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It is recommended that this practical report provided

By

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Entitled

**THE INSTALLATION OF ALUMINUM TOP HUNG WITH FIX GLASS WINDOW
AND ALUMINUM SLIDING GLASS DOOR**

Accepted in partial fulfilment of the requirements for obtaining a Diploma in Building.

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STUDENT DECLARATION

I declare that this practical report is the result of my own research except as express through practical training that I went through for four month from 12 May 2014 to 29 September 2014 at ALUBINA SDN BHD. It is also as one of the requirement to pass the course DBN307 and it submitted in partial fulfilment for obtaining Diploma in Building

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Date : 30 SEPTEMBER 2014

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Thank you.

ABSTRACT

Windows and doors are one of important design elements for any construction needs. They help to link our home to the outside and make it brighter and living spaces feel wider. By far one of the main benefits of aluminum doors and windows is the inherent strength with slim sight lines. The method of installation aluminum top hung with fix glass and aluminum sliding door is about all steps, proper procedure and all requirements. This report is aim to identify and studying the method of procedure for installation of Aluminum side hung with fix glass window and sliding glass door, identify and understanding the defect of opening and how to solve it and identify and understanding the component and tools used for installation. This report are hereby provided by using 3 types of methodology which is an observation works, research or revision works and interview sessions from individuals involved. . The content of this report is more to give knowledge about components and elements which will be used for this specific type of windows and doors installation, be more aware in selecting the appropriate tools and machineries to be used and the most important is to give clear information of method of installation aluminum top hung with fix glass and aluminum sliding door and checking the defect of the works.

CONTENTS	PAGES
Acknowledgement	i
Abstract	ii
Content	iii
List of Figure	v
List of Photo	vi
List of Table	vii
List of Abbreviations	viii
CHAPTER 1.0 PREFACE	
1.1 Introduction	1
1.2 Objective	2
1.3 Scope of study	3
1.4 Method of study	4
CHAPTER 2.0 COMPANY BACKGROUND	
2.1 Introduction	5
2.2 Company Profile	6
2.3 Company Objective	7
2.4 Organizational Chart	8
2.5 List of project	
2.5.1 List of On-going Project	9
2.5.2 List of Complete Project	11
CHAPTER 3.0 CASE STUDY	
3.1 Introduction	15
3.2 Background of project	16
3.3 Installation of Aluminium Top Hung	17

3.3.1 Component and Element	18
3.3.2 Method statement for Installation Aluminum Top Hung	25
3.4 Installation of Aluminium Sliding Door	36
3.4.1 Component and Element	37
3.4.2 Method statement for Installation Aluminum Sliding Door	47
3.5 Tools and Machineries	53
3.6 Checking Defect for Aluminium Top Hung and Sliding Door	56
CHAPTER 4.0 CONCLUSION	
4.1 Problems and Solutions	58
4.2 Recommendations	64
4.3 Conclusion	65
REFERENCES	
Appendix A: Roof Plan Drawing	66
Appendix B: Approval on Shop Drawing	67
Appendix C: Method Statement of SMAW	68

CHAPTER 1

INTRODUCTION

1.1 Introduction

Windows and doors are one of important design elements for any construction needs. They help to link our home to the outside and make it brighter and living spaces feel wider. By far one of the main benefits of aluminum doors and windows is the inherent strength with slim sight lines. This means greater flexibility for window frames as the aluminum can be worked into slim frames. Aluminum provides not only greater strength but is also more resistant to the elements and thus not likely to warp or rot. It is a material with a high strength to weight ratio that is easily formed into many shapes and configurations, remaining the most common commercial framing material.

There are many types of windows and doors in construction field these days such as top hung window, fixed window, sliding window and others. But, in this report, it only will focuses on 2 types of opening which is, Aluminum sliding glass door and Aluminum top hung casement window.

This report is different than others because, all the contents in this report are hereby provided by using 4 types of methodology which is an observation works, research or revision works, interview sessions from individuals involved and searching from internet. These 4 type of methodology is done to help collect crucial information by practical method on proper to do an installation of an Aluminum top hung with fix glass window

and sliding glass door and also how to check the problem and defect to solve it which no other books or articles had written before.

Besides review on procedures of installation, this report will help to understand all the components function and tools needs for completing this installation work. Step by step from the moment get architecture drawing and building quantities to determine type, size and quantities of window and door. All the problems relate to windows and doors installation also will be generally review along with its recommendation on how to solve it.

1.2 Objective Reports

Objective of this practical training report is to identify more precisely on how Aluminum top hung windows and sliding doors are installed at site. Other objectives are:

- 1.2.1. To identify and studying the method of procedure for installation of Aluminum side hung with fix glass window and sliding glass door.
- 1.2.2. To identify and understanding the defect of opening and how to solve it.
- 1.2.3. To identify and understanding the component and tools used for installation of side hung with fix glass window and installation of sliding glass door.

1.3 Scope of Report

Installing an Aluminum top hung with fix glass window and sliding glass door are practically review on methodology of scope of study for this report. Besides getting more knowledge on components function and tools needed to complete the whole step of installation, it also will help to provide more information on why aluminum is used as a frame that hold panels of glass and track for sliding door compared to other material used in construction field these days.

Therefore, this scope of study is done only under project named, MESSRS Sime Darby Sungai Kantan Development SDN. BHD., which is to “Proposed & Developed the Semi-Detached Houses Double Storey” is located at Lot 34662, Saujana Impian, Mukim Kajang, Daerah Hulu Langat, Selangor, Darul Ehsan. The actual owner of this land for MESSRS Sime Darby Sungai Kantan Development SDN. BHD. project is B&G Corporation Sdn. Bhd.

1.4 Method of study

The methodology that used to ensure this report completed are:

1.4.1. Site visit

Site visit is needed to ensure all the details work are supervised properly. Pictures is taken for this report to showing the precise work of installation. Some of the pictures are about tools, machineries, components and any other elements for these two type of installations.

1.4.2. Review document and information

Files, documents and drawing plan is needed to complete this report. This documents and files is revised as revision to ensure that all the works are done according to its step. Document and files from last project be a revision for me to add any information about the company. Such as method statement, company profile and weekly report

1.4.3. Interview

Interview session is need to be done to collect more information about installation of Aluminum top hung windows and sliding glass doors. This interview sessions is done with many individuals at Alubina Sdn Bhd. Some of the interview individuals are site supervisor, engineer, and workers.

1.4.4. Search from internet

To add more information in this report, information from internet is taken to increase the information, knowledge to complete this report.

LIST OF FIGURE

Figure 2.1	: Company Organizational Chart.	8
Figure 3.1	: The Design for Top Hung Window.	17
Figure 3.2	: Top Hung Aluminium Profile.	18
Figure 3.3	: Aluminium Profile.	19
Figure 3.4	: Dimension of Friction Stay.	21
Figure 3.5	: Type of Gasket	24
Figure 3.6	: Type of Sliding Door Used	36
Figure 3.7	: Dimension of Aluminium Track	39
Figure 3.8	: Glass Roller System	40
Figure 3.9	: Installation of Floor Guide	43
Figure 3.10	: Installation of Sliding Door Handle	46
Figure 4.1	: Aluminium Sub frame And Inner	58
Figure 4.2	: New Dimension of Inner	61

LIST OF PHOTO

Photo 3.1	: Plan and Front Elevation	16
Photo 3.2	: Sample of Aluminium Top Hung	19
Photo 3.3	: 6mm Clear Float Glass	20
Photo 3.4	: Friction Stay	20
Photo 3.5	: Type of Handle Use	22
Photo 3.6	: Type of Handle Use	22
Photo 3.7	: Silicone N- Sealant	23
Photo 3.8	: Silicone Allfix Acrylic	23
Photo 3.9	: Gasket at Top Hung	24
Photo 3.10	: Example of Tempered Glass	37
Photo 3.11	: Aluminium Sliding Track	39
Photo 3.12	: Roller that Use	41
Photo 3.13	: Roller Stopper	41
Photo 3.14	: Floor Guide	42
Photo 3.15	: Floor Guide that Use	42
Photo 3.16	: Wool Pile	43
Photo 3.17	: Bracket	44
Photo 3.18	: Wall Plug	44
Photo 3.19	: Type of Sliding Door Handle	45
Photo 3.20	: Handle that used	46
Photo 4.1	: Top Hung	62
Photo 4.2	: Black Rubber Tape	62

LIST OF TABLE

Table 2.1	: Company Profile	6
Table 2.2	: List of On-going Project	9
Table 2.3	: List of Complete Project	11
Table 3.1	: Size of Friction Stay	21
Table 3.2	: Aluminium Sliding Door Track	38

LIST OF ABBREVIATIONS

FCAW	Flux Core arc Welding
CIDB	Construction Industry Development Board
MAA	Malaysia Architects Association
MRO	Maintenance Repairing and Overhaul
DSSB	Defense Services Sdn. Bhd.
CNC Profile	Computer Numerical Control Profile Cutting
ASTM	American Society for Testing and Material
AWS D1.1	Structural Welding Code steel
BS-EN ISO	British Standard European Normal International Standards Organizations
SSPC	Society for Protective Coatings

CHAPTER 2

COMPANY BACKGROUND

2.1 Introduction

Preserver Bina Sdn. Bhd. (610805-M) was incorporated in April 2003 as a general contractor with a steel fabrication factory. Its long list of services includes the construction of Factories and Warehouses, Power Generation, Petrochemical and Oleo Chemical Plants, Heavy Equipment Installations, Bridges and Infrastructural, Architectural Steel Structures, Commercial Buildings and High Rise Buildings, High-end Show Units, Bungalows and Residential Buildings. It's registered as a Grade 7 Contractor with the Construction Industry Development Board Malaysia (CIDB) and within a decade, this company has secured the prestigious ISO 9001:2009 Award. Preserver Bina assures the best performance to deliver results as promised and work towards win-win deals.

Preserver Bina Sdn. Bhd. is located at Lot 8292, No.2, Tingkat 1, Jalan Istimewa, Kg Batu Belah, 41150 Klang, Selangor Darul Ehsan. This company also have their own Steel Fabrication factory which is located at No.22A, Jalan Tiara 5, Bandar Baru Klang, 41150, Klang, Selangor Darul Ehsan. This company is headed by a Chairman of Preserver Bina Sdn Bhd, Mr. Khoo Aun and three members of the Board of Directors which are Mr Wong Kok Meng, Mr Soon Kian Eng and Mr Khoo Beng Seong.

In 17th April 2009, Preserver Bina Sdn. Bhd. had established a new subsidiary to facilitate their work of the construction as known as Alubina Sdn. Bhd. Alubina's range

of aluminium & glazing works. Their services include fabricate and install of Aluminium and backed by very experienced technicians and professional knowledge to ensure high quality products to fulfil client needs.

2.2 Company Information

Company Name	PRESERVER BINA SDN. BHD. (610805-M)
Partner Name	ALUBINA SDN. BHD.
ROC Registration No	853439-K
Incorporated on	17 April 2009
Address (Office)	Lot 8292, No.2, Tingkat 1, Jalan Istimewa, Kg. Batu Belah, 41050, Klang, Selangor Darul Ehsan
Address (Factory)	No.22A, Jalan Tiara 5, Bandar Baru Klang, 41150, Klang, Selangor Darul Ehsan
Directors	Khoo Beng Aun, Wong Kok Meng, Soon Kian Eng Khoo Beng Seong
Tel. No.	
Fax No.	+603-33437023
Email Address	alubinasb@gmail.com

Table 2.2: Company Profile

2.3 Company Objectives

Preserver Bina Sdn. Bhd. aims to get better and stay ahead from other companies in the industries, so that they can remain as the preferred choice in General Construction, Infrastructural projects and Steel Fabrication.

Mission

Preserver Bina Sdn. Bhd. dedication is to constantly improve in all aspects of operations more than just a daily lived philosophy. It's what keeps Preserver Bina Sdn. Bhd. ahead. This company goes the extra mile, design and delivers what clients expect, and it is backed by a great multi-talented team with ultimate potentials. Together this company will drive to take on the most challenging of projects.

Within a short span of less than a decade, this company has made it mission and become one of the most reliable forces in the industry, by mobilizing they edge of technical expertise to transform every projects assigned into a benchmark of excellence.

Vision

Preserver Bina Sdn. Bhd. aims to keep getting better and stay ahead.

2.4 Company Organizational Chart

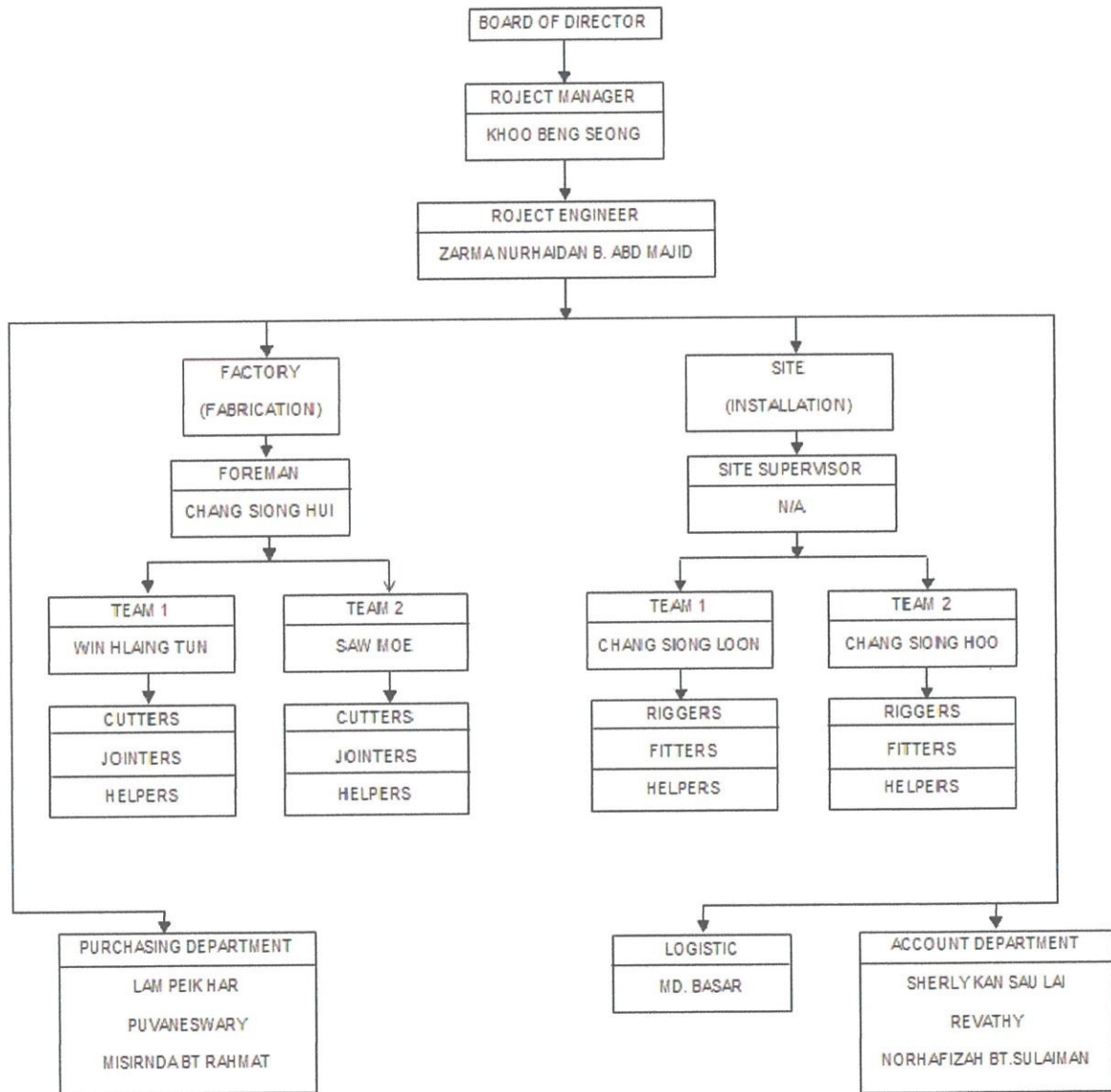


Figure 2.1: Company Alubina Sdn. Bhd. Organizational chart

2.5 List of Projects

2.5.1 List of On-going Project

Table 2.2 List of On-Going Projects

Bil	Project	Scope Of Works	Contract Value (RM)	Completion Date
1.	Samudera Kargo Sdn. Bhd. Proposed Developed The Process Plant & Factory At Lot 26018 (PT 17308), Jln Keluli 2, Bukit Raja Perdana, Mukim Kapar, Daerah Klang, Selangor Darul Ehsan.	- Aluminum Louvers - Glass Mirrors - Aluminum Windows - Aluminum Doors - Glass Canopy	850,000.00	30.08.2014
2.	KLK OM 077 Oleomass Sdn. Bhd Proposed Developed Of Manufacturing Maintenance Repair And Overhaul And Office Facalities At Lot 135940, Jln Sg. Pinang 5/18, FASA 2D, Seksyen 5, Taman Perindustrian Pulau Indah, Klang, Selangor	- Aluminum Louvers - Glass Canopy - Glass Mirrors - Glass Doors - Aluminum Doors - Aluminum Windows - Composite Panels	16,200,000.00	10.06.2014
3.	Saujana Impian B&G Sdn. Bhd Proposed To Build 30 Units 3 storey Semi-Detached House, 6 Units Villa At Saujana Impian, Kajang, Selangor	- Glass Canopy -Glass Mirrors - Aluminum Windows - Aluminum Doors - Swing door - Sliding Door	540,000.00	10.10.2014

Bil	Project	Scope of works	Contract Value (RM)	Completion Date
4.	<p>MB Kinrara BMW Showroom</p> <p>Proposed To Build A Unit of Showroom And Service Manangement 6 Floor At Lot PT 8417 (HSD 288475), Jln BK 1/14, Taman Perindustrian Bandar Kinrara, Selangor Darul Ehsan.</p>	<ul style="list-style-type: none"> - Aluminum Louvers - Glass Canopy - Sun Louvers - Fix Glass Panel - Glass Shower Screen - Aluminum windows - Aluminum doors - Composite Panel 	1,800,000.00	21.12.2014
5.	<p>Nestle Bintang Shah Alam, McConenell Dowel</p> <p>Proposed Development Process Plant & Factory At Lot 5 Jalan Playar 15/1, Kaw. Perindustrian Shah Alam, 40000, Shah Alam, Selangor Darul Ehsan</p>	<ul style="list-style-type: none"> - Aluminum louvers - Glass Doors - Glass Mirrors - Aluminum Doors - Aluminum Windows - Sun Louvres 	760,000.00	15.01.2015

Sources: Alubina Sdn. Bhd. (2014)

2.5.2 List of Complete Projects

Table 2.3 List of completed projects

Bil	Project	Scope Of Works	Contract Value (RM)	Completion Date
1.	DRB-Hicom Defence Technologies Sdn. Bhd Proposed Upgrading Of Manufacturing Maintenance Repair And Overhaul (MRO) And Office Facalities At Deftech Pekan, Pekan, Pahang Darul Makmur.	- Aluminum Louvers - Glass Canopy - Glass Mirrors - Glass Doors - Aluminum Doors - Aluminum Windows	265,000.00	07.04.2013
2.	Defense Services Sdn. Bhd, Proposed Upgrading Pf Manufacturing Maintenance Repair & Overhaul (MRO) And Office Facalities At DSSB Nilai, Negeri Sembilan Darul Khusus.	- Curtain Walls Systems - Glass Canopy - Alu. Louvers Door -Glass Mirrors - Aluminum Windows - Aluminum Doors	183,000.00	29.03.2013
4.	Datin Sri Azian bt.Abdul Talib Proposed To Build A 3 Storey Bungalow House With Swimming Pool At Pt 2995 (Lot 6056), Jln. 7 Kemensah Height, Mukim Ulu Kelang, Daerah Gombak, Selangor	- Aluminum Louvers - Glass Canopy - Sun Louvers - Fix Glass Panel - Glass Shower Screen - Aluminum windows - Aluminum doors	550,000.00	01.03.2013

Bil	Project	Scope of works	Contract Value (RM)	Completion Date
6.	Metropolitan Square Proposed Construction Of Commercial Mixed Construction At PT 44014 Jln. PJU 8/1, Petaling Jaya, Selangor Darul Ehsan.	- Glass Canopy With Spider System. - Alu. Composite Panels. - Sun Shade Devices. - Stainless Steel Copping. - Fixed Glass Panel.	320,000.00	30.09.2012
7.	Port Dickson Learning Centre (PDLC) Proposed Development Learning Center At Lot 1888, Mukim Pasir Panjang, Daeran Port Dickson, Negeri Sembilan, Darul Khusus.	- Glass Canopy - Sun Louvers - Glass Shower Screens -Glass Doors -Glass Windows - Aluminum Windows - Aluminum Doors	380,000.00	12.02.2007
8.	Management Science University (MSU) Proposed Construction & Development At MSU (Management Science University) At No.4 Persiaran Olahraga, Kawasan Perindustrian Seksyen 13, 40100, Shah Alam, Selangor, Darul Ehsan.	- Glass Canopy - Alu. Composite Panels. - Aluminum Louvers.	2,700,000.00	12.01.2012

Bil	Project	Scope of works	Contract Value (RM)	Completion Date
9.	Valsar Oil & Gas Factory, Proposed Valsar HQ Office And Factory At PT 1082 (Lot 3), Nilai Utama, Mukim Sentul, Seremban, Negeri Sembilan, Darul Khusus.	- Glass Curtain Wall - Glass Mirrors - Glass Doors - Aluminum Doors - Aluminum Windows	400,000.00	30.12.2011
11.	Auto Part Manufacturers Co. Sdn.Bhd. Proposed Construction For Office Renovation At Lot 600, Jln Raja Lumu, Kws. 12, Kaw. Perindustrian Pendamaran, Pelabuhan Klang, Selangor, Darul Ehsan.	- Glass Curtain Walls - Alu. Composite Panels. - Aluminum Louvers - Aluminum Doors. - Aluminum Windows	150,000.00	01.08.2011
12.	Barny Callebaut Factory Proposed Factory At Lot 2, Lebuh Sultan Muhammed 1, Kaw. Perindustrian Bandar Sultan Sulaiman Pelabuhan Klang, Selangor, Darul Ehsan.	- Alu. Composite Panels. - Aluminum Louvers - Glass Canopy - Aluminum Doors - Aluminum Windows	350,000.00	30.17.2011
13.	Sipro Plastic Industries Sdn. Bhd. Proposed Construction Office And Factory At Pt 7422, Lot 9399, Jln. Jasmine, Beruntung, Mukim Serendah, Selangor Darul Ehsan.	- Sun Louvers - Aluminum Louvers - Aluminum Doors - Aluminum Windows	100,000.00	25.05.2011

Bil	Project	Scope Of Works	Contract Value (RM)	Completion Date
14.	Madam Esther Ng Proposed To Build 1 Unit Of 2storey Bungalow At No.13, Jalan BK 6B/13, Banfar Kinrara, Puchong, Selangor Darul Ehsan.	- Aluminum Louvers - Sun Louvers - Glass Canopy - Fixed Glass Panels - Aluminum Doors - Aluminum Windows	250,000.00	25.03.2011
15.	Madam Lai Shuh Bin Proposed To Build 1 Unit Of 2 Storey Bungalow At Jalan Setia Nusantara U13/22C, Setia Eco Park, Section U13, Shah Alam, Selangor Darul Ehsan.	- Aluminum Louvers - Sun Louvers - Glass Canopy - Fixed Glass Panels - Glass Shower Screens - Aluminum Doors - Aluminum Windows	320,000.00	15.01.2011
16.	Proposed To Build 4 Units 3 storey Semi-Detached House, Lot 27695, 27696, 27697, 27698, Taman Gembira, Jalan Kuchai Lama, Petaling Jaya, Selangor, Darul Ehsan.	- Aluminum Louvers - Sun Louvers - Glass Canopy - Aluminum Doors - Aluminum Windows	550,000.00	04.03.2011

Sources: Alubina Sdn. Bhd. (2014)

CHAPTER 3

THE INSTALLATION METHOD OF ALUMINUM TOP HUNG WITH FIX GLASS WINDOW AND ALUMINUM SLIDING DOOR

3.1 Introduction

Windows and doors are one of important design elements for any construction needs. They help to link our home to the outside and make it brighter and living spaces feel wider. By far one of the main benefits of aluminum doors and windows is the inherent strength with slim sight lines. Aluminum provides not only greater strength but is also more resistant to the elements and thus not likely to warp or rot. It is a material with a high strength to weight ratio that is easily formed into many shapes and configurations, remaining the most common commercial framing material.

There are many types of windows and doors in construction field these days such as top hung window, fixed window, sliding window and others. But, in this report, it only will focuses on 2 types of opening which is, Aluminum sliding glass door and Aluminum top hung casement window. Sliding glass door and top hung window, both needs a component and element. Examples of components needed are frames, window friction stays, sliding door aluminum track, tempered glass, accessories handle, and gasket rubber. All these components have their own function to help installation work done properly.

In addition, this report will comprehensively guide to all aspects of window and door work on installation and checking the defect. This report will also come out with

complete guidance and understanding the tools needed to be used in every aspect of procedure to get a proper installation of sliding glass door and aluminum side hung window especially at site.

3.2 Background of project

Project name is MESSRS Sime Darby Sungai Kantan Development SDN. BHD., which is to “Proposed & Developed the Semi-Detached Houses Double Storey” is located at Lot 34662, Saujana Impian, Mukim Kajang, Daerah Hulu Langat, Selangor, Darul Ehsan. The actual owner of this land for MESSRS Sime Darby Sungai Kantan Development SDN. BHD. project is B&G Corporation Sdn. Bhd.

It is contain 1 block of double-storey villa house (type E), 6 blocks of double-storey house (type A), 6 block of double-storey house (type B), 7 blocks of double-storey house (type C), 7 blocks of double-storey house (type D), 1 unit of Canteen/ Surau/ and Driver’s room, 2 unit of Guardhouse and Weighbridge, 1 unit of TNB (Tenaga Nasional Berhad) building, 1 unit of Effluent Treatment Plant block, 1 unit of Recycleable Material block, 1 unit of Effluent Treatment Material block, 1 unit of Natural Gas Storage, 1 unit of Hydrogen Gas Storage, 1 unit of Refuse Chamber, and last but not least Parking lot for car and motorcycles with roofing.

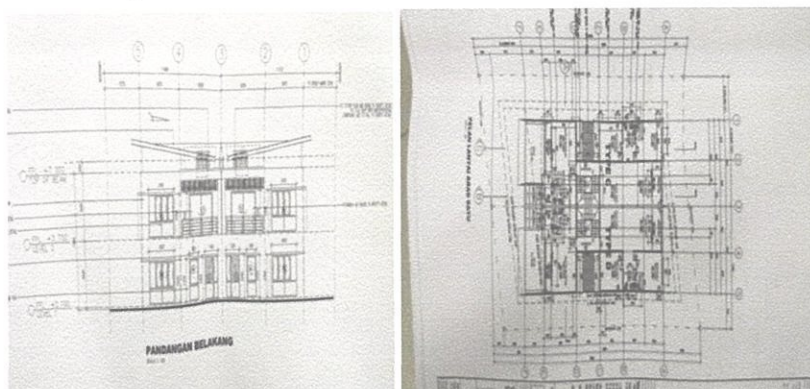


Photo 3.1: Plan and front elevation of project MESSRS Sime Darby Sungai Kantan Development SDN. BHD.

3.3. Installation of Aluminum Top Hung

Aluminium Top Hung Casement windows are the most common and popular of window designs. The aluminium top hung windows are constructed using an outer frame and a hinged “sash”. The sash projects outwards. In a top hung window the hinge is on the top of the outer frame, thereby allowing the bottom to swing out secured by high quality steel friction stays.

Aluminium Top Hung windows have a pleasant slim-line, discreet architectural appearance. Aluminium Top Hung windows functional design makes them ideal in situations where furniture prevents easy access to the window. Can be left partly open in bad weather without allowing nature’s elements into your home. Besides, hinged along the top horizontal edge, the bottom opening outwards and also available in a variety of standard sizes. Aluminium Top Hung windows are extremely low maintenance

This report will focus on the specific design of top hung window together with fix glass window. The picture below shows the full panel of top hung and fix glass window.

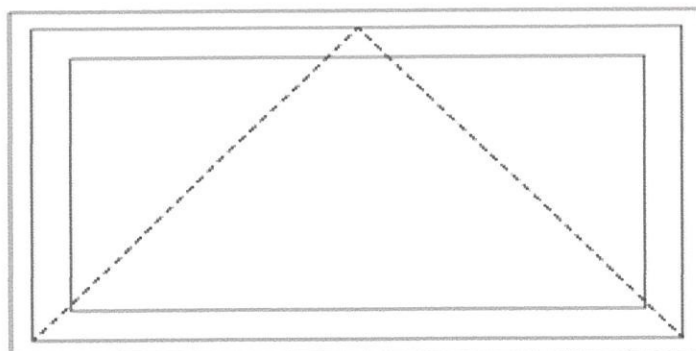


Figure 3.1: The design of Top hung window with Fix glass window

3.3.1 Components and elements

i. Aluminum Frames

All type of windows will need a rigid structure that surround or enclose something which is called as frame to support structure for windows and doors. There are many type of frame made by different kind of material, such as Aluminum, Steel, and Timber.

To be more specific, all frames for this kind of window which is ‘Top hung window together with Fix glass window’ will all be made from 1.2mm thick Aluminum extrusions with powder coated finishes.

These aluminum profiles are selected based on type of window use. Top hung window profile is made from Aluminum profile which is Outer frame #70491 and Inner frame #70589. These Profiles can be seen in picture below.

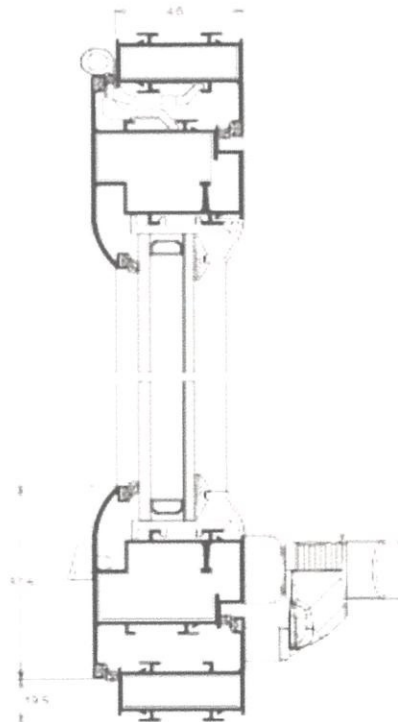


Figure 3.2: Top Hung window Aluminum profile

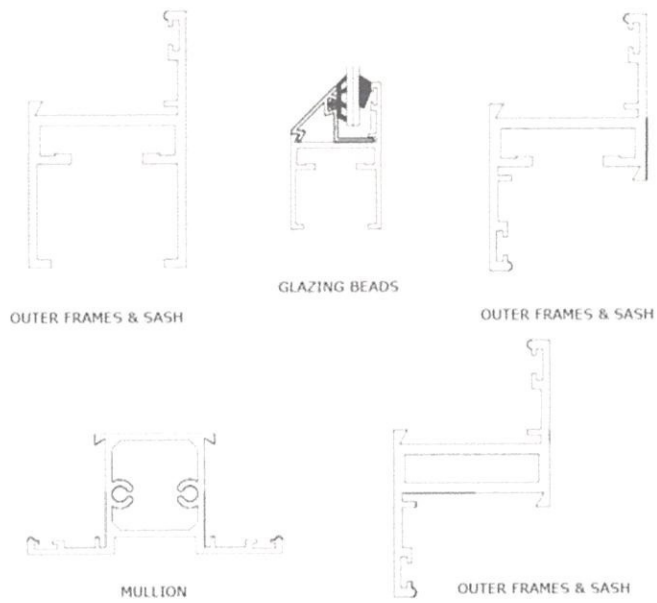


Figure 3.3: Fix glass window Aluminum profile extrusions.

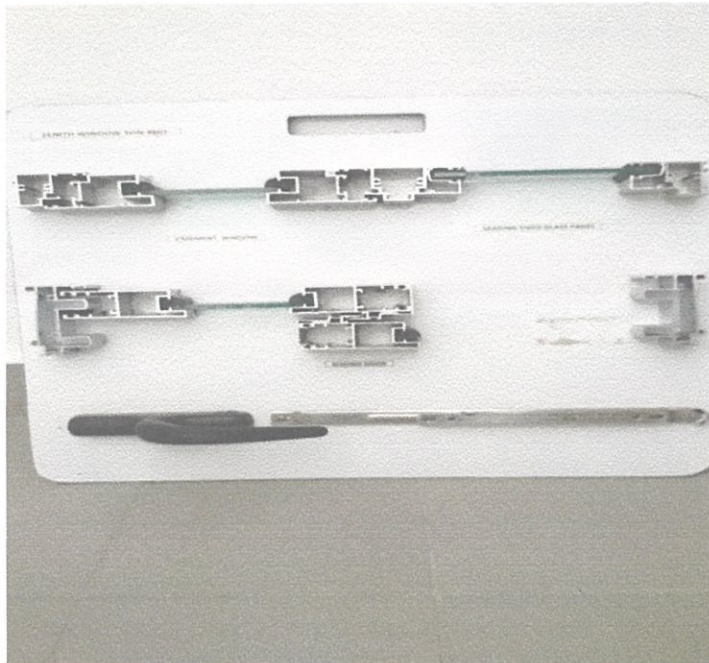


Photo 3.2: Sample of Aluminum top hung window that submitted to client

ii. Clear Float Glass



Photo 3.3: 6mm thick Clear float glass

In this report, the glaze used for top hung and fix glass window is a typical glazed in any kind of construction of window and door, which is known as “Clear float glass”. This kind of glass is provided by supplier with different kind of thickness and rate (RM). There has 6mm thickness, 8mm thickness, 10mm thickness, and 11.5mm thickness. All these thicknesses will be selected according to it durability and suitability of area.

iii. Aluminum Friction stays

These days, there are many available series of friction hinge stays provided by supplier. Some of them provide available in five sizes to cater for sashes weighing up to 40kg.

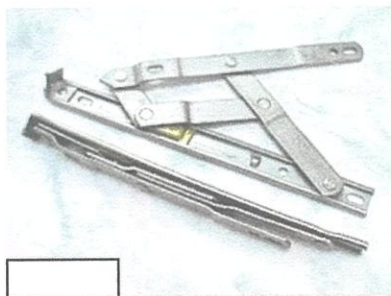


Photo 3.4: The frictions stay use in project Sime Darby Sungai Kantan Development SDN. BHD.

The actual function of friction stays is to support the weight of window panel while the window is open/close outward. Besides that, the frictions stays will help remain the window open at any selected position due to it is design to stay an open position by means of friction. Selection of most appropriate model is determined by the sash weight and size.

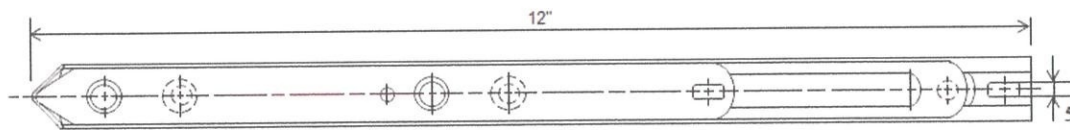


Figure 3.4: The actual dimension Friction stays used in Sime Darby Sungai Kantan Development SDN. BHD.

Table below show 3 different type of frictions stay with many sizes and suitability for selection

TCY 430 Friction stay

Size	Thickness (mm)	Height (mm)	Width (mm)	Weight (kg)	Opening Degree
8"	1.5	1200	450	10	45
8"	2.0	1200	450	10	45
12"	2.0	1200	600	16	90
16"	2.5	1200	800	21	55

TECA SUS-304 Friction stay

Size	Thickness (mm)	Height (mm)	Width (mm)	Weight (kg)	Opening Degree
8"	2.0	1200	450	10	45
12"	2.0	1200	600	16	90
16"	2.5	1200	800	21	55
20"	3.0	1200	900	33	45

Table 3.1: Size Friction Stay

Sources: TECA Marketing Sdn.Bhd.

iv. Handle (Accessories)

Handle is an important part that attach to the window or door. It is a grip or a something that can be operated by human hand. To be more specific, the function of window handle is to aid the operable hinge or window panel that can be open and close.



Photo 3.5: The type of handle use in project Sime Darby Sungai Kantan Development SDN. BHD.



Photo 3.6: The handle attach to the window panel.

v. Silicone & Gasket rubber (Sealer)

Silicone and gasket rubber is being used in many type of installation these days. This type of sealer has been used ages in construction of windows and doors. The main function of silicon and gasket in installation of windows are to sealed and not let the excessive water or air from outside get into the inside of area of building.



Photo 3.7: The silicone N-sealant (clear) help to sealed Inner frame & Outer frame



Photo 3.8: The silicones Allfix Acrylic sealer (white) help to close gap between wall and window frame.

The gasket Rubber has varies type of size and design As we can see the picture below, all type of gasket that use in window depend on their suitability. Meanwhile, the top hung window has their own specific type of gasket can be used

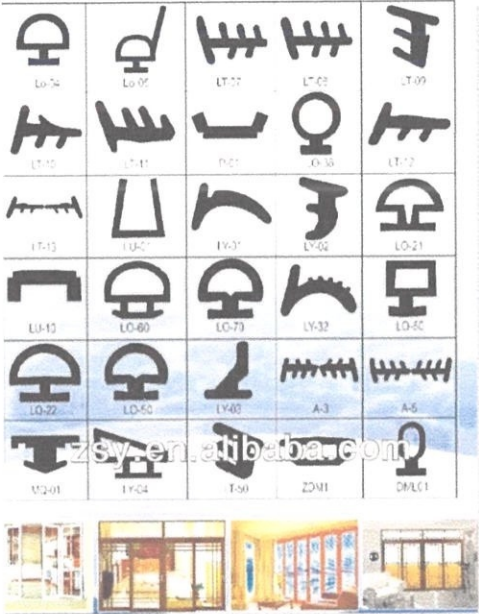


Figure 3.5:Type of gasket that use in fabrication of top hung window

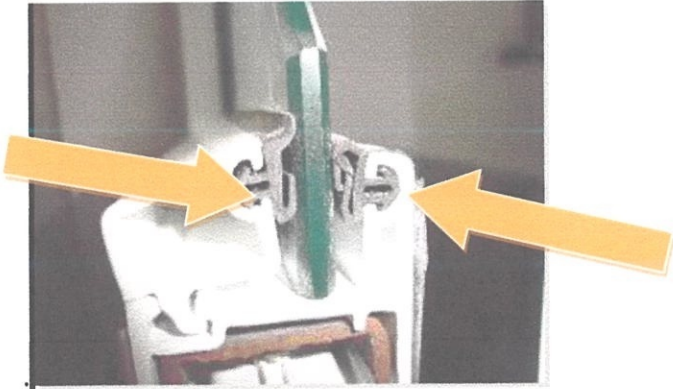










Photo 3.9:The actual location of gasket rubber used in top hung and fix glass window




3.3.2 Method statement for Installation Aluminum Sliding Glass door



Installation of sub-frames and shop-front frames will be practically done at site:

Photo of work:	Method:	Equipment:	Labour:	Duration:
 <p>Ensure opening for windows is provided</p>	<p>Before the Installation of Aluminum windows can be done, make sure the opening for windows is made accurately with lintel at beam is provided. So that, measuring work for windows can be taken so that the dimension of windows frame can be fit to opening provided.</p>	<p>-Measuring tape</p>	<p>-1 unskilled Labour</p>	<p>5 minute</p>
 <p>Subframe made in factory</p>  <p>Installed sub-frames on the opening.</p>	<p>After that, the installation of sub-frames work can be start, the sub-frames will be installed at the opening provided by using hammer and nails</p>	<p>-Sub-frames -hammer & nails</p>	<p>-1skilled Labour -1 unskilled Labour</p>	<p>10 minute</p>




 <p>Preparing the shop-front frames for installation of windows</p>	<p>After that, the shop-front frames for window panel can be installed and make it into a window frame outside of the opening. It is to help ease the installation of shop-fronts frame work onto the opening provided.</p>	<p>-Cutting machines -Drills</p>	<p>-1skilled Labour -1 unskilled Labour</p>	<p>15minute</p>
 <p>Installed the shop-fronts into frames of window.</p>	<p>In this period of time, The frame will be cut by using cutting machines to get a perfect shape of frames so that it can be fit into the opening with dimension (1600 x 3700)</p>	<p>-</p>	<p>-</p>	<p>-</p>
 <p>Preparing the laser for installation work</p>	<p>Installed the laser with tripod stand properly on the ground to get a laser shows horizontally and vertically line on the wall. Mark the line produce by laser as a guide to ease the installation work of shop-front frames, so that, the frames will be installed parallel and perfect.</p>	<p>-Laser -Tripod stand</p>	<p>-1 skilled Labour</p>	<p>2minute</p>




 <p>Installed the shop-front frames at the opening provided</p>	<p>The installation of shop-front frame can be start by put the shop-front frame that has been installed outside on the opening provided. Then, drills the frame by using drillers and screwed it with wall plug.</p>	<p>-Drills -Screw and Wall plug -Ladder</p>	<p>-1skilled Labour -1unskilled Labour</p>	<p>5minutes</p>
 <p>Installed the Pendulum Bob</p>	<p>After half of the frames are properly installed, as precaution steps the pendulum bob will be putted on the frame, just to ensure the frames that are half installed were properly straight and parallel to the opening provided.</p>	<p>-Pendulum Bob</p>	<p>-1 unskilled Labour</p>	<p>2minute</p>



 <p>Drills been used to screwed the frames onto the walls.</p>  <p>The installation of frames work continued.</p>	<p>After the frames are confirm to be parallel and straight to the opening provided. The installation work is now can be fully finish without any problems.</p>	<p>-Drills -Screw and Wall plug -Ladder</p>	<p>-1skilled Labour -1 unskilled Labour</p>	<p>10minute</p>
 <p>Installed the Pendulum Bob again</p>	<p>Pendulum bob will again be set-up as precautions step, to ensure the frames are properly installed.</p>	<p>-Pendulum Bob</p>	<p>-1 unskilled Labour</p>	<p>2minute</p>

	<p>After the installation of shop-front frames are done, the measurement for fix glass window and top hung window can be taken from it. So that, the fix glass and top hung window will be fabricated at the factory before it can be delivers to the site.</p>	<p>-Measuring tape</p>	<p>-1skilled Labour</p>	<p>2minute</p>
<p>The frames that ready to be install</p>  <p>The frames that has been installed completely</p>				

Fabrication work of glass for Fix glass window will be make at Factory before it delivers to the site.


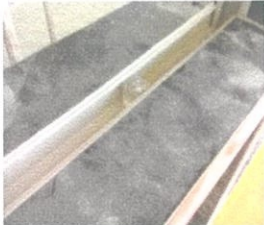

Photo of work:	Method:	Equipment:	Labour:	Duration
 <p>The glass will be cut at the factory</p>	<p>Fabrication work: The glass panel for fix glass window will be cut according to its different dimension of glass by using glass cutting tools. All glass panels for fix glass window are 8pcs in total.</p>	<p>-Glass cutting tools</p>	<p>-1skilled Labour</p>	<p>5 minute</p>
 <p>The glass that has been delivered to the site</p>	<p>Delivers work: The glass panel for fix glass window which is already delivers will be installed at the shop-front frame.</p>	<p>-Lorry</p>	<p>-2 unskilled Labour</p>	<p>5 minute</p>
 <p>The Inner frame for Top hung window is fabricated at factory</p>	<p>Fabrication work: To made a perfect inner top hung window consist of inner frame work, glazing work, gasket rubber work and also silicone work.</p> <p>Firstly: The inner frame for top hung window will be fabricated at factory. Inner frame will be made properly to it dimensions provided.</p>	<p>-Drills</p>	<p>-1skilled Labour</p>	<p>10 minute</p>

 <p>The glass for top hung window is cut properly using cutting tools.</p>	<p>Secondly: The glass for top hung window also will be cut by using glass cutting tools and the glass will be inserted into the frame carefully and properly.</p>	<p>-Glass cutting tools</p>	<p>- 1 unskilled Labour</p>	<p>5 minute</p>
 <p>The glass for top hung window is properly inserted into inner frame.</p>	<p>-</p>	<p>-</p>	<p>-</p>	<p>-</p>
 <p>The Silicone work.</p>	<p>Thirdly: The silicone work will be aid to help seal the top hung window from excessive water or air. The silicone N-sealant (Clear) will be put at one side of the window panel.</p>	<p>-Silicone gun</p>	<p>-1 unskilled Labour</p>	<p>5 minute</p>





	<p>Fourthly: The main function of Gasket rubber is similar to the function of silicone used. The gasket rubber will be installed at the other side of window panel. The gasket rubber used is #3320-S</p>	<p>-Gasket rubber -Cutter</p>	<p>-1 unskilled Labour</p>	<p>5 minute</p>
	<p>Delivers work: The inner frame will then be delivered to the site by lorry and need to be installed at the shop-front frames provided.</p>	<p>-Lorry</p>	<p>- 2 unskilled Labour</p>	<p>5 minute</p>
<p>The Gasket rubber work.</p>	<p>The Inner frame that has been delivered to the site</p>			

Fabrication work of Inner frame for Top hung window will be make at Factory before it delivers to the site.

Installation of Fix glass window will be done after the glass is been delivered to the site:

Photo of work:	Method:	Equipment:	Labour:	Duration:
 <p>Workers properly insert the glass into fix glass window</p>  <p>The position of setting block</p>	<p>After the glass is been delivered to the site, the glass can be installed properly by using glass suction tools that help assist to lift up the panel of glass for ease the glass to be insert inside the shop-front frames. But before that, ensure the setting block is cut into a cube and placed inside the shop-front frames to help support the glass weight. All glass is 8pcs.</p>	<p>-Glass suction tools -Setting block -Cutter</p>	<p>-1skilled Labour -1 unskilled Labour</p>	<p>10 minute</p>
 <p>Installed gasket rubber at fix glass window</p>	<p>After the glass is completely insert inside the shop-front frames the gasket rubber will be done at both side of window, and the gasket rubber used is #3320-B</p>	<p>-Gasket rubber -Cutter</p>	<p>-2 unskilled Labour</p>	<p>10 minute</p>

Installation of Top hung panel will be done after the inner frame is been delivered to the site:

 <p>Type of friction stay used is SUS 304</p>  <p>The installation of friction stays</p>	<p>After the inner frame been delivered to the site, the installation of inner frame will be started with installed the friction stays at both side of window panel. And after that screwed both side of stays to the outer frame of top hung window so that the window now can be open and close better.</p>	<p>-Friction stays -Drills</p>	<p>-1 unskilled Labour</p>	<p>5 minute</p>
 <p>The handle will be installed on the outer frame</p>	<p>The handle will be installed after the friction stays are properly done. The handle will be installed at the inner frame and the outer frame of top hung window.</p>	<p>-Handle -Drills</p>	<p>- 1 unskilled Labour</p>	<p>5 minute</p>
 <p>The complete installation of Top hung window with Fix glass window.</p>	<p>The complete window panel.</p>	<p>-</p>	<p>-</p>	<p>-</p>

3.4 Installation of Aluminum Sliding Glass Door

Aluminum sliding door is a door that opens horizontally slide. This type of door has many types of design with different element and component, but among all the sliding door used, the most popular sliding doors are a Sliding glass door. All the components and elements used for this type of sliding door can be seen in picture below.

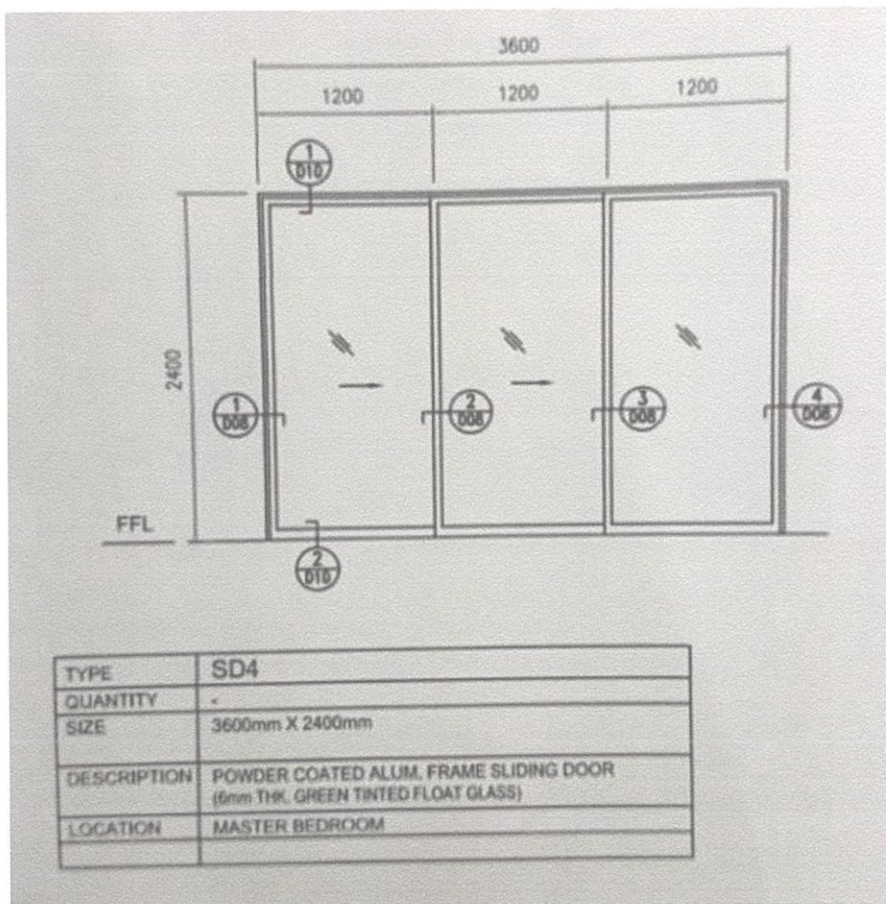


Figure 3.6: Type of sliding door that used in this MESSR B&G Sime Derdy

3.4.1 Components and elements

i. Tempered Glass

In this report, the sliding glass door is using a single large pane of glass as a door access from a room to the other side of room. The ideologies of using this glass door as a sliding glass door is to ease the natural light enter the house and also increase the aesthetical value of design and architectural. The glass used in typical construction of sliding glass door is double glazed and UV (Ultra-violet) reflected glass, but this project are using a 12mm thickness, Tempered clear float glass with dimension 1500mm x 2120mm, as their sliding glass door due to its durability against cracked and heat.



Photo 3.10: The Tempered glass used for Sliding glass door

ii. Aluminum track

This kind of sliding glass door indeed needs an Aluminum track to get smooth and perfect horizontally sliding method. There are many types of tracks provided by supplier these days. These tracks are provided by different size and length. It can be found in 2 meter long, 3 meter long, 4 meter long and 6 meter long depends on it design and suitability. Some of them can be installed together with its track cover. TECA Marketing Sdn. Bhd. also provides 2 type of track which is shown in the table below.

Table 3.2: Aluminum track & cover for Sliding door system

<p>Track 02 <u>Aluminum track</u> 2 meter 4 meter 6 meter</p>	
<p>Track 04 <u>Aluminum track</u> 2 meter 4 meter 6 meter</p>	
<p>Track 03 <u>Aluminum track cover</u> 2 meter 3 meter 4 meter 6 meter</p>	

The actual function of Aluminum track is to provide a guide for ease the glass top roller moved horizontally sliding. It also helps the glass door to open and closed smoothly. But, this project is not using TECA Marketing Sdn. Bhd. as their track supplier instead using CKS Glass Hardware Sdn. Bhd. which is code CKS-400. This track provided by CKS Glass Hardware Sdn. Bhd. can lifted maximum door weight till 120kg and the material used is much better which is Aluminum Alloy (AA), with Silver finishes layer.

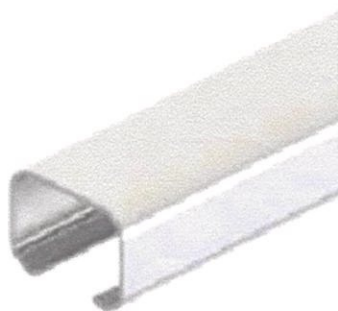


Photo 3.11: The Aluminum sliding door track used.

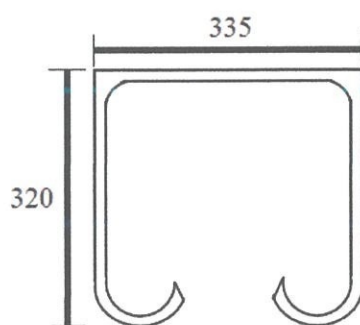


Figure 3.7: The actual dimension used for Aluminum sliding door track

iii. Glass roller & Glass clamping patch

Besides track and tempered glass, glass roller is another important element in sliding glass door. The glass roller is used in sliding door to ensure the glass door is slide along the track provided. The glass roller can ensure the sliding glass door either to be slide directed along one axis on parallel overhead tracks or sliding past to each other. This roller can be installed in two ways, which is by screwed it directly to the timber sliding panel door, or installed together with glass clamping patch if the sliding door is a glass panel door. This clamping patch is function to lift the glass door up and let it slide smooth and perfect, just like as shown in picture below.

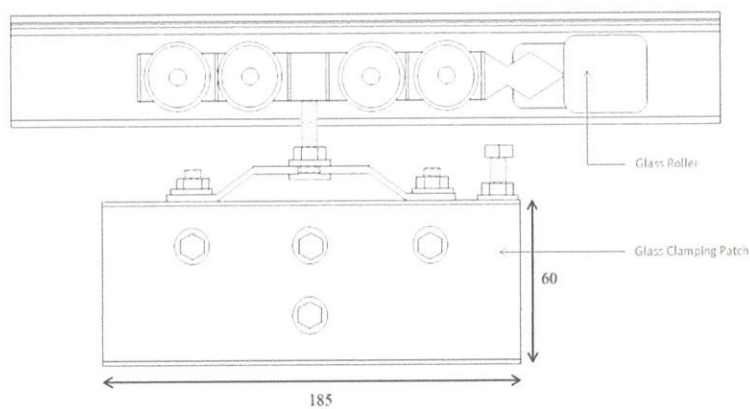


Figure 3.8: The glass roller installed together with glass clamping patch.



Photo 3.12: The maximum door weight can be lift up maximum 120kg.

iv. **Roller stopper**

As we know the definition of stopper is to cause something to stop operating or puts an end to something functioning. Roller stopper is functional to cause a glass roller to stop at one point. Without roller stopper the glass roller is not secured enough to be slide horizontally open and close. Therefore, the glass roller is important to be installed inside the aluminum track and guide the glass roller to stop gently at certain point. Example of stopper been used in many construction can be seen in picture below.

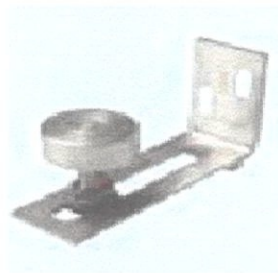


Photo 3.13: Example roller stopper for aluminum sliding door system.



Photo 3.13: Roller stopper screwed into the Aluminum track.

In this project Sime Darby Sungai Kantan Development SDN. BHD. the roller stopper is installed inside the aluminum track to stop the glass roller before it hit the wall, it will be screwed into the aluminum track as shown in picture below.

v. Floor guide

The most aesthetical design of sliding glass door is the one that is frameless. This type of Sliding glass door is normally suspended from above and when it suspended at above part the bottom part will be trackless. Therefore, due to its trackless at bottom, a guide for sliding glass door will be needed at floor panel to make sure the sliding glass door sliding in parallel on one side way without any disruption. The picture of floor guide can be seen in picture below, which is provided by CKS Glass Hardware Sdn. Bhd.

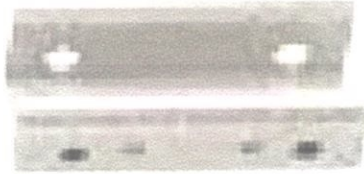


Photo 3.14: The Floor guide.



Photo 3.15: The Floor guide, provided by CKS Glass Hardware Sdn.Bhd. that used in Sime Darby Sungai Kantan Development SDN. BHD

The floor guide will be installed and mounted at the surface of floor to help lead the glass door sliding open and close horizontally; it can be shown in picture below.

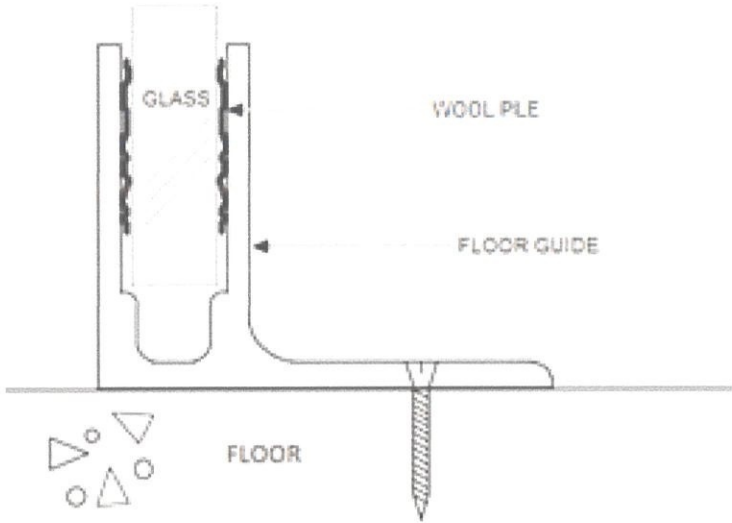


Figure 3.9: The installation of floor guide screwed to the floor.

Before the glass can be slide inside the floor guide, firstly the wool pile will be installed. The main function of putted the wool pile inside the floor guide is to let the glass slide more fluent and protected.

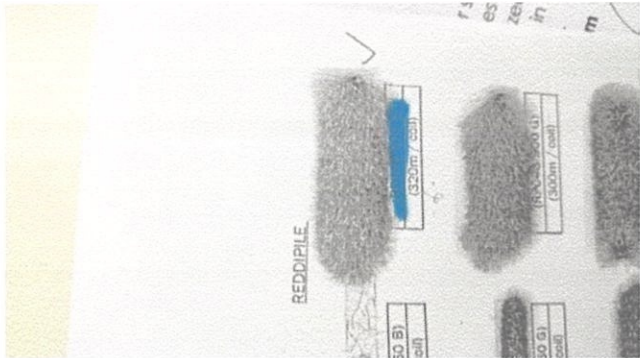


Photo 3.16: The wool pile

vi. Side Fixing Bracket & Wall plug

The side fixing brackets and wall plug is to help support the aluminum track. This bracket will be screwed through the wall and attach together with aluminum track to get full support from lintel and help ease hold the weight of glass door. The side fixing brackets and wall plug used in project Sime Darby Sungai Kantan Development SDN. BHD. can be seen in picture below.



Photo 3.17: The Side fixing brackets used to support Aluminum track



Photo 3.18: The Wall plug used to support Aluminum track

vii. Handle

Handle is one of the important accessories of doors and windows. It is attached to a door and been used for opening and close the sliding glass door. Normally, handle will come together with lockset. But, some consumers prefer not to use this type of handle together with lockset due to aesthetical value and appearances. The type of handle been used in sliding glass door provided by CKS Glass Hardware Sdn. Bhd. can be seen in picture below.



Photo 3.19: Type of sliding door handle

This handle will be installed directly through the glass door, as the glass door is already made with a special hole for handle installation before the glass door is delivered to the site. The hole for handle will be in \varnothing diameter 45mm, with distance from center of the hole to the end of glass is 65mm, the actual dimension of installation handle can be seen in picture below.



Photo 3.20: The handle that used in project Sime Darby Sungai Kantan Development SDN. BHD.

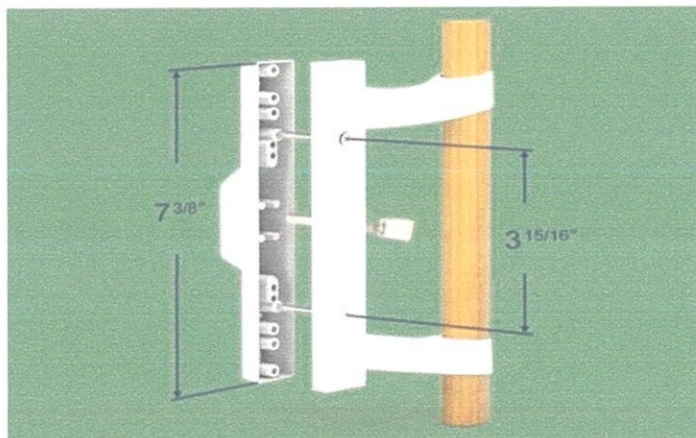













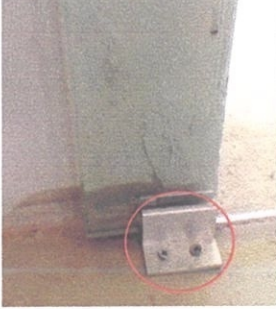
Figure 3.10: The installation of handle with actual dimension shows




3.4.2 Method statement for Installation Aluminum Sliding Glass door

Photo of work:	Method:	Equipment:	Labour:	Duration:
 <p>Lintel is provided at opening of Sliding glass door.</p>	<p>Before the Installation of sliding work can be done, make sure the opening for sliding glass door is made accurately with lintel at beam is provided. After that, the measurement for dimension of sliding glass door opening can be taken so that the dimension of glass can be fit to it and aluminum track can be accurately measured</p>	<p>-Measuring tape</p>	<p>-1 skilled Labour</p>	<p>15 minute</p>
 <p>The Aluminum track is cut by using cutting machine</p>  <p>Worker are cutting the aluminum track using jigsaw if not have cutter machine</p>	<p>After the measurement stage is done, the length of aluminum track will be marked down and the unwanted part will be cut off by using cutting machine to ensure the track is in accurate measurement for sliding glass door opening which is (mm)</p>	<p>-Cutting Machine</p>	<p>-1 skilled Labour</p>	<p>5 minute</p>




 <p>The Aluminum track is cut by using cutting machine</p>	<p>Meanwhile, the glass door is made and fabricated by Crystal Tempered Glass factory, delivered to the site with accurate dimension given (1.5m x1.2m) with 12mm thickness of Tempered Clear Float glass</p>	<p>-Lorry; delivered the glass door to the site.</p>	<p>-1 skilled Labour -1 unskilled Labour</p>	<p>10 minute</p>
 <p>The Wall plug is installed by using drills</p>  <p>The Wall plug is installed by hammer.</p>	<p>After the glass and aluminum track is prepared to fit into the sliding glass door opening. The wall plug will be screwed into the beam lintel provided by using Drills. Then it will be hammered into the beam by using hammer.</p> <p>The function of wall plug, as we know is to support the Aluminum track at the lintel. As an extra support the side fixing bracket also will be installed together with track and screwed into the lintel for extra strength.</p>	<p>-Drills -Hammer -Wall plug -Side Fixing brackets</p>	<p>-1 skilled Labour -1 unskilled Labour</p>	<p>15 minute</p>

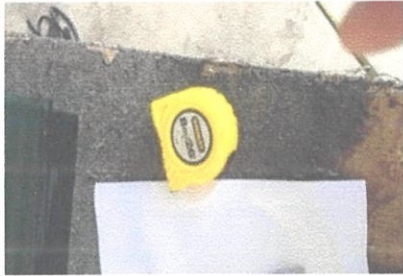
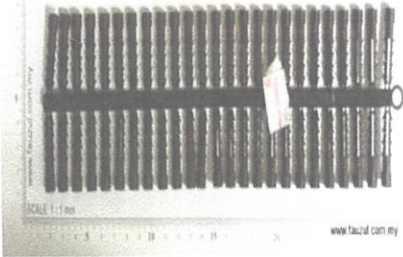


 <p>The Aluminum track attach to the steel hollow and screwed into lintel</p>	<p>As we can see, the Aluminum track is attached to the steel hollow; it is purpose to get an extra weight supporter. Then, the steel hollow will be installed together with wall plug and side fixing brackets as an attachment for aluminum tracks to the lintel.</p>	<ul style="list-style-type: none"> -Drills -Hammer -Wall plug -Side Fixing brackets -Steel hollow 	<p>-1 skilled Labour -1 unskilled Labour</p>	<p>20 minute</p>
 <p>The Glass roller & glass clamping patch is already inside the track</p>	<p>But before the Aluminum track can be attach with steel hollow and screwed together with wall plug and side fixing brackets. Make sure the 2set of Glass roller and glass clamping patch (front and back) is already putted inside the aluminum track; to ease work of installation.</p>	<p>-</p>	<p>-1 unskilled Labour</p>	<p>3 minute</p>
 <p>The glass clamping patch with layer of pad inside it.</p>	<p>After that, carefully open and split the face of glass clamping patch using Allen key and after that put a layer of pad on both inside of glass clamping patch and stick it together with silicone N-sealant to help hold the glass door for extra grip towards it.</p>	<ul style="list-style-type: none"> -Allen key -2 Layer of pad -Silicon N-sealant (Clear) 	<p>-1 unskilled Labour</p>	<p>5 minute</p>






 <p>The glass clamping patch is installed back after the glass door is putted inside.</p>  <p>The gap between glass door and wall</p>	<p>After the track is installed properly and the glass clamping patch is ready, the workers will help lift up the glass door by using glass suction tools and put it carefully between track and setting block. The setting block is been used as temporary support of glass door, just to ensure that there are gap allowed between glass door and surface of floor (The gap between floor and glass door is 1.5cm). Then, after the glass is putted on the glass clamping patch, Allen key is been used again to keyed the bolt and nut of glass clamping patch. Make sure the gap between wall and glass door is (2cm).</p>	<ul style="list-style-type: none"> -Glass suction tool -Hand Gloves -Allen key -Setting Block 	<ul style="list-style-type: none"> -1 skilled Labour -2 unskilled Labour 	<p>10 minute</p>
 <p>The floor guide after the glass door is installed inside it.</p>	<p>After that, take out the temporary support made by using setting block, and installed the glass door inside the floor guide at bottom of glass. Then screwed down the floor guide onto the surface of floor.</p>	<ul style="list-style-type: none"> -Drills -Screwed and plug 	<ul style="list-style-type: none"> -1 skilled Labour -1 unskilled Labour 	<p>5 minute</p>

	<p>After that, installed the roller stopper at both side of track (front and back) to stop the roller before it hit the wall.</p>	<p>-Drills</p>	<p>-1unskilled workers</p>	<p>3 minute</p>
	<p>Last but not least, installed the wool pile at end side of glass door, to help protect the glass from hit the wall vigorously.</p>	<p>-Wool pile</p>	<p>-1 Unskilled workers</p>	<p>2 minute</p>
	<p>Done installing the Sliding glass door.</p>	<p>-</p>	<p>-</p>	<p>-</p>

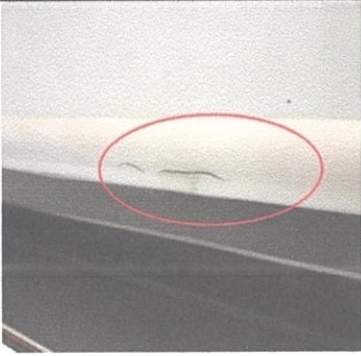
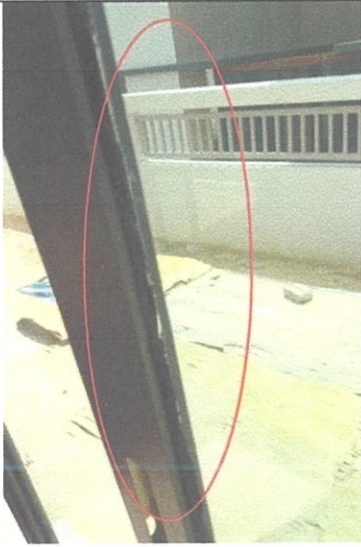
3.5 Tools and Machineries


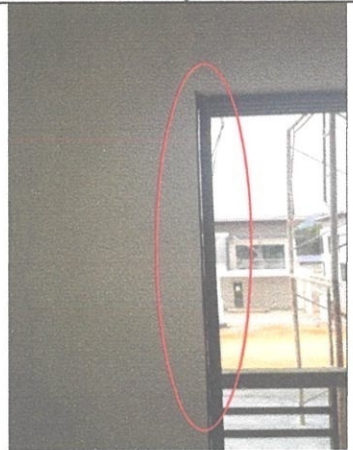
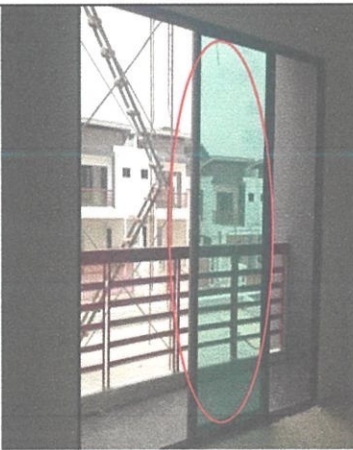
Machineries:	Function:	Pictures:
Electric Drills	<p>-Use to drills and screwed the floor guide to the surface of floor. Besides that, it will be used to screw in the roller stopper inside the aluminum track.</p>	 <p>The Electric Drills.</p>
Wiring Drills	<p>-Use to drill the wall for installing the wall plug and side fixing brackets at the lintel above sliding door track.</p>	 <p>The Wiring Drills.</p>
Cutting Machine	<p>-Normally, used in early stage of installation, it is been use to cut the unwanted length of aluminum track.</p>	 <p>The Cutting machine.</p>

Hand Tools & Equipment:	Function:	Pictures:
<p>Measuring Tape</p>	<p>-Measuring tape is been used for early stage of work. It is to measure the dimension of aluminum track and glass needed before installation.</p>	 <p>The Measuring tape.</p>
<p>Screw and Plug</p>	<p>-Use for installation of floor guide. The plug will be putted inside the floor after the floor is been drills using wiring drills. Then, the screw will be screwed in by using Electric drillers.</p>	 <p>The Screw and plug</p>
<p>Silicone N-Sealant (Clear)</p>	<p>-Use to seal the glass together with glass clamping patch and Silicone N-sealant will be use to increase the strength of glass clamping patch hold the glass after installed.</p>	 <p>The Silicone N-Sealant</p>
<p>Hammer</p>	<p>-The hammer is been use to hit the wall plug get into the wall. -It is to help ease the wall plug to be screwed into the wall.</p>	 <p>The Hammer</p>

<p>Allen key</p>	<p>-Allen key will be used to key the bolt at the glass clamping patch; help to hold the glass.</p>	 <p>The Allen key</p>
<p>Glass suction tools</p>	<p>-Use to assist workers lift up the glass for installation. It is to ease support the load of glass. Normally, this type of glass suction tools will be only used for a larger dimension of glass installation.</p>	 <p>The Glass suction tools</p>
<p>Wool pile</p>	<p>-Use to stick at the end of glass, and absorb impact if glass door open and close. Wool pile also been used to help protect glass from hit the wall vigorously. Besides that, it will also help to prevent air release and moisture get into the area trough gap between glass and wall.</p>	 <p>The Wool pile</p>
<p>Setting Block</p>	<p>-Use as temporary support to help support the weight of tempered glass due to installation to glass clamping patch and put inside the floor guide.</p>	 <p>The Setting block</p>
<p>Hand Gloves</p>	<p>-Use as protective and safety measures and workers use it to ease lift up the tempered glass for installation.</p>	 <p>The Hand Gloves</p>

3.6 Checking the defects of Aluminum top hung and sliding door and the solutions.

Photo of defect:	Solution for defect:	Equipment:	Labour:
 <p>Cracking of silicon for outer frame</p>	<p>Re-plaster the silicon to ensure there is no gap or holes that give water to enter.</p>	<p>- Silicone gun</p>	<p>-1 skilled Labour</p>
 <p>The gasket not install properly and not straight.</p>	<p>Open the inner frame to allow glass to release and re-install the gasket properly</p>	<p>-gasket - Electric Drills</p>	<p>-1 skilled Labour</p>

 <p>The Aluminum friction stay is covered by concrete.</p>	<p>Clean the concrete on the Aluminum friction stay and always make sure the window is close to ensure the same problem not happen again.</p>		<p>-1 unskilled Labour</p>
 <p>There is a gap between wall and Aluminum frame.</p>	<p>Silicon the gap between wall and Aluminum frames to ensure there id no gap and holes the give water to enter.</p>	<p>Silicone gun</p>	<p>-1 unskilled Labour</p>
 <p>The centre of window is not vertically straight.</p>	<p>Extract the sliding door and mullion. Install mullion first and use the pendulum bob to ensure that it is straight and then install the sliding door.</p>	<p>Electric Drills Pendulum bob</p>	<p>-1 skill Labour -2 unskilled Labours</p>

CHAPTER 4

PROBLEMS AND SOLUTIONS

4.1 Problems & Solutions related to work of windows and doors

I. Mis-measured the dimension of Aluminum Sub frame and Inner

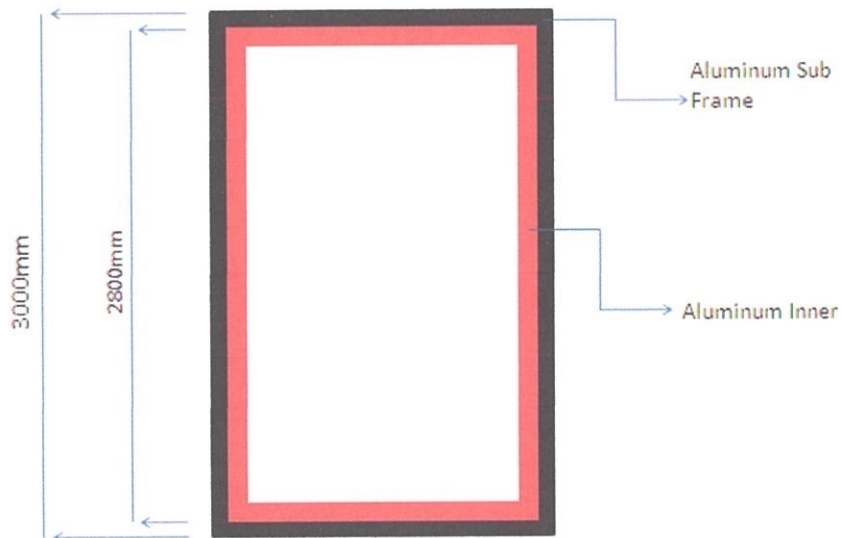


Figure 4.1: The Aluminum sub frame and inner

The measurement of every sub frame and inner should be accurately taken by skilled workers. Normally the frame of the will be installed first at the opening provided. After the frame work is done, the measurement work can be taken so the fabrication work can be made at the factory according to the measurements taken. If the measurement is measured wrongly, it will not be fit onto frame that has been installed at the opening provided.

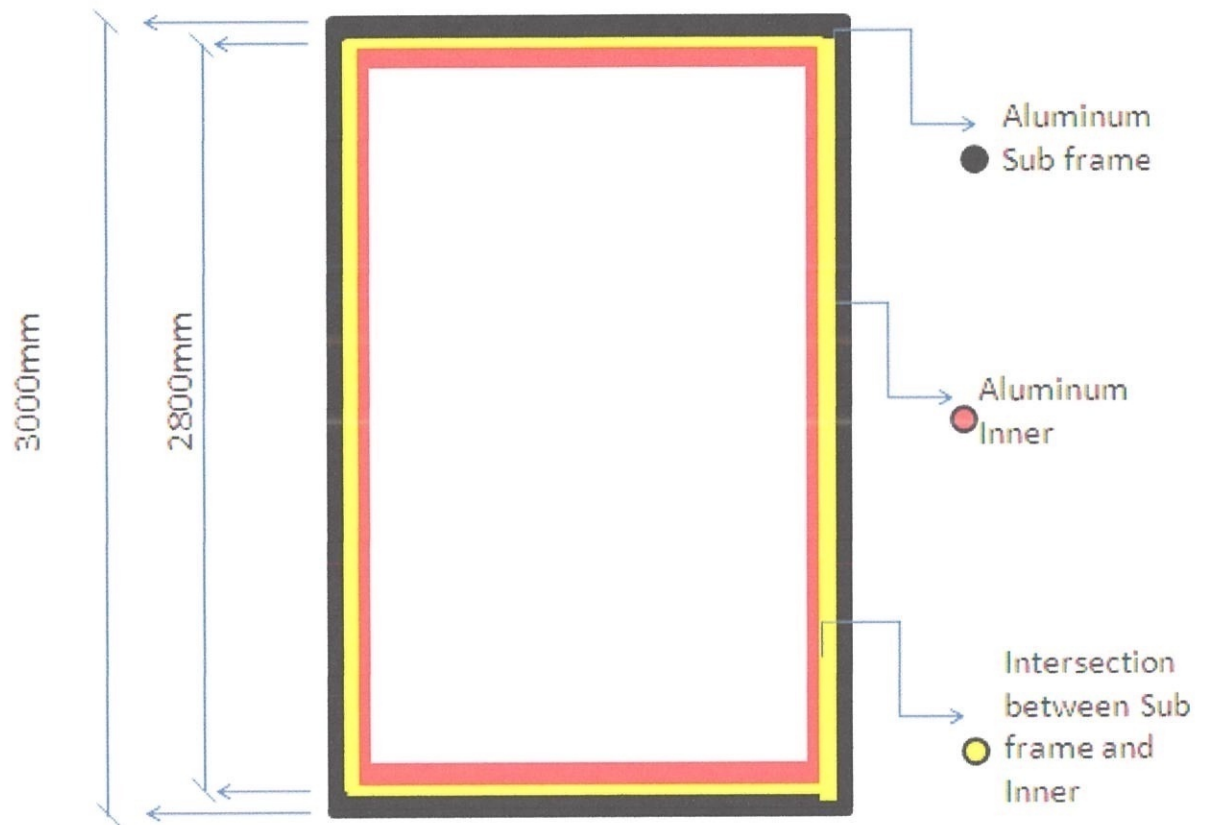





Figure 4.2: Picture above show that the wrong measurement taken that cause the inner frame not fit exactly onto sub frame. The yellow colour shows that the interception occur when the inner intercept because of mis measured by workers at site.

Therefore, the solutions are been taken to ensure the door panel can be used and fit onto the door frame provided. The works of modifying the door panel consist of:

List of work:	Photo:
<p>Dismantling or hacks the bottom part of Aluminum door.</p>	 <p>The dismantling work at bottom part of doors by using drills.</p>
<p>Re-measures the door panel with accurate measurements and use sub-frames as a guide to cut off the unwanted area of aluminum doors.</p>	 <p>Use sub-frames as a guide to cut off the unwanted area.</p>
<p>Using a grinding machine to cut off the unwanted area of Aluminum door so that the door panel can be installed fit onto the frame provided.</p>	 <p>Use grinding machines to cut off the unwanted area.</p>

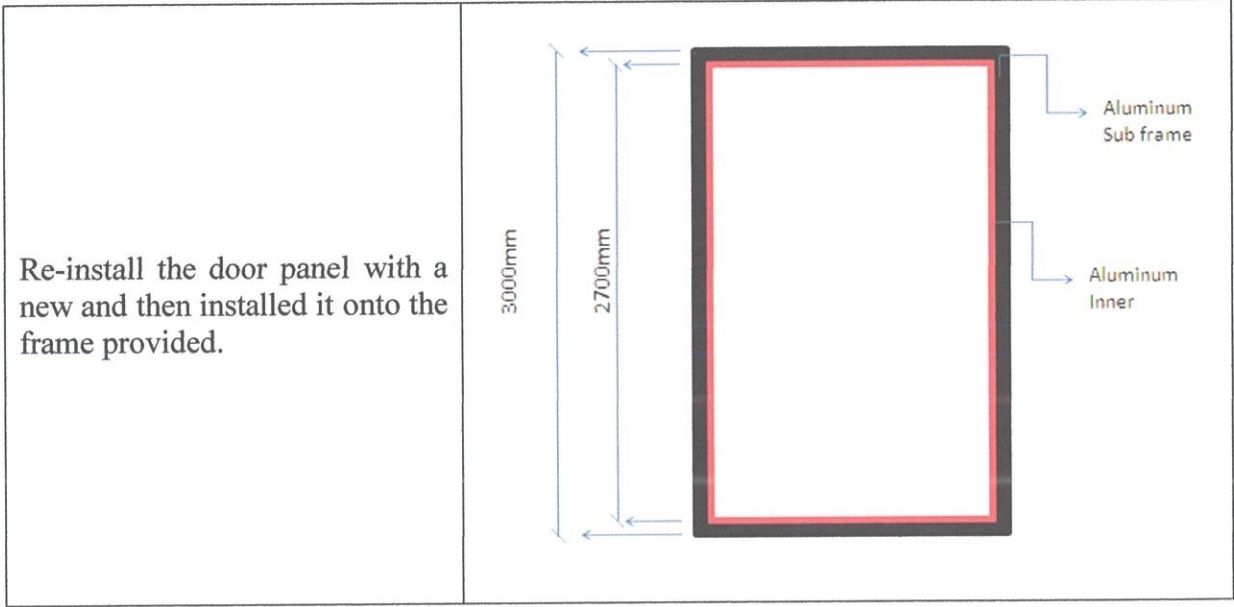


Figure 4.3: The new dimension of Aluminum Doors (GD2)

II. Window are scratch and dirty.



Photo 4.1: The top hung window that locate in toilet

The top hung window normally is protected or covered by black tape so that the profile is protected from dust, sand and scratch.



Photo 4.2: The black rubber tape that used to covered the aluminium

Therefore, the solutions are been taken to ensure the Aluminum top hung window are protected and covered, the black tape is use to covered the profile. The works of adjusting

List of work:	Photo:
<p>The workers must covered all the aluminum profile with black tape so that the profile is protected and not scratch.</p>	<div> </div> <p>The workers are covered the aluminium profile with black tape</p> <div> </div> <p>Example of window that have been covered by black tape.</p>

the door panel consist of:

CONCLUSION AND RECOMMENDATION

4.2 Conclusion

In this project report, installation of Aluminum top hung and Aluminum Sliding glass door is discussed in details. As we know windows and doors is one of important element in any kind of projects. The main function of this element is to provide better ventilation and light illumination for certain area in building.

But to provide this kind of proper ventilation and light illumination, components and elements will become the greatest factor that may affect the main function of windows and doors. Therefore, with this report content I can understand more about components and elements which will be used for this specific type of windows and doors installation.

Besides that, from this report I can also be more aware in selecting the appropriate tools and machineries to be used for installing an Aluminum Top hung with Fix glass window and Aluminum Sliding glass door. All the tools and machineries should be selected according to method of work and problems arise to be solved.

Moreover, I have learn that some problems related to our works may come from other people who does it purposely or not, but sometimes with improper installation work from our workers itself could also bring problems or damages towards our windows and doors. However, this report will help to understand all these problems and solved it.

4.3 Recommendations

4.3.1. Provide a sufficient tools and machineries

A proper work of installation will definitely need a proper skill of labours and sufficient tools and machineries to do it. As we know all these tools will need to be sufficient enough to make a work become more easy and fast. This is because, not only the installation of work will requires the tools and machineries but some time the workers will be divided into two groups which is one for installation and the other one will need to do some repairing and modifying works if requires to do so. If the tools and machineries are not providing sufficiently enough therefore, all the works that should be complete early will be delayed or postpones.

4.3.2. Provide more safety equipment for workers.

In this company, I'm aware that the safety of are not properly organized by supervisor. This company should be more aware and provide more safety to workers. As we know this kind of work will need a safety equipment such as boots, eye protection, glove safety kit and others. So with a proper safety equipment for workers the installation work and fabrication can be more ease and without any injury.

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