the scope of paragraph 1:-
   - 2.1 you failing to take all such steps to strengthen or solidify the floor upon which the Product will be used as are necessary in the circumstances whether in accordance with British Standard 5385-1:2009 which states that backgrounds on which tiles are laid should be rigid and stable so that the tiling does not become subject to excessive stresses, leading to failure;
   - 2.2 the Product not being laid in straight lines with joints staggered;
   - 2.3 the Product not being laid tightly butted together;
   - 2.4 the failure of you, or of any other person, to use Dukkaboard XL Polyurethane Adhesive in fixing the Product to any timber substrate.
3. the Product being used in rooms in which a central or other freestanding structure has caused the floor upon which the Product is used to bow;
4. the Product being laid on a floating or resting floor (for instance tongue and groove floorboards laid over an insulation slab and/or concrete with no mechanical fixings holding the floor in place);
5. malicious damage to the Product or any part of the building in which the Product has been used;
6. any act, omission or negligence of you or any person working for you;
7. unauthorised use of the Product;
8. any alteration or works carried out to the premises where the Product has been used; or
9. normal wear and tear.

   Please note that our liability under this document is limited only to the cost of the Product when it was sold to you. We will not be liable for any consequential or economic loss caused by the Product or its use by you or any other person or by any negligence or other breach of contract of us, our employees, agents or representatives.

Nothing in this document:-

(a) excludes any liability which we may have for death or personal injury caused by our negligence;

(b) affects any statutory rights which you may have as a consumer.