



Fade Protection Explained

The paint on your panels is made up primarily of two components: *resin* and *pigment* (a third, *solvent*, is used to transfer the two to the metal surface and is released during the application process). Understanding the attributes of each of the components will help you choose the best paint for you.

PIGMENT

Pigments are the particles of color that are suspended in the resin to create color. Inorganic and ceramic pigments offer the best protection against fade over organic compounds. **Fading occurs when environmental influences attack the pigments causing them to change color over time.** Pigments are rated on their ability to resist fading. In this rating the lower the number the better.

Central States products use the trademarked CentralGuard® protection system. It includes a cross-linked matrix resin and UV blockers that deter fading.

RESIN

Resin binds the pigment to the metal surface. The stronger the binding agent, the more resistant it is to sun, rain and pollution. Resins are rated according to their resistance to chalking.

Chalk, or the appearance of a whitish, powdery substance on the panel surface, is the result of a breakdown of carbon bonds in the finish. Resins protect the pigments and give UV resistance to help them fade less over time. Higher resin content means a longer lasting film, more abrasion resistance and more panel protection.

CentralGuard's advanced resin system resists color washout with a unique chalk-resistant formula that does not break down in harsh sunlight and extreme weather like traditional resins.

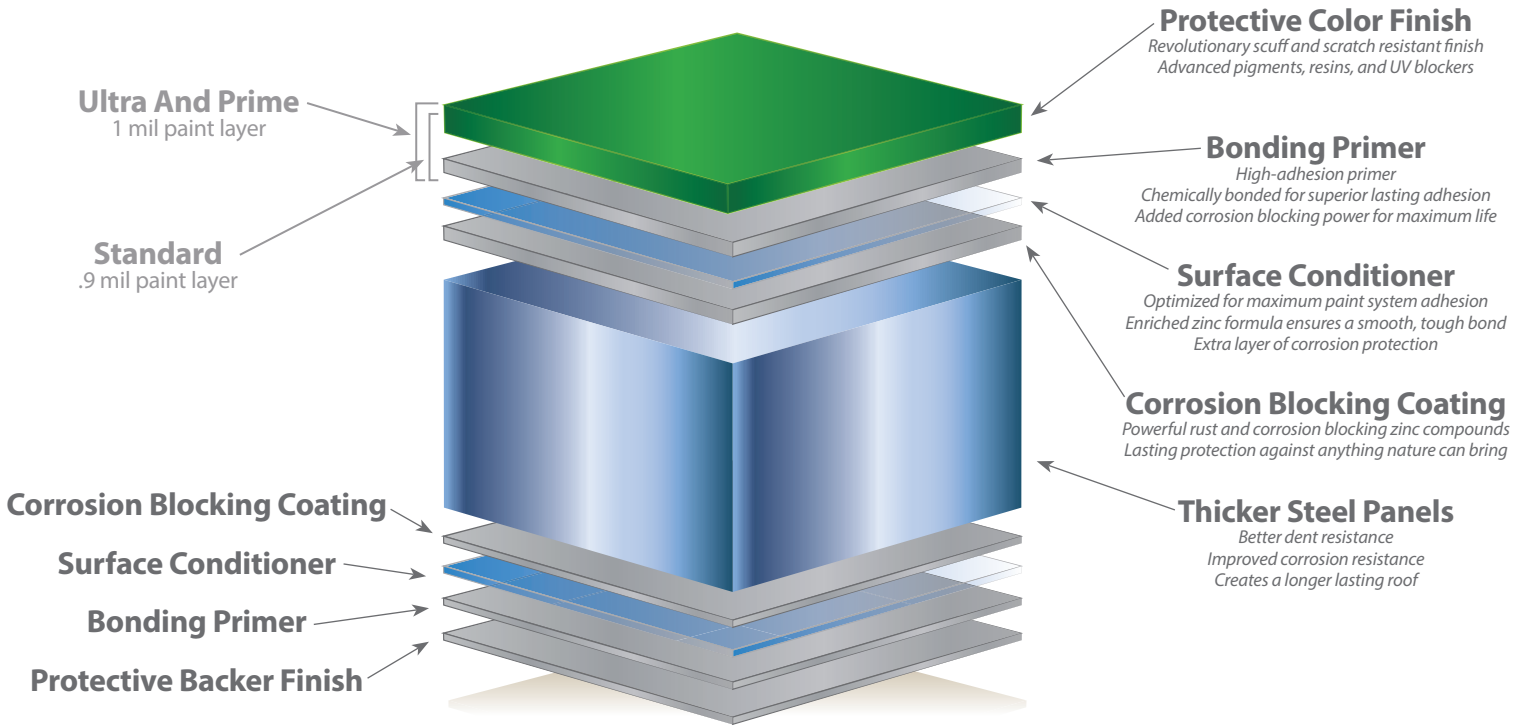


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LAYERS OF PROTECTION



MEASURING FADE AND CHALK RESISTANCE

FADE is measured in **Hunter Units**. One Hunter Unit denotes the smallest degree of color change visible to the naked eye. *Lower numbers are better*



CHALK is measured by the amount of powdery material that is deposited on a black cloth when painted metal is rubbed. *In this case higher numbers are better.*

Central States Protection

Roof Panel
7 units of **Fade**
over the next **30 years**

Wall Panel
5 units of **Fade**
over the next **30 years**



Central States Protection

Roof Panel
6 Chalk rating
over the next **30 years**

Wall Panel
8 Chalk rating
over the next **30 years**

Hunter Unit Scale

	1 Hunter Unit	3 Hunter Units	5 Hunter Units	7 Hunter Units
FADE COMPARISON	FADE	FADE	FADE	FADE
Brand New Roof	After 7 Years	After 15 Years	After 22 Years	After 30 Years
	2.5 Hunter Units	5 Hunter Units	7.5 Hunter Units	10 Hunter Units

CentralGuard® by Central States

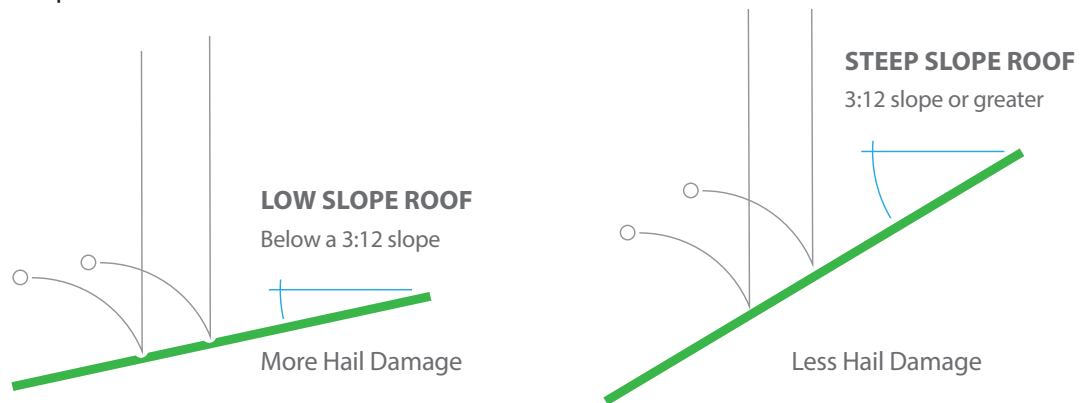
Substandard Metal Roofs

For comparison only. Fade may vary by color.



Dent Protection Explained

Each year, hail causes about 1.6 billion dollars worth of damage to residential roofs and barns in the United States. Hailstorms are most concentrated in the southern and central plains states, but can occur almost anywhere there are thunderstorms. Hailstones larger than 1 inch in diameter have the potential to cause damage to any exposed object. The level of damage depends on the size, density, falling velocity, and distribution of hailstones. Roofs may be especially susceptible to damage depending on the slope of the roof. Hailstones cause more damage to low slope roofs than steep slope because the greatest damage occurs at a 90-degree angle of impact.

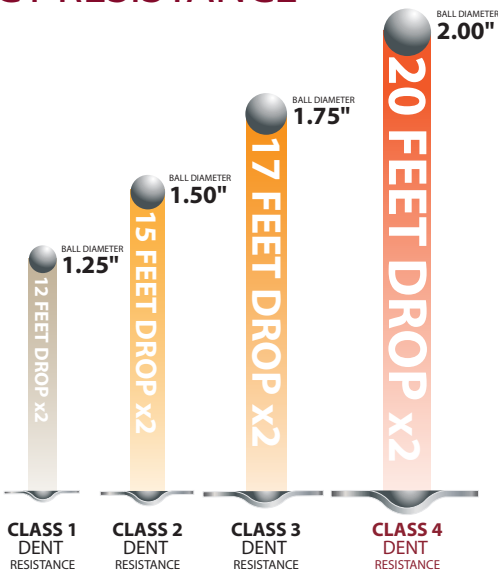


In general, damage can be categorized into two types: aesthetic damage and functional damage. Aesthetic damage has an adverse effect on appearance but does not affect the performance of the roof. Functional damage results in less water-shedding ability and a shorter expected



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IMPACT RESISTANCE



Underwriters Laboratory has developed a test (UL 2218) to evaluate the impact resistance of roofing material. This test evaluates materials by dropping a steel ball onto the roofing panel twice at the same location. The material must show no evidence of fracture, cracking, splitting, or any other failure resulting in an opening of the roofing material. The sizes of the steel balls range from 1.25" to 2.00" and are dropped twice from a height of between 12 and 20 feet.

Central States uses metal with a Class 4 impact resistance rating.

DENT PROTECTION

According to engineers at U.S. Steel Corp., dent resistance of a coated sheet is proportional to the square of the yield strength multiplied by the fourth power of the sheet thickness.

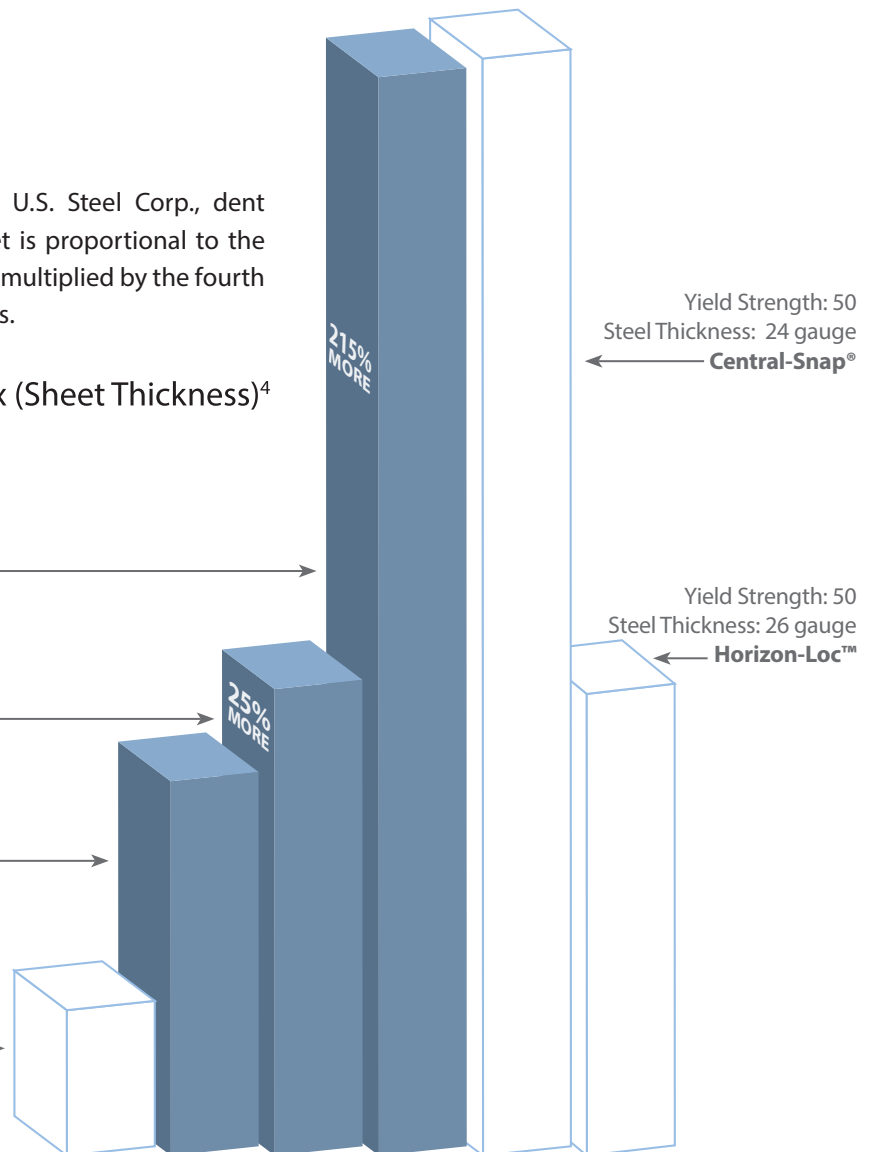
$$\text{Dent resistance} \propto (\text{Yield Strength})^2 \times (\text{Sheet Thickness})^4$$

Yield Strength: 80
Steel Thickness: 26 gauge
Panel-Loc Plus™ Ultra

Yield Strength: 80
Steel Thickness: Thick 29 gauge
Panel-Loc Plus™ Prime

Yield Strength: 80
Steel Thickness: Thin 29 gauge
Panel-Loc Plus™ Standard

Yield Strength: 33-50
Steel Thickness: Thin 29 gauge
Most trim and trim-grade material being used to roll-formed panels



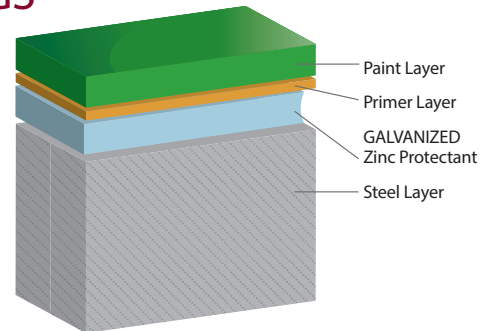


Rust Protection Explained

Along with the paint, a rust-blocking Galvanic coating protects the steel from moisture and the elements. The two most popular rust-inhibitive coatings are Galvalume® and Galvanized zinc coatings. Galvanized coatings use a strictly zinc-based protectant, while Galvalume® uses both zinc and aluminum. Both have benefits that must be considered when choosing the right protection for your job.

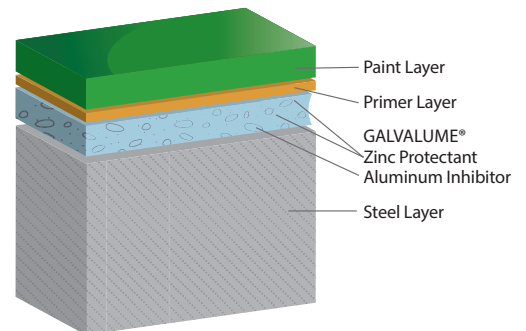
KEY BENEFITS OF USING GALVANIZED COATINGS

- Best protection **short term**: Shows little or no edge-rust for the first 10 years.
- Long-term industry standard.



KEY BENEFITS OF USING GALVALUME® COATINGS

- Superior protection **long term**. After a small amount of initial edge-rust, has up to 4 times the protection of comparable options.
- 20-year rust-through warranty on painted, AZ50 coated panels and 25-year rust-through warranty on non-painted, AZ55 coated panels.



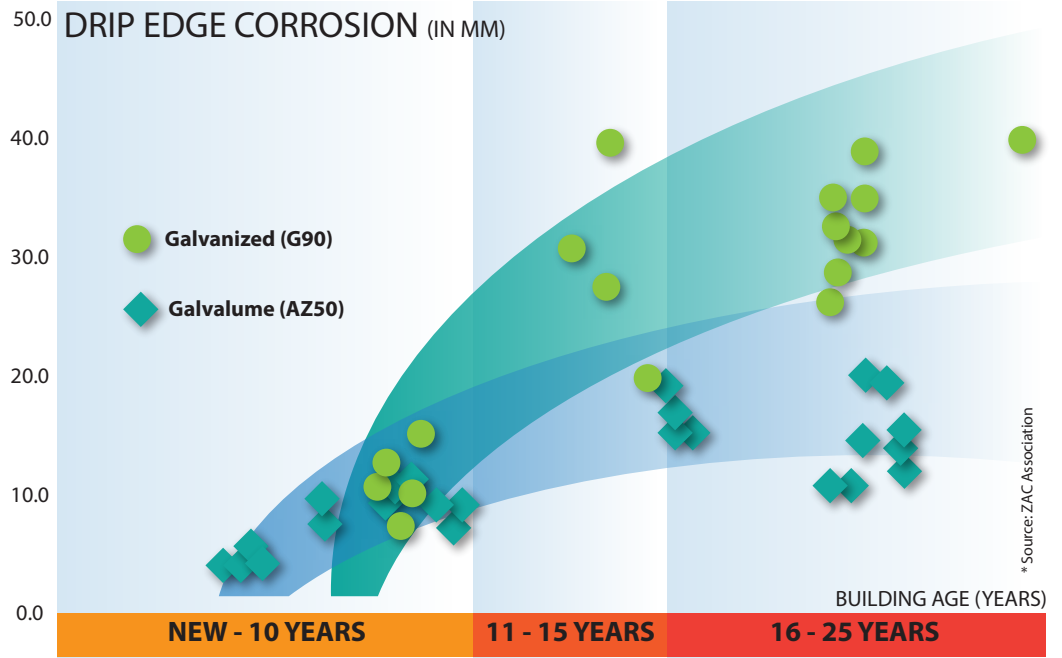
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GALVALUME® AND GALVANIZED PROTECTION OVER TIME

It is important to note that there are various thickness of Galvalume® and Galvanized coatings. Although the chart to the right compares G90 to AZ50, the corrosion protection varies when comparing other thickness of Galvalume® and Galvanized coatings.



G90 (Galvanized) initially out-performs AZ50 (Galvalume®) in edge-rust protection.

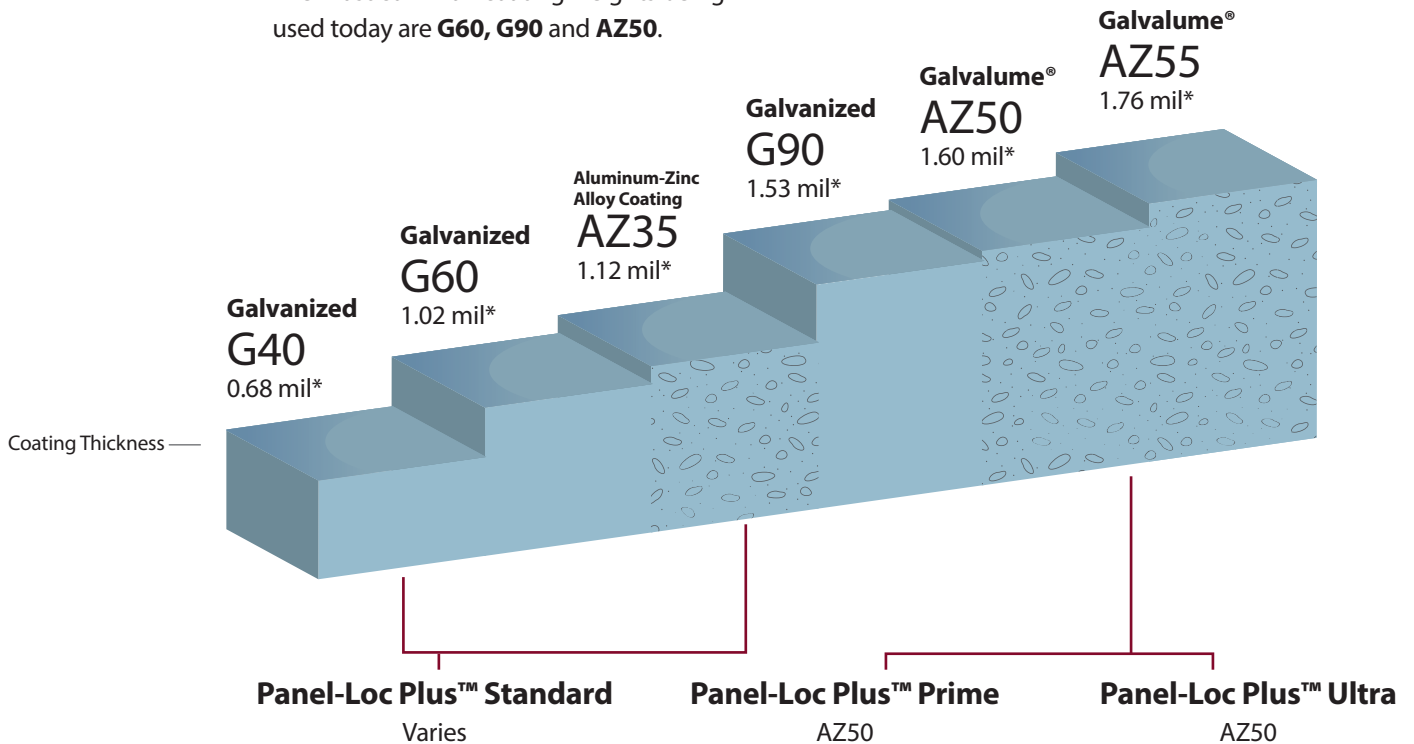
At 10 years there is no discernible difference in performance between these two materials.

After 15 years AZ50 begins to outperform G90.

COATING THICKNESS

Coating thickness is an important factor in the effective application of the protectant layer to the substrate.

The most common coating weights being used today are **G60, G90** and **AZ50**.



* Total minimum thickness for both sides of the substrate
 Source: United States Steel Corporation Technical Bulletin - TBP 2012.4