KEXTRA PRODUCT ADVISORY BULLETIN

DESIGN PRELIMINARIES

PRODUCT SELECTION

There are many kinds of profile nowadays in market. When you want to design a roof, there are many choices that can be made because there are many different types, designs, specifications, colour of the roof that you can choose. As we know, the roof is a layer of steel that protects us from all kinds of weather. If you are unsure about any product feature related to roofing, visit www.kextra.com.my or you call our information line or reach our specialist to seek an advice.

ROOFS

There are many factors in designing roofs including:

•The shape: is the roof to be 'flat' or pitched or curved?
•The supporting structure and support spacing;
•The wind forces that the roof must sustain;
•The pitch which affects the looks, the profile's ability to
efficiently carry rain to the gutters, and
fixing details;
•Thermal expansion of long sheets;
•The attributes of other materials used in the roof design.

WALLS

The design of a steel wall is not so complicated because it is fairly straight forward due to its surface which more geometrical.
Once you have made the aesthetic decision of which profile to use,
the only thing you need to consider are the support spacings, fixing
details and the details of flashing.

This bulletin doesn't attempt to cover the structural design details of supports or aesthetics. Detailed information we can obtain from Malaysia Standard and CIDB. The aesthetic aspects of steel roofing and walling, and its installation, have special features and you should seek advice from relevant experts if necessary.

This bulletin gives tables of recommended support spacings and the maximum roof length for pitch and rainfall intensity for KEXTRA roofing products. The appropriate design will depend on your specific needs and circumstances. You should get advice from the relevant specialists where required.

MATERIALS AND FINISHES

Our profile most widely for roof and cladding available in pre-painted steel, or in bare finish with metallic coated.

MATERIAL SPECIFICATIONS

Pre-painted steel for exterior roofing and walling. The painting complies with AS 2728 (Color) – Equivalent to Malaysia Standard MS 2383 and the steel base is an aluminium/zinc/ magnesium alloy-coated steel complying with AS 1397 (Bare) – Equivalent to Malaysia Standard MS 1196.Minimum yield strengths are G550 (550 Mpa), or G300 (300 Mpa) depending on profile.

Check with your local KEXTRA office for availability of profiles, materials, finishes, colours, accessories; and for suitability of the product. Tables 1.1 list general information for profile selection. Refer to our publications on specific products for detailed specifications. There are also publications on Aluminium Zinc Coated and Zinc Coated from our information line.

SUPPORT SPACING AND OVERHANG

The maximum recommended support spacings for end and internal spans are shown in Tables 1.1. For roofs the maximum recommended support spacing is based on data .

The roof spacings in the tables are recommended to produce adequate performance of claddings under concentrated loading (incidental for maintenance). For support spacings in wind conditions, refer Kextra publications on specific products for wind pressure data. The overhang is the projection of the sheet past a support. The minimum overhang must consider:

The minimum recommended end distance of the cladding's fastener / clip. The industries requirement for projection of the cladding into a gutter (box, valley or eaves).

The maximum overhang is shown in Table 1.1. For roofs the maximum overhang is a guide and is based on a nominal incidental load applied adjacent to the free edge. All roof overhangs should be treated as a non-trafficable area. When a roof overhang exceeds the guide then added care should be considered with respect to providing stiffening or support to minimise the potential of damage from accidental loading.

In all cases, cladding is fixed to a support of 1.0mm minimum base metal thickness (BMT) and minimum yield stress of G550. If you want to use metal battens thinner than 1.0mm, seek advice
from our information line.

MAXIMUM LENGTHS OF ROOFING

The valleys (or pans) of roofing have to carry water to the gutters. If in heavy rain, the valleys overfill, water can flow into the roof through the side-laps and flashings. Factors affecting waterproof and drainage capacity of the laps of a profile include:

•The width and depth of the valleys or pans;
•The pitch of the roof – rain flows faster on a steeper pitch;
•Rainfall intensity for the geographical area;
•The length of the roof from ridge to gutter; and
•Penetrations that cause nearby valleys to carry extra rain diverted from valleys obstructed by the penetration (refer to the KEXTRA® Roofing & Walling Manual- Figure 2.14.1).

The maximum recommended roof lengths for drainage for each profile are given in the KEXTRA Roofing & Walling Manual – Table 1.1

LOW ROOF PITCHES

Unless there is adequate positive fall in a roof, there is danger of ponding, which can lead to a reduced service life, or reduced rainwater capacity. Reduced service life is of particular importance in more severe environment.

At low slopes, say around 2° or less slope, all roof supports must be in the one plane because slight variations can result in zero or negative fall. This may occur during construction, or even after completion of the building as the result of construction tolerances/practices, settlement, timber warping or shrinking, or extra loadings (like air conditioners) or suspended services. Minimum recommended roof slopes are listed in Table 1.1. As a guide, wherever possible, you should design for a minimum slope of 1 in 30 (2°).

Roof slopes lower than the recommended minimum may be available subject to enquiry and will be dependent upon the roof application and building details. Lower roof slopes may require additional provisions to be adhered to. Please call your nearest service centre for advice.

WIND FORCES ON ROOFS

Winds create considerable forces on both the topside and the underside of roof cladding, and you must consider these forces in the design and fixing of any roof. The forces are:

•**inward forces** tending to collapse the roof cladding inwards, caused by wind acting directly on the windward side; and
•**outward forces** tending to lift the roof cladding from its framing, and the entire roof PAINT. The roofing and walling with pre-painted finish can be damaged by some handling, installation or maintenance activities. If damage occurs to the metal roofing pre-painted finish, refer to Technical Bulletin TB-2, published by KEXTRA. This incident is usually caused by man power but can be avoided. Because of that the method for handling, installation or maintenance must be applied and follow the step.
structure from the rest of the building. Outward forces can be caused both by uplift from negative wind pressures, outside the building; and by positive wind pressure inside the building.

Generally, the greatest wind forces imposed on roofs are due to the outward forces. Because the dead weight of roofing materials is relatively small, the outward forces must be resisted by the roof fasteners. It is very important that the battens and roof framing are adequately fixed to the rafters and walls, and that under extreme conditions the wall framing is anchored to the footings. Special anchoring provisions may apply in cyclonic areas. Specialist advice should be sought in these circumstances.

CODES AND PERFORMANCE TESTS

Metal roofing products must comply with the performance specifications, and be checked by stringent tests, in accordance with the standard. Such tests have been carried out on all our claddings and the results have been used in the preparation of the fixing and installation recommendations in this manual.

ENVIRONMENTAL CONDITIONS

Coated steel products can be damaged by some environmental conditions including industrial, agricultural, marine, intensive animal farming, swimming pools or other aggressive conditions.

If any of our products are to be used in these conditions, or unusually corrosive environments, seek advice from our information line.

Keep the product dry and clear of the ground. If stacked or bundled product becomes wet for extended periods, separate it, wipe it with a clean cloth and stack it to dry thoroughly.

TRANSPORTATION

Because our roofing and walling is manufactured by continuous processes, sheet lengths can be supplied up to the limits of transport regulations, which vary from state to state.

KEXTRA I-Clip 720 is available in extra long lengths via roll foaming on site . This service is available nationally, subject to enquiry.

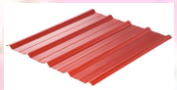
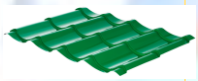
PAINT AND PRE-PAINTED STEEL

The roofing and walling with pre-painted finish can be damaged by some handling, installation or maintenance activities. If damage occurs to the metal roofing pre-painted finish, refer to Technical Bulletin TB-2, published by KEXTRA. This incident is usually caused by man power but can be avoided. Because of that the method for handling, installation or maintenance must be applied and follow the step.

SPECIFICATIONS ROOFING

TABLE 1.1

SPECIFICATIONS OF ROOFING & WALLING PROFILES.

KEXTRA Profile		BMT	TCT	Weight	Cover Width	Rib Depth	Roof Pitch Min	Roof			Wall		
		mm	mm	kg/m2	mm	mm	Degree	Internal mm	End mm	Overhang mm	Internal mm	End mm	Overhang mm
	I-Clip 720	0.40	0.45	4.10	720	37	2	2000	1500	150	1500	2600	150
		0.42	0.47	4.38	720	37	2	2100	1600	200	1600	2800	200
		0.48	0.53	5.08	720	37	2	2500	2000	300	2000	3000	300
	I-Clip 680	0.40	0.45	4.34	680	40	2	2000	1500	150	1500	2600	150
		0.42	0.47	4.63	680	40	2	2100	1600	200	1600	2800	200
		0.48	0.53	5.27	680	40	2	2500	2000	300	2000	3000	300
	I-Deck 762	0.35	0.4	3.4	762	25	3	900	1000		1200	1200	
		0.40	0.47*	3.88	762	25	3	1050	1300		1500	1500	
		0.42	0.47	4.14	762	25	3	1200	1500		1700	1700	
		0.48	0.53	4.7	762	25	3	1300	1700		2000	2000	
	I-Rib 750	0.35	0.4	3.46	750	30	2	1300	1200	150	2600	1600	200
		0.40	0.47*	3.94	750	30	2	1500	1400	150	2600	1600	200
		0.42	0.47	4.2	750	30	2	1600	1500	150	2700	1650	200
		0.48	0.53	4.78	750	30	2	2000	1900	150	2920	2300	200
	I-Span 700	0.35	0.4	3.71	700	23	3	1658	1217	100	2379	1876	
		0.40	0.47*	4.22	700	23	3	2039	1737	100	2570	2144	
		0.42	0.47	4.61	700	23	3	2192	1945	100	2646	2251	
		0.48	0.53	5.22	700	23	3	2650	2568	150	2875	2572	
	I-Euro 762												