



*Elegance*  
RAIN GUTTERS

a **LESSO** company

★ ★ ★  
**LEAD-FREE**  
PIPE SYSTEMS

SUITABLE FOR BUILDINGS  
AND HOUSES.

**LESSO**





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## PRODUCT RANGE

## RAINGUTTERS

## FEATURES

- An exclusive layout, with internal brackets and outlets that can be placed anywhere along the length of the gutter, avoiding the need to break the running length for the downpipe
- Superior outlook
- Certified BS EN 607 and BS EN 1462



## ADVANTAGES

- Corrosion and UV Resistant
- Durable and Lightweight
- High Flow Capacity with 16,100 mm<sup>2</sup>
- No Over Flow
- Anti-Dripping System to Prevent Leak
- Weir Outlet to Induce Higher Flowrate
- Designed to accommodate extensive thermal movement



## APPLICATION

Paling Raingutter Systems are recommended for building applications, and are specifically designed for contemporary houses and condominiums.



## Stylish Design

The unique design of the Paling's *Elegance* Rainwater Gutter System is able to complement any contemporary lifestyle to date. With this exclusive layout, the internal brackets and outlets can be placed anywhere along the length of the gutter without the need to break the running length to accommodate the down-pipe.

A comprehensive range of Paling's *Elegance* and accessories are manufactured to the same high standards. Paling's *Elegance* range is designed to suit wide application and with its aesthetically superior outlook, most buildings can benefit from it.

# Elegance

## Rainwater Gutter System



### Performance Characteristics

PVC-U is a corrosion free material. It can withstand tough weather conditions for an extensive period of time. It is UV resistant even though exposed to direct sunlight. It is also extremely durable, light weight and easy-to-install.

PVC-U is maintenance free. Its smooth surface prevents algae and fungus growth. Together, these innovative features improve the building's outlook, reduce assembly and installation time, reduce percentage of failure and help save up a considerable amount of money.

As a result, this system offers easier and faster assembly, a design that last much longer than any typical rainwater gutter system.

### Efficiency

Paling's *Elegance* Gutter Profile has a high capacity with an effective cross sectional area of 16100mm<sup>2</sup>. It prevents over flow and keeps the house clean and dry.

The expansion outlet has high flow capacity and anti dripping feature. No rubber gasket and solvent cement is required. In addition, advance design at joints prevents leakage.

Paling's *Elegance* complies with the Standard BS EN607 for gutter profile and fittings and Standard BSEN1462 for the gutter brackets.



### PALING GUTTER PROFILE

- 1 More flexibility with P-Shape front return
- 2 Grooved profile to enable horizontal movement after locking into internal bracket
- 3 Higher capacity 16 100mm<sup>2</sup>



### EXPANSION OUTLET

- 1 Weir flow, draining up to 6L/S to 10L/S
- 2 No leaking with anti dripping baffle
- 3 Suitable for round and rectangular



### PALING INTERNAL BRACKET

- ① Allowing horizontal movement with P.Shape
- ② Can load up to 60kg each
- ③ Aesthetically superior outlook



### PALING EXPANSION JOINER

- ① Accommodates thermal movement from -10°C to +40°C
- ② 2 in 1 (Joiner + expansion)
- ③ Double rubber seals to prevent leakages



## QUALITY & CERTIFICATION



## SYSTEM CERTIFICATION

### RAINWATER GUTTER

1. Unplasticized Polyvinyl Chloride (PVC-U) Rainwater Gutter

### RAINWATER DOWNPIPES

1. Unplasticized Polyvinyl Chloride (PVC-U) Rainwater downpipes round and rectangular shape

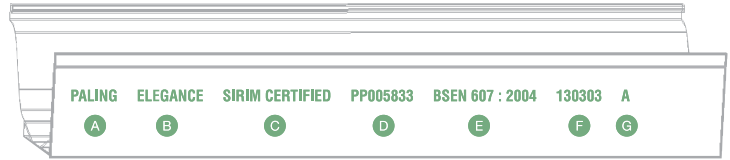
### RAINWATER GUTTER FITTINGS

1. Unplasticized Polyvinyl Chloride (PVC-U) fittings for Rainwater Gutter and downpipes



# STANDARDS AND QUALIFICATION

- 1 BSEN 607 for gutter profile and fittings
- 2 BSEN 1462 for gutter bracket

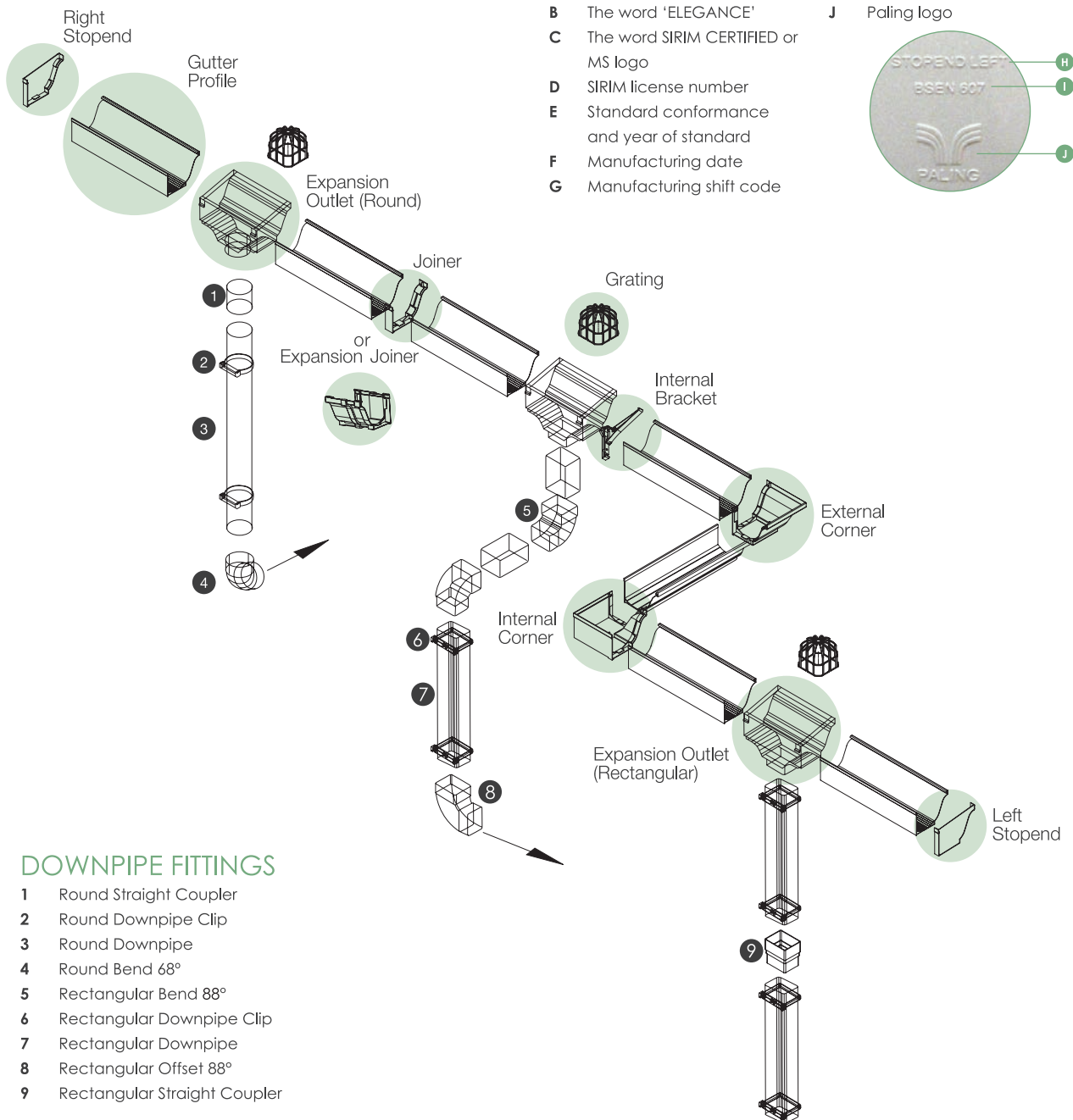


## GUTTER PROFILE PRINTING

- A The word 'Paling' or Paling logo
- B The word 'ELEGANCE'
- C The word SIRIM CERTIFIED or MS logo
- D SIRIM license number
- E Standard conformance and year of standard
- F Manufacturing date
- G Manufacturing shift code

## GUTTER FITTINGS MARKING

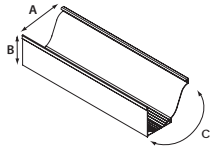
- H Product name
- I Standard
- J Paling logo



## DOWNPIPE FITTINGS

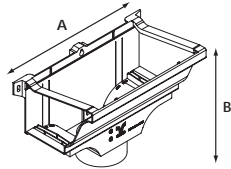
- 1 Round Straight Coupler
- 2 Round Downpipe Clip
- 3 Round Downpipe
- 4 Round Bend 68°
- 5 Rectangular Bend 88°
- 6 Rectangular Downpipe Clip
- 7 Rectangular Downpipe
- 8 Rectangular Offset 88°
- 9 Rectangular Straight Coupler

## GUTTER PROFILE



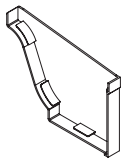
CODE NO.		DIMENSIONS (mm)			LENGTH (m)
WHITE	GREY	A	B	C	
8020130015	8020130012	205	125	424	5.8

## EXPANSION OUTLET



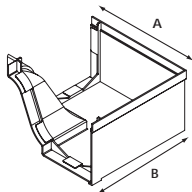
CODE NO.		OUTLET SIZE (mm)	SHAPE	DIMENSIONS (mm)	
WHITE	GREY			A	B
8020140031	8020140028	110	ROUND	341	238
8020140044	8020140041	110	RECTANGULAR	341	238

## STOP END



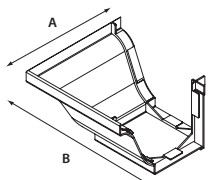
CODE NO.		DIRECTION
WHITE	GREY	
8020140009	8020140007	LEFT
8020140012	8020140010	RIGHT

## INTERNAL CORNER



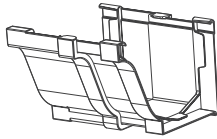
CODE NO.		DIMENSIONS (mm)	
WHITE	GREY	A	B
8020140019	8020140014	227	227

## EXTERNAL CORNER



CODE NO.		DIMENSIONS (mm)	
WHITE	GREY	A	B
8020140016	8020140013	227	227

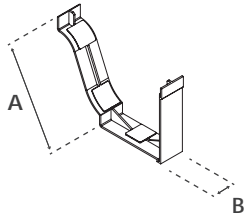
## EXPANSION JOINER



CODE NO.	
WHITE	GREY
8020140025	8020140022

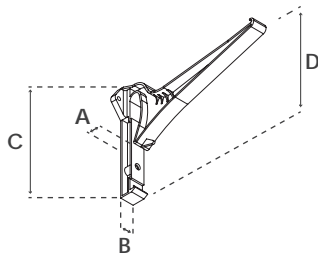
\*Dimension details refer to page 22

## JOINER



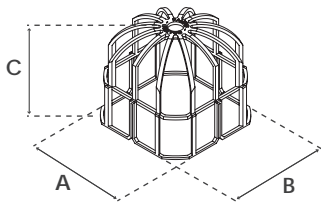
CODE NO.		DIMENSIONS (mm)	
WHITE	GREY	A	B
8020140004	8020140001	42	144

## INTERNAL BRACKET



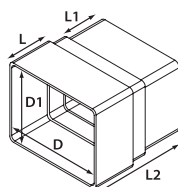
CODE NO.		DIMENSIONS (mm)			
WHITE	GREY	A	B	C	D
8020140021	8020140017	17	20	147	142

## GRATING



CODE NO.		DIMENSIONS (mm)		
WHITE	GREY	A	B	C
8020140006	8020140002	114	114	100

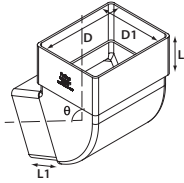
## STRAIGHT COUPLER (Rectangular)



CODE NO.	DIMENSIONS (mm)				
	L	L1	L2	D	D1
8020140058	52	50	122	115	90

**68° BEND**

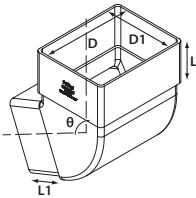
(Rectangular)



CODE NO.	ANGLE		DIMENSIONS (mm)		
	$\theta$	L	L1	D	D1
8020140026	68°	52	50	115	90

**88° BEND**

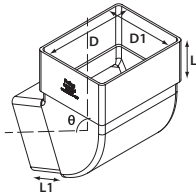
(Rectangular)



CODE NO.	ANGLE		DIMENSIONS (mm)		
	$\theta$	L	L1	D	D1
8020140027	88°	52	50	115	90

**OFFSET 88°**

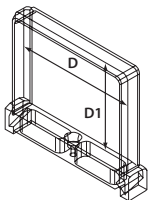
(Rectangular)



CODE NO.	ANGLE		DIMENSIONS (mm)		
	$\theta$	L	L1	D	D1
8020140042	88°	52	50	115	90

**DOWNPIPE CLIP**

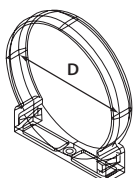
(Rectangular)



CODE NO.	DIMENSIONS (mm)	
	D	D1
8020140037	115	90

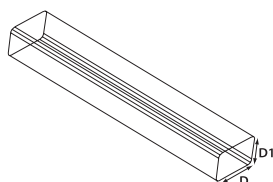
**DOWNPIPE CLIP**

(Round)



CODE NO.	DIMENSIONS (mm)	
	D	
8020140023	110	

## RECTANGULAR DOWNPIPE

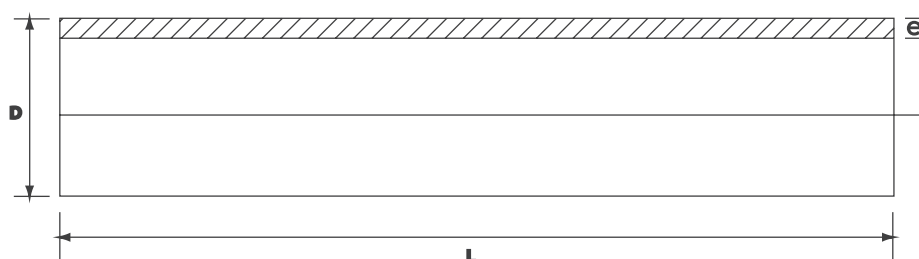


CODE NO.	LENGTH (m)	MIN. WALL THICKNESS e (mm)	DIMENSIONS (mm)	
			D	D1
8020130017	5.8	1.7	115	90

## RAINWATER PIPES

There are three types of rainwater pipe:

- The Normal Duty Pipe is intended for exposed installation on the building that do not exceed five storeys in height, such as terrace houses or low-rise shop-houses.
- The Medium Duty is intended for exposed installation on building exceeding five storeys.
- The Heavy Duty designed with higher ring stiffness for use in pipe work to be encased in reinforced concrete (RC) columns.



CODE NO.	MODEL	NOM. SIZE (mm)	SPECIFICATION	OUTSIDE DIAMETER	WALL THICKNESS	LENGTH L
				D (mm)	e (mm)	(m)
8020013461	Normal Duty	110	BS 4576/ BS EN 12200	110.0-110.3	2.2-2.7	5.8
8020013460	Medium Duty	110	BS EN 1329 / BS EN 12200	110.0-110.3	3.2-3.8	5.8
8020013555	Medium Hi Duty	110	BS EN ISO 1452 / BS EN 12200	110.0-110.3	4.2-4.9	5.8
8020013533	Heavy Duty	110	BS EN ISO 1452 / BS EN 12200	110.0-110.3	5.3-6.1	5.8



## PALING SOLVENT CEMENT

CODE NO.	DESCRIPTION	GMS	TIN/ CARTON
8120010059	Coloursolve fast dry (Green)	500	20
8120010055	Coloursolve slow dry (Blue)	500	20
8120010065	Clearsolve Elegance RG	500	20





## PRODUCT RANGE

# SOLVENT CEMENT

## FEATURES

- PVC Solvent Cement Fast Dry – for pipes and fittings  $\leq 80\text{mm}$
- PVC Solvent Cement Slow Dry – for pipes and fittings  $\geq 80\text{mm}$
- Moderate solvent odour
- Complies with MS 628 or BS 4346. SPAN listed



## ADVANTAGES

- Colour Co-Polymer for Easier Application and Inspection
- Easy to Use
- Premium Quality
- Fast and Slow Drying Solvent available for Strong Bonding



## APPLICATION

Paling Solvent Cement is formulated for PVC pipes used for rainwater and raingutter applications.



## PALING COLOURSOLVE FAST DRY

**Solid Content: 24%**

**Consistency property: 1,000 pcs**

**Quality: Tough & Resilient**

**Solid consist of: MEK & CYC**

**Colour: Green**

**Standard: MS 628-4:2015**

- Highly soluble fast dry PVC-U Solvent cement.
- Suitable for joining all PVC-U pipes from 15mm - 75mm diameter.
- When applied, it will instantly dissolve and blend with the pipe to produce a film (wall) of 0.4mm thick, so that the fitting gap will be strong and stable.

### STRAINING TIME

Pipes with diameters 15mm	10 seconds
Pipes with diameters 25mm to 32mm	8 seconds
Pipes with diameters 50mm	6 seconds
Pipes with diameters 75mm	4 seconds

## PALING RAINGUTTERS SOLVENT CEMENT

**Solid Content: 24%**

**Consistency property: 1,000 pcs**

**Quality: Tough & Resilient**

**Solid consist of: MEK, CYC & THF**

**Colour: Transparent and Clear**

**Standard: MS628 Part II Section 2.2**

- Suitable for joining all PVC-U pipes rain gutter.
- When applied, it will instantly dissolve and blend with the pipe to produce a film (wall) of 0.4mm thick, so that the fitting gap will be strong and stable.

### STRAINING TIME

Gutter Profile	30 seconds
----------------	------------

## PALING COLOURSOLVE SLOW DRY

**Solid Content: 24%**

**Consistency property: 1,000 pcs**

**Quality: Tough & Resilient**

**Solid consist of: MEK, CYC & THF**

**Colour: Blue**

**Standard: MS 628-4:2015**

- Highly soluble slow dry PVC-U Solvent cement.
- Suitable for joining all PVC-U pipes from 75mm - 200mm diameter.
- When applied, it will instantly dissolve and blend with the pipe to produce a film (wall) of 0.4mm thick, so that the fitting gap will be strong and stable.

### STRAINING TIME

Pipes with diameters 25mm	20 seconds
Pipes with diameters 32mm to 50mm	16 seconds
Pipes with diameters 75mm to 100mm	12 seconds
Pipes with diameters 150mm	8 seconds
Pipes with diameters 200mm	4 seconds

## ATTENTION:

1. Temperature below 15°C (50°F) will extend the straining period for approximately 5 minutes for each type of pipe.
2. All the above solvent cement is not applicable to those PVC-U pipe or fitting which are made of partly recycled material.
3. After assembly, the pipe must be tightly held in place and shall only be released after recommended straining time as stipulated. If release prematurely, the pipe to be fitted will spring apart.

### PACKING

500g. (with brush) x 20 Tins per ctn.

### CTN. SIZE

508mm x 220mm x 225mm

## SOLVENT CEMENT REQUIREMENT FOR PVC-U PIPES & FITTINGS

NOMINAL SIZE OF PIPE OR FITTING (mm)	AMOUNT OF SOLVENT CEMENT REQUIRED PER JOINT (g)	NO OF POSSIBLE JOINTS	
		100 g	500 g
15	1.3	76	383
20	2.0	55	250
25	2.5	40	200
32	3.2	30	156
40	5.0	20	100
50	7.2	13	69
80	12.0	8	41
100	15.5	6	32
155	26.0	2	19
200	49.0	1	10

## SOLVENT CEMENT REQUIREMENT FOR PVC-U GUTTERS & COMPONENTS

SIZE (mm)	AMOUNT OF SOLVENT CEMENT REQUIRED PER JOINT (g)	NO OF POSSIBLE JOINTS (500 g)
205 x 125	15.5	32

### RECOMMENDATIONS ON BRUSH:

- A : Pipes with diameter 25mm and below - use brush as accompanied and affixed to can
- B : Pipes with diameter 32mm to 50mm and below - use 1" brush
- C : Pipes with diameter 75mm to 200mm and below - use 2" brush
- D : Rain Water Gutter and Components - use brush as accompanied and affixed to can

### PRESSURE TEST:

	TEST PRESSURE	DRYING TIME
Cold Water (20°C)	Below 12kg/cm <sup>2</sup> (171psi)	After 1 hour
Hot Water (60°C)	Below 12kg/cm <sup>2</sup> (171psi)	After 2 hours

## PHYSICAL AND CHEMICAL PROPERTIES

Flash point: 15°C

#### Flammable Mixture (UN No. 1133)

This solvent cement material will ignite at ambient temperatures. Colourless vapours may travel considerable distance to ignition sources and cause flash fires or explosions.

#### Hazard Identification

May cause eyes and skin irritation, burns or dermatitis.

#### Storage

Store in well-ventilated area. Keep away from heat, sparks and flame.

#### Safety Advice

- Keep out of reach of children.
- Keep away from sources of ignition - No Smoking.
- Avoid contact with eyes.
- In case of fire, use chemical powder, foam or carbon dioxide.

## INSTALLATION GUIDES AND TIPS

THE FOLLOWING FACTS HAVE TO BE DETERMINED BEFORE THE INSTALLATION STARTS

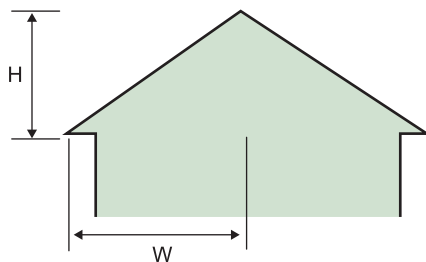
- The Effective roof area
- The number and position of outlets
- The angles and their distances from outlets
- Total number of brackets and fittings
- Low points of the installation (expansion outlet fixing point)
- High points of the installation

### The effective roof area

The Effective Roof Area (ERA) can be determined by using the following calculations:

Option **1** Simple Calculation Formula

$$[(H/2) + W] \times \text{Length of roof (L)} = \text{Area in m}^2$$



Referring to Example A (Calculation Sequence),

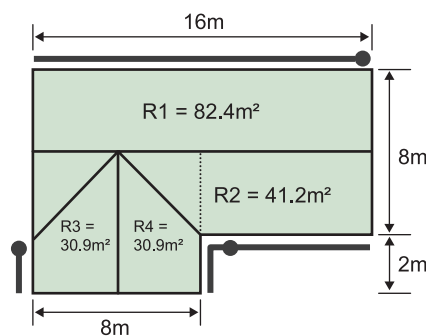
$$R1 : (4m + 2.3/2) \times 16m = 82.4m^2$$

$$R2 : (4m + 2.3/2) \times 8m = 41.2m^2$$

$$R3 : (4m + 2.3/2) \times 6m = 30.9m^2$$

$$R4 : (4m + 2.3/2) \times 6m = 30.9m^2$$

Note : H = 2.3



Example A

Using roof dimensions with a 30° roof pitch.

$$R1 : 4m \times 16m \times 1.288 = 82.4m^2$$

$$R2 : 4m \times 16m \times 1.288 = 41.2m^2$$

$$R3 : 4m \times 16m \times 1.288 = 30.9m^2$$

$$R4 : 4m \times 16m \times 1.288 = 30.9m^2$$

Note : ● Expansion Outlet — Gutter

Option **2** Multiplication Calculation Formula

$$\text{Wide (W)} \times L \times \text{Factor} = \text{Area in m}^2$$

The table below provides a wider range of factors to enable accurate assessment of effective roof area to be determined. The average ERA of 100m² requires at least one expansion outlet. Therefore 3 expansion outlets are needed for example A.

Roof pitch	Factor
10°	1.088
12.5°	1.111
15°	1.134
17.5°	1.158
20°	1.182
22.5°	1.207
25°	1.233
27°	1.260
30°	1.288
32.5°	1.319
35°	1.350
37.5°	1.384
40°	1.419
42.5°	1.459
45°	1.500
47.5°	1.547

For roofs of 50° and above, a factor of 1.600 may be used



## INSTALLATION GUIDES

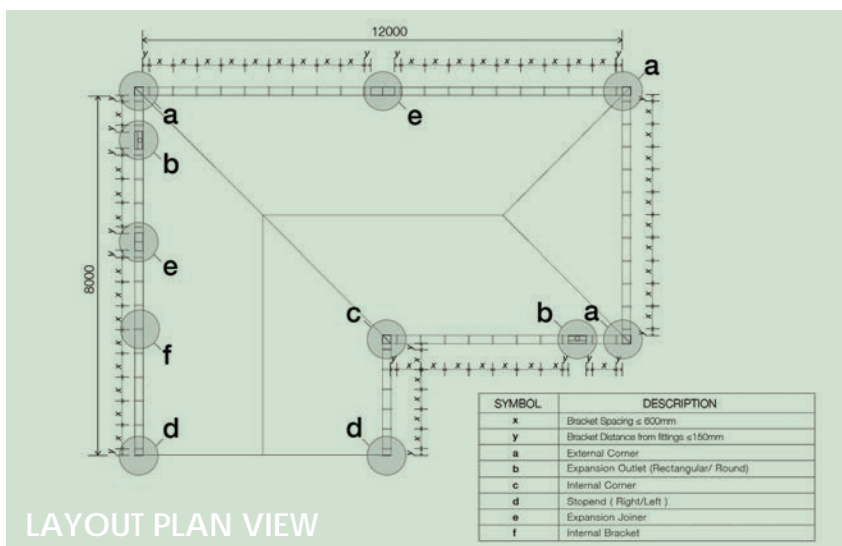
It is Important to Read Entire Instructions Prior to Attempting any Installation!

To obtain the maximum benefits, it is essential that you have the right quantity of components and parts before assembling to save time and effort.



### Required Equipment

1. Hammer
2. Hacksaw
3. Power drill
4. Cloth
5. String line
6. Builders level or line level
7. Ladder
18. Planks
19. Measuring tape
10. Pencil
11. Graph paper
- 12 Square and rule
13. Screws
14. *Elegance* Solvent Cement



### STEP 1

Measure and use a planning guide to sketch a roof plan (1 centimetre = 1 metre). Determine the fittings required and transfer the information to the order sheet. This will enable you to calculate the cost of materials required to complete the installation. Also, decide where you want your downpipe. The effective roof area of 100m<sup>2</sup> required a minimum of one expansion outlet. Larger effective roof area will require more expansion outlets. PALING's *Elegance* is available in 4 metre and 6 metre lengths.

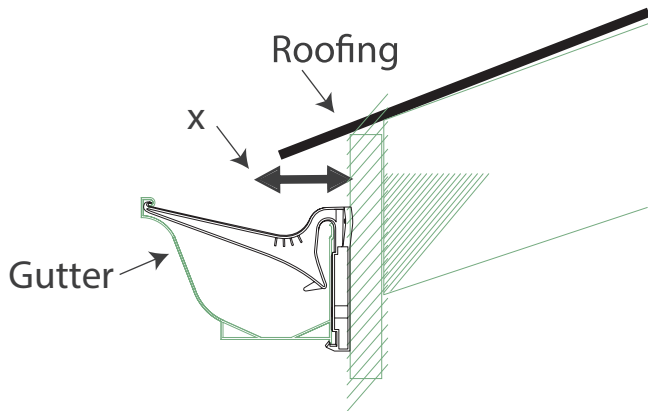


### STEP 2

Measure the roofline where the gutter will be installed, adding together the lengths of each fascia board. Take the measurement from the outer edge of the shingle (Figure A). Mark the measurements and make an outline on a graph paper.

Next, mark the locations of the downpipes with a 'X'. (Figure B)

All the repainting for the fascia board should be completed before *Elegance* installation is carried out.



The roof eaves beyond the fascia board, X should not be less than 50 mm or greater than 75 mm



Figure C



Figure E



Figure G



Figure D



Figure F



Figure H

### STEP 3

Drive a nail into the fascia board at one end of the gutter-run (Figure C). The roof eaves beyond the fascia board should be not be less than 50mm or greater than 75mm to ensure correct roof water discharge into the gutter. Stretch a string line from the nail. To properly align the slope (using a line level on the string line) drop one end of the line a quarter-inch for every 10 feet of fascia board length, then mark that point with a pencil (Figure D).

### STEP 4

Determine the lowest point, and attach the expansion outlet to the fascia board by using a power drill (Figure E). Along the gutter run, placed the internal brackets at every 600mm interval (Figure F). In order to support the fittings (joiner, internal & external corner, stop end and expansion outlet), internal brackets should be fixed at a distance of 150mm from each end of the fittings.

### STEP 5

Lay gutter profiles and their fittings on the ground as the model for how they will go on the fascia board. Use hacksaw to cut the gutters to the required length (Figure G) and remove all burrs at the cut end. Apply PALING's Solvent Cement to the joining sections and seal those sections accordingly (Figure H). Check the welded sections to ensure that they are completely sealed together. Ensure sufficient solvent cement is used for joining. Wipe off excess solvent cement with a clean cloth immediately.

## INSTALLATION GUIDES

### STEP 6

To apply the gutter profiles to the fascia boards, position the P-shape interlock of the gutter each the bracket ends. After ensuring each bracket is correctly engaged into the P-shape interlock, roll gutter section evenly upwards towards the bracket until the rear top edge firmly locks into the bracket (Figure I). Never solvent weld the gutter with the expansion outlets as the gutter needs to move freely to accommodate thermal expansion (Figure J).



Figure I



### STEP 7

A series of selection fittings are assembled to divert the rainwater to the drainage system. Install pipe clips at every 1.8m interval along the downpipes (Figure K & L).



Figure J



Figure K



**B** PALING’s formulated Solvent Cement to be used with Elegance system. The surface areas to be joined must be clean and dry before application. Apply solvent cement on both surfaces and join them accordingly. Hold the joining parts together for a minimum of 10 seconds. Check

The welded surfaces to ensure that a complete seal has been achieved. Excess solvent cement on the exterior surface should be removed immediately.

(No other Solvent Cement should be used without consultation with the manufacturer.)

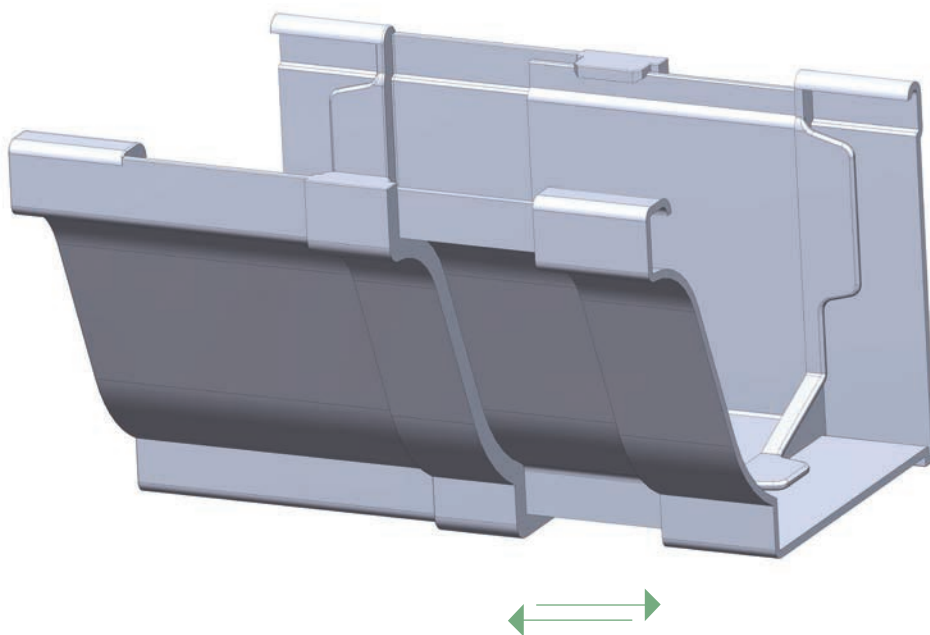
## APPLICATION SOLUTION

The Elegance expansion joiner is specially designed for addressing substantial movement from thermal expansion/contraction resulting from installation of long and straight gutter.

The application is normally suitable for the run of gutter length exceeding 8 metres and without any incorporation of expansion outlet.

It is also intended for gutters running along multiple corners, without thermal movement provision.

Utilizing the expansion joiner in such installation will prevent gutters from warping, bowing and dislocating, resulting in a fairly straight and neat finish.





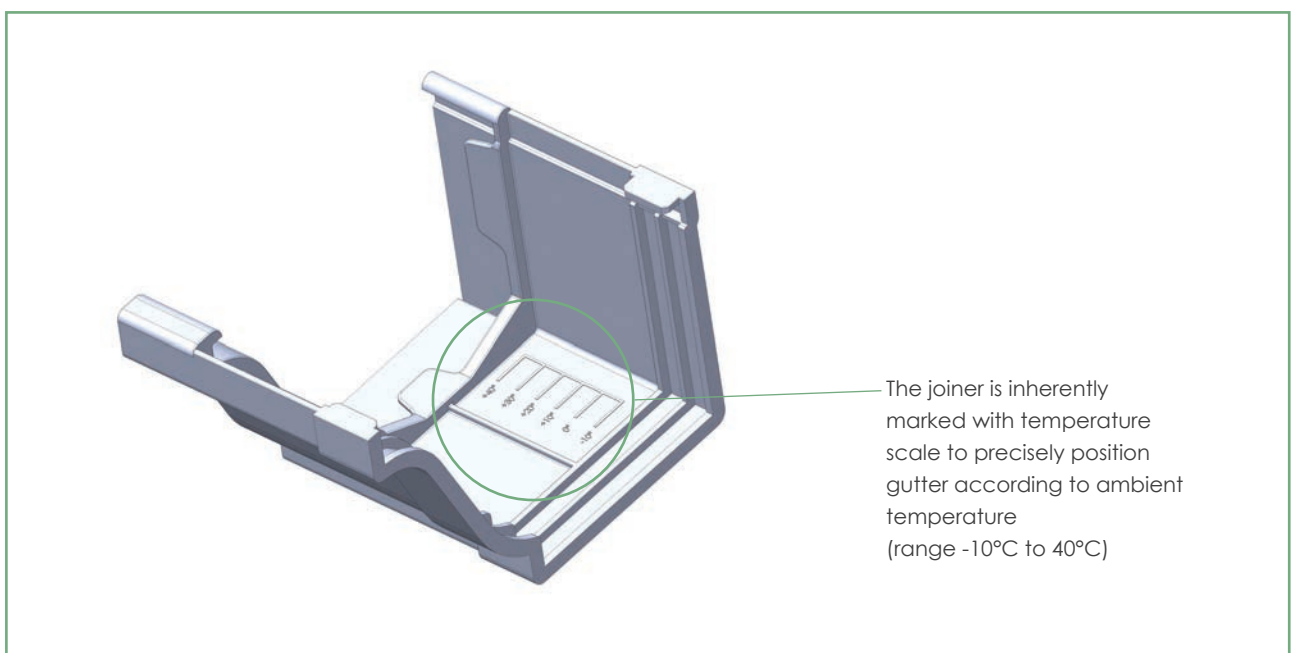
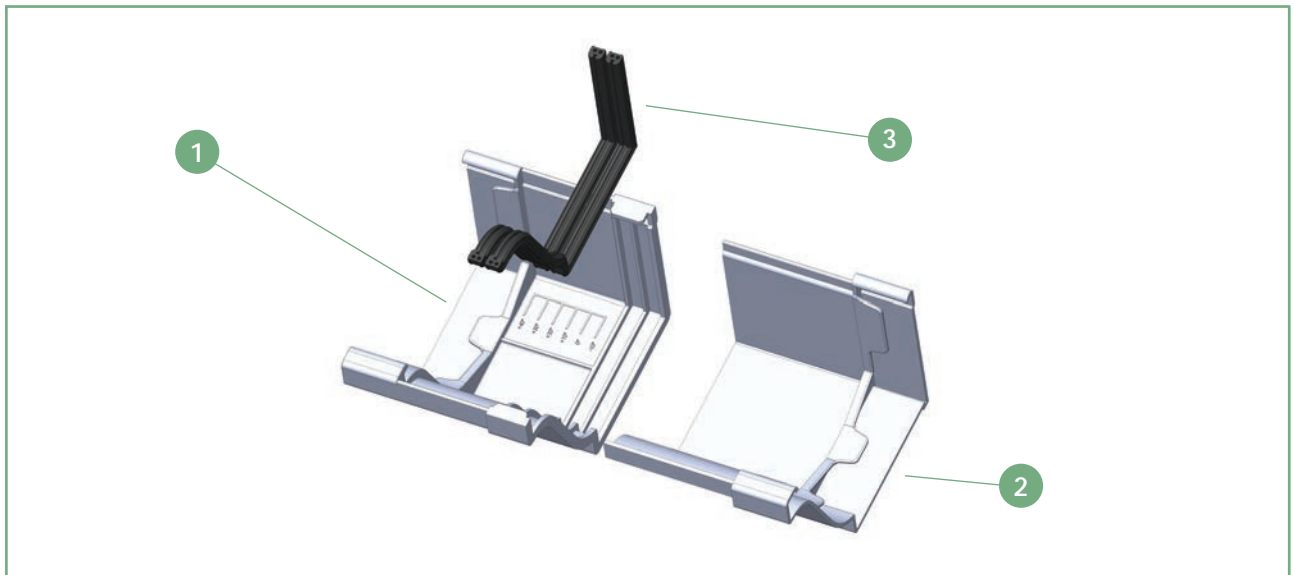
## PROPRIETY FEATURES

The Elegance expansion joiner is equipped with double sliding rubber seal (3), which accommodates and facilitates the movement of the gutters (1), (2).

The dual seal design enhances reliability against leakage during normal or heavy rainfall rate.

Seal material is made of resilient and durable to weathering effect.

The seals inside the expansion joiner can be easily cleaned or replaced, in the event of damage, by removing the 2 parts of the unit (lubricate the gasket with silicon grease after cleaning or replacement before reassembling). The complete unit is pre-lubricated at factory.





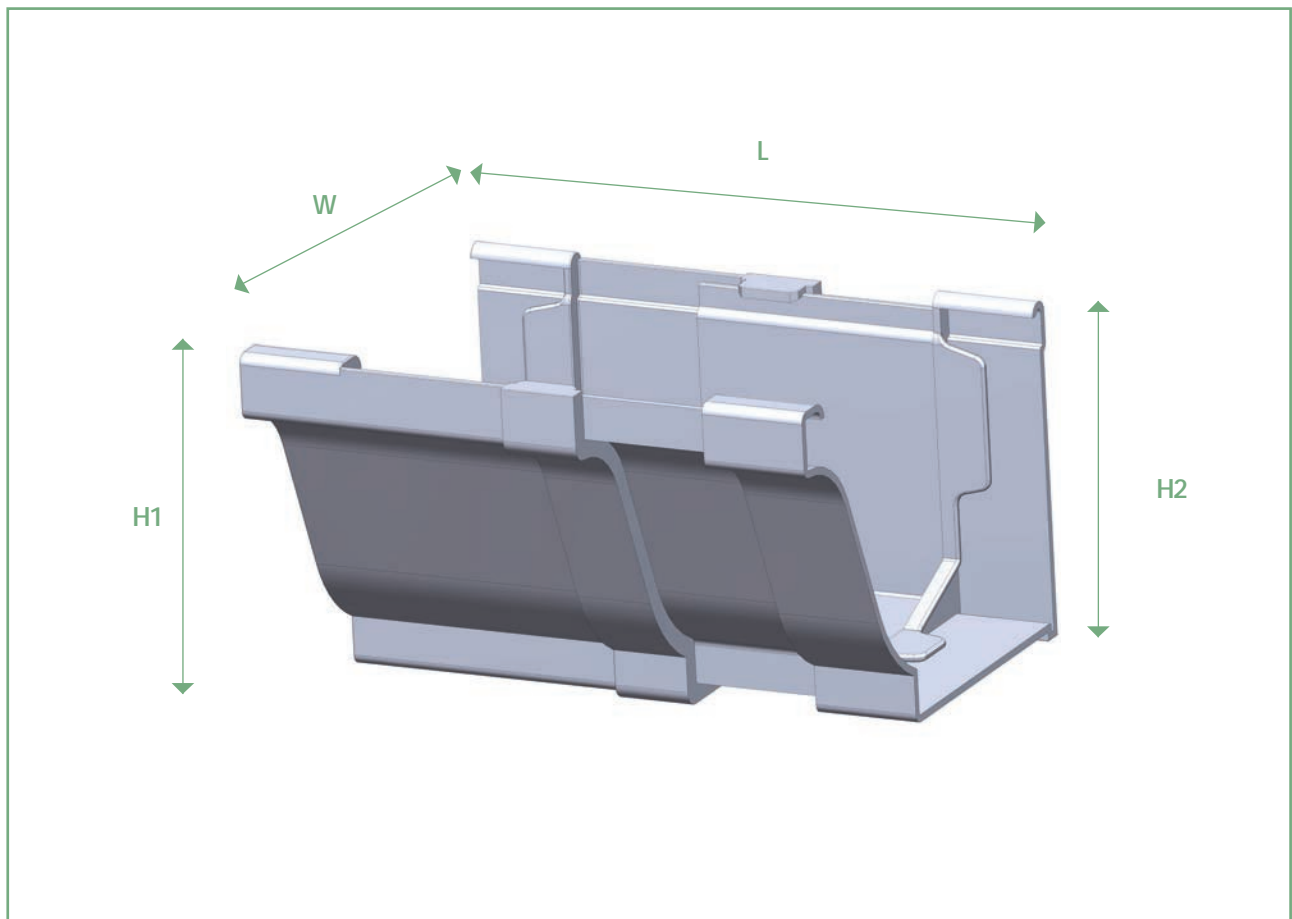
## INSTALLATION

To fix the Elegance expansion joiner is simple and swift. The steps outlined below guides the installation:

- Set bracket spacing at 400mm and place the joiner at mid distance between these brackets.
- Solvent Cement the gutter into one side of the Expansion Joiner and insert into previously installed brackets.
- Set the expansion joiner using the graduated temperature marked on the inside of the base of the fitting according to the temperature at the time of the installation. It is important that the fitting is set in the right position for it to function correctly.
- Determine the length of the next piece of gutter. Solvent Cement this length of gutter into the other side of the expansion joiner, ensuring the joiner is still set at the correct temperature position.

## TECHNICAL DATA

DIMENSIONS (mm)	
L (Open)	190
L (Close)	145
H1	148
H2	130
W	210



## ASSEMBLY PIPES WITH SOLVENT CEMENT JOINTS

### -1- CUT & DEBURR

Where necessary, cut pipe to length at right angle to its axis to maximize surface for bonding. Use of a mitre box and tooth saw is recommended.



Cut surface need to be deburred and chamfered to a slight bevel to simplify centred insertion and uniform adhesive distribution between parts.

### -2- DEGREASE THE SPIGOT AND SOCKET

Mark the insertion depth to the pipe spigot to avoid excessive application and provides control as to whether pipe has been adequately inserted into the



Clean parts to be fused with priming to ensure that dirt and possible slip and release agents are removed for optimal results. Scrape off any discoloured pipe layer due to UV-radiation or proper bonding cannot be achieved.

### -3- APPLY THE SOLVENT CEMENT

Apply adhesive evenly to both sides to be mated using a brushing stroke parallel to or along the pipe axis. It is recommended that a 1" brush be used to apply the solvent cement



can or tin well before using to ensure homogeneity.

for pipes with diameters between 32 to 50mm and 2" brush for pipes with diameters above 50mm. Joint must be made within 2 minutes of starting application.

### -4- MAKE THE JOINT

Insert pipe straight into the as deeply into the socket as possible without twisting and hold in place mly and steadily for at least ten seconds for Fast Dry and twenty seconds for Slow Dry.

Remove excess solvent cement with a soft cloth. A small closed adhesive ring should be clearly visible at the end of the to signal that the adhesive has been applied.



### -5- CLEAN THE EXCESS SOLVENT CEMENT

When making multiple joints on a piping system, an undisturbed rest period of at least minutes is required before second bond can be carried out. This is to avoid stress to the joint, which may weaken its adhesion.



Wait 24 hours before testing or use

## PROJECT REFERENCES

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NOTE :

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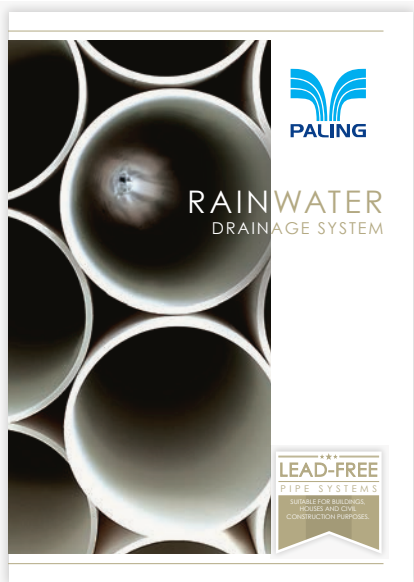
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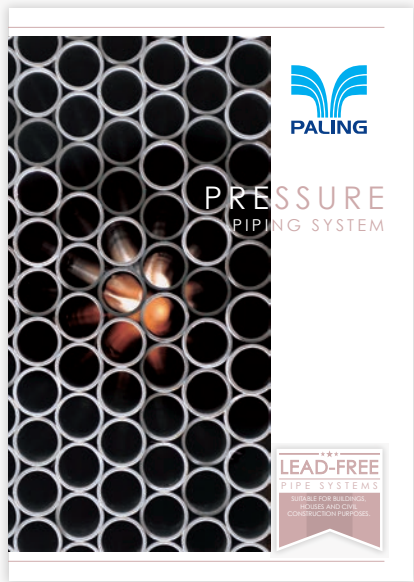
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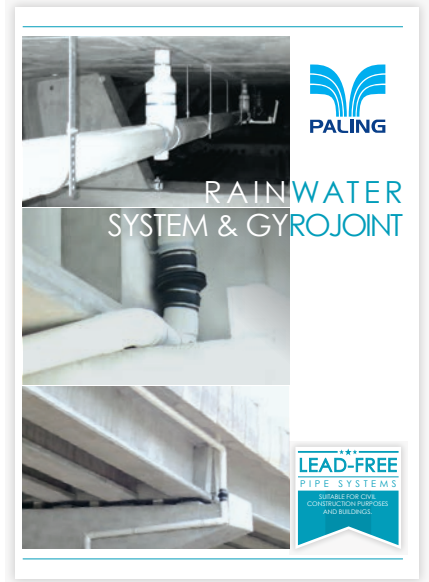
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**LESSO MALAYSIA INDUSTRIES SDN BHD** 202001023994 (1380314-K)

Lot 10072, Persiaran Mahogani Utama 2 Seksyen 4,  
Bandar Utama Batang kali, 44300 Batang Kali,  
Selangor Darul Ehsan, Malaysia.

**T** : 603 - 6063 6888 (General)

603 - 6057 0580 (Sales)

**F** : 603 - 6057 0680

**E** : sales@paling.com.my



Official Website

**Distributed by :**

**KEKALBOLEH SDN BHD**  
(199901021248/496148-K)  
Lot No. 7, Lorong Perindustrian Kolombong Jaya,  
Pusat Perindustrian Kolombong Jaya,  
Mile 5.5, Jalan Kolombong,  
88450 Kota Kinabalu, Sabah.  
Tel/WhatsApp: 088-385555 / 013-8867570  
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