## 12. METALWORK

## ROLLED STEEL WINDOW AND DOOR FRAMES

### Frames

Window and door frames of rolled mild steel profiles must comply with *SABS* 727, and be of type, size, spacing of glazing bars, type of hinges, glazing side, type and finish of ironmongery, and primed or zinc coated as *specified*.

Suitable weather bars must be provided to bottom of opening in and vertically pivot hung ventilators, and to the bottom of all opening out ventilators where they occur above other ventilators.

Suitable holes for fixing with screws and plugs must be provided to frames, at the same spacing as standard lugs for building in, wherever frames have to be fixed to concrete columns, beams or walls.

Side hung ventilators not accessible from outside for cleaning must be provided with projecting hinges for cleaning from inside, as *specified.*

Frames must be of one piece construction except where shown to be coupled with standard coupling mullions and/or transoms, as *specified*.

Outward opening doors must have door frames fitted at bottom with sills of door framing section (stepped sills), but inward opening doors must have door frames with metal ties welded to frames, for embedding in thresholds (flush sills).

Doors must be hung on three hinges per leaf. Hinges must be of the projecting type so that the door opens 180 degrees when frames are set back from wall faces.

If locks are *specified* to doors, these must be three-lever locks.

### Burglar bars

Burglar bars must be mild steel burglar proofing of pattern as *specified*.

Bars must be riveted or welded to window frames and at every intersection. Bars must be kinked at peg stays. Burglar bars must be fixed to the inside of windows that open outward, and to the outside of windows that open inward. Burglar bars must be fixed to all opening sections, or as *specified*.

### Gauze screens

Gauze screen frames to window opening sections must be of pressed steel filled in with 1,5 x 1,5 mm mesh fibreglass gauze to comply with *SABS-CKS* 210. The steel frames must be baked enamel finished to *approved* colour.

Screen frames to outward opening sections must have sliding or hinged sections so as to allow access to opening stays and fasteners from the inside.

Screen frames to inward opening sections or louvres must be of a heavier gauge steel and be bolted to window frames.

Screen frames to pivot type windows must be in two sections, one on the outside and one on the inside, with the gap between the two filled with approved rubber flashing fixed in such a way as to be easily renewable.

### Building in of frames

Build in frames upright, square and free from warp with fixing lugs provided with the frame.

Check frames and opening sections and adjust before glazing.

## PRESSED STEEL WINDOW AND DOOR FRAMES

### Pressed steel window and door frames

Pressed steel clisco type window frames must comply with *SABS* 1311 and be single or double rebated and primed or zinc coated as *specified*.

Pressed steel door frames must comply with *SABS* 1129 and be of type, material of lock strike plate, hinges, size, type of profile, fanlight, , type of lock, whether frames are to be for power floated floors, and primed or zinc coated as *specified*.

Frames must be of 1,2 mm thick plate except single rebate door frames for one-brick walls and frames for double swing doors which must be of 1,6 mm thick plate.

Frames for double swing doors must have

1. jambs with V-shaped centres to fit rounded edges of doors
2. plain heads or transoms, holed and prepared to receive top centres of spring hinges.

Rebates receiving doors must be provided with two rubber buffers on the lock side.

Frames for external doors must have a standard RFX7 residential window section permanently welded on as a threshold.

### Pressed steel door and frame combination

Pressed steel door and frame combination must consist of 1,2 mm pressed steel door with 40 mm edge, at least two V-shaped vertical ribs over full door height, three horizontal rails and 1,6 mm steel lock box, hung on one pair of 100 mm steel hinges in single rebated pressed metal door frame, all primed or zinc coated as *specified*. The door frame must comply with *SABS* 1129.

### Building in of frames

Build in frames upright, square and free from warp.

Brace jambs with timber while building in.

Bed fixing lugs in 1:3 cement mortar.

Fill in space between door frame and wall solid with mortar.

Remove base ties after mortar has set, if they are to be removed.

## TIP-UP DOORS

### Doors

Pressed mild steel tip-up door and frame with balanced counterweight or spring action as *specified*, from an approved manufacturer, and consisting of:

1. 0,8 mm mild steel door pressed to troughed or fluted pattern, reinforced at back with 1,2 mm mild steel braces and channel surround, all welded together
2. Two sintered metal or aluminium rollers in vertical and horizontal guides
3. Jamb- or cam-spring, or counterweight mechanism
4. Lock with chromium plated handle on outside, with two keys.

Paint doors one coat zinc phosphate primer to comply with *SABS* 1319 in factory, or galvanise or pre-paint as *specified*.

Bolt channels to jambs of door openings.

Service door at completion and leave in perfect working order.

## ALUMINIUM FRAME WINDOWS AND DOORS

### Glazed aluminium windows and residential sliding doors

Glazed aluminium alloy windows and sliding doors for external use must comply with *SABS* 1651 and be of type and dimension, handing, finish, type and quality of glass, colour of gaskets and weather-strips, material and finish of hardware, insect screens, whether weather-strips are to be renewable, additional security devices and performance class as *specified*.

### Glazed aluminium shop fronts, entrances and screens

Glazed aluminium alloy shopfronts, entrances and screens must be of design and dimension, door types, finish of aluminium, type and quality of glass, colour of gaskets and weather-strips, material and finish of hardware and performance class as *specified*.

### Aluminium and finish

Aluminium extrusions must be alloy 6063 or 6261 in temper T5 or T6 to comply with *BS* 1474. Aluminium sheet must be alloy 1200 or 3004 or 5251 of appropriate temper to comply with *BS* 1470.

Shopfront profiles may be reinforced by inserting steel channels or tubes which are suitably treated to prevent corrosion and reaction with the aluminium alloy extrusions. These steel members must be properly fixed to the aluminium sections. Do not use wood as reinforcing.

Anodising must be to *SABS* 999, of finish, thickness and colour as *specified*.

Powder coating must be to *SABS* 1578 part 1 and 2, of type, thickness and colour as *specified*.

Provide a certificate that the finish conforms to the specified standards by an approved anodizer or powder applicator, who is a member of the Aluminium Federation of South Africa (AFSA).

Provide a written guarantee for 10 years from the anodizer/powder applicator against peeling and discolouration.

### Glass

Glass must be of type, thickness and colour as *specified*.

### Design

Design wind pressure and class designation must be as *specified*. The manufacturer is responsible for taking height of product head above ground into account when selecting products of appropriate performance. Atmospheric temperature range is between -10°C and 35°C. The plastic, shrinkage and creep deflection of floor slabs must be as *specified*.

### Manufacture

Aluminium framed windows and doors must be manufactured according to the minimum requirements of the Association of Architectural Aluminium Manufacturers of South Africa (AAAMSA).

Each window and door must be marked with the mark and number of the test certificate issued by AAAMSA, or a copy of the latest performance test certificate for similar products must be provided.

The supplier is responsible for confirmation of opening sizes.

Frame parts must be joined by mechanical means or by welding. Joints may have flush, stepped or lapped surfaces. Mitred joints may only be flush. All joints must be sealed. Contact between incompatible materials is not allowed.

Accessories must be removable without having to remove the frames from the structure. Sliding members must be fitted so that no metal to metal sliding contact occurs.

Sealants must be compatible with aluminium, and fitted so that the performance of the sliding or swinging parts is not impaired by their deterioration.

Glazing beads, gaskets and glazing compounds must be compatible with the aluminium, its finish and with the glass. No putty is permitted.

Hardware and fittings must be resistant to atmospheric corrosion and be accessible for adjustment, repair and replacement after the window or door has been installed.

Fastenings must be compatible with aluminium and its finishes.

### Installation

Build in approved subframes if so *specified*.

Fit windows at the last possible stage in the building process to prevent damage and staining of the aluminium frames.

Protect frames against impact or scratching by wrapping with paper or plastic or covering with a light tack tape, and leave these wrappings in place until all rough trades are finished.

Use fixings of aluminium or 304 grade stainless steel.

Avoid direct contact between aluminium and other metals or wet concrete by applying a separating coat of bituminous paint.

Install the window or door secure, sealed and undamaged.

Scratches and blemishes shall be viewed for inspection at a distance of three metres under normal and reasonable lighting conditions.

## STEEL KITCHEN CUPBOARDS

### Cupboards

Steel kitchen cupboards must comply with *SABS* 1385, with type of stainless steel for sinks and/or drain boards, material of worktops, edging of worktops, locks, finish and colour as *specified*.

Supply a sample of a cupboard unit with door, drawer, handles and lock for approval, as *specified*.

The supplier is responsible for checking the sizes on site and for providing detail layout drawings for approval before any work is started.

### Fixing

Securely fix cupboards in position *according to the manufacturer's instructions*.

Seal all joints between work tops and walls with an approved fungus-resistant sealant.

### Adjusting

Inspect and adjust all cupboard components after fixing and leave everything in perfect working order.

Protect cupboards from damage.

## ADJUSTABLE METAL LOUVRE FRAMES

### Louvres and fixing

Adjustable glass louvre frames and mechanisms must be of galvanised steel to comply with SABS-CKS 413. The mechanism must be capable of being operated by the remote control system as *specified*. Glass louvres must be 115 mm wide, unless otherwise *specified*, with long edges polished.

Fit adjustable louvre frames after the fixed window frame has been painted, with stainless steel or chromium plated brass dome-head screws.

Service the louvres at completion and leave in perfect working order.

## STEEL ROLLER SHUTTERS AND DOORS

### Slats

Slats must be cold rolled interlocking Z275 galvanised mild steel sections of *specified* profile and in continuous lengths without joints, forming a weather proof curtain capable of withstanding a wind loading of 70 kPa.

The mass of interlocking slats (excluding T-bar) must be 11,0 kg/m2 for door spans smaller than 4500mm; 13,5 kg/m2 for door spans of 4500-5500mm, and 16 kg/m2 for door spans larger than 5500 mm.

### Grilles

Grilles must be 10 mm diameter continuous mild steel bar without joints over the span of the door width and of *specified* profile, assembled by means of an approved shaped clip.

The mass of grilles (excluding T-bar) must be at least 13 kg/m2, depending on the profile.

### T-bars

T-bars must be two cold rolled steel angles fitted back to back with a half slat in between, riveted together with 8 mm diameter mild steel rivets, or with 6 mm diameter steel screws, at 350 mm maximum centres (pop riveting is not acceptable)

Lifting handles must be provided on the T-bar of hand operated (push-up type) doors on the side from where it is to be operated: two of 25 x 5 mm flat mild steel bent to desired shape for doors of smaller than 1500 mm width; two of 40 x 40 x 3 mm mild steel angle, for doors of 1500 - 5500 mm width); two of 50 x 50 x 6 mm mild steel angle, for doors of 5500 - 6500 mm width)

### Guides

Guides must be 3 mm minimum thickness cold rolled mild steel channel with minimum depth of 50 mm for doors smaller than 2500 mm width, 70 mm for doors 2500 - 6500 mm width. Specially fabricated guides must be provided for doors larger than 6500 mm wide.

Provide guides with the necessary bellmouths, 25 x 3 mm flat mild steel T-bar stoppers, and 50 x 5 mm mild steel fixing lugs with 11 mm diameter holes for fixing bolts.

### End plates

End plates must be 4 mm minimum thick mild steel plate, fastened to supporting wall angles with not less than two 10 mm diameter bolts.

### Barrel or shaft

Outer and inner tubes of barrels or shafts must be complete with springs, anchors, barrel end castings, ball bearings, stub axles and rings.

Allowable deflection of barrels is 4 mm/m maximum.

Torque safety factor of inner tube must be 3:1 minimum.

Torsion spring must be hard drawn spring steel wire to DIN 17223/1984 or BS 5216/1980. Adjust spring so that door, when stationary, does not move more than 200 mm up or down.

Barrel end castings and spring anchors must be grey cast iron.

Bearings must be high grade sealed ball bearings.

### Canopy cover

Canopy covers must be 1 mm thick sheet steel for door spans of smaller than 3000 mm; 1,2 mm thick for door spans larger than 3000 mm.

Canopy covers must be hot-dip galvanised to comply with *SABS* 934, class Z275.

### Wicket gates

Wicket gates must be of size 685 x 1830 mm or 685 x 1220 mm as *specified*, with a fill-in curtain similar to the door curtain, a cylinder night latch and/or provision for a padlock, as *specified*.

Electrically operated doors must have a power cut-off switch.

### Operation

Operation must be manual or push-up, chain-operated, gear-operated or electrically operated, as *specified*.

Chain-operation must be by endless hand chain that will not foul the opening of the doorway, and hangs to within 1 m of the floor. Provide a chain lock on one of the guides.

Gear operation must be by gearbox and handle with locking system, to be installed 1 m from floor level.

Electrical operation must be by electrical motor and gearbox with emergency handle in the event of a power failure, isolator and control push buttons and limit switches.

### Fixing

Bolt guides to wall with 10 mm diameter steel anchor bolts, rawl bolts or sleeve anchors

Weld guides to steel structure by means of a stitch weld.

Service shutters and doors at completion and leave in perfect working order.

## STRONGROOM/RECORD ROOM DOORS AND VENTILATORS

### Doors

Strong room doors must comply with *SABS* 949 and be of category, dimensions, fittings, and type and number of locks as *specified*.

Record room doors must comply with *SABS* 1015 and be of dimensions, finish and type of lock as *specified*.

### Ventilators

Ventilators for strong rooms must be double ended steel telescopic ventilators for wall opening size and wall thickness as *specified*, with face plates on both sides, drop shutter mechanism operating from a fuseable metal plug, wire gauze and baffle plates.

### Installation

Fix strong room door in position with lugs provided, *according to the manufacturer's instructions*.

Ensure that the door will clear the finished floor by at least 5 mm.

Build in ventilator(s).

### Key

Arrange with the manufacturer to have the key sent to the architect/principal agent by registered post, giving the following particulars:

1. Manufacturer's name
2. Manufacturer's door number
3. Class of door
4. Size of door
5. Name of contractor by whom ordered
6. Building and room where installed.

## STAINLESS STEEL SHOP FRONTS, COUNTERS, BALUSTRADES, CLADDING, SIGNS, STREET FURNITURE

### Stainless steel

Austenitic stainless steel grade 304 or 304L (1.4301 or 1.4306) in annealed and pickled finish, or as specified.

### Welding

Welding of stainless steel must conform to SABS 044.

### Cleaning

Immediately remove mortar and plaster splashes from stainless steel surfaces. Do not use acid for cleaning stainless steel. Avoid contact or spillage of acid used for the cleaning of brickwork or tiles.