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SGCC (Steel Galvanized Cold Commercial)

Description

SGCC is the most widely used hot-dip galvanized steel sheet. It uses SPCC cold-rolled steel as the substrate and forms a zinc coating of 5–25 μm on the surface through the hot-dip galvanizing process. Not heat-treatable , and its properties are determined jointly by the substrate and the zinc coating. Its greatest advantages are excellent corrosion resistance (with an outdoor service life of 20–50 years), good weldability, and extremely low cost, making it the preferred material for applications in construction, home appliances, automotive, agriculture, and other fields. Compared to SECC, SGCC features a thicker coating and superior corrosion resistance but has a rougher surface, making it suitable for outdoor applications and scenarios with general aesthetic requirements. In contrast, SECC offers a smooth surface and excellent formability, making it ideal for precision electronics and high-end home appliances. When selecting materials, the zinc coating mass (ranging from Z60 to Z275) shall be determined based on the environmental corrosivity (indoor, outdoor, or coastal) to avoid either over-engineering or insufficient protection.

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Datasheet

SGCC Hot-Dip Galvanized Steel Sheet Material Data Sheet

1. Chemical Composition (%)

Elements	C	Mn	P	S	Note
Content	≤0.15	≤0.80	≤0.05	≤0.05	Low-carbon steel with excellent formability

Feature: The chemical composition of the substrate is equivalent to that of SPCC. The low carbon content ensures high ductility, while a slightly higher manganese content enhances strength.

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Datasheet

2. Physical Properties

Performance parameters	Value	Unit	Note
Density	7.85	g/cm³	Substrate density (the influence of the extremely thin coating is negligible)
Melting range	1480~1526	°C	Substrate melting point
Elastic modulus	200~215	GPa	Tensile state
Poisson's ratio	0.29	—	Typical Value
Coefficient of thermal expansion	11.2~13.8	×10⁻⁶/℃	20~100°C
Thermal conductivity	25~93	W/(m·K)	Change with temperature
Resistivity	1.43~1.74×10⁻⁷	Ω·m	20°C
Coating thickness	5~25	μm	Typically 7–20 μm per side
Coating weight	30~600	g/m²	Typically Z60~Z275（60~275g/m²）

Typical values: Tensile strength: 310 ~ 380 MPa, yield strength: 180 ~ 320 MPa, elongation: 20 ~ 28%

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Datasheet ▸

3. Mechanical Properties (by Thickness)

Thickness range (mm)	Tensile strength Rm (MPa)	Yield strength Rp0.2 (MPa)	Elongation A (%)	Hardness HRB	Note
0.25≤t<0.40	≥270	≥205	≥20	40~75	Sheet metal
0.40≤t<0.60	≥270	≥205	≥22	40~75	Common specifications
0.60≤t<1.0	≥270	≥205	≥22~28	40~75	For general forming
1.0≤t<1.6	≥270	≥205	≥24	40~75	For structural parts
1.6≤t<2.5	≥270	≥205	≥26	40~75	For stiffeners
t≥2.5	≥270	≥205	≥28	40~75	Thick plate

Xometry

Datasheet

4. Coating Weight Code

Code	Coating weight (g/m^2)	Equivalent ASTM standards	Applicable environment	Expected service life
Z30	30	G30	Interior dry	5~10 years
Z60	60	G40	Moderate indoor	10~15 years
Z80	80	G60	Urban outdoor	15~20 years
Z120	120	G90	Industrial area	20~25 years
Z180	180	G60	High humidity	25~30 years
Z220	220	G80	Coastal area	More than 30 years
Z275	275	G90	Severe environment	30~50 years

Xometry

Datasheet

5. Surface Structure & Treatment

Designation	Surface structure	Characteristics and applications
R	Regular spangle	Distinct crystalline pattern; suitable for general-purpose applications
M	Minimized spangle	Fine crystalline structure; ideal for pre-painting treatment
N	Zero spangle	Smooth surface; the preferred choice for home appliance panels
S	Bright finish	Ultra-smooth finish; designed for automotive exterior panels
O	Oiled	Rust protection during transportation and storage
C	Chromate passivation	Enhanced corrosion resistance and paint adhesion
P	Phosphate treatment	Improved paintability / coating performance

6. Process Performance

Items	Performance classification	Description
Cold formability	★★★★☆ Good	Suitable for stamping, bending, and roll-forming for general fabrication requirements
Paintability	★★★★★ Excellent	Bonding strength is further enhanced after phosphating treatment
Corrosion resistance	★★★★★ Excellent	Zinc coating provides cathodic (sacrificial) protection, ensuring an outdoor service life of 20–50 years
Weldability	★★★★☆ Good	Compatible with resistance welding and arc welding; zinc vapor control is required
Cost-effective	★★★★★ Excellent	Cost-effective solution with an excellent price-to-performance ratio
Heat resistance	★★★☆☆ Moderate	Continuous operating temperature ≤230°C to avoid zinc layer oxidation

7. Corrosion Resistance

Environmental condition	Corrosion resistance	Description
Interior dry environment	20–30 years without rust formation	Z60–Z80 is sufficient
Urban outdoor environment	15~25 years	Z120–Z180 recommended for areas affected by atmospheric pollution
Industrial area	10~20 years	Z180–Z220 required to resist acid rain corrosion
Coastal environment	15~30 years	Z275 or higher mandatory for severe salt spray corrosion
Slat spray test	Time to white rust formation	Approximately 200 hours for Z80; over 1,500 hours for Z275

Feature: The zinc coating protects the steel substrate through a sacrificial anode mechanism. This ensures that red rust is prevented even at localized scratches. Consequently, the protective service life is directly proportional to the zinc coating mass.