crealco

Wispeco Architectural Products

Wispeco Installation, Cleaning and Maintenance Procedures for Crealco Products

(Revision 2 – February 2016)

Product of

WISPECO Aluminium

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1 | INTRODUCTION

The purpose of the *Wispeco Installation, Cleaning and Maintenance Guidelines* is to aid the manufacturer of aluminium fenestration products in the installation, cleaning and maintenance of Wispeco and Crealco products.

In the use of this manual, it is recommended that the reader refers to the Table of Contents (see above), the Glossary (all circumscribed terminology henceforth indicated by an asterisk*****), List of figures and List of illustrations (found at the end of the manual), to aid in their full understanding of the procedures being described.

2 | DISCLAIMER

Product(s) must have been fabricated correctly from genuine Wispeco materials and installed correctly – according to product specifications stipulated in product manuals – and maintained in accordance with these recommendations. The onus rests on fabricators to ensure that they are up to date with the latest version of Wispeco manuals (as contained in the latest version of *StarFront, Wispeco's* manufacturing software application). Where Wispeco's products are incorporated into another entity's product or system, or used for any purpose other than its intended use, or where there has been misuse or clear abuse of the product, or where natural disasters or unusual external environmental factors have resulted in damage, or where the product has been altered in any way without Wispeco's knowledge and consent, or where any aluminium profile component is not a genuine product of Wispeco, Wispeco (Pty) Ltd cannot be held liable for any defect.

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BEWARE OF IMITATIONS!

WISPECO PERFORMANCE CERTIFICATES

DO NOT APPLY TO COPIED PRODUCTS

3 | CAUTIONARY ADVICE

3.1 | HAZARDOUS AREAS

Besides general cleaning and maintenance and using correct fixing material, installations in hazardous environmental areas such as coastal and industrial regions require specific pre-assembly preventative measures for aluminium windows and doors to prevent various types of aluminium corrosion. For relevant definitions, literature and guidelines refer to industry literature such as AFSA's (Aluminium Federation of South Africa) "Corrosion pocket guide", Akzo Nobel's "Hazardous areas and edge protection", etc. For your convenience these industry literature and more have been collated on the Crealco Website.

3.2 | SILICONE USE

Acidic based silicon induces aluminium corrosion, especially in hazardous areas such as coastal and industrial regions. It is strongly recommended not to use these and mould resistant types of silicon on aluminium. Refer to AFSA corrosion pocket guide for more info. The use of a Neutral Cure silicone is recommended. The "Crealco Silicon" have specifically been developed for use on aluminium and is available from Wispeco Appointed Stockists.

3.3 | PROTECTION TAPE / FILM

Protection tape or film is intended for aluminium surface protection during transport, fabrication and installation and should be removed immediately after windows and doors are installed and wet trade is completed. Generally these protective films are not resistant to long periods of weather exposure and if left on the product exposed to UV, heat and moisture for long periods could leave a residue on the product upon removal.

4 | INSTALLATION

4.1 | GENERAL FUNDAMENTALS

4.1.1 | SUBSTRATES

The type and condition of the substrate (i.e. building material and the **anchor base***) are decisive for selection of the fixing method. Different fixing methods are used for different building materials – i.e. **concrete, masonry** and **panel building** substrates.

- **Concrete**

  A distinction should be made between 'Standard' and 'Light Weight' concrete. Standard concrete contains stone, gravel and cement while light weight concrete comprises of additives like **pumice***, expanded clay or **styropore***, usually with lower compressive strength. As a result, light weight concrete offers less favorable substrate conditions for anchoring and fixing.

  The magnitude of the bearing force of heavy-load fixing depends (among other things) on the compressive strength of the concrete. This is indicated by the numbers in "short designations": For example the most common concrete strength being C 20/25, which has a compressive strength of 25N/mm^2 (when a sample 150mm cube is crushed in a test machine).

- **Masonry**

  Masonry is a composite of blocks and mortar. The type and condition of the blocks and of the mortar should be taken into consideration for fixing and anchoring. Typically, the compressive strength of blocks is higher than that of mortar, especially in old buildings. In most cases, therefore, anchors should be fixed into masonry blocks. In some cases, the bricks are of poor quality – in which case the mortar may offer a better substrate for fixing.

Generally, four types of masonry blocks can be defined:

a) ***Solid blocks with dense structure*** *(Figure 1)* are building blocks with high resistance to compressive loads. These blocks are without cavities or have only a low percentage of surface holes (up to max. 15%, e.g. as grip-hole). They are very well suited for anchoring fixings. Examples are solid sand-lime bricks and solid clay blocks also known as brick or clinker brick.

b) ***Perforated blocks*** *(Figure 1)* have a compact structure but are perforated or contain hollows. These are mostly manufactured from the same compressive strength materials as solid blocks but manufactured with cavities. If higher loads are to be fixed into these blocks, special fixings should be used that bridge or fill in the cavities. Horizontal perforated blocks and vertical perforated blocks are often termed latticed or honeycomb blocks.

c) ***Solid blocks with porous structure*** *(Figure 1)* usually have a very large number of pores and low compressive strength. Therefore, special fixings should be used for optimal fastening, e.g. fixing with long expansion zone and fixings that engage with the material. Typical examples are solid blocks of light concrete and solid blocks of expanding clay, e.g. 'Liapor', 'Gisoton' and aerated concrete, such as 'Ytong' or 'Hebel'.

d) ***Perforated blocks with porous structure (light perforated bricks)*** *(Figure 1)* have many cavities and pores and thus usually have low compressive strength. In this case, special care must be taken in order to select and install the fixing correctly. Suitable fixings include those with a long expansion zone or injection anchors with a form-locking anchorage, especially with light concrete hollow blocks and cavities filled with polystyrene. Light concrete hollow blocks are often made from pumice or expanding clay.

Figure 1: Types of masonry blocks

- **Panel Building Materials**

  Panel building materials *(Figure 2)* are thin-walled construction materials that usually have limited strength, e.g. plasterboard panels like 'Rigips', 'Knauf', 'LaGyp', 'Norgips', gypsum fireboard like 'Fermacell' or 'Rigicell' or chipboard, hard particle board or plywood. For optimum fastening, special cavity fixings have to be selected. These are fixings of plastic or metal and expand on the rear of the paneling, engaging with a form of locking mechanism that anchors directly on the reverse side of the panel in the cavity.

Figure 2: Panel building materials

4.1.2 | DRILLING

The substrate building material also determines the type of drilling required. **Four** drilling methods exist:

1. **Rotary drilling:** *(Figure 3)* Drilling in rotation without impact for perforated blocks and construction materials with low strength so that the hole does not break out too large and / or the webs in the perforated blocks do not break.
2. **Impact drilling:** *(Figure 3)* Rotation and a high number of light impacts with the impact drilling machine, for solid building materials with dense structure.
3. **Hammer drilling:** *(Figure 3)* Rotation and a small number of impacts with high impact energy with the drilling hammer, also for solid building materials with dense structure.
4. **Diamond or core drilling process:** Mainly used for large hole diameters or with greater reinforcement.

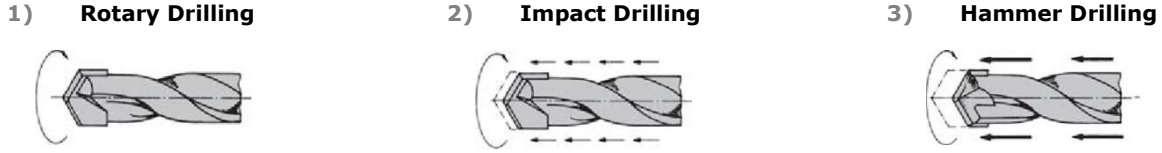


Figure 3: Drilling methods

Carbide drill bits drill faster if they are ground sharp, similar to steel drill bits *(Figure 4)*. There are also special masonry drill bits available.

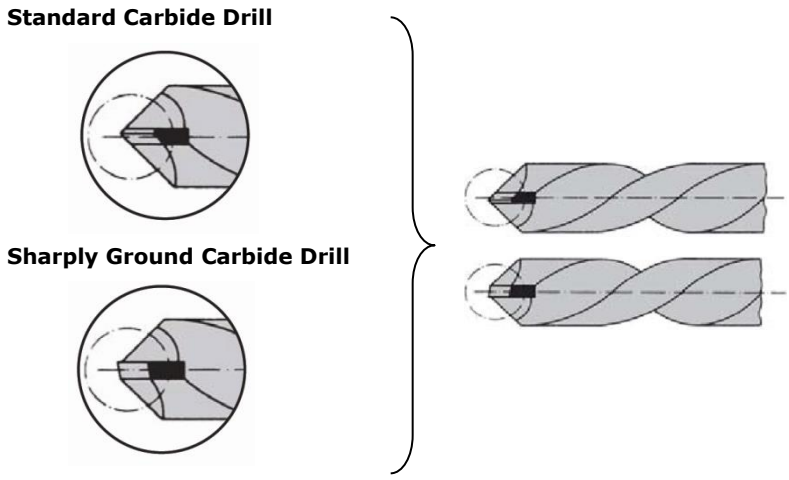


Figure 4: Carbide drill bits

4.1.3 | CALCULATING FAILURE LOADS

During installation, the **failure loads*** and / or the **characteristic failure loads*** of fixings should be calculated. This is done by dividing the respective failure loads by a **safety factor**:

$$\text{Max. working load} = \frac{\text{Failure load (F)}}{\text{Safety Factor } (\gamma)}$$

Recommended safety factor

Compared to the **average** failure load:

- Steel and bonded anchors $\gamma \geq \mathbf{4}$
- Plastic fixing $\gamma \geq \mathbf{7}$

Compared to the **characteristic** failure load:

- Steel and bonded anchors $\gamma \geq \mathbf{3}$
- Plastic fixing $\gamma \geq \mathbf{5}$

Example of a steel fixing with a failure load of **40kN**:

$F_{Gebr.}$ = 40kN/4 = 10kN

The safety factors given above are *standard recommendations* and are only to be used for fixings if nothing different is indicated in the tables of this catalogue (to follow below). With approved fixings, the safety factor can be decreased to γ **= 2.52** by using many test series: in other words, utilization can be optimized with the use of approved fixings.

4.1.4 | PRINCIPLES OF FUNCTION

There are different **bearing mechanisms*** that transfer the forces that act on the fixing into the base material.

1. **With friction connection**

   The expansion part of the fixing is pressed against the whole wall – the outer **tensile*** loads are held by friction.

2. **With form locking**

   The fixing geometry matches the shape of the substrate and / or of the drill hole.

3. **With adhesive bond***

   The mortar adheres the fixing with the anchor base.

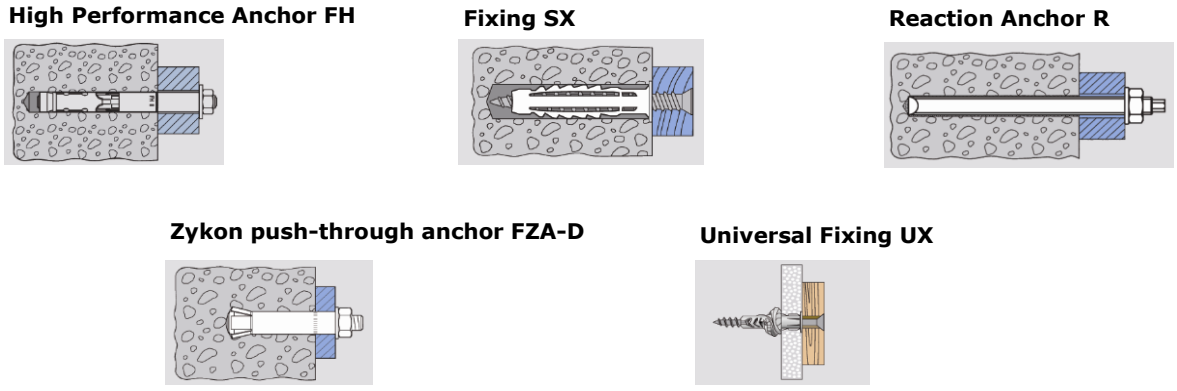


Figure 5: Anchoring and fixing types

4.2 | FIXING METHODS

4.2.1 | S–PLUG

The **S–Plug** *(Figure 6)* can be described as a nylon expansion fixing that is used with wood-chipboard and self-tapping screws.

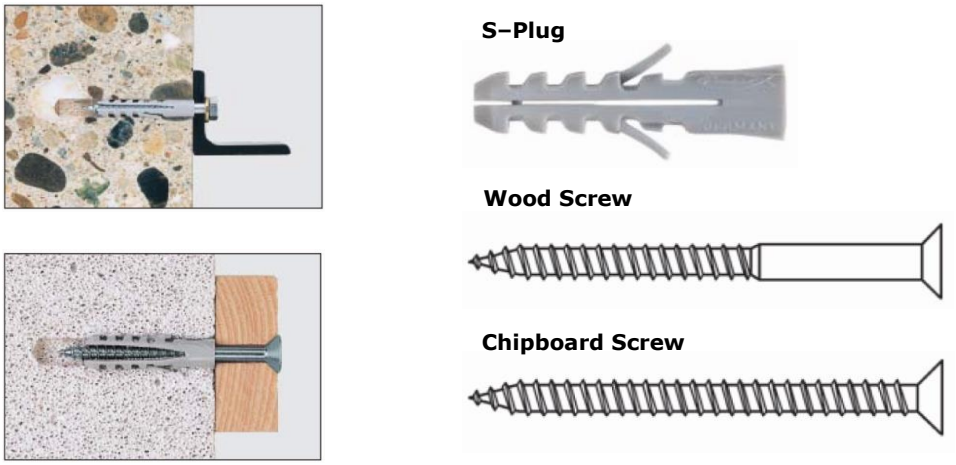


Figure 6: S–Plug and screw types

An **S–Plug** is **suitable for** concrete, natural stone with dense structure, solid brick, solid sand-lime brick, solid block made from lightweight concrete and hollow concrete blocks. PLUG S is generally used for the **fixing of** pictures, motion detectors, lamps, skirting, electric switches, small wall-mounted shelves, towel rails, lightweight mirror cabinets, letter boxes, hanging baskets and curtain rails.

Its **advantages** and **benefits** are:

- Anti-rotation lugs stop the plug rotating in the drill hole;
- The wide neck is subject to no expansion pressure and prevents surface damage to tiles and plaster;
- It is temperature resistant from **-40^{0}C** to **+80^{0}C**;
- It can be used with wood, slabs made of perforated bricks, hollow concrete blocks and so forth.

Note: for installations close to the edge we recommend turning the plug in a way that the direction of expansion acts parallel to the edge *(Figure 7)*.

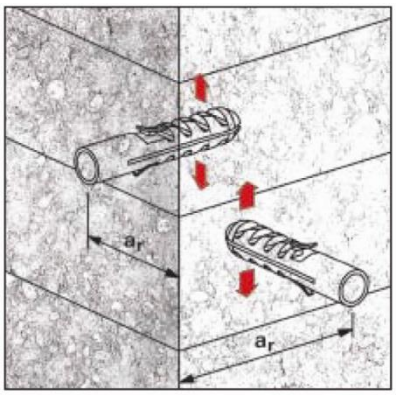


Figure 7: Direction of expansion

4.2.2 | SX–PLUG

The **SX–Plug** *(Figure 8)* is a nylon expansion fixing used with wood, chipboard, and self-tapping screws. SX long version plugs are mainly used for higher anchoring depth in perforated building materials, **aircrete*** and to bridge plaster.

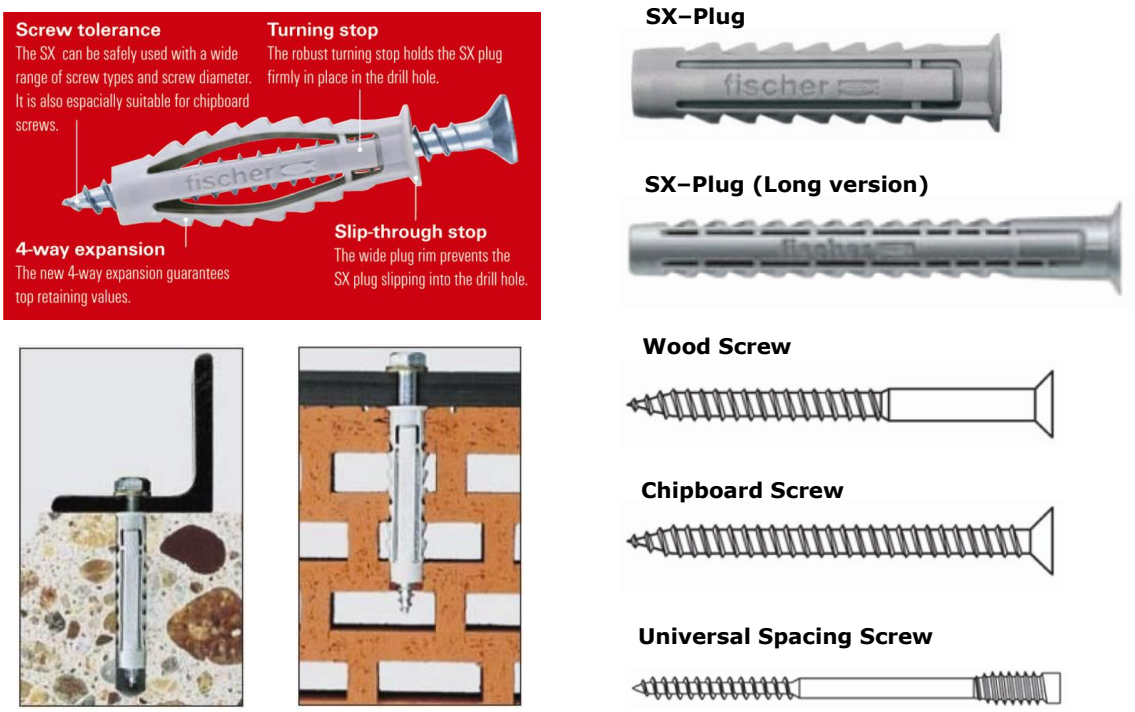


Figure 8: SX–Plug and screw types

It is **suitable for** concrete, pre-stressed hollow-core concrete slab, natural stone with dense structure, solid brick, solid sand-lime brick, solid block made from lightweight concrete, aircrete, solid panel made from **gypsum***, vertically perforated brick, perforated sand-lime block, hollow block made from lightweight concrete, slabs made of perforated bricks as well as hollow concrete blocks. An SX–Plug is generally used for the **fixing of** pictures, motion detectors, lamps, electric switches, small wall-mounted shelves, towel rails, lightweight mirror cabinets, letter boxes, hanging baskets and curtain rails.

Its **advantages** and **benefits** are:

- 4-way expansion guarantees highest grip;
- Anti-rotation lugs prevent the plug rotating in the drill hole;
- The special spread-free neck prevents damage to tiles and plaster;

- Simple and quick push-through installation reduces installation time;
- Integrated hammer-in-stop enables (with pre-assembled screw) push-through installation;
- The fixing's collar prevents it slipping deeper into the drilled hole;
- Temperature-resistant from **-40°C** to **+80°C**;
- The plug's geometry allows the use of wood and chipboard screws between 2 and 12mm.

4.2.2.1 | Pre-positioned & Push-through installation

When using either the S–Plug or the SX–Plug there are (essentially) **two** installation methods: **(1)** pre-positioned installation *(Figure 9)* and **(2)** push-through installation *(Figure 10)* – both are best illustrated graphically:

(1) Pre-positioned installation

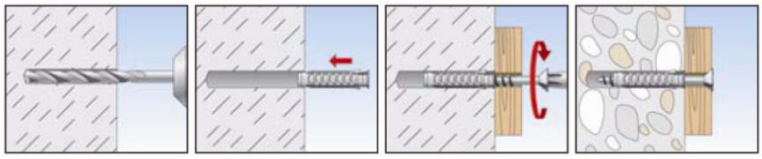


Figure 9: Pre-positioned installation

(2) Push-through installation

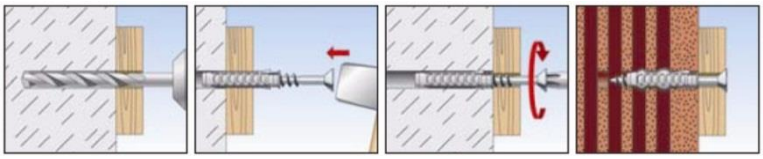


Figure 10: Push-through installation

The required screw length is determined by the anchorage depth, the thickness of the fixture and the screw diameter. Push-through installation requires the largest possible screw diameter. Drill only in a rotary motion (i.e. hammer switched off) in perforated and hollow bricks and aerated concrete. For safety relevant applications under permanent tensile load, nylon plugs are not allowed. Therefore nylon plugs may not be used for suspensions from the ceiling (such as lightings).

4.2.2.2 | Technical Data: SX–Plugs

TECHNICAL SPECIFICATIONS SX PLUG							
Type	**Art. No.**	**ID**	**Drill** d_0 (mm)	**Min. drill hole depth** (mm)	**Plug length –min. anchoring depth** $l = h_{ef}$ (mm)	**Chipboard screw** $d_s \times l_x$ (Ø mm)	**Qty. per box** (pcs)
SX 4 x 20	70004	4	4	25	20	2 - 3	200
SX 5 x 25	70005	1	5	35	25	3 - 4	100
SX 6 x 30	70006	8	6	40	30	4 - 5	100
SX 6 x 50*	24827	0	6	60	50	4 - 5	100
SX 6 x 50R	78185	2	6	60	50	4 - 5	100
SX 8 x 40	70008	2	8	50	40	4.5 - 6	100
SX 8 x 65	24828	7	8	75	65	4.5 - 6	50
SX 10 x 50	70010	5	10	70	50	6 - 8	50
SX 10 x 80	24829	4	10	95	80	6 - 8	25
SX 12 x 60	70012	9	12	80	60	8 - 10	25
SX 14 x 70	70014	3	14	90	70	10 - 12	20
SX 16 x 80	70016	7	16	100	80	12 (½')	10
***Without collar**							

Table 1: Technical Specifications SX Plug

TECHNICAL SPECIFICATIONS SX PLUG WITH CHIPBOARD SCREW								
Type	**Plug SX with Chipboard Screw**	**ID**	**Drill d_o** (mm)	**Min. drill hole depth** (mm)	**Plug length – min. anchoring depth $l = h_{ef}$** (mm)	**Max. useable length t_{fix}** (mm)	**Chipboard screw $d_s \times l_x$** (Ø mm)	**Qty. per box** (pcs)
SX 6 x 30 S /10	70021	1	6	40	30	10	4.5 x 40	50
SX 8 x 40 S / 20	70022	8	8	50	40	20	5 x 60	50

Table 2: Technical Specifications SX Plug With Chipboard Screw

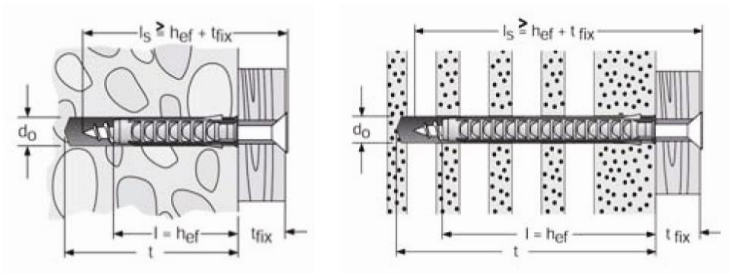


Figure 11: Technical data (SX-Plug)

RECOMMENDED LOADS N_{REC} [kN] AND MEAN ULTIMATE LOADS N_U [kN]

These values apply to the use of wood screws with the given screw diameter.
When using chipboard screws these values should be reduced by 30%.

Fixing Type	Wood screw diameter (mm)	Substrate	Concrete ≥ C12/C15	Solid brick ≥ Mz12 (DIN105)	Solid sand-lime brick ≥ KS12 (DIN106)	Vertical perforated brick ≥ Hlz12 (p ≥ 1.0 kg/dm³) (DIN105)	Perforated sand-lime brick ≥ KSL12 (DIN106)	Aerated concrete ≥ PB2	Aerated concrete ≥ PB2
SX 5x25	4	N_{rec}	0.3	0.3	0.3	0.07	0.17	0.03	0.09
		N_u	2.00	1.6	2.0	0.5	1.2	0.2	0.6
SX 6x30	5	N_{rec}	0.7	0.3	0.5	0.07	0.3	0.03	0.09
		N_u	4.9	2.2	3.5	0.5	2.1	0.2	0.6
SX 6x50 SX 6x50R	5	N_{rec}	0.8	0.6	0.8	-	0.3	-	0.15
		N_u	6.8	4.4	6.4	-	2.7	-	1.0
SX 8x40	6	N_{rec}	0.7	0.65	1.2	0.17	0.3	0.09	0.3
		N_u	8.5	4.5	8.5	1.2	2.0	0.6	2.0
SX 8 x 65	6	N_{rec}	0.7	0.6	0.6	0.17	0.35	0.04	0.14
		N_u	6.0	4.1	4.2	1.2	2.3	0.3	1.0
SX 10x50	8	N_{rec}	1.2	0.65	1.2	0.17	0.3	0.09	0.3
		N_u	8.5	4.5	8.5	1.2	2.0	0.6	2.0
SX 10x80	8	N_{rec}	1.2	12	1.2	0.5	0.8	0.2	0.6
		N_u	8.5	8.5	8.5	3.5	6.5	1.4	4.2
SX 12x60	10	N_{rec}	1.7	0.7	1.7	0.26	0.3	0.14	0.45
		N_u	12.0	6.0	12.0	1.8	2.0	1.0	3.1
SX 14x70	12	N_{rec}	2.0	0.8	2.0	0.4	0.3	0.3	0.5
		N_u	14.1	6.6	14.1	3.1	2.2	2.2	3.4
SX 16x80	12	N_{rec}	2.6	0.9	2.6	0.6	0.4	0.4	0.6
		N_u	18.0	6.9	18.0	4.1	2.8	2.8	4.0

[1]Due to large range of scatter of the test results being unsuitable, the failure of the substrate varies greatly therefore no reproducible values can be given.

Table 3: Recommended loads and mean ultimate loads

DISTANCE FROM COMPONENT EDGES (EDGE AND CORNER DISTANCE A_R) IN CONCRETE		
Fixing	**Screw diameter** (mm)	**Edge / corner distance** (mm)
SX 6 x 30	5	35
SX 8 x 40	6	40
SX 10 x 50	8	50
SX 12 x 60	10	65

Table 4: Distance from component edges in concrete

4.2.3 | WINDOW FRAME FIXING F-S

Window **Frame Fixing F-S** *(Figure 12)* can be described as a nylon window frame fixing. By tightening the screw, the glass-fibre reinforced plastic cone is drawn into the sleeve, whereby the fixing is expanded and wedged inside the drill hole.

Window Frame Fixing F-S
(with zinc plated countersunk screw and cross-drive recess)

Cover Caps

Figure 12: Window frame fixing F-S and cover caps

It is **suitable for** concrete, natural stone with dense structure, solid brick, solid sand-lime brick, solid block made from lightweight concrete, aircrete, solid panel made from gypsum, vertical perforated brick, perforated sand-lime block and hollow block made from lightweight concrete. Window Frame Fixing F-S is used for the **fixing of** windows, door frames and squared timbers.

Its **advantages** and **benefits** are:

- The sleeve is made of polyamide (nylon) for secure anchoring even in fragile building materials;
- The principle of installation prevents window frames from being pulled against the substrate;
- Locking lugs on the edge of the fixing provides strong joint resistance to both compressive and tensile loads, particularly with metal and plastic hollow sections;
- The plastic sleeve avoids contact corrosion and thermal bridges between metal window frames and the fixing screw;
- Cover caps conceal the fixing.

When installing Window Frame Fixing F-S, use the **push-through** installation method *(Figure 13)*:

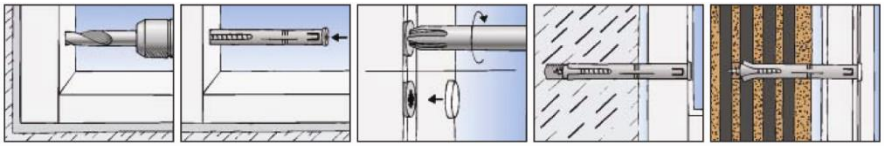


Figure 13: Push-through installation of window frame fixing F-S

4.2.3.1 | Technical Data: Window Frame Fixing F-S

TECHNICAL SPECIFICATIONS – WINDOW FRAME FIXING F-S									
Type	**Art.No**	**ID**	**Drill Ø** d_o (mm)	**Min. drill hole depth** t_d (mm)	**Effect anchorage depth** h_{ef} (mm)	**Anchor length** l (mm)	**Max. unusable length** T_{fix} (mm)	**Plug edge** (Ø mm)	**Qty. per box** (pcs)
F 8 S 100	88635	9	8	115	40	100	50	10	550
F 8 S 120	88636	6	8	135	40	120	70	10	50
F 8 S 140	88637	3	8	155	40	140	90	10	50
F 10 S 75	88625	0	10	90	50	75	15	12	50
F 10 S 100	88626	7	10	115	50	100	40	12	50
F 10 S 120	88627	4	10	135	50	120	60	12	50
F 10 S 140	88628	1	10	155	50	140	80	12	50
F 10 S 165	88629	8	10	180	50	165	105	12	50
Screw head Ø 10mm and 12mm									

Table 5: Technical Specifications – Window Frame Fixing F-S

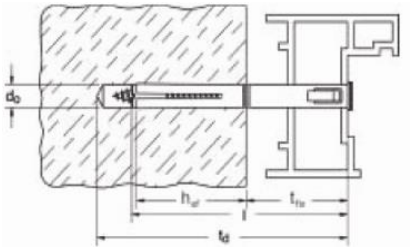


Figure 14: Technical data (Window Frame Fixing F-S)

TECHNICAL SPECIFICATIONS – COVER CAPS FOR F-S				
Type	**Art.No**	**ID**	**Cap** (Ø mm)	**Qty. per box** (pcs)
ADF 12W White	**60275**	**1**	**12**	**100**

Table 6: Technical Specifications – Cover Caps for F-S

RECOMMENDED LOADS N_{REC} [kN] AND MEAN ULTIMATE LOADS N_U [kN]						
Fixing Type	**Substrate**	**Concrete ≥ B25**	**Solid ≥ Mz 12**	**Solid sand-lime brick ≥ KS12**	**Solid brick made from lightweight concrete ≥ V2**	**Perforated sand-lime brick ≥ KSL 6**
F 8 S	N_{rec}	0.78	0.90	0.90	0.25	0.25
	N_u	3.1	3.6	3.6	1.0	1.0
F 10 S	N_{rec}	1.48	1.25	1.25	-	-
	N_u	6.9	6.0	6.0	-	-

Table 7: Recommended loads and mean ultimate loads

4.3 | PROCEDURES

4.3.1 | WINDOWS

When fitting aluminium windows **two** fixing methods are typically used: using **(1)** an extruded aluminium fixing lug or **(2)** using a plug and screw.

1. Using an **extruded aluminium fixing lug**

   Using an extruded aluminium fixing lug *(Figure 15)* allows the window to be factory **glazed*** and **wrapped***. This method is most commonly used when the inside **reveal** is to be plastered after fixing, thereby concealing the lug. Use a minimum 6 x 35mm HPS **anchor***.

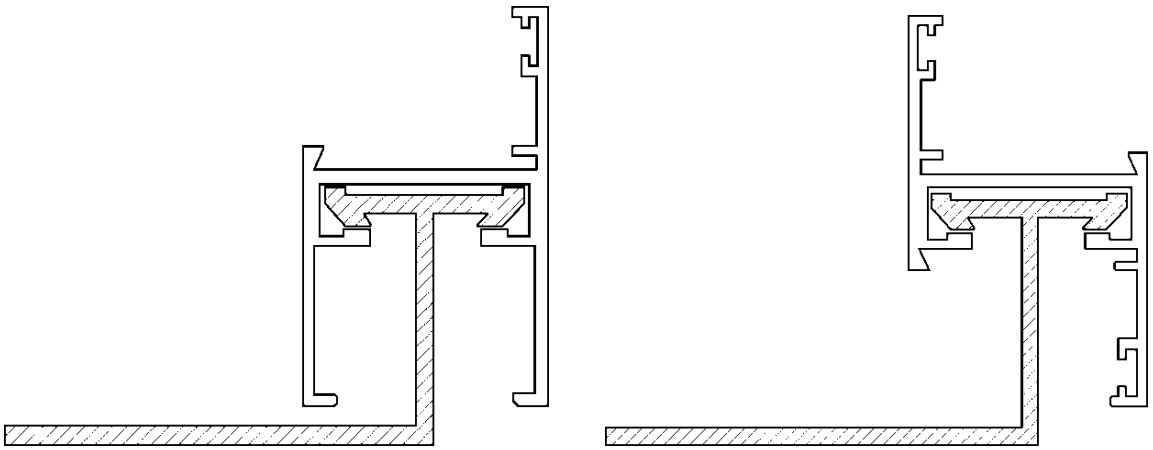


Figure 15: Window fixed with extruded aluminium lug

   Windows are put into position – the sill is then built at a *later* stage – the bottom lugs can be left in place but it is often found that the mason either bends them out of its way or breaks them off. This practically means that most windows are only secured on three sides.

2. Using **a plug and screw**

   This method entails **counter sunk screw-fixing** through the frame of unglazed windows. It is used to fit a window to a face-brick reveal – therefore glazing and plastic wrap is done **on site**. Use a minimum 5 x 75mm stainless steel or plated woodscrew.

TYPICAL CASEMENT WINDOW FASTENING POSITION

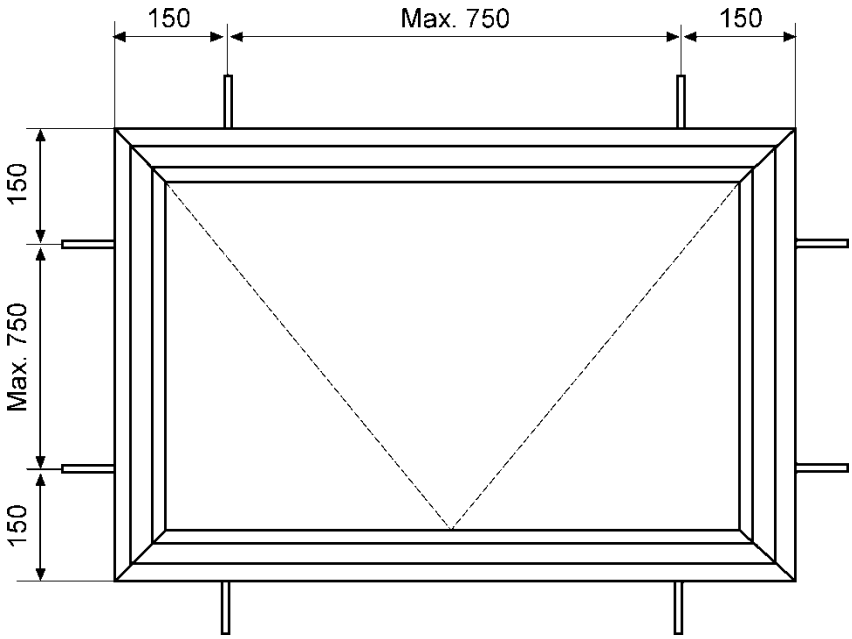


Figure 16: Typical casement window fastening position

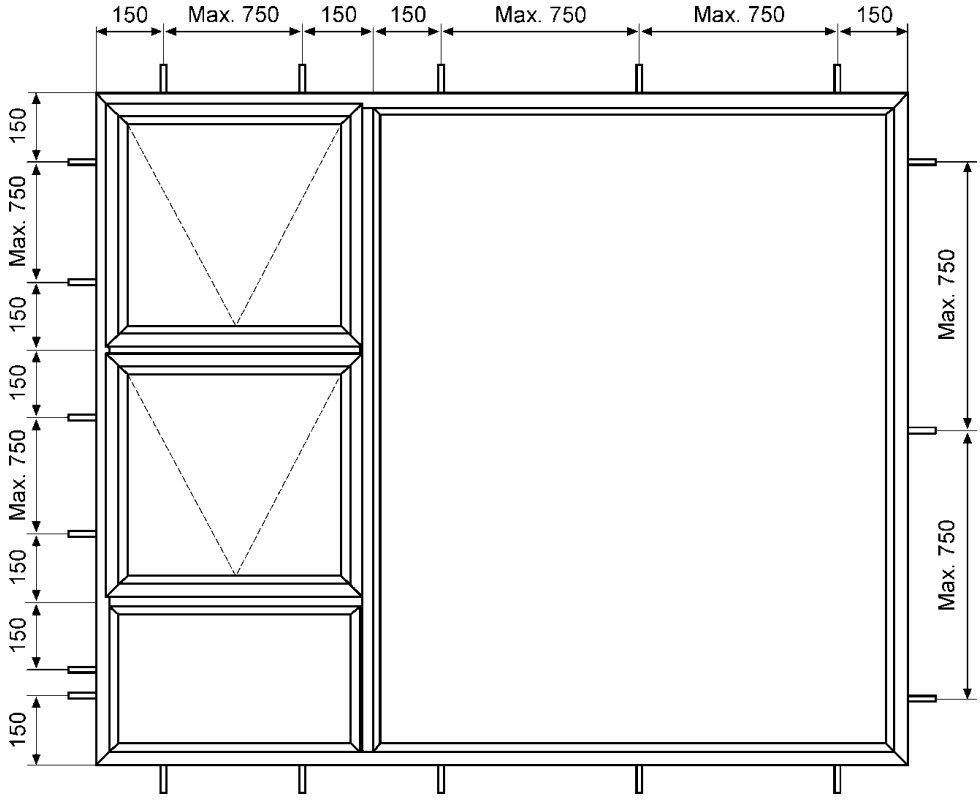


Figure 17: Typical casement window fastening position (2)

4.3.2 | SHOP FRONTS

Shop fronts are typically installed using one of **two** methods: using either **(1)** an aluminium strap or **(2)** a plug and screw.

1. Using **an Aluminium strap**

   When an **Aluminium strap*** is used *(Figure 18)*, the reveal is plastered *after* installation. Use a minimum 6 x 35mm HPS anchor.

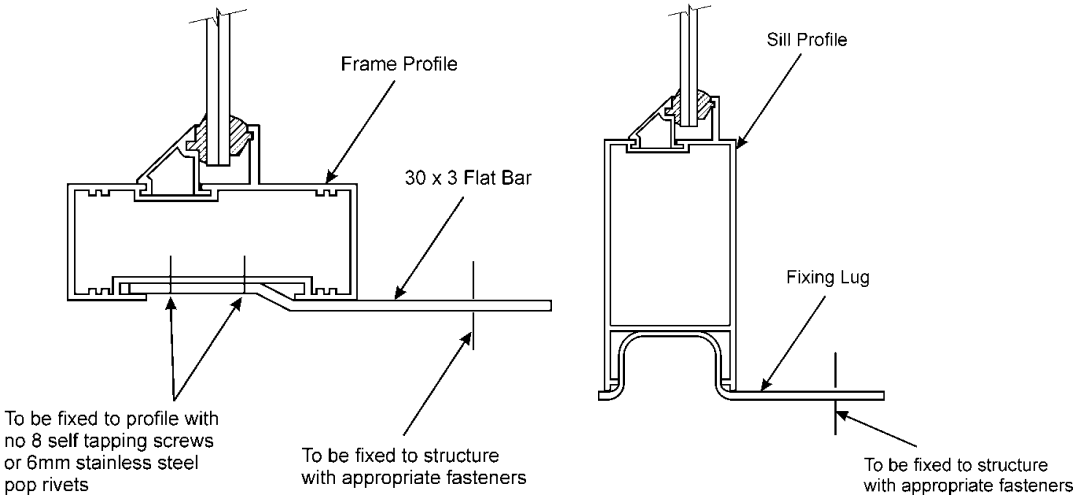


Figure 18: Shop front fixed with aluminium strap

2. Using **plug and screw**

   Again, this method entails counter sunk screw-fixing through the frame *(Figure 19)* – see methods A & B. For the recommended positions of fixing lugs, see attached drawings.

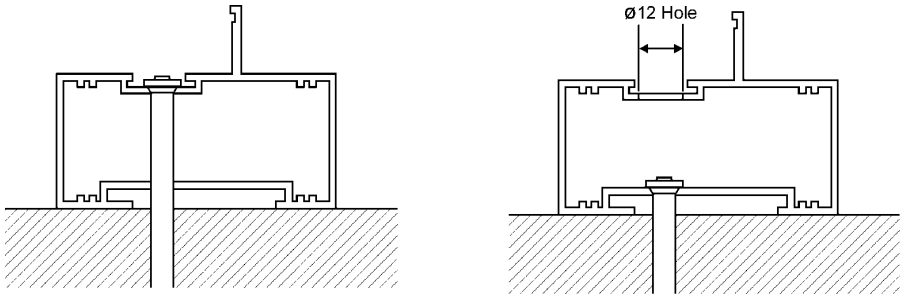


Figure 19: Counter sunk screw-fixed through the frame

TYPICAL SHOPFRONT FASTENING POSITIONS

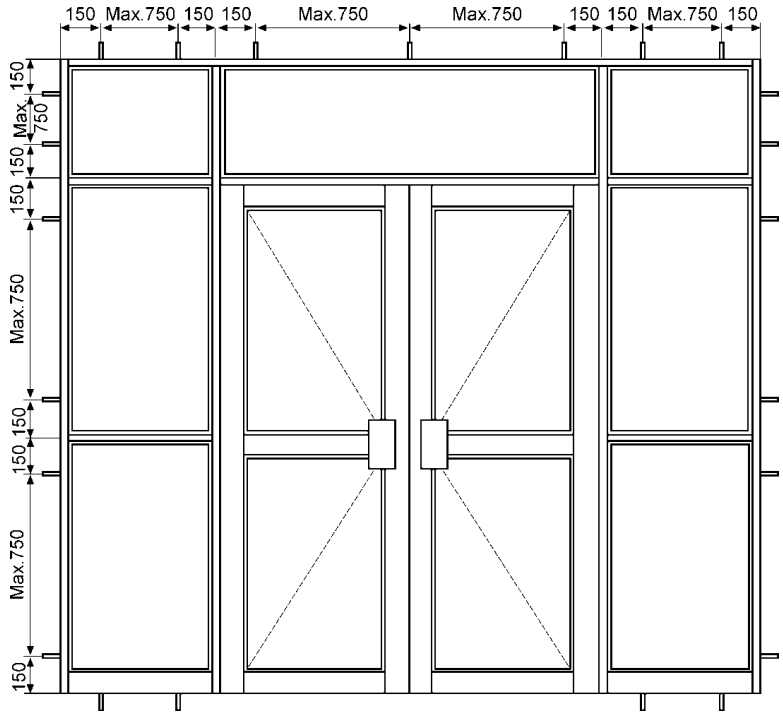


Figure 20: Typical shop front fastening position

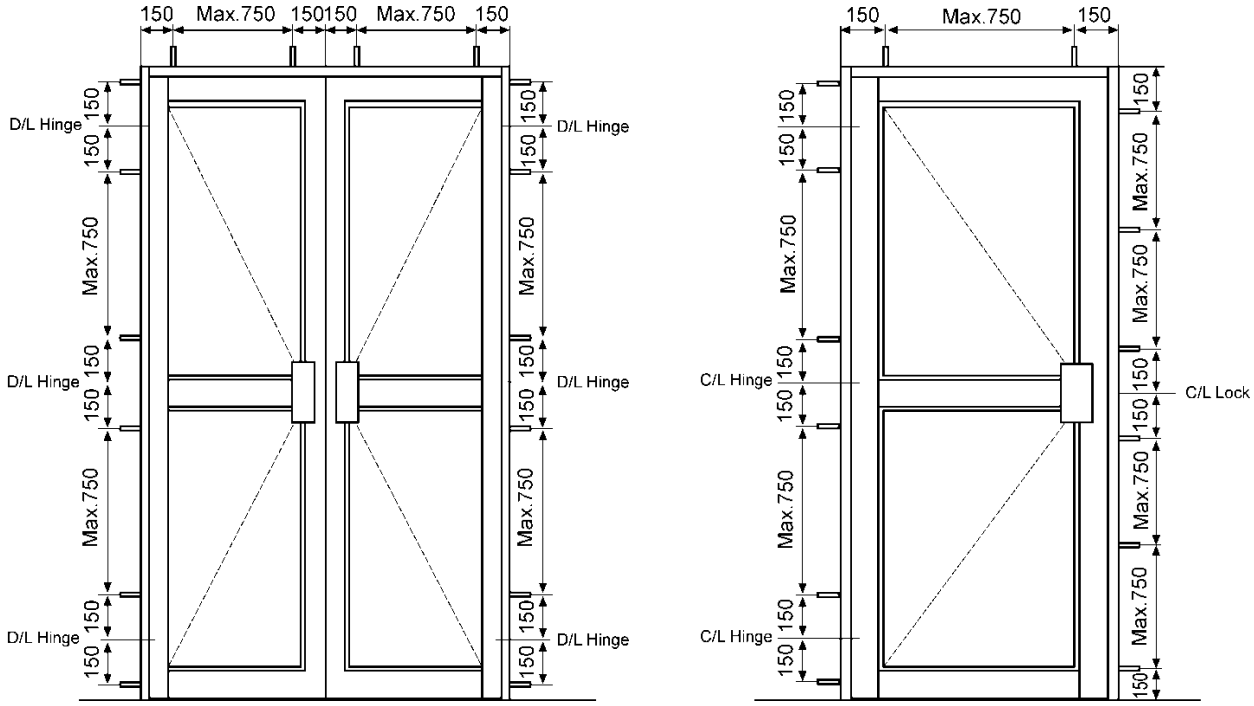


Figure 21: Typical shop front fastening positions (2)

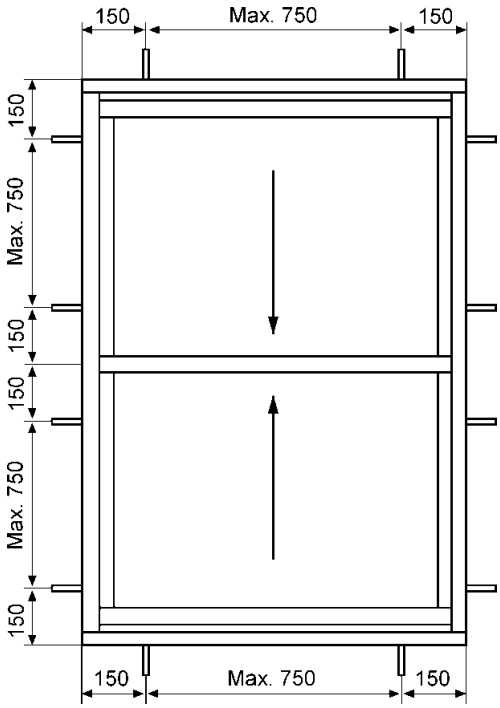


Figure 23: Typical vertical sliding window fastening system

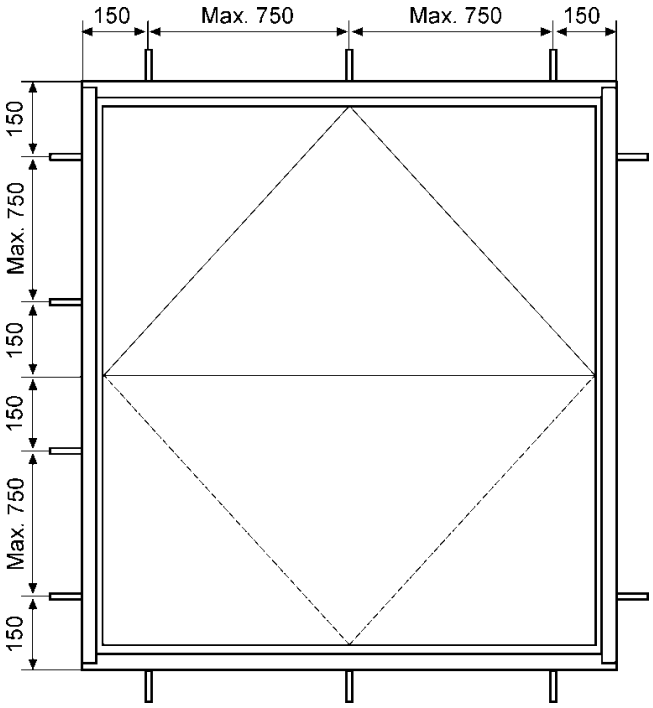


Figure 22: Typical pivot window fastening positions

TYPICAL HORIZONTAL SLIDING WINDOW & DOORS

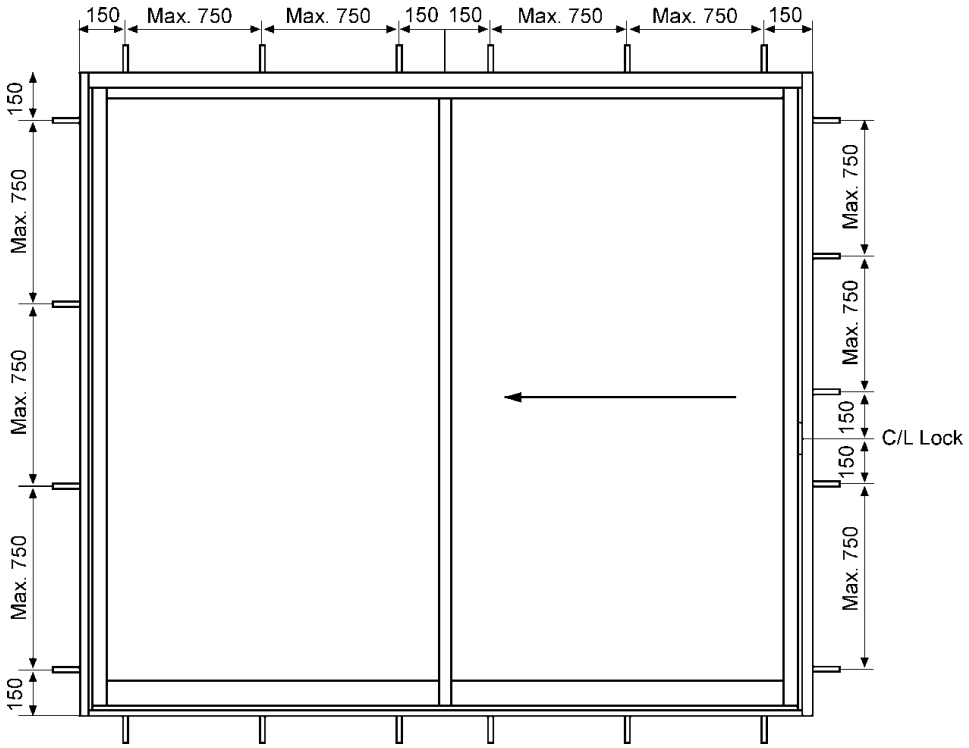


Figure 24: Typical horizontal sliding window & doors

4.4 | GLAZING

4.4.1 | WHAT IS GLAZING?*

Glazing is the process of installing windows and inserting a sealed protective glazing on glass windows.

4.4.2 | LOCATION OF GLASS SETTIN BLOCKS

Glass-to-metal contact must be avoided at all times by using **Glass setting blocks**having a hardness of 50^0 to 90^0 **shore A durometer***. Use only blocks made of Neoprene, EPDM, Silicone or other **elastomeric*** material.

Setting blocks are to have a minimum thickness of 3mm and must be at least 27mm in length per square metre of glass area[1].

In the event of laminated glass and / or sealed insulated glass unit's drainage is to be provided to prevent the glass edge from being submerged. Two or more 7mm diameter holes or 5mm x 9mm slotted holes (or larger) are to be equally spaced in the sill section of **sash*** or frame to allow for such ventilation / drainage.

THE POSITION OF THE GLASS SETTING BLOCKS

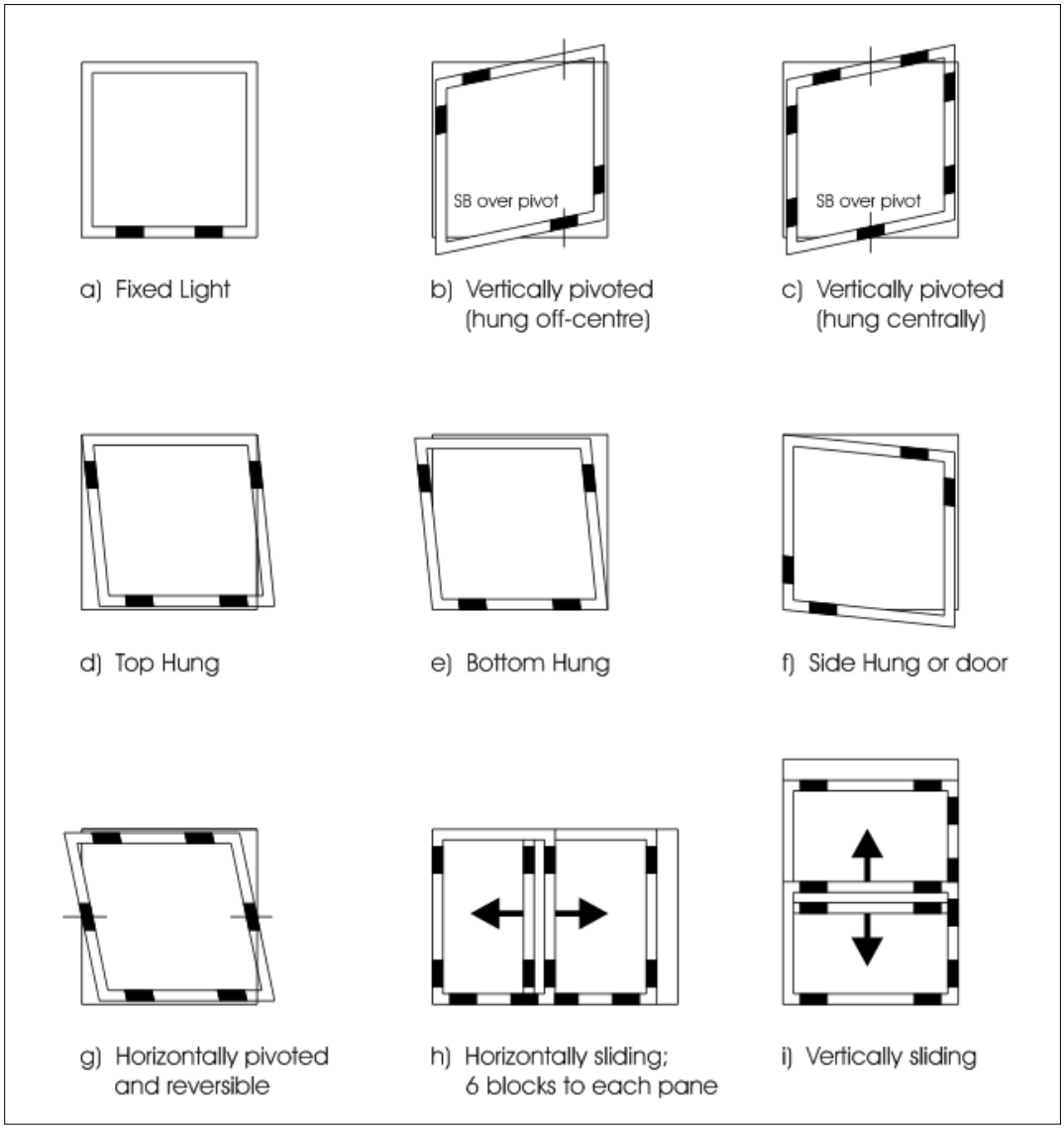


Figure 25: Position of setting and location blocks

Refer to *Figure 26: Steps for positioning of setting blocks*. Insert the pull-in vinyl butterfly gasket into glazing beads by sliding or pressing it into the groove **(1)**. Before cutting gasket, ensure that it has not stretched and cut 6mm longer so that gasket corners are in compression at all times.

Position bottom glazing bead in glazing bead rebate **(2)**.

Place glass on glazing blocks **(3)**.

Insert top and then side glazing beads ensuring that they are in correctly.

Starting from top centre, insert roll in wedge gasket **(4)** without stretching it **(5)**. Stop 150mm from corner and partly cut gasket 6mm longer than the edge of the vertical bead. Insert gasket at corner and then roll in remaining 150mm. Repeat this on the other sides. Where gasket ends meet, cut gasket 6mm longer. Insert cut ends first and complete.

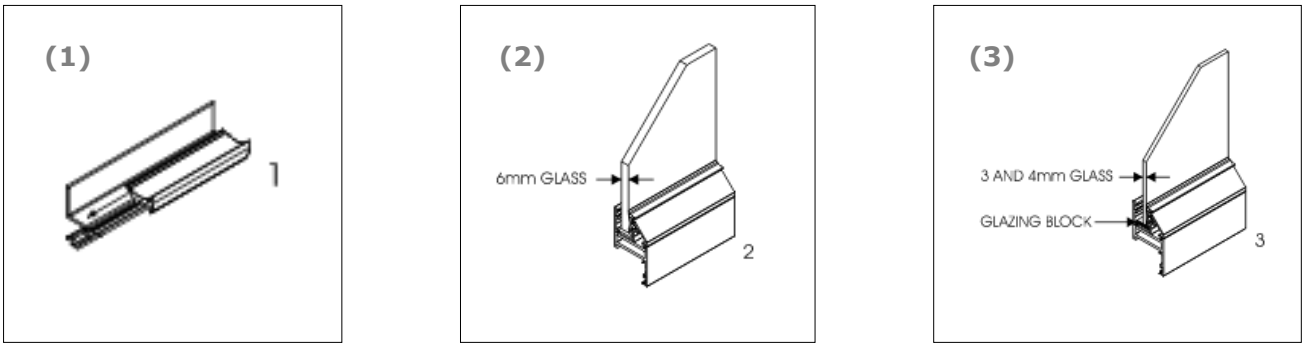
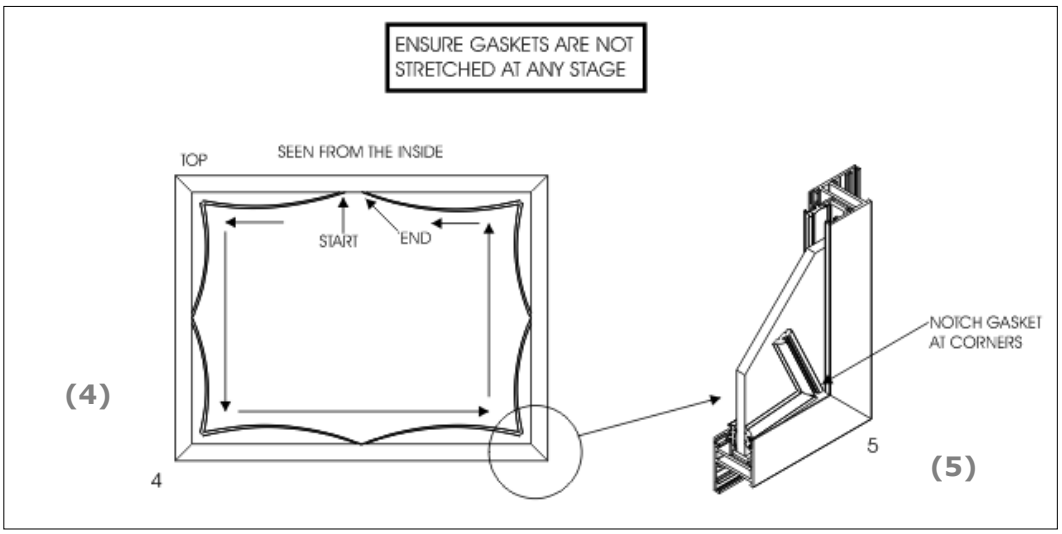


Figure 26: Steps for positioning of setting and location blocks



4.4.3 | SAGGA* REGULATIONS

Contractors involved with the installation of glazing products are advised that the Minister of Trade & Industry, Mandisi Mphalwa, Gazetted the following rules on 30 May 2008 (effective from 1 October 2008). Installations will be inspected in accordance with *South African National Standard (SANS) – Part N: Glazing, Edition 3.1 (SANS 10400: 2012)*. Here follows those regulations.

4.4.3.1 | EXTERNAL GLAZING (Structures not exceeding 10m / 3 storeys)

VERTICAL GLAZING – SUPPORTED ALL ROUND							
	Maximum Pane sizes (m^2)						
Nominal Glass Thickness (mm)	**3**	**4**	**5**	**6**	**8**	**10**	**12**
Monolithic* Annealed Glass	0.75	1.5	2.1	3.2	4.6	6.0	6.0
Patterned Annealed & Wired Glass	-	0.75	1.2	1.9	2.6	3.4	-
Laminated Annealed Safety Glass	-	-	-	2.9	4.3	6.7	6.7
Toughened Safety Glass	-	1.9	3.0	4.5	8.0	8.0	8.0

Table 8: Vertical (external) glazing - supported all round

VERTICAL GLAZING – TWO OPPOSITE SIDES SUPPORTED							
	Maximum Pane sizes (m^2)						
Nominal Glass Thickness (mm)	**3**	**4**	**5**	**6**	**8**	**10**	**12**
Monolithic Annealed Glass	-	0.4	0.5	0.6	0.85	1.0	1.3
Patterned Annealed & Wired Glass	-	0.25	0.3	0.35	0.5	0.6	-
Laminated Annealed Safety Glass	-	-	-	0.55	0.8	0.95	1.2
Toughened Safety Glass	-	0.55	0.7	0.85	1.15	1.3	1.8

Table 9: Vertical (external) glazing – two opposite sides supported

4.4.3.2 | INTERNAL GLAZING

VERTICAL GLAZING – SUPPORTED ALL ROUND							
	Maximum Pane sizes (m^2)						
Nominal Glass Thickness (mm)	**3**	**4**	**5**	**6**	**8**	**10**	**12**
Monolithic Annealed Glass	0.75	1.5	2.1	3.2	4.6	6.0	6.0
Patterned Annealed & Wired Glass	-	0.75	1.2	1.9	2.6	3.4	-
Laminated Annealed Safety Glass	-	-	-	4.1	6.0	7.2	7.2
Toughened Safety Glass	-	3.0	4.2	6.4	9.2	9.2	9.2

Table 10: Vertical (internal) glazing – supported all round

VERTICAL GLAZING – TWO OPPOSITE SIDES SUPPORTED							
	Maximum Pane sizes (m^2)						
Nominal Glass Thickness (mm)	**3**	**4**	**5**	**6**	**8**	**10**	**12**
Monolithic Annealed Glass	-	0.65	0.8	0.95	1.3	1.55	2.0
Patterned Annealed & Wired Glass	-	0.4	0.48	0.57	0.78	0.9	-
Laminated Annealed Safety Glass	-	-	-	0.9	1.25	1.5	1.95
Toughened Safety Glass	-	0.9	1.1	1.3	1.75	2.0	2.7

Table 11: Vertical (internal) glazing – two opposite sides supported

MINIMUM GLASS FIN DIMENSIONS		
Fin Height (m)	**Internal**	**External**
1.5	150 x 12	150 x 15
2	150 x 12	150 x 19
2.5	150 x 12	175 x 19
3	175 x 15	200 x 25
3.5	225 x 15	275 x 25
4	275 x 15	300 x 25
Note: A butt joint is assumed to have no structural strength. Accordingly panels, which incorporate a butt joint, are not considered to be supported on four sides. A glass fin is necessary to provide the support at the joint so that the pane can be considered to be supported along four sides. Should no fin be in place selection of glass must be in accordance with the tables above.		

Table 12: Minimum glass fin dimensions

4.4.3.3 | FRAMING (Irrespective of Material Type)

Glazing must comply with all the requirements of **SANS* 613** for the wind and impact loads as determined in accordance with the requirements of **SANS 10400-B** by a **competent person** (structures). Obtain **AAAMSA*** (Association of Architectural Aluminium Manufacturers of South Africa) Performance Test Certificate to confirm compliance with SANS 613. **Please note**: minimum wind load for external application is 1000Pa (A1) and internal application 600Pa (A0).

DIMENSIONS FOR FLAT FRAMELESS GLASS SHOWER ENCLOSURES		
	Maximum panel size (m^2)	
Toughened safety glass thickness (mm)	**Doors and panels supporting doors**	**Fixed Panels**
6	1.6	2.1
8	2	3.3
10	2.2	4.00
Note: This table does not apply to curved glass.		

Table 13: Dimensions for flat frameless glass shower enclosures

4.4.3.4 | SAFETY GLAZING

The performance of safety glazing material must be in accordance with the requirements of **SANS 1263-1** and the individual panes of safety glazing material shall be permanently marked by the installer in such a manner that the markings are visible after installation.

Safety glazing material that complies with SANS 1263-1 is to be used where:

1. Doors and sidelights form part of any entrance up to 2100mm from finished floor level;
2. A window has a sill height of less than 500mm from the floor or external ground level;
3. A window has a sill height of less than 800mm from the floor or external ground level without any permanent barrier[2] that prevents persons from coming into contact with the glass panel, and is so placed that persons are likely, on normal traffic routes, to move directly towards such window;
4. A bath enclosure or shower cubicle is glazed, or where glazing occurs immediately above and within a distance of 1800mm horizontally or vertically from a bath or shower;
5. Glazing is used in any shop front or display window within 2100mm from the finished floor level;
6. Glazing is used in any wall or balustrade to (or immediately adjacent to) a stairway, ramp, landing, pathway, patio, veranda or balcony;
7. Glazing is used within 1800mm of the pitch line of a stairway or the surface of a ramp, landing, pathway, patio, veranda or balcony;
8. Glazing applications are sloped or are horizontal;
9. A mirror is installed as a facing to a cupboard door less than 800mm above floor level and there is no solid backing;
10. Glazing is used around areas such as swimming pools and ice rinks; and
11. Glazing is used in internal partitions, within 2100mm of floor level.

All glazing for occupancy or building classification is A3 (places of instruction), E1 (place of detention), E2 (hospital) and E3 (other institutional (residential buildings)) and H2 (dormitory), where such is associated with a building of occupancy classification A3, E1, E2 or E3 (see SANS 10400-A) shall be safety glazing material that complies with the requirements of SANS 1263-1.

Glass in balustrades should be toughened safety glass unless rigidly supported on all sides. Glazing material in balustrades is subject to impact and line loads determined in accordance within the requirements of **SANS 10160-2**.

Glass in horizontal or sloping applications must be laminated safety glass or toughened safety glass. Toughened safety glass can only be used where individual panes are framed on all sides.

Wired glass having two-edge support may be used in vertical glazing saw tooth roofs.

4.4.3.5 | GENERAL

Glazing installations ***not*** covered by or deviating from items mentioned above – such as, but not limited to, external glazing in structures in excess of 10m in height, overhead or sloped glazing, glass flooring, three and one edge supported glass, toughened glass assemblies and entrances, glass for balustrading supported by clamps, and so forth – must be signed off and approved in writing by a competent person (glazing or structures).

5 | CLEANING

To ensure the longevity and hassle-free operation of Wispeco's Crealco systems, the following cleaning and maintenance procedures must be strictly adhered to. Cleaning procedures are divided according to the **type** of material being cleaned: i.e. aluminium, glass, stainless steel and alloy.

5.1 | ALUMINIUM

5.1.1 | CLEANING INSTRUCTIONS FOR ANODISED ALUMINIUM

Correctly identify the aluminium finish to be cleaned (anodised or powder coated) when selecting an appropriate cleaning method. Check the specifications and / or building drawings if in doubt as to type of finish.

Construction soils, including concrete and mortar, should be removed immediately. The exact procedure for cleaning will vary depending on the nature and degree of soil. As prevention masking materials such as protection tape or pealable coatings can be applied to aluminium, hardware and glass.

Never use aggressive alkaline or acid cleaners on aluminium finishes. It is important not to use cleaners containing **trisodium phosphate*, phosphoric acid*, hydrochloric acid*, hydrofluoric acid*, flourides***, or similar compounds on anodised aluminium surfaces. Always follow the recommendations of the cleaner manufacturer as to the suitable cleaner and concentration. Test clean a small area first. Different cleaners should not be mixed.

It is preferable to clean the metal when shaded. Do not attempt to clean hot, sun-heated surfaces since possible chemical reactions on hot metal surfaces will be highly accelerated and cleaning non-uniformity can occur. Surfaces cleaned under these adverse conditions can become streaked or stained so that they cannot be restored to their original appearance. Also avoid cleaning during freezing temperatures or when metal temperatures are cold enough to cause condensation.

Apply the cleaning solution only to an area that can be conveniently cleaned without changing position. Thoroughly rinse the surface with clean water before applying cleaner. Minimize cleaner

rundown over the lower portions of the building and rinse such areas as soon and as long as practical.

Cleaners containing strong organic solvents will have a **deleterious*** effect on organic overlay coatings, but not on anodised aluminium. The possibility of solvents extracting stain-producing chemicals from sealants and affecting the function of the sealants, however, must be considered. Test a small area first.

Strong cleaners should not be used on windows and other building accessories where it is possible for the cleaner to come into contact with the aluminium. Solutions of water and mild detergents should be used on windows. If for some particular reason, an aggressive cleaner is required for some other component of the building, extreme care must be taken to prevent the cleaner from touching the aluminium finish.

5.1.2 | CLEANING INSTRUCTIONS FOR POWDER COATED ALUMINIUM

Construction soils, including concrete and mortar, should be removed as soon as possible. The exact procedure for cleaning will vary depending on the nature and degree of soil.

Try to restrict cleaning to mild weather. Cleaning should be done on the shaded side of the building or ideally on a mild, cloudy day.

When choosing a cleaning solution and method, take other building components into consideration (like glass, sealants and painted surfaces). If necessary, apply prevention masking materials, such as protection tape or pealable coatings, to aluminium, hardware and glass.

Over cleaning or excessive rubbing can do more harm than good.

Strong solvents or strong cleaner concentrations can cause damage to painted surfaces.

Avoid **abrasive*** cleaners. Do not use household cleaners that contain abrasives on painted surfaces.

Abrasive materials such as steel wool, abrasive brushes, etc., can wear and harm finish.

Avoid drips and splashes. Remove run downs as quickly as possible.

Avoid temperature extremes. Heat accelerates chemical reactions and may evaporate water from solution. Extremely low temperatures may give poor cleaning effects. Cleaning under adverse conditions may result in streaking or staining. Ideally, cleaning should be done in shade at moderate temperature.

Do not substitute a heavy duty cleaner for frequently used mild cleaner.

Do not **scour*** painted surfaces.

Never use paint removers, aggressive alkaline, acid or abrasive cleaners. Do not use trisodium phosphate, highly alkaline or highly acidic cleaners. Always do a surface test.

Follow manufacturers' recommendations for mixing and diluting cleaners. Never mix cleaners.

To prevent marking and scratches, make sure cleaning sponges and cloths are **grit*** free.

5.1.3 | INTERPON D CLEANING AND MAINTENANCE GUIDELINES

Maintaining the good looks of your powder coated products is just like caring for your car – and is a smart way to protect your investment. Over time with exposure to the elements, powder coatings may show signs of weathering such as loss of gloss, chalking and slight colour change. A simple regular clean will minimize the effects of weathering and will remove dirt, grime and other build-up detrimental to all powder coatings.

For any particular region or territory, there may be local regulations or local requirements to be met in order to achieve conformance to certain published quality labels or standards. It is the user's responsibility to be aware of such standards.

Records of all cleaning schedules and frequencies shall be kept and maintained and made available to AkzoNobel if requested. **Failure to comply with the recommended cleaning schedule will nullify and warranties.**

Cleaning coated surfaces

Cleaning should start at the time the products are installed, ensuring that construction materials such as concerete, plaster and paint splashes are removed before they have a chance to dry. Failure to remove these materials at this early stage will require the use of aggressive cleaning materials and techniques with potential damage to the powder coated surface.

Method

The best method of cleaning of **Interpon D** products is by regular washing of the coating using a solution of warm water and non-abrasive, pH neutral detergent solution. Surfaces should be thoroughly rinsed after cleaning to remove all residues. All surfaces should be cleaned using a soft cloth or sponge or nothing harsher than a soft natural bristle brush. Cleaning of powder coated sections can be conveniently carried out at the same time as window cleaning.

If the project is subject to any hazardous unusual environmental factors, or is close to salt water, an estuary or marine environments then Akzo Nobel must be consulted on an individual project basis.

Renovation can be required in the case of heavy soiling (due to lack of maintenance). It is then recommended to consult a specialized company.

Cleaning products

Before cleaning, attention must, without exception be paid to the cleaning agent's datasheet and the applicable guidelines of the various associations:

- GRM
- Qualicare
- AMRAL

Usual maintenance can be done using water with mild detergent (pH 5 to 8). If the atmospheric pollution has resulted in heavy soiling of the coating, some stains or marks may require stronger domestic products. In such cases, they should always be diluted, and some small inconspicuous test areas cleaned first. In no circumstance should any abrasive cleaner or polish, or any cleaner containing ketones, esters be used.

Frequency

The frequency of such cleaning will depend on many factors including:

- The geographical location of the building
- The environment surrounding the building, i.e., marine, swimming pool, industrial, or a combination of these environments etc.
- Levels of atmospheric pollution
- Prevailing wind
- Protection of the building by other buildings
- Possibility of airborne debris (e.g., sand/dust etc.) causing erosive wear of the coating

- If the environmental circumstances change during the lifetime of the building (e.g., rural becomes industrial)
- The powder coating chemistry

The frequency of cleaning depends in part on the standard of appearance that is required and also the requirements to remove deposits, which could, during prolonged contact with either the powder film or the metal substrate, (if exposed) cause damage.

Sheltered areas can be more at risk of coating degradation than exposed areas. This is because windblown salt and other pollutants may adhere to the surface and will not be cleaned away with rainfall. These areas should be inspected and cleaned if necessary on a more regular basis.

Records of all cleaning schedules and frequencies shall be kept and maintained and made available to Akzo Nobel if requested.

The Akzo Nobel cleaning frequency specifications are shown on the next page:

Table: Global Cleaning Recommendations

Climate / Environment		Temperate and Arid			Tropical		
		D1000 series	D2000 series	D3000 series	D1000 series	D2000 series	D3000 series
Normal – C3 Inland		12 months	18 months	24 months	90 months	15 months	18 months
Marine – C4 Coastal	2000 to 5000m from coastline	12 months	18 months	24 months	9 months	15 months	18 months
	500 to 2000m from coastline	6 months	9 months	12 months	6 months	6 months	9 months
	500 to 500m from coastline	3 months	6 months	9 months	3 months	3 months	3 months
	Less than 50m from coastline	Not available	Not available	Not available	Not available	Not available	Not available
Industrial – C5I	2000 to 5000m from source of pollution	12 months	18 months	24 months	9 months	15 months	18 months
	500 to 2000m from source of pollution	6 months	9 months	12 months	6 months	6 months	9 months
	50 to 500m from source of pollution	3 months	6 months	9 months	3 months	3 months	6 months
	Less than 50m from source of pollution	Not available	Not available	Not available	Not available	Not available	Not available
Swimming Pool	Greater than 2m from edge of pool	3 months	3 months	3 months	3 months	3 months	3 months
	2m from edge of pool	Not available	Not available	Not available	Not available	Not available	Not available

Type of Climate	Temperature Range	Highest Temperature with RH ≥95%
Temperate	-33°C to 35°C	25°C
Arid		
Warm Arid	-20°C to 40°C	27°C
Extremely Warm Arid	3°C to 55°C	28°C
Tropical	5°C to 40°C	33°C

Note for more detailed definitions of environment and climate please refer to ISO9223

Cleaning of Brick and Concrete

Chemical Cleaners

The cleaning solutions used on both brick and concrete contain strong chemicals that can cause damage to the powder-coated surface. All exposed powder-coated surfaces should be fully protected. If any such solutions or chemicals come in contact with the powder-coated surface, wash immediately with copious amounts of water. Prolonged exposure can cause discolouration of the film, loss of gloss and damage to the coating surface.

Abrasive Blasting

The cleaning of concrete or brick by using abrasive shot blasting must be carried out in such a way that all structures coated with powder coating must be fully protected. The abrasive medium will strip the powder coating from the metal substrate. Only protective tape with a low tack and approved by the suppliers of the protective tape for use on Powder Coatings should be used.

Low Tack Tapes

These tape should be removed after a period not exceeding six (6) months. If further protection is required new tape should be applied. Any residue from the tape should be removed as soon as possible.

Do not use scrapers, abrasive papers or similar items to clean the area as this may damage the surface of the powder coating. Water and a small amount of mild detergent may be used to clean the surface of the powder coating. Where it is absolutely necessary a small amount of white spirit may be used followed by cleaning with water and mild detergent. Do not under any circumstances use any strong solvents or solutions containing:

- Chlorinated Hydrocarbons
- Esters
- Ketones
- Abrasive cleaner or polish

5.2 | GLASS

The information offered here serves as a general guide. Specific advice on the cleaning of glass should always be sought from a reputable **glazier*** or professional window cleaner before any glass cleaning is undertaken.

5.2.1 | CLEANING INSTRUCTIONS FOR (ORDINARY) CLEAR GLASS

Clean warm water containing a highly diluted mild household detergent is recommended. Glass should be cleaned often enough to prevent heavy soiling (preferably monthly). If the glass surface is still soiled after normal cleaning, the supplier should be consulted for remedial advice.

The following cleaning products must not be used:

- Acid products,
- Highly abrasive materials such as polish, blades or sandpaper and
- Water containing abrasive granules (like cement, etc.)

5.2.2 | CLEANING INSTRUCTIONS FOR PILKINGTON ECLIPSE ADVANTAGE™ REFLECTIVE LOW-E GLASS

Pilkington Eclipse Advantage™ Reflective Low-E Glass has a very thin **pyrolitic*** coating on its top surface. This hard and durable low **emissivity*** top coating gives the glass improved solar control and thermal insulation performance compared to ordinary clear glass. The low emissivity coating does have a very fine, hard texture which requires a slightly different cleaning procedure.

5.2.2.1 | Routine Cleaning (Hand Wash)

Pilkington Eclipse Advantage™ Reflective Low-E Glass can be cleaned and maintained by hand washing with non-abrasive, ordinary glass cleaning solutions. For hand washing, a mild detergent and water solution is recommended. Uniformly apply the solution to the glass and wash with a clean, soft cloth, sponge or pad. Rinse thouroughly with clean water and wipe or squeegee dry immediately.

Make sure no metal parts of the cleaning equipment touch the reflective glass surface, and that no abrasive particles are trapped between the glass and the cleaning materials. Stubborn stains can be removed with organic solvents such as mineral spirits, denatured alcohol, acetone, or MEK, following appropriate safety procedures.

The solvent wash should be followed immediately by a detergent wash and clear water rinse to remove solvent and dirt residues. Do not use harsh chemical cleaners, abrasives, **opaque*** liquid cleaning solutions, steel wool, or razor blades on the reflective surface. Do not use any strong acidic cleaners on Pilkington Eclipse Advantage™ reflective coating.

There are a number of solutions commercially available for 'rejuvenating' water-stained glass surfaces. Be wary: these products often contain **hydrofluoric acid*** and can severely damage the reflective surface of Pilkington Eclipse Advantage™ Reflective Glass.

An exposed Pilkington Eclipse Advantage™ reflective coating will not get dirtier any faster than non-coated glass in the same location but the reflective surface will show dirt and other deposits more readily. The reflective coating should never be allowed to become dirtier than what is visibly acceptable for the naked eye. It should be cleaned as frequently as possible to prevent it from ever appearing unacceptably dirty. In this way, accumulation and hardening of excessive dirt deposits can be prevented.

5.2.2.2 | Spot Cleaning

Occasionally, spot cleaning may be required to remove stubborn dirt or foreign materials that can adhere to the low emissivity glass surface. Spot cleaning products work to remove paint or grease markings, oil, tape adhesive, crayons (and other waxy materials) as well as rub marks from plastics.

Recommended Spot Cleaning Products

- **Denatured*** alcohol, acetone or organic solvents available from hardware stores.

Spot Cleaning Procedure

1. Apply a small quantity of one of the cleaners listed above to a clean, wet cloth or towel.
2. Rub on areas of glass needing spot cleaning.
3. Wipe clean using a dry, clean, lint free towel or cloth followed by the routine cleaning procedure given above.

5.2.2.3 | Specialized Cleaning

As a rule, razor blades, steel wool or other metallic objects should not come into contact with the low emissivity coated surface. If metallic objects scratch the coated surface, a thin layer of metal removed from the object may be deposited onto the coating which results in a discoloured stain which is difficult to remove using normal cleaning procedures.

Recommended Specialized Cleaning Product (for metal marks, etc.)

- HTH swimming pool acid with 40% hydrochloric acid.

Specialised Cleaning Procedure (for metal marks, etc.)

1. Apply a small quantity of one of the specialized cleaning products listed above to a wet, clean cloth or towel.
2. Rub on the areas of glass needing cleaning.
3. Wipe clean using a dry, clean, lint free towel or cloth followed by the routine cleaning procedure.

5.2.3 | CLEANING INSTRUCTIONS FOR MCLAM® ENERGY SAVING GLASS™

All McLam® Energy Saving Glass™ products have a very thin, hard, pyrolytic coating on one surface. This durable low emissivity coating gives it improved thermal insulation performance, and in the case of McLam® ESG™ Grey, Green & Neutral, improved solar control as well. The low emissivity coating has a very fine, hard texture which requires a slightly different cleaning procedure compared to plain, non-coated glass.

5.2.3.2 | Routine Cleaning

Hand cleaning of a pyrolytic low emissivity coating, to visibly remove accumulated dust or fingerprints, can be accomplished using a number of different cleaning products which are readily available from domestic supply, grocery and hardware stores. Do not use razor blades, steel wool or other metallic objects on the coated surface. The hard coating will probably not damage but fine metal marks (resembling faint scratches in sunlight) can easily be left on the coating. Marks such as these call for special cleaning techniques (see **4.2.3.4** below). Follow the manufacturers' recommended handling procedures for each product listed.

Recommended Routine Cleaning Products for McLam® Energy Saving Glass™

- Mr Muscle Window & Surface Cleaner, by SC Johnson & Son, Inc.
- Mixture of one part clear vinegar with one to ten parts clean water. Commercially available vinegar-based glass cleaners have generally demonstrated an ability to provide a clean, streak-free coated surface.

- McCoy's glass does ***not*** recommend the use of **ammonia*** or alcohol based glass cleaners because these products can leave visible streaks on the coating.

Routine Cleaning Procedure

1. Flood the low emissivity coated surface with a spray-on cleaning solution or with a wet cloth saturated with the cleaning solution to thoroughly wet the surface and remove any grit particles. Be generous with the amount of solution applied.
2. Rub the wetted surface with a clean, **lint free towel*** or cloth. It is preferable not to use a **squeegee*** on the low emissivity surface.
3. To prevent streaking, stop wiping when the glass is almost dry and there is still a uniform, thin film of moisture left on the glass surface. This film will quickly evaporate leaving a clean surface. **Note**: streaking is simply the re-deposition of smears of non-uniform dirt, and detergent from the cleaning solution if there was too much dirt and too little volume of cleaning solution.

5.2.3.3 | Removing Large Amounts of Dirt

If the coated surface is heavily contaminated with dirt, such as during installation on a construction site, use a water spray from a hose or garden spray pressure bottle to flush away **insoluble*** particulate matter without risk of creating fine scratches.

Flood the low emissivity coated surface with a spray-on cleaning solution or with a cloth saturated with the cleaning solution. Be generous with the amount of solution applied.

Rub the wetted surface with a clean, **lint free*** towel or cloth, to fully dissolve any dirt on the coating.

Wipe dry with a dry, clean, lint free towel or cloth. It is preferable not to use a squeegee on the low emissivity surface. To prevent streaking, stop wiping when the glass is almost dry and there is still a uniform thin film of moisture left on the glass surface. This film will quickly evaporate leaving a clean surface. **Note**: streaking is simply the re-deposition of smear or non-uniform dirt and detergent from the cleaning solution if there was too much dirt and too little volume of cleaning solution.

If after the above procedure, and under critical viewing, the glass does not appear clean then a final rinse with distilled water should be made before the cleaning solution has had time to evaporate, to remove the dirt contaminated detergent solution. This allows the final evaporation of a thin film of pure, clean water which cannot leave any visible deposits.

5.2.3.4 | Spot Cleaning

Occasional spot cleaning may be required to remove stubborn dirt or foreign materials that have adhered to the low emissivity coated surface. Spot cleaning products containing organic solvents, or the one-time hand application of very fine abrasives, can be used to remove markings from grease, oil tape adhesive, crayons (and other waxy materials) as well as paint and rub-off marks from plastics.

Recommended Spot Cleaning Products

- **Methyl Ethyl Ketone*, acetone*** or other organic solvents available from hardware stores.

Spot Cleaning Procedure

1. Use a cloth saturated with a routine cleaning solution to thoroughly wet the surface and to remove any grit particles.
2. Apply a small quantity of one of the cleaners listed above to a clean, wet cloth or towel.
3. Rub on areas of coating needing spot cleaning.
4. Take particular care to prevent solvents, such as those listed above, from contacting glass sealants, framing and adjacent paintwork.
5. Wipe clean using a dry, clean, lint free towel or cloth and immediately follow with the rinsing procedure given above in 'Detailed Cleaning Procedure.'

5.2.3.5 | Specialized Cleaning

As a rule, razor blades, steel wool or other metallic objects should not come into contact with the low emissivity coated surface. If metallic objects scratch the coated surface, a thin layer of metal removed from the object may be deposited onto the coating which results in a discoloured stain which is difficult to remove using normal cleaning procedures.

If metallic objects have contacted the coated surface, a thin layer of metal removed from the object may be deposited onto the coating which results in discoloured stains or marks that looks like a scratch. Such marks cannot be removed using the normal cleaning procedures given above but require the specialized techniques below.

Recommended Specialized Cleaning Products (for removing metal marks, etc.)

- 20-30% hydrochloric acid solution – typically found in domestic liquid swimming pool acid.

Specialized Cleaning Procedure

1. Use a cloth saturated with a routine cleaning solution to thoroughly wet the surface and to remove any grit particles.
2. Apply a small quantity of one of the specialized cleaning products listed above to a wet, clean cloth or towel.
3. Rub on areas of glass needing cleaning.
4. Wipe clean using a dry, clean, lint free towel or cloth. Follow with the rinsing procedure given above in 'Detailed Cleaning Procedure.'

5.2.3.6 | Disclaimer – McCoy's Glass

"All reasonable care has been taken in compiling these guidelines. However, McCoy's Glass makes no representations or warranties, express or implied, as to the accuracy, reliability or completeness of, and disclaims all liability, direct or indirect (and whether or not arising out of the negligence, default or lack of care of McCoy's Glass for any loss or damage, whether foreseeable or not) suffered by the recipient or any other person arising out of, or in connection with, any use or

reliance by any of them on this document. Liability which cannot legally be excluded is limited to the maximum extent possible."

5.2.4 | CLEANING INSTRUCTIONS FOR SUNERGY GLASS PRODUCTS

Sunergy™ Glass Products have a metal oxide coating that is applied to the glass. These coatings are very resistant and durable. No extraordinary precautions are necessary when the coating is positioned on the inside of the insulating glazing unit (i.e. in contact with the air / gas layer – position 2). In single glazing or when the coating is located on the outside of the insulating glazing unit (position 1, external side of the building, or position 4, internal side of the building), the ordinary and special cleaning regimens described below are sufficient. However, bear in mind that a transparent and very thin metal surface is also being washed.

5.2.4.1 | Routine Cleaning

In most cases, the glass can be washed with plenty of clean water. Sometimes a bit of neutral detergent or an appropriate commercial cleaning product can be added to the water. A squeegee or specially designed cloths are also used. Once cleaned, the glass should be rinsed with clean water and wiped with a squeegee.

5.2.4.2 | Specialised Cleaning

When ordinary cleaning is not enough, other steps can be taken:

1. Remove oily spots and other organic pollution with solvents such as **isopropyl alcohol*** or acetone applied with a soft, clean cloth.
2. Remove other residue by lightly polishing with a suspension of cerium oxide in water (between 100 and 200 grams per litre).
3. Rinse thoroughly and then follow the ordinary cleaning regimen.

5.2.4.3 | Initial Cleaning after Installation

When glass is cleaned for the first time after being installed (at the end of a project), it may be particularly dirty. We recommend the following steps:

1. Remove labels and cork interlayers as soon as possible.
2. Rinse thoroughly to remove as much dust as possible.
3. Perform the ordinary cleaning regimen.
4. Examine any remaining dirty marks.
5. Very carefully remove the majority of any remaining deposits of sealing compound, putty, cement, etc. using a specially designed scraper or razor blade. There is a very high risk of scratching the glass, so take great care at all times. This is especially true for coated glasses.
6. Perform the special cleaning regimen where necessary.

5.2.4.5 | Important Hints & Tips

Any scratching will penetrate the surface of the coating and cannot be repaired.

Any excessive mechanical treatment might remove the coating in **localised*** areas.

Avoid all contact with metal objects.

Avoid all chemicals that might attack the surface and damage it irreparably. Consequently, special care should be taken to follow the guidelines and precautions set out in this document.

In areas with high levels of pollution, treatments and products supplied by experienced professionals are essential.

All products containing hydrofluoric acid or fluorine derivatives are prohibited since they can destroy the coating and the surface of the glass.

Highly acidic and alkaline products are prohibited, as are abrasive products.

Ensure compatibility between the products used and other components (seals, paints used on the frame, aluminium, stone, etc.).

Comply with the instruction manuals. When in doubt, contact the manufacturer.

When carrying out the special cleaning regimen, always start with a trial on a small area.

Do not wash the glass when it is fully exposed to the sun. Avoid washing it when it is too cold or hot.

Take advantage of the washing process to inspect seals, drainage and frame.

Make sure that cloths, squeegees and other tools are in good condition at all times.

5.3 | STAINLESS STEEL COMPONENTS

Stainless Steels are inherently corrosion resistant materials that do not need additional surface protection to enhance their appearance and durability. Why is stainless steel so corrosion resistant? The alloying elements in stainless steel form a thin, transparent 'passive layer' on the surface. Although this protective passive layer is only a few atoms thick, it instantaneously reforms in the presence of oxygen from air or water, so even if the material is scratched or damaged the passive layer continues protecting the surface from corrosion. This explains why stainless steel does not require any coating or other corrosion protection to remain bright and shiny even after decades of use.

However, some routine maintenance and cleaning is needed to keep stainless steel surfaces in good condition so that its aesthetic appearance and corrosion resistance are not compromised. In this respect, stainless steels are no different to other construction materials such as glass, plastics or coated steels, which are ***never*** maintenance free throughout the life of a building. The following guidelines are to give building owners, developers and facility manager's advice on efficient, cost-effective cleaning that will allow them to take full advantage of the corrosion resistant properties of stainless steel.

5.3.1 | INITIAL CLEANING

The first cleaning is generally done before the building is handed over to the owner. If the stainless steel parts have been protected adequately then simple 'maintenance cleaning' at the hand-over stage will probably be sufficient. An adhesive plastic film during fabrication, transport and assembly often protects stainless steel parts. Although providing excellent protection against damage and soiling, some plastic films deteriorate on exposure to the ultraviolet radiation in

sunlight which can make them difficult to strip. The film adhesive can also stick to the stainless steel surface. Protective plastic films should be removed as soon as they are no longer necessary for protection during the installation / erection stage, starting at the top of the building and working downwards.

Mortar and cement splashes can be treated with a solution containing a small amount of phosphoric acid. Rinse with water (preferably **deionised*** water) and dry. Deionised water reduces the risk of water staining marks. Proprietary products are available from specialists finishing companies. Never allow mortar removers or diluted hydrochloric acid to be used on stainless steel. If they have accidentally been applied to or spilt over the stainless steel, rinse generously with fresh water.

Building contractors and tradesmen are not always aware of the dangers of proprietary building mortar removers containing hydrochloric acid. This should be stressed. If possible, the sequence of operations should be changed so that any ceramic tile fixing and cleaning is completed before neighbouring stainless steel components such as skirting boards or kick plates are installed.

Iron particles picked up from tools or from contact with structural steel, scaffold tubing etc. must be removed immediately. Steel dust particles created during operations such as welding, cutting, drilling and grinding of carbon (non-stainless) steel will rust quickly. Besides corroding themselves, these particles can locally break the self-healing 'passive film' of stainless steel resulting in pitting corrosion in spite of their normally good corrosion resistance.

At an early stage, light deposits can be removed mechanically using nylon pads, such as the 'Scotch-Brite' type used in the kitchen. Alternatively the contamination can be removed with a proprietary stainless steel cleaner containing phosphoric acid.

If pitting attack has occurred, depending on its severity, acid pickling treatments or mechanical rectification will be needed to restore the surface. Pickling agents in paste form are available for localised, on-site application. Care must be taken to use these products in accordance with the supplier's directions so that there is a safe system of work and the relevant legislation on environmental protection is adhered to. Specialist finishing companies will often carry out this service on site.

While restoring the corrosion resistance of the surface, pickling may change the surface appearance of the steel. Further mechanical or chemical treatments may be necessary to restore the original surface finish. It is therefore advisable to avoid contamination, in the first place by either protecting the stainless steel parts, whilst work is being done or by installing those after other operations that could cause contamination have been completed.

On **external applications**, such as facades, rainfall can normally be expected to wash off accumulations of dirt and other deposits efficiently, depending on the amount of exposure and the elevation.

Special attention should be given to sheltered areas during routine cleaning to ensure that accumulations of airborne contaminants are removed. This is particularly important in marine and industrial environments, where build-up of airborne chlorides or SOx can result in localised corrosion, if not effectively removed.

On **interior applications**, finger marks can be an issue. There is a wide range of finishes available for stainless steels, many of which are particularly suitable for use in heavily exposed (high traffic) public areas. Selecting finishes that are less sensitive to fingerprint marking in the design process will reduce the effort and costs of cleaning during the service life of the finished building.

Brushed finishes*, which are a popular choice for interiors, may show finger marks in the period immediately after installation, but the visibility of the marking should become less evident after the first few cleaning operations.

5.3.2 | CLEANSERS

To remove fingerprints and other marks from architectural finishes, soapy water or a mild detergent are usually safe and successful. Proprietary spray cleaners are available, which combine ease of cleaning with a light film that produces an even and smooth lustre. These spray cleaners remove existing fingerprints and leave the surface in a condition that reduces the tendency for fingerprints to show in subsequent service. After applying the spray to the surface, polish with a dry cloth. Your nearest national stainless steel development association should be able to advise on products locally available.

Mirror-polished stainless steel can be cleaned with glass cleansers. These products should be selected chloride-free.

For more **stubborn stains**, mild household cream cleansers should be effective. This should also be suitable for cleaning off watermarks and light discolouration. After cleaning, remove the residues with (preferably deionised) water (available in supermarkets, e.g. for steam ironing or car batteries) and dry to avoid streaking and water marks. Scouring powders should not be used as these products can leave scratches on stainless steel surfaces.

Care is needed with solvents to avoid spreading the staining on the stainless steels, which can then be difficult to fully remove. It is advisable to apply clean solvent several times with a clean, non-scratching cloth, until all traces of the partially dissolved oil / grease are removed.

Paint and graffiti can be treated with proprietary alkaline or solvent-based paint strippers. The use of hard scrapers or knives should be avoided as the underlying stainless steel surface may become scratched.

Heavily neglected surfaces can be treated with metal polishes, such as those for cleaning chromium-plated items (e.g. automotive trim). Furthermore, polishes used for re-finishing car paint can be considered. Care must be taken as highly polished surfaces may become scratched with these cleaners.

Alternatively, use a proprietary stainless steel cleaner containing phosphoric acid to remove contamination, rinse with deionised water and dry. It is advisable that the entire surface of the component is treated so that a patchy appearance is avoided.

Before commencing any task, ensure that you have received the appropriate health and safety literature from the supplier and fully understand it. If in doubt, seek further advice.

Cleaners that should NOT be used on stainless steels include:

- Chloride-containing cleansers, especially those containing hydrochloric acid.
- **Hypochlorite bleaches*** should not be used on stainless steels; if applied accidentally or spilt on stainless steel surfaces should be rinsed off immediately with liberal amounts of fresh water.
- Silver-cleaners must not be used on stainless steel.

5.3.3 | CLEANING UTENSILS

- A **damp cloth** or **chamois leather** will usually be suitable for removing normal soiling, fingerprints etc.
- For more stubborn dirt, **nylon pads** such as those known as 'Scotch-Brite' pads are usually satisfactory. Non-stainless steel based scouring pads, cleaning wool or wire brushes must not be used on stainless steel. Apart from scratching the surface, these pads can leave

carbon steel deposits on the stainless surface, which can subsequently develop into rust spots, if the surface becomes wet.

- **Soft nylon brushes** can be used for cleaning stainless steel with patterned finishes. Non-stainless steel wire brushes must not be used. On 'grained' directional finishes, such as EN 10088-3 types G, J and K the direction of cleaning strokes should be along the grain and not across it.
- Where water has been used for cleaning or rinsing, wiping the surface dry to prevent watermarks, especially in hard water areas may be advisable. The use of deionised water will prevent the formation of hard water staining.
- To avoid 'cross-contamination' of iron particles, ensure that cleaning utensils have not been used for 'ordinary' (i.e. carbon) steel before. Cleaning materials for use on stainless steel items should preferable be reserved exclusively for that purpose.

5.3.4 | CLEANING INTERVALS

The cleaning of stainless steel items for building interiors is really no different to other materials. Cleaning should be done before there is a visible build-up of soiling or finger-marking, so that the effort and cost of cleaning is minimised along with the risk of marking altering the appearance of the surfaces.

On building exterior applications, stainless steel may be exposed to a wider range of potentially more aggressive environments as a result of contact with marine atmospheres, environments laden with industrial pollutants, salt spray from road de-icing salt, atmospheric dirt and traffic film. All cause brown staining to appear. It is good practice to clean the stainless steel at the same frequency as the building's windows (glazing). Depending on the severity of soiling and deposit build up, routine cleaning frequencies of 6-12 months for **light soiling** and 3-6 months for **heavy soiling** or environments such as those listed above is advisable. A stainless steel cleaner containing phosphoric acid will remove this form of contamination.

5.4 | EN AC 46100 ALUMINIUM ALLOY

Wispeco systems using hardware items made from **EN AC 46100** are:

- Wispeco 540 sliding window,
- Crealco 1000 sliding window,
- Crealco 4500 sliding door,
- Crealco 5000 top hung sliding folding door
- Crealco Serene series of windows and sliding doors.

Where these products are used in an average to high corrosion area, it is important that the manufacturing and sealing process, as set out in the relevant system manuals, is followed.

6 | MAINTENANCE

6.1 | WISPECO'S CREALCO RANGE OF PRODUCTS

6.1.1 | CREALCO CASEMENT WINDOWS

- Casement 28 window (28mm)
- Casement 30.5 window (30.5mm)
- Casement 34 window (34mm)
- Casement 36 window (36mm)
- Casement 38 window (38mm)
- Casement 44 window (44mm)
- Pivot 38 window (38mm)
- Edge thermal break casement window (42mm)
- Serene casement or tilt and turn window (52mm)
- Clip 38 entrance wall
- Clip 44 entrance wall

6.1.2 | CREALCO SLIDING WINDOWS

- 500 Slenderline sliding window
- 540 Sliding Window
- 1000 sliding window
- Rouge sliding window

6.1.3 | CREALCO VERTICAL SLIDERS

- Vert 70 vertical sliding window

6.1.4 | CREALCO SLIDING DOORS

- 700 sliding door
- Rouge sliding door
- 4500 sliding door
- Palace high performance sliding door
- Clip 44 internal sliding door
- Clip 38 sliding door
- Serene heavy duty tilt & sliding door

6.1.5 | CREALCO SHOWER DOORS

- Seal Tri-slide shower door
- Seal Pivot shower door
- Seal Pane shower return panel

6.1.6 | CREALCO SLIDING / FOLDING DOORS BOTTOM ROLLING

- Vistafold sliding folding door

6.1.7 | CREALCO SLIDING / FOLDING DOORS TOP HUNG

- 5000 top hung sliding folding door

6.1.8 | CREALCO SHOP FRONT SYSTEM

- Clip 44 shop front
- Clip 38 shop front

6.1.9 | CREALCO LOUVRES

- Horizon adjustable shutters for windows
- Fixed Louvre (Y, Oval, Z, Lazy Z)
- Clip Louvre clip-in fixed door ventilator

6.1.10 | CREALCO CURTAIN WALL SYSTEMS

- Façade 60

6.1.11 | CREALCO GARAGE DOORS

- ALDoor overhead garage door

6.1.12 | CREALCO INSECT SCREEN

- Cassette roll-up insect screen for windows
- Dusk insect screen for sliding windows
- Tranquil sliding insect screen for doors

6.1.13 | CREALCO BALUSTRADE

- NewYork Balustrade

6.1.14 | WRAP PUTTY GLAZED WINDOW

6.1.15 | INTERNAL GLASS PARTITION

6.1.16 | GUARDIAN SECURITY BARRIER

6.2 | MAINTENANCE PROCEDURES

6.2.1 | CREALCO CASEMENT WINDOWS

Maintenance of aluminium frame work must be done as in **5.1** and maintenance of glass when necessary as in accordance with 5.2 (of this document).

Handles should be cleaned when necessary with water and a cloth.

Stainless steel friction stays should be cleaned once every 3 months as in 5.3 (of this document).

Seals on opening **sashes*** must be cleared of sand and dirt.

Note: Depending on the location of the casement window, it should be cleaned at least every 3 months. No dirt or sand must be allowed to build up between the frame and the sash. In coastal areas where high moist and salt spray conditions occur more frequent cleaning is required

6.2.2 | CREALCO SLIDING WINDOWS

Maintenance of aluminium frame work must be done as in 5.1 and maintenance of glass when necessary as in accordance with 5.2 (of this document).

Handles should be cleaned when necessary with water and a cloth.

If sliding sashes do not slide freely, the sash should be removed and the wheels checked for damage and replaced if needed.

All cavities, wheels, dust and dirt traps should be vacuumed to remove debris that could damage the workings of the window.

Drainage holes are to be kept clean and unblocked.

Note: Depending on the location of the sliding window, it should be cleaned at least every 3 months. . In coastal areas where high moist and salt spray conditions occur more frequent cleaning is required

6.2.3 | CREALCO VERTICAL SLIDING WINDOWS

Maintenance of aluminium frame work must be done as in **5.1** and maintenance of glass when necessary as in accordance with **5.2** (of this document).

Handles should be cleaned when necessary with water and a cloth.

The spring balance should only be removed by a competent person, the spring is under tensions and when taking it out, the correct procedure must be adhered to.

All cavities, wheels, dust and dirt traps should be vacuumed to remove debris that could damage the workings of the window.

Drainage holes are to be kept clean and unblocked.

Note: Depending on the location of the vertical window, it should be cleaned at least every 3 months. . In coastal areas where high moist and salt spray conditions occur more frequent cleaning is required.

6.2.4 | CREALCO SLIDING DOORS

Maintenance of aluminium frame work must be done as in **5.1** and maintenance of glass when necessary as in accordance with **5.2** (of this document).

Handles should be cleaned when necessary with water and a cloth.

If sliding sashes do not slide freely, the sash should be removed and the wheels checked for damage and replaced if needed.

All cavities, wheels, dust and dirt traps should be vacuumed to remove debris that could damage the workings of the door.

Note: Depending on the location of the sliding door, it should be cleaned at least every 3 months.

In coastal areas where high moist and salt spray conditions occur more frequent cleaning is required

6.2.5 | CREALCO SLIDING / FOLDING DOORS BOTTOM ROLLING

Maintenance of aluminium frame work must be done as in **5.1** and maintenance of glass when necessary as in accordance with **5.2** (of this document).

Handles should be cleaned when necessary with water and a cloth.

Wheel tracks must be kept free from debris and the top channel must be clear of obstacles. If the door is not opening smoothly then a competent person must be called in to service this product.

All cavities, wheels, dust and dirt traps should be vacuumed to remove debris that could damage the workings of the window.

Hinges should be checked and where necessary adjusted and tightened. Flush bolts should be aligned with the hole in the floor.

Note: Depending on the location of the sliding / folding door, it should be cleaned at least every 3 months. . In coastal areas where high moist and salt spray conditions occur more frequent cleaning is required

6.2.6 | CREALCO SLIDING / FOLDING DOORS TOP HUNG

Maintenance of aluminium frame work must be done as in **5.1** and maintenance of glass when necessary as in accordance with **5.2** (of this document).

Handles should be cleaned when necessary with water and a cloth.

Wheel tracks must be kept free from debris and the top channel must be clear of obstacles. If the door is not opening smoothly then a competent person must be called in to service this product.

All cavities, wheels, dust and dirt traps should be vacuumed to remove debris that could damage the workings of the window.

Hinges should be checked and where necessary adjusted and tightened. Flush bolts should be aligned with the hole in the frame.

Note: Depending on the location of the sliding / folding door top hung, it should be cleaned at least every 3 months. . In coastal areas where high moist and salt spray conditions occur more frequent cleaning is required

6.2.7 | CREALCO SHOP FRONTS

Maintenance of aluminium frame work must be done as in **5.1** and maintenance of glass when necessary as in accordance with **5.2** (of this document).

Note: Depending on the location of the shop fronts, they should be cleaned at least every 3 months. . In coastal areas where high moist and salt spray conditions occur more frequent cleaning is required.

6.2.8 | CREALCO HINGED DOORS

Maintenance of aluminium frame work must be done as in **5.1** and maintenance of glass when necessary as in accordance with **5.2** (of this document).

Handles should be cleaned when necessary with water and a cloth.

When the door leaf starts to drag or scratch the floor when opening, it might be that the glass has not been glazed correctly or the hinges are coming loose. A glazer should be called in to reset the glass and / or tighten the hinges.

Note: Depending on the location of the hinged door and the amount of traffic passing through it, it should be cleaned at least once a week.

6.2.9 | CREALCO PIVOT DOORS

Maintenance of aluminium frame work must be done as in **5.1** and maintenance of glass when necessary as in accordance with **5.2** (of this document).

Handles should be cleaned when necessary with water and a cloth.

The pivot should be cleaned weekly.

Note: Depending on the location of the pivot door, it should be cleaned at least every 3 months. . In coastal areas where high moist and salt spray conditions occur more frequent cleaning is required.

6.2.10 | CREALCO LOUVRES

Maintenance of aluminium frame work must be done as in **5.1** and maintenance of glass when necessary as in accordance with **5.2** (of this document).

Handles should be cleaned when necessary with water and a cloth.

All cavities, dust and dirt traps should be vacuumed to remove debris that could damage the workings of the window.

Note: Depending on the location of the louvres, it should be cleaned at least every 3 months. . In coastal areas where high moist and salt spray conditions occur more frequent cleaning is required

6.2.11 | CREALCO CURTAIN WALL SYSTEMS

Maintenance of aluminium frame work must be done as in **5.1** and maintenance of glass when necessary as in accordance with **5.2** (of this document).

6.2.12 | CREALCO TILT & TURN WINDOWS / DOORS

Maintenance of aluminium frame work must be done as in **5.1** and maintenance of glass when necessary as in accordance with **5.2** (of this document).

Handles should be cleaned when necessary with water and a cloth.

All cavities, dust and dirt traps should be vacuumed to remove debris that could damage the workings of the window.

Note: Depending on the location of the tilt & turn window or doors, it should be cleaned at least every 3 months. . In coastal areas where high moist and salt spray conditions occur more frequent cleaning is required

6.2.13 | CREALCO TILT & SLIDE DOORS

Maintenance of aluminium frame work must be done as in **5.1** and maintenance of glass when necessary as in accordance with **5.2** (of this document)**.**

Handles should be cleaned when necessary with water and a cloth.

All cavities, dust and dirt traps should be vacuumed to remove debris that could damage the workings of the window.

Note: Depending on the location of the tilt & turn door, it should be cleaned at least every 3 months. . In coastal areas where high moist and salt spray conditions occur more frequent cleaning is required

6.2.14 | CREALCO SHOWER DOORS

Maintenance of aluminium frame work must be done as in **5.1** and maintenance of glass when necessary as in accordance with **5.2** (of this document)**.**

Handles should be cleaned when necessary with water and a cloth.

The wheels should always be on the top track.

All cavities, dust and dirt traps should be vacuumed to remove debris that could damage the workings of the door.

Fungus growing in corners must be removed with a shower cleaner designed to kill and remove it.

Note: Depending on the location of the shower door, it should be cleaned at least every 3 months. . In coastal areas where high moist and salt spray conditions occur more frequent cleaning is required

6.2.15 | CREALCO GARAGE DOORS

Maintenance of aluminium frame work must be done as in **5.1** (of this document).

Wheels should be maintained in accordance with the manufacturer's specifications.

All cavities, dust and dirt traps should be vacuumed to remove debris that could damage the workings of the garage door.

Note: Depending on the location of the garage door, it should be serviced at least once a year, dependant on usage.

6.2.16 | CREALCO INSECT SCREEN

Maintenance of aluminium frame work must be done as in **5.1** (of this document).

Handles should be cleaned when necessary with water and a cloth.

Check that the insect screen does not have holes in and that the spring is working.

All cavities, dust and dirt traps should be vacuumed to remove debris that could damage the workings of the window.

Note: Depending on the location of the insect screen, it should be cleaned at least every 3 months.

6.2.17 | CREALCO HATCH SYSTEM (BOTTOM ROLLING SLIDING SYSTEM)

Maintenance of aluminium frame work must be done as in **5.1** and maintenance of glass when necessary as in accordance with **5.2** (of this document)**.**

Handles should be cleaned when necessary with water and a cloth.

If panels are not sliding, remove the glass panels, check the wheels and replace if damaged.

All cavities, dust and dirt traps should be vacuumed to remove debris that could damage the workings of the window.

Note: Depending on the location of the hatch system, it should be cleaned daily. . In coastal areas where high moist and salt spray conditions occur more frequent cleaning is required

6.2.18 | CREALCO BALUSTRADE

Maintenance of aluminium frame work must be done as in **5.1** and maintenance of glass when necessary as in accordance with **5.2** (of this document)**.**

Balustrades that are exposed to an external or aggressive environment must be treated to resist corrosion and regular inspections are to be done to prevent this from happening.

Balustrades must be periodically inspected for evidence of excessive wear, damage or reduced strength. Any element, connection or anchorage that shows a loss of strength or a loss of stiffness (of 20% or more) must be either replaced or restored to its initial condition. The loss of strength is determined by comparing the deflection of the balustrade under a certain load with the deflection of a new replicate under the same load.

Note: Depending on the location of the balustrade, it should be cleaned at least every 3 month. In coastal areas where high moist and salt spray conditions occur more frequent cleaning is required.

6.2.19 | WRAP PUTT GLAZED WINDOW

Maintenance of Aluminium frame work as in **5.1**.

Maintenance of Glass when necessary as in accordance with **5.2**

Handles should be cleaned when necessary with water and a cloth.

Seal on opening sashes must be clear of sand and dirt.

Note: *Depending on the location of the casement window, it should be cleaned at least every 3 months. No dirt or sand must be allowed to build up between frame and sash. The closer to the coast the more frequently the system must be cleaned.*

6.2.19 | INFINITY INTERNAL PARTITION

Maintenance of Glass when necessary as in accordance with **5.2**

Board as recommended by the manufacture.

Note: cleaning of glass will be relevant to the marks on the glass, every second day?

6.2.20 | GUARDIAN DOOR

Bottom track to be kept clear of dirt.

Maintenance of Aluminium frame work as in **5.1** and **5.2**

Note: Depending on the location of Guardian, it should be cleaned daily. No dirt or sand must be allowed to build up between Track and Sliding mechanism.

7 | APPENDICES

7.1 | LIST OF TABLES

7.2 | LIST OF FIGURES

7.3 | GLOSSARY

7.3.1 | ABBREVIATIONS

AAAMSA – the Association of Architectural Aluminium Manufacturers of South Africa.

SAGGA – South African Glass and Glazing Association

SANS – South African National Standards

7.3.2 | TERMINOLOGY

Abrasive – (Adj.) relating to a substance or material that is capable of polishing or cleaning a hard surface by rubbing or grinding; (noun) a substance that is used for the grinding, polishing or cleaning of a hard surface.

Acetone – A colourless, volatile, extremely flammable liquid kerotone which is used widely as an organic solvent.

Adhesive bond – The bond formed from the binding together of materials using a number of adhesive substances.

Aircrete – A versatile lightweight construction material usually used in block which has a low density and good insulation properties.

Alkaline – Having the properties of an alkali; containing alkali or having a pH greater than 7.

Aluminium strap – A silvery ductile metallic element(Aluminium) which is used to fasten or give support as a strap.

Ammonia – A colourless gas with a characteristic pungent smell, a solution of this gas is used as a cleaning fluid.

Anchor (base) – An item which holds a doorframe above a finished floor.

Annealed – To heat metal or glass and allow it to cool slowly, thereby removing internal stresses in order to toughen it.

Anodised – To coat a metal (especially aluminium) with a protective oxide layer by an electrolytic process in which the metal forms the anode.

Balustrade – A railing supported by balusters.

Bearing mechanisms – A rotating support placed between moving parts, allowing them to move easily.

Brushed finishes – A finish whereby a metal is abraded with fine grit sandpaper.

Characteristic failure loads – Designate those loads that are reached or exceeded in 95% of all tests (5% fractile).

Deionised – A substance which has had its ions or ionic constituents removed.

Deleterious – Harmful often in a subtle or unexpected way.

Denatured (alcohol) – Ethyl alcohol that is unfit for drinking but is still useful for other purposes.

Elastomeric – Various elastic materials that resemble rubber and resume their original shape once a deforming force is removed.

Emissivity – The relative ability of a material's surface to emit energy by radiation.

Failure loads – Those loads that lead either to a failure of the anchor base or a failure or pulling out of the fixing. Their average values result from at least 5 individual tests.

Fluoride – A chemical compound containing fluorine that is used to treat water.

Glazier – A person whose profession is fitting glass into windows and doors.

Glazing – The action of installing windows; a sealed protective glazing on glass windows.

Grit – Small loose particles of stone or sand.

Gypsum – A soft white or gray mineral consisting of hydrated calcium sulfate. Occurs in sedimentary deposits and is used in the building industry to make Plaster of Paris and fertilizers.

Hydrochloric acid – A strongly acidic solution of the gas hydrogen chloride (HCl) in water.

Hydrofluoric acid – An acidic and extremely corrosive solution of the liquid hydrogen fluoride (HF) in water.

Hypochlorite bleaches – Sodium Hypochlorite, a greenish-yellow liquid commonly referred to as bleach. It is prepared by reacting dilute caustic soda solution with liquid or gaseous chlorine accompanied by cooling.

Insoluble – Cannot be dissolved.

Isopropyl alcohol – Alcohol used as antifreeze or a solvent.

Lint free towel – A towel that does not give up fluff when being used, it is mainly used for cleaning surfaces or applying products to a rough surface.

Localised – To restrict something to a particular place.

Methyl ethyl ketone – Butane; a colourless soluble flammable liquid ketone used as/in a solvent for resins, a paint remover, lacquers, cements, adhesives, cleaning fluids and celluloid.

Monolithic – Formed of a single large block of stone; A building which is very large and characterless.

Opaque – Not transparent, unable to see through.

Phosphoric acid – A crystalline acid obtained by treating phosphates with sulphuric acid, used in fertilizer, soap manufacture and food processing.

Powder coating – A coating that is applied as a free-flowing dry powder. Applied electrostatically and cured under heat allowing it to flow and form a 'skin'.

Pumice – A very light and porous volcanic rock formed when a gas-rich froth of glassy lava solidifies rapidly.

Pyrolitic – Resulting from pyrolysis (the decomposition brought about by high temperatures).

Reveal – Either side surface of an aperture in a wall for a door or window.

Sash – A frame holding the glass in a window, typically one of two sliding frames.

Scour – To clean or brighten the surface of something by rubbing it hard, typically with an abrasive or detergent.

Shore A durometer – An instrument used to gauge soft to medium hard rubber based on resistance to a frustum (truncated) cone indenter point.

Solvent – The liquid in which a solute is dissolved to form a solution.

Squeegee – A scraping implement with a rubber-edged blade set on a handle that is typically used for cleaning windows.

Styropore – Polystyrene, a foam-like plastic material used for insulation.

Tensile – Of or relating to tension; capable of being drawn out or stretched.

Trisodium phosphate – The tertiary phosphate of sodium used as a builder in soaps and detergents.

Wrapping – Paper or soft material used to cover or enclose someone or something.

7.4 | REFERENCES

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