



Vikan A/S

# Shadow Board Materials

Recommendation of materials and construction principles for shadow board product

## 1 FOREWORD

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This document details Vikan’s recommendations for constructing a shadow board. This information is useful for developing shadow boards or the initial discussion with a potential supplier.

## 2 CONTENTS

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- 1 Foreword..... 1
- 1 Material selection ..... 2
- 2 Material properties ..... 3
  - 2.1 Resistance to chemicals, solvents, detergents, oil and grease used at food production site ..... 3
  - 2.2 No water absorption in construction material ..... 3
  - 2.3 High impact strength..... 3
  - 2.4 Shatter properties (Brittleness)..... 3
  - 2.5 High resistance to bending ..... 3
- 3 Construction and derived properties..... 4
  - 3.1 Mobile shadow board with hygienically designed construction ..... 4
  - 3.2 Wall mounted shadow board with spacers for inspection and cleaning behind board ..... 4
  - 3.3 Rigidity of board (size dependent)..... 5
  - 3.4 Machineability and malleability of material ..... 5
  - 3.5 Printing process chosen (UV vs. Laminate)..... 5



# 1 MATERIAL SELECTION

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The material chosen for a shadow board must have some essential characteristics.

Vikan have chosen to divide these into two separate categories, 'Material properties' and 'Construction & derived Properties'.

The sections covered are summarised here

## Material properties:

- Resistance to chemicals, solvents, detergents, oil and grease used at food production site
- No water absorption in construction material
- High impact strength
- High resistance to bending
- Shatter-proof material

## Construction & derived Properties:

- Mobile shadow board with hygienically designed construction (drainable; minimal crevices, sharp internal angles, and rough surfaces; minimal loose fixings, etc..)
- Wall mounted shadow board with spacers for inspection and cleaning behind board
- Rigidity of board (size dependent)
- Additional spacer centrally mounted for larger boards to increase rigidity and stability
- Machinable material
- Printing process chosen (UV vs. Laminate) (Barriers)



## 2 MATERIAL PROPERTIES

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The material properties covered in this section covers

### 2.1 RESISTANCE TO CHEMICALS, SOLVENTS, DETERGENTS, OIL AND GREASE USED AT FOOD PRODUCTION SITE

All parts of the shadow board should be constructed of materials that are resistant to the chemicals and temperatures that they are likely to experience within the food production facility. This could include a range of cleaning and disinfection chemicals with pHs ranging from 2 to 14, and environmental temperatures of between -20°C and +60°C

### 2.2 NO WATER ABSORPTION IN CONSTRUCTION MATERIAL

The materials used for the construction of the shadow board should be minimally absorbent. Moisture absorption by the shadow board can affect both its mechanical strength and its hygiene level.

Most plastics will absorb some moisture. The amount they absorb is indicated as a % weight gain in the plastic due to absorption. This % can vary greatly e.g., Polypropylene = 0,010% to 0,030% vs PA (Nylon) = up to 9.5%.

Boards should not be made of wood or fibreboard. These materials are highly absorbent and ingress of moisture will severely impact on their structural integrity and hygienic performance.

### 2.3 HIGH IMPACT STRENGTH

Due to the industrial environment in which the shadow boards will be installed, Vikan recommend choosing a construction material with a high impact resistance. This will maximise the boards durability on accidental impact with large factory environment equipment.

### 2.4 SHATTER-PROOF PROPERTIES (BRITTLESNESS)

Hard plastic fragments are a food safety and quality issue within a food production environment. The materials used for the construction of the shadowboard should not only be of high impact strength but also be shatter proof, to minimise the risk of foreign body generation.

Plastics will become more brittle and prone to shattering, if a subjected to low enough temperatures. Consequently Vikan recommends a plastic material that does not become brittle until a temperature lower than -20°C is reached. This is not a practical issue with metals like aluminum and stainless steel.

### 2.5 HIGH RESISTANCE TO BENDING

In the section about construction principles, guidance is provided on the addition of wall spacers to a wall mounted shadow board. The addition of spacers makes it easier to clean behind the boards but can result in a less rigid board.

Using materials with high bend resistance will help counteract this, as will using thicker board material.

### 3 CONSTRUCTION AND DERIVED PROPERTIES

#### 3.1 MOBILE SHADOW BOARD WITH HYGIENICALLY DESIGNED CONSTRUCTION

A mobile structure with the intent of supporting a shadow board will most like consist of numerous parts, including wheels.

Some forethought is recommended before deciding on a construction like this. Generally hygienic design principles apply in this regard. These can be summarised as the following:

- Avoid contaminations traps, i.e., places where water, dirt and debris can accumulate and be difficult to remove
- Minimise the number and area of flat horizontal surfaces
- Make the construction self-draining
- Make the construction cleanable
- Chose materials that are scratch, chemical and heat resistant
- Utilise smooth welds
- Minimise the use of loose fixings, e.g. nuts, bolts, screws, washers
- Minimise the use of drilled holes

Vikan would recommend a stainless steel construction.

The metal sections can be hollow but should be sealed, preferably through welding.

Minimise the use of bolts to connect the sections or to fit wheels, handles, boards etc..

A mobile shadow board will require wheels. These are potential bacterial traps. Vikan recommends a good, simple, solid wheel construction that is easy to inspect, clean and dismount.



#### 3.2 WALL MOUNTED SHADOW BOARD WITH SPACERS FOR INSPECTION AND CLEANING BEHIND BOARD

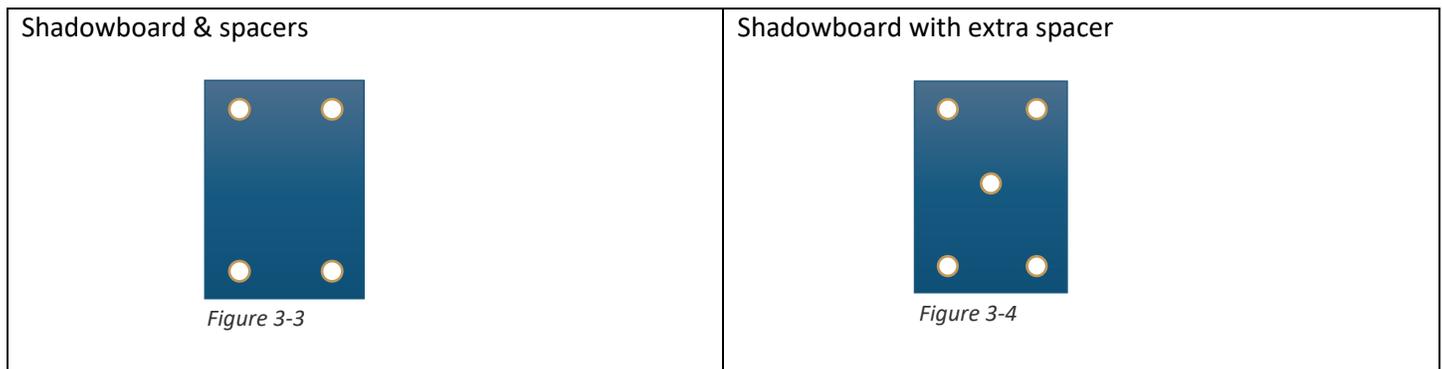
One of the biggest issues with shadow boards is that they are often fixed tightly to the wall using screws, bolts, or glue. This means that they cannot easily be removed for cleaning and has shown that, over time, contamination can build up behind the boards (especially where wet cleaning is involved) and they can then become a major source of contamination. Consequently, it is suggested that shadow boards should be either free standing; mounted at a distance

away from the wall, so that they can be cleaned behind; or secured to the wall by an easy attach/detach mechanism, to make them easier to remove and clean behind.

If using spacers, Vikan recommends utilising spacers that can de-attach the board, for more thorough cleaning if required.

### 3.3 RIGIDITY OF BOARD (SIZE DEPENDENT)

Depending on the board material, dimensions and treatment, the board will have different flexibility properties. Adding wall spacers in the corners, will remove any structural support the wall provides, this setup is shown In Figure 3-. To counteract this, a spacer in the centre of the board can be added, potentially without drilling though the board material, see Figure 3-.



### 3.4 MACHINEABILITY AND MALLEABILITY OF MATERIAL

The shadow board material should be easy to cut, drill and fix. It should be resistant to the compressive load from nut and bolt and to installation damage.

### 3.5 PRINTING PROCESS

Vikan recommends the avoidance of stickers. These are likely to bubble, peel or crack over time and create contamination traps and foreign body issues.

Vikan recommends they use of a stable printing method directly on the board itself (or on to the back of a transparent shadow board). It is important to ensure the print is able to withstand the cleaning agents and temperatures it might be exposed to.

If a protective coating is applied to the board to cover the print, Vikan recommends that the entire board is covered. Care should be taken to ensure that the coating does not bubble, peel or crack over time (as for the stickers)