

LIGNEUS

Bring home the essence of nature



Bhagwati Sai Metal Alloys

(AN ISO 9001 : 2015 CERTIFIED ALLUMINIUM EXTRUSION PLANT)

LIGNEUS



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• P R E F A C E •

PROFILES

Bhagwati Sai Metal Alloys have set up an Aluminium Extrusion Plant, first of its kind in entire N.E.Region for Export & Supply of high quality profiles of Aluminium Extrusions in different Alloys and to meet the ever-changing needs of various industries. We have one of the few plants in India that is equipped with the most sophisticated manufacturing facilities (Extrusion press and allied equipment) & computerized tool room to receive high quality & quantity production. Our technical advancement integrated with our field knowledge & engineering expertise allows us to develop innovative products to meet customer specific requirements.

OUR PRODUCTS

We offer a wide range of Aluminium Extrusions and Aluminium profiles in different alloys.

APPLICATIONS

Aluminium Extrusions and Aluminium Profiles in different alloys for general and customized applications in various industries such as :

- Engineering Industry
- Agricultural Industry
- Transport Industry
- Communication Industry
- Electronics Industry
- Construction Industry
- Aviation Industry

OUR STRENGTHS

Advanced Manufacturing Facilities :

We have an ideal combination of modern machinery, gas based aluminium extrusion plant and Engineering expertise to offer high quality extruded Aluminium profiles. Our manufacturing facilities incorporate latest extrusion technology including:

- Sophisticated PLC extrusion press.
- In-house foundry with Hot-Top Casting technology.
- Semi auto Anodizing Plant with Electro coloring facility.
- High Standard Power Coating Plant
- Wood Grain Sublimation Plant

QUALITY ASSURANCE

All our products confirm to international quality standards.

We use LPG as fuel in our manufacturing activities that facilitates in maintaining the quality of products.



CONTINUAL UPGRADATION OF TECHNOLOGY

Constantly updated manufacturing technology, process automation and alloy development enable us to keep pace with the technological advancement in the Aluminium Extrusion Industry.

HIGH QUALITY ANODIZING

Due to use of LPG gas, sulfur content is very negligible that ensures high Quality anodizing.

KEY BENEFITS OF HIGH QUALITY ALUMINIUM EXTRUSIONS ARE MANIFOLD

- **Light Weight** - Aluminium weighing one third the weight of iron, steel, copper or brass and hence becomes easier to handle and transport.
- **Strength** - Aluminium Extrusions can be made as strong as the purpose demands.
- **Strength-to-weight Ratio** - The combined property of strength and lightness in aluminium makes it a key ingredient of many industrial applications.
- **Corrosion Resistant** - Aluminium provides a natural protective layer against environmental, chemical and physical corrosive agents and hence, can never rust
- **Electric Conduction** - Aluminium has better conductivity over copper per unit weight and is universally used for power consumption
- **Uniform Quality** - Aluminium assures reliability and uniformity in quality and hence minimizes rejection rates, corrective fabrication and production downtime.
- **Variety of finish** - A wide array of finishes ranging from paint lacquer and enamel, textures from rough matte to mirror smooth and a variety of powder coated, anodized colours and Wood Grain Finish are available. The finish enhances durability and elegance of the product.

We have our own foundry with tilting furnaces and hot top system to make billets covering a wide range of alloys. Complete metal treatment procedures as degassing, grain refining and filtration are carried out. The alloys are analyzed to ensure that they are within the limits required.



ABOUT CATALOGUE

The section shown in this catalogue are considered standard for which dies are available with us on the Date of publication and are available to customers without die charges. We are continually adding to the range of extrusion dies. If the particular section, required by you, is not given in the Catalogue, please write to our works office to meet your specific needs. To avoid confusion and delay in the Processing of enquiries and execution of orders, correct and detailed information about the desired sections are required.

All the standard sections given in the catalogue are generally available in alloy 6063 temper (IS-733, IS-1285), Extrusions in alloys other than these would be subject to special enquiry. Please note that the sections are arranged in the increasing order of dimensions.

ABOUT EXTRUSION

Extrusion is a most modern and very versatile method of forming Aluminum. The aluminum logs, after casting to the specified alloy are fed into the continuous log homogenizing furnace wherein it is heated to a desired temperature. The logs are then fed into hot logs shear where the logs are sheared to required size billets. These are pushed under tremendous pressure, applied by a hydraulic ram, through a shaped aperture in a steel die. The die aperture may have almost any imaginable contour, thereby making it possible to produce infinite shapes and the cross sections can be sawed to the required lengths. It is possible to control the finish of the extruded sections to such a degree, during its passage through the steel die that no further finishing may be necessary, and if required, the part may be anodized straight away into attractive colors for higher consumer appeal.

PHYSICAL PROPERTIES OF ALLUMINIUM

Specific Gravity-2.70

Electrical conductivity-53 to 62% IACS

Co-efficient of linear expansion -22×10^{-6} mm/mm/0c

Thermal conductivity (at 200 c)-0.53 cal/sq.cm/sec./cm/0c

Electrical resistivity (at 200 c)-2.850 micro-ohm (for EC-0)

Modulus of elasticity- 7×10^5 kg/cm²

MAXIMUM CIRCUMSCRIBING CIRCLES SIZES

Solid shapes - 125 mm.

Hollow shapes - 115 mm.

Round tubes - 100 mm.

Rectangle tube - 150 x 25 mm

MANUFACTURING TOLERANCES

LENGTH : Extrusions are supplied to standard commercial tolerances. Special tolerances are subject to individual enquiry. Unless requested for other exact lengths, material will be supplied in 4876.8 mm (16 feet) standard length. Tolerance ± 5 mm

WEIGHT : The weight kg/m given in catalogue are the nominal weights. In practice, tolerance, alloy and such other factors will affect the final weight and a normal variation of + or -10% should be expected.

WEIGHT CALCULATION : Section weight-kg/m= section area (mm²) x 0.0027

Chemical Composition of Wrought Aluminium And Aluminium Alloys Bars Rods and Sections for General Engineering Purposes

| Chemical Composition | | | | | | | | | | |
|--|-----------|----------|-----------|---------|------|-----------|------|--|-----------|----------------------------------|
| (Composition limits are in percent maximum unless shown otherwise) | | | | | | | | | | |
| Designation | Aluminium | Copper | Magnesium | Silicon | Iron | Manganese | Zinc | Titanium And /OR Grain Refining Elements | Chromium | Remarks |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| 63400 | Remainder | 0.1 | 0.4-0.9 | 0.3-0.7 | 0.6 | 0.3 | 0.2 | 0.2 | 0.1 | ---- |
| 64423 | Remainder | 0.5-1.0 | 0.5-1.3 | 0.7-1.3 | 0.8 | 1.0 | ---- | ---- | ---- | ---- |
| 64430 | Remainder | 0.1 | 0.4-1.2 | 0.6-1.3 | 0.6 | 0.4-1.0 | 0.1 | 0.2 | 0.25 | ---- |
| 65032 | Remainder | 0.15-0.4 | 0.7-1.2 | 0.4-0.8 | 0.7 | 0.2-0.8 | 0.2 | 0.2 | 0.15-0.35 | Either Mn or Cr shall be Present |

NOTE 1 - It is the responsibility of the supplier to ensure that any element not specifically limited is not present in an amount such as is generally accepted as having an adverse effect on the product. If a purchaser's requirement necessitate limits for any element not specified these should be agreed to between the supplier and the purchaser.

NOTE 2 - Major alloying elements have been printed in bold face type.

*Titanium and/or other grain refining elements and/or chromium may be present at the option of the supplier provided the total content does not exceed 0.3 percent.

Mechanical Properties of Wrought Aluminium and Aluminium Alloys Bars, Rods and Sections (Extruded) for General Engineering Purposes

| Designation | Temper Condition | Size (Diameter or Minor Cross Sectional Dimension),mm | | 0.2% Proof Stress | | Tensile Strength | | Elongation % Min, on 50 mm, or 5.65 $\sqrt{S_0}$ Gauge Length |
|-------------|------------------|---|---------------------|-------------------|---------|------------------|---------|---|
| | | Over | Up to and Including | Min,Mpa | Max,Mpa | Min,Mpa | Max,Mpa | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 63400 | T4 | ---- | 150 | 80 | ---- | 140 | ---- | 14 |
| | T6 | ---- | 150 | 150 | ---- | 135 | ---- | 7 |
| 64423 | T4 | ---- | ---- | 155 | ---- | 266 | ---- | 13 |
| | T6 | ---- | ---- | 265 | ---- | 330 | ---- | 7 |
| 64430 | T4 | ---- | 150 | 120 | ---- | 185 | ---- | 14 |
| | T6 | ---- | 5 | 255 | ---- | 295 | ---- | 7 |
| 65032 | T4 | ---- | 150 | 115 | ---- | 185 | ---- | 14 |
| | T6 | ---- | 150 | 235 | ---- | 280 | ---- | 7 |

NOTE - Mpa = 1 N/mm² = 0.102 kgf/mm²

*Properties in M temper are only typical values and are given for information only.

Characterstics and Typical Uses of Aluminium Alloys

| Designation | Characterstics | Available Forms | Typical Uses |
|-------------|--|--|---|
| 63400 | Suitable for intricate extruded setions of medium strenght.Forms well in W condition. Highly Corrosion resistant | Extrusion, Tube, Wire, Rolled Rod and Forging | Architectural uses, such as window/door-frames, wall facings, partition, hand rails etc, and other similar applications where surface finish is important and medium strenght would suffice |
| 63401 | Do | Do | Bus Bar application |
| 64401 | Do | Do | Conductor application |
| 64423 | Stronger than 64430 and has Extrusions superior machinability | Extrusions | Application requiring good strenght and machinability such as missile machinery components |
| 64430 | Medium - strenght alloy with good mechanical properties, corrosion resistance and weldability | Sheet, Plate, Extrusion, Tube, Wire and Forgings | Structural applications of all kinds, such as road and rail transport vehicles, bridges, cranes, roof trusses, rivets, etc. Cargo containers, milk containers, deep-drawn containers and flooring |
| 65032 | Medium strenght alloy similar to 64430 | Do | Similar to 64430 |



Aluminium Vs uPVC

| FEATURES | ALUMINIUM | uPVC |
|------------------------------|--|---|
| STRENGTH | The special aluminium alloy used has very high strength (minimum UTS 185 mPa), can be designed for any size window, and is suitable for high-rise buildings. | uPVC has low strength (minimum UTS 51 mPa), low modulus, and low impact resistance. MS/GI/Al reinforcements are required. |
| AESTHETICS | Limitless colors and textures through anodizing, powder coating and wood finish. | Limited color options Susceptible to fading, discoloration, and chalking from continuous exposure to UV radiation. |
| TEMPERATURE STABILITY | Stable in the range of 150 degrees Celsius down to sub-zero. It melts at 660 degrees Celsius. | Stable in the range of 60 degrees Celsius to 20 degrees Celsius. It melts at 80 degrees Celsius. |
| FIRE RESISTANCE | Non combustible. | Flammable vinyl siding can also release toxic fumes when burned, particularly dioxins. |
| THERMAL EXPANSION | The coefficient of thermal expansion, at 0.0000240/degree Celsius, is more resistant to warping, twisting, or sticking when subjected to the elements. | The coefficient of thermal expansion is 0.0000600/degree Celsius. Exposure to high temperatures may result in expansion and warping, while exposure to sub-zero temperatures may cause uPVC to crack. |
| THERMAL INSULATION | Window performance is mainly decided by glazing; hence, aluminium or uPVC does not matter, even more in hot climates. | Window performance is mainly decided by glazing, and hence, aluminium or uPVC does not matter, even more, in hot climates. |
| SOUND INSULATION | Outperforms in noise abatement with a damping factor of 25.9. | The damping factor is very low, at 1.8. |
| MAINTENANCE | Easy to maintain and at a low cost. | Lower durability implies higher maintenance costs. |
| RESALE VALUE | 100% recyclable, hence the high resale value. | Negligible resale value. |
| ENVIRONMENT FRIENDLY | Endlessly recyclable. | The purity of material degrades. Additives cause disposal problems. |



ANODIZING & COLOURING FACILITY

Aluminum anodizing is the electrochemical process by which aluminum is converted into aluminum oxide on the surface of a part. This coating is desirable in specific applications due to the following properties :

- Increased corrosion resistance
- Increased durability / wear resistance
- Ability to be colored through dyeing
- Electrical insulation
- Excellent base or primer for secondary coatings

The process of anodizing consists of an anodizing solution typically made up of sulfuric acid. A cathode is connected to the negative terminal of a voltage source and placed in the solution. An aluminum component is connected to the positive terminal of the voltage source and also placed in the solution. When the circuit is turned on, the oxygen in the anodizing solution will be liberated from the water molecules and combine with the aluminum on the part forming an aluminum oxide coating.

The thickness of the aluminium oxide "anodized" coating can be varied by processing time. The depth of anodized coating may be varied according to application

25 Micron is recommended for heavy duty external permanent architectural application where little deterioration can be tolerated.

15 Micron is recommended for the majority of ordinary architectural requirements.

10 Micron is suitable for internal application and outdoor applications where cleaning is very frequent.

Our modernized anodizing and electro coloring plant ensures uniform coating to match the taste & decor for varied applications, without any color variation. The extrusions are anodized from 10 micron to 25 micron. We also have the facility for coloring the extrusions in different colors like silver, champagne, light bronze, medium bronze, deep bronze & black. A full proof sealing system ensures durable finish for long lasting applications.



POWDER COATING

Powder coating is the process of coating a surface in which a powder material is applied using an electrostatic or compressed air method. The applied powder is then heated (cured) to its melting point, after which it flows to form a smooth film which dries to a firm, durable finish very resistant to scratches, cracking, peeling, UV rays and rust.

The entire powder coating process involves several steps.

Very generally:

- Cleaning step to ensure the substrate is free of any oils, dirt, rust, mill scale, etc;
- A pretreatment step (an important step not done by all coaters) during which the product is treated with a pretreatment chemical to further protect it and improve the surface for powder adherence;
- Rinse, rinse, rinse..dry completely then
- Powder coat, usually done with an electrostatic gun,
Finally, FULLY cure the powder in the oven,

The result is a high quality coating with an attractive finish and excellent durability.

ADVANTAGES OF POWDER COATING

- Resistant to heat, corrosion, impact and abrasion
- Resistant to most chemicals and solvents
- Resistant to fading from sunlight
- Resistant to scratching, peeling, and cracking

Powder Coating is highly protective of our environment. While liquid finishes contain solvents which have pollutants known as volatile organic compounds (VOC's), powder coating contains no solvents and release negligible amounts, if any, VOC's into the atmosphere.

✓ FACILITY AVAILABLE WITH US

- Separate facility for dust free smooth finish.
- Colors application- As per AkzoNobel, Asian or Berger RAL Color cards
- Strictly follow International practice for pretreatment and post Treatment
- 60-100 microns.



LIGNEUS

Bring home the essence of nature

Ligneus is an exclusive range of wooden grain finish aluminum profile section. Introduced for the first time in North East India, 'Ligneus', offers not just the strength, durability and non-combustible nature of aluminium, but also adds warm aesthetics and essence of wooden finish to the architecture of your design.

The product offers a wide range of design and color options with the promise of exceptional quality. The product is made using the chemical process of sublimation coating and offers a wide variety of choice to the users.

SUBLIMATION COATING PROCESS

The ligneus product range is made using this process. In this process, the sublimation ink (with the texture and effects of wood) is transferred to into the powder coatings by the use of temperature and pressure. The process also takes into account the UV resistance of the product and thus, keeps a check on the UV performance of the product. The process of sublimation is very delicate and detailed.

The intricate process ensures that the final product has guaranteed superior quality, This is because sublimation is done properly only if certain parameters of adequate quality are met.

QUALITY MARKERS OF SUBLIMATION COATING

- Good Powder Coating
- The Quality of the Powder
- Proper process of sublimation with adequate attention to time and pressure.
- Quality of the film and ink
- Use of correct machine
- The time of curing the powder

FEATURES

- High weather resistance
- High Customization
- High UV resistance
- No limits in terms of colors and design repetition

FUNCTIONAL UTILITY

- Window Framing
- Door Framing
- Mosquito Net Screen Frames
- Sun Shades and shutters
- Partition
- Furnitures



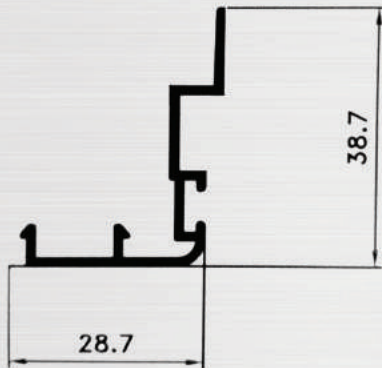
BHAGWATI SAI SLIDING WINDOWS AND DOOR SERIES

Invite **NATURE** to your work hours



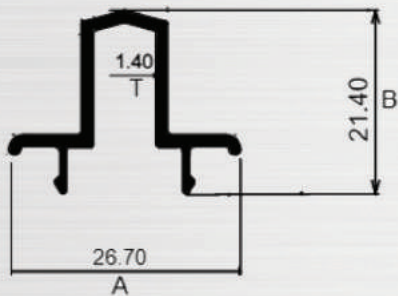
27MM Series

27MM Clip



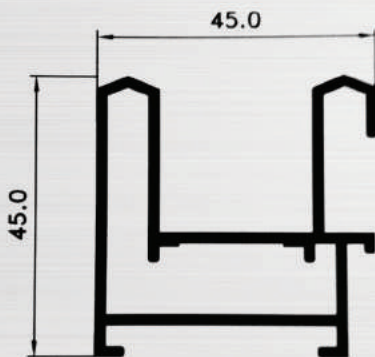
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|---------|-------------|------|------|------|------------------|
| 1 | 8005 | 28.7 | 38.7 | 1.40 | 1.05-1.40 |

27MM RAIL CAP



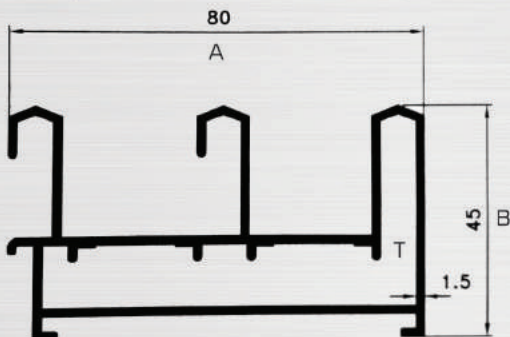
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| 1 | 8006 | 26.70 | 21.40 | 1.40 | 0.80 -1.00 |

27MM Two Track



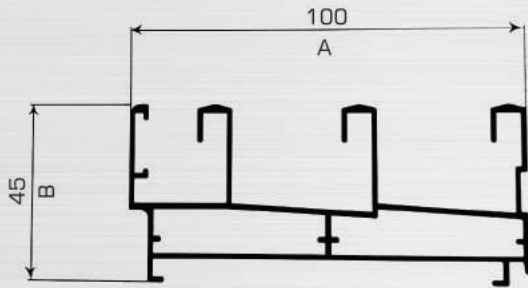
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| 1 | 8008 | 45.0 | 45.0 | 1.50 | 4.50-4.80 |

27MM Three Track



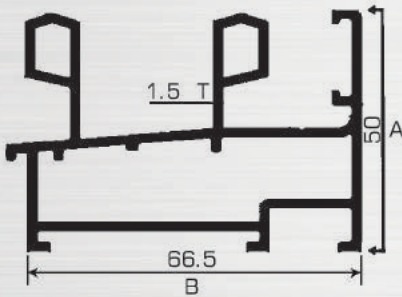
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|---------|-------------|------|------|-----|------------------|
| 1 | 8009 | 80.0 | 45.0 | 1.5 | 6.70-7.10 |

27MM Three Track Frame



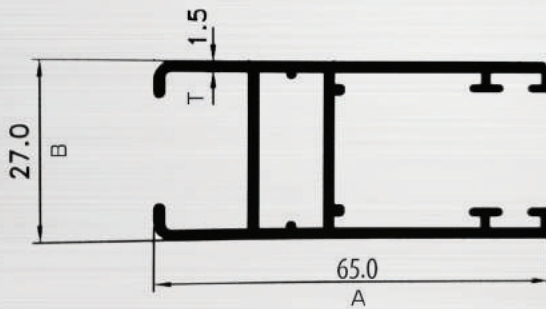
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|---------|-------------|-------|------|------|------------------|
| 1 | 8010 | 100.0 | 45.0 | 1.50 | 7.50-8.00 |

27MM Two Track Frame



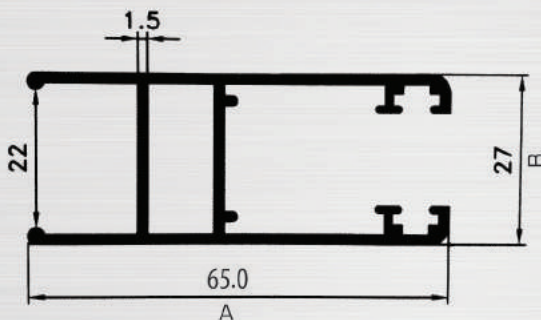
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|---------|-------------|-------|-------|------|------------------|
| 1 | 8020 | 50.00 | 66.50 | 1.50 | 6.50-7.00 |

27MM Shutter SG



| Sl. No. | Section No. | A | B | T | Wt. Range KG/16' |
|---------|-------------|------|------|------|------------------|
| 1 | 9001 | 65.0 | 27.0 | 1.50 | 3.90-4.50 |

27MM Shutter DG



| Sl. No. | Section No. | A | B | T | Wt. Range KG/16' |
|---------|-------------|------|------|------|------------------|
| 1 | 9002 | 65.0 | 27.0 | 1.50 | 4.30-4.60 |



BHAGWATI SAI OPENABLE SERIES

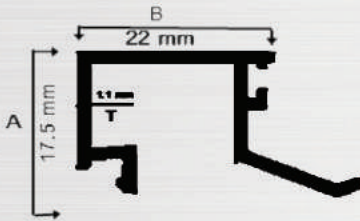


WOODEN TOUCH

for a natural flair

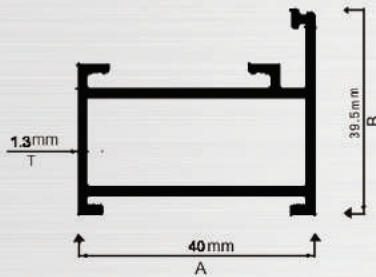
40MM Series

40MM Clip



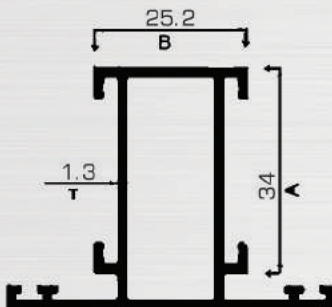
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| 1 | 8021 | 17.50 | 22.00 | 1.10 | 0.75-1.00 |

40MM Outer



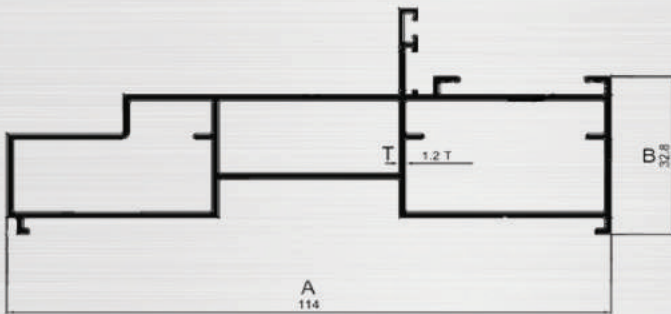
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| 1 | 8022 | 40.00 | 39.50 | 1.30 | 2.70-3.00 |

40MM MULLION 34 X 25.2



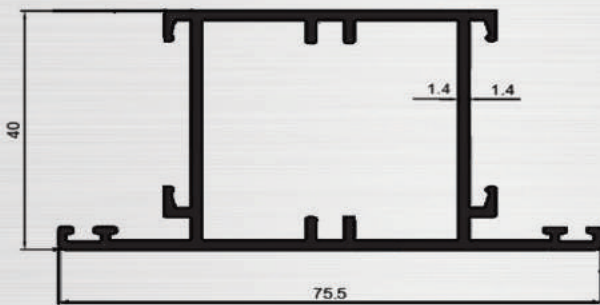
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| 1 | 8023 | 34.00 | 25.20 | 1.30 | 3.20-3.60 |

40MM 3 in 1 Window Frame



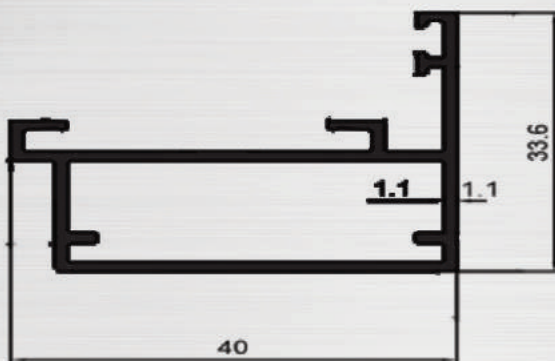
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| 1 | 8024 | 114.00 | 32.80 | 1.20 | 6.00-6.50 |

40MM Mullion 75.50 X 40



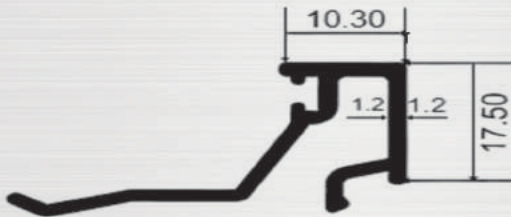
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| 1 | 8025 | 75.50 | 40.00 | 1.40 | 4.10-4.80 |

40MM Universal Clip



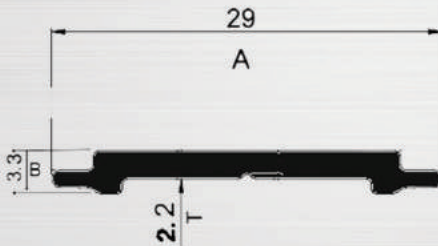
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|---------|-------------|-------|-------|------|------------------|
| 1 | 8026 | 40.00 | 33.60 | 1.10 | 2.00-2.50 |

40MM DGU Clip



| Sl. No. | Section No. | A | B | T | Wt. Range KG/16' |
|---------|-------------|-------|-------|------|------------------|
| 1 | 8027 | 10.30 | 17.50 | 1.20 | 1.05-1.50 |

40MM F. Patti



| Sl. No. | Section No. | A | B | T | Wt. Range KG/12' |
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| 1 | 8028 | 29.00 | 3.30 | 2.20 | 0.60-0.80 |

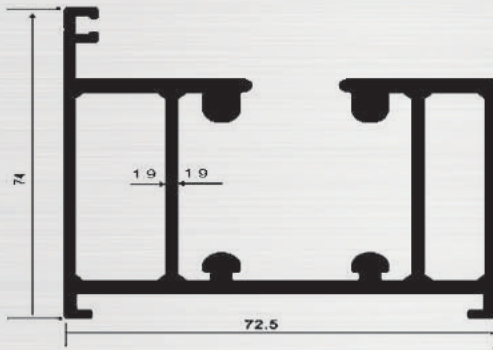


BHAGWATI SAI SLIDING AND FOLDING DOOR SERIES



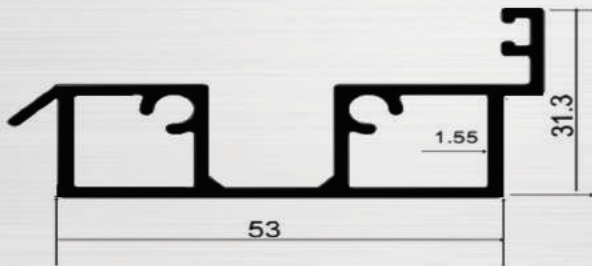
50MM Series

50MM Top Guide



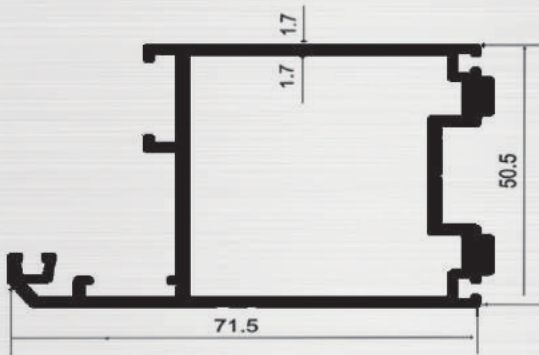
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| 1 | 8050 | 74.00 | 72.50 | 1.90 | 12.00-13.00 |

50MM Bottom Guide



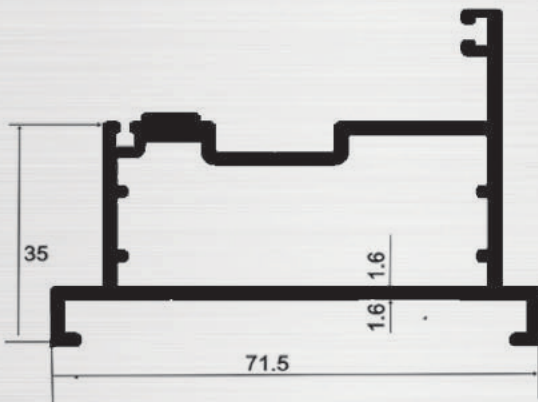
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|---------|-------------|-------|-------|------|------------------|
| 1 | 8051 | 53.00 | 31.50 | 1.55 | 4.00-4.50 |

50MM Shutter



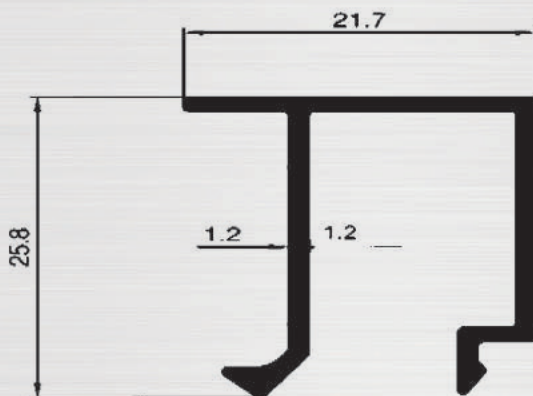
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|---------|-------------|-------|-------|------|------------------|
| 1 | 8052 | 71.50 | 50.50 | 1.70 | 6.50-7.00 |

50MM Frame



| Sl. No. | Section No. | A | B | T | Wt. Range KG/16' |
|---------|-------------|-------|-------|------|------------------|
| 1 | 8053 | 71.50 | 35.00 | 1.60 | 5.20-5.80 |

50MM SGU CLIP



| Sl. No. | Section No. | A | B | T | Wt. Range KG/16' |
|---------|-------------|-------|-------|------|------------------|
| 1 | 8055 | 21.70 | 25.50 | 1.20 | 1.00-1.30 |



MISCELLANEOUS

GEORGIAN BAR



| Sl. No. | Section No. | A | B | T | Wt. Range KG/16' |
|---------|-------------|------|---|------|------------------|
| 1 | 8060 | 20.5 | 7 | 1.10 | 0.70-0.80 |