



DESSAU Constructions GmbH

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A simple guide to understanding Light Gauge Steel construction.

LGS for *Dummies*



www.dessau.ch



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Introduction.

The basics of Light Gauge Steel (LGS)

Light Gauge Steel (LGS) is a modern construction system made from thin sheets of high-strength galvanized steel, shaped into lightweight but strong profiles. Unlike traditional heavy steel, LGS is cold-formed, meaning it is shaped without heating, maintaining its structural integrity while allowing for fast and precise assembly.

LGS is commonly used in residential, commercial, and industrial construction, offering an alternative to concrete, brick, and timber. Thanks to advanced manufacturing processes, each component is cut and formed with millimeter accuracy, ensuring consistency and minimal material waste.



How is it Different from Traditional Construction Materials?

Introduction.

Unlike concrete, brick, or timber, LGS provides higher strength-to-weight ratio, precision, and flexibility. Key differences include:

Speed

Prefabricated components allow for rapid assembly, reducing construction time by up to 50%.

Weight, Strength, Fire & Seismic Resistance

LGS is significantly lighter than concrete or timber while maintaining high structural performance. Steel is non-combustible and engineered to withstand earthquakes better than traditional materials.

Precision Engineering and Durability

Designed using advanced software, ensuring millimeter-accurate production and seamless on-site assembly. LGS does not warp, rot, shrink, or attract pests, unlike timber, and is highly resistant to moisture and corrosion.

Why is it Growing in Popularity?

The demand for LGS is increasing due to its efficiency, sustainability, and adaptability. With its combination of strength, speed, and sustainability, LGS is shaping the future of construction by providing a cost-effective, durable, and environmentally friendly alternative to traditional building methods. Its ability to reduce waste, accelerate project timelines, and enhance structural performance makes it an ideal solution for modern construction challenges, from urban developments to disaster-resistant housing and energy-efficient buildings.

Key reasons

Faster Construction

With global demand for rapid building solutions, LGS reduces project timelines and labor costs.

Sustainability

Made from 100% recyclable materials, it significantly reduces waste and has a lower carbon footprint than concrete.

Energy Efficiency

LGS structures support modern insulation systems, reducing energy consumption for heating and cooling.

Versatile Applications

Used for houses, apartment buildings, office spaces, and industrial facilities, LGS adapts to a variety of construction needs.

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How is Light Gauge Steel Made.

How Steel is Made in a Steel Mill

The foundation of Light Gauge Steel (LGS) starts in steel mills, where raw materials like iron ore, coal, and limestone are processed into high-strength steel coils. The process involves:

- **Melting & Refining** – Iron is heated in blast furnaces to remove impurities and enhance its mechanical properties.
- **Alloying & Casting** – The molten steel is combined with other elements to improve strength and flexibility before being cast into slabs.
- **Rolling & Galvanizing** – The slabs are rolled into thin sheets and coated with a protective zinc or alloy layer, making them highly resistant to corrosion.

These steel sheets are then coiled and transported to manufacturing facilities, where they are shaped into precise structural components used in LGS construction.



What is S350GD? Why Do We Use This Type of Steel?

S350GD is a high-strength structural steel specifically designed for construction applications. It is classified under the **EN 10346** standard.

S350GD is the preferred choice for LGS because it offers the perfect balance between strength, flexibility, and durability, making it ideal for fast, efficient, and safe construction.

A Yield Strength of 350 N/mm²

Ensuring high load-bearing capacity.

Excellent Ductility

Allowing the material to bend without breaking, which is essential for seismic resistance.



Superior Coating Adhesion

ensuring long-lasting corrosion protection when combined with advanced coatings like Magnelis®.

Magnelis® Coating

How is Light Gauge Steel Made.

Unlike traditional galvanization, Magnelis® is an advanced metallic coating that offers exceptional corrosion resistance and extended durability for steel structures.

Magnelis® was developed by **ArcelorMittal**, the world's leading steel and mining company. Designed as an innovative solution for superior corrosion resistance, it has become the gold standard for steel protection in demanding environments.

Magnelis® is composed of zinc (Zn), aluminum (Al), and magnesium (Mg), forming a self-healing protective layer that extends the lifespan of steel. The most common grades used in LGS are:

ZM250 – Provides robust corrosion resistance for standard applications.

ZM310 – Offers enhanced protection in high-humidity or coastal environments.

Corrosion Resistance and Durability

Lasts 3x longer than traditional galvanization, reducing maintenance costs.

Forms a self-repairing protective layer, preventing rust in cut edges and scratches.

Performs exceptionally well in harsh environments, such as high-moisture and saline conditions.

By using S350GD steel with Magnelis ZM250/ZM310, LGS structures remain highly durable, low-maintenance, and long-lasting even in challenging climates.



ArcelorMittal

From Coil to Profile



Once the steel coils arrive at the manufacturing facility, they are processed through high-tech roll-forming machines that transform them into structural profiles with millimeter precision. This automated, software-driven process ensures that every profile is consistent, accurate, and ready for fast installation, reducing material waste and construction errors.

Decoiling

The steel coil is unwound and prepared for shaping.

Roll-Forming

The steel is passed through a series of rollers that gradually shape it into C, U, or other profile types.

Precision Cutting

Computer-controlled systems cut the profiles to exact project specifications.

Pre-Punching & Marking

Holes and markings are added for easy assembly, eliminating the need for on-site drilling.

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Eurocode 3 Standards: Why is it Crucial for Structural Integrity?

Modern Light Gauge Steel (LGS) construction relies on advanced engineering, automation, and strict standards to ensure precision, efficiency, and structural reliability. Unlike traditional building methods, LGS components are computer-designed and factory-produced, guaranteeing millimeter accuracy and reducing errors on-site.

Eurocode 3 (EC3) is the European standard for steel structures, setting the guidelines for design, strength, and safety. It ensures that LGS buildings meet strict load-bearing and seismic requirements, making them safe for residential, commercial, and industrial use.

By following Eurocode 3, every LGS component is manufactured and assembled to strict engineering tolerances, ensuring long-term stability and performance.

Key benefits of Eurocode 3 compliance:

Guaranteed Structural Safety

Designed to withstand wind, snow, and seismic loads.

Material Optimization

Ensures steel profiles are used efficiently without excess weight.

Seismic Performance

LGS structures engineered to EC3 standards are highly resistant to earthquakes due to their lightweight, flexible nature.

How Software Designs LGS Structures



Precision Engineering.

LGS structures are not hand-cut or manually adjusted—they are engineered with precision software that transforms architectural designs into ready-to-assemble steel components.

The result: Perfectly measured and pre-drilled components, ensuring fast and error-free assembly on-site.

3D Modeling & BIM Integration

Software creates detailed digital blueprints, allowing for flawless coordination between architects, engineers, and builders.

Automated Roll-Forming Machines

Convert designs into steel profiles with millimeter accuracy, eliminating human error.

Optimized Material Usage

Reduces steel waste by up to 30% compared to traditional construction, making LGS more sustainable.

QC: Ensuring Accuracy and Safety in Every Profile

Unlike traditional construction, where errors often occur on-site, LGS manufacturing follows strict quality control procedures to maintain precision and consistency.

By combining advanced software, automation, and strict Eurocode 3 compliance, LGS offers a superior level of precision and reliability, making it the future of modern construction.

Key quality control measures:

Computerized Cutting & Punching

Eliminates inconsistencies, ensuring every profile fits perfectly.

Coating Inspection

Every steel section is checked for proper Magnelis protection, ensuring long-term durability.

Load Testing & Structural Analysis

Profiles are tested under simulated stress conditions.

Construction isn't just about building—it's about resilience.

In 2011, the Tōhoku earthquake and tsunami devastated Japan, causing widespread destruction. While many traditional buildings collapsed under the force of the 9.1-magnitude quake, steel-framed structures, including LGS buildings, remained standing. Their lightweight yet flexible design absorbed seismic shocks better than concrete, saving lives and reducing damage.

In earthquake-prone regions like California, Turkey, and Japan, engineers now prioritize Light Gauge Steel for its proven seismic resistance. Unlike rigid, heavy materials that crack under pressure, LGS flexes and disperses energy, protecting both structures and occupants.

In 2017, Hurricane Maria tore through the Caribbean, leaving a path of destruction across Puerto Rico. Winds exceeding 250 km/h (155 mph) flattened traditional concrete and wooden structures, yet LGS-framed buildings withstood the storm. Their aerodynamic, lightweight design and superior connection strength helped them resist extreme wind forces that tore apart heavier, more rigid constructions.

After the disaster, engineers and relief organizations turned to Light Gauge Steel to rebuild faster and stronger. In hurricane zones like Florida, the Caribbean, and the Philippines, LGS is now a preferred choice—its wind resistance, corrosion protection, and rapid assembly make it ideal for resilient construction in extreme climates.

Nature is unpredictable. Strength shouldn't be.



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Where Can
LGS Be Used?

Residential Buildings

LGS is revolutionizing residential construction by offering faster build times, reduced costs, and superior durability compared to traditional materials. It enables customized architectural designs, making it suitable for various housing types:

Houses & Villas



LGS allows for energy-efficient, lightweight structures that are quick to assemble and require less labor. It is ideal for custom-built homes with open layouts and large windows due to its high strength-to-weight ratio.

Apartments & Multi-Family Housing



With precise factory production, LGS ensures consistent quality across multiple units, reducing on-site errors. It also lowers foundation requirements, making it cost-effective for multi-story buildings while maintaining excellent fire, moisture, and seismic resistance.

Commercial & Industrial

Businesses demand flexible, durable, and cost-efficient construction solutions—LGS delivers on all fronts. Prefabricated steel structures allow for rapid expansion, easy modifications, and long-term structural reliability.

Warehouses & Logistics Centers



LGS supports large, open spaces with minimal internal columns, maximizing storage capacity and allowing for efficient racking systems. Steel's corrosion resistance ensures longevity in harsh industrial environments.

Office Buildings & Retail Spaces



Modern businesses require adaptable layouts, and LGS provides lightweight yet strong structural solutions that can be easily reconfigured. Whether for temporary commercial setups or permanent headquarters, steel framing supports energy-efficient, well-insulated workspaces.

Public Infrastructure

Public sector projects benefit from the speed, efficiency, and sustainability of LGS. Governments and developers increasingly turn to steel-framed solutions for projects requiring fast deployment and long-term resilience.

Schools & Hospitals



LGS enables the rapid construction of durable, fire-resistant buildings that meet strict safety and hygiene standards. Schools and medical facilities built with LGS provide modern, adaptable spaces with superior insulation and soundproofing.

Emergency & Temporary Housing



After natural disasters and humanitarian crises, LGS structures can be deployed quickly and efficiently. Their lightweight but durable nature makes them ideal for temporary shelters, field hospitals, and refugee housing, offering long-lasting, cost-effective solutions.

Solar Panel Structures

LGS plays a crucial role in the renewable energy sector, providing strong, corrosion-resistant, and lightweight support structures for solar power installations.

Ground-Mounted Solar Farms



Large-scale solar farms require weather-resistant steel structures that can withstand strong winds, seismic activity, and extreme temperatures. LGS framing, with Magnelis coating, offers long-lasting corrosion resistance, reducing maintenance costs over decades.

Rooftop Solar Mounting Systems

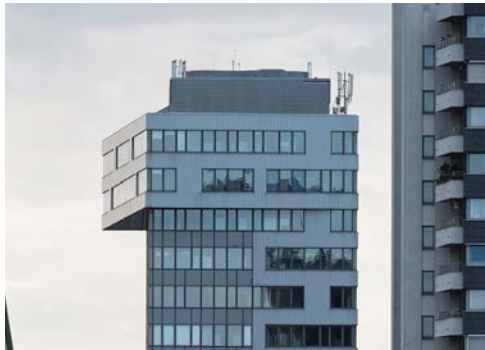


LGS is an excellent choice for commercial and industrial solar panel installations, as it is lightweight yet strong enough to support panel loads without overburdening rooftops. The precise factory-cut steel ensures perfect alignment, optimizing solar efficiency and structural integrity.

Structural Upgrades & Extensions

Light Gauge Steel (LGS) is an ideal solution for expanding and reinforcing existing buildings, especially in urban areas where space is limited and structural weight must be minimized. Its lightweight yet strong composition allows for vertical and horizontal extensions without overloading the original foundation.

Adding Extra Floors



Many older concrete structures were not designed to support additional levels. LGS provides a lightweight alternative that allows extra stories to be added without significant structural reinforcement, making it perfect for hotels, office buildings, and residential complexes.

Infrastructure Enhancements



LGS can be used for walkways, pedestrian bridges, and extensions on existing infrastructure where weight restrictions are critical.

LGS is redefining construction across multiple industries, providing a smarter, more efficient, and sustainable alternative to traditional materials.



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LGS vs.
Traditional
Construction.

Concrete & Brick vs. LGS

Concrete and brick buildings are heavy, time-consuming to build, and require significant labor. The drying and curing process of concrete alone can extend construction timelines by weeks. LGS, on the other hand, is prefabricated and arrives on-site ready for assembly, reducing build times drastically. Unlike brick and concrete, which are prone to cracking over time due to ground movement, LGS structures are more flexible and can absorb vibrations without compromising integrity. In terms of cost efficiency, LGS requires fewer materials for foundations due to its lower weight, while concrete and brick demand extensive groundwork to support their mass. Additionally, LGS eliminates wet trades, minimizing on-site waste and environmental impact.

Advantage in numbers

30–50%

Faster construction time than traditional concrete and brick buildings.

60–70%

Lighter than concrete, reducing foundation costs and other expenses.

90%

Less material waste than traditional masonry construction.

50%

More seismic energy absorption than rigid concrete structures.

Timber vs. LGS – Why Steel Wins

Wood has long been used in construction, but it presents major challenges, especially in terms of durability and maintenance. Timber structures are vulnerable to pests, rot, and moisture damage, requiring continuous upkeep to prevent deterioration. LGS does not degrade over time, is resistant to mold and termites, and does not warp under changing humidity conditions. Fire resistance is another major advantage—while timber is highly flammable and spreads fire quickly, LGS has a non-combustible rating, significantly improving safety in residential and commercial buildings. Structural consistency is also superior with LGS, as every steel profile is manufactured to precise tolerances, eliminating the variability and imperfections found in timber.

Advantage in numbers

300%

More higher fire resistance in extreme conditions

0%

Vulnerability to termites and rot compared to untreated timber, which can deteriorate in 5-10 years.

99%

Timber has up to 15% dimensional variation due to moisture absorption, while LGS maintains 99% precision.

100+ yrs

Properly coated LGS lasts 100+ years, while timber structures require replacement after 30-50 years.

Weight, Strength, and Durability

LGS offers a superior strength-to-weight ratio compared to both concrete and timber, allowing for lighter structures without sacrificing load-bearing capacity. The reduced weight means easier transportation, lower installation costs, and reduced foundation requirements. Traditional materials like concrete may offer compressive strength, but they struggle with tension and flexibility, making them prone to cracking under stress. LGS frames, engineered with Eurocode 3 standards, are designed to withstand high loads, strong winds, and seismic activity. Steel's durability ensures a long building lifespan with minimal maintenance, whereas timber and masonry deteriorate over time due to exposure to environmental conditions.

Strength in numbers

9.0

LGS structures are engineered to withstand earthquakes up to **9.0 on the Richter scale**

250^{km/h}

LGS structures can handle **hurricane-force winds** exceeding 250 km/h (155 mph).

Energy Efficiency & Sustainability

LGS is one of the most sustainable construction methods available today. Unlike concrete, which has a high carbon footprint due to cement production, and timber, which requires deforestation, LGS is made from 100% recyclable steel. The precision of LGS manufacturing reduces material waste significantly, while its compatibility with high-performance insulation materials improves energy efficiency in buildings. Steel structures allow for thinner wall assemblies while maintaining high insulation values, optimizing both interior space and thermal performance. Additionally, LGS buildings support the integration of renewable energy systems, such as solar panels, further reducing environmental impact and long-term operational costs.

Sustainability and efficiency in numbers

75%

Less CO2 emissions compared to concrete, significantly reducing the environmental impact of construction.

50%

Better thermal insulation due to optimized wall cavity space for high-performance insulation materials

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The Future of
Construction
is LGS.

Final Thoughts for Anyone Interested in LGS Construction

Why This is the Best Construction Method Moving Forward

Light Gauge Steel is not just another building material—it is the next step in modern construction. Its precision engineering, rapid assembly, and unmatched durability make it superior to traditional methods. Unlike concrete and timber, which require extensive labor, long curing times, and ongoing maintenance, LGS provides a faster, stronger, and more reliable alternative. With its ability to withstand earthquakes, hurricanes, and harsh climates, it offers a future-proof solution for residential, commercial, and industrial projects.

How It Fits into Global Trends in Sustainability and Efficiency

As the world moves toward greener, more efficient construction, LGS aligns perfectly with these demands. It is made from 100% recyclable steel, significantly reducing environmental impact compared to concrete, which is

responsible for 8% of global CO₂ emissions. The precise, waste-free manufacturing process of LGS contributes to a circular economy, while its superior thermal efficiency lowers energy consumption in buildings. Governments, architects, and developers worldwide are adopting sustainable materials and faster construction methods, making LGS a key player in the industry's future.

Final Thoughts for Anyone Interested in LGS Construction

The shift toward stronger, more efficient, and eco-friendly buildings is already happening. Whether you are an architect looking for design freedom, a developer seeking cost-effective solutions, or an investor focused on long-term sustainability, LGS offers a clear advantage. With its proven track record in resilience, energy efficiency, and adaptability, LGS is not just the construction material of today—it is the foundation of the future.



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Contact information

For media and press inquiries, collaboration requests, or brand-related information, please reach out to us. We are happy to provide press materials, interviews, and insights about DESSAU's innovative approach to modern construction and design.

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Thank you for your attention.

