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Entrepreneur's Guide:
Aluminum Door Window Manufacturing

ENTREPRENEUR'S GUIDE: ALUMINUM DOOR WINDOW MANUFACTURING



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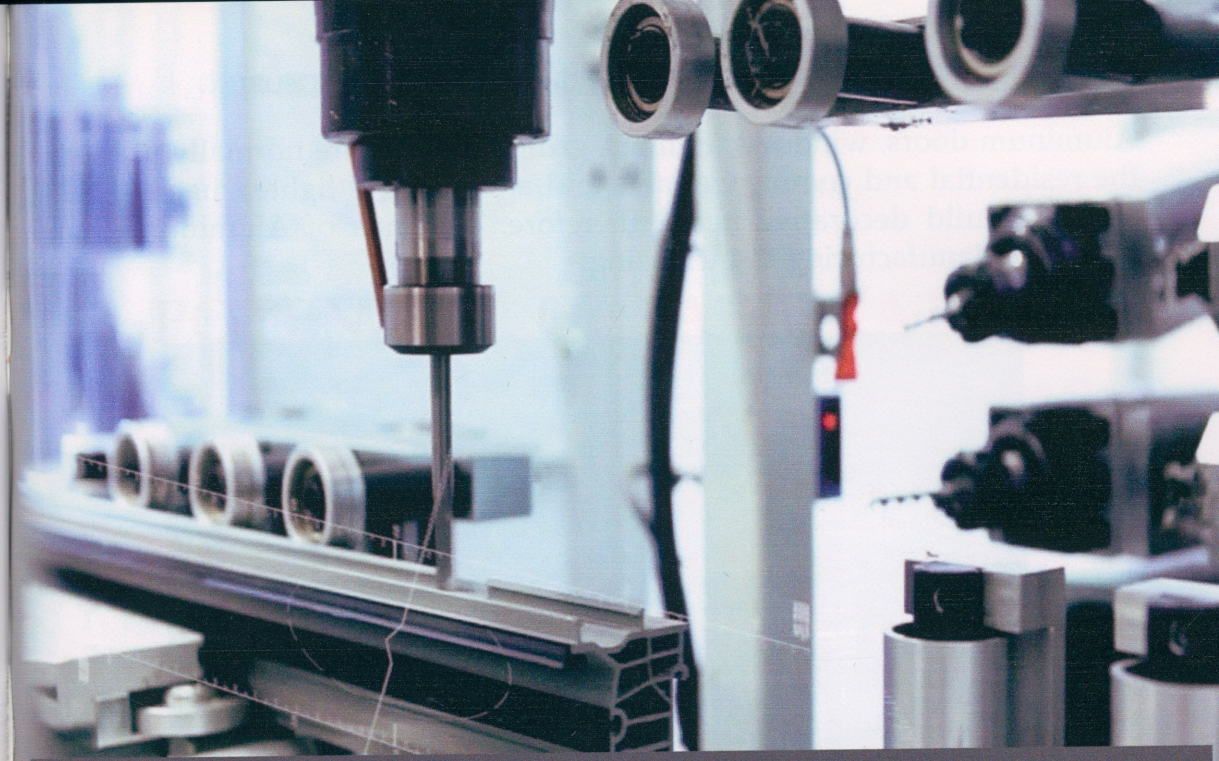
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Preface

Aluminum is widely used in construction. Closely related to the steel industry is the aluminum industry. While the steel industry dominates the ferrous metals category, aluminum is the most important nonferrous metal used in building construction. The production process of aluminum involves mining of bauxite, the basic raw material, refining of bauxite to alumina, conversion of alumina to aluminum ingots in a smelter plant, and semifabrication of the ingots through rolling and extrusion. It can be fabricated into different architectural products like windows, door, handrails, partitions, false ceiling, louvers, etc. To meet the ever increasing demand in aluminium fabrication, expert technicians are required for fabrication and erection of the products. Aluminum fabrication business is exceedingly worthwhile on the grounds that it manages a fundamental component in building development. Any house is inadequate without legitimately introduced windows and entryways.

Entrepreneur's Guide of Aluminum Door Window Manufacturing is intended to provide the required competencies in a learner for entrepreneurship in the operation, installation and maintenance of specialized machinery to manufacture aluminum products. In this guide, a basic overview of aluminum fabrication, from properties to fabrication techniques to industries and applications is given. It will develop the competencies for learners to perform aluminum work in the construction industry. The guide also provides the basis upon which further related learning and career development can take place. It covers on entrepreneurial competencies, financial accountancy and management, legal aspects, and regulatory aspects of SMEs. It also details on aluminum door window producing manufacturing with various kinds of casings, fittings is a beneficial manufacturing opportunity around the world. Aluminum created things like doors, windows, staircase, handrails, backings, and railings for buildings. If you want to know what it takes to be a successful aluminium fabrication business owner or how to get your business to the next level? Then this book is the ultimate guide that is straight to the point about what you need to know and how to do it.



ENTREPRENEUR'S GUIDE:
ALUMINUM DOOR WINDOW MANUFACTURING

INTRODUCTION

Aluminum Door Window Manufacturing has a profitable manufacturing opportunity in India. Because of the use of aluminum in every constructive area for functional as well as a decoration point of view and for stacking purposes.

Manufacturing aluminum windows and doors with different types of frames, fittings are a relatively simple process that can even be conducted from the well-equipped workshop or home-based shop.

Aluminum doors, windows, railings, grill works etc. are normally used for the residential and commercial area and aluminum is lighter material that helps to build decorative items, therefore, demands of Aluminum Door Window Manufacturing is increasing.

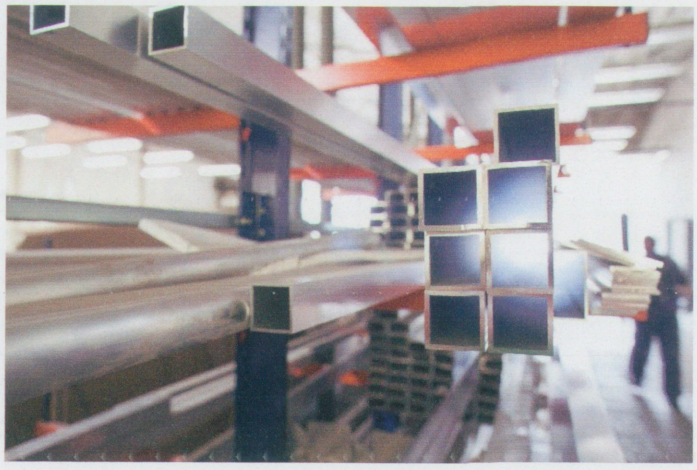


1

POTENTIAL OF FABRICATION BUSINESS (MARKET OPPORTUNITY)

1.1 ALUMINIUM FABRICATIONS

Aluminium fabricated items like doors, windows, staircase hand rails and supports, railings for verandas, corridors etc. have become the generally accepted feature in most modern buildings. The use of aluminium in business and office complexes, buildings, theatres as well as decorative purposes is very common. Similarly in residential buildings also aluminium doors, windows, railings, grill-works etc. are used extensively. Textile shops and other trading shops built in lighter materials too are going in for shelves made of aluminium for stocking purposes.



The advantages of aluminium such as light weight, strength, corrosion resistance, durability, easy in fabrication, attractive appearance and easy maintenance make it a popular material for use in modern buildings. Aluminium required for use in buildings is available from large scale manufacturers such as Indal, Balco, Jindal etc. as extruded sections in various shapes and sizes for specific uses. These sections are also available

through their local dealers. The usual length of these sections is 12 feet/4 meters. Fabricators anodise these to desired colours and fabricate the items as per the customers' requirements. These items have good appearance and finish and the maintenance expenses are almost nil while steel and wooden items require regular painting and polishing periodically.

1.1.1 Market Potential

The development and construction activities being inter-linked, there is good scope for aluminium fabrication units for meeting the growing demand of new buildings for offices, business and shopping complexes, theatres etc. Aluminium fabricated and anodised items like doors, windows, railings, staircases, shelves, ladders etc. are being increasingly used in the modern constructions on consideration of durability and appearance. If the present trend is any guide, theatres, restaurants, hotels, shopping complexes, office premises and other luxurious buildings will fast replace wooden materials with aluminium fabricated items. The consumption of these items is already on the increase.



1.1.2 Basis and Presumptions

- The production of the unit is worked out on the basis of single shift of 8 hours a day for 300 working days a year. The unit is expected to work at 70% efficiency in the first year.
- The unit is expected to achieve 80% production capacity in the second year onwards.

- Wages for labour etc. have been taken as per the rate prevailing at the time of preparation of the project profile.
- Interest rate is calculated @ 12% on Capital Investment.
- Entrepreneur has to raise 25% of the capital investment as margin money.
- Considering the product and usage, the project can last for more than 10 years. The repayment of term loans will be made in 5 years after one year **moratorium**.
- The unit is proposed to function in own building.
- Cost of machinery and equipment has been taken as per the rates quoted by machinery manufacturers/suppliers.

KEY FACT

Moratorium is a temporary suspension of activity until future events warrant lifting of the suspension or related issues have been resolved.

Implementation Schedule

Name of Activity	Period in Weeks
Preparation of project report • Calling Quotations • Scheme Preparation	5 weeks 2 weeks
Provisional Registration as SSI	1 week
Financial arrangement from financial institutions and others	12 weeks
Purchase and procurement of machinery and equipment	8 weeks
Erection and electrification	3 weeks
Recruitment of personnel	4 weeks

1.1.3 Technical Aspects

Process of Manufacture

Manufacturing process involves anodising the aluminium extruded sections first and then fabrication. Anodising process involves buffing, pickling in acid

solution, then cleaning in water, neutralising in acid and keeping the extruded sections in anodising tank for specified time. After anodising, the sections are to be fabricated as per the design and sizes of the customer by cutting, drilling, bending, welding, screwing, riveting, assembling with glasses and beading, wherever necessary. Handles locks etc. are also fitted as per requirements.

Production Capacity (per annum)

Items	Quantity	Value (In Rs.)
Stair Case Hand Rails	9,000 sq. ft	54,44,000
Doors	12,000 sq. ft	58,05,000
Windows	13,000 sq. ft	56,61,000

Quality Control and Standards

IS 1948:1961 specifies requirements regarding materials, fabrication and dimensions of aluminium doors, windows and ventilators manufactured from extruded aluminium alloy sections of standard sizes and designs completed with fittings ready for fixing with buildings. This standard does not cover the requirements for industrial doors, windows and ventilators. IS 1949:1961 deals with aluminium windows suitable for use in industrial buildings.



Aluminium doors, windows, stair case hand rails etc. are made as per the customers' specifications and requirements. Workmanship and high finish

are main criteria for these kind of products. Care should be taken in joining and assembling to get better appearance and finish.

Pollution Control

The anodising process using acid solution may leave residual solution which has to be disposed off periodically. The local Pollution Control Board may be consulted for appropriate method of disposal of these solutions.

Energy Conservation

Energy Conservation Energy consumption of this unit is on the low side since the lower powered motors are used in the production activity. The workers of the unit should be made aware of the need to conserve energy by switching off the energy sources when not required.



Bay windows offer many advantages, such as stunning views, natural light, window seats in cozy alcoves, connections between indoors and out, and extra storage and floor space.

1.1.4 Profitable Aluminium Business Ideas & Opportunities

The aluminium industry is one of the most traditional industries in India. There are a lot of domestic and industrial products from this metal. Most of the aluminium related business is highly cost intensive. Additionally, the businesses demand strategic planning. However, here in this article we put a list of 10 small scale aluminium business ideas. These businesses demand comparatively small startup capital investment.

In India, the domestic aluminium production exceeds the domestic demands. Thus creates a huge opportunity of export from our country. India earns export revenue every year from this metal. Apart from the aluminium as the raw material, our country also exports aluminium-made products. The list includes scrap, powder, flakes, bars, rods, foil, pellets, sheets, tubes and pipes.

1. Aluminium Bottles Manufacturing

Aluminum bottles are essential items in liquid and beverage industry. These bottles are durable and not fragile. Additionally, these are recyclable. A broad range of this beverage bottle profiles, styles, and configurations are available for commercial production, including "traditional", "oval", and "sports shapes".

2. Aluminium Can Manufacturing

This is an another very lucrative project for the entrpreneurs. The use of this type of cans is increasing rapidly. Thus creating a huge demand in the market. Generally, the major consumers are soft drinks and juice manufacturers. You can start this business as small, medium and large scale basis.

3. Aluminium Casting

There are a lot of automobile and industrial items that demand to cast. The list includes diesel pistons, automotive timing gear, gear boxes, crankcases, clutch housing, pump bodies, bracket Etc. Other essential items are storage tanks, flywheel housing, and propellers, artificial limbs, ornamental hardware, ashtrays etc.



4. Aluminium Door Window Manufacturing & Fabrication

The door window manufacturing **fabrication** with different types of frames, fittings is a profitable manufacturing opportunity in India. Aluminum fabricated items like doors, windows, staircase, handrails and supports,

railings for verandas, corridors etc. have become the standard accepted feature in most modern buildings.

5. Aluminum Foil Container Manufacturing

This is an another very profitable business in the packaging industry. As the food processing and packaging industry are growing at a rapid pace, the demand for the foil and containers are also growing. Additionally, you can start this business as medium and large scale basis.

KEY FACT

Fabrication is thus an industry term that refers to the manipulation of raw materials (such as steel) to make machines and structures.

6. Aluminium Phosphide Manufacturing

This is a highly toxic inorganic compound. And also an essential item for industrial and agrochemical use. It is one of the most popular insecticides. It comes as tablet or pellet form. This product also saves the cereals and grains from the insect attack at storage. The product has good demand in the market. And you can initiate the business with moderate capital investment.

7. Aluminium Pilfer Proof Caps

The pilfer-proof caps are essential items in the liquid packaging industry. Pharmaceuticals, Chemicals, Food industries and Distilleries as glass bottle closures are the major consuming sectors. Pilfer proof caps provide protections to a container against substitution, adulteration or pilfering.

8. Aluminium Powder

This is an industrial item and the product has huge demand in the industry. It comes as a fine granular powder. However, this item is not exempted by the Pollution Control Board. Therefore, you must obtain a clearance certificate from the Pollution Control Board as per their requirements.

9. Aluminium Sulphate Manufacturing

The another name of this product is alum. Also, this is an industrial item with huge market potential. The major area of use for Alum is in water treatment and clarification. Additionally, other major areas of use is in sizing of paper. You can start this business with small startup capital investment.



10. Aluminium Utensils Manufacturing

In our country, there is a wide use of domestic utensils. Additionally, these utensils are comparatively cheap, durable and recyclable. Therefore, there is a potential demand for this product. And you can start this business as small and medium scale basis. However, it demands strategic planning and proper distribution to get the success from the business.

1.1.5 Aluminium Door Window Manufacturing Fabrication Small Scale Business

Aluminium door window manufacturing fabrication with different types of frames, fittings is a profitable manufacturing opportunity in India. Aluminum fabricated items like doors, windows, staircase, handrails, and supports, railings for verandas, corridors etc. have become the standard accepted feature in most modern buildings. The use of aluminum in business and office complexes, buildings, theaters, the auditorium is very extensive for functional as well as decorative purposes. Similarly in residential buildings

also aluminum doors, windows, railings, grill works etc. are used extensively. Textile shops and other trading shops in lighter materials too are going in for shelves made of aluminum for stacking purposes.

Aluminium Door Window Manufacturing Fabrication Market Potential

India is the fifth largest producer of aluminium in the world with a tremendous bauxite reserve of about 3 billion tons. While the major consumption of aluminium in India is done by the electrical (31%) and Building &Construction sectors (13%), the future growth is envisaged to happen in the solar power and industrial sector. Aluminium is popular in Building and Construction due to its environment and user-friendly nature. Apart from this lightweight, strength, corrosion resistance, durability, ease of fabrication, attractive appearance, and easy maintenance make it a popular material for use in the modern building.

The development and construction activities being interlinked. And there is the good scope for aluminium fabrication units for meeting the growing demand of new building for offices, business and shopping complexes theaters etc. Aluminium fabricated and anodized items like doors, windows, railings, staircases, shelves; ladders, etc. are essential items in the modern constructions on considerations of durability and appearance. Nowadays wooden materials are replacing fast with aluminium fabricated items.

Aluminium Door Window Manufacturing Fabrication Business Compliance

Aluminium Door Window Manufacturing Fabrication Small Scale Business

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KEY FACT

Durability is the ability of a physical product to remain functional, without requiring excessive maintenance or repair, when faced with the challenges of normal operation over its design lifetime.

Aluminium Door Window Manufacturing Fabrication Business Compliance

In initiating aluminium door window manufacturing fabrication business, you will need to follow some basic steps.

1. Registration of the business with ROC (Register Of Companies)
2. SSI Unit Registration.
3. Trade License
4. Vat Registration
5. BIS Quality Standard: IS: 1948-1961 – Specification for aluminium doors, windows and ventilators: Specifies requirements regarding materials, fabrication and dimensions of aluminium doors, windows and ventilators manufactured from extruded aluminium alloy sections of standard sizes and designs completed with fittings ready for fixing with buildings. This standard does not cover the requirements for industrial doors, windows, and ventilators.

   IS 1949-1961: – Specification for Aluminium Windows for Industrial Buildings: deals with aluminium windows suitable for use in industrial buildings. Aluminium doors, windows, staircase handrails etc. are made as per the customers' specifications and requirements. Workmanship and high finish are main criteria for this kind of products. Additionally, you must take care in joining and assembling to get the better appearance and finish.

   Manual on Doors & Widows details for Residential Buildings, Vol.-I of CPWD (GoI)

   IS 4571-1977: – Specification for Aluminium Extension Ladders for Fire Brigade use.
6. NOC from Pollution Control Board: The anodizing process using acid solution may leave residual solution. And you have to dispose of it periodically. This may lead to some pollution in the water source if the disposal of such residual solution is not done taking due precautions. An effluent treatment plant needs to be established in getting 'consent to operate' from local Pollution Control Board.

Aluminium Door Window Manufacturing Fabrication Unit Setup

Before setting up a unit, you must have a customized project report in hand

primarily. From there you will get information about the area required machinery installation layout plan and also finance requirement. Especially in aluminium door window manufacturing fabrication business, you will need to have specific tools and equipment for outdoor fittings work. The major consumable utility is electricity.

Aluminium Door Window Manufacturing Fabrication Machinery

The machinery required for aluminium door window manufacturing fabrication unit as follows:

1. A heavy duty cut-off machine with 2 HP motor, Starter etc.
2. Drilling Machine 12 mm cap. with 0.5 HP motor
3. Portable Electric Drill
4. Double ended Bench Grinder 200 mm diameter with 0.75 HP Motor
5. Anodizing Plant Complete with Rectifier 500 Amps., 30 Volts, Completed with necessary tanks of 14 ft. the length and initial chemicals
6. Buffing Machines with 2 HP motors
7. Hand tools, work benches etc.

Aluminium Door Window Manufacturing Fabrication Raw Material

In this business generally, you will need to procure raw material according to the specific product you want to build. Here we put some of the general essential aluminium extruded sections raw material list.

1. Book Type Hand Rail 100 mm size
2. 25 mm Sq. Pipe
3. Flat 50 mm X 1.5 mm Thick
4. 112 mmX50 mm Section
5. 63 mm X 38 mm section
6. 50 mm X 25 mm Section
7. Handle Section for Doors
8. Clips

9. Glass Sheet/ Board 3 mm/4.5 mm

10. Chemical for Anodizing

You will need to procure some of other miscellaneous items such as hinges, Screws, Rubber Beading, Tower Bolts, Locks, Wooden/Plastic Plugs as per requirement.



Aluminium Door Window Manufacturing Fabrication Process

Manufacturing Process involves anodizing the aluminium extruded sections first and then fabrication. Anodizing process involves buffing, pickling, in acid solution than cleaning in water, neutralizing in chemical and keeping the extruded sections in an anodizing tank for specified time. Then wash them again with water and dry in the sun or by any other means. Additionally, you will need to fabricate the sections after anodizing as per design and sizes of customers. You can do the cutting, bending, joining by screwing or riveting, assembling with glass/board and beading wherever necessary. Finally, fit the handles, locks, tower bolts, stoppers etc. as per requirements lastly in the aluminium door window manufacturing fabrication process.

1.1.6 Aluminum Door and Window Manufacturing Business Plan

An aluminum door and window **manufacturing business** is a good venture to take as it really provides a rewarding experience. Only a few secrets or elements must be considered as part of the business plan. A low startup

requirement, an established network and a stable demand also make window manufacturing a good business to pursue among business owners.

KEY FACT

Manufacturing business is any business that uses raw materials, parts, and components to assemble finished goods.

Preparing an aluminum door and window manufacturing business requires paying attention to a business plan that will guide one towards his or her goals. In the business plan, it must consist or document far more realistic information about the targeted customers, the resources to build the business and marketing and financial plan strategies that attract customers toward the business.



Survey

It is wise to do the market survey and learn the current requirements. What is the problem with available aluminum doors and windows? What your customers would like to see in your products? What is the retailers' and wholesalers' requirement?

Choose the Most Ideal Location

Included in plan is choosing for the most ideal location in United States. Seeking for the most ideal location intended for the business is a must. What it means to say by ideal is the place whereas the business will be reached by customers and suppliers.

The location will always have its effect in the success of the business. If one will put it up in a far to reach

area or a remote area, it would almost be impossible to succeed in it. At the first place, there might be no potential clients that the business may get.

Estimate the Finances, Bank Loan and Buy the Equipments and Tools

The next thing to consider in the plan is estimating the total costs that need to be built up. The costs will incur the tools, equipment, rent, labor, supplies and utilities. You will also look for supports like logistic, raw material supply, office setup, etc.

Now is the time to arrange the funds for your business. You will be needing 100,000 USD or 1M USD depends on your scale of manufacturing. No matter how much money you can get out of your pocket on the table for your business, you should always consider financing your manufacturing plant through a banker.

After arranging the funds, identifying and buying the right equipment and tools is now the next consideration. These are all needed in crafting windows, aluminum doors, frames and more for the clients.



Learn from Other People who already are in the Industry

Even though one has already prepared all things needed in the business plan, it is somehow still essential learning from other people who already are in the industry. It is essential talking to someone who is already operating the same business. Never rely on the local competitors of giving you the best advice. This might sound overoptimistic. The very last thing they

would do is for one to become a better competitor. An entrepreneur who manages and who owns the same business in a different city may like it sharing his or her entrepreneurial wisdom with you.

There is only a need to prove that one will not directly compete with them. There are lots of owners who can be happy in giving advice to new entrepreneurs. They would also find it a worthwhile activity giving advice to new entrepreneurs. It will somehow take a while before finally finding an entrepreneur ready to talk. It is still worth of the effort.

The aluminium industry is one of the most traditional industries in India. A number of domestic and industrial products are manufactured from from this metal. Most of the aluminium related businesses are highly cost-intensive. Additionally, businesses demand strategic planning.

The popularity of aluminium as a construction and manufacturing material has created an active market for aluminium businesses. Well-rounded aluminium companies provide extrusion, fabrication, and finishing solutions, often with a single-source business model that delivers a value-added component to commercial customers.

Although aluminium holds promise for growth and expansion, startup entrepreneurs need to be realistic about the startup requirements of the aluminium trade. Industry expertise, substantial capital equipment outlays and strong business leadership skills will be needed if your aluminium startup is going to survive past its critical years.

1.1.7 Characteristics of a Good Aluminium Business Plan

Every business plan is unique. However, the most effective business plans do address specific sound business plan elements:

- ***Mission Statement*** – Your description of your aluminium business' reason for existing.
- ***Goals & Objectives*** – A list of mile markers on your aluminium business' road to success.
- ***Financial, Marketing & Action Plans*** – Specific plans that describe your business environment, demographic targets, and quantitative estimates.

B2B Selling Tips for New Aluminium Businesses

Aluminium fabricators live in a B2B environment. Unlike other small businesses that sell directly to consumers, aluminum businesses sell to other businesses.

- ***Sales department***: The first step in succeeding as a B2B seller is to create a first-rate sales team within your organization. Since you can't afford to wait for customers to find your business, you'll need to hire professional salespeople who are skilled in taking the initiative and pursuing targeted sales leads throughout the aluminium industry.
- ***Lead lists:*** The best aluminium sales teams leverage current and precise lead lists for prospecting and directing marketing initiatives. Stale and unfocussed lead lists generate inefficiencies, causing your sales team to waste time on unproductive clients. By investing in accurate and sort-able lead lists from a reputable lead list provider, you can dramatically improve team efficiency and ROI.
- ***Conversion rates:*** Conversion rates should be constantly monitored to ensure that your sales team is making the most of every selling opportunity.

1.1.8 Reasons why Aluminium is Perfect for Windows and Doors

Aluminium has been called a 'magical metal'. Mainly found as Bauxite ore, it's the third most common element in the earth's crust and the most abundant metal on the planet. But what makes it perfect for use in windows, doors and curtain walling?

Well, it's the chemical, physical and mechanical properties of modern-day aluminium alloys that account for the steep rise in its global use at over 5% every year. Here are just 8 reasons why the market for aluminium frames in the glazing world continues to grow, now dominating the **commercial market** and giving PVC-U a run for its money in the residential sector.

KEY FACT

Commercial marketing is pitching goods to corporations and individuals.



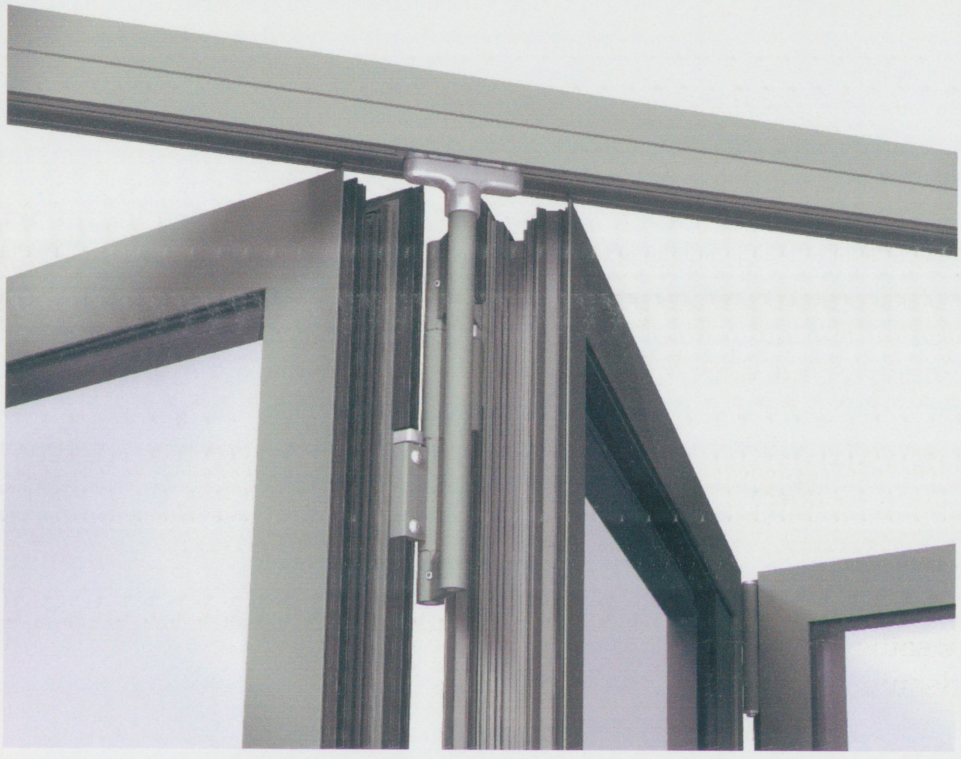
Light weight – Aluminium is a very light metal with a specific weight of just 2.7 g/cm^3, which is about a third that of steel or copper. In fact, it's one of the lightest commercially available metals. This makes it ideal for window and door frames, but using a lightweight frame is especially important when it comes to curtain walling. Curtain walls are not structural and are only able to carry their own weight, so the lighter the better.

Resistant to corrosion – if you're looking for a low maintenance window, then aluminium is your answer. That's because when aluminium comes into contact with air, a protective layer of aluminium oxide immediately forms on the surface. This layer is extremely resistant to corrosion from anything the weather can throw at it, including acid rain, and won't be damaged by cleaning products. And unlike timber or PVC-U frames, aluminium window frames won't swell, crack, split or warp over the years whatever the weather. Protection from corrosion can be increased even further by anodising or painting (usually by powder coating) the surface.

Won't break – aluminium is both malleable and ductile – in case you've forgotten your GCSE chemistry, that means it can be bent or pressed into shape or drawn out into a thin wire without losing its toughness and without breaking or cracking. In other words, its pliable not brittle. In fact, aluminium is the second most malleable metal and the sixth most ductile. This is fantastic news for anyone wanting a curved curtain wall or window, as the aluminium frame profiles can easily be bent or pressed into the required shape without any danger of them breaking.

100% Recyclable – Aluminium is unique when it comes to recycling metals. It is 100% recyclable and the quality of recycled aluminium is identical to that of virgin aluminium. Which means it can be recycled again and again. In fact, nearly 75 percent of all aluminium ever produced is still in use today. This is good news for aluminium supply, especially when you consider that since the first industrial quantities of aluminium were

produced around 100 years ago, worldwide demand for aluminium has grown to around 29 million tons per year. But it's even better news for the environment, because whilst it takes 14,000 kWh to produce 1 tonne of new aluminium, it only takes 5-10% of this to remelt and recycle the same amount. Which means a smaller carbon footprint and lower costs.



Very strong – aluminium alloys are used to make window door and curtain wall frames. That's because pure aluminium on its own doesn't have a high tensile strength. However, once it is alloyed with other elements like manganese, silicon, copper and magnesium its strength increases vastly. The tensile strength of pure aluminium is around 90 MPa but can be increased to over 690 MPa as an alloy. In fact, Aluminium which as we've already seen is one of the lightest engineering metals, has a far better strength to weight ratio than steel when used as an alloy. Even more impressive, unlike steel, the strength of aluminium increases the colder it gets, whereas steel becomes brittle at low temperatures (below 0°C). This means that aluminium windows, doors and curtain walling can more than cope with the most extreme winter temperatures in the UK. The lowest temperature recorded in the UK was -27.2°C in Scotland.

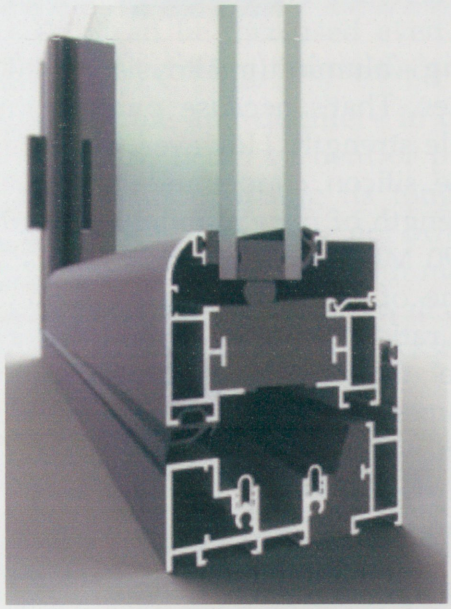
Readily forms alloys – as we've already seen aluminium is usually alloyed with other elements to improve its physical properties. For example, the

KEY FACT

Corrosion resistance is the ability to prevent environmental deterioration by chemical or electro-chemical reaction.

strength of pure commercial aluminium can be increased by 20% by simply adding manganese. Aluminium also readily forms alloys with silicon, copper, zinc, iron and magnesium. This means it is possible to produce a range of alloys with properties tailored to particular applications. Aluminium glazing firms use alloys of aluminium with silicon and magnesium which are an excellent choice for extruding aluminium profiles. They are very versatile, heat treatable, highly formable, weldable and have high strength plus excellent **corrosion resistance**.

Easy to make into frames – aluminium window frames are made using an extrusion process i.e. by forcing the pre-heated aluminium alloy through a die to create an aluminium profile. These profiles are then joined together to form the frame. It is the design of these profiles that gives the window frame its unique characteristics. They can be complex designs but thankfully these intricate shapes can be achieved using a single extruded section, so that the profiles are both strong and durable. Aluminium also has good machinability, making it easy to accurately fabricate the aluminium profiles into the finished window frame.



Decorative – aluminium can be easily anodized or powder coated to give it a decorative smooth or textured finish. This means that aluminium windows, doors and curtain walling not only perform well but look fantastic too. Anodising is carried out by immersing the aluminium in an acid electrolyte bath and passing an electric current through it. This converts the metal surface into a decorative, durable, corrosion-resistant, aluminium oxide finish. The aluminium oxide is fully integrated with the underlying aluminium, so that it cannot chip or peel, making it amazingly durable. The aluminium oxide has a porous structure so needs to be sealed to make it resistant to corrosion. The sealant can be clear or contain special dyes so that anodized aluminium is available in a wide range of colours.



The alternative is to powder coat the aluminium with paint. The aluminium is pre-treated either by anodizing or via a chemical reaction to form a corrosion resistant barrier, and can then be powder coated in any RAL colour. At Senior Architectural System we have a state-of-the-art powder coating facility at Denaby. The pre-treated aluminium bars are earthed and the paint powder is given an electrostatic charge as it leaves the guns. This helps the powder molecules to stick to the bars via electrostatic charge, just like dust particles stick to your TV due to the electrostatic charge on the screen! The bars are then cured in an oven where the powder melts and forms a uniform, flexible and smooth finish which is resistant to weathering for 25 years.



1.1.9 Global Aluminum Window Profile Market

The global aluminum window profile market is projected to reach US$ 991.34 million by 2026, at a CAGR of 4.2% over the forecast period, owing to increasing aluminum demand worldwide from construction sector coupled with growing preference for sustainable buildings.

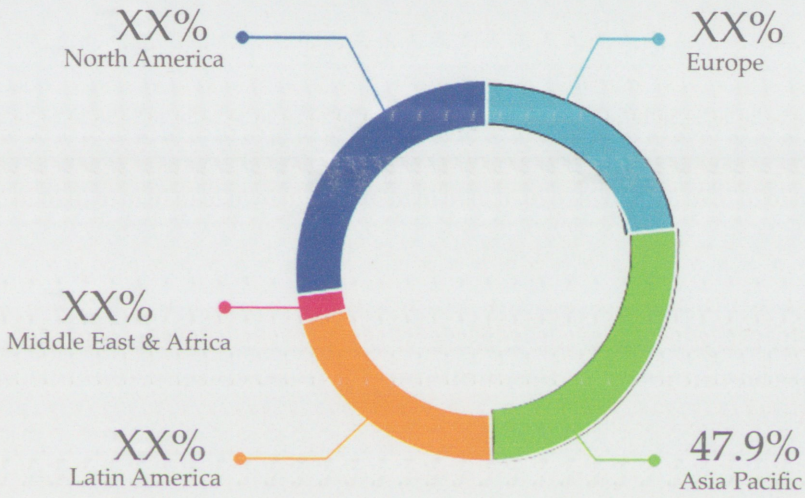
Aluminum frames are fabricated with high-performance metal and offer improved thermal performance. These frames can be thermally broken, which further increases their energy efficiency. Moreover, thermal break technology comes in two crucial formats: reinforced polyamide bar and a resin-filled channel. Both these formats create insulated barrier within the window frame, which slows down heat, noise, and cold up to 1000 times. These factors are expected to increase demand for aluminum window profiles over the forecast period.

Aluminum windows find application in residential, commercial, and industrial construction. Demand from residential segment is predicted to grow at a faster pace during the forecast period, owing to increasing preference for energy-efficient homes. This in turn is propelling demand for aluminum profiles in window, particularly for slim aluminum window profiles. Therefore, significant growth in the real estate sector is expected to boost demand for aluminum window profiles over the forecast period. According to India Brand Equity Foundation (IBEF), real estate sector in India was valued at US$ 120 billion in 2017, and is expected to reach US$ 1 trillion by 2030.

However, loss of heat and interior condensation associated with aluminum window profile is projected to hamper the market growth. However,

aluminum frames that have thermal break technology have high thermal performance between outer and inner parts of the frame. According to Branz' — a provider of testing facilities—frames with thermal break feature can be thermally more efficient than those aluminum frames without this technology.

The global aluminum window profile market was valued at US$ 698.41 million in 2017, and is expected to register a CAGR of 4.2% in terms of revenue over the forecast period (2018 – 2026).



Asia Pacific is the fastest growing market and accounted for the largest market share of 47.9% in 2017, owing to increasing construction activities in this region. Increasing construction activities in emerging economies such as China and India is attributed to rise in disposable income, which is also expected to drive the market growth. As per IBEF, per capita GDP of India is expected to reach US$ 3273.85 by 2023, which as per World Bank was US$ 1942 in 2017.

Furthermore, key players in the market are focusing on using eco-friendly construction techniques pertaining to windows in order to enhance their market share. For instance, companies such as Velfac — a major supplier and manufacturer of aluminum window profiles — uses around 30% of aluminum that comes from recycled sources in window profile production and 95% is produced via hydro-electricity. The window unit produced by the company is considered re-usable up to 93%. Therefore, this trend is expected to reduce aluminum wastage and propel growth of the aluminum window profile market over the forecast period.

Players operating in the global aluminum window profile market are adopting various growth strategies such as mergers & acquisitions and

business expansion to enhance their market share. For instance, in June 2017, Apogee Enterprises acquired EFCO Corporation (Window manufacturer). EFCO became the ninth independent operating unit in Apogee portfolio. The acquisition is expected to help Apogee Enterprises to expand its presence in mid-size commercial buildings sector and geographic presence in the U.S.

Major players operating in the global aluminum window profile market include, Apogee Enterprises Inc., Fletcher Building, Ply Gem Holdings Inc., YKK AP Inc., LIXIL Group Corporation, Xingfa Aluminium, Sapa Group, PGT Inc., Wacang, and Fenan Group.



ROLE MODEL

Oleg Deripaska

Oleg Vladimirovich Deripaska is a well-known Russian oligarch and philanthropist, who founded and own 'Basic Element' (erstwhile 'Siberian Aluminium'), counted among the largest diversified industrial groups in Russia. He also serves as the CEO of the sixth largest aluminium company in the world, 'United Company RUSAL', and owns and controls the Russian energy-related company 'En+ Group'. A physics graduate from 'Moscow State University', this intelligent and agile entrepreneur forayed into the industrial scene initially as a metals broker with speciality in trading aluminium and thereafter started dealing with machinery, agribusiness, energy and financial services. 'Sibirsky Aluminium' of Deripaska and 'Millhouse Capital' of Roman Abramovich formed partnership in 2000 leading to formation of 'Rusal' which again merged with 'Glencore International AG' and 'SUAL Group' in 2007 to form 'United Company RUSAL' with Deripaska as its chairman. During the financial crisis of 2007-08 amidst heavy and rising debts, Deripaska lost much of his wealth that was estimated to be around $28 billion, thus slipping from the position of richest man in Russia. According to Forbes, his estimated wealth as of May 2017 is $5.2 billion. His humanitarian efforts saw him founding the largest charitable foundation of Russia, 'Volnoe Delo'. He has close association with the incumbent President of Russia, Vladimir Putin.

Childhood & Early Life

- Oleg Deripaska was born on January 2, 1968, in Dzerzhinsk, Nizhny Novgorod Oblast, Russian SFSR, in a Kuban Cossack family and was brought up in Ust-Labinsk, Krasnodar Krai.
- His father died when he was very young and his mother, an engineer by profession, had to move out in search of work. He was primarily raised by his grandparents who taught him farming as well as discipline towards hard work.
- Even before attaining teenage, Deripaska landed up with his first job, serving as an electrician's apprentice at the Ust-Labinsk plant where his mother was already serving.

- In 1985, he enrolled at the physics faculty of 'Moscow State University' and completed his graduation with honours in physics from the university in 1993.
- Meanwhile, he was enrolled for compulsory military service in 1986 following which he served Strategic Missile Forces of the Soviet army in the Trans-Baikal area, Siberia, till 1989.
- Unable to continue his studies as a theoretical physicist due to the effect of dissolution of the Soviet Union, he enrolled at the Plekhanov Russian University of Economics and obtained a master degree in 1996.
- He developed interest in reading from an early age and loved to read the books of Jack London and Mayne Reid.

Career

- The first metal trading company established by him was VTK. He set it up at the age of 25 along with fellow engineers, rocket scientists and physicists. He delved in export arbitrage by purchasing metal at Russian prices considerably much lower than the international market price in which it was sold abroad.
- Most of the profits made from such dealings were spent by him to obtain a portion of shares of a smelter in Southern Siberia, the 'Sayanogorsk Aluminium Smelter'. He went on to acquire more shares and vouchers of the smelter during 1993-94 and emerged as its largest individual shareholder after the Russian State by holding a stake of 20%.
- From 1994 to 1997 he remained the prime shareholder of the smelter as also the General Manager. He also became the Director General of the plant in 1994.
- 'Sayanogorsk Smelter' went on to become the main asset of Sibirsky (Siberian) Aluminium Group in 1997 while Deripaska served as President of Sibirsky Aluminium Investment Industrial Group from 1997 to 2001. The investment industrial group eventually became Rusal's main asset.
- Apart from metals, he went on to become stakeholder of different companies from varied sectors like financial and insurance services, manufacturing, auto components, energy, construction, agriculture and aviation.
- He owns 'Basic Element' that he founded in 1997. It emerged as one of the largest diversified Russian industrial groups with

its core assets being concentrated in 6 economic sectors namely manufacturing, energy, financial services, mining, agribusiness, airport management and construction and real estate.

- Some of the major assets of 'Basic Element' are 'United Company RUSAL', 'Ingosstrakh', 'Aviakor', 'EuroSibEnergo', 'GAZ Group', 'Basel Aero' and 'Kuban Agroholding' among others. The group based in Moscow, Russia owns companies and subsidiaries spread over Russia, Australia, Asia, the CIS, Latin America, Europe and Africa having an employee count of around 250,000. Till 2001 it was called 'Siberian Aluminium'.
- He established the private charitable foundation 'Volnoe Delo' in 1998 that supports more than 400 initiatives in Russia with a particular focus on children and education. In 2009, it emerged as the largest Russian charity foundation. According to reports, so far Deripaska have donated over $250 million mainly for educational causes.
- 'Sibirsky Aluminium' of Deripaska and 'Millhouse Capital' of Roman Abramovich came to an agreement to manage jointly the alumina and aluminium assets controlled by them and in such pursuit formed a partnership in 2000 that led to the formation of Rusal.
- The ensuing years saw Rusal acquire many strategically significant assets including a 90% stake in the Russian alumina refinery, 'Boxitogorsk'; buying 50% stake and becoming partner with 'SUAL' in the Komi alumina project; acquiring 20% equity interest of 'Queensland Alumina Limited'; and increasing stake in alumina refinery 'Nikolaev' to 100% among others.
- Deripaska represented Russia in the Asia-Pacific Economic Cooperation Business Advisory Council (ABAC) in 2004.
- He became the President and controlling shareholder of the diversified energy, mining and metals group EN+ Group that was formed in 2006. The group owns a 100% stake in the PLC power company 'EuroSibEnergo' and a majority stake of 48.13% in 'United Company RUSAL' apart from other holdings.
- 'United Company RUSAL' was formed merging Rusal with 'Glencore International AG' and 'SUAL Group' in 2007. It was listed on the Hong Kong Stock Exchange in 2010 marking it as the first Russian company to achieve such feat.
- 'United Company RUSAL' burgeoned with time and eventually became the biggest aluminium producer around the globe until 'Hongqiao Group' from China clinched the spot in 2015. Presently

Deripaska serves as the President of the company that operates in 19 countries across five continents with employee strength of more than 72,000.

- He received the 'Aluminium Industry Ambassador Award' in the Metal Bulletin Awards for Excellence in 2013 for his "great influence within the global aluminium industry and the wider market."
- Many of the Olympic facilities for the 2014 Winter Olympics held in Sochi were developed by his group.
- Apart from his business pursuits, Deripaska holds several imminent positions including being the Chairman of ABAC Russia since 2007. He chairs the executive board of the Russian national committee of the International Chamber of Commerce.
- He serves as Vice President of the 'Russian Union of Industrialists and Entrepreneurs' and as member of the Russian government agency 'Competitiveness and Entrepreneurship Council'.
- He is board of trustees' member of many organisations such as the School of Business Administration at St. Petersburg State University, the School of Economics at Moscow State University and the Bolshoi Theatre.

Personal Life & Legacy

- He married Polina Yumasheva in February 2001. She is the daughter of Russian politician, journalist and business developer, Valentin Yumashev, also known as top advisor and son-in-law of the first President of the Russian Federation, Boris Yeltsin.
- He has two children with Polina - a son, Pyotr, born in 2001, and a daughter, Maria, born in 2003.

CASE STUDY

An Abundant use of Aluminum Windows in a Pre-Fab Home



Aluminum windows provide homeowners with a modern look and feel, due to their thin frames and clean lines that direct your eye to the interior space and exterior views.

The Munday family, living in the San Francisco Bay Area, wanted their home to embrace their beautiful view and an indoor/outdoor living lifestyle.



Working with Connect Homes, a pre-fabricated home manufacturer, they purchased a 2,560-square-foot home with three bedrooms and two-and-a-

half baths and shipped it from the factory in Los Angeles to their location in Northern California. The open concept floor plan, a quintessential feature of modern living, was a must.

The Milgard bronze anodized aluminum windows added to the modern feeling and the large walls of windows let in a lot of light and made the most of their view.



"The house feels airy and open and functions very well," Ben Munday told the company.

"We have large windows high up on the double height living room, which is my favorite part of the house. The floor to ceiling vertical windows give a very dramatic sense, especially on the upper floor where you can look down. I also love the narrow window styles that give a modernist feel. The windows feel very solid, [and] function well."

The home is nestled into the hillside making it easy for their family to connect with nature and spot the local wildlife through almost any window. And now, they can really let the outside in when all the windows are open and the refreshing cross breeze blows through.

2

REGISTRATIONS & LICENSES FOR ALUMINUM DOOR WINDOW MANUFACTURING

2.1 DOCUMENTS REQUIRED TO REGISTER A SMALL SCALE INDUSTRY

Registrations to a Small Scale Industry is granted by the State Directorates of Industries as per the guidelines issued by the Development Commissioner (SSI), Ministry of Industry, Department of Small Scale Industries and Agro & Rural Industries, Govt. of India, New Delhi. The classification of activities and size of investment in fixed assets of plant & machinery for SSI are governed by the provisions of Industrial (Development & Regulation) Act, 1951.

The SSI Board under the chairmanship of the Prime Minster and the Small Industries Development Organization (SIDO) articulate various policies for the development of SSI sector. A large number of products are reserved for exclusive manufacture by SSI sector in order to protect **small scale industry** from large industry.

SSI registration can be obtained by both manufacturing units and service-rendering enterprises.

However, the registration eligibility criteria differ for SSI units in manufacturing and SSI units in service rendering as follows:-

Micro Enterprises: Investment of up to Rs.25 lakhs in plant and machinery.

Small Enterprises: Investment of up to Rs.5 crores in plant and machinery.

Medium Enterprises: Investment of up to Rs.10 crores in plant and machinery.



KEY FACT

Small scale industries are those industries in which the manufacturing, production and rendering of services are done on a small or micro scale.

Step 1: Provisional SSI Registration:-

To obtain SSI registration the business must first apply for Provisional SSI Registration Certificate (PRC). Provisional Registration Certificate is given when the unit is in a pre – operative period and helps the SSI unit obtain term loans and working capital from financial institutions/banks under priority sector lending. In addition to helping obtain a bank loan, the provisional SSI registration certificate also helps the business obtain facilities for accommodation, land, other approvals etc. and obtain various necessary NOC's and clearances from regulatory bodies such as Pollution Control Board, Labor Regulations etc.

Provisional SSI registration can be applied for by a business at any time and an industrial license is not required. Once an application is made for Provisional SSI registration, the provisional registration is provided and no field inquiry is done. Provisional SSI registrations are valid for five years and if the entrepreneur is unable to set up the unit in this period, a fresh application for provisional registration can be made at the end of five years period.

Step 2: Start the Business:- Start the business with the provisional SSI registration certificate. Commence activity or production.

Step 3: Permanent SSI Registration:-

Once the business commences production or activity, the business can apply for and obtain permanent SSI registration. Obtaining permanent **SSI registration** will help the business obtain the following benefits:

Income-Tax exemption and **Sales Tax** exemption as per State Government Policy.

Incentives and concessions in power tariff as per State Government Policy.

Price and purchase preference for goods produced.

Availability of raw material depending on existing policy.

Permanent SSI registration will be provided only if the following conditions are satisfied by the SSI unit:-

1.The unit has obtained all necessary clearances whether statutory or administrative,

2. The unit does not violate any restrictions in force,

3. Value of plant and machinery is within prescribed limits and,

4. The unit is not owned, controlled or subsidiary of any other industrial undertaking as per notification.

2.1.1 Common License and Permit Requirements

The most common license and permit requirements for manufacturing businesses include:

- a basic business operation license from the city or county where your business will operate
- a federal employer identification number (EIN) -- also called a tax identification number -- from the IRS, and a similar tax ID number from your state's department of taxation or revenue
- a fictitious business name or "doing business as" (dba) permit, if you will operate under a name that is different from your legal entity's registered name
- zoning and land use permits that cover your manufacturing business's operations
- sales tax license to sell your manufactured goods
- health department permits if your manufacturing business includes the preparation or sale of food
- building permits.



2.1.2 Aluminium Company Registration

KEY FACT

Profitability is a measurement of efficiency – and ultimately its success or failure.

The **aluminum sector** is one of the most significant sectors associated with metallurgy, and offers rather bright and affluent prospects for growth and **profitability**. This webpage contains relevant info about the aluminum company registration, the current status of the aluminum industry, and our expert legal services for business establishment and growth in this sector.

Besides the company incorporation services for all types of companies, all other necessary services are offered by our veteran and updated lawyers to companies for business management, legal security, and desired growth. The intellectual property rights form an essential part of these services. Hence, apart from company formation and registration in the aluminum sector of India, the interested entrepreneur may also avail our expert and economical service for the brand name and logo registration for his company. In general, the trademark registrations related with the aluminum industry are made under the Class 6 and other relevant classes of the Nice Classification. Today, our brisk and secure services for the online company registration and registration of trademarks and service-marks are hugely popular

For business establishment in the aluminum sector of India, the most suitable types of companies could be the small to medium enterprises, private limited company, or the public limited company. The last section on this webpage contains exclusive information about how to register an aluminum company in india, to help the concerned people and entities of India or abroad.

2.1.3 Aluminum Industry in India and Scope of Work (SOW)

The regularly thriving Aluminum Industry of India is the second most significant metallurgical industry of the country. Today, India is the fourth largest producer of primary aluminum in the world, contributing around 3% to the overall global production.In 2016, the global aluminum consumption registered a growth of about 5% to reach the level of around 60 MT, over the year 2015. The domestic consumption of aluminum in India is hopefully expected to grow at 6-8% every year in near future (say in next five years), considering the low per capita aluminum consumption in the country, which is far below the global average.Also, aluminum production in India has regularly been growing every year; in the financial year 2016-17, it registered a growth of 17%, as compared to 19% in the preceding financial year.

Through augmenting its aluminum production capacities and using the new technologies, today India aspires to carve a significant niche in the global aluminum market, along with meeting the constantly growing domestic demands. India has been exporting the surplus stock of aluminum to numerous countries worldwide, notable among these are South Korea, Malaysia, Mexico, Italy, Turkey, the U.S., Taiwan, Spain, Japan, Indonesia, Bangladesh, Singapore, Brazil, and the Netherlands.The Indian aluminum sector is dominated mainly by large integrated aluminum producing companies like NALCO (The National Aluminum Company Ltd, Koraput) and HINDALCO (The Hindustan Aluminum Corporation Ltd., Renukoot), and other public sector and private aluminum companies. Other major **aluminum companies of india** are the following --- BALCO, Korba; INDAL, Hirakud; MALCO, Mettur; etc.

For establishment of an efficient and profitable aluminum company, the most important and vital requirements are easy and economical availability of the needed raw materials (predominantly Bauxite), ample and uninterrupted supply of electricity at low costs, and cheap availability of manpower. These factors are therefore, also decisive in selecting the location of the aluminum company. As far as India is concerned, these factors are quite favorable to

it - India has the world's fifth largest reserve of bauxite, easy and cheaper availability of technocrats and skilled & unskilled labor, and the soft option of using the captive power plants in addition to the usual power supply at governmental charges. Here, it may just be noted that, the production process of primary aluminum involves broadly the following main stages --- mining of bauxite, refining of bauxite to alumina, and lastly, smelting of alumina to aluminum. Hence, the capital costs are also high for setting up an aluminum company.

Lastly, the most important factors or growth drivers to regularly growing domestic demands of aluminum in India are the following in near future --- the per capital aluminum consumption in India is quite low, which is most likely to grow in future, though gradually; aluminum has become very famous as an elegant and economical substitute of steel, copper, zinc, and leads in many industries; increasing uses of aluminum in the sectors of building & construction, transportation (particularly, metros and high-speed railway coaches), electricals & electronics, packaging& cans, defense, automobiles, rapid urbanization,solar reflectors, various consumer durables, power transmission, air-conditioners, furniture items, etc.

2.1.4 How to Start or Register an Aluminum Company in India?

For registering any SMEs (demanding less than ten crores in plants and machinery in the manufacturing activities), concerned are the District Industries Centre or the Directorate/Commissioner of Industries of the relevant District or State. Small and medium scale enterprises avail a variety of governmental supports and subsidies. Our well-informed and veteran company lawyers will be supporting entrepreneurs comprehensively, in this connection.

In general, the following are our other supporting services for smooth and booming businesses of aluminum companies in india, apart from the tasks involved in the entire procedure for the company registration (private or public limited):

- Obtaining the DSCs and DINs for the Directors [Form DIR-3]
- Reservation to the proposed company name [Form INC-1]
- Preparation of apt MOA & AOA, Consent Letters, Affidavits, Powers of Attorneys, etc.
- Application filing for company registration[through Form INC-7]
- Submitting other necessary forms and documents to the concerned ROC

- Making the PAN, TAN, GSTIN, Bank Account, Export-Import Code (IEC), etc., for the aluminum company
- Acquiring necessary permissions and licenses from the concerned Governmental authorities
- Establishing manufacturing or production infrastructure
- Expert and innovative legal services for registration and protection of the brands, logos, trademarks, service-marks, patents, or designs, of the aluminum companies.
- Drafting flawlessly various contracts or agreements related with manufacturing processes, commercial dealings & transactions, various core activities of the aluminum company, leasing/hiring of equipment and machinery, financing, **franchising**, distribution and marketing of finished products, etc., of the company
- All mandatory annual and periodic compliances by the aluminum company with ROC and other regulatory authorities
- Innovative strategies for business growth and greater profitability.
- Services related with FDI Policy of India, and rules & regulations of FEMA, RBI, etc.
- Services under SEBI, related with its various provisions and regulations, applicable especially for the listed aluminum companies.
- Processes and compliances relating to various other legal Acts and Statutes, such as Labor and Employment Laws, Intellectual Property Laws, Commercial Laws, Income Tax Act and GSTN, Maritime and Admiralty Laws, ESI and PF Regulations, Environmental Laws, International Business, etc.

KEY FACT

Franchising is based on a marketing concept which can be adopted by an organization as a strategy for business expansion.

2.1.5 Procedure of Registration

Definitions of Micro, Small & Medium Enterprises is

defined in accordance with the provision of Micro, Small & Medium Enterprises Development (MSMED) Act, 2006 the Micro, Small and Medium Enterprises (MSME). Small Scale and ancillary units (i.e. undertaking with investment in plant and machinery of less than Rs. 10 million) should seek registration with the Director of Industries of the concerned State Government. The main purpose of registration of SSI or MSME is to maintain statistics and to maintain a not e of such units for providing support and incentives for these companies. States have generally adopted a uniform registration method for registering these companies but since this is a State list subject and they use the registration to implement their own scheme, so it is possible that in some states have slight modification from the general procedure provided below and some states may have a "SIDO registration scheme" and a "state registration scheme".

In the registration of SSI/MSME there are two types of certificates provided by the authorities, initially provisional registration certificate is given to the companies which is valid for five years. It is given for pre-operative period and after that a permanent registration certificate is given in perpetuity.

There are three slabs which are prescribed under MSME Act to define an enterprise:

No.	*Type of Enterprise*	*Manufacturing Enterprises (Investment in Plant and Machinery)*	*Service Industry (Investment in equipment)*
1.	Micro	Does not exceed Rs. 25 Lakh	Does not exceed Rs. 10 Lakh
2.	Small	Exceeds Rs. 25 Lakh but does not exceed Rs. 5 Crore	Exceeds Rs. 25 Lakh but does not exceed Rs. 5 Crore
3.	Medium	Exceeds Rs. 5 Crore but does not exceed Rs. 10 Crore	Exceeds Rs. 2 Crore but does not exceed Rs. 5 Crore

The registration for a medium enterprise which is engaged in manufacturing is necessary to be registered for other enterprises registration is optional.

2.1.6 Eligibility

All Micro & Small Enterprises which are registered with the Director of Industries (DI)/District Industries Centre (DIC) as manufacturing/service enterprises or having Acknowledgement of Entrepreneurs Memorandum (EM Part-II) are eligible for registration with NSIC under its Single Point Registration Scheme (SPRS).

Micro & Small Enterprises who have already commenced their commercial production but not completed one year of existence. The Provisional

Registration Certificate can be issued to such Micro & Small Enterprises under Single Point Registration scheme with monitorylimit, minimum amount of money to be invested, of Rs. 5 Lacs which shall be valid for the period of one year only from the date of issue after levying the registration fee and obtaining the requisite documents.

2.1.7 How to Apply

Micro and Small enterprises could be applied through online application that is provided by the prescribed state website(State website's of thou are applying for registration) respective state in which or by submitting the application form in duplicate which is to be submitted the concerned Zonal/Branch Office of NSIC located nearest to the unit.

Step 1: Provisional Small Scale Industry (SSI) Registration

To obtain SSI registration you must apply for provisional SSI registration certificate. This certificate is given when the unit is in pre-operative stage and helps SSI unit obtain term loans and working capital. This license is given for five years.

One could apply for this certificate online through the state website or by applying in the concerned zonal department.

Important Documents for Provisional SSI registration:

- Three passport size photographs of proprietors/partners/directors, as the case may be.
- Photocopy of the partnership deed in case of a partnership unit. It is not necessary that the partnership should be registered under the partnership Act.
- Copy of the Memorandum and Articles of Association in case of Private Company along with certificate of incorporation. Copy of the resolution of the company authorising one of the Directors of the company to sign the application form and also appear for the interview.
- Proof of legal possession i.e. rent receipt, NOC from the landlord with proof of ownership, the power load authorised by the connection holder to the applicant
- Provisional Registration would be allowed in approved Industrial areas only after the Unit has obtained consent to establish from Delhi Pollution Control Committee

- Some of the documents may differ because each state has different requirements of documents. Above given documents are minimum required documents which are to be submitted

Benefits of Provisional SSI registration

- Material for construction of factory building : The material which is needed for construction of the factory or building would be available to the factory at subsidized rates from government
- Apply for Municipal Corporation License & power connection. With the provisional registration the company would be able to get all the clearances from the concerned authorities.

Step 2: Start the Business

The next step towards having a permanent license is to start the business with SSI certificate. The owner should start the production in the factory so that permanent licence could be given.

Step 3: Apply for Permanent SSI registration

After you have started the business you should apply for permanent SSI registration. This could be done by applying online through state website or through the Zonal office or district office of the department.

Requirements for applying PRC(Permanent Registration Certificate)

- You may apply for the PRC without an industrial license in case your unit is listed in Schedule-III of the Industrial Licensing Exemption Notification. Other units must first acquire an industrial license.
- The unit should have obtained all clearances from the pollution control board, drug control board etc.
- The unit should not violate any locational restriction
- The original value of plant including machinery should be within prescribed limits for which you are applying.
- The unit should not be a subsidiary, owned or controlled by another industrial undertaking.

Documents which are to be submitted for applying in

- Proof of ownership of premises i.e. allotment letter/possession letter/lease Deed/property tax receipt. If the unit has a municipal corporation license in its own name or in the name of its proprietor

or one of the Partner/Directors as the case may be, then no other proof of legal possession is required.

- In case premises are arranged on rental basis, unit should submit proof of Legal possession i.e. a rent receipt and/or NOC from the landlord supported by the proof of land lord's ownership. For this purpose rent receipt/rent agreement with GPA (General Power of Attorney) is also accepted provided the GPA is appointed by the owner/lessee through a Regd. deed.
- One photo copy of sale bill of each end product applied for.
- One photo copy of purchase bill of each raw material.
- Copy of partnership deed in case of partnership unit (this need not be registered.)
- Copy of Memorandum of Articles of Association with certificate of incorporation in case of private limited company (in case of any change of Directors subsequently, copy of resolution and intimation in form No.32)along with copy of resolution authorising one of the directors to sign the application for grant of permanent SSI registration.
- Copy of the industrial license from Govt. of India in case the end products require such license under Industrial Development and Regulation Act.1951.
- An affidavit on Rs.10/- Non judicial Stamp Paper duly attested by Notary Public affixed with proper notarial Stamp giving the status of the unit, machinery installed, power requirement etc. as per the prescribed format
- Purchase bill of machinery installed.
- Photo copy of valid consent letter from pollution control committee of that state.

Benefits for having a permanent SSI registration

- Tax Benefits: Depending on your business, you may enjoyExcise Exemption Scheme as well as exemption from certain Direct Taxes in the initial years of your business.
- Availability of raw material depending on existing policy: Raw material for production would be given by the government in the initial years at subsidized rates.
- Benefits from Banks: All banks and other financial institutions recognise MSMEs and have created special schemes for them. This usually includes priority sector lending, which means that the

likelihood of your business being sanctioned a loan is high, and lower bank interest rates. There may also be preferential treatment in case of delay in repayment.

- Benefits from State Governments: Most states offer those who've registered under the MSMED Act subsidies on power, taxes and entry to state-run industrial estates. In particular, there is a sales tax exemption in most states and purchase preference on goods p

Time taken for SSI or MSME registration ranges between 5 to 20 days depending on the state in which the industry is located in.

KEY FACT

Ownership is the state or fact of exclusive rights and control over property, which may be any asset, including an object, land or real estate, intellectual property, or until the nineteenth century, human beings.

2.1.8 Trade License

A trade license is a document/certificate that gives the permission to the applicant (person seeking to open a business) to commence a particular trade or business in a particular area/location. However, the license does not allow the holder to any other trade or business than for it is issued. Furthermore, this license does not pass on any kind of property **ownership** to the holder of the license.

Why Trade License?

In the last forty years, trade license has been introduced in the country and is being regulated through municipal corporation acts by the state governments. This helps in ensuring that no one is severally affected by nuisance and health hazard of any trade or business.

It has been made necessary by the government to carry out any particular business or trade in a particular area and to ensure that no one is carrying out any unethical business practices. This license creates a harmony in the society that every business is following relevant rules, guidelines and obeying the safety measures. This license was made obligatory to make sure that the government can regulate various

trade activities in the country. The core objective of issuing a this is to control the locations by restricting the people from executing certain types of businesses from their home location to maintain the business environment and locality environment.

Who can issue a Trade license?

It is issued by the licensing department of the municipal corporation in various departments like industries, engineering, health etc.

The government of India authorizes the license in a manner to regulate in cities across the country. It grants permission by the way of letters or documents/certificates to carry on any business or trade where it is located. The issuance of the license varies from state to state depending on the local government agencies (Municipals) rule and regulations.

Different categories of trade license

a. Industries license: small, medium and large scale manufacturing factories

b. Shop license: Dangerous and Offensive trades like a sale of firewood, cracker manufacturer, candle manufacturer, barber shop, dhobi shop etc.

c. Food establishment license: Restaurants, hotels, food stall, canteen, the sale of meat & vegetables, bakeries etc.

Eligibility for a Trade license

a. The applicant must have crossed the age of 18 years

b. The applicant must not have any criminal records

c. Business must be legally permissible.

Documents need to be submitted for Trade License as per BBMP

In order to apply for a trade license, the applicant is required to make an application and submit the same to the concerned Municipal Corporation along with all the necessary documents.

There are different documents that required to be provided depending on the type of business intended to carry on.

a. Application in the prescribed Form

b. If the applicant is any Firm, LLP or a Company, their PAN Card, along with the incorporation certificate.

c. In the case of an individual applicant, his/her Aadhaar Card is mandatory.

d. Latest Municipality Property Tax Payment Receipt.

e. Lease documents or consent letter from the owner of the property.

f. NOC from your immediate neighbor

g. A certified layout plan of your trade building showing the business, working or washing or resting areas

h. Katha extracts

i. Katha certificate

j.Sanction plan

k. Occupancy certificate (OC)

Processing Time

In general, it takes 7-10 days time to process the application of Trade license in metro cities. However, in other small cities and rural areas, it takes longer.

Trade license Renewal

Statically, trade licenses in India are renewed in between January 1st to March 31st. The validity of a license issued by the municipal authority is for a period of one year and required to be renewed every year.

The application for renewal of the license is to be made within thirty days from the date of its expiry. In case the renewal process is delayed, then it may attract fine depending upon the rules and regulation of the issuing authority.

Following are the documents that need to be submitted for renewal of the license–

a. Original copy of the trade License;

b. Previous year challans;

c. Up to date property tax paid receipt.

Penal provisions

There are various other provisions, rules, and regulations that are required to be followed by the registered person. In case of failure to comply with the registration requirements of trade license and commencing any trade activity before the issuance of this license, the person in the default will be liable to pay prescribed penalty. Furthermore, legal action can also be taken against the defaulter.

Important points to be noted

a. The Trade license issued by the municipal authority is exclusively for the Trade or business.

b. Rules and regulations in relation to the issuance of a trade license varies from state to state

c. The fee structure for the issuance of the license differs based on the nature of the business

d. A business granted with this license will enjoy a greater goodwill than an unregistered entity and subsequently attracts more customers and investors.

e. This also ensures ethical business practice is performed by the traders as they have to follow safety measures and guidelines.

f. If a person doesn't apply for the license or before the grant of the license as required under law and commences any trade or business activity than the relevant government (authority) can impose fines and penalty as per their rules and regulation. The failure to comply with pre-requisites of the trade license can also result in the closure of a business.



Dormer Windows

If your home's exterior suffers from an expansive block of roofing, consider breaking it up by adding dormer windows. Dormer windows can be used to balance your home's exterior elements, bring attention to certain areas of the facade, and add height and light to your home's interior.

2.1.9 Industry Standards

The Standards That Keep Commerce Moving

For more than 60 years, the Aluminum Association has worked with the industry to develop and maintain technical standards for aluminum production. From designating alloys to answering technical questions to engaging with the academic community, the Association's Standards & Technology Department creates the backbone of a vital communication system that facilitates the production, sale and use of aluminum.

This section includes information about:

- Aluminum Alloys 101
- ANSI Accredited Standards Committee H35
- Alloy & Product Registration Process and Request Forms
- Errata for Publications
- Standards Action Reports

International Registration Records

The following International Registration Records and the Addenda to several Registration Records are available for free by clicking the links below:

- Teal Sheets (Wrought Aluminum International Alloy Designations & Chemical Composition Limits)
- Gray Sheets (Aluminum Hardeners International Designations & Chemical Composition Limits)
- Gold Sheets (Unalloyed Aluminum International Designations & Chemical Composition Limits)
- Future Purple Sheets (Designations & Chemical Composition Limits for Powders used for Powder Metallurgy and Additive Manufacturing)

Addendums

NOTE: The addendum for each of the rainbow sheets includes new registrations that were approved after the latest issue(s)

- Addendum to Teal Sheets
- Addendum to Gray Sheets
- Addendum to Tan Sheets
- Addendum to Yellow Sheets
- Addendum to Pink Sheets
- Addendum to Light Green Sheets (Clad)

Available Standards Publications

The following additional Standards material are also available for free below:

- Visual Quality Characteristics of Aluminum Sheet & Plate (QCA-1)
- Guidelines for Minimizing Water Staining of Aluminum (TR-3)
- Guidelines for In-Plant Handling of Aluminum Plate, Flat Sheet and Coil (TR-7)

- Global Advisory Group Aluminum Terms & Definitions
- Technical White Paper on Quantometer Accuracy

2.1.10 Certification from Pollution control Board

One of the requirements to import some of the specific products effecting environment is to obtain a Certificate from pollution control department of importing country.

Necessary certificate from pollution board has to be attached along with other documents, as a part of documentation methods to import some of the specific products fall under.

The import of Hazardous Wastes is subject to control by the Pollution Control Department. The importer of such products is required to obtain a Basel Permit for the import of hazardous wastes controlled under the Basel Convention and the Hazardous Waste and its Regulations. The import, export and transit of hazardous wastes are not allowed with non-parties to the Basel Convention. Importer must declare Basel Import or Transit Permit Number, item description and item quantity, the corresponding Product HS codes etc. along with import permit application. Importer has to fax Invoice, Bill of Lading (BL) or Air waybill (AWB), Copy of Basel export, import or transit permit or any other supporting documents relevant to the export, import or transit permit to the Pollution Control Department.

If any material containing hazardous materials is imported, importer should follow the terms and conditions of Hazardous Waste (Control of Export, Import and Transit) Act and its Regulations along with permit from Pollution Control Department, the national competent authority for Basel Convention.

The concerned authority will issue a permit for the import of the hazardous waste, if it is satisfied that all the relevant competent authorities of the other countries have also given their consent of the movement.

2.1.11 Area Required For Fabrication Business(Location)

The location for your business is a very essential aspect in this business. For your information a minimum of 500 sq. ft area is need for this fabrication business. To select the location it is recommended to check if skilled labour is easily available the area must nearby busy street or close to the construction area. Along with a suitable storage place with a good workshop is highly advisable as the location for your business.



ROLE MODEL

Richmond Shreve

Richmond Shreve is a well known Architect. Richmond was born on June 25, 1877 in United States..**Richmond** is one of the famous and trending celeb who is popular for being a Architect. As of 2018 Richmond Shreve is 69 years (age at death) years old. Richmond Shreve is a member of famous **Architect** list.

Wikifamouspeople has ranked Richmond Shreve as of the popular celebs list. Richmond Shreve is also listed along with people born on June 25, 1877. One of the precious celeb listed in Architect list.

Nothing much is known about Richmond Education Background & Childhood. We will update you soon.

Details

Name Richmond Shreve

Age (as of 2018) 69 years (age at death)

Profession Architect

Birth Date June 25, 1877

Birth Place Not Known

Nationality Not Known

Richmond Shreve Net Worth

Richmond primary income source is Architect. Currently We don't have enough information about his family, relationships,childhood etc. We will update soon.

Richmond Age, Height & Weight

Richmond body measurements, Height and Weight are not Known yet but we will update soon.

Family & Relations

Not Much is known about Richmond family and Relationships. All information about his private life is concealed. We will update you soon.

Facts

- Richmond Shreve age is 69 years (age at death). as of 2018
- Richmond birthday is on June 25, 1877.
- Zodiac sign: Cancer.

CASE STUDY

KAT Aluminium Windows

KAT'S Aluminium perfectly replicates original timber style

KAT's aluminium windows were chosen to replace the original leaded frames and glazing of a 1930s traditional-style black and white house at Nethercote, Cheshire, with results that exceeded expectations.

After 20 years of painstaking maintenance of their original metal and timber-sill leaded windows, some of which had not opened since they bought the house in 1996, the homeowners knew they would need to upgrade them. But they had been reluctant to do so until they found a material, colour and style that replicated the originals as closely as possible. Find out more about KAT Aluminium windows.



Until recently, uPVC alternatives did not meet the owners' colour and style requirements and timber was a much greater investment. The family needed a durable product that was more resilient to weather conditions than wood and could offer thermal efficiency. Added to this, they would not compromise on the overall aesthetic of their house.

Having been early adopters of the increasingly popular aluminium bifold doors on their rear extension, the homeowners took the plunge to replace all rear windows, having researched and discovered KAT's aluminium range. The frames were in-keeping with the contemporary anthracite grey bifold doors, and were available in an exact colour match of the front original window frames, painted in Farrow & Ball 'Railings' grey.



Aluminium is naturally strong, offering customers quality and durability. KAT's full range of aluminium windows and doors come with a unique polyamide thermal break for optimum efficiency. As with all its products, KAT's aluminium windows come with a 10-year guarantee. Contact KAT for a quotation or download a brochure for your individual project.



Having been considerately advised by KAT's authorised design partner, JB Installations, the homeowners chose windows with clean vertical lines and opening to fit with the bifold doors. KAT offers seven stock colours across its full aluminium range, with dual colour options. The owners opted for white internal frames to maximise the light inside, and anthracite grey external frames.



From order to delivery, the process took less than two weeks. Installation was straightforward because each frame is hand crafted to exact measurements at one of KAT's three manufacturing facilities in Cheshire, Sussex and Ayrshire. The proprietors were pleased with the results. "We were expecting there to be some 'making good' on our part to fill the recesses left by the secondary glazing. This was all taken care of by JB Installations, the windows and the inside frames looked incredibly neat, with no decorative repair work needed by us. The windows themselves looked beautiful externally too. We were understandably nervous to replace the original windows but the match was spot on."

So much so, the homeowners immediately commissioned JB Installations to replace the front porch's timber leaded windows that had been added to the house in the 1980s. KAT's glazing range spans every period-style, with leaded glass and anthracite grey aluminium frames selected to match the originals.

The homeowners continued: "Our own cats may have been a little confused by the new vertical opening windows, but we are more than certain KAT's aluminium window range has restored the beauty and traditional-style we aimed to achieve.

"With that in mind, there's no doubt we will upgrade the remaining front original windows as we have the confidence in the product and service to create the desired aesthetic."

KAT manufacture Sliding Patio Doors, Bi-folding Doors, Entrance

Doors, French Doors, Windows and Roof Glazing in uPVC and Aluminium. To request a complimentary brochure or a quotation, contact KAT on 01625 439666 or visit the website to see the full range of doors, windows and roof glazing.



3

RAW MATERIALS FOR ALUMINUM DOOR WINDOW MANUFACTURING

3.1 DOOR ACCESSORIES

The following raw materials are recommended for Aluminium doors :

- Door Handles
- Door Fasteners
- Door Viewer
- Door Closers
- Door Bells
- Door Frames
- Door stoppers
- Architrave

3.1.1 Door Handle

- A kind of lever (An object to pull or push with force) found commonly on the outside of a door or swinging main gate to another room.
- They are usually placed around 3 feet and 4 inches above the ground. Some handles are made of metal or rarely of plastic.

Door knob:

- A door knob is a popular type used for opening and closing a door. In the simplest form, a door knob provides a place to grab so that the door may be pulled towards oneself.
- It normally holds the closed door and is attached to the modern doors.

- A door knob may also have an inbuilt lock. Though in some cases it is beneficial to have a separate lock.

Crash bar/panic bar:

- A spring-loaded bar that is mounted horizontally on the side of a door, opens outward. When pushed upon the bar, the bolt is released.
- This device is compulsory where the fire exits.
- Many of these doors are one-way, and cannot be opened from the outside. To use this device on a two-way door, another type of handle must be mounted on the opposite side.

3.1.2 Door Fasteners

Latch :

A door fastening device has no locking function.

Lock :

A device that prevents access by those without a key or combination.

Rim lock:

A lock which is built up to the outer surface of a door.

Bolt:

- A metal pipe, usually internal to the door that extends to the jamb(vertical side of a doorway) fastens a door.
- They are typically manipulated with a lock on the outside and a lock on the inside. Bolts are generally used for security purposes.

Latchbolt:

- A bolt whose surface acts as a base to push the bolt inside while the door is being closed.
- By the use of a **latch bolt**, a door can be closed without operating the handle.

KEY FACT

Latch bolt is an extremely common latch type, typically part of a lockset, it is a spring-loaded **bolt** with an angled edge.

Deadbolt

- Deadbolts usually extend deeper into the frame and are not automatically retractable the way while the latch bolts are.
- They are typically manipulated with a lock on the outside and either a lock or a latch on the inside.
- Deadbolts are generally used for security purposes on external doors.

Push Plates

- Push plates are properly located to receive the normal hand push.
- These are centered 45" from the bottom of the frame.

Crossbar

- A fastener consisting simply of a plank or beam mounted to one side of a door by a set of hooks.
- The board can be slid past the frame to block the door. Alternatively, the bar can be a separate piece that is placed into open cleats or hooks, extending across the frame on both sides.
- This device is essentially opposite of the crash bar that it effectively makes the door one-way while in us.

Hinge

- A joint that holds two parts together so that one can swing relative to the other.
- A component that attaches one edge of a door to the frame while allowing the other edge to swing from it.
- One door usually has about three hinges but it can vary.
- These are made of stainless steel, aluminum,

brass and iron.

- Hinges come in a large variety of sizes and weights.
- There are various hinges such as Butt hinges, slip hinges, joint hinges, flag hinges, T-hinges, spring hinges, bi-fold screen hinges, latch hinges, concealed hinges, strap hinges and even hinges have anti-microbial coating to control bacteria, mold and mildew

3.1.3 Door Viewer

- Optical device fitted into a hole in front of a door enables observation without opening the door.
- Viewer has a curved lens in it to magnify an image on the other side of the door. Viewers have various degrees of vision.

3.1.4 Door Closer

- These are devices for closing doors or gates automatically after opening.
- They may be overhead or floor mounted and either exposed or concealed.

There are two general styles of door closers:

Manual and automatic:

- A manual door closer will close a door after it has been opened by hand.
- An automatic door closer opens the door itself, typically under the control of a push button, motion detector or other device and then closes it as well by detecting whether it is safe to close the door.

3.1.5 Door Bells

A push button at outer door that gives a ringing or buzzing signal when pushed.

3.1.6 Door Frames –

Lintel:

A lintel is a long rectangular stone block which levels a door or window

opening to support the wall or the weight of the structure above. (Also known as a header).

Jamb:

It is a vertical post that forms the sides of a door frame where the hinges are mounted with which the bolt interacts.

Sill:

A horizontal beam below the door that supports the frame.

3.1.7 Door Stoppers

It is a thin slat built inside the frame to prevent a door from swinging through when closed. Hinges might break without their use.

Architrave

It is a decorative molding that outlines a door frame.



Skylights and High Windows

Skylights, transoms, and other high windows are great ways to add natural light to a room without sacrificing privacy and wall or storage space. Skylights can be used to show off a ceiling's striking pitch, bring the outdoors in, and offer sky and treetop views. Additionally, if operable, high windows can provide a valuable source of ventilation.

3.1.8 Glasses for Doors

Various types of glasses used in doors are given below -

- Clear window glass
- Plate glass
- Prism glass
- Quartz glass
- Processed glass

- Frosted glass
- Wire glass
- Bullet proof glass
- Pinhead glass
- Insulating glass
- Colored glass

Clear window glass –

It is thin transparent flat glass. Its thickness varies from 2.5 to 7.5 mm.

Prism glass:

It has prism shaped ribs which reflect light. These prisms are provided at different angles.

Plate glass:

It is also plain flat transparent glass in thickness of 3 to 32 mm; fitted in the windows of costly buildings.

Quartz glass:

This glass transmits ultra- violet rays and is used in hospitals.

Processed glass:

- The various types available are ground glass, chipped one process and chipped two process glasses.
- Some are used for providing privacy because they scatter/diffuse light while others transmit maximum light.

Frosted glass:

- This glass is made by breaking up of the polished surface by a sand blast (High-pressure air mixed with sand applied to the surface of glass to carve texture or to get a cloudy dull finish).
- It is used to reduce heat and glare.
- It is referred as ground glass or translucent glass also and is used mainly in toilets and other places where vision is blocked.

Wire glass:

A network of wire is embedded in the glass for strengthening.

Bullet proof glass:

This glass is manufactured with laminated plate. The glass breaks under the impact but does not turn into pieces.

KEY FACT

Frosted glass is produced by the sandblasting or acid etching of clear sheet glass.

Pinhead glass:

This is also called perforated glass. Holes are made in sheet or plate glass with the help of roller to produce diffusion. It is used for the same purposes as **frosted glass** for.

Insulating glass:

It is fitted in windows to prevent heat loss. The glass consists of two or more tightly sealed sheets separated by 6-12 mm of dry air.

Colored glass:

It is made by adding oxides of metals to molten glass.

3.1.9 Types of Finishing/ Protective Coating Materials Are Recommended For Aluminium Doors

The following types of finishing protective materials are recommended for Aluminium doors. Primer

- Zinc chromate should be used for painting Aluminium doors.
- Covering capacity is about 18 to 20 sqm/ ltr/coat

Raw linseed oil:

It shall lightly be viscous but clear of yellowish color with light brown touch. The oil shall be smooth

and sweet to the taste with very little smell. The oil shall be of matured quality sufficiently.

Double-boiled linseed oil:

This shall be more viscous than the raw oil. Maintains deeper color and specific gravity between 0.931 and 0.945 at a temperature of 30 degree Celsius. It shall be dry with a glossy surface. The oil shall be of approved brand and manufacture.

Turpentine:

Mineral turpentine, i. e. petroleum distillate that has the same rate of evaporation as vegetable turpentine shall be used. It shall have no grease or other residue when allowed to evaporate.

Exterior Grade enamel paint:

These are available in two types:

- Synthetic enamel
- Enamel

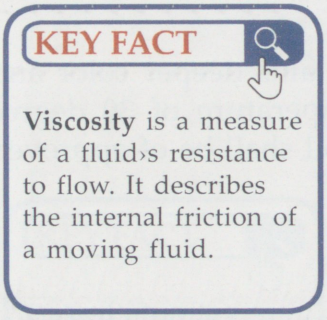
Synthetic enamel makes surface dry much faster than enamel paints does. Covering capacity of synthetic enamel paints for painting metal surfaces is about 15-22 sqm/liter for single coat and 10-12 sqm/liter for two coats. For undercoat, paint of the same quality shall be used. The best coating for metals (fencing, window grills, fans, gates, poles, etc.) is provided by synthetic enamel paint which acts both as a decorative and protective coating. Enamels are tough, durable and protect metals from corrosion. On drying they form a smooth glossy, relatively hard and permanent solid layer. The enamel paint coat presents a glossy surface but if desired an eggshell or flat finish may also be obtained by adding turpentine in small quantity.

Enamel paint interior:

These paints are used for the interior protection and decoration.Where red color is acceptable, Red oxide paint shall be prepared by mixing red oxide, raw linseed oil and boiled linseed oil in the ratio of 4.79 kg: 2 liter: 1 liter. Note: Ready mixed paints have the correct consistency and shall not require further dilution with thinners. If a slight adjustment of **viscosity** is necessary, use the thinners recommended by the manufacturers.

3.1.10 Aluminum Fabrication

Aluminum fabrication is the process of shaping aluminum into a finished product, such as a solar panel part or an outdoor enclosure. Fabrication of aluminum spans a wide field of processes, including welding, stamping, bending, extruding, and shearing, just to name a few. In this guide, we're giving a basic overview of aluminum fabrication, from properties to fabrication techniques to industries and applications. Looking to source aluminum?



3.1.11 How Raw Aluminum is Manufactured

Aluminum has been used in mass production only for the last hundred or so years. Before that it was as rare and valuable as gold, since the highly malleable metal was extremely rare in its free (metal) form. Aluminum's mass production can be attributed to the Hall-Héroult process for extracting aluminum, patented in 1886, which is still used today.

The aluminum manufacturing process starts with the mining of bauxite, with every four pounds of bauxite being refined into two pounds of alumina. The two pounds of alumina then must be further refined into a single pound of aluminum. To do this, alumina must be dissolved into a bath of molten cryolite, and an electric current passed through the bath using anodes. This draws oxygen atoms out of the alumina, leaving molten aluminum at the bottom of the pot. The refined aluminum is then siphoned out and put in a holding furnace, from which it can be cast into an ingot and sent to be formed into bar, wire, sheet, or other forms. The electrolytic process, however, is still far more expensive than recycling, which requires only a fraction of the energy. This is one of the main reasons aluminum recycling is so useful and important.

3.1.12 Properties of Aluminum

In general, aluminum as a fabrication material is quick and easy to shape, thanks to its softness and lightness. Its properties can change, however, depending on how it is combined with other metals to create alloys. For more specific details, you can see our detailed rundown of general aluminum types and their properties, or check out our guide on specific, commonly used alloys.

Advantages of Aluminum in Fabrication

Aluminum is a popular material for its unique combination of properties. At a third the weight of stainless steel, it's a lightweight metal with a higher strength-to-weight ratio. Aluminum is also an easy metal to work with thanks to its comparative softness, corrosion resistance, and recyclability. Its non-toxicity has made it a popular choice for food preparation machinery, and its reflective and non-combustive properties have also cemented its place in lighting.

Drawbacks of Aluminum in Fabrication

At the same time, this softness and weakness compared to stainless steel can make for less sturdy end products. Thanks to its thermal conductivity, many types of aluminum can also be difficult to weld for the inexperienced because it can easily be melted through. Certain stresses can also cause aluminum to break, as it can be brittle in some ways from manufacturing processes.

3.1.13 Aluminum Fabrication Techniques

Aluminum can go through the same fabrication techniques as any other commonly used metal, but certain methods work better than others. We've covered several of the basic types of metal fabrication in another article, but here we're covering tips on how to fabricate aluminum with some of the more common methods:

- **Extrusions** put the least stress on aluminum. Extrusion forces a piece of aluminum through or around a die, which can be open or closed. This forces the metal to conform to the size and shape of the die. Extrusions can be done either hot (where the metal is heated) or cold (where the metal is room temperature).
- **Drawing** pulls metal through a tapered die to stretch it, with deep drawing referring to a resulting product with a greater or equal depth than its width. Aluminum is often drawn into wire and

products like cans, thanks to its ductility. This is especially useful for the 3003, 5005, and 5052 alloys.

- **Forming**, including bending, stamping, and rolling, suits aluminum's flexibility and softness. The 3003 alloy is especially good for this, as well as the 5052 and 6061 varieties, but most alloys in the 1xxx, 2xxx, 4xxx, 5xxx, and 8xxx alloy families can be formed. Forming involves pressing part or all of a sheet or plate to shape it into the desired end product.
- **Castings** are made when liquid metal is poured into a mold or die. They're best made from 4xxx and 5xxx alloys, which are known for their strength and wear resistance.
- **Forging**, when metal is beaten or compressed into shape, is best for applications where the end results must be incredibly durable (such as for stress bearing parts).
- **Machining**, including turning and milling, is best accomplished with 1100, 2011, 3001, and 6061 aluminum. Machining is a subtractive cutting process that sculpts by removing metal. With aluminum, it's important to use special tools and lubricant, since the metal has specific thermal properties that make it difficult to use general equipment.
- **Waterjet cutting**, the high pressure spraying of water with abrasives, does not use heat. In this way it avoids altering aluminum's properties the way laser cutting could. However, aluminum can still also be cut by saw blade, laser, or plasma cutting.
- **MIG and TIG welding**, which involve melting a metal thread to bind two pieces of aluminum together, are best performed on the 1xxx and 3xxx-6xxx aluminum alloys. Friction welding can also help when attaching aluminum to another metal.
- **Adhesive bonding** is also a common method of assembling aluminum, as certain adhesives bond to the outer layer of aluminum oxide.

3.1.14 Aluminum's Industries and Applications

Aluminum's properties make it ideal for uses that vary widely across industrial, commercial, and consumer applications, including:

- **Aerospace**, which uses aluminum's weight-to-strength ratio and corrosion resistance for wings, fuselages, and parts.
- **Packaging**, including cans and foil, which rely on aluminum's easy workability, softness, and durability.

- **Automotive** applications, which use aluminum to absorb crash forces. It is also used to make car bodies and components lighter and therefore more fuel efficient.
- **Construction**, where aluminum acts both as decoration and as structural material thanks to its energy efficiency and sustainability.
- **Electronics and electrical** applications. Power grids use aluminum wiring and conductors in power grids. Consumer electronics like refrigerators and laptops use the metal thanks to its thermal abilities, light weight, and structural strength.



ROLE MODEL

William Frederick Lamb

William Frederick Lamb FAIA (November 21, 1883 – September 8, 1952), was an American architect, chiefly known as one of the principal designers of the Empire State Building.

Lamb joined the New York architecture firm Carrère & Hastings in 1911, shortly after returning from Paris, where he earned a diploma at the École des Beaux-Arts. Lamb became a partner in 1920; the firm would be known as Shreve & Lamb from 1924 to 1929 and thereafter as Shreve, Lamb and Harmon. Lamb's notable projects include the Empire State Building, the Standard Oil Building, 521 Fifth Avenue, the Forbes Magazine Building, and the General Motors Building in New York City; the Acacia Mutual Life Insurance Building in Washington, D.C.; and academic buildings for the Connecticut College for Women, Williams College, Cornell University, and Wesleyan University. In addition to his studies at the École des Beaux Arts, Lamb received a bachelor's degree from Williams College in 1904 and did graduate work at the School of Architecture, Columbia University, from 1904 to 1906. Lamb received an honorary doctorate from Williams College in 1932; other honors include two gold medals from the Fifth Avenue Association (1930, 1931), a medal from the Architectural League of New York (1931), and a medal of honor from the New York Chapter of the American Institute of Architects (1932). He was a member of the American Academy of Arts and Letters, the Art Commission of the City of New York, the Beaux-Arts Institute of Design, and the Architectural League of New York. In the period preceding the 1939 New York World's fair, Lamb served as "Coordinator of Design" for the fair's board of planners. Lamb served on the U.S. Commission of Fine Arts from 1937 to 1945, including as vice chairman from 1941 to 1945. In 1942 he was elected into the National Academy of Design as an Associate member and became a full Academician in 1950.

The firm also designed 521 Fifth Avenue, the Forbes Magazine Building, the Standard Oil Building, the Bankers Trust Building and worked with H. Craig Severance on 40 Wall Street in New York. He also designed the Reynolds Building in Winston-Salem, North Carolina

He died in New York on September 8, 1952.

4

ALUMINIUM DOORS

4.1 OVERVIEW OF ALUMINUM DOOR

Aluminum door is a solid barrier fixed in door way or opening in a wall. It consists of two parts i.e. frame and shutter and can be opened for access to and from buildings, between rooms or be closed for privacy. A variety of doors such as wooden doors, iron doors, PVC or plastic doors and aluminum doors are available in the market. Now a days aluminum doors, windows and glazing are widely used.

Materials of aluminum door

Aluminum alloy standard extruded sections are used for fabrication of aluminum doors. Chemical composition and mechanical properties of these extruded sections should comply with requirements of IS: 733, IS: 1285, IS: 737.

4.1.1 Anodizing Aluminum Doors

Aluminum is anodized by manufacturing units with the help of **anodizing**/ electro coating plants. It should be uniform without color variation. The outer surface of aluminum members is anodized up to 30 microns in different colors like silver, champagne, bronze and black. A foolproof scaling system ensures durable finish for long lasting applications. The anodizing should be as per ISO 9002.

How to fabricate aluminum doors?

Aluminum door frames should be fabricated after measuring actual size of opening. The side legs of frame should be 50 mm more in length so that they can be embedded into floor. The frame of door should be manufactured by reducing 25 mm width and by keeping the height 37.5 mm, more than opening i.e. (50 -12.5 = 37.5) because 50 mm length is required for embedding in floor.

Sizes of aluminum members used in door frame

- 50.8 mm
- 88.9 mm
- 127 mm

Sizes of aluminum members used in door shutter

- Side rail and top rail = 57.2 mm, 98.4 mm, 104.8 mm or127 mm.
- Lock rail/middle rail = 152.4 mm.
- Bottom rail = 203.2mm, 254 mm, 304.8 mm.

Precautions for fabrication of aluminum door frames

- Aluminum door frames should be fabricated by reputed local workshop using standard sections manufactured by renowned manufacturers.
- While doing fabrication, the fasteners should be zinc plated and actual required length of each member should be cut by cutter, not by chisel. The holes should be drilled instead of punching them.
- In aluminum frames, the fixing should be done with the help of steel screws.
- Make sure the corners of frame are at right angle. All members of door frame should be in straight line horizontally and vertically.
- The material used in aluminum doors should be free from cracks, surface flaws, rough and imperfect edges.
- The screws should be driven with the help of screw driver, not be hammered.

KEY FACT

Anodizing is an electrochemical process that converts the metal surface into a decorative, durable, corrosion-resistant, anodic oxide finish.

4.1.2 Fixing Aluminum Door in Various Openings

1. Fixing door frame in opening of brick masonry

- Stack aluminum door frames at site on level platform to keep them in true shape without any damage.
- Keep the size of **aluminum doorframe** less than the size of opening according to the

thickness of cement plaster on sides of door opening.

- Fix doorframe either by cutting bricks or by removing bricks near lugs and avoid plastering on jambs that look ugly since usually aluminum doorframe are manufactured either equal to or with little margin to the size of opening.
- Use slotted, adjustable, galvanized and steel lugs of size 100x16x3 mm for fixing aluminum doors.
- Make use of 8 No lugs, 4 No. on each side of doorframe and keep height of lugs 45cm, 109 cm, 139 cm and 188.5 cm from floor level.
- Apply a thick shop coat of clear transparent lacquer on aluminum door frame to protect surface from wet cement during installation before aluminum doors are fixed in position.
- Check the size of opening for obstruction if any. After marking position of lugs, the holes should be made in masonry and lugs are fixed with cement concrete mix in the ratio of 1: 3: 6.
- Set the filling finally after the gap is filled with mastic cement and plaster.

2. Fixing door frame in opening of concrete surface

- Stack aluminum door frames at site on level platform to keep them in true shape without any damage.
- Keep the size of aluminum doorframe less than the size of opening according to the thickness of cement plaster on sides of door opening.
- Make use of 8 No lugs, 4 No. on each side of doorframe and keep height of lugs 45cm, 109 cm, 139 cm and 188.5 cm from floor level.
- Apply a thick shop coat/temporary cover of clear transparent lacquer on aluminum door frame to protect surface from wet cement

KEY FACT

Aluminum door frames are lighter to work with and therefore, easier to install when compared to a steel door frame.

during installation before aluminum doors are fixed in position.

- Check the size of opening for obstruction if any. After marking position of lugs, the holes are made in cement concrete and teak wooden plugs are fixed with cement concrete **mortar** mix in the ratio of 1: 3:
- Fix door frame after the plugs are duly set.
- Set the filling finally after the gap is filled with mastic cement and plaster.

3. Fixing door frame in opening of woodwork

- Make an opening in wood work which are normally rebated and be fixed with approved mastic or rubber lining to jambs.
- Fix doorframe with screws in woodwork already fixed.

KEY FACT

Mortar is composed of cement, fine sands and lime; it is used as a binding material when building with brick, block, and stone.

4.1.3 Benefits of Reduced Size Aluminum Door

As per IS 1948, the sizes of aluminum doors prescribed in drawings issued for construction are the sizes of modular openings i.e. the sizes of opening to be provided in masonry. The size of aluminum doorframe should not be equal to the size of opening provided in the masonry. The following are some benefits of reduced size aluminum doors.

- Easily and properly fixed in openings without disturbing jambs since the width of aluminum door frames is reduced by 12.5 mm on each side and height by 12.5 mm on top face during manufacturing.
- Offers good looks. If overall size of aluminum doors frame is not reduced, 12 mm plaster on jamb would abut the face of aluminum door frame and gives bad look.
- Keeps elevation intact. The 12 mm thick cement plaster on jambs sets in the gap left at rear face of the frame and keeps original elevation intact.

- No problem of cracks in jambs plaster if the size of aluminum doorframe is reduced than the opening.

4.1.4 Standard size of internal aluminium doors?

The Standard sizes of internal Aluminium doors are as follows :

- Size:
  - The standard is usually 1981mm x 762mm (6 6 x 2 6), Though there are different sizes which are intended for wider and narrower openings such as under the stairs or walk-in cupboards.
- Thickness:
  - Internal doors come in two thicknesses of 35mm and 40 mm.35 mm door is being used widely. Internal Fire Doors are 44 millimeters (provide protection from fire
- Weight
  - Internal doors are usually much lighter than external doors; this is because of their thickness, material and method used in their construction.

The following table suggests Standard Sizes for Aluminium doors:

864 x 2060mm	2-10" x 6- 9"
838 x 2060mm	2 -9" x 6- 9"
813 x 2060mm	2 - 8" x 6- 9"
762 x 2060mm	2- 6" x 6- 9"
686 x 2060mm	2- 3" x 6- 9"
610 x 2060mm	2- 0" x 6- 9"
914 x 2060mm	3- 0" x 6-9"
1097 x 2060mm	3- 6" x 6-9"
926 x 2060mm	Standard Metric
826 x 2060mm	Standard Metric
726 x 2060mm	Standard Metric
626 x 2060mm	Standard Metric
525 x2060mm	Standard Metric

ROLE MODEL

Anil Agarwal (industrialist)

Anil Agarwal (born 1954) is the founder and Chairman of Vedanta Resources Limited. He controls Vedanta Resources through Volcan Investments, a holding vehicle with a 100% stake in the business.

Early life

Agarwal was born and brought up in Patna, Bihar, India. His father Dwarka Prasad Agarwal had a small aluminium conductor business. He studied at Miller High School, Patna. and decided to join his father's business, making aluminium conductors, instead of going to university. At 19, he left Patna for Mumbai (then Bombay) to explore career opportunities.

Career

In the mid-1970s, he began trading in scrap metal, collecting it from cable companies in other states and selling it in Mumbai.[10] In 1976, Anil Agarwal acquired Shamsher Sterling Corporation, a manufacturer of enameled copper, among other products, with a bank loan. For the next 10 years, he ran both businesses. In 1986, he set up a factory to manufacture jelly-filled cables, creating **Sterlite Industries**. He soon realized that the profitability of his business was volatile, fluctuating with the prices of his raw materials: copper and aluminium. So he decided to control his input costs by manufacturing the metals instead of buying them.

In 1993, Sterlite Industries became the first private sector company in India to set up a copper smelter and refinery. In 1995, Sterlite Industries acquired Madras Aluminium, a 'sick' company that had been shut down for 4 years and held by the Board for Industrial and Financial Reconstruction (BIFR). The next step of the backward integration process seemed natural: mining.

His first opportunity came when the government announced a disinvestment program. In 2001, he acquired 51 percent in Bharat Aluminium Company (BALCO), a public sector undertaking; in the very next year, he acquired a majority stake (nearly 65 per cent) in state-run HZL(Hindustan Zinc Limited). Both the companies were considered sleepy and inefficient mining firms.

To access international capital markets, Anil Agarwal and his team incorporated **Vedanta Resources Plc** in 2003 in London. At the time of

its listing, Vedanta Resources Plc, was the first Indian firm to be listed on London Stock Exchange, on 10 December 2003, Vedanta Resources became the parent company of the group through a process of internal restructuring of group companies and their shareholding.

In 2004 Vedanta Resources Plc announced a global bond offering and acquired Konkola Copper Mines in Zambia, Africa. In 2007, Vedanta Resources acquired a controlling stake in Sesa Goa Limited, India›s largest producer-exporter of iron ore, and in 2010, the company acquired South African miner Anglo American›s portfolio of zinc assets in Namibia, Ireland and South Africa. The next year, Vedanta Resources acquired controlling stake in Cairn India, India›s largest private sector oil-producing firm. The merger of Sesa Goa and Sterlite Industries was announced in 2012, as part of the Vedanta Group›s consolidation.

Vedanta Resources, headquartered in London, is a globally diversified natural resources conglomerate, with interests in zinc, lead, silver, copper, iron ore, aluminium, power generation, and oil and gas. The greatest share of its assets, however, is in India; Agarwal lives in London.

In October 2017, it was announced that Agrawal's Volcan Holdings Plc had taken a 19% stake in mining company Anglo American, making him biggest shareholder of the company.

According to The *Sunday Times Rich List* in 2020 his net worth was estimated at £8.5 billion.

Controversy and Criticism

In 2004, a committee of the Indian Supreme Court charged that Vedanta had dumped thousands of tons of arsenic-bearing slag near its factory in the Indian state of Tamil Nadu, resulting in major poisoning of the environment and neighbouring population. In 2005, another committee of the Indian Supreme Court charged that Vedanta had forced over one hundred indigenous families from their homes in the Indian state of Odisha, where it sought to mine bauxite. According to the committee's report: "An atmosphere of fear was created through the hired goons", and residents were "beaten up by the employees of M/s Vedanta". Vedanta's actions in Odisha were rebuked by the British commerce agency, and the Church of England investment funds sold their shares in the company in protest. In Zambia, Vedanta dumped hazardous waste into the Kafue River, from its copper mine there, according to a lawsuit filed by 2,000 residents, resulting in widespread human illness and the death of fish. A local judge stated: "This was lack of corporate responsibility and criminal, and a tipping point for

corporate recklessness". In 2014, an audit was begun by Zambian officials due to suspicions that Vedanta has not been paying its proper fees to the government. In addition, "hundreds of former mine workers are fighting Vedanta for severance or disability pay."

Thoothukudi violence

In March and April 2018, there were renewed mass-protests against the company's plans of setting up a second smelting complex and to demand a shutdown of its Thoothukudi (Tuticorin) smelting plants, on grounds of violating environmental regulations. On 22 May 2018 the protests took a deadlier turn as 13 people were killed and several others injured, following a police shooting. Section 144 was imposed to control the situation.

Philanthropy

In 1992, Anil Agarwal created the Vedanta Foundation as the vehicle through which the group companies would carry out their philanthropic programs and activities. In the financial year 2013–14, the Vedanta group companies and the Vedanta foundation invested US$49.0 million in building hospitals, schools and infrastructure, conserving the environment and funding community programs that improve health, education and livelihood of over 4.1 million people. The initiatives were undertaken in partnership with the government and non-governmental organizations (NGOs). Among his inspirations, Agarwal counts Andrew Carnegie and David Rockefeller who built public works with their fortunes, and Bill Gates. The activities funded by his philanthropy are focused on child welfare, women empowerment and education.

Anil Agarwal was ranked second in Hurun India Philanthropy List 2014 for his personal donation of Rs. 1,796 crore (about $36 million). He was ranked 25th in the Hurun India Rich List with a personal fortune of 12,316cr.

In 2015, the Vedanta group in partnership with Ministry for Women and Child development inaugurated the first "Nand Ghar" or modern anganwadi, of the 4,000 planned to set up. Agarwal has pledged to donate 75% of his family's wealth to charity, saying he was inspired by Bill Gates.

Honours and awards

- The Economic Times, Business Leader Award – 2012
- Mining Journal Lifetime Achievement Award - 2009
- The Ernst & Young Entrepreneur of the Year - 2008

- The Asian Awards Entrepreneur of the Year - 2016
- The One Globe Forum (OGF) award for creating a strong social impact for the communities the group operates in, and for initiatives such as Nand Ghar - 2018
- Dr.Thomas Cangan Leadership Award– 2013, Faculty of Management Studies – Institute of Rural Management, Jaipur (FMS-IRM)

Vedanta was stripped of international safety awards after it was found it failed to declare its involvement one of the worst industrial accidents in India's history.

CASE STUDY

New Homeowners Impressed by Elegant Style and Energy Efficiency of MI Windows



As he was perusing a catalogue of home designs, Preston Stokes wasn't necessarily expecting to have a "Eureka" moment. Nevertheless, when he came upon Keystone Custom Homes' farmhouse model with vinyl black windows from MI Windows and Doors, he knew the search was over.

"We didn't know black windows were an option," says Stokes, referring to himself and his wife Ciara. "There's something about that look. It's almost like a black-and-white suit — it just looks really sharp. It caught our eye and we fell in love with it immediately."



The Stokes family is not alone, as Americans have been falling in love with black windows for the past few years. Aided by home décor television shows and design websites, consumers have become attuned to the numerous benefits of black windows: They go with everything, they're stylish, and they look great without any treatments.

When black windows first hit the market on a large scale less than a decade ago, customers came running. It's a stampede that has only grown since.

"Black has definitely caught on," says Jeffrey Jenks, a window salesman for one of MI's highly valued distribution partners, BMC. "It establishes a look that their neighbor might not have. I think it results in an elegant finish."



It was fortuitous that the farmhouse style with the black windows was the one that jumped off the page for Preston Stokes, because he and Ciara had already selected the perfect place to build a modern farmhouse. Their new home sits in the southern portion of Chester County, Pennsylvania, near both the Maryland and Delaware borders. This region is historically an agricultural area, and, though it's seen its fair share of development over the years, it still offers plenty of farmland.

That's one reason why Keystone, headquartered in neighboring Lancaster County, Pa., sells so many homes featuring the farmhouse design. However, in a nod to modernity, they've decided to meld the classic American farmhouse with the latest trend, thus pairing it with MI's black 3500 Series vinyl windows and 910 Sliding Glass Door.

"MI's 3500 Single-Hung is Keystone's go-to window," says Jenks, who supplies MI windows to Keystone. "And now that it's available with a stylish black exterior, it's more popular than ever."

One of MI's top sellers, the 3500 Single-Hung window enriches any style of home, though it looks particularly good on a modern farmhouse. As noted above, Preston was certainly struck by the black windows' aesthetic.

But he was just as pleased with the energy efficiency of this vinyl window.

"The house that we built, it's not just a smart house, it's not just a farmhouse," he says. "It's an extremely energy-efficient house. So if the windows weren't up to par, then they weren't going to fit with the whole heating and cooling system that we have. But they obviously complement that system very well."

And why wouldn't they? The 3500 Single-Hung and 910 Sliding Glass Door feature Low-E glass, which deflects the sun's ultraviolet rays while still allowing light into a home. Additionally, the windows' warm-edge spacer system and multi-chambered mainframe help to maintain a comfortable interior temperature by reducing heat transfer through the product. The insulated glass unit can be enhanced with argon gas, which is denser than air and helps to further insulate the home's interior.

For extreme energy efficiency, this product can be upgraded to an even higher performing Low-E. The end result is an impressive U-Value rating — which is the primary classification used by ENERGY STAR® and other agencies to evaluate and compare the energy efficiency of building products such as windows and doors.

Having moved into their home at the beginning of summer, Preston and Ciara could see how energy efficient the windows were right away.

"On the hot days, they've been great," Preston says. "The house is pretty cool."

That seems to be the consensus of the couple's family and friends, too. Though they're not always talking about the climate inside the house.

"I've received so many compliments on these black windows," Preston says. "The black gives our home that clean cut, classy, modern farmhouse look that we were going for. The whole aesthetic of the house completely changes with the windows."

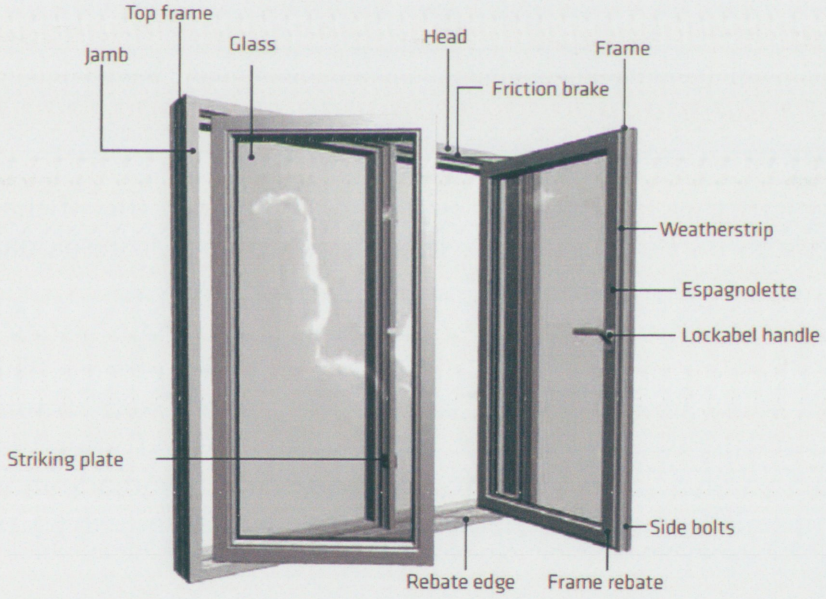
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THE CONSTRUCTION OF THE WINDOW

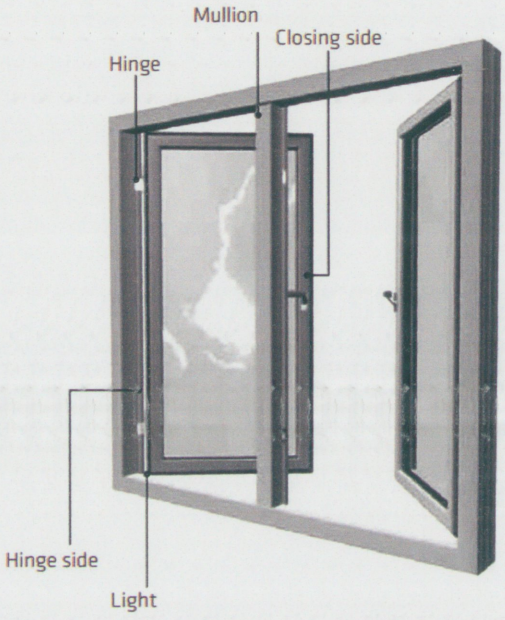
5.1 WINDOW CONSTRUCTION

To make it easier to understand the technical terms used in this Installation and user manual, the terms are shown on the two general drawings below.

Outside



Inside



5.1.1 Installation, General

Correct installation is important for the function and life of the elements. The installation should therefore be carried out by professional fitters of windows and external doors.

The instructions in this manual cover some of the main issues – and not every detail – which may be helpful in the installation process. The elements will normally be supplied with glass, but for large "fixed" frames or large combined elements glass will often have to be added after the elements have been installed. Such mounting of glass should be made in accordance with the installation guide provided by the Danish Industry Co-operative Organisation (GS).

The frame is usually placed in the aperture on the outer leaf of the construction. Please ensure uniform sealant gap width at the sideframe and frame head, and make sure the sill is level with the external sill/floor.

The distance (gap for subsequent sealing) between the frame and the surrounding "masonry" should normally be approx. 10-15 mm.

In the hinge side of the frame must be in plumb on both the wide and the narrow side. The frame must also be adjusted and fastened to ensure the correct closing position and space between sash and frame.



Beware!

Never use permanent support near the frame head of wide elements such as tilt and slide doors, as the overlying construction may weigh down on the elements.

5.1.2 Securing, General

Windows and external doors should always be secured to the surrounding building parts with "mechanical means" such as framebolts/dowels or ironmongery.

If any foaming material is used to fill the gap between the outer frame surface and the surrounding brickwork, the element must still be secured to the surrounding building parts with mechanical means such as frame bolts/dowels or ironmongery.

KEY FACT

Moisture resistance is mainly concerned with a medium›s ability to maintain dimensional stability when exposed to high humidity and changes in humidity.

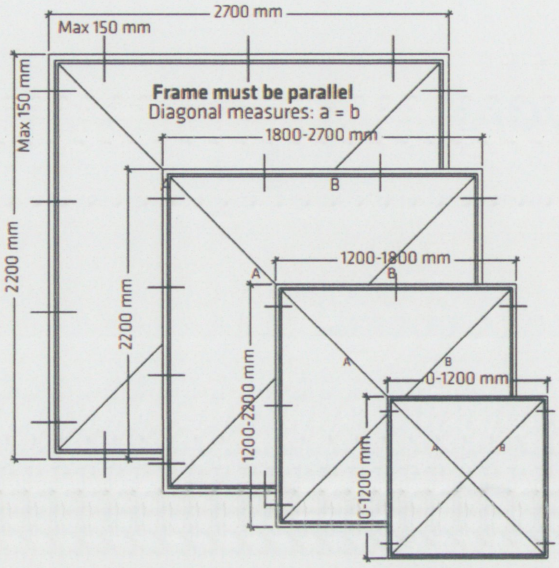
5.1.3 Without Permanent Support

If the frame is fixed in the wall aperture using mechanical means at each fixing point, the frame can be secured without the use of permanent support.

However, permanent support/wedging must always be in place under sideframes and mullions to ensure that the weight of the element is supported by the underlying brickwork/construction. The wedging material must be **moisture-resistant**.

Max. dimensions:

Max. Dimensions should be 150 mm from each corner and then at 450 mm to a max of 600 mm centres.



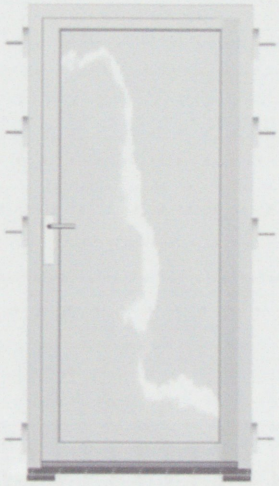
Securing, especially for windows

Always use permanent wedging below the outer ends of the sill and mullions – Fig. The wedge material must be moistureresistant.



Securing, especially for doors

Place the top and bottom fastening device in the hinge side of the door in the rebate as close to the hinges as possible, since the weight ofthe entire door is centred here.



Always use permanent wedging underneath the outer ends of the sill and mullions. For wide doors we recommend permanent wedging at the centre of the bottom of the sill.



For 2-leaf doors, with or without centre mullion, place permanent wedging under the mullion/wing joint underneath the sill – Fig. The wedging material must be moisture resistant

In the closing side there must be permanent support behind the striking plate – Fig. Themain function of this support is to prevent burglaries.

Place the element in the window aperture of the construction and wedge it up underneath the sideframes and mullions, if any. The sill should be horizontal and level. It must not under any circumstances curve upwards or downwards.

Adjust the side frames so they are in plumb on both the wide and the narrow side. Opening sashes should have suitable clearance and close properly against the frame rebate. Secure the element with suitable frame bolts or ironmongery. It is possible to use frame bolts intended for installation with or without permanent support as long as the sideframes are parallel and do not curve inwards as this will make operation difficult.

When the installation is complete remove the dust from the frame and ironmongery. Lubricate all closing points and joints for smooth and permanent operation. We recommend brushing the weatherstrips with a silicone stick.



Clerestory Windows

Usually located below one roof and above another, clerestory windows serve many functions. They define rooflines, bring light into spaces without compromising privacy and wall space, highlight certain architectural details or areas of the ceiling, and offer views of passing clouds. Here, clerestory windows flood the kitchen with natural light, ensure ample wall space for storage, and maintain the integrity of the home's exterior.

5.1.4 Advantages Disadvantages Maintenance Durability of Aluminium Windows

Windows are made with different kinds of materials. In the recent past, the usage of Aluminium doors and windows has increased because of the metal's great flexibility. The lightweight material can regarding. The alloy metal will enhance properties, and they can High-quality for windows without any issues. As a reputed architectural firm, we provide the options for windows to choose from which will be suggested based on the clients budget.

If you would like to go for aluminium windows for your residential or **commercial** project, you should be aware of the characteristics of the metal and its properties. The benefits of the product vis-à-vis other materials will help you settle for the best option.



KEY FACT

Commercial project is defined as the construction of structures and facilities for commerce and business.

For residential projects, Aluminium windows are widely used. They can be adapted to the modern window styles perfectly. Effortlessly accentuating the clean lines is possible. Even though aluminium windows are expensive than vinyl windows, they are considered as a better option as they are cheaper than wooden or steel windows.

It is possible to meet the energy code by going for premium grade aluminium windows. If you go for clear anodised aluminium, you can manage nice looks without any issues. You can go for windows which will be in tune with sliding doors, garage doors and accordion doors. If you go for windows package, your needs will be met in a very efficient way.

The thermal performance of the aluminium windows is very high. There will be an improvement in heat gain, and heat loss can be arrested substantially. You can reduce the carbon footprint by opting for aluminium windows. As you chose aluminium windows, you will contribute to environmental protection as well. The metal can be recycled very easily.

Advantages Of Aluminium Windows

- Few Aluminium windows advantages are that they are energy-efficient windows panes. There will be great aesthetics by choosing aluminium windows. The durability and low maintenance are always guaranteed..
- There will not be any scope to swell like other metals. You will not find any crack, split or warp over a period. The chances of

creep will be very low..

- To meet the US energy standards, you can go for double or triple pane windows. As the thermal bridge of the aluminium is very high with triple pane windows, you can go for the aluminium frame..
- You should understand the fact that double pane windows are much cleaner than triple pane windows..
- Aluminium windows are available in various grades. You can take advantage of excellent thermal properties..
- The doors and windows are benefited based on the new and advanced technology. Aluminium is considered as a better option than plastic. Most of the modern buildings are coming up with aluminium windows. They are far better than UPVC in terms of aesthetics..
- The strength delivered by aluminium windows is very high. It can resist varied environmental conditions, and it will not rust. The strength to weight ratio of the metal is very high. The aluminium is used in both residential and commercial windows and doors..
- Aluminium windows are much affordable. You can take advantage of design flexibility and finish as well. The metal is considered as environmentally sustainable as it offers the highest recycling rate.

Disadvantages of Aluminium Windows

- The significant aluminium windows disadvantages that there may be some gap between interior wood liner.
- Generally, aluminium frame as thermally broken aluminium frames will experience differential expansion because of humidity and temperature.
- If safety and security is the prime most concern, you should choose widows made up of iron or wood. The heat holding capacity of aluminium is inferior.
- If there is condensation inside windows, there will be a number of issues.
- You should manage a break between internal and external aluminium parts. If there is no gap, a thermal bridge will be established and there will be a loss of heat.
- Hence, you might not be able to use aluminium windows during cold climatic conditions.

Durability of Aluminium Windows

- The material can withstand denting in a very efficient way. You can maintain very easily. The structural integrity can be maintained without any issues hence Aluminium windows durability is excellent. You can keep architectural specifications as well.
- The product is available in any colour. You can use for light as well as heavy applications. Government buildings, schools, hospitals and restaurants can go for aluminium windows so that there will be great **flexibility**.
- The durability is further enhanced with the introduction of polypide technology. There is an excellent improvement in the thermal insulation. You can take advantage of high strength and dual colour finish. You can manage different internal and external faces with aluminium windows.
- Highly skilled professionals will ensure that windows are made as per the latest standards. The strength and durability are further enhanced by choosing the newest technology.
- High quality tools and equipment are used to prepare windows. You can choose a design of your choice without compromising on the style as well as strength.
- Even though windows are exposed to harsh environmental conditions, there is no scope for decay. Before the deployment of windows, the high-quality finish will be attained.
- There will be a consistently stable year-round performance with aluminium windows. If you use other materials like timber or UPVC, you will notice swelling. As aluminium is more stable than any other product, one can apply for doors and windows without any issues.

KEY FACT

Flexibility is the range of motion in a joint or group of joints or the ability to move joints effectively through a complete range of motion.

5.1.5 Maintenance of Aluminium Windows

- It is very easy to clean hence aluminium windows maintenance is easy. They are preferable to wooden and iron windows. The lightweight construction will let you **manage them in varied conditions** without any issues..
- Aluminium windows are **available in various sizes**. If you would like to preserve historic architecture, you can go for windows made of aluminium. You can take advantage of **a lifetime warranty** on frame. There are some brands which offer 10-year thermal break warranty and lifetime glass seal warranty.
- To **avoid sticking and prevent stiff springs**, you should maintain windows as per the guidelines are given by the manufacturer. You should clean windows at least once a month.
- To maintain aluminium frames, you should **clean and vacuum** them in a perfect way.
- While cleaning windows, you should clean surrounding areas as well so that the **dust will not stick** to windows. By using a vacuum cleaner, it is possible to vacuum windows in a very efficient manner.
- If you spray penetrating **lubricant onto spring locks**, the cleaning will be done very efficiently. The springs will not become stiff. To protect from dirt and grim, you can apply car wax to aluminium frames. In this process, you will ensure that the aluminium will shine like never before.
- By using a silicone lubricant, the metal can be **protected from corrosion** and rust formation. The lubricant should be applied after cleaning the window thoroughly.
- The oxidation and pitting can be **prevented by using a scrub** with mild detergent. Glass cleaner should be used to clean glass. Thus, you can manage aluminium windows in perfect condition.

WHO can OPT / GO for ALUMINIUM WINDOWS

- There will be practical and stylistic windows when you choose aluminium. The cost of the product is very low. If you follow the maintenance steps, they can be preserved for a long period without any issues.
- You should go for aluminium windows in specific scenarios. If you need naturally strong windows profiles, there is every reason to settle for aluminium windows.
- The durability of the metal is very high, and it is a low maintenance product. Hence, you can deploy at residential as well as commercial

establishments without any issues.

- The corrosion resistance quality of the metal is very high. If you cannot deal with wood or iron because of exposure to wet climatic conditions, you can opt for high-quality aluminium windows.
- Users who would like to contribute to the environment can opt for aluminium products. The product has the excellent feature as it can be recycled effortlessly. The probability to swell or crack is very less. Hence, you can deploy aluminium windows in a variety of conditions.
- Customers looking for a wide range of colour finishes can opt for aluminium-based products. The customisation of the product can be done concerning the colour and design.
- If you need a product to exceed energy-efficiency, you can opt for aluminium windows.
- The heat-trapping potential is very high in multi-chambered profiles. The heat will not escape, and the energy efficiency can be enhanced in the best possible way.
- Users can take advantage of clean window profile and exceptional lifespan. The lifespan of the windows will be 30 years and above. It is far better than UPVC material.
- You can choose the reputed company so that it is possible to settle for the best option without any issues. The lifespan of the product is very high and it is possible to make the most of your investment.
- Before placing an order for aluminium windows, you should go through the reviews presented by experts. As you go through the reviews, you will be able to understand the pros and cons of the product and it is possible to settle for the best product without any issues.

5.1.6 Door Installation

The elements should be placed in the door cavity and wedged up underneath the sideframes and mullions, if any. The sill should be horizontal and level. It must not under any circumstances curve upwards or downwards.

Adjust the hinge side so it is in plumb on both the wide and the narrow side. The hinge side is then secured with suitable frame bolts with permanent support.

Smart Tip

On doors, the fixings in the hinge side must be placed in the rebate as close to the hinges as possible, as the entire weight of the door is centred here. We recommend this solution if possible – if not, securing with suitable ironmongery will be necessary

During installation, the gap, i.e. the space between the frame and sash, should be adapted to the function of the element. The closing side must be adjusted so that it fits the frame and provides full closure.

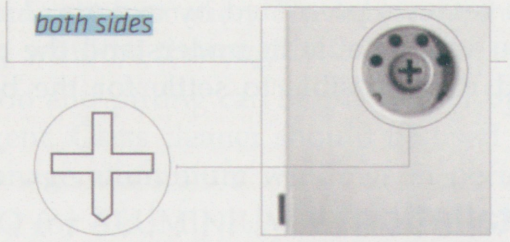
When installing double doors it is important that the doors close fully in the centre joint and that the two door plates are flush. The frame head must not curve downwards!

When the frame has been adjusted, secure the rest of the elements with suitable frame bolts with permanent support.

Beware!

Cylinder | catch installation!

Be aware that when installing the cylinder in the door, the arrow is facing downwards on both sides



Sideframes and head and sill on double doors must be parallel and must not curve inwards, as this will make operation difficult.

When the installation is complete, remove the dust from the frame and ironmongery. Lubricate all closing points and joints for smooth and permanent function. We recommend brushing the weatherstrips with a silicone stick.

5.1.7 Sealing | Sealant Types

The sealing work (caulking sealants) must be carried out in accordance with current standards.

When stuffing the insulation material into the gaps make sure not to add too much as this will cause the frame parts to curve.

If any foaming insulation material is used, the frame must be reinforced or in some other way secured until the foaming process is finished completely

Always finish off with a protective cover on the outside such as mastic, sealant tape or similar material.

DID YOU KNOW?

Fixing should be with permanent support, and an additional permanent support should be placed behind the striking plate in order to prevent burglaries. Always install extra permanent supports below hardwood and aluminium sills.

5.1.8 Sealant Type

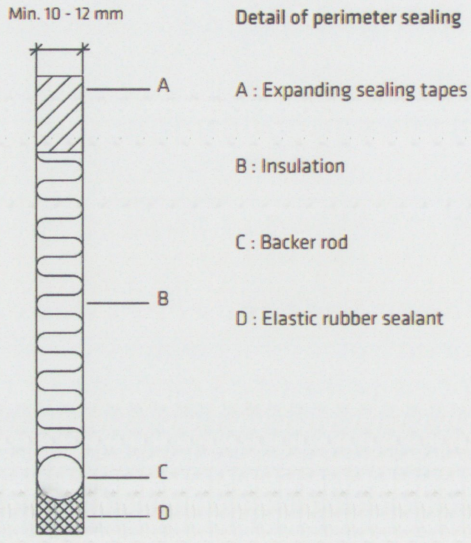
There are a wide range of sealing products tochoose from for use between frames and outer walls.

The two most common types are:

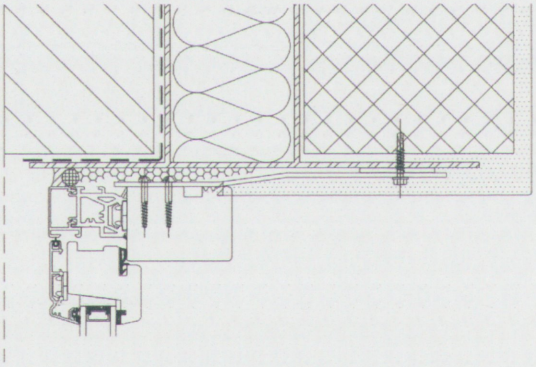
- Plastic or elastic mastic
- Asphalt saturated plastic foam (Illmod sealing tape)

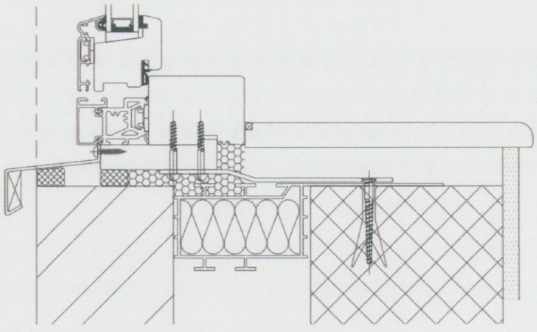
In order to preserve the wood and keep heating consumption low it is important that the sealing work stays intact.

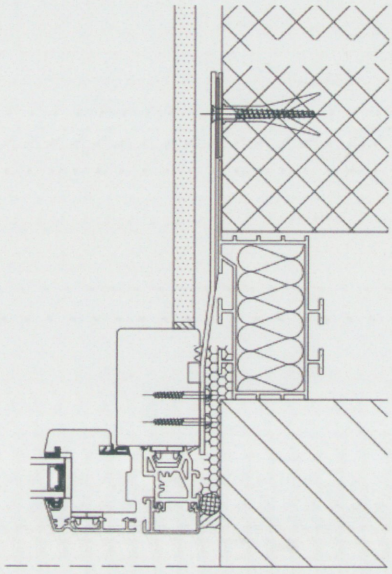
The sealing work should therefore be inspected at least once a year, and any leaks should be remedied using the same type of material as the existing one. In case of any major leaks, all the sealing material must be replaced. In such cases it must be assessed whether a different type of sealant would be more suitable than the existing one.



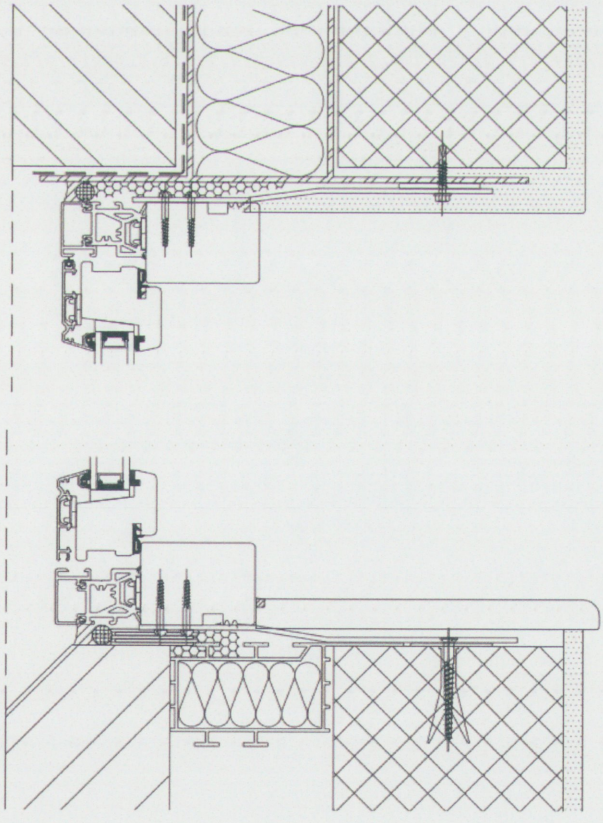
5.1.9 Installation Details

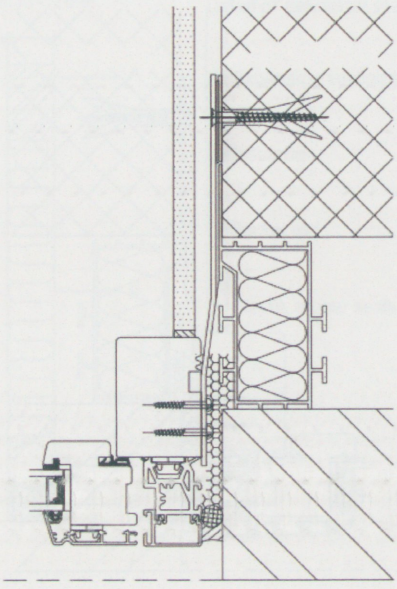




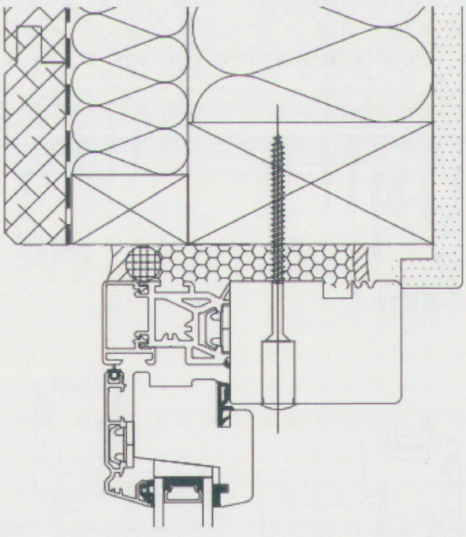


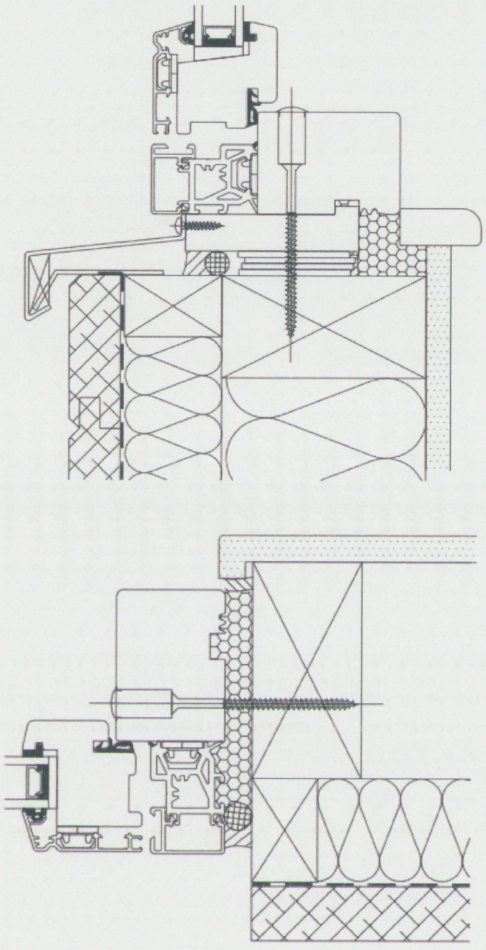
Frame Brickwork interface detail, Typical 340mm cavity wall



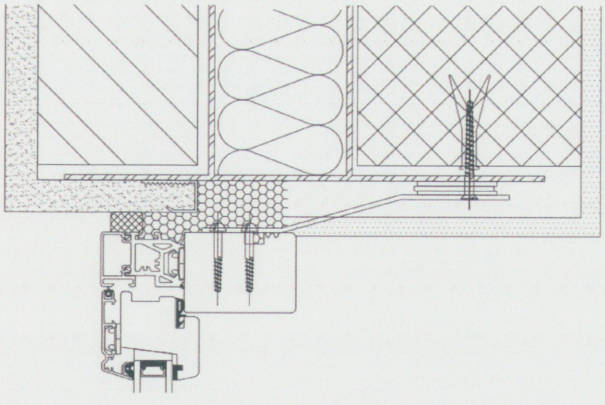


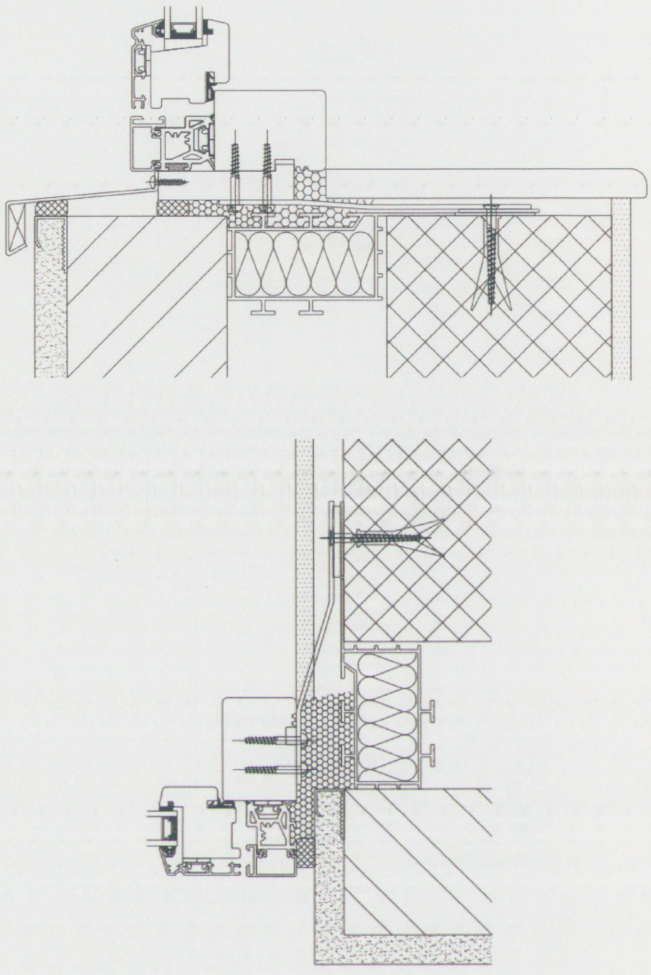
Typical 340mm cavity wall with cant brick



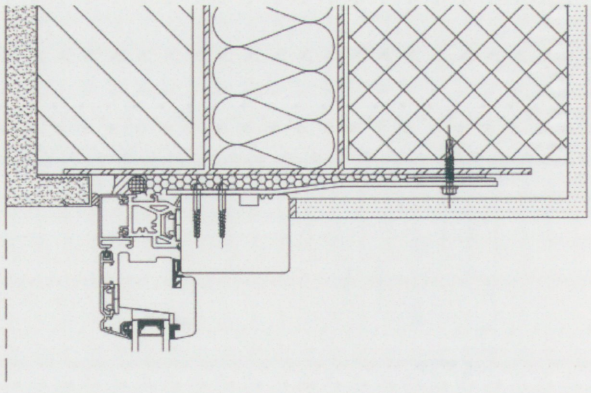


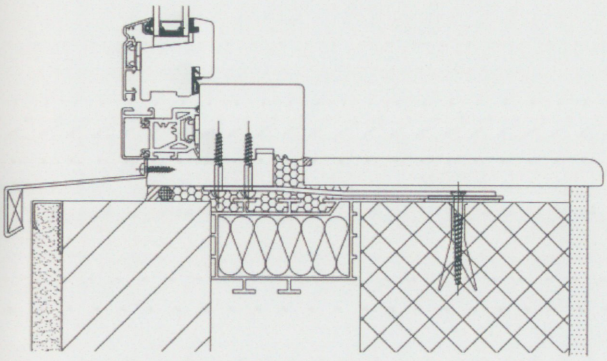
Frame Brickwork interface detail, with internal steel stud framing

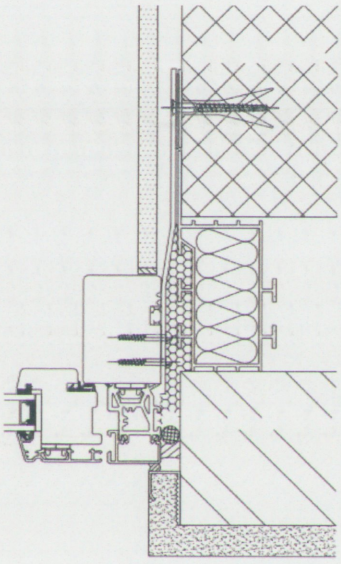




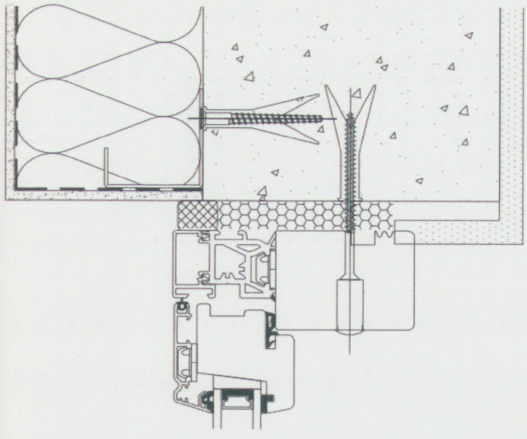
Frame render interface detail, typical 340mm cavity wall

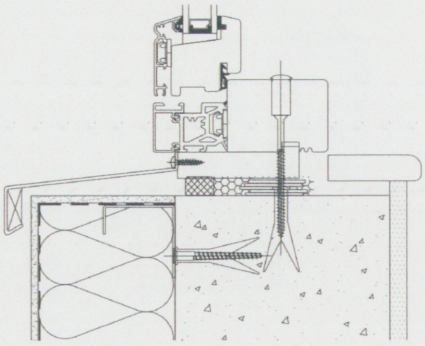


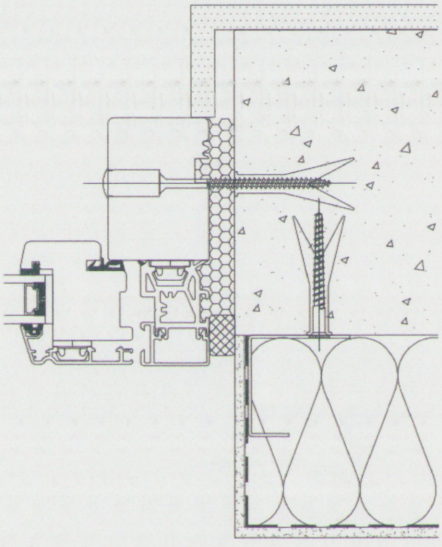




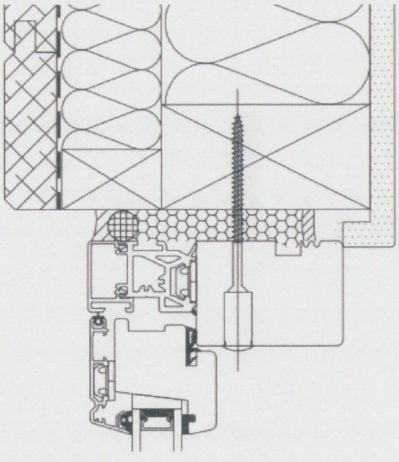
Frame Render interface detail, typical 340mm cavity wall

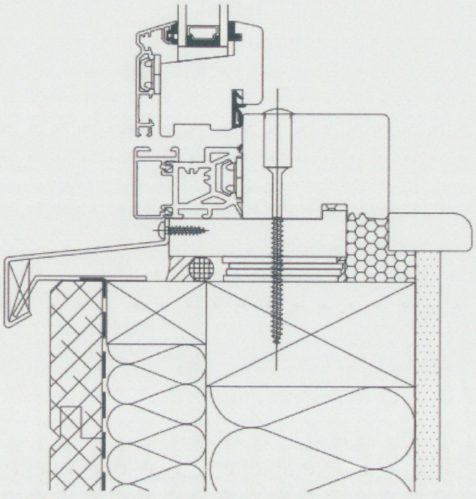


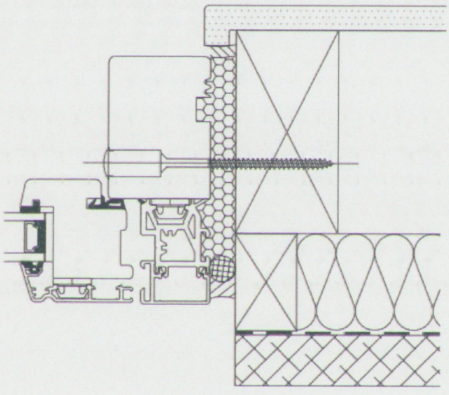




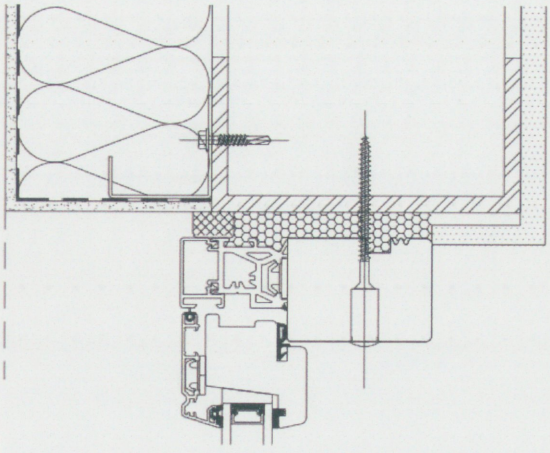
Frame Render interface detail, typical 250mm insulated render

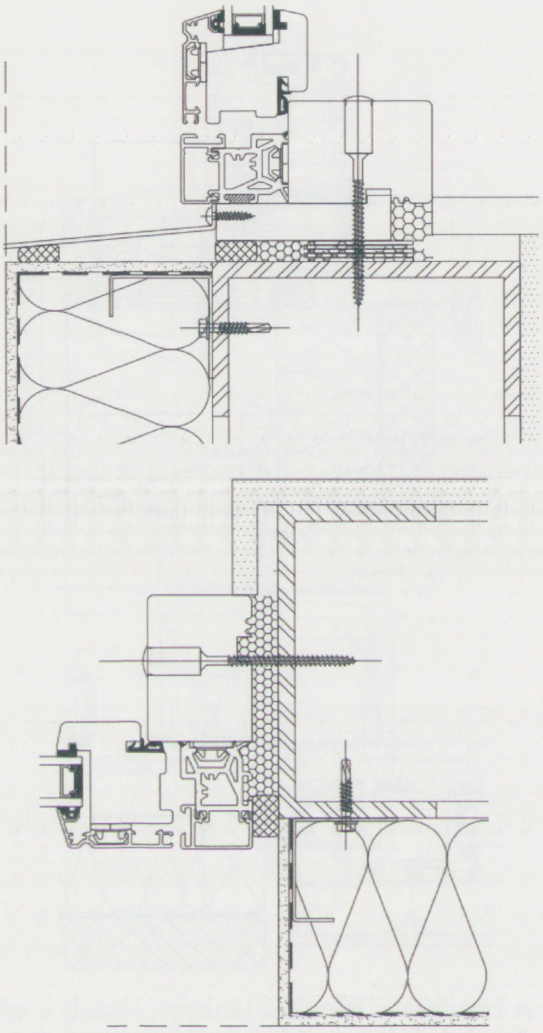




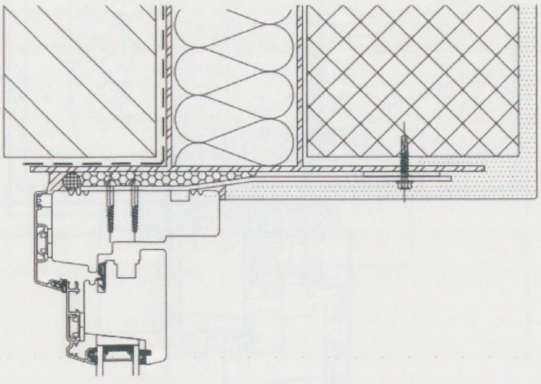


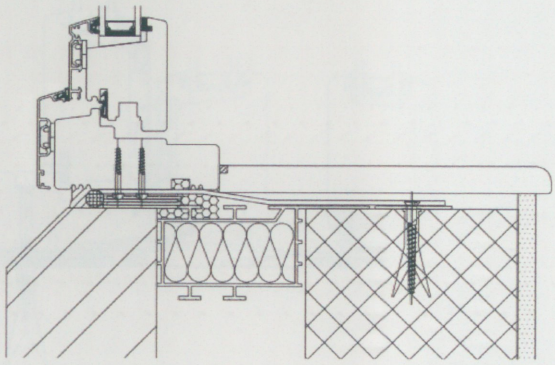
Frame timber interface detail, timber stud wall with timber cladding

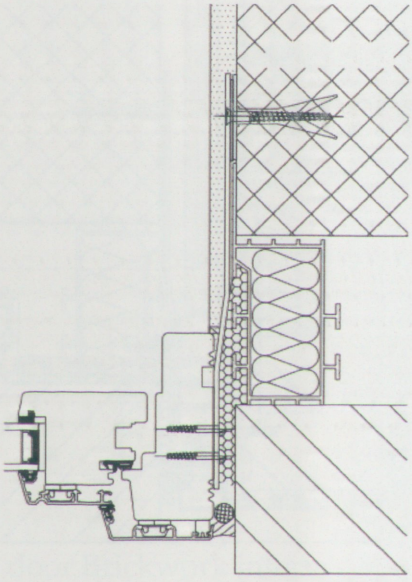




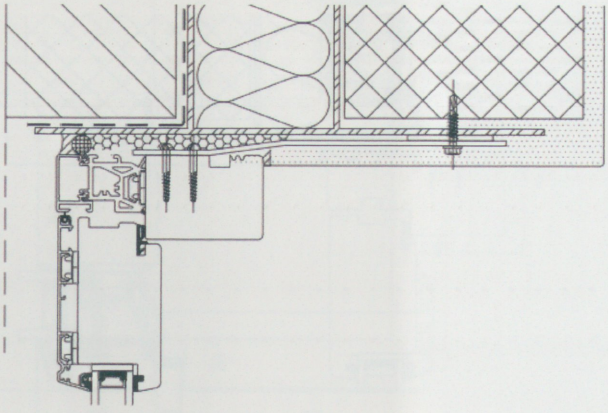
Frame Steel frame interface detail, Steel frame with insulated render

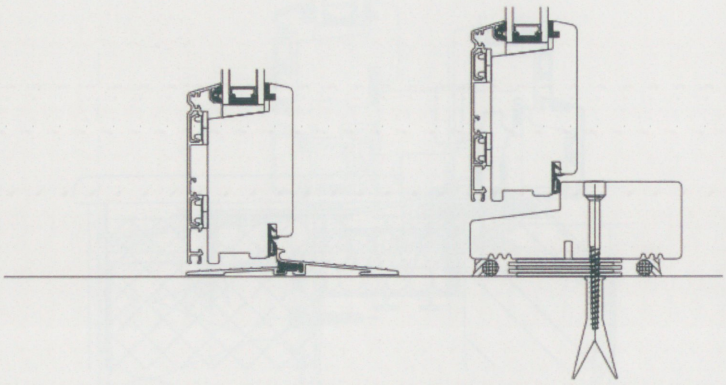


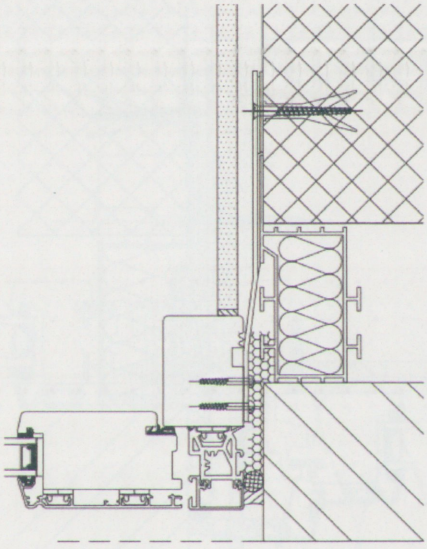




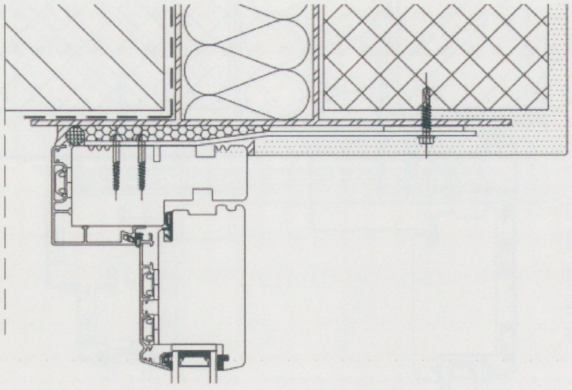
Frame Tilt and Turn Brickwork interface detail, typical 340mm cavity wall

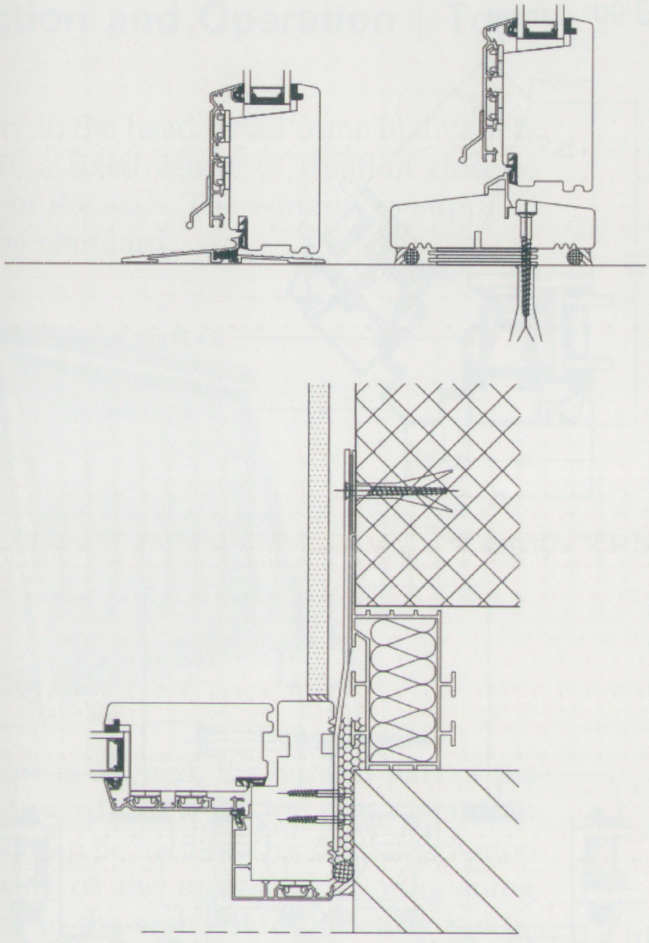




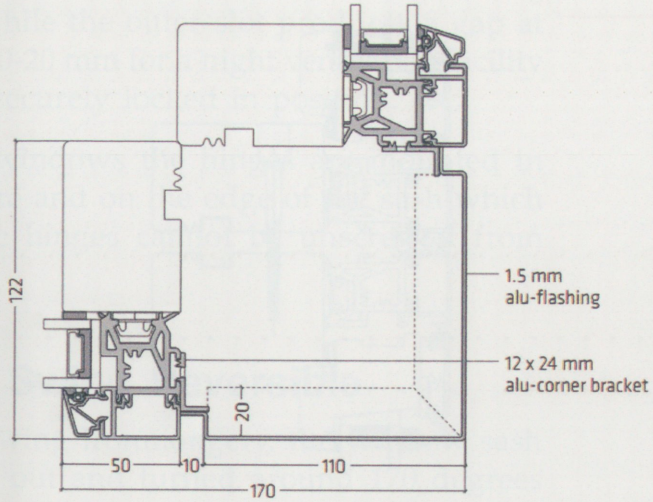


Frame Outwards Opening Door Brickwork interface detail, typical 340mm cavity wall

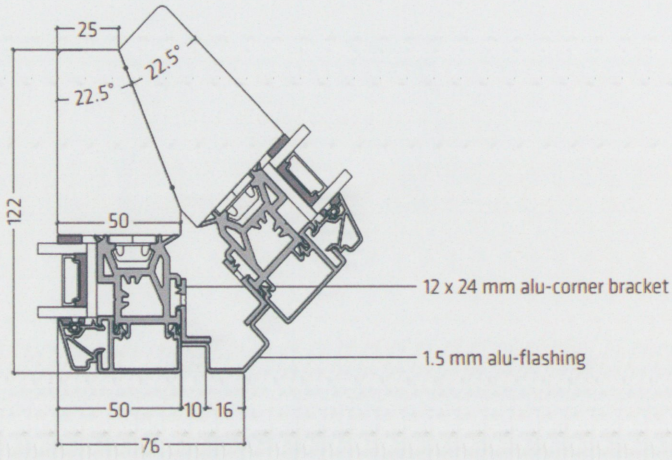




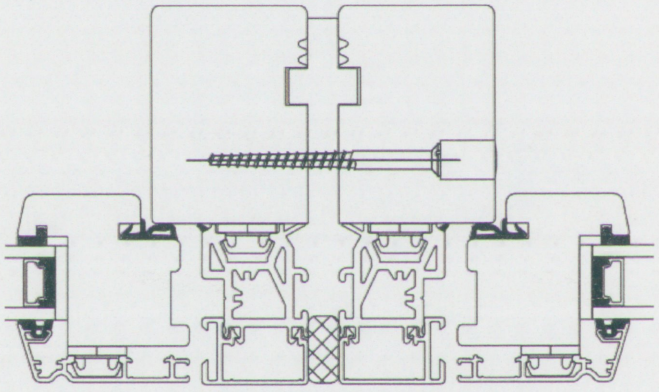
Frame Inwards opening door Brickwork interface detail, typical 340mm cavity wall



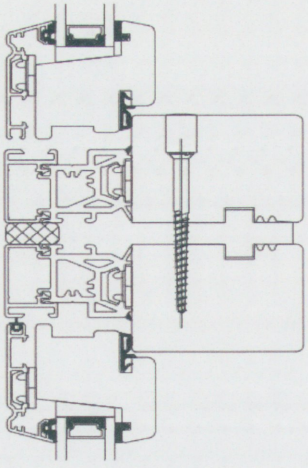
Frame Standard 90° corner



Frame Standard 45° corner



Frame Standard coupling mullion



Frame Standard coupling transom

5.1.10 Function and Operation | Top guided

The ironmongery to the head detail come in a variety of types all with a fixed centre of rotation close to the upper edge of the sash. The window is supplied with a handle as standard.



When the window is opened, the bottom part of the sash is pushed forward, while the top part remains in position. The sash can be held in a random ventilation position by means of the built-in friction/opening restriction device in the sash's sides. Friction can be tightened or loosened by adjusting the friction bolt in the ironmongery on the side of the sash.

The receiver has two slots, the inner slot is for closing the window, while the outer slot produces a gap at the bottom of 10-20 mm for a night ventilation facility which can be securely locked in position.

On top hung windows the hinges are mounted in the frame rebate and on the edge of the sash which means that the hinges cannot be unscrewed from the outside.



Smart Tip

The friction brake does not secure the sash's position during strong winds or draughts.

5.1.11 Top Swing Reversible

With the top swing ironmongery, the window sash can be pushed out and turned around 170 degrees outside the frame. The ironmongery is always placed

in the middle and the sash can therefore be turned around within the outer dimensions of the frame. The outside of the glass can then be cleaned from the inside. The sash is operated by a handle at the centre of the bottom sash which activates an espagnolette that engages with the receiver in the frame when the sash is closed.

The receiver has two slots, the inner slot is for closing the window, while the outer slot produces a gap at the bottom of 10-20 mm for a night ventilation facility which can be securely locked in position.

The top-swing window is equipped with an integrated child-proof lock which blocks the sash when it is opened approx. 100 mm. Further opening of the window is done by deactivating the child-proof lock and the sash can now be turned 170° outside the façade of the house, so the outside of the glass can be cleaned from the inside.

Beware!

Child-proof lock

The child-proof lock is placed in the righthandside when viewed from the inside. It is activated by lifting the safety arm off the stop while pulling the sash slightly inwards. The sash can now be opened while the safety arm is kept clear of the stop.



Press here to activate the lock !

The sash can also be opened to a random angle and secured by the built-in friction in the ironmongery. Note that the position of the sash cannot be secured during strong winds or draughts.

When the sash is turned around for cleaning, the child-proof lock acts as a cleaning safety lock so that the sash cannot accidentally turn around during cleaning.

Windows that are lower than 606 mm are not equipped with child-proof lock/ventilation position.

5.1.12 Side Hung

The sash is equipped with 2-3 pin hinges depending on its size.



Operation with espagnolette

Our side hung window is supplied with espagnolette and friction brake. The window is operated with a single handle in the closing side of the sash.

The friction brake in the sash's upper side makes it possible to secure the sash in a random ventilation position from an opening of approx. 100 mm to an almost fully opened position.

The receiver has two slots, the inner slot is for closing the window, while the outer slot produces a gap at the bottom of 10-20 mm for a night ventilation facility which can be securely locked in position.

5.1.13 Side Guided

This window allows cleaning from the inside. The hinges are hidden in the rebate.

With side guided easy clean hinges, the sash can be opened up to 108° producing a gap of 150-200 mm at the back edge of the sash – just enough to reach out and clean the outside of the glass.

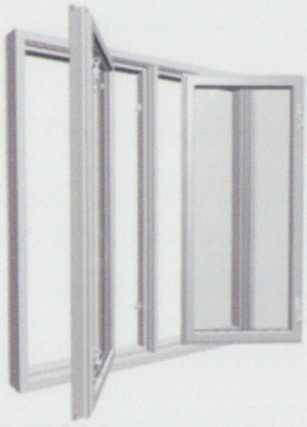
The sash is operated by means of a handle at the centre of the side sash. For operation with handle, the sash can be secured in a ventilation position by opening the sash 10- 20 mm and pushing the handle downwards. For other opening angles, the sash is controlled by the friction in the ironmongery.

Smart Tip

Never open a side hung window for the purpose of airing the room unless it is secured by either a window stay or a safety catch. In case of strong winds or draughts, you cannot count on the ironmongery friction stays to keep the sash in a ventilation or open position.

5.1.14 Side Swing Reversible

This window allows cleaning from the inside. The hinges are hidden in the rebate.



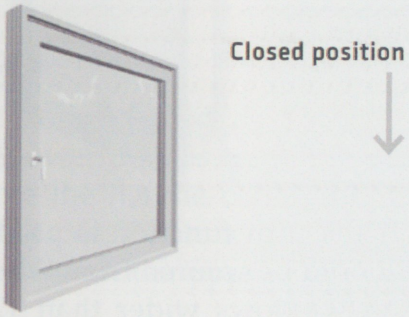
With side swing easy clean hinges, the sash can be turned around. This function was only designed for window cleaning and should not normally be used for ventilation and airing. The sash is operated by means of a handle at the centre of the side sash. For operation with handle, the sash can be secured in a ventilation position by opening the sash 10- 20 mm and pushing the handle downwards.

5.1.15 Tilt| Turn Window

The tilt | turn window is an inward opening window with both a side and bottom hung function. The side hung function is primarily used in connection with cleaning of the outside glass while the bottom hung function (tilt) is used for the daily ventilation and airing. Depending on its size, the window may have closing points all the way around, but it is operated with only one handle located in the side sash.

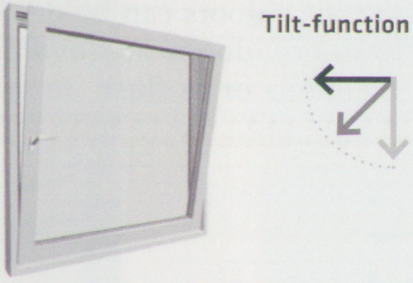
Closed position

When in a closed position, the handle must face downward.



Tilt - function (bottom-hung)

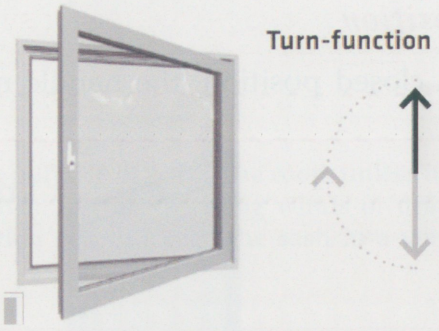
Turn the handle from its downward closed position to a horizontal position, then tilt the sash inwards. This provides a 100 mm opening.



The sash is pushed into place in the frame before activating the handle and shifting between the individual functions.

Turn | function (Side hung)

Turn the handle to the vertical position and the sash can be opened in a side hung position. If the ironmongery is operated incorrectly, turn the handle to a horizontal position, push the sash into the frame rebate and turn the handle to a vertical position. Then close the window again by turning the handle to a locked position. The **ironmongery** is now back in its original position. If the side hung function is used for ventilation, the sash should be secured against the wind.



KEY FACT

Ironmongery is perfect for creating reliable and secure door handles which makes it ideal for both domestic and industrial use.

If the turn function is used for ventilation the sash should be secured from wind gust. The turn function on windows wider than 1200 mm should be used for cleaning puposes only and not as ventilation. On windows of this size only the tilt function should be used for ventilation.

5.1.16 Entrance Doors | Stable Doors

Entrance doors can be outward or inward opening. Entrance doors are available with glazings and spandrels or as flush doors.



Idealcombi's entrance doors are supplied with espagnolette lock and three closing points in the handle side. When the handle is pulled down, all three closing points are disengaged and the door can be opened. The bottom and top closing point is activated by lifting the handle upwards. The door can

then be locked. A three point closing system makes the door close tighter and this type of door locking system provides a better protection against burglary

5.1.17 Stable Doors

The two door halves can be opened as one door when the handle on the lower door is turned to the opening position – before the handle on the upper door is operated. It is only possible to lock the door with a key when the handle on the upper door has been turned upward.



The door can be supplied with one-point closure.

The stable door can also be supplied as a terrace stable door without a key lock system. Operation: Please see under "terrace door".

5.1.18 Terrace Doors

Terrace doors can be inward or outward opening doors, made as sash doors with **glazing** and panels.

A Frame or Nation terrace door from Idealcombi comes with built-in three-point espagnolette lock in the handle side which is activated by turning the inside handle 90°.

Doors with friction brake can be locked in any

KEY FACT

Glazing is also less commonly used to describe the insertion of ophthalmic lenses into an eyeglass frame.

random ventilation position from approx. 5 cm to wide open by turning the handle to its closed position. The friction stay cannot be expected to secure the door during strong winds or draughts.



2-leaved Terrace Doors

2-leaved terrace doors only have one handle on the door that opens first. The other leaf is secured by two flush bolts, one at the top and one at the bottom, which are located in the rebate.



5.1.19 Tilt | Turn and Tilt | Slide Doors

In principle, the function and operation of a tilt | turn terrace or balcony door is the same as that of a tilt | turn window



Tilt | slide doors

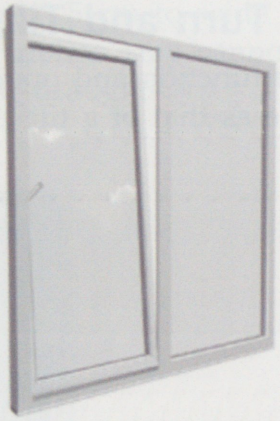
The general function of a tilt | slide door is the same as that of a tilt | turn door. But the function of a slide-tilt door begins with the door sash being freed and tilted from the frame. Then the frame is pushed forward at the bottom pushed past the fixed part of the unit. When closing and locking the door, make sure the handle is completely back in its locked position.

The handle in upright position

When the handle is in upright position the door is closed.

The handle in a 45 degree angle position

When the handle is turned to an angle position of 45 degrees the top part of the door is automatically released from the top frame. The door is now in tilt position.



The handle in a 90 degree angle position

Turn the handle further on to an angle position of 90 degrees and the bottom part of the door is released from the frame. Pull the door from the frame and slide it sideways.

Closing the door

When closing the door, tilt or slide the door into place in the frame and turn the handle respectively 45 or 90 degrees toward upright postition. The ironmongery in the door automatically grips both top and bottom and closes the door

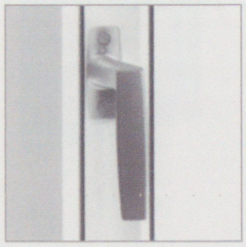
Smart Tip

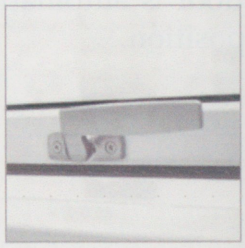
A pressure with the palm of the hand on the sash opposite the handle will help secure that the sash falls correctly into place and closes tight

5.1.20 Accessories

Non-locking handle

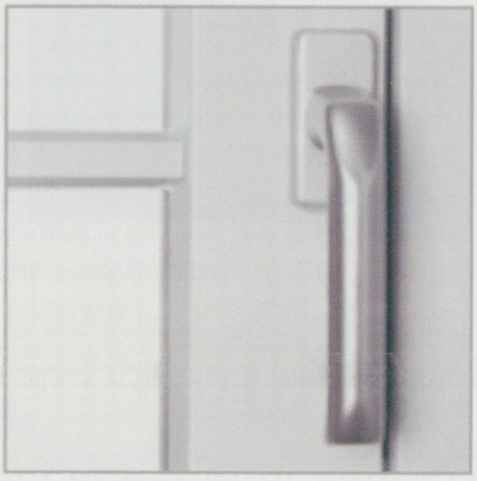
Non-locking handle that, when turned, drives hook bolts into the adjustable keeps in the frame.





Tilt|turn handle

Handle with inward opening tilt function combined with a side hung function.



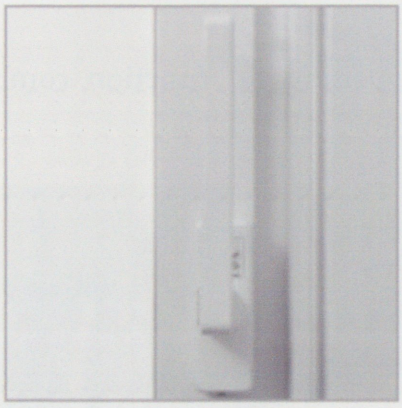
Handle operated brake

Brake that is activated by turning the handle into closed position when the window is open.



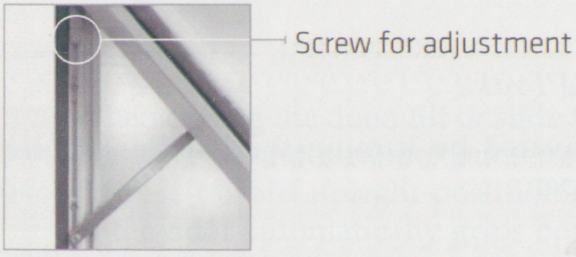
Slide|tilt handle

Handle with inward opening tilt function combined with a sliding function



Friction

Ironmongery with friction, without brake, that keeps the sash in an arbitrary position.



5.1.21 Adjustment of Windows and Doors

Windows

Top swing reversible | side guided |side hung

There is no actual adjustment device on top swing reversible windows. Therefore, they must be installed very carefully to ensure a suitable clearance for the ironmongery in the hinge sliders and guides.

Top guided | Top hung

On top guided windows and top **hung windows**, friction can be adjusted by adjusting the bolt in the hinge slider on the hinge. To ensure optimum functionality, it is important that friction is adjusted equally on both sides.

Side hung

The hinges can be adjusted using a hinge adjustment tool if the sash sags a little.

Doors

There are no actual adjustment devices on doors. However, it is possible to adjust the hinges with a hinge adjustment tool in order to regulate the space between the frame and sash if the door sags upon installation. The door can also be adjusted so it presses harder on the weatherstrip in the closing side by adjusting the tongue of the striking plate with a screwdriver.

KEY FACT

Hung windows is the bottom window panel or lower sash moves up and down, and the upper sash remains stationary. This means that when you open the window, the upper sash is covered on the inside.

Tilt | turn sashes

Idealcombi delivers the element with the fitting in neutral position, but it may be necessary to precision-adjust the element after mounting. The fitting has been designed to allow adjustment of the sash in every direction. The bottom hinge is 3-way adjustable, i.e. the height, width and weather strip pressure can be adjusted.

Width and weather strip pressure are adjustable using the top gear on the top of the sash. By using the bottom hinge and top gear width adjustments, the sash can be raised/lowered diagonally. Furthermore, the weather strip pressure can be adjusted by turning the closing rollers next to each strike plate. The fitting is adjusted using a 4 mm Allen key and a Torx bit 15.

Separation of frame and sash (tilt|turn)

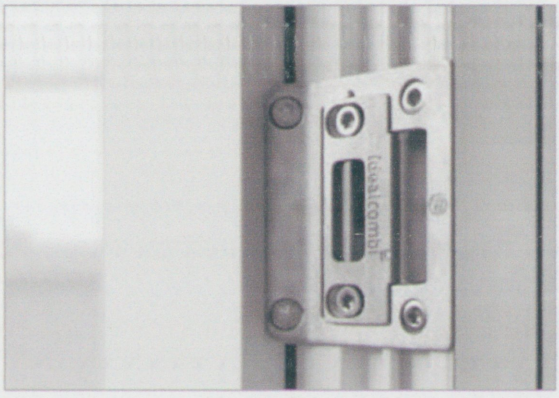
Open the sash in side-hung position to approx. 60°, lift the dowel on the top gear slightly, turn it 90° counter-clockwise and lift it out of the sash fitting.

Then release the maloperation lock by pushing the small fitting on the sash edge next to the handle, and move the handle upwards into tilt position. Now tilt the top gear free and push the small button at the end of the red connecting rod to lift the top gear free.

Then lift the sash out of the bottom hinge and remove it from the frame

Adjustable Keeps

The adjustable keeps are mounted in a standard position from the factory. The first time the keep is adjusted break off the littel tap at the end of the adjustable plate and adjust the plate a little bit more to the side than necessary at the following adjustments. For general adjustment loosen the two screws in the adjustable plate and displace the plate forward or backward depending on whether the sill is too tight or too loose. The keeps are adjusted with bits torx 20.



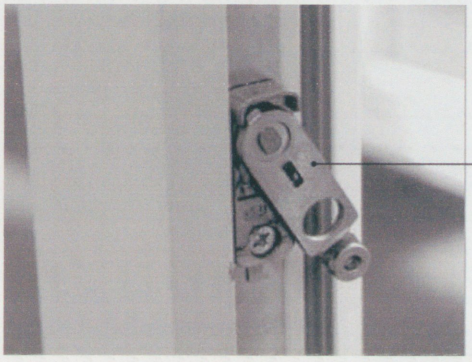
Adjustable keep



Hook bolts

5.1.22 Adjustment Instruction

Sill | bottom sash Tilt | turn



Faulty operation

Fail-safe catch|sash |

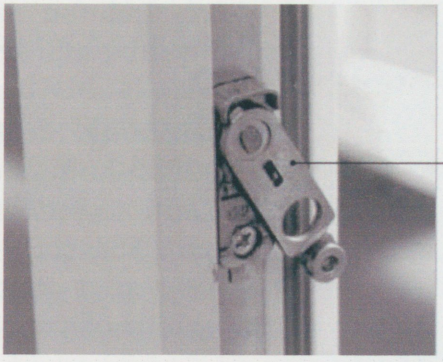
Side sash



Side sash

Adjustment screw | out and in

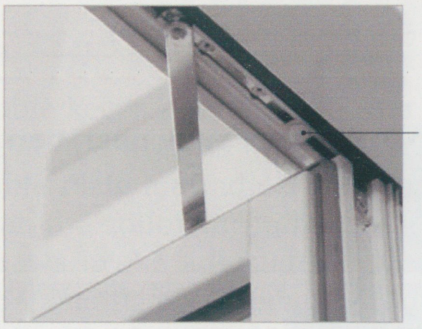
Faulty operation



Faulty operation

Fail-safe catch|sash |

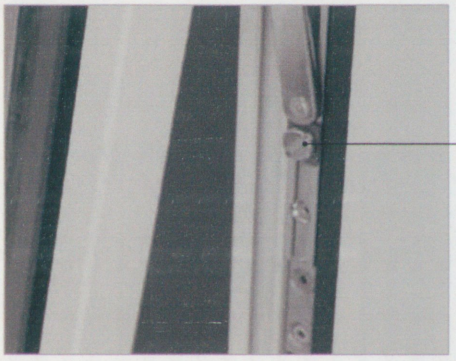
Side guided| friction



Side guided|friction

Screw for adjustment of friction brake

Top guided | friction



Top guided|friction

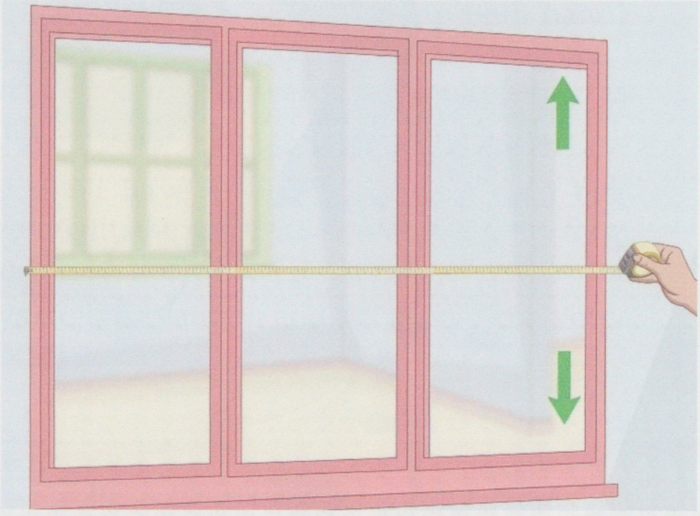
Screw for adjustment of friction brake

5.2 MAKE A WINDOW SCREEN

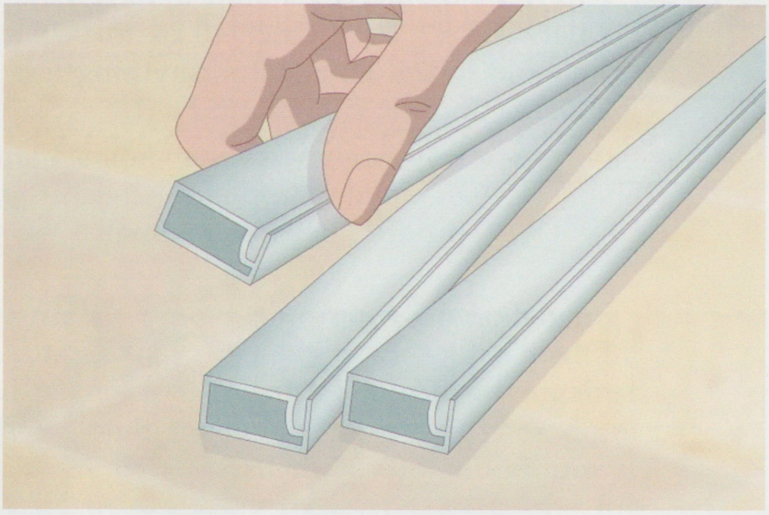
Window screens are indispensable in the summer for letting fresh air in your home while still keeping those nasty bugs out. Whether your window screen is broken or you don't have one at all, making one is not a big investment—all you need are a few materials and some tools!

5.2.1 Creating Your Screen Frame

Calculate the opening of the window you are screening. Measure the height and width of your open window frame. Most aluminum and vinyl frames have a channel for the screen to fit into, so be sure to measure all the way to the insides of this channel. Subtract $\frac{1}{4}$ inch (0.64 cm)—as well as an additional an additional 1.5 inches (3.8 cm) for corner connections—from each dimension to determine the height and width of your new frame.

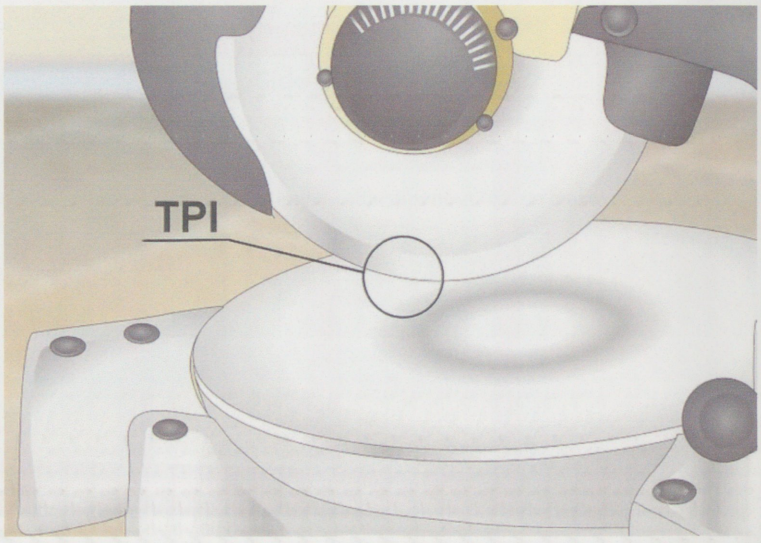


- Older windows with wooden frames may be trickier, and the corners won't always be square. If possible, use the original screen to obtain dimensions for your new one. Otherwise, use your best judgement.



Buy aluminum window frame stock pieces. Home hardware stores sell window screen kits with precut pieces of aluminum as well as individual pieces. Most individual pieces are available in 72 inch (180 cm) and 94 inch (240 cm) lengths. Standard aluminum frame pieces are $^{2}/_{8}$ inch (0.64 cm) in width and $^{25}/_{32}$ inch (2.0 cm) thick, which will work for most windows. Focus on purchasing enough aluminum for your frame›s dimensions.

- Take note of the spline groove on the screen frame—the width should be marked on the packaging. When you purchase your spline, it needs to match the width of the spline groove.

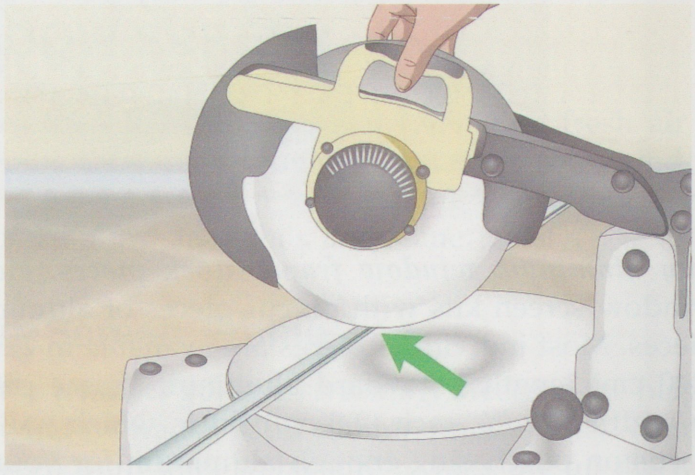


KEY FACT

Thickness is the measurement of how thick something is; a layer of something.

Purchase a hacksaw with the appropriate teeth per inch (TPI). Measure the width of your aluminum pieces. If their **thickness** is between $\frac{1}{8}$ to $\frac{1}{2}$ inch (0.32 to 1.27 cm), the TPI should 14 to 18 TPI. For thickness between $\frac{3}{32}$ to $\frac{5}{16}$ inch (0.24 to 0.79 cm), the TPI should be 24. Finally, for anything less than $\frac{1}{8}$ inch (0.32 cm), the TPI should be 31.

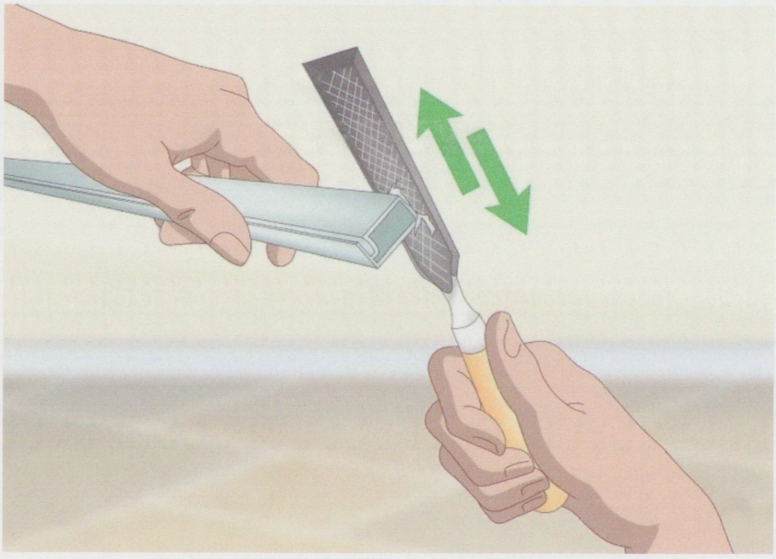
- Buy hacksaws from home hardware stores or online suppliers. Check the TPI on the product label or manual.



Saw the aluminum frame pieces to length with a hacksaw. Mark the cutlines on each bar using a permanent marker. Attach your aluminum pieces

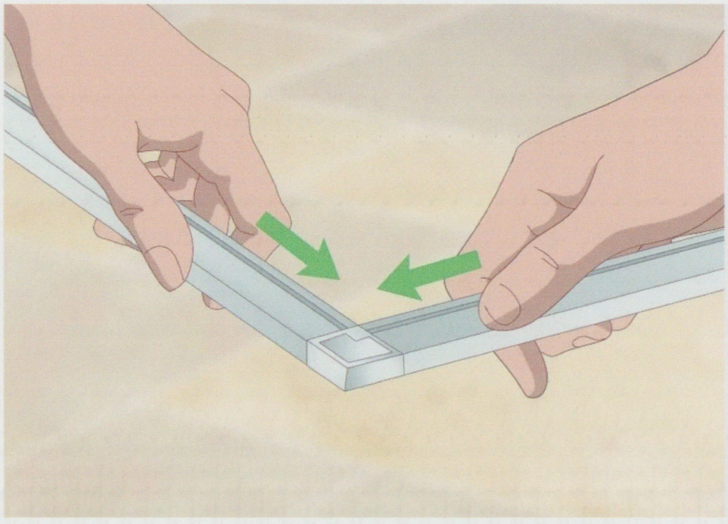
into a vice grip for maximum stability. Grip both handles of the hack saw and make big, long strokes away from you along the cutline. Make sure the blade teeth are pointing forward and you're using as much of the blade as possible with each stroke.

- If you don't have a vice grip, place each bar onto a clean, flat surface. With the edge to be cut hanging from the surface, have a friend hold the other end firmly as you carefully saw the bar.
- Always exercise caution and cut away from you and anyone helping you.



Use a metal file to remove any rough edges. Sawing aluminum can leave some rough cuts. Obtain a second-cut file with a medium degree of coarseness and rasp-cut teeth. Hold the aluminum firmly against a clean, flat surface with your non-dominant hand. Now, use your dominant hand to apply pressure from the file toward the rough aluminum surface and move the file in forward strokes away from you. Once the file reaches the end of the aluminum, lift it up and bring it back toward you.

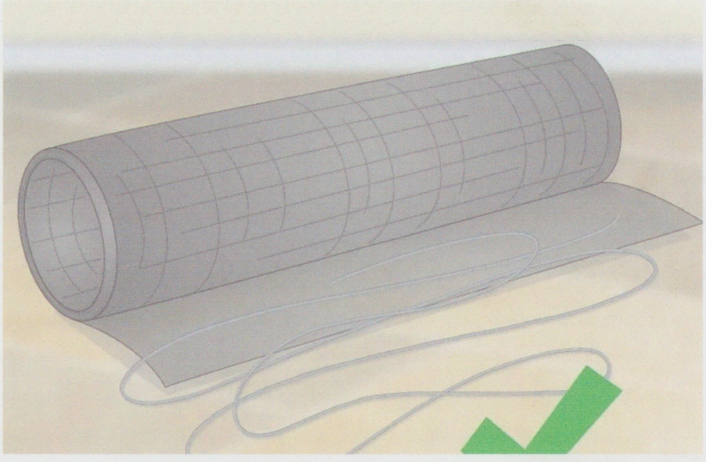
- Never file in back and forth motions.
- Whenever possible, secure your aluminum in a vice grip to keep it stable.



Connect the upper and lower window corners with 4 corner inserts. Push the frame pieces into the openings of the «L-shaped» plastic or aluminum frame corner inserts. Make sure that the spine tracks in the corners align with the tracks on the frame pieces.

- Make sure your corner inserts are 1.5 inches (3.8 cm) long. Purchase them from home hardware stores separately or in window screen packages.

5.2.2 Cutting the Screen



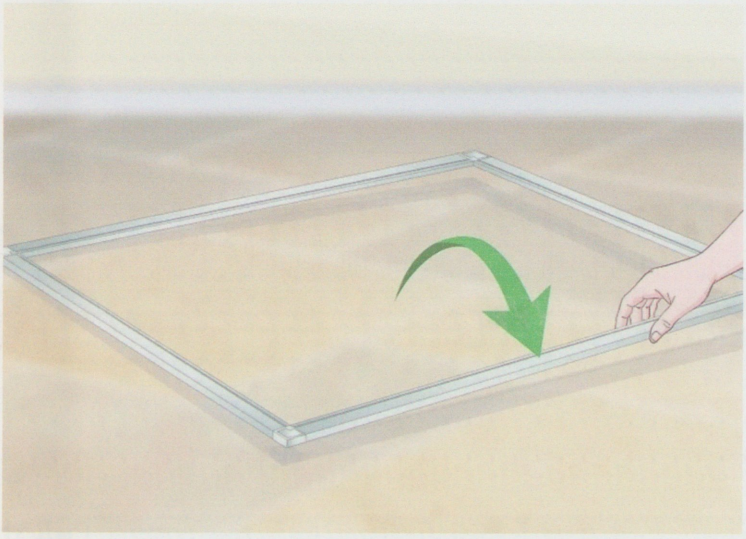
Purchase screen spline with charcoal fiberglass for the best results. Spline can be purchased from home hardware stores separately or in window screen packages. Window screen packages will provide you with the appropriate spline for the provided aluminum pieces. But if you purchase your **spline**

separately, make sure its width matches the width of your frame's spline groove.

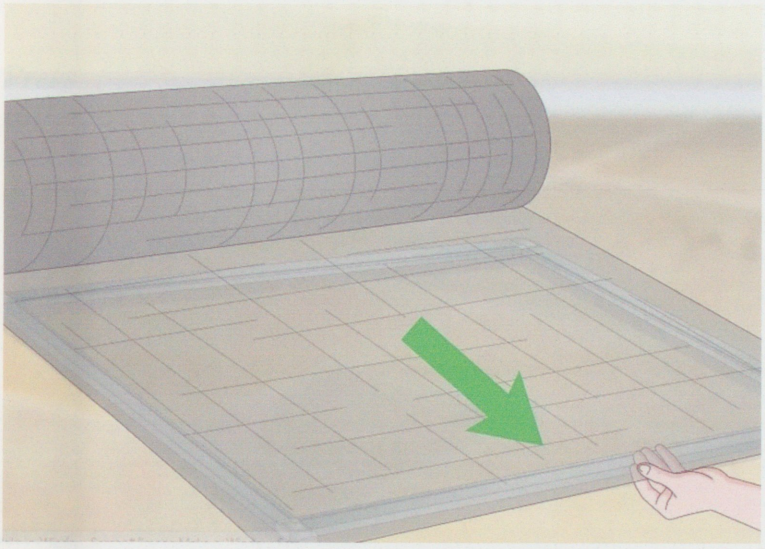
- Compare the width listed on the spline packaging to the width of the spline groove listed on its packaging.

KEY FACT

Spline is a special function defined piecewise by polynomials.

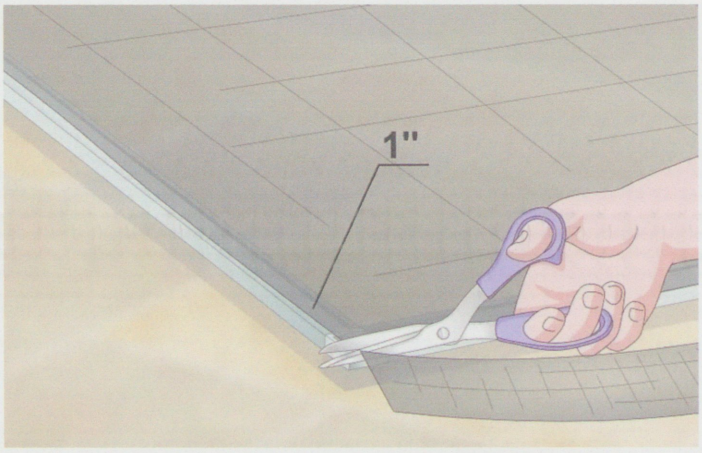


Place your aluminum framing onto a flat surface and hold it steady. The aluminum framing is soft metal and very flexible. It can easily be warped and ripped from the screening—hold it firmly against a flat surface and make sure all of the edges are parallel.



Lay the screening material straight onto the frame. While holding the frame firmly against a flat surface, lay your screening down over it. The screening should be 1 to 3 inches (2.5 to 7.6 cm) more than the aluminum framing on all four sides.

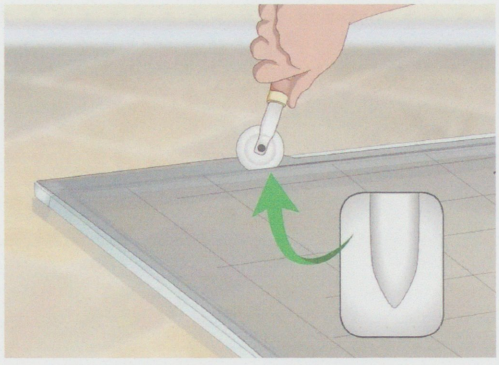
- Have a friend hold the frame steady as you pull the screening over the surface for better results.



Cut the screening material 1 inch (2.5 cm) bigger than the frame. Pull the screening tight, first in the length and then in the width. Take care not get a warp in the frame or waves in the screening material. Now, use a standard pair of scissors to cut the screening approximately 1 inch (2.5 cm) larger than the frame.

- Don't worry about cutting completely straight—giving yourself enough extra screening material is more important.

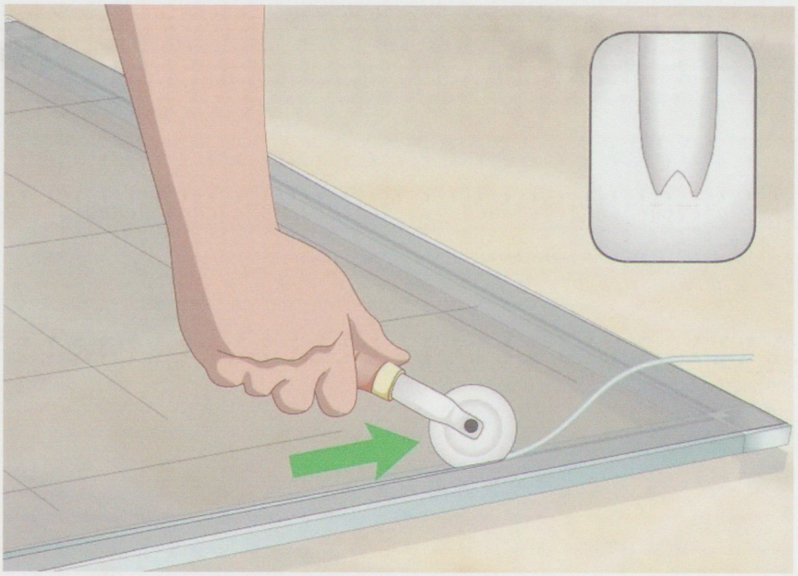
5.2.3 Attaching Your Screen to the Frame



Press the wire screening material into the frame channel with a spline roller. Feed the spline through the spline roller starting from the back

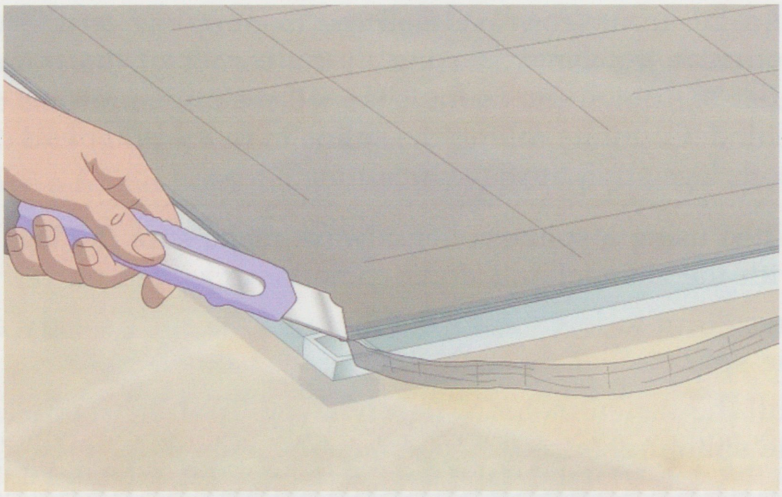
(concave) to the front (convex). Roll the front spline all the way around the front circular leg. Now, starting in the corner of the frame, push the front circular leg down the frame channel, making sure that the back leg follows behind. Continue rolling the spline in to the other end of the frame, keeping both legs straight the whole time.

- When using a spline roller, always make sure the legs are aligned with the channel and don't come loose as you move.
- Press firmly down onto the mount to keep it steady as you drag the spline roller through the frame channel.
- Pull the screen material tightly away from the frame as you move the spline roller.



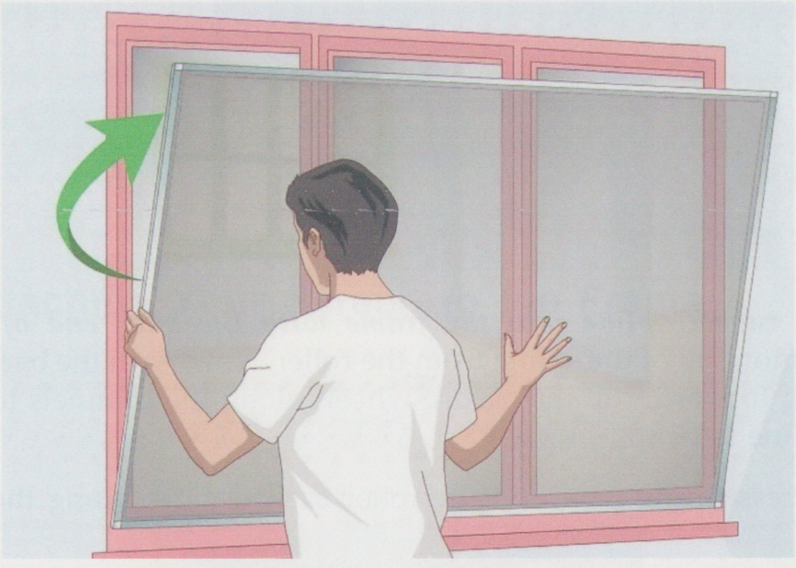
Press the rubber spline into the frame with the back end of the spline roller. Remove all of the spline from the roller. Now, with the back (concave) end facing forward, roll the mouse wheels along the channels to ensure all of the spline is firmly in place.

- Press firmly down on the roller as you move along the channels.



Cut the unnecessary screening carefully off with a utility knife. Pull on the excess spline away from the frame. Place the utility knife at a 45-degree angle and pull it along the frame outline right above the spline. Continue this for all 4 sides, taking care to make even cuts.

- Apply a firm amount of pressure down on the knife when making your cuts.



Turn the window screen with the spline facing inside your home. Before mounting your window screen, position the spline inside your home. In addition, make sure any spring clips face upward to fit into the top window slot.

- Be sure the spline is firmly connected to the aluminum frame before installing it in your window opening.

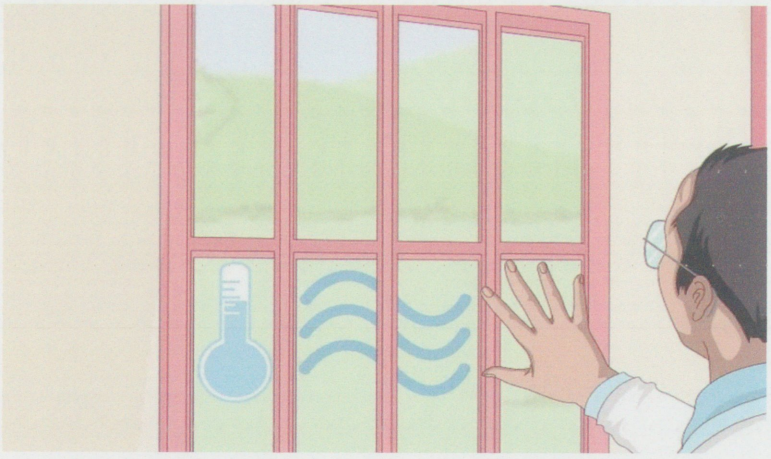
Smart Tip

If the frame is intact but the spline has come loose, you may be able to just roll the spline back into place rather than make an entirely new window screen.

5.3 WRAP WINDOWS WITH ALUMINUM

Heating or cooling your home is usually quite expensive. As you try to keep your home at the right temperature, drafty windows can cost you a fortune over time. One way to increase the efficiency of your windows throughout the year is to attach aluminum foil insulation to them. The installation process is pretty straightforward with the foil being taped directly to the window frame after you've made the measurements and cuts. If you are really looking for a quick fix, you can even insert a foil-wrapped piece of cardboard into a window frame to block the air flow.

5.3.1 Measuring Out Your Aluminum

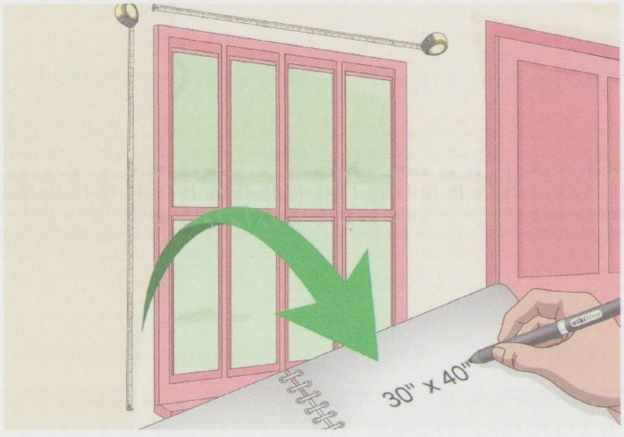


Check your windows for drafts. If you are concerned about conserving heat, go around to each window and place your hand in front of it. Check to see if your hand feels a cold draft coming from outside. This means that the window is leaching out some of your house's heat.

- To test for drafts in the summer, go outside to a window. Place

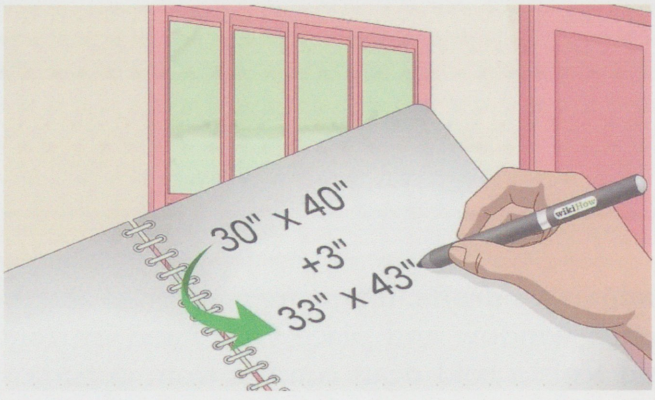
your hand near the window's seam and see if you feel any cold air. If you do, this means that air from your air conditioner is leaking from the inside to the outside.

- You can also test for drafts by turning off your air conditioner, heater, or any fans. Then, light a stick of incense near the window. If the smoke is pushed toward the window or away from it, you have a draft.



Measure each window. Place a measuring tape along the top of the window frame and record the length. Then, do the same thing with the side of the window frame and record the height. Take your time and measure twice just to be certain. These are the dimensions for your window.

- If the window has a slight lip for a screen, include that in the measurement as well.
- Measure from inside the building, as you will attach the foil from the interior.

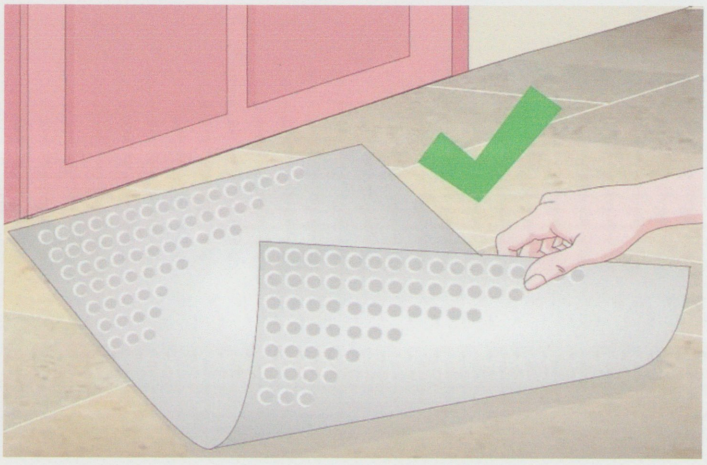


Add at least 3 inches (7.6 cm) to your measurements. This gives you enough extra room to attach the foil to the window panel or frame. If you are

concerned that the panel is extra-large, don't be afraid to add even more inches. In general, it's better if your measurements are a bit longer than shorter, as you can always trim off excess foil.

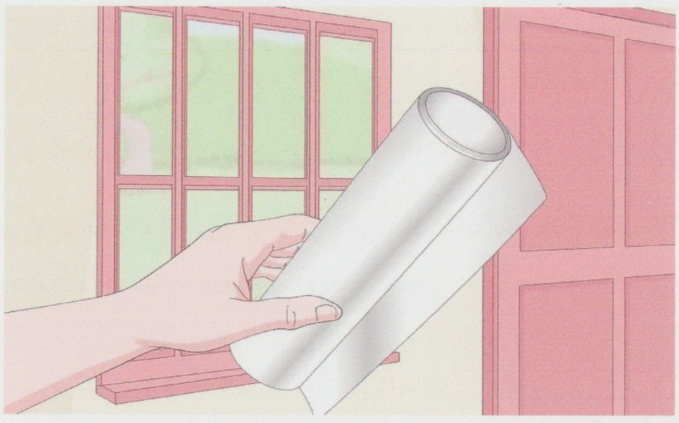
- These added inches will also give you enough space to fold the sides of the foil over to prevent injuries.

5.3.2 Cutting the Aluminum



Use aluminum foil insulation for extended protection. This is bubble wrap that is covered with foil on both sides. It comes in rolls or sheets and can be purchased at your local hardware store. The bubble wrap helps to trap the cold or warm air from outside the window and keeps it from crossing into the room.

- You can also remove and move these pieces of insulation as often as needed.

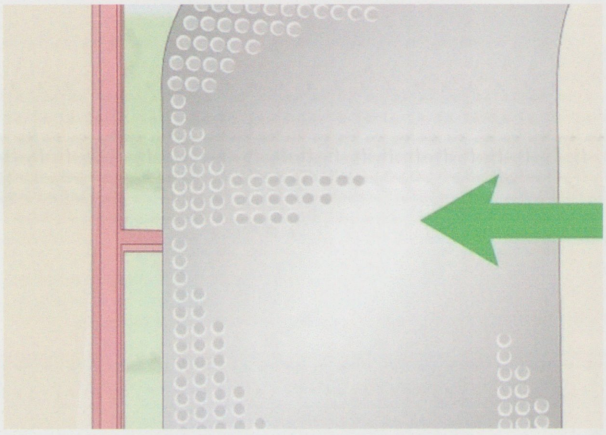


Insulate with kitchen foil as a temporary solution. If you don't have the money or time to track down aluminum insulation, kitchen foil will work as well. Attach it to the window in double layers to increase its effectiveness as a barrier. Fold over the sides of the foil to protect yourself from its sharp edges.

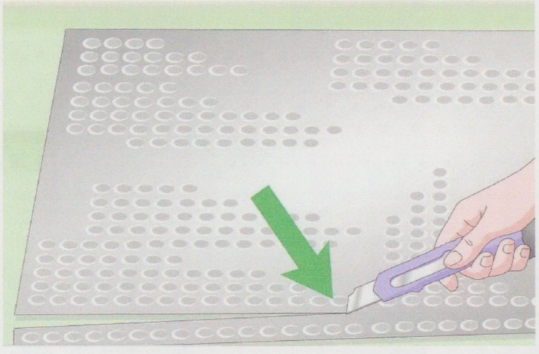
- Heavy-duty kitchen foil can provide even more **protection**, as it is thicker.

KEY FACT

Protection is any measure taken to guard a thing against damage caused by outside forces.



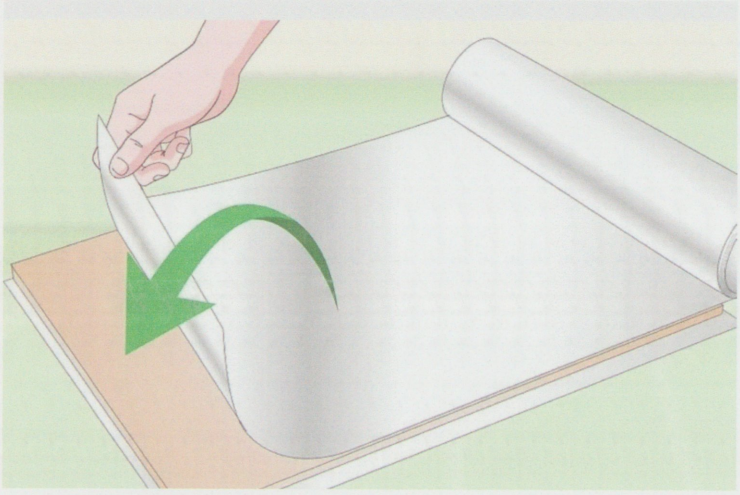
Place the foil vertically or horizontally depending on the whole window's shape. Compare the window's final dimensions to the width of your foil roll. Your goal is to have the fewest number of seams/foil pieces across the window, as they let out additional heat or cool air. Map out your layout of foil for each window prior to making any cuts.



Cut out your foil pieces. Place your foil sheets or rolls on a flat surface, such as a work table. Measure out the dimensions of your whole window on the

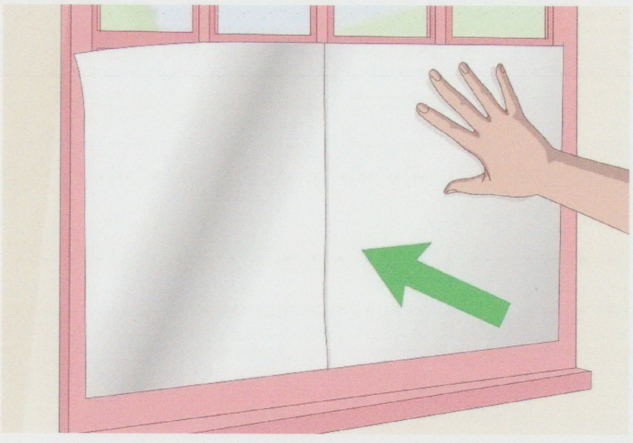
foil, making small cutting guide marks with a marker. Then, carefully cut along these points with a pair of scissors or utility knife. Repeat this process for each window.

- Handle the foil with caution to avoid cutting yourself on the edges, which can be sharp.



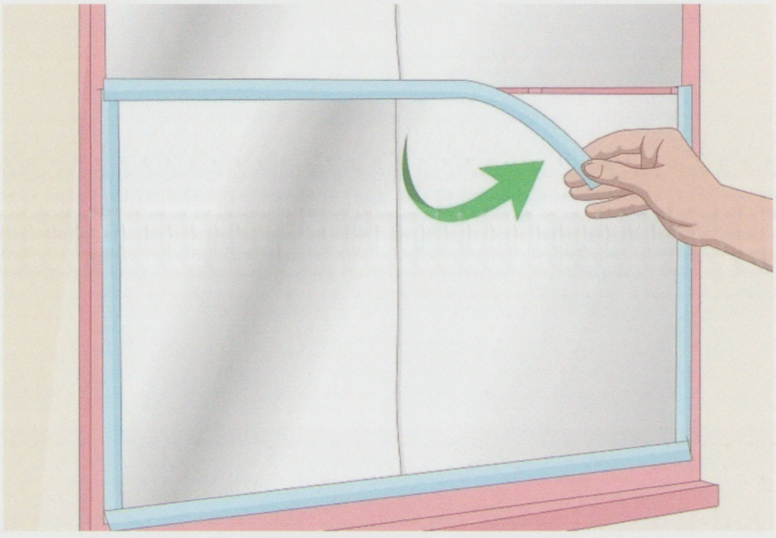
Go with a foil-wrapped insert for more stability. If your window is larger or if you are worried about the foil ripping, consider wrapping a piece of cardboard with kitchen foil instead. Cut out the cardboard to fit the whole window's measurements. Then, cover the cardboard fully with foil on both sides. When you are finished, simply insert the piece into the window casing and secure the edges with tape.

5.3.3 Attaching the Aluminum to the Window

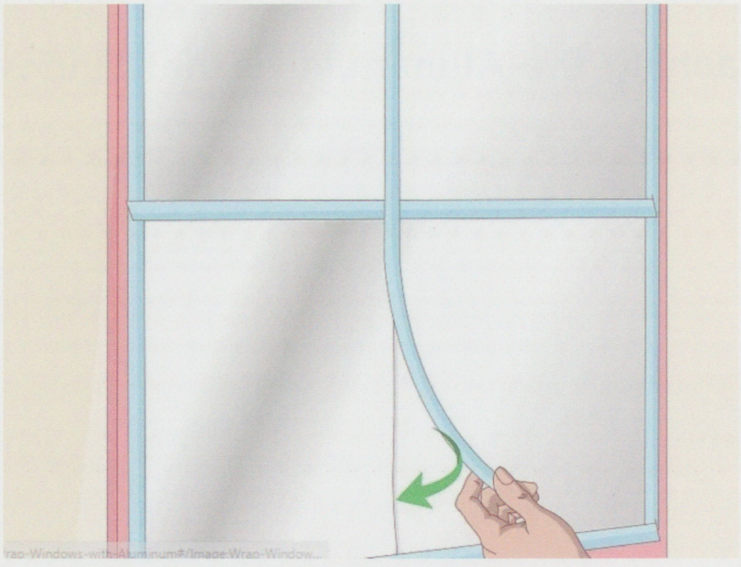


Place a foil piece against the window. The shiny side should be facing out. Position the piece so that it overhangs the lip of the window by 1 inch (2.5 cm) on all sides. If the window will take 2 or more pieces to fully cover it, consider that too and leave enough room.

- It also helps if you flatten the foil slightly with your palm. Don't bend it, just apply a bit of pressure until it's flat against the window.



Tape the edges down. Use masking or duct tape to attach the foil to the edges of the window. The tape should overlap at the corners. The goal is to eliminate any open spaces around the sides of each foil piece, creating a secure border around the window.



Cover each seam with masking tape. If you need multiple pieces of foil to cover the window, you should position them so that they overlap by at least 1 inch (2.5 cm) above the window pane. Then, you'll see a gap where they meet over the glass. Place a piece of tape fully along this seam. Otherwise, air drafts can escape through this space.



Smart Tip

Masking tape is usually your best option for a painted window frame. It's less likely to take off the paint when pulled away.



ROLE MODEL

Michael Cherney

Michael Cherney (Hebrew , Russian: Михаил Чёрный, also **Mikhail Chernoy**, **Mikhail Semenovitch Chorny** or **Mikhail Chernoi**; born 16 January 1952) is an Uzbek entrepreneur and industrialist. He is known for his significant role in the 1990s Aluminium in Russia, and his business ventures in Israel. He is also the founder of the Michael Cherney Foundation and a sponsor of The Intelligence Summit.

Biography

Cherney grew up in Tashkent, Uzbek SSR, in a Jewish family whose father was a book-keeper and an engineer, the eldest of three sons. At the age of fourteen, Cherney started working, as he joined his father on moonlighting jobs. After high school, he was drafted into the Soviet Army and attended a technical college. Later, his athletic pursuits – boxing and football – led to employment in sports administration.

In the early 1990s Cherney immigrated to Israel but kept close ties to Bulgaria, where he had bought a leading newspaper, a top football team and Bulgaria›s only mobile phone company, Mobiltel. In August 2000 Bulgarian authorities denounced what they said were his ties to foreign criminal rackets and expelled him, saying he could not return to Bulgaria for 10 years.

Furthermore, the United States has "denied Cherney a visa since 1999 because of alleged ties to the Russian mafia, according to *St. Petersburg Times* in Florida».

Cherney is wanted on an Interpol international arrest warrant on allegations of money laundering and organised crime, but in June 2010 *The Jerusalem Post* reported that Cherney is preparing an application to contest it before the European Union Court of Human Rights.

In August 2010 the Israeli TV Channel Two aired a short program about the most expensive and lavish wedding ceremony in Israel until that time,

costing 20 million ILS (about 5 million US dollars). The program revealed that the bride was Cherny's daughter, that the wedding was paid by him and that Israeli ministers and members of parliament (Knesset) of Russian origin attended

Business Interests

TWG and founding of the Russian aluminium industry

Cherney, together with his brother Lev Cherney and UK metals traders David and Simon Reuben, founded Trans-World Group (TWG) – the first and largest private company in Russia, which produced aluminium and sold it on Western markets. *BusinessWeek* reports that the brothers «were known for their rough style of doing business».

In 1994, TWG was drawn into a government inquiry into the theft of more than $US100 million from Russia's central bank by a number of separate criminal groups during the early 1990s. In an article on TWG, *Fortune* magazine reported: «That a theft occurred is not in dispute, nor is the fact that the Cherneys ended up with a piece of the stolen money and used it to partially fund Trans World›s startup phase in 1992.... The inquiry›s objective was to determine whether the Cherneys knew the funds were indeed stolen.»

In an attempt to clean up its reputation and refute allegations of questionable business practices, the Reuben brothers hired Mayer Brown & Platt, a US-based law firm. Terrence Burke, an investigator employed by the law firm and former acting head of the DEA, recommended that the Reubens sever their ties with Cherney after the FBI told him that «it believed Michael himself was an organised crime figure.» As a result, Michael was paid $US400 million «just to go away» while his brother Lev remained with the company.

In August 2001 a *Fortune* article notes, «the prosecutor›s office in Düsseldorf notified the Reuben brothers that it had terminated its probe into alleged money laundering, saying ‹I hereby confirm expressly that there is no remaining suspicion of money laundering or any other criminal actions.›» However, the same article states that the Kroll report «doesn›t discuss an essential part of the story», nor does it "explore the complex business and financial relationships in Russia between the Reubens and Lev and Michael Chernoy."

SuAl and partnership with Oleg Deripaska

According to the Financial Times, in 1994, Oleg Deripaska, then an independent metals trader, won the backing of Cherney and TWG to become general manager of Sayansk aluminium plant in Siberia, which lead to formation of SibAl and a partnership between Cherney and Oleg Deripaska in this company.

BulgarTabac

In 2002, 80% of the capital in the Bulgarian State-owned tobacco company, Bulgartabac, was placed on the market. In April 2002 Cherney put together a three-partner consortium called "Metatabac" to bid for Bulgartabac. Ownership was structured between three groups: the Russian firm Soyuzcontracttabac, which owned 35%, MCG Holdings, a firm owned by Cherney, which owned 35%, and another 30% held by a Cypriot company named Metacontact Ltd.

Mobiltel

In 2002 Cherney was involved in the selling-on of the Bulgarian mobile provider Mobiltel. Cherney bought the company together with Austrian business men Martin Schlaff, former minister of the Austrian People's Party Josef Taus, and financial expert Herbert Cordt. The 768 million Euro deal was financed by BAWAG P.S.K.. In 2005 Mobiltel was sold for 1.6 billion euros to Mobilkom Austria Group with a huge profit of 830 million Euros. Critics found it hard to understand «why the state bought an asset for such a high price from someone who was effectively a go-between who stood to pocket a fat profit, rather than directly from the original owner of the company».

The Intelligence Summit

Cherney is the founder and primary sponsor of the Intelligence Summit. In February 2006, *The New York Sun* reported that John Deutch and James Woolsey had resigned from the Intelligence Summit's board of advisers after receiving information that the conference's primary sponsor, Cherney, had "alleged ties to the Russian mafia".

Legal investigations

Invalid passport

On 21 May 1994, Cherney and his future wife were detained by immigration officers on arrival in Heathrow from Geneva. It was discovered that they had attempted to enter the UK on false Polish passports and they were deported back to Switzerland.

The following day they were arrested by the Swiss police on the grounds that they had made use of false identities. Both were searched and found to be in possession of two allegedly invalid Polish driving licences. Cherney gave a statement to the police in which he admitted using a Polish passport in an attempt to enter the UK, which had been successful previously. On 25 October 1994 the Swiss authorities confirmed that they would not be pressing any charges against Cherney. On 20 November 1996 the Swiss Federal Aliens Office confirmed that he was no longer subject to a prohibition order and that there was nothing to prevent his coming into Switzerland.

Alleged illegal payments to Avigdor Lieberman

Cherney is a close friend of Avigdor Lieberman who allegedly received millions of shekels from various entrepreneurs, including Cherney, while serving as member of Knesset; under Israeli law, MKs are not allowed to receive any payment beyond their salary. One claim is that Cherney paid a company called *Path to the East* large amounts of money between the years 1999 and 2006, and that these sums were then allegedly passed on to Lieberman as a bribe. Other allegations concern a company called *M.L.1*, founded by Lieberman's daughter Michal when she was 21. These allegations concern money transferred to M.L.1 from unknown sources outside Israel; the money was later allegedly used for paying salaries to Avigdor and Michal Lieberman.

In April 2007, Israeli police questioned Avigdor Lieberman, Israel's Deputy Prime Minister, on suspicions of illegally financing his 2001 electoral campaign. According to the police, in May 2001, three months after Lieberman was appointed Minister of Infrastructure in Ariel Sharon's Cabinet, approximately $US500,000 was transferred to the bank accounts of Lieberman associates through Cyprus. This money could be traced back to Cherney. Cherney's attorney, Yaakov Weinroth, said the money was transferred by his client "for a totally transparent, legal wine deal".

In May 2011, Haaretz reported that the Israeli Attorney General had issued a draft indictment against Avigdor Lieberman for fraud and money laundering,

including allegations against Cherny. A second *Haaretz* article detailing the draft indictment reported that a company owned by Cherney had paid $US500,000 to a company owned by Avigdor Lieberman in May 2001. It added, «Prosecutors say Lieberman then used his government posts to try to restore Chernoy›s Israeli passport, which he had been stripped of in 1999, and to assist him in other personal matters.» Cherney was acquitted. Over the years, Cherney›s passport was returned by the Israeli authorities.

Bezeq affair

In 1999, businessman Gad Zeevi purchased shares in the Israeli telecommunications company Bezeq on behalf of businesses he owned. According to an indictment filed in 2004, Cherney provided the financial guarantee for the purchase—information that Cherney and Zeevi hid from the banks financing the deal, in fear that Cherney›s direct involvement would not be approved by the Israeli ministry of communications. In 2015, Cherney, Zeevi and a number of other defendants were cleared of all charges, with the court stating that the information had not in fact been hidden, and the fact that Cherney loaned the necessary funds to Zeevi did not constitute fraud against Bezeq.

Spanish allegations and attempted arrest in the United Kingdom

According to sources cited in the Spanish daily *El Mundo*, Spanish authorities sought Cherney in connection to "Operation Avispa", a 2005 investigation that had resulted in the arrest of several prominent Russian mafia figures. The investigators believe that Cherney managed several Spanish businesses, registered in Alicante and Levante, used by the mafia for money laundering of 4 million euros.

In May 2009, Spain's Supreme Court issued a detention order against Cherney. Along with his business partners Oleg Deripaska (head of RusAl) and Iskander Makhmudov (head of UGMK), Cherney is suspected of laundering money. The Spanish authorities claim they succeeded in tracing the organization's complicated money laundering track, including Deripaska's, Makhmudov's and Cherney's alleged participation. As a result, Interpol issued an international arrest warrant against Cherney.

Lawsuit against Oleg Deripaska

On 24 November 2006, Cherney filed a suit against Oleg Deripaska, a Russian billionaire who owns the huge Russian aluminium company, RusAl, in the Commercial Court of London's High Court. Cherney sought a Court

3G E-LEARNING

declaration affirming that Deripaska holds 20% of the RusAl shares on behalf of Cherney or damages for breach of Deripaska's agreement to dispose of the shares and to account to Cherney for the proceeds. The claims are based on a written agreement between the two businessmen that was signed in a London hotel room in March 2001. Deripaska denies that Cherney owns shares and said in an affidavit that his relationship with Cherney was one of a businessman being extorted by a crime boss. After the 2001 meeting, Deripaska paid Cherney $US250 million.

As of December 2006 RusAl was in the final stages of negotiating a takeover of domestic rival SuAl and the aluminium assets of Glencore, a major Swiss commodities trader, which could create a new company valued at up to $US30 billion. According to this estimate, Cherney's 20 percent stake in RusAl could be worth as much as $US3 billion. On 3 July 2008, a British judge ruled that Cherney had the right to sue Deripaska for £2 billion. High Court Justice Christopher Clarke ruled that Cherney might be assassinated or held on trumped-up charges if he tried to bring the case in Russia.

At a June 2011 case management conference, the judge deferred a decision on whether Cherney would be allowed to give evidence by video link from Israel rather than appear in person as an outstanding Interpol arrest warrant means he would be detained if he visited the UK. In late July 2011, the High Court ruled that Cherney may give evidence at the trial by video link from Israel and set trial for April 2012. The case was settled out of court between Cherney and Deripaska in September 2012.

Illegal wiretaps

On 13 January 2010, a Tel Aviv Court handed down its first verdict in the case of illegal eavesdropping on Cherney. Aviv Mor, a private investigator was found guilty of illegally gathering information of personal nature - in particular, tapping the phones of Cherney and sentenced to a plea bargained result which handed down a 14-month sentence to Mor. Part of the sentence will be in the form of community service and the rest will be a suspended sentence. The District attorney's office stated in court that the cases of other suspects in the illegal data collection case "are at an advanced stage and close to indictment .» In February 2008 Cheney filed a suit in a Tel Aviv court that alleged the illegal spying was commissioned by a Russian citizen, Alexei Drobashenko who at the time was the head of the External Relations department at Basic Element, a financial and industrial group that belongs to Oleg Deripaska. Cherney claimed that it was this Russian oligarch, acting through Drobashenko, who had hired Eskin, Pridan and Mor. In his claim, Cherney accused a group of 10 plotters, including Oleg Deripaska, Alexei Drobashenko and the already sentenced Aviv Mor, of

illegal wiretapping, hacking the computers of his charity fund, publishing slanderous articles, and harassing him with insulting graffities and leaflets.

Personal life

Spouse of Michael Cherney is a businesswoman Nicole Raidman. In 2010 their daughter Michelle was born, and in 2014 their son Richie. They live in Herzliya.

Cherney shared a house in Moscow with Igor Putin, Vladimir Putin's cousin, and Berel Lazar, Putin's Rabbi who is the Chief Rabbi of Russia.

CASE STUDY

Beautiful Kansas Home Features 53 New MI Windows



Overland Park has been referred to as the best-kept secret in the Midwest because it has a little something for everyone. It has a very low crime rate for a city its size, it's home to a top-notch tech industry, and the Overland Park Arboretum & Botanical Gardens has been named one of the prettiest places in America.

So it should be no surprise that few places in America have grown as quickly as Overland Park over the past half century. It had a population of 21,000 in 1960, but now approximately 191,000 people call it home.



With such rapid growth, there's always a great deal of construction going on in the city, and recently a new development arose on the southern end of town called Mills Farm. Among the many beautiful homes there is a particularly noteworthy dwelling built by Braklow Custom Homes. This six-bedroom abode features windows by MI Windows and Doors.

"We had previous experience with MI Windows," says Joe Ackerman, Vice President of Operations at Braklow. "They produce high-quality windows at an attractive price point."

This immense home has 6,400 square feet of living area, necessitating 53 windows to bring the ideal amount of natural light into the space. "It has a great deal of windows," says Scott Koch of Kansas City Building Supply, the window dealer on the project. "And you need a window that looks good, is economical, and efficient."

Four different MI products — sold by Brad Holtz, sales representative at MI — appear in the Mills Farm house, most of which are from MI's 3500 line. The series combines quality, exceptional durability, and optimal energy efficiency. With standard features that include a pre-punched mounting fin and removable sash for easy drywall pass through, the 3500 window is builder-friendly and ideal for any new home construction project.

The 3500 Series windows have undergone rigorous testing and are ENERGY STAR®-qualified in all four U.S. climate zones. This energy-efficient vinyl window features a warm-edge spacer system and a welded, multi-chambered frame and sash to maximize performance. These features and more make MI Windows' 3500 single-hung and 3580 single-sliders premium new construction windows."It was very important for us to have energy-efficient windows and patio doors in our house," says homeowner Gina Lee. "The weather in Overland Park can be very cold and windy in the winter to very hot in the summer, so we definitely needed energy-efficient windows."



In addition to the single-hung and single-slider windows, Braklow chose MI's 9770 casement window. Featuring beveled exterior edges, MI's casement windows provide superior style and traditional craftsmanship. The 9770 boasts a large viewing area similar to a fixed picture window but its 90-degree hinge capability with multi-point locking hardware allows for

maximum ventilation functionality.

Lee's home also features MI's 1615 sliding-glass door. A step above most patio doors, the 1615 comes standard with a saddle sill and heavy-duty rollers that result in easy, effortless operation. This door is also available in configurations up to 24 feet wide, giving homeowners a high-end patio door that offers energy efficiency while enhancing the views and providing seamless integration between indoor and outdoor living spaces.

"The views are great through the sliding-glass doors," Lee says. "It makes the view from the dining room to the outside almost an extension of our indoor space."

All four of the MI products in the Mills Farm property were used to complement an exquisite, palatial house that's indicative of many of Braklow's homes. This structure features the modern farmhouse interior design, complete with a massive stone fireplace on the first floor.

"It's one-and-a-half stories with a finished lower level," Koch says. "It has a traditional exterior with a more transitional interior."

As if all that wouldn't be enough to attract future buyers, the Mills Farm home is also located by a lake in a quiet section of Overland Park.

"Being located on a lake lot, windows were a very important factor for the build," Ackerman says. "We focused on quantity and placement to maximize the view."

6

MACHINERY REQUIRED FOR FABRICATION BUSINESS

6.1 FABRICATION MACHINES

Your fabrication shop bids on a job. The customer looks for several key factors to decide which bid to go with. You are more likely to win the bid if you have what it takes to get the job done on time and on budget. When they award the contract to your shop, the value provided will be a major part of that decision.

There's no need to outsource to multiple vendors because the whole job is happening at your shop. You're going to take their requirements they provide from engineering drawings and make something they can sell without them having to micro-manage the details. This will be extremely quick and easy for you if you have all the necessary machine tools to complete each part of the job.

Here are the 6 types of machine tools that every fabrication shop needs for big jobs:

6.1.1 Hydraulic Press Brakes

Hydraulic press brakes offer accuracy and versatility for bending simple or complex metal parts. KAAST press brakes have multiple axes and come in a wide range of lengths and tonnages.

If you have a small shop and are looking to improve the efficiency of your bending processes while on a budget, the KAAST hydraulic press brake might just be what you are looking for. The fully welded all steel construction is designed for maximum rigidity and minimum deformation during the **bending** process. A heavy duty torque tube connects a pair of hydraulic cylinders so that they are synchronized and stay parallel to the bending table at all times.

"Old Reliable" should be stenciled on the side of every press brake in the world. Press brakes are, without a doubt, the sturdiest, strongest, and most dependable bulls in the pasture. It is common when searching for used press brakes to find many of the top brands like Amada and Cincinnati with vintages from the 60s and 70s still kicking and in great condition. This is because press brakes have only one function: bending metals.

KEY FACT

Bending is a manufacturing process that produces a V-shape, U-shape, or channel shape along a straight axis in ductile materials, most commonly sheet metal.

Press brakes have a simple operation: Secure the workpiece on the bed and the ram will descend upon it, using its tonnage to accurately bend the metal to the specified degree. The different types of metals commonly fabricated by these machines include steel, aluminum, brass, and sheet metal. Press brakes are rated by their pressing capacity (tonnage) and the bed length, which dictates the overall length of your workpiece that can fit in the bending zone. Tonnage capabilities range anywhere from 25 tons all the way up to 1,000 tons. The smallest bed lengths start at four feet, whereas the longest beds can reach a length of almost 30 feet.

There are four types of press brakes:

- Mechanical,
- Hydraulic,
- Pneumatic, and
- Servo-electric.

The two most common brakes used in nearly all contemporary machine shops are mechanical and hydraulic. Mechanical brakes dominated the industry until the 1950s when advances in technology introduced computer controls. This made the hydraulic brakes much more popular and user-friendly.

If you have lower tonnage requirements, mechanical brakes should be at the top of your list of machines to invest in because they are simple to maintain and will not break the bank. If your shop is bending very thick metal, you will need higher tonnage capabilities. In this case, go with a hydraulic press brake. It's

the most powerful and efficient type of machine for larger jobs using thicker metals.

6.1.2 Swing-beam Shears

Shears are a cost-effective cutting solution because they are fast to set-up and easy-to-use. KAAST offers several types of shears with different metal cutting capabilities.

A swing beam shear is a hydraulic machine. The upper beam hinges on a pivot point in the middle of the side frames. This is a heavy duty, robust machine designed for cutting thicker material. Shears can be found as manual, NC, or CNC machines. At KAAST, for example, we offer this machine in our HGS series with touchscreen. The HGS is available in cutting capacities of ¼" up to ¾" and in lengths of 10' up to 13'. The KAAST HGS shear boasts the world's heaviest and most robust swing beam shear construction.

KEY FACT

Metal fabrication involves the cutting and shaping of metal, which will soon be assembled and formed into a product.

With technology advancing to the point in the **metal fabrication** industry that we now are cutting metal with plasma and lasers, many people have asked, *"Is there still a need for a shear in our shop?"* In most cases you will find the answer to be a resounding, *"Yes."*

A shear is a staple in many shops for their day-to-day business operations. A shear is a highly utilized and productive piece of equipment because of its ease of use, quick set up time and low operating cost. For example, it doesn't make a lot of sense to use a plasma machine to cut 4" off of a piece of ¼" material that is four feet wide when you can simply put it on a shear and within a couple minutes make the cut and be done.

There a few different types of shears that are common and widely used in the industry: mechanical, swing beam and guillotine style.

6.1.3 Ironworkers

A KAAST ironworker can be the "Swiss Army Knife" of your machine shop — with stations for punching, notching, shearing and more, this versatile piece of equipment should be indispensable in your metal fabrication operation. It saves labor, time, energy and cost.

The heavy-duty Ironworker has 5 work stations that are fully integrated:

Punch Work Table: Includes back gauge and adjustable stops. **Adjustable See-Through Punch Stripper:** For fast and easy setup. **Die Holder:** Adjustable in machined T-slots for quick punch and die alignment. **Support Table:** Includes guides for accurate positioning and indicator lines at 30 and 45 degrees left and right. **Adjustable Hold-Down:** Holds work piece securely in position when shearing. **Upper Shear Blade:** Provides for minimum distortion. Two (2) usable edges. Shearing with no material loss and minimum deformity. **Shear Blades:** Four (4) usable edges.

6.1.4 Plate Rolls

Plate rolls are designed to quickly and efficiently transform flat sheet metal into cylindrical or radius parts. KAAST offers both mechanical and hydraulic plate rolls in a variety of roll diameters and lengths.

Three-roll variable axis plate rolls are more precise, productive, safer and faster than any other 3-roll benders due to their user-friendly controls that make them less dependent on operator competence.

They are suitable for medium and thick plate bending. Unlike the usual cylinder machines, the lower rolls move horizontally to right and left and the upper roll moves up and down. Similar to a 4-roll machine, the material loads parallel to the floor and not at an angle, like other three rolls.

The side rolls approach the upper roll and the upper roll applies pressure to the plate from the top. This allows pre-bending both sides of the plate without removing it from the machine. The variable geometry 3-roll has a greater pre-bending capacity than other 3-roll bending machines.

The gap on the side rolls are adjustable to maximum levels, allowing thick plates to bend to smaller diameters or wider angles. While most machines in the market can perform a conical bending to three times the top roll diameter, the KAAST RBD rolls can easily create a conical bending to 1.5 times the diameter.

6.1.5 Profile Rolls

Bending metal tubes, pipes, channels or beams is fast and easy with a KAAST angle roll. We have the right machine for your structural steel fabrication application.

KEY FACT

Torque is the measure of the force that can cause an object to rotate about an axis.

The robust machine frame is constructed of rugged steel, machined after welding for rigidity, and all welds are stress relieved prior to machining. Precision bearings and large shaft diameters minimize deflection for precise bending.

Machines are ensured a long life due to their strong frame and world-class hydraulic and electrical components, and short cycle times are achieved by high **torque** drive system and machine speed. Straight edge is minimized by close roll stance, powerful guide rolls and hydraulic adjustments. Flat spots are minimized due to closer roll stance. Low energy and maintenance costs by friction-free planetary swing guides.

6.1.6 Horizontal Band Saws

KAAST Machine Tools offers an extensive portfolio of saws for a wide variety of machining applications. The saw portfolio covers everything from miter band saws to semi-automatic and fully automated band saws. High reliability and precision are integral to all our saws. Our fully automated band saws with bundle vises are ideal for cutting entire material packs to length. In addition to semi-automatic horizontal miter band saws, KAAST also offers fully automated miter band saws with programmable cutting angle and automatic workpiece feed.

All KAAST saws fulfill European standards, undergo rigorous testing and bear the CE mark. Our machines are known for their simple user-friendly design to ensure ease of use as well as quick and easy care and maintenance.

Designed with you in mind, this steel cutting machine is the best choice when it comes to price and quality.

Our band saws are proven time and time again to be the best when you need an economic and reliable way to cut your toughest materials. These metal cutting machines are unbeatable in performance and accuracy. Our Automatic Band Saw allows you to cut in a bundle with great accuracy, and this saves you time, reduces material handling, and increases your production. They're great for solid steel up to 12" round.

At a fraction of the cost from our competition, our band saws prove to be the best value for an automatic band saw out there. The frame is designed to give you better accuracy, and stability when you apply additional pressure on the down feed. This metal cutting band saw is powerful, ridged and extremely precise. The KAAST HBA horizontal band saw will be the most important machine in your shop.

6.1.7 A Look into the Different Types of Fabrication Machinery

If you are running a machine shop, you probably don't have that kind of spare time available. As such, I've decided to write about the five most commonly used types of fabrication machines found in almost every machine shop today:

- Waterjets,
- Press brakes,
- Laser systems,
- Plasma systems, and
- Shears.

Waterjets

Waterjets are, by far, the most useful and cost-efficient method of cutting a variety of materials. These industrial machine tools use a combination of water and an abrasive substance to cut virtually *anything*, including:

- Stainless steel,
- Carbon steel,
- Aluminum,
- Titanium,
- Plastics,
- Copper,
- Brass,

- Rubber,
- Glass,
- Ceramics, and
- Stones like granite and quartz.



These machines are so versatile because almost no heat is generated to the **workpiece** – unless, of course, you're cutting steel that is at least two inches thick, which can cause temperatures to reach 120 degrees F.

Waterjets work by using high-pressure pumps, which reach speeds of anywhere from 30hp to 100+ hp, to force water out through the nozzle (commonly referred to as the "head") to cut your material. Almost all jets have an "abrasive hopper system." This feature incorporates a metered flow of granular abrasive, usually garnet, to aid in cutting the aforementioned materials.

KEY FACT

Workpiece is a piece of raw material that is in the process of being formed into a component or part.

Whether you are considering opening your own machine shop, or you're looking for that perfect machine to give you an edge to help your existing business grow, a waterjet is the best and most versatile machine to invest in.

Laser Systems

Laser cutting systems are quite advanced. The most common applications that lasers can be used for includes:

- Cutting,
- Welding,
- Marking, and
- Surface treatment.

Industries with high demand for these operations are usually ones that require high precision for cutting complex parts. These include parts for automotive, shipbuilding, aerospace, steel, electronics, and medical industries.



Laser systems work by using thermal energy to remove material from the workpiece by melting, vaporizing, burning, or blowing it away. This leaves a high-quality surface finish that is critical to the success of the finished product as a whole. During operation, Computer Numerical Control (CNC) technology directs the laser head to move about the workpiece, cutting the desired shapes with an accuracy of up to 10 micrometers on newer machines. This cutting process maintains *very* tight tolerances — often within .001 of an inch.

If you are on the machining side of any of the previously mentioned industries, you know there is zero room for error. These machines make that level of precision possible.



ROLE MODEL

Lakshmi Mittal

Lakshmi Niwas Mittal (born 15 June 1950) is an Indian steel magnate, based in the United Kingdom. He is the chairman and CEO of ArcelorMittal, the world›s largest steelmaking company. Mittal owns 38% of ArcelorMittal and holds a 20% stake in Queens Park Rangers F.C.. In 2005, *Forbes* ranked Mittal as the third-richest person in the world, making him the first Indian citizen to be ranked in the top ten in the publication›s annual list of the world›s richest people. In 2007, Mittal was considered to be the richest Asian person in Europe. He was ranked the sixth-richest person in the world by *Forbes* in 2011, but dropped to 82nd place in March 2015. He is also the «57th-most powerful person» of the 72 individuals named in *Forbes'* «Most Powerful People» list for 2015. His daughter Vanisha Mittal's wedding was the second-most expensive in recorded history.

Mittal has been a member of the board of directors of Goldman Sachs since 2008. He sits on the World Steel Association's executive committee, and is a member of the Global CEO Council of the Chinese People's Association for Friendship with Foreign Countries, the Foreign Investment Council in Kazakhstan, the World Economic Forum's International Business Council, and the European Round Table of Industrialists. He is also a member of the board of trustees of the Cleveland Clinic.

In 2005, *The Sunday Times* named him «Business Person of 2006», the *Financial Times* named him «Person of the Year», and *Time* magazine named him «International Newsmaker of the Year 2006». In 2007, *Time* magazine included him in their «Time 100» list.

In 2019, Forbes named him in the list of India's Richest 2019.

Early life and career

Mittal was born in a Marwadi Family. He studied at Shri Daulatram Nopany Vidyalaya, Calcutta from 1957 to 1964. He graduated from St. Xavier's College, affiliated to the University of Calcutta, with a B.Com degree in the first class. His father, Mohanlal Mittal, ran a steel business, Nippon Denro Ispat.

In 1976, due to the curb of steel production by the Indian government, the 26-year-old Mittal opened his first steel factory PT Ispat Indo in Sidoarjo, East Java, Indonesia. In 1989 Mittal purchased the state-owned steel works in Trinidad and Tobago, which were operating at an enormous loss. He turned them into profitable ventures in a year.

Until the 1990s, the family's main assets in India were a cold-rolling mill for sheet steels in Nagpur and an alloy steels plant near Pune. Today, the family business, including a large integrated steel plant near Mumbai, is run by his younger brothers Pramod Mittal and Vinod Mittal, but Lakshmi has no connection with it.

Social work

Sports

After witnessing India win only one medal, bronze, in the 2000 Summer Olympics, and one medal, silver, at the 2004 Summer Olympics, Mittal decided to set up the Mittal Champions Trust with $9 million to support ten Indian athletes with world-beating potential. In 2008, Mittal awarded Abhinav Bindra with Rs. 1.5 Crore (Rs. 15 million), for getting India its first individual Olympic gold medal in shooting. ArcelorMittal also provided steel for the construction of the ArcelorMittal Orbit for the 2012 Summer Olympics.

For Comic Relief he matched the money raised (~£1 million) on the celebrity special BBC programme, *The Apprentice*.

Education

In 2003, the Lakshmi Niwas Mittal, Usha Mittal Foundation and the Government of Rajasthan partnered together to establish a university, the LNM Institute of Information Technology (LNMIIT) in Jaipur as an autonomous non-profit organisation.

In 2009, the Foundation along with Bharatiya Vidya Bhavan founded the Usha Lakshmi Mittal Institute of Management in New Delhi.

SNDT Women's University renamed the Institute of Technology for Women (ITW) as Usha Mittal Institute of Technology after a large donation from the Lakshmi Niwas Mittal Foundation.

He completed his Primary and Secondary school from Nopany High formerly known as Shri Daulatram Nopany Vidyalaya.

Medical

In 2008, the Mittals made a donation of £15 million to Great Ormond Street Hospital in London, the largest private contribution the hospital had ever received. The donation was used to help fund their new facility, the Mittal Children's Medical Centre.

COVID-19 pandemic

He made a donation of 100 crores to PM cares fund during the COVID-19 pandemic in India in 2020.

Criticism and allegations

PHS

Mittal successfully employed Marek Dochnal's consultancy to influence Polish officials in the privatisation of PHS steel group, which was Poland's largest. Dochnal was later arrested for bribing Polish officials on behalf of Russian agents in a separate affair.

In 2007, the Polish government said it wanted to renegotiate the 2004 sale to ArcelorMittal.

Slave-labour allegations and questionable safety records

Employees of Mittal have accused him of allowing "slave labour" conditions after multiple fatalities in his mines. During December 2004, twenty-three miners died in explosions in his mines in Kazakhstan caused by faulty gas detectors.

The Mittal Affair: "Cash for Influence"

In 2002, Plaid Cymru MP Adam Price obtained a letter written by Tony Blair to the Romanian Government in support of Mittal's LNM steel company, which was in the process of bidding to buy Romania's state-owned steel industry.[36][37][38] This revelation caused controversy, because Mittal had given £125,000 to the British Labour Party the previous year. Although Blair defended his letter as simply "celebrating the success" of a British company, he was criticised because LNM was registered in the Dutch Antilles and employed less than 1% of its workforce in the UK. LNM was a "major global competitor of Britain's own struggling steel industry".

Blair's letter hinted that the privatisation of the firm and sale to Mittal might help smooth the way for Romania's entry into the European Union. It

also had a passage, removed just prior to Blair's signing of it, describing Mittal as "a friend".

Queens Park Rangers

Mittal had emerged as a leading contender to buy and sell Barclays Premiership clubs Wigan and Everton. However, on 20 December 2007, it was announced that the Mittal family had purchased a 20 per cent shareholding in Queens Park Rangers football club joining Flavio Briatore and Mittal's friend Bernie Ecclestone. As part of the investment Mittal's son-in-law, Amit Bhatia, took a place on the board of directors. The combined investment in the struggling club sparked suggestions that Mittal might be looking to join the growing ranks of wealthy individuals investing heavily in English football and emulating similar benefactors such as Roman Abramovich.

On 19 February 2010, Briatore resigned as QPR chairman, and sold further shares in the club to Ecclestone, making Ecclestone the single largest shareholder.

Environmental damage

Mittal purchased the Irish Steel plant based in Cork, Ireland, from the government for a nominal fee of £1 million. Three years later, in 2001, it was closed, leaving 400 people redundant. Subsequent environmental issues at the site have been a cause for criticism. The government tried to sue in the High Court to have him pay for the clean-up of Cork Harbour but failed. The clean up was expected to cost €70 million.

Personal life

Mittal was born on 15 June 1950 in Rajasthani marwari family in Sadulpur, Rajasthan. He is married to Usha Mittal. They have a son Aditya Mittal and a daughter Vanisha Mittal.

Lakshmi Mittal has two brothers, Pramod Mittal and Vinod Mittal, and a sister, Seema Lohia, who married Indonesian businessman, Sri Prakash Lohia. His residence at 18–19 Kensington Palace Gardens—which was purchased from Formula One boss Bernie Ecclestone in 2004 for £67 million (US$128 million)—made it the world's most expensive house at the time. The house is decorated with marble taken from the same quarry that supplied the Taj Mahal. The extravagant show of wealth has been referred to as the "Taj Mittal". It has 12 bedrooms, an indoor pool, Turkish baths and parking for 20 cars. He is a lacto-vegetarian.

Mittal bought No. 9A Palace Greens, Kensington Gardens, formerly the Philippines Embassy, for £70 million in 2008 for his daughter Vanisha Mittal who is married to Amit Bhatia, a businessman and philanthropist. Mittal threw a lavish "vegetarian reception" for Vanisha in the Palace of Versailles, France.

In 2005, he also bought a colonial bungalow for $30 million at No. 22, Dr APJ Abdul Kalam Road, New Delhi, one of the most exclusive streets in India, occupied by embassies and billionaires, and rebuilt it as a house.

In December 2013, Mittal's niece Shrishti Mittal got married in a three-day celebration that is said to have brought Barcelona to a standstill and cost up to £50 million. Some 200 butlers, cooks and secretaries were reportedly flown into Spain from India and Thailand while the 500 guests were made to sign confidentiality agreements.

Personal wealth

According to the *Sunday Times Rich List 2016*, Mittal and his family had an estimated personal net worth of GB£7.12 billion, a decrease of $2.08 billion on the previous year. Meanwhile, in 2016 *Forbes* magazine›s annual billionaires list assessed estimated Mittal›s wealth in 2016 at as the 135th-wealthiest billionaire with a net worth of US$8.4 billion. Mittal›s net worth peaked in 2008, assessed by *The Sunday Times* at £27.70 billion, and by *Forbes* at US$45.0 billion, and rated as the fourth-wealthiest individual in the world.

3G E-LEARNING

CASE STUDY

MI Windows Bring The Light Into Pennsylvania Sunroom With Top-Selling Replacement Windows



Sunrooms – or, as they're also known, solariums – can denote a certain level of status. For example, the sunroom in the White House, built in 1927 by President Calvin Coolidge and his wife Grace, has famously served as a place for generations of first families to relax, play cards, host friends, and watch football.

But, of course, you don't have to be a president to revel in the comfort of a sunroom. Many people are adding them to their home for numerous reasons: a relaxing hangout for the family, secondary dining room, or even a home office.



Ken and Kathy Bogdan recently added a sunroom to their home in Camp Hill, Pa. In addition to desiring a little extra space for their retirement years, the Bogdans also wanted a sunroom so they could look out on a

beautiful backyard. In order to get the optimal views, the Bogdans chose MI windows for

the addition.

"We are very happy we chose MI products," Ken says. "We installed 14 windows during our initial remodel three years ago, and they perform very well and look great."

Robert Wright, the designer and contractor on Bogdan's first remodel, also got the call to build the sunroom.

"When we first discussed the project, I read the reviews on MI and it looked like they had very good products," Wright says. "I encouraged Ken to pull the trigger."

For a job that involved one room, the Bogdan solarium nevertheless boasts an array of vinyl windows. There are six 1685 double sliders from MI. One of MI's top replacement windows, the 1685 features a triple-pane option – which the Bogdans ordered – with argon gas, making it ideal for any climate, but especially beneficial for the cold Pennsylvania winters.

But as important as energy efficiency is for a sunroom in Pennsylvania, the Bogdans also like the 1685 for its two moveable sash, large viewing areas, and adjustable roller system for easy operation.

"We love the double sliders," Ken says. "They give us so much visibility and flexibility. We love that we can slide either side of the window. Hung windows would have blocked our vision at the same height all around the room, while the sliders have a narrow area of blockage. We also purchased the flexible FlexScreens that look and perform great. We really like that the screens give us better visibility."

The Bogdans' sunroom addition also has MI's 1650 picture window and a pair of 1615 sliding-glass doors. A top-of-the-line patio door, MI's 1615 is available with multiple configurations, including a blinds-between-the-glass option, which Ken wanted.

"I use the self-contained blinds every day," he says. "The blinds are a great value when compared to the hassle of installing and cleaning regular blinds."

Perhaps the most intriguing pieces in the remodel are a pair of polygon-shaped windows. MI is able to fabricate unique shapes for innovative designs, and Ken wanted these windows for his "cathedral wall."

"Those windows were an idea of his to bring in more light, to give that whole wall a feeling of openness," Wright says. "They have a wonderful view out to the backyard; they wanted to maximize that experience to see as much opening as they could."

3G E-LEARNING



Although the Bogdan homestead is located just minutes from the state capital of Harrisburg, it's in a secluded area that offers a beautiful view of the woods and waterways that are a staple of the southcentral Pennsylvania landscape. The Bogdans decided to build their solarium to get a better view of the natural world that's just outside their doorstep.

"Kathy and I are very fortunate to have Conodoguinet Creek in our backyard," Ken says. "We frequently see eagles, egrets, heron, and ducks. The creek also draws in deer, fox, and mink. The sunroom is a nice quiet space to read or just enjoy the day. It's bug free and stays cool in the summer and toasty in the winter."

7

MAINTENANCE, CLEANING AND LUBRICATION

7.1 MAINTENANCE

Windows and doors from Idealcombi require a minimum of maintenance. Under normal conditions, maintenance can be limited to regular cleaning of exterior surfaces with lukewarm water and a neutral cleaning agent to remove dirt from the surface. Apart from this, moveable ironmongery parts must be lubricated as required and at least once a year. Keeping hinge sliders, guides, weatherstrips, etc. free from dust and dirt will ensure smooth operation in years to come.

Cleaning, General

The outer sash and frame surfaces are affected by the surrounding environment such as city and industrial areas with high traffic intensity and air pollution and coastal areas with salty air which soil and affect the surface more than clean country air.

Cleaning should be done on a regular basis and at least twice a year, maybe in connection with window cleaning. Wash sash and frame surfaces in lukewarm water with a neutral cleaning fluid such as car shampoo and wipe surfaces and edges with a cloth.

Lubrication, general

It is important to lubricate and maintain all types of ironmongery to ensure easy and smooth operation and function of your windows and doors and to uphold the warranty on the elements.

Lubrication and maintenance frequency depend on the use and the effect weather conditions, pollution, etc. have on the ironmongery.

We know from experience that ironmongery used in for instance city and industrial areas, areas with high traffic intensity and coastal areas with salty air should be lubricated and maintained more often than ironmongery in a less harsh environment.



Smart Tip

All ironmongery is lubricated at the factory. But we would like to stress that the person/ contractor responsible for the installation must ensure that all moveable parts, with the exception of friction parts/hinge sliders, are lubricated with a suitable lubricant before they are delivered to the client.

Generally, all moveable parts on hinges and closing/locking ironmongery should be lubricated as required, however, at least once a year.

7.1.1 General Information about Stainless Steel Handles and Fittings

As standard, our stainless steel handles and fittings are made in matte brushed AISI 304 stainless steel which is well suited for modern construction work and provides optimum corrosion protection. Our products can be used everywhere for indoor and outdoor mounting and contribute optimum function and quality.

Material and surface

Stainless steel is extremely suited for applications with requirements for high wear resistance, excellent hygiene and good corrosion resistance.

Stainless steel forms a thin, protective surface oxide film which provides for a dense, durable surface with high mechanical load resistance.

Despite containing e.g. nickel, stainless steel is considered to be a non-allergenic material when used for door handles, fittings etc. A number of sub-components may be made from other materials, such as polymer, brass or aluminium, all of which have been used with due consideration to the optimum function, manufacture and durability of the product.

Cleaning and maintenance

Regularly check the function and mounting of fittings, retighten any loose fixings and clean product surfaces. In areas and environments with elevated impact from sulphur and nitrogen oxides, and in coastal environments with chloride condensation, the protective oxide layer on stainless steel may corrode, oxidising the surface and possibly forming reddish brown stains that resemble rust formations. However, this corrosion is only superficial.

The discolorations can easily be prevented or removed through normal surface cleaning. Use hot water, mild detergent, soft brushes or synthetic sponges for cleaning. In special cases, you may use custom-made polish for stainless steel. Never use scouring pads, steel sponges or steel brushes as these may damage the surface! The product is only covered by warranty if correctly mounted and maintained.

Environment

If used alone, stainless steel emits no hazardous vapours or metals. Generally, stainless steel is not classified as environmentally dangerous waste, but because the material contains heavy metals, the products must be disposed of according to the regulations for industrial iron/metal waste, which ensures optimum sorting and recirculation.

7.1.2 Specific Lubrication Instructions

Side hung hinges

Hinges on side hung windows and doors should be lubricated with acid-free oil during repeated activation. We recommend lubrication with acid-free grease. It will, however, be necessary to lift the sash off the tenons and apply the grease directly onto the tenons.

Tilt and turn ironmongery

Hinges, side bolts and receiver/striking plate on tilt and turn windows and doors should be lubricated with acid-free oil or acid-free grease during repeated activation. Scissor ironmongery and friction brake must be lubricated in all joints during repeated activation, so that the lubricant reaches the moveable arms.

The joints should be lubricated on the outside and in the crack between the arms. Use an easily penetrating acid-free oil followed by a long-lasting acid-free grease in spray form.

Top guided, side swing reversible and side hung

These are all hinge systems, and all joints must be lubricated during repeated activation so that the lubricant reaches the moveable arms. The joints should be lubricated on the outside and in the crack between the arms. Use an easily penetrating acid-free oil followed by a long-lasting acid-free grease in spray form.

Sliding surfaces, hinge sliders and sliding blocks should be maintained in a clean state to facilitate sliding.

It is possible to apply stearin or a dry lubrication product on the sliding surfaces to facilitate friction. Never use oil on these surfaces as it binds dust and dirt to the surface.

Sliding surfaces

All sliding surfaces are made from anodised aluminium and must be cleaned regularly depending on climatic conditions and the degree of air pollution. We recommend that the surface is wiped with a cloth or sponge. Never use emery cloth, steel wool, soda or other cleaning or abrasive agents containing alkali or acid on these surfaces. Only use neutral cleaning fluids such as car shampoo.

Friction brakes

Friction brakes are not normally lubricated, but always make sure the hinge slider is clean. If necessary, a handle activated brake connected to the espagnolettes on side-hung windows and terrace doors can be lubricated with a dry **lubrication** product.

Lubrication tools

Lubrication can be made with an oil can, a syringe or a spray can with a thin pipe.

Inspection of weatherstrips and glazing gaskets

The condition of weather strips and glazing gaskets should be inspected concurrently with the annual lubrication.

Weatherstrips

Our weatherstrips are made from EPDM rubbers and several of them in a combination with a solid foot and a soft cellular sealing surface.

KEY FACT

Lubrication is the process or technique of using a lubricant to reduce friction and wear and tear in a contact between two surfaces.

The weatherstrips do not require any special maintenance but should be kept clean and free of dirt. This is done by wiping them off once a year with lukewarm water and a neutral cleaning fluid using a cloth. We recommend brushing the weatherstrips with a silicone stick to minimize friction during operation.

Also check that the weather strips are positioned and secured correctly and that they have maintained their sealing function.

All weatherstrips are loosely mounted in a perimeter groove making them easy to removing and installing on most element types if they are damaged and need replacement – or in connection with surface treatment maintenance.



Beware!

Never paint weatherstrips or brush them with wood preservatives/oils.

Glazing gaskets

Our glazing gaskets are made of EPDM/ cellular rubber and require no special maintenance other than being kept clean and free of dirt as described under weatherstrips. Also check that the positioning and compression of the glazing gaskets still ensure tightness. Check whether the corner joints are completely tight to avoid unnecessary penetration of water.

The easiest way to control the tightness of the glazing gaskets is by means of a thin feeler gauge which must be met with resistance when inserted between the glazing surface and the glazing gasket.

7.1.3 Maintenance of Surface Treatment - Aluminium

Maintenance of powder coated surfaces

The outer aluminium covering is yellow chromed as standard and surface treated with a polyester powder coating, Corro-Coat PE-F from Jotun Powder Coatings.

This treatment offering a very strong and weather-resistant surface requiring only limited maintenance. In practice this means cleaning it a couple of times a year with a soft brush or cloth and lukewarm water with a neutral cleaning fluid such as car shampoo.

Minor damage to the surface treatment will not affect the element's durability, since a natural oxide film quickly forms on exposed aluminium, preventing corrosion and white rust attacks.

However, for cosmetic reasons it may desirable to repair such damage, and Idealcombi's service department would be happy to provide advice and guidance.

Maintenance of anodised surfaces

The outer aluminium covering on our products in wood/aluminium can alternatively be supplied with anodised treatment. Once the alu-profiles have been chemically prepared and cleaned thoroughly, they undergo an electrolytic process. Direct current is applied to the profiles which become anodised, thus turning the surface metal into oxide. This process continues until the desired film thickness has been achieved.

An anodised surface treatment provides excellent corrosion resistance in most environments. It also offers a very smooth, dirtrepellent surface along with the ability to preserve what we call a "new" appearance.

Anodised alu profiles are almost maintenancefree provided that the surface is cleaned a couple of times a year with a soft brush or cloth and lukewarm water with a neutral cleaning fluid such as car shampoo.

7.1.4 General Facts about Surface Treatments on Wood Profiles

Resin lumps and discolouration from knots

All wood profiles from Idealcombi are quality optimised, finger jointed/ laminated ensuring elimination of at least 95% of all knots, star shakes and other defects. This gives the wood profiles greater stability and significantly reduces problems such as knot discoloration, yellow blotches and resin lumps in the surface treatment.

Please bear in mind that wood is a natural material, and as such resin lumps may form underneath the paint and discoloration from the wood treatment may occur – even with the best surface treatment.

Small droplets of resin penetrating the paint can easily be removed with rubbing alcohol. If small lumps of resin form underneath the paint, leave them for 2-3 years or until the resin has penetrated the surface treatment, then remove them with rubbing alcohol or, in more serious cases, scrape and sandpaper them

away before applying new paint. Yellow discoloration, which can normally be removed with rubbing alcohol, often occurs on light colour finishes.

The above mentioned problems are often more pronounced during hot summers (tropic climates) and may occur rapidly particularly on facades facing south.

Maintenance of surface treatment – Timber

When cleaning the wooden parts with lukewarm water and a neutral cleaning fluid, check for any damage or wear to the **surface treatment**. If a degraded surface treatment needs restoration, we recommend the following procedure:

KEY FACT

Surface treatment is a process applied to the surface of a material to make it better in some way, for example by making it more resistant to corrosion or wear.

Cleaning

Thorough preparatory work is decisive for the durability and adhesion of the treatment. First, wash thoroughly with water and ammonia or a strong cleaning agent (not dish soap). Scrape off loose paint and remove any resin with rubbing alcohol.

Priming

Exposed wood facing the outside environment must be primed with a clear wood preservative or priming oil. When dry, sand all surfaces and edges lightly with sandpaper and remove the dust with a brush or cloth.

Finish

Finish with two coats of paint of the desired colour. We recommend that you use the same water-dilutable product as the elements were originally treated with.

bright ideas

Energy-Efficient Windows

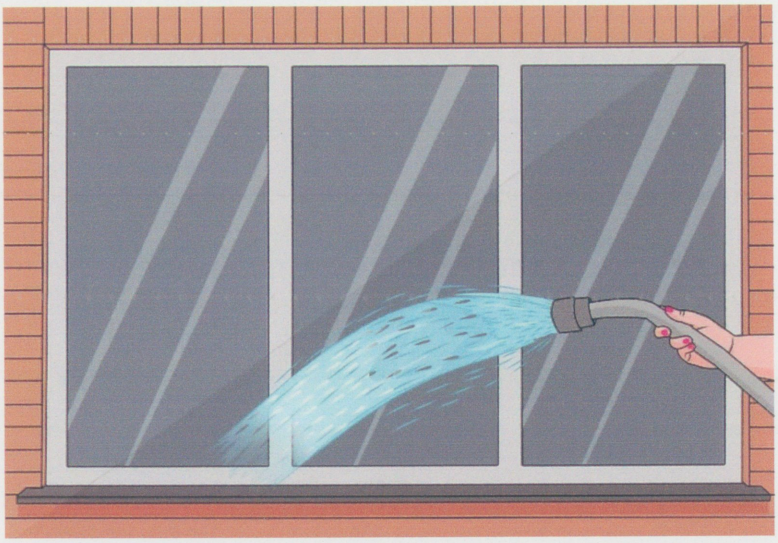
Replacing old windows with more efficient options is one way to significantly reduce your utility costs. Learn about our top picks for new energy-efficient windows from leading manufacturers such as Andersen, JELD-WEN, Marvin, and Pella. With a wide variety of styles and materials, you're sure to find a good match for your home.

Double-hung, casement, and replacement windows clad in vinyl, wood, and fiberglass composite. Learn about low-E glass, glazing options, and environmentally friendly materials.

7.2 CLEAN ALUMINUM WINDOW FRAMES

Aluminum window frames gather dirt and debris over time and lose some of their shine. They require both indoor and outdoor cleaning. Frames can be cleaned with a combination of commercial cleaners and household products. Make sure to follow package instructions on commercial cleaners closely to avoid damaging your window frames.

7.2.1 Cleaning Frames Outdoors

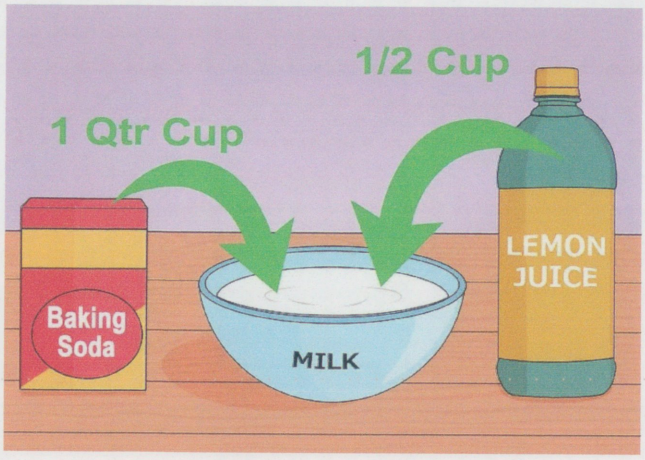


Douse the frames in water. If you have a hose, use this to get the aluminum frames wet. This will help remove a small layer of dirt and grime and make your cleaner more effective. If you do not have a hose, get the frames wet using a bucket of water.

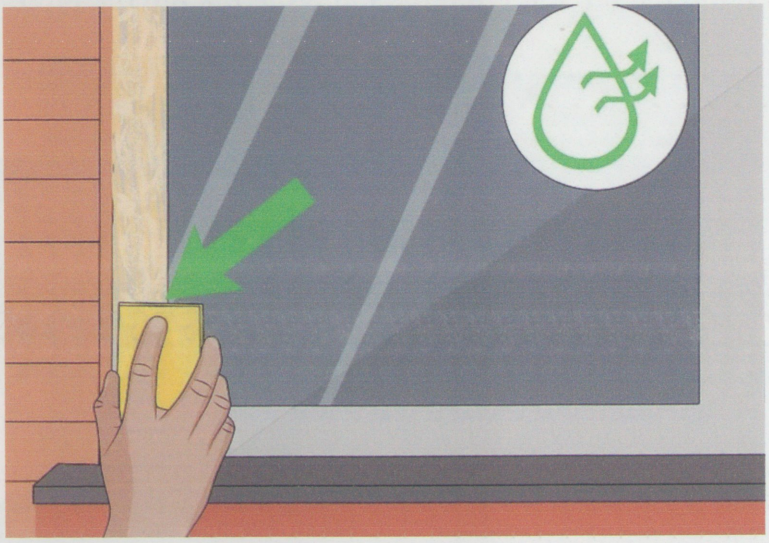


Remove grease spots with a commercial cleaner. Buy a solvent-based cleaner online or at a local hardware store. Make sure the cleaner is safe to use or made specifically to use on aluminum. Obvious grease spots and stains should be treated with a commercial cleaner.

- Refer to the instruction manual for precise instructions. Most cleaners should sit on the stain for a set amount of time before being wiped off. Make sure to completely rinse the cleaner off the aluminum once it has set.
- Look the safety instructions on your cleaner as well. Gloves or goggles may be advised.

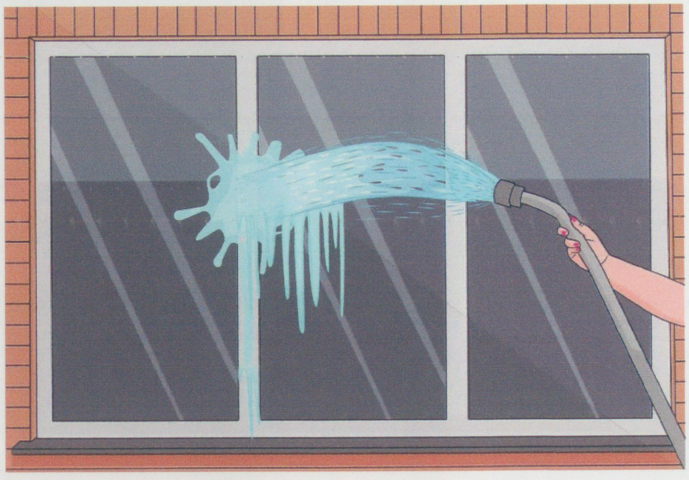


Make a paste with baking soda and lemon juice. Lemon juice and baking soda can clean a lot of dirt and grime off of aluminum and leave it looking shiny. After applying a commercial cleaner to the stains, give the whole frame a scrub with a paste made of ½ cup (120 ml) of lemon juice and ¼ cup (45 g) of baking soda.



Apply your paste. Rub the paste using a sponge or rag. The paste should remain on the window frame until it dries. The precise time this will take depends on the current climate in your area.

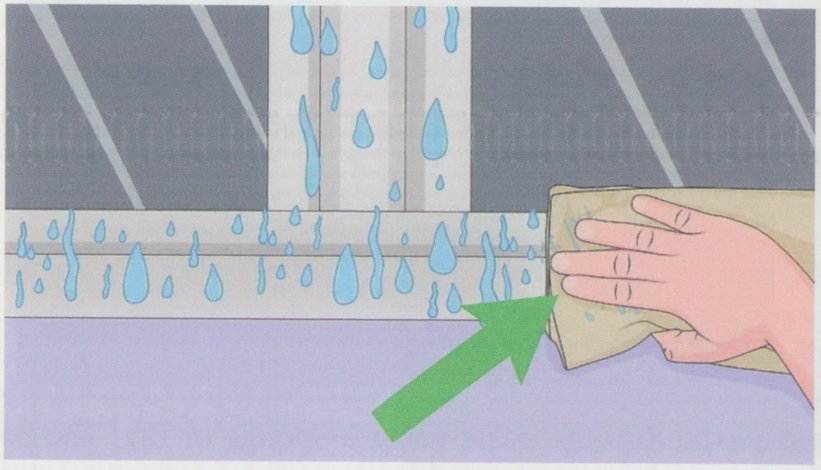
- Make sure you apply the paste to the entire window frame. Do not neglect cracks or crevices in the window.
- If you need a smaller tool, such as a scrub brush, to get into certain places, use that to apply the cleaner.



Rinse the frames. Use a damp sponge to remove the paste after it dries. Use water to rinse off the paint and any remaining traces of your commercial cleaner. Make sure to keep rinsing until the water runs clean. Any lingering residue could damage your windows.

- Polish your frame with steel wool and water when you're finished to make your frames shiny.

7.2.2 Cleaning Frames Indoors



Wipe down the frames with a damp cloth. Get your window frames wet before you begin cleaning. This will loosen dirt and dust, making the cleaning process go smoother. Wet a sponge and run it along the full frame, making sure to get into cracks and crevices as well.

- If certain areas are hard to reach using a sponge, opt for a smaller tool like a scrub brush.



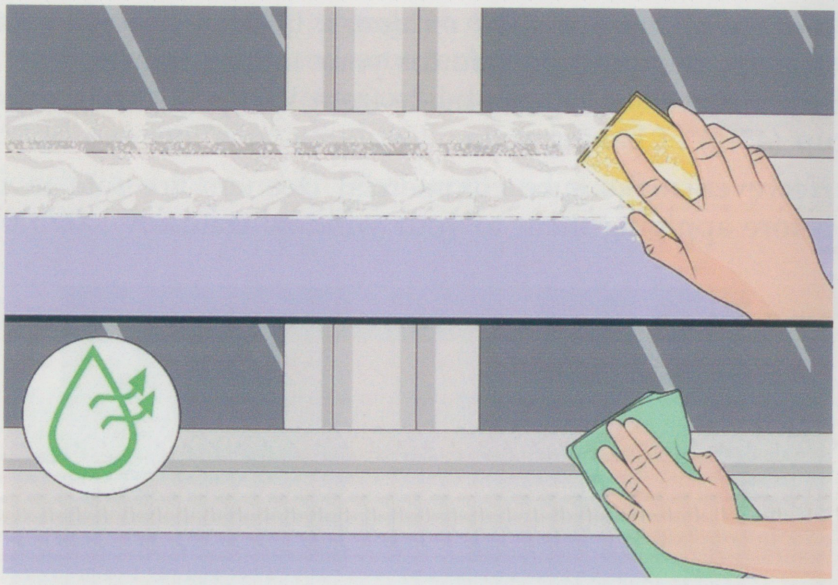
Use the same cleaners you used outdoors. If cleaners were safe for your outdoor frames, they will be safe for your indoor frames. Use a solvent-based cleaner as well as a paste made from ½ cup (120 ml) of lemon juice and ¼ cup (45 g) of baking soda.

- However, make sure commercial cleaners are safe to use inside before applying them to your window frames.



Apply your cleaner with a scouring pad. A scouring pad helps dislodge dirt and debris. When applying your cleaners, do so using a scouring pad. This helps dislodge unwanted debris from your window frames, such as stuck on messes from the kitchen. If you don›t have scouring pads, they can be purchased at most department stores.

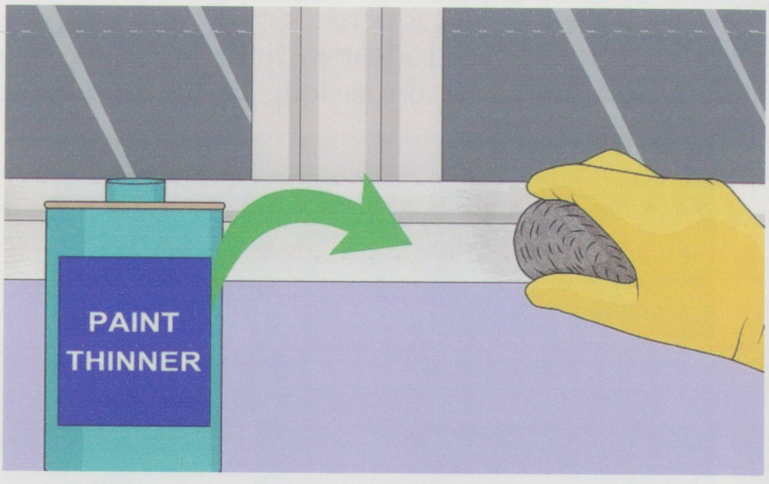
- Apply the solvent-based cleaner first, targeting obvious stains. Allow the cleaner to sit on as long as the package recommends before cleaning it off.
- Apply your lemon juice and baking soda paste second. Let the paste dry before rinsing your frames.



Rinse and dry the frames. Rinse your frames off using a damp sponge. After rinsing them, rub off the remaining water using a dry cloth. Indoor frames will not dry as fast on their own and need to be dried after the cleaning process.

- Polish the frames when you're finished by using a fine steel wool and water.

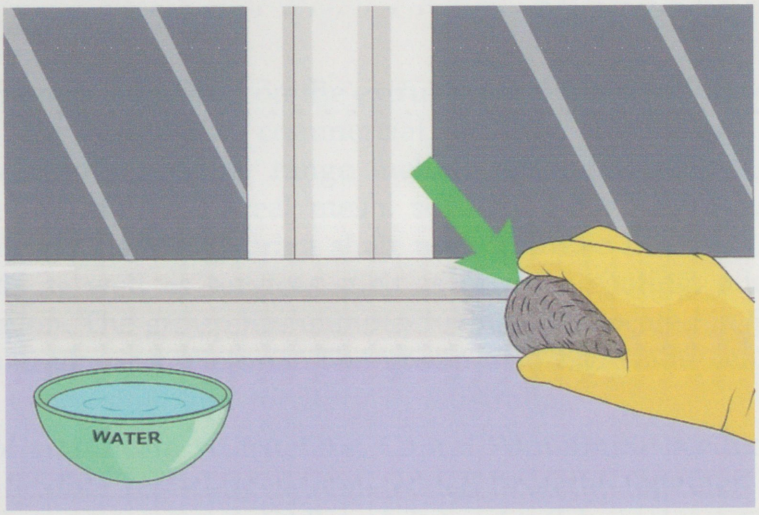
7.2.3 Ensuring a Quality Clean



Use steel wool and paint thinner for tough stains. If you encounter difficult stains that do not come off with a commercial cleaner, paint thinner applied with steel wool can help. Make sure to follow package directions, especially

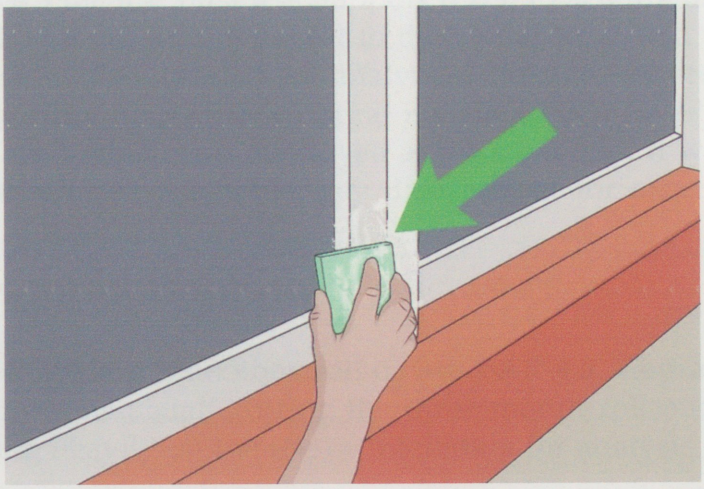
any safety instructions, before applying paint thinner. Then, work the paint thinner into the frames using a steel wool sponge until the stains come off.

- Be gentle when using steel wool to avoid scratching the frames.
- Some steel wool pads have soap built in that can help you clean.



Polish your frames when you're done. After cleaning your frames, they may look a little dull. Apply water using fine steel wool, buffing the surface of the frames until they shine.

- Outdoor frames may become dull due to a process called anodizing. This looks similar to rust and cannot be polished off. Aluminum frames that appear rusty should be treated by a professional cleaner.



Test your product on a small part of the window frame first. Never apply any product, even household products, to the full window frame without testing them first. Before applying a product to your window frame, apply it to a small portion of the frame that›s mostly out of sight. Make sure the cleaner does not cause a negative reaction, such as discoloration, before applying it to the rest of the window frames.

CASE STUDY

Capral Aluminium

The Company

Capral Aluminum is focused on the extrusion and distribution of aluminum products for the residential, commercial, security, automotive & transport industries. Capral's product range include sliding windows and doors, glazed framing, stainless steel mesh, security grills, aluminum roofing, guttering, facade cladding, drive shaft tubing, brake housings, machining bar and rods as well as services such as powder coating, anodising and light fabrication. The group has manufacturing sites located in Queensland, Western Australia and Victoria. The group also has trade centres located throughout every state and territory in Australia.

At a time of significant restructure, Capral Aluminum needed to rapidly establish a flexible reporting system which brought together information from two disparate systems, SAP and Tolas. Staff lacked access to concise information as Capral's sales data was split between two systems. It was essential that their sales and operational personnel be reorganised and that they have a full view of daily sales and customer activity prior to system integration.

Solution

Capral engaged Practical Business Support (PBS) to acquire data from both Tolas and SAP systems and deliver it to their sales team in a way in which they could use it. PBS created an analytical linkage between the legacy systems in transition to SAP 4.6. Capral installed PBS's Sales Management Tool - Intellidata – which was employed at the front end. It was considered that Intellidata offered a reliable, key data output for executive decision making.

Results

This process enabled a smoother roll-out to SAP 4.6. Capral was able to conduct "business as usual" during the three month roll out period, with key staff relying heavily on the use of Intellidata for analysis to assist them

in critical decision making. The work conducted by PBS ensured that the time frame required to become functional on the new system was greatly reduced. Similarly, development work required for transition to the new system was also greatly reduced. The original data and structures provided by PBS were integral to building the new system.

8

WHERE TO SELL FABRICATION

8.1 SELL ALUMINUM FABRICATION

If you are interested in the thriving construction industry, there are loads of businesses you can start in the value chain of this industry and one of them is to go into the manufacturing of aluminum doors and windows.

Aluminum door and window manufacturing is of course one of the many businesses that can be started in any part of the world and the owner of the business can still penetrate the global market by simply exporting his or her products to other countries of the world.

Aluminum doors and windows are basically doors and windows made from aluminum materials and in some cases, these doors are bullet-proof and are used in situations where security is of top priority. It is a known fact that the market for aluminum doors and windows has continued to soar high.

If you are however considering starting your own aluminum door and window manufacturing business, then you must be ready to learn the ropes. Below is a sample aluminum door and window manufacturing business plan template that will help you write your own.

The marketing of your business depends on the budget you have for advertising purposes.

Local market

Marketing your business: You can showcase your business by using local advertisements using print media like using newspaper and other magazines.

Online market

Currently, most people are searching for any products online thus an online presence will improve your business as it makes your business even more visible. You can be transparent enough to display your work and costs

online and by seeing that customers can directly contact you regarding your business.

B2B websites: If you are interested in having orders in bulk then by registering your business on B2B websites like Alibaba, Indiamart, Tradeindia, Exportersindia, is significant.

Brand and uniqueness

Sales department: If your capital permits, you can appoint a sales team to promote your fabrication business in different places. You can also advertise and promote your brand through the recurring clients and request them to spread it to your local customers which will help you to get a few more customers.

Aluminum door and window manufacturing companies manufacture metal doors and door frames. The products made by players in this industry are primarily made of aluminum and steel and are used in a variety of residential and nonresidential facilities, including fire doors and safety exits; they supply doors made from metal for residential, commercial, institutional and industrial building applications.

Please note that the Metal Door and Window manufacturing industry does not manufacture doors with a wood core. Research conducted by IBISWORLD shows that the Metal Door and Window manufacturing industry performance depends on demand from residential and commercial construction, which accounted for a respective 55.7 percent and 29.7 percent of industry revenue in 2017.

As a result, construction trends tend to indicate industry revenue movements. The report further pointed out that construction activity and residential spending in particular, lagged in its recovery. This factor was borne out in the relatively low revenue generated by industry participants.

If you take note of the Metal Door and Window Manufacturing industry, you will notice that the industry performance was initially constrained by weak recovery in residential construction activity, followed by weakening demand from the commercial and industrial construction markets in the latter half of the period.

On the other hand, revitalized residential construction activity since 2013, coupled with continued new product development and branding, has helped domestic metal door makers boost sales during the second half of the period. In addition, input prices have generally trended downward since 2013, helping boost profit margins.

Over the next five years, IBISWorld expects the industry to benefit from accelerating construction activity in the residential and nonresidential sectors

despite rising external competition.

Statistics has it that in the united states of America alone, the Metal Door and Window Manufacturing industry generates over $49 billion annually from more than 7,692 registered and licensed door and window production companies scattered all around the United States of America.

The industry is responsible for the employment of over 187,220 people. Experts project the metal door and window manufacturing industry to grow at a 3.2 percent annual rate between 2014 and 2019. Please note that no company can boast of having the lion share of the available market in the United States of America.

Some of the factors that encourage entrepreneurs to start their own aluminum door and window manufacturing could be that the business is a thriving business and the products can be sold not just in your country but all across the globe because there is a large market for aluminum doors and windows manufactured in the United States of America.

Good enough, there are fewer aluminum door and window manufacturing companies in the United States of America especially when compared to countries like india and China. This in effect means that the industry is not saturated and it is open to interested investors who are ready to tap into the rising activities in the construction industry.

Aluminum Door and Window Manufacturing Co., Inc. is a registered aluminum door and window manufacturing company that will be located in Fargo Moorhead – North Dakota. We have been able to lease a facility that is big enough (a 10 thousand square foot facility) for the kind of standard aluminum door and window manufacturing company that we intend launching.

Aluminum Door and Window Manufacturing Co., Inc. will be involved in manufacturing different sizes and shapes of aluminum doors and windows and also other products such as metal doors and screen doors, architectural and ornamental metal work and grills, diffusers and moldings for acoustical ceiling systems and sheet metal HVAC ducts, culverts and stove pipes et al.

We are set to service a wide range of clientele in and around Fargo Moorhead – North Dakota. We are aware that there are several aluminum door and window manufacturing companies all around the United States of America, which is why we spent time and resources to conduct a thorough feasibility studies and market survey so as to be well positioned to compete with all our competitors.

Aluminum Door and Window Manufacturing Co., Inc. will at all times

demonstrate her commitment to sustainability, both individually and as a firm, by actively participating in our communities and integrating sustainable business practices wherever possible.

We will ensure that we hold ourselves accountable to the highest standards by meeting our customers' needs precisely and completely whenever they patronize our products. Aluminum Door and Window Manufacturing Co., Inc. will ensure that all our customers are given first class treatment whenever they visit our factory.

We have a CRM software that will enable us manage a one on one relationship with our customers (wholesale distributors) no matter how large they may grow to. We will ensure that we get our customers involved when making some business decisions that will directly or indirectly affect them.

Aluminum Door and Window Manufacturing Co., Inc. is owned by O'Brien Smith and his immediate family members. O'Brien Smith has a Degree in Production Engineering with over 15 years' experience in the metal door and window manufacturing industry, working for some of the leading brands in the United States.

8.1.1 Products and Services

Aluminum Door and Window Manufacturing Co., Inc. is in the metal door and window manufacturing industry to manufacture quality and durable products for a wide range of clients and of course to make profits.

We will do all that is permitted by the law of the United States to achieve our business goal, aim and ambition of starting the business. Our product offerings are listed below;

- Manufacturing aluminum doors and windows (both bulletproof and regular)
- Other related products such as metal doors and screen doors, architectural and ornamental metal work and grills, diffusers and moldings for acoustical ceiling systems and sheet metal HVAC ducts, culverts and stove pipes et al.

8.1.2 Mission and Vision Statement

- Our vision is to become the leading brand in the metal door and window manufacturing industry and the pride of the construction industry in the whole of the United States of America.
- Our mission is to establish a world – class aluminum door and window manufacturing business whose products will not only be

retailed in the United States of America, but also be exported to other countries of the world.

8.1.3 Business Structure

Our intention of starting an aluminum door and window manufacturing company is to build a standard business whose products will be exported to other countries of the world. We will ensure that we put the right structures in place that will support the kind of growth that we have in mind while setting up the business.

We will ensure that we hire people that are qualified, honest, customer centric and are ready to work to help us build a prosperous business that will benefit all the stake holders. As a matter of fact, profit-sharing arrangement will be made available to all our senior management staff and it will be based on their performance for a period of ten years or more.

In view of that, we have decided to hire qualified and competent hands to occupy the following positions;

- Chief Executive Officer (Owner)
- Factory Manager
- Human Resources and Amin Manager
- Sales and Marketing Manager
- Aluminum Doors and Windows Manufacturers
- Accountants/Cashiers
- Customer Services Executive/Front Desk Officer

8.1.4 Job Roles and Responsibilities

Chief Executive Officer – CEO:

- Increases management's effectiveness by recruiting, selecting, orienting, training, coaching, counseling, and disciplining managers; communicating values, strategies, and objectives; assigning accountabilities; planning, monitoring, and appraising job results
- Responsible for fixing prices and signing business deals
- Accountable for providing direction for the business
- Creates, communicates, and implementing the organization's vision, mission, and overall direction – i.e. leading the development and implementation of the overall organization's strategy.

- Responsible for signing checks and documents on behalf of the company
- Evaluates the success of the organization
- Reports to the board

Admin and HR Manager

- Responsible for overseeing the smooth running of HR and administrative tasks for the organization
- Maintains office supplies by checking stocks; placing and expediting orders; evaluating new products.
- Ensures operation of equipment by completing preventive maintenance requirements; calling for repairs.
- Defines job positions for recruitment and managing interviewing process
- Carries out induction for new team members
- Responsible for training, evaluation and assessment of employees
- Responsible for arranging travel, meetings and appointments
- Supervises the smooth running of the daily office activities.

Factory Manager:

- Responsible for overseeing the smooth running of the factory
- Part of the team that determines the quantity of aluminum doors and windows and other products that are to be produced
- Maps out strategy that will lead to efficiency amongst workers in the factory
- Responsible for training, evaluation and assessment of factory workers
- Ensures that the steady flow of raw materials to the factory and easy flow of finished products to the market
- Ensures operation of equipment by completing preventive maintenance requirements; calling for repairs.
- Ensures that the factory meets the expected safety and health standard at all times.
- Supervises the workforce in the factory.

Sales and Marketing Manager

- Manages external research and coordinate all the internal sources of information to retain the organizations' best customers and attract new ones
- Identifies, prioritizes, and reaches out to new partners, and business opportunities et al
- Identifies development opportunities; follows up on development leads and contacts
- Responsible for supervising implementation, advocate for the customer's needs, and communicate with clients
- Document all customer contact and information
- Represent the company in strategic meetings
- Help increase sales and growth for the company

Aluminum Doors and Windows Manufacturers

- Responsible for operating machines used in the manufacturing aluminum doors and windows
- Responsible for manufacturing metal doors and screen doors, architectural and ornamental metal work and grills, diffusers and moldings for acoustical ceiling systems and sheet metal HVAC ducts, culverts and stove pipes et al
- Assist in loading and unloading of aluminum doors and windows, and other products into trucks meant for delivery.

Accountant/Cashier:

- Responsible for preparing financial reports, budgets, and financial statements for the organization
- Provides managements with financial analyses, development budgets, and accounting report
- Responsible for financial forecasting and risks analysis.
- Performs cash management, general ledger accounting, and financial reporting
- Responsible for developing and managing financial systems and policies
- Responsible for administering payrolls
- Ensures compliance with taxation legislation
- Handles all financial transactions for the organization

- Serves as internal auditor for the organization

Client Service Executive/Front Desk Officer

- Welcomes guests and clients by greeting them in person or on the telephone; answering or directing inquiries.
- Ensures that all contacts with clients (e-mail, walk-In center, SMS or phone) provides the client with a personalized customer service experience of the highest level
- Through interaction with clients on the phone, uses every opportunity to build client's interest in the company's products and services
- Manages administrative duties assigned by the manager in an effective and timely manner
- Consistently stays abreast of any new information on the company's products, promotional campaigns etc. to ensure accurate and helpful information is supplied to clients
- Receives parcels/documents for the company
- Distribute mails in the organization

8.1.5 SWOT Analysis

Aluminum Door and Window Manufacturing Co., Inc. is in business to become one of the leading aluminum door and window manufacturing companies in the whole of Fargo Moorhead – North Dakota and we are aware that it will take the right business concept, management and organizational structure to achieve our goal.

We are quite aware that there are several aluminum door and window manufacturing companies all over the United States of America and even in the same location where we intend locating ours, which is why we are following the due process of establishing a business.

We know that if a proper SWOT analysis is conducted for our business, we will be able to position our business to maximize our strength, leverage on the opportunities that will be available to us, mitigate our risks and be equipped to confront our threats.

Aluminum Door and Window Manufacturing Co., Inc. employed the services of an expert HR and Business Analyst with bias in manufacturing to help us conduct a thorough SWOT analysis and to help us create a Business model that will help us achieve our business goals and objectives.

Aluminum Door and Window Manufacturing Co., Inc.;

Strength:

Our core strength lies in the high quality of our aluminum doors and windows, closeness to sources of raw materials and of course the power of our team and the state of the art factory that we own. We have a team of highly trained and experienced staff that can produce durable aluminum doors and windows.

We are well positioned in the heart of Fargo Moorhead – North Dakota and we know we will attract loads of clients from the first day we open our company for business.

Weakness:

A major weakness that may count against us is the fact that we are a new aluminum door and window manufacturing company and we don't own our own aluminum ore like other key players in the industry.

Opportunities:

Studies show that the largest market for industry products is the commercial construction market, which purchases sheet metal products such as air ducts, grilles, metal moldings for acoustical suspension ceiling systems, emergency egress doors and exits for use during construction.

Consequently, the value of private nonresidential construction is the primary driver of industry performance. The value of private nonresidential construction is expected to increase in 2019, representing a potential opportunity for the industry.

Threat:

Steel is one of the primary raw materials used in this industry, and its price can fluctuate wildly. Higher prices damage industry profitability because companies cannot always pass on increased prices to the consumer. The world price of steel is expected to decline in 2019. This decline and its historical volatility pose a potential threat to the industry. So also, unfavorable government policies may also pose a threat for businesses such as ours.

8.1.6 Market Analysis

Market Trends

If you are conversant with the trends in the metal door and window manufacturing industry, you will agree that the industry has benefited from improved industrial production and construction activity over the last half a decade.

A close watch on industry activities reveals that the metal door and window manufacturing industry was hit hard by the recent economic downturn and experienced a decline in revenue in recent time. Please note that external factors such as Housing stats and Industrial production index in will impact industry performance and trend.

The aluminum door and window manufacturing landscape has seen tremendous changes in the last 20 years; it has grown from the smaller enterprise to a more organized and far reaching industry. This trend has benefited them in such a way that they can comfortably sell their aluminum doors and windows nationally and also export them to other countries of the world.

Our target market is well defined and in view of that, we have positioned our aluminum door and window manufacturing company to service construction companies, building material retailers and other construction related companies all around Fargo Moorhead – North Dakota and every other location where we intend distributing our products.

We have conducted our market research and feasibility studies and we have ideas of what our target market would be expecting from us.

8.1.7 Competitive Advantage

A close study of the Metal door and window manufacturing industry reveals that the market has become much more intensely competitive over the last decade. As a matter of fact, you have to be highly creative, customer centric and proactive if you must survive in this industry. We are aware of the competition and we are prepared to compete favorably with other leading aluminum door and window manufacturing companies in the industry.

Having a good technical knowledge of the product, access to high quality inputs, optimum capacity utilization, ability to quickly adopt new technology, ability to control total supply on market and upstream vertical integration (ownership links) are part of our competitive advantage.

Our aluminum door and window manufacturing company is located in an ideal property highly suitable for the kind of manufacturing company that we want to run. One thing is certain, we will ensure that we manufacture different sizes and shapes of aluminum doors and windows to meet international standards.

One of our business goals is to make Aluminum Door and Window Manufacturing Co., Inc. a one stop company for construction material retailers and contractors. Our excellent customer service culture, online store, various payment options and highly secured facility will serve as a competitive advantage for us.

Lastly, our employees will be well taken care of, and their welfare package will be among the best within our category in the industry meaning that they will be more than willing to build the business with us and help deliver our set goals and objectives. We will also give good working conditions and commissions to freelance sales agents that we will recruit from time to time.

8.2 SALES AND MARKETING STRATEGY

Sources of Income

Aluminum Door and Window Manufacturing Co., Inc. is in business to manufacture and retail different sizes and shapes of aluminum doors and windows. Our source of income will be the manufacturing and retailing of different sizes and shapes of;

- Aluminum doors and windows (both bulletproof and regular)
- Other related products such as metal doors and screen doors, architectural and ornamental metal work and grills, diffusers and moldings for acoustical ceiling systems and sheet metal HVAC ducts, culverts and stove pipes et al at affordable prices.

8.2.1 Sales Forecast

One thing is certain when it comes to aluminum door and window manufacturing business, if your factory is well located and you have good business network, you will always attract customers cum sales.

We are well positioned to take on the available market in Fargo Moorhead – North Dakota and we are quite optimistic that we will meet our set target of generating enough income/profits from the first six months of operation

and grow the business and our clientele base beyond Fargo Moorhead – North Dakota to other states in the United States of America.

We have been able to examine the metal door and window manufacturing industry, we have analyzed our chances in the industry and we have been able to come up with the following sales forecast.

Below are the sales projection for Aluminum Door and Window Manufacturing Co., Inc., it is based on the location of our business and other factors as it relates to aluminum door and window manufacturing startups in the United States;

- **First Fiscal Year (FY1):** $575,000
- **Second Fiscal Year (FY2):** $975,000
- **Third Fiscal Year (FY3):** $1.95 million

N.B: This projection was done based on what is obtainable in the industry and with the assumption that there won't be any major economic meltdown and there won't be any major competitor manufacturing or retailing same products as we do within same location. Please note that the above projection might be lower and at the same time it might be higher.

- Marketing Strategy and Sales Strategy

Before choosing a location for Aluminum Door and Window Manufacturing Co., Inc., we conducted a thorough market survey and feasibility studies in order for us to penetrate the available market and become the preferred choice for stakeholders in and around Fargo Moorhead – North Dakota.

We have detailed information and data that we were able to utilize to structure our business to attract the numbers of customers we want to attract per time.

We hired experts who have good understanding of the Metal door and window manufacturing industry to help us develop marketing strategies that will help us achieve our business goal of winning a larger percentage of the available market in Fargo Moorhead – North Dakota and throughout the United States of America.

In summary, Aluminum Door and Window Manufacturing Co., Inc. will adopt the following sales and marketing approach to win customers over;

- Introduce our aluminum door and window manufacturing company by sending introductory letters alongside our brochure to construction companies, building materials retailers and contractors and key stake holders in and around Fargo Moorhead – North Dakota

- Make use of attractive hand bills to create awareness and also to give direction to our factory
- Position our signage / flexi banners at strategic places around Fargo Moorhead – North Dakota
- List our business and products on yellow pages' ads (local directories)
- Leverage on the internet to promote our business
- Engage in direct marketing and sales
- Encourage the use of Word of mouth marketing (referrals)
- Join local chambers of commerce and industries with the aim of networking and marketing our products.

8.2.2 Publicity and Advertising Strategy

Despite the fact that our aluminum door and window manufacturing company is well located, we will still go ahead to intensify publicity for the business. We are going to explore all available means to promote our aluminum door and window manufacturing company.

Aluminum Door and Window Manufacturing Co., Inc. has a long – term plan of opening our distribution channel in various locations all around key cities in the United States and Canada which is why we will deliberately build our brand to be well accepted in Fargo Moorhead – North Dakota before venturing out.

Here are the platforms we intend leveraging on to promote and advertise Aluminum Door and Window Manufacturing Co., Inc.;

- Place adverts on community based newspapers, radio and TV stations
- Encourage the use of word of mouth publicity from our loyal customers
- Leverage on the internet and social media platforms like; YouTube, Instagram, Facebook, Twitter, LinkedIn, Google+ and other platforms to promote our business.
- Ensure that our we position our banners and billboards in strategic positions all around Fargo Moorhead – North Dakota
- Distribute our fliers and handbills in target areas in and around our neighborhood
- Advertise our aluminum door and window manufacturing company in our official website and employ strategies that will help us pull traffic to the site

- Brand all our official cars and trucks and ensure that all our staff members and management staff wear our branded shirt or cap at regular intervals.

8.2.3 Pricing Strategy

Aside from quality, pricing is one of the key factors that gives leverage to an aluminum door and window manufacturing company, it is normal for clients to go to places where they can get quality aluminum doors and windows at cheaper prices which is why big players in the industry will always attract loads of clients.

We know we don't have the capacity to compete with leading aluminum door and window manufacturing companies in the United States, but we will ensure that the prices and quality of all our products are competitive with what is obtainable amongst aluminum door and window manufacturing companies within our level.

We are aware that there are one – off supply contracts from government works department and construction giants. We will ensure that we abide by the bidding price template for such contract.

- Payment Options

The payment policy adopted by Aluminum Door and Window Manufacturing Co., Inc. is all inclusive because we are quite aware that different customers prefer different payment options as it suits them but at the same time, we will ensure that we abide by the financial rules and regulations of the United States of America.

Here are the payment options that Aluminum Door and Window Manufacturing Co., Inc. will make available to her clients;

- Payment via bank transfer
- Payment via credit cards
- Payment via online bank transfer
- Payment via check
- Payment via mobile money transfer
- Payment via bank draft

In view of the above, we have chosen banking platforms that will enable our client make payment for the purchase of our aluminum doors and windows without any stress on their part.

8.2.4 Startup Expenditure (Budget)

After due diligence, we noticed that these are the key areas where we will spend our startup capital on;

- The total fee for registering the Business in the United States of America – $750.
- Legal expenses for obtaining licenses and permits as well as the accounting services (software, P.O.S machines and other software) – $3,300.
- Marketing promotion expenses for the grand opening of Perfect Edge® Aluminum Door and Window Manufacturing Co., Inc. in the amount of $3,500 and as well as flyer printing (2,000 flyers at $0.04 per copy) for the total amount of $3,580.
- The total cost for hiring Business Consultant – $2,500.
- The total cost for payment of insurance policy covers (general liability, workers' compensation and property casualty) coverage at a total premium – $9,400.
- The total cost for long – term leasing of a standard production factory – $150,000
- The total cost for remodeling the warehouse – $20,000.
- Other start-up expenses including stationery ($500) and phone and utility deposits – ($2,500).
- Operational cost for the first 3 months (salaries of employees, payments of bills et al) – $100,000
- The total cost for aluminum doors and windows making machines and start-up inventory – $150,000
- The total cost for supply of raw materials – $100,000
- The total cost for store equipment (cash register, security, ventilation, signage) – $13,750
- The total cost for the purchase and installation of CCTVs: $10,000
- The cost for the purchase of office furniture and gadgets (Computers, Printers, Telephone, TVs, Sound System, tables and chairs et al): $4,000.
- The total cost of launching a website: $600
- Miscellaneous: $10,000

We would need an estimate of seven hundred and fifty thousand dollars ($750,000) to successfully set up our aluminum door and window manufacturing company in Fargo Moorhead – North Dakota.

Generating Funds/Startup Capital for Aluminum Door and Window Manufacturing Co., Inc.

Aluminum Door and Window Manufacturing Co., Inc. is owned and financed by O'Brien Smith and his immediate family members. They do not intend to welcome any external business partner which is why he has decided to restrict the sourcing of the startup capital to 3 major sources.

- Generate part of the startup capital from personal savings and sell of stocks
- Source for soft loans from family members and friends
- Apply for loan from the bank

N.B: We have been able to generate about $200,000 (Personal savings $150,000 and soft loan from family members $50,000) and we are at the final stages of obtaining a loan facility of $550,000 from our bank. All the papers and documents have been signed and submitted, the loan has been approved and any moment from now our account will be credited with the amount.

8.2.5 Sustainability and Expansion Strategy

The future of a business lies in the number of loyal customers that they have garnered, the capability and competence of their employees, their investment strategy and the business structure. If all of these factors are missing from a company, then it won't be too long before the business closes shop.

One of our major objectives of Perfect Edge® Aluminum Door and Window Manufacturing Co., Inc. is to construct a business that will survive off its own cash flow without the need for injecting finance from external sources once the business is officially running.

We know that one of the ways of gaining approval and winning customers over is to manufacture and retail durable and quality aluminum doors and windows, and other related products a little bit cheaper than what is obtainable in the market and we are prepared to survive on lower profit margin for a while.

Perfect Edge® Aluminum Door and Window Manufacturing Co., Inc. will make sure that the right foundation, structures and processes are put in place to ensure that our staff welfare are well taken of. Our company's corporate culture is designed to drive our business to greater heights and training and retraining of our workforce is at the top burner.

We know that if that is put in place, we will be able to successfully hire and retain the best hands we can get in the industry; they will be more committed to help us build the business of our dreams.

8.2.6 Why the Aluminium Window & Door Market is growing

Move over PVC-U; Aluminium windows and doors are taking over! That's what all the latest market research into the residential sector reveals. We look at the latest predictions for the growth of aluminium and what this means for domestic window and door fabricators and installers

Aluminium has long dominated the commercial sector, accounting for over 80% of frame material (based on installed value) in 2014, compared to only 6% for PVC-U.[1] Even more impressive, growth rates for Aluminium frames in the same year were over twice that of PVC-U, with a forecast of a 22% growth in aluminium glazing sales by 2019 to £2.7 Billion.

The reason for aluminium's popularity in the commercial sector is its strength, flexibility, durability, and recyclability. This means that lightweight slim frames can hold large pieces of glass securely in place, giving maximum daylight and the widest views. Ideal for the larger windows doors and curtain walling seen in offices, colleges, hospitals, shops and car showrooms etc. Powder coating means minimal maintenance whilst durability gives a 40+ year life expectancy, after which the aluminium frame is 100% recyclable.

Domestic Rising Star

It's been a complete role reversal in the housing market, with over 80% of windows and 50% of entrance doors being PVC-U in 2015, compared to only 6% for aluminium window frames and 20% for aluminium entrance doors. Reasons given for choosing PVC-U in the past have been mainly centred around cost and thermal efficiency.

But all that is changing! With technological advances, aluminium windows and doors can now achieve comparable energy rating to plastic windows. With their slimmer sightlines, elegant looks, lower maintenance and greater durability, aluminium windows and doors win hands down on aesthetics and long-term value for money. Add to that their quality, plus safety and security features and it's no wonder that the tide is turning.



In fact, growth rate forecasts predict that Aluminium will be the new kid on the domestic block. According to the Palmer Report[2], by 2020 the number of aluminium window frames will have risen by 3%, whilst the number of PVC-U frames will have dropped by 5%. And when it comes to entrance doors the predictions are even more striking; an amazing 27% growth in aluminium doors compared to a plummeting 32% drop for PVC-U.

Bring on the Bifolds

One area where aluminium is already way out in front is bifold doors. In 2015 almost 60% of bifold doors in Great Britain were made of aluminium compared to only 27% made using PVC-U. Patio doors are a growth area in the domestic housing market, due to the ongoing trend for family rooms with garden access to bring the outside in and ramp up the daylight internally. Overall patio door installations are forecast to grow significantly by 2020, sliding doors by 5%, hinged doors by 10% and bifold doors by a whopping 44%!



Fabricators and Installers Get Ready!

So, what does all this mean for fabricators and installers? Well for the commercial market it's clear that an aluminium system should be your glazing system of choice.

For the domestic market, it's a little more complex. Many fabricators and installers only offer PVC-U windows and doors, but it's becoming increasingly important for fabricators and installers to also offer aluminium products.

Here's why. According to the latest (2017) Insight Data Fabricator and Installer Report[3], the number of PVC-U window and door fabricators is declining, down 8% on 2014. And it's no wonder that many PVC-U only fabricators have gone out of business – you only need to look at the number of google searches for "PVC Windows" and "PVC Doors" vs Aluminium Windows" and "Aluminium Doors" to see what homeowners want.

Most PVC Fabricators now offer Aluminium Systems

With the increase in competition most PVC-U fabricators now offer alternative systems to make sure they're not missing out on work, to improve customer loyalty and to increase overall margins. Most commonly PVC-U fabricators now also offer aluminium products, but a small number also manufacture timber frames.

Almost half of Installers now fit Aluminium Systems

It's a similar story for installers. Although the number of PVC window and door installers has remained fairly constant since 2014, there has been a massive 40% increase in firms who offer aluminium products. Of the 13,281 window and door installers in 2017, almost half (6,353) now offer aluminium and the trend is expected to continue.

Choose the right aluminium window and door systems

With so many aluminium windows and doors on the market, making sure that you choose the right one to offer to your customers is very important. You should look for:

- High quality products from a trusted systems supplier
- In-house powder coating for a guaranteed finish and an extensive choice of colours
- Fabulous aesthetics with super slim sightlines to maximise daylight and give the widest views
- A variety of design options to offer customers more choice
- A range of patio doors which must include a bifolding option
- Excellent thermal performance with an A or A+ Energy Rating
- Fully tested products for weathertightness and strength
- Windows and doors with enhanced security fully tested to PAS24:2016
- Products that are easy to fabricate, install and adjust

8.2.7 What is the right way to sell double glazing?

Speak to any salesman working for smaller or medium sized companies and they will tell you that they find it easy to sell against the big firms and the sales tactics they employ.

Engage in discussions with other independent window businesses and you'll see a common agreement that there is no place for pressure selling, being in someones home for hours on end, telephone or door canvassing, buy one get one free offers and so forth.

Has the double glazing buying process changed?

The internet has brought a huge amount of information to consumers. Rewind 25 years or so and the general purchasing process of double glazing was vastly different. It was commonplace to get a salesman to come round

your home because that was the way windows were sold.

- The customer had no idea what system they were buying.
- The customer was replacing their windows for different reasons than today.
- The product availability was far more limited.
- The consumer rarely did their own research.
- The availability of information was far less.
- Systems companies never marketed their brand directly to consumers.
- Our lifestyles have drastically changed.

We have long advocated that the traditional sales tactics of many double glazing salespeople are employed simply to secure a sale. Our view is that the reason these sales tactics came about is because of the commission only nature of double glazing sales that is still commonplace today. Also these sales tactics are an integral part of companies that really heavily on lead generation and extensive follow up calls. What is also true is that we remain in a hugely competitive market with no stability or a common theme in window and door prices.

It is right to question whether anyone should be pressured into buying a product, whether there is any logical reason for a salesman to spend hours in the home or whether huge discounting and incentives to buy really work? Does this tactic still work for many companies? Clearly it does if it secures sales. The ethics of it are another subject altogether.

Do high pressure sales tactics work?

Those of us working outside the large double glazing firms continue to question how in today's information age and with more information available to consumers these sales tactics could possibly work.

By nature of the £100m+ turnover of Anglian, Everest or Safestyle consumers surely are quite happy with the buying experience. If not these companies would not sell the sheer volume that they do?

What is a typical double glazing sales process?

For the large companies, sales training is far more important than product training. For many window firms, the traditional method of selling still works. It is all about focusing on the opposite to what the customer expects. Examples include focusing on customer emotion, customer needs, and problems. Other examples of how double glazing is sold includes

focusing on benefits not specifications, focusing on value not price. There are still a large number of businesses that do operate this way. They will confirm established sales tactics, drop closing, telesales, door to door canvassing and huge discounting works for them and generates them sales.

The closing technique or phrase is still used by many. If you've had a salesman visit or been a salesman before, are any of these phrases familiar?

Everyone perceives value differently.

The designer clothing and accessories market is a great example of brand loyalty and extensive marketing. However dig deeper and you'll find that often it is not what it seems.

There is vertical integration in the sunglasses sector. There are huge factories manufacturing many designer clothing or fashion watch labels under one roof. There are even high end, iconic British and international brands having some their goods made in China.

The point here is that we all perceive value and brands differently. Large double glazing firms after so many years trading are cemented in people's minds as the people to go and get a quote from. And let us not forget the multi million pound marketing budgets that these large companies have.

There may also be the issue of trust. The large companies have been trading for several decades and Everest of course has the "fit the best" slogan. You'll know marketing slogans can be embedded in our minds for generations. Is this excellent marketing for Everest continuing to serve them well?

Therefore whilst some criticise the way the larger double glazing companies choose to sell windows, we have to respect consumer choice and perceived value. Some us may know what aluminium system Everest sell under their well known slogan. We in the window industry might not perceive it as the best, but the consumers may well do thanks to excellent marketing over many years and how the salesman ultimately presents the company and the product. The same could be said for any product.

The window industry has knowledge that consumers don't.

It is also right to point out that we in the window industry have access to information that consumers don't. Knowledge is power and knowledge often cements our point of views.

We bemoan the large double glazing firms selling a basic composite door for three thousand pounds to an unsuspecting homeowner. We all express

our disgust at how anyone can get away with selling a door for this amount of money.

But what we have is insider knowledge at what it cost us to buy this door, our labour rates, profit margins and so forth.

The consumers don't!

If the sales process of some is to quote several thousand pounds for a door, discount it and the customer perceives this as getting fantastic value we have to respect that as well. If by sheer size, these companies must sell at a high price in the hope they may get away with as much as possible to cover extensive overheads then that is not just double glazing that does this but many other large firms with huge wage bills, administration/ operational costs and marketing budgets.

In many walks of life we rely on the knowledge of others to help us make a buying decision. It is unfortunate that sometimes this knowledge can be false or misleading. This is frustrating for us in the window industry that sell honestly where some salesmen choose to grossly mislead or criticise the competition in order to sell their own product.

Local window firms are changing double glazing for the better

Via the Aluminium Trade Website we receive enquiries from the general public about home replacement products. As a consequence of this, and our work creating websites and digital advertising solutions, we are fortunate to come into contact with many window companies.



The window industry is investing in showrooms and marketing like never before. Here the Eden Windows Showroom in Kent.

What we have seen after nearly 30 years in the home improvement and construction sector is change. Today's ethical, modern and progressive window companies are vastly different from those of years ago.

- They offer a terrific product range that is varied.
- Window companies are ethical professional and hard working.
- There is a focus on customer service and satisfaction like never before.
- There is huge investment in high quality showrooms and marketing.
- They're shifting from the traditional method of selling double glazing.
- Window companies are working to educate the consumer.

But even whilst the smaller local firm will often offer a bigger and better range, a more personal service and better prices, a buyer has the right to compare one to another, large to small.

Ultimately the buying decision of any consumer is up to them. If they are happy with the price, the perceived quality, discount or incentive to buy, then that decision has to be respected surely?

Selling any product will always be competitive, varied and open to question. However it's not just double glazing. PPI firms and Injury Claim companies are marketing to us via text messages and other methods. It's either the new frustration for consumers or now another tried and tested method of securing sales.

8.2.8 Aluminium Windows: A Buyer's Guide

Modern aluminium windows are a great option for increasing kerb appeal or finishing off a contemporary home. A huge part of your overall project – both in look and feel – it's important to the design right and within budget. Here's where to start...



Aluminium windows have recently become the material of choice when it comes to finishing modern homes and, more increasingly, renovating period-style properties.

Glazing plays a huge part in defining the elevations of a new self build project and refreshing an existing homes' kerb appeal. It's therefore worth prioritising your time when it comes to designing the way you want your aluminium windows to look.

Sleek and versatile, aluminium windows come in all shapes, sizes and colours (yes, companies offer more than just Anthracite Grey). However, it pays to be savvy in your shopping and look out for the best value for money. This means watching out for build quality in terms of finish and security, not just the cheapest price.



What are the Benefits of Aluminium Windows?

One of the main attractions to aluminium windows is their **slim sightlines** that won't break up or look out of place against a large expanse of glazing but there are many more practical advantages to choosing aluminium frames over other materials:

- Lightweight and versatile but durable
- Resilient to warping, corrosion and flexing
- Thermally efficient
- 100% recyclable
- Almost completely maintenance free
- Long lasting (up to 30-40 years)

Do I Need Planning Permission to Change to Aluminium Windows?

Generally, replacing windows falls under Permitted Development but those living in listed buildings, or in designated areas (such as conservation areas or Areas of Outstanding Natural Beauty) may have restrictions to timber or a certain style. If in doubt, check with your local planning authority.

If you're making window openings bigger – or smaller – you may need planning permission, particularly if it may cause overlooking issues.



How Much is an Aluminium Window?

The cost of aluminium windows is naturally dependent on house size and the number of windows being replaced/installed.

When compared to PVCu (also seen as uPVC), plastic windows come out on top in terms of cost (an estimated 20% less than aluminium), but stretching the budget a bit could prove well worth it when build quality and finish are taken into account.

Aluminium windows tend to be most costly than PVCu, but overall more affordable than timber. A major advantage of aluminium is that they won't warp or flex over time and last longer than PVCu, while still being low-maintenance (something timber struggles to offer).



Comparing aluminium and timber windows is pretty much apples and pears: while aluminium offers a contemporary look, very few things rival the period character of timber, and although timber can last decades if cared for properly, aluminium can last just as long without the maintenance.

Composite and timber windows can match aluminium in cost (depending on wood type chosen).

A happy medium can be composite frames which offer the performance of aluminium with the appearance and charm of timber. Some products can also offer different finished inside and out to match the house design best.

Slimline Aluminium Windows

'Flush' is the key word when choosing aluminium as the way the opening and fixed glass elements sit against each other side by side will make an impact of the **slick look** of the finished product.

Uniform sightlines result in **stylish, seamless exterior façades** and many architects and homeowners want a system in which all units are identical.

Sightlines are the visible parts of the window frame and the bars that hold the panes together. The slimmer the sightlines, the less windows impede on a view. Modern aluminium suppliers are striving to offer the slimmest sightlines yet. However, before this snippet lures you in, do some research on what's actually available.

The renaissance of industrial-style and Crittall-style windows had seen a more design-led approach to sightlines. Delicate steel-inspired astragal bars create a contemporary and bold finish that rivals the coveted uninterrupted views to the garden.



What Colours Do Aluminium Windows Come in?

Many manufacturers offer frames prefinished in any RAL colour, which

means greater flexibility when considering the kerb appeal. What's more, companies tend to offer different finishes inside and out. This means while you might want a bright colour outside to a little cheer to a brick facade, paler colours can be chosen to compliment interior design on the inside, and vice versa.

That said, black, grey and anthracite reign supreme for more traditional and period homes as they can replicate slimmer traditional styles in Belgian doors and Crittall-style heritage windows.

Painting Aluminium Windows

Powder coated simply means spraying a polyester powder onto the aluminium to give a uniform and vibrant finish. Powder coating is typically considered to be the highest quality finish for an aluminium window as it is low-maintenance and weather resistant. Fixtures such as handles and hinges can be colour matched, too.

Although it won't produce the same flawless and uniform finish as in a factory, aluminium can be painted 'DIY'. Make sure the aluminium is properly cleaned, sanded and primed before beginning any paint work for the best results.

How to Choose an Aluminium Window Supplier

The rule of thumb is to get quotes from at least three suppliers as there will no doubt be a huge range in amounts. Make sure you compare like-for-like (locks, handles, any required pressings etc) as additional extras might sway your decision.

Remember, buying windows is more than just a pricing game: lead-in times can hugely impact your project. It's important to be aware that a cheap buy with long manufacture and delivery times can delay a schedule and impact other aspects of a build.

Lead-in times are generally dictated by the manufacturers themselves and the industry standard is around four to eight weeks. However, if you're in a pinch, Origin offers an optional 24 hour delivery promise.

Don't forget, as most systems require specialist fitting, you will need to coordinate with a local approved installation firm if the window company doesn't offer a fitting service.



8.2.9 How to Get the Best Aluminium Windows

There can be a huge variety in the quality of the aluminium windows themselves. Good quality companies use prime billets in the manufacture of the windows, rather than cheaper scrap metal. To be sure, ask questions as to the grade of the aluminium used when shopping around.



Premium aluminium should have a smooth and consistent finish so watch out for pitting from when the profile has been heated during powder coating. The die should be polished – reducing corrosion and avoiding contamination on the surface – after each extrusion run to create a high quality finish.

There are huge variations in the quality of how the window has been put together by suppliers. For example, when it comes to composite systems –

which combine two materials, usually timber on the inside and aluminium externally – ensure that the external and internal frame elements are distinct (rather than, for instance, comprising a wooden frame clad on to an aluminium skin).

When comparing products, ask from where the key elements originated and where they were actually manufactured.

Maintenance of Aluminium Windows

Although appealing for their low-maintenance material, to get the best out of aluminium windows minimal effort will be required.

Use a non abrasive cloth and a mild detergent – like baby wash – in warm water to get any marks from frames and to dry with a soft cloth.

Occasionally, you might need to spray the hinges of your aluminium window with silicon spray to lubricate and ensure smooth functionality.



Security Requirements

Most windows and doors manufacturers aim to talk up their products' security but now, thanks to changes to Part Q of the Building Regulations in

2015 and the Secured By Design standards, there are measurable ways of ensuring your choice ticks the boxes.

New builds require accessible windows (basement, ground floor and other easily accessible windows) as part of Part Q to be made to a design that has been shown through testing to meet the security requirements of British Standards Publication PAS 24:2012.



ROLE MODEL

Sanjeev Gupta

Sanjeev Gupta (born September 1971) is an Indian-born British businessman, and the founder of Liberty House Group. He is the CEO and chairman of GFG Alliance which employs more than 35,000 people and annual revenue of US$20 billion.

Early life

Gupta was born in Ludhiana, Punjab, India, the third of four children of Parduman K Gupta who founded the SIMEC Group. Both his father and grandfather were industrialists and businessmen. At age 13 he was enrolled at St Edmund's School, Canterbury, UK as a boarder. After completing his A-levels he spent his gap year selling bicycles in Turkey for his father before enrolling to study Economics at Trinity College, Cambridge. It is there that in February 1992 he founded the Liberty House Group. When the business was generating £1m a day, he switched to economics with management, a move which he claims freed up time to work on the business.

Career

Trading roots

Initially, Liberty House traded steel, rice, sugar, FMCG, engineering and other goods as a part of the family business but it soon diversified into specific commodities and brought together the trading business under three categories—steel, chemicals, and agriculture. In 2009, it entered steel making, buying plants in Africa. A year later in 2010, it was in Asia, setting up the regional headquarters in Singapore and a hub in Hong Kong in 2012 to focus on China.

Industrial expansion

In 2013, Liberty House Group entered the UK through the purchase of Mir Steel UK (previously Aphasteel), a steel mill in Newport, South Wales, stopping it from being shut down. The business was formally re-launched as Liberty Steel Newport in October 2015. In the two and a half years leading up to the re-opening Gupta kept the entire 150 people workforce on half-pay while he tried to get the mothballed site operating again. Liberty

Steel Newport produces hot rolled coil (HRC) for the following industries: construction, automotive, pipes and tubes, structural hollow sections, highway, yellow goods, materials-handling and power.

In November and December 2015 Gupta purchased from administration the UK assets and business of the former Caparo Industries Plc, saving over 1,000 jobs primarily in the West Midlands.

In March 2016 Liberty House reached an agreement for the purchase of the last two previously mothballed steel manufacturing sites in Scotland from Tata Steel UK. The deal, which was brokered by the Scottish Government, was completed on 28 April 2016 when Liberty formally acquired the Clydebridge and Dalzell steel mills. The Dalzell site which manufactures steel plate was re-launched on 28 September 2016 by Scotland›s First Minister Nicola Sturgeon.

In April 2016 when Tata Steel UK announced its intention to sell its UK based operations, Gupta launched a daring bid for the business, and launched Liberty House's Greensteel strategy.

In October 2016, Liberty House launched its steel recycling division called Liberty Metals Recycling.

In November 2016, Gupta finalised his purchase of Tungsten Bank, and renamed it Wyelands Bank, after the country house estate Wyelands he owns near Chepstow.

In November 2016 Liberty House entered into exclusive negotiations with Tata Steel UK for the acquisition of its speciality steels business based in West Yorkshire and China. In February 2017 Tata Steel UK and Liberty House signed an agreement on the purchase, and the deal was completed in April 2017. The acquisition saved 1,700 jobs across sites in Rotherham, Stocksbridge and Brinsworth, Bolton and Wednesbury.

In December 2016, the Gupta-led GFG Alliance completed the acquisition of Britain's last aluminium smelter at Fort William in Lochaber, along with the hydro-power plants at Kinlochleven and Fort William.

In August 2017,[24] Gupta acquired the Arrium steel and mining business in Australia, encompassing primary steelmaking, recycling, distribution and iron ore mining. The new business is conducted under the Liberty brand.

In December 2017, Gupta entered the US market by acquiring the Georgetown steelworks and expanded the US presence by acquiring Export Metals in March 2018. At the end of 2018, he purchased Keystone Consolidated Industries.

During December 2018, Gupta acquired Aluminium Dunkerque, the largest aluminium smelter in Europe. This followed the acquisition of AR Industries, a French aluminium wheel manufacturer.

In April 2019, Gupta acquired a second bank which he renamed the Commonwealth Trade Bank. He then doubled the GFG Alliance workforce in July 2019, by acquiring seven steelworks and five service centres across seven countries in continental Europe from Accelor Mittal.

In October 2019, Gupta consolidated all his global steel businesses to form Liberty Steel Group, which he announced would aim to be the world's first carbon neutral company by 2030. He extended that target to his aluminium businesses, which he grouped together to form ALVANCE Aluminium Group, which he announced in January 2020.

He has been dubbed the man who can save the British steel industry through an approach called Greensteel, and has since been working to apply this model of operation to other countries including Australia and the USA.

Charity

Gupta and his wife Nicola founded the GFG Foundation charity, which was launched in February 2017. The charity aims to develop programmes to develop the skills of young people and boost their employment prospects.

The Foundation expanded to Australia in 2019, with its first programme in Whyalla, South Australia.

Awards and recognition

In May 2017, Gupta was awarded CEO of the year at the Platts Global Metals Awards in London.

In October 2017, he was awarded "Business Leader of the Year" at the British Asian Achievers Awards 2017.

The HRH Prince of Wales appointed Gupta as an official HRH Ambassador for Industrial Cadets in March 2018. Gupta is also a member of the Wall Street Journal CEO council.

Personal life

Gupta's wife Nicola is from Canvey Island, Essex, and was the treasurer of his company. Gupta had kept the relationship secret for seven years before they married in 2008, the family's first cross-cultural marriage. Gupta and his wife own Wyelands, a country house estate near Chepstow in Wales and have a residence in Sydney, Australia. They have three children.

CASE STUDY

Mr & Mrs Spragg, Stotfold, Hertfordshire

At Everest we're proud to say we 'Fit the best', so we end
all our customers happy and totally satisfied. In this case
kindly invited to visit the Spragg family in Stotfold, Hertf
their beautifully decorated uPVC conservatory, installed w
heating to make it extremely cosy and usable, especially
months. The family's love for their new conservatory was ob
confirmed that the room was in constant use by everyon
below to find out how we gave this happy customer a hom
to shout about.



We were originally thinking about completing the conserva
build project but after seeing Everest's Sales Consultant and h
project management team would take care of everything – w
minds and decided to go with the professionals. We weren't
The project management was spot on, with great communicati
plan which they stuck to religiously with no delays through





stalled

white Cheltenham uPVC Conservatory with Blue Ultimate

the Installation

mily purchased their house from new just over 2 years ago. to add an extra room by way of a conservatory when they ere expecting their second child.

Initial Consultation

The Spraggs booked appointments with both Everest and a leading competitor and after seeing both, settled with Everest, taking advantage of our Price Rewind offer and making savings of over £12,000. A contributing factor in choosing Everest was the fact that our sales consultant understood their needs better, listened intently to their wish list and didn't try to persuade them to change their design. He also advised them against adding bi-fold doors due to the expensive small bespoke size that would be required (a decision they are very happy with). Finally, they were highly impressed by the 3D design software they were shown of the final build, not to mention the product and finance knowledge imparted by the sales consultant.

The Survey

As their house was a new property, the house builder had removed the permitted development rights to build a conservatory without applying for planning permission. Our efficient Everest surveyor, offered the full 'turn key' service including obtaining planning on their behalf and this process, according to the customer, was extremely quick and painless and meant their vision was underway.

The Installation Team

Once the planning was through, the build began in January 2017 during an extremely cold spell and the family felt sorry for the team due to the extreme conditions. Richard Spragg was keen to confirm that all members of the team were very considerate, keeping the site clean and tidy at all times and he was particularly impressed that they went to great lengths to protect the lawn from damage whilst working. All of the contractors were complimentary about Everest as a whole and their project manager was constantly on the telephone making sure things were running smoothly. The whole build went without a hitch and much better than the family had dared hope, with them barely knowing the contractors were there at times.

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Entrepreneur's Guide: Aluminum Door Window Manufacturing

Aluminum is widely used in construction. Closely related to the steel industry is the aluminum industry. While the steel industry dominates the ferrous metals category, aluminum is the most important nonferrous metal used in building construction. The production process of aluminum involves mining of bauxite, the basic raw material, refining of bauxite to alumina, conversion of alumina to aluminum ingots in a smelter plant, and semifabrication of the ingots through rolling and extrusion. It can be fabricated into different architectural products like windows, doors, handrails, partitions, false ceiling, louvers, etc. To meet the ever increasing demand in aluminium fabrication, expert technicians are required for fabrication and erection of the products. Aluminum fabrication business is exceedingly worthwhile on the grounds that it manages a fundamental component in building development. Any house is inadequate without legitimately introduced windows and entryways.
Entrepreneur's Guide of Aluminum Door Window Manufacturing is intended to provide the required competencies in a learner for entrepreneurship in the operation, installation and maintenance of specialized machinery to manufacture aluminum products. In this guide, a basic overview of aluminum fabrication, from properties to fabrication techniques to industries and applications is given. It will develop the competencies for learners to perform aluminum work in the construction industry. The guide also provides the basis upon which further related learning and career development can take place. It covers on entrepreneurial competencies, financial accountancy and management, legal aspects, and regulatory aspects of SMEs. It also details on aluminum door window producing manufacturing with various kinds of casings, fittings is a beneficial manufacturing opportunity around the world. Aluminum created things like doors, windows, staircase, handrails, backings, and railings for buildings. If you want to know what it takes to be a successful aluminium fabrication business owner or how to get your business to the next level? Then this book is the ultimate guide that is straight to the point about what you need to know and how to do it.

The Book comes with a companion DVD for rich learning experience, which includes:

1. E-Book with further reading and learning links.
2. Interactive E-lecture of each chapter. E-lectures are expressive, informational, entertaining and persuasive, it uses the tool of self-exploration, which makes it easy to learn and understand each topic in detail. It is very informative as concrete details are provided and also entertaining, as graphics and other visuals are provided to make the learning process more interactive.
3. Video Lecture of each chapter, which explains each topic in detail with examples, animations, images and text and makes it easy to understand the topics in easier, simpler and better way.
4. Huge Database of Interactive Assessments for each chapter, which is also printable.
5. Further reading and learning links for each topic.
6. Glossary and Notes for each chapter to understand each chapter with to the point information.
7. The DVD also includes a printable workbook, which walks through with a various sets of questions and choices and assists in completing the curriculum. The workbook covers; Learning Objectives, Essential Concepts, Matching Definitions, Study Problem, Questions, Fill in the Blanks and Answers.
8. Review Questions for each chapter are also given in the DVD, which are also printable.

The DVD is also a useful tool for teachers to teach with digital resources in classroom and do a great job of illustrating skills and techniques that are otherwise difficult to explain.

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