

STEEL STORIES

Amazing Coated Steel by BlueScope

STEEL STORIES Feature

3 LAYERS THAT DEFINE QUALITY

Understanding Base Metal Thickness (BMT),
Metallic Coating & Paint Thickness of Coated Steel

You may not realise it but coated steel is an integral part of our everyday lives. From places of shelter to transportation, machines and home appliances – these can all be made of coated steel.

However, not all coated steels are created equal as they differ in three key areas – areas which also determine the overall quality of the coated steel: **Base Metal Thickness (BMT), metallic alloy coating mass and paint dry film thickness**. If you're thinking that the difference is simply to create variety in the market, you are only half right. The reason for the variations is also due to different manufacturing goals of different manufacturers.

While the strength of coated steel is mainly determined by its BMT, it is not the only thing that separates a superior coated steel from others.

In this issue of Steel Stories, we look at how BMT is measured and why it is such an important information in any specification document, e.g. the bill of quantities. And as we do so, we will also cover how metallic alloy coating and paint formulation enhance the performance of steel against harsh weather!

May Diwali's lights
Bring you delight
In all areas of your life!

**Happy
Deepavali**

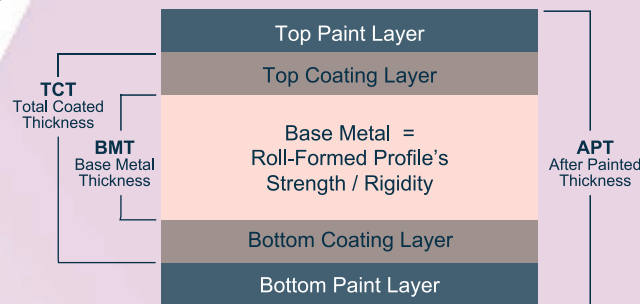
from all of us at
NS BlueScope Malaysia

Why BMT Matters for Strength, Not Total Coated Thickness (TCT)

Let's start first by understanding the different measurement terms used. The strength of a building is always determined by its core, as it is the foundation that provides much-needed support to keep the building up and standing. More foundation equals to stronger buildings, and this same concept can be applied to understanding what defines coated steel strength.

It all boils down to how thick its core is. By measuring the thickness of its base metal, you get what is known in the industry as Base Metal Thickness or BMT for short.

The base metal or the flat steel strip is usually coated with metallic alloy coating on both sides, and the overall thickness after coating is termed as Total Coated Thickness (TCT).



Cross-section diagram of coated steel

For BlueScope who manufactures prepainted coated steel (COLORBOND® steel), the term "After Painted Thickness (APT)" is used instead to define overall thickness. This includes the paint layers. Although the term "APT" is not yet a common term, it is used exclusively by BlueScope to acknowledge the final thickness after painting. By doing so, the thickness of metallic alloy coating and paint layers can be clearly distinguished.

TCT Does Not Specify The Strength of Coated Steel

While it is common for professionals to use TCT as the benchmark in their specification documents, TCT does not necessarily represent the true strength of coated steel. For example, when the architectural firm demands for coated steel of 0.48mm BMT, but is supplied with 0.48mm TCT instead, they could very well be receiving a product of inferior structural strength.

TCT and BMT values may look the same but bear in mind that TCT refers to the total thickness after metallic alloy coating and is not the actual thickness of its base metal (steel). This means that the base metal did not actually meet the basic thickness requirements and as a result, poses risks of compromised structural integrity and safety for both the developer and consumer. For example, in a worse case scenario, a worker could fall from the roof due to a lack of structural integrity of the coated steel.

This is why, TCT alone is deemed less reliable when it comes to identifying the structural strength of coated steel.

So how should professionals like architects and engineers ensure that they aren't getting shortchanged in terms of thickness measurements then? **Always have the BMT specified.**

Specifically for roofing and wall cladding, the minimum BMT specified is 0.42mm and 0.35mm respectively in accordance to Australian Standard (AS 1445) and Building Code of Australia (BCA). Domestically, Jabatan Kerja Raya (JKR) has also developed a Standard Specification which requires the minimum BMT for roofing to be 0.42mm.

Effects of insufficient BMT



Cracks easily at ribs



Collapse of roofing sheet

All BlueScope's products- ZINCALUME® steel, TRUECORE® steel, COLORBOND® steel and more - are labelled with BMT to ensure that customers always receive the right thickness required. BlueScope believes in being transparent with its specifications as safety and integrity always come first.

Enhancing Strength and Anti-Corrosiveness with Metallic Coating

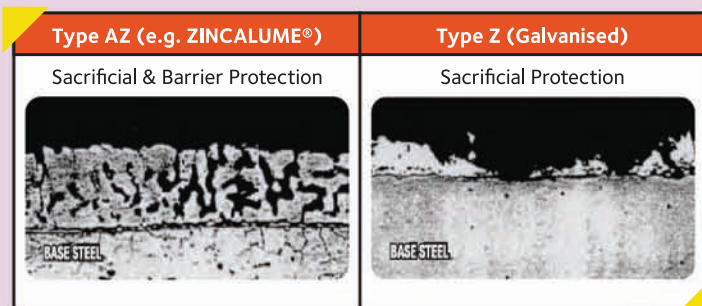
The next layer of coating after the base steel is metallic alloy coating, also known as galvanic protection coating. While creating a brighter and more metallic finish, metallic alloy coating adds on to the quality of the steel, namely in terms of providing protection against corrosion. Unlike BMT, which indicates the strength of steel in millimeter thickness, there are two aspects to consider when it comes to determining high quality metallic alloy coating: **the coating composition** and **coating mass**.

Coating Composition – What Makes A Superior Coating?

There are two common types of coating composition: Type AZ and Type Z.

Type AZ refers to a unique composition of 55% aluminium and 43.5% zinc content in the metallic coating composition, while Type Z refers to >99% zinc content. Rigorous field tests conducted by BlueScope has proven that Type AZ outperforms Type Z in corrosion protection.

Without doubt, as a form of galvanic protection coating, Type Z showed better sacrificial protection in the early stages. However, the layer wore off faster, continued to corrode and subsequently, affected even the base steel once the zinc coating was gone. On the other hand, the Type AZ coating excelled in both sacrificial and barrier protection. With 55% aluminium-rich composition, Type AZ coating provided further protection to the base steel even after the zinc content wore off.



Microscopic view of Type AZ (left) and Type Z (right) after prolonged weathering

Coating Mass – How Thick is More Effective?

Besides coating composition, the second aspect to determine the quality of the metallic alloy coating is its coating mass. This is often mistaken by industry professionals as coating composition.

Type AZ, which comprises of aluminium and zinc, is the coating

composition that can be coated in different thickness. This thickness is quantified by coating mass, which is represented in gram per square meter (g/m^2). For example, ZINCALUME® steel and TRUECORE® steel by BlueScope, are both coated with AZ150 where “AZ” refers to Type AZ coating and the “150” means 150 g/m^2 .

Unlike BMT, which specifies certain measurements to indicate strength capability (such as minimum 0.42mm BMT for roofing), the quality of metallic coating relies on its manufacturer’s claim and accordance to established international standards, i.e. the Australian Standard (AS 1397) or Malaysian Standard (MS 1196).

BlueScope’s ZINCALUME® steel and TRUECORE® steel are Type AZ products which are certified to Australian Standard (AS 1397). With a unique composition comprising of 55% aluminium, 43.5% zinc and 1.5% silicon, ZINCALUME® provides superior resistance against extreme climates and various weather conditions. It also has a longer lifespan thanks to its enhanced sacrificial and barrier protection. A clear choice for builders.

Maintaining Steel Aesthetics through Time with Paint Formulation and Technology

The final layer of a coated steel is the paint coating layer. Here’s the layer that gives coated steel all its wonderful colours and fulfills the vision of architects. The quality of paint coating predominantly comes from its paint formulation and painting technology. Very often, these two areas are also dependent on the manufacturer’s production and research and development (R&D) excellence.

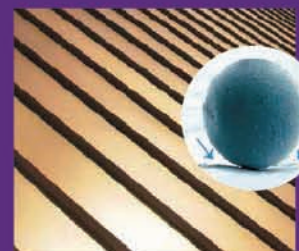
COLORBOND® steel, which is finished with BlueScope’s proprietary paint system – the Super Polyester Paint Technology, is combined with superior quality formulation (which uses inorganic pigments for its colours) to achieve long-lasting colour stability. COLORBOND® steel is prepainted with high consistency and precision, hence, it sets the benchmark for prepainted steel in the market.

Apart from that, COLORBOND® steel’s Clean Technology also gives COLORBOND® a strong resistance against dirt staining. This allows COLORBOND® steel to maintain its vibrancy and glossiness even after prolonged exposure to harsh weather.

Conventional Pre-painted Steel



COLORBOND® Steel



Clean Technology by COLORBOND® steel prevents dirt particles from bonding with the surface. Hence, dust particles easily washed away during rainfall

Apart from paint formulation and the manufacturer’s technology, another gauge for paint quality is the paint’s dry film thickness, typically measured in “micron” or “ μm ”. For clarity, $1\mu\text{m} = 0.001\text{mm}$. This data can be easily found in published documents by BlueScope and can be used to accurately calculate the APT of any BlueScope steel product.

It is important to note however, that paint coating thickness cannot be used as the only measure for overall quality. Thicker does not always mean better. Without the foundation (i.e. good paint formulation and coating technology), paint thickness alone cannot provide sustainable long-term performance.

BlueScope Steel – The Solution for Buildings and The Mind

With BlueScope confidently checking off all three areas; structural quality, corrosion resistance and high-quality aesthetics are guaranteed. Through numerous tests and stringent quality control, BlueScope is able to offer steel of only the best quality, adhering to both local and international standards.

What’s more, with various brand guarantees and warranties offered by BlueScope, builders can safely build with peace-of-mind. Now that’s what we call true quality.

For more information on BlueScope steel products, visit www.bluescope.com.my now!

BEAUTIES WITH PURPOSE: HIDDEN ARCHITECTURAL JEWELS

They come in unique shapes and sizes. Lesser-known and less-glorified compared to its skyscraping peers, they can be found in unassuming neighbourhoods, idyllic townships and where you least expect an architectural marvel to be.

Yet, they stand tall in their element and instantly uplift its surrounding atmospheres. Providing more than a space for human connection, they add colour, lines and unique shapes to the skyline while creating contrasts that define the places they were built in.

They are Malaysia's lesser-known architectural 'jewels', but with none less in beauty as they radiate with their own unique architectural brilliance.

KELAB GOLF SARAWAK, KUCHING

The Pyramid of Sarawak

As its triangular roof reaches out to the sky, the pyramid-inspired Kelab Golf Sarawak (KGS) stands out in minimalistic elegance. Living up to its status as the largest golf club in Sarawak, KGS boasts of a 36-hole golf course sprawling across 60,984 sq ft of land. Today, 34 years since it was built, KGS continues to be one of the most important locations in Kuching, acting as a central hub for social gatherings and sporting events. Despite being over three decades old, the building stands strong and pristine, thanks to COLORBOND® steel, of which its roof is made of.

PROTON TANJUNG MALIM, PERAK

The Dome of National Excellence

Modern and futuristic – that's what the dome-like crown of PROTON's central building exudes. A part of the national automotive maker's RM1.8 billion assembly plant, the central building rises tall and wide with the linear profiles of its dome-like roof. While creating an illusion of a trajectory, it also reflects PROTON's vision to develop the township as the 'City of The Future' for Malaysia's automotive industry by 2020. The building's distinct roof and sophisticated aesthetic is enhanced with COLORBOND® steel's clean profile.

SENJA CLUB HOUSE, THE MINES, SELANGOR

The Jewel of The Mines

Underneath the sunlight, Senja Club House (SCH) glistens like a large jewel resting amidst the exquisite neighbourhood of Senja Residences. Roofed with COLORBOND® steel, it draws the eyes towards its multi-dimensional high-glass walls – a sight to behold especially in the evenings, as it reflects orange rays upon the serene lake located opposite. Behind these glass walls, a myriad of recreational facilities like a sauna, kitchen, gym and reading room beckon the souls of Senja Residences in need of refreshment.