



High-strength steel technology

What we can do — and what we have already delivered. A capabilities and reference overview of the continuously advanced, nanotechnology-based steel families held exclusively as the GIFLO family's intellectual property.

Exclusive family IP

800–2200 MPa

"Green steel"

Defense • rail • marine • energy

Prepared: **2026**
GS Tech Magyarország Kft. • GIFLO Steels

gstech@giflosteels.hu
www.giflosteels.hu

1

Who we are

THREE GENERATIONS • ONE EXPERTISE

GIFLO is the name of a Miskolc steelmaking family that has been researching and producing high-strength steels for three generations. The technology is not a laboratory promise: it matured over decades in real industrial production — and it keeps evolving.

3

GENERATIONS IN STEEL

40+

YEARS OF R&D

6

STEEL FAMILIES

800–2200

MPa

STRENGTH RANGE

The roots

- A family with a University of Miskolc and Diósgyőr Steelworks background.
- Metallurgical researchers and inventors — proprietary know-how kept as IP.
- A team that is both theory-driven and hands-on.

Intellectual property

- The IP is **owned exclusively by the GIFLO family** — not shared, not licensed to any third party.
- The family previously held several steel patents (in 31 countries); **these have now expired and none are active.**
- The technology has since been **significantly advanced**, and is protected as continuously developed family **know-how / trade secret.**

An honest snapshot — where we stand today

So far our focus has been the **material itself**: developing, proving and partner-manufacturing GIFLO steel. **We currently have no plant of our own**, and we are not rich in manufacturing bases either — precisely because, with our technology, we are essentially **a competitor to every steelmaker**. This is both a challenge and an opportunity: the logical next step is to build our own or dedicated production capacity, which this document also highlights.

2 The GIFLO technology

NANOTECHNOLOGY IN THE CRYSTAL LATTICE

The distinguishing principle is simple: strength is achieved **not** through subsequent heat treatment (quench & temper), but **during steelmaking itself**, via micro- and nano-elements built into the crystal lattice. A small amount, 5–10 kg per tonne of “activator” (8–12 elements), does the job.

Conventional route



GIFLO route



Simpler, cheaper

Fewer alloys (5–10 kg/t), no costly liquid quenching. Our selling price is — depending on the steel grade — **10–30% lower** than competitors’.



Size-independent

Homogeneous cross-section strength regardless of thickness — a limitation for quenched competitor plates.



“Green steel”

By skipping heat treatment, specific energy demand drops by up to ~30% → less CO₂ and dust.

Adaptable, no extra capex: GIFLO steel can be produced with **any steelmaking technology** (EAF / BOF) without special equipment, and any profile can be made by hot forming. Feedstock can be pig iron, mixed, or **100% steel scrap**.

3

Unique material properties

WHERE IT OUTPERFORMS THE MARKET

GIFLO steels are not only stronger — they behave in extreme environments where conventional steels hit their limits. Four properties stand out:



Outstanding hot strength

At high temperature it **retains its mechanical properties far better** than conventional steels. It performs where other materials already soften and lose strength — key for energy, metallurgical and engine applications.



Marine (anti-fouling) advantage

On its surface **algae and mussels do not settle** the way they do on conventional steel. For marine and river structures this dramatically reduces maintenance and extends service life.



Hydrogen storage

Hydrogen **does not diffuse out** of a tank made of GIFLO steel — addressing a core problem of hydrogen infrastructure, where embrittlement and leakage are common issues.



High usable strength

The yield point is close to the tensile strength → you can **design** to nearly full strength. High fatigue limit, with atmospheric corrosion resistance and good weldability in some grades.

Why does this matter commercially?

Every property listed means **less weight, longer life and lower operating cost** for the end user — exactly the arguments that create a real technical need, and thus business, at an armor developer, vehicle maker, energy or marine partner.

4 Steel families and product lines

SIX FAMILIES • THREE COMMERCIAL BRANDS

Decades of development produced six complementary high-strength steel families that cover the performance-oriented markets from structural steel to ultra-high-strength armor.

D

High-strength, weldable structural steels

F

High fatigue-limit, atmospheric corrosion-resistant, weldable structural steels

M

Ultra-high-strength, high fatigue-limit structural steels

Z

High-strength, easily polished stainless steels

S

High-strength, easily machined engineering steels

U

High-strength, easily machined free-cutting steels

Commercial product lines

PROMAX

Defense / armor plate. 400–600 HBW+, EN 10029. Ballistic protection, high YS/UTS ratio, formability, weldability.

HARDMAX

Wear plate. EN 10051 / 10029. Hard from surface to core; weight reduction can add 15–20% payload.

TRUMAX

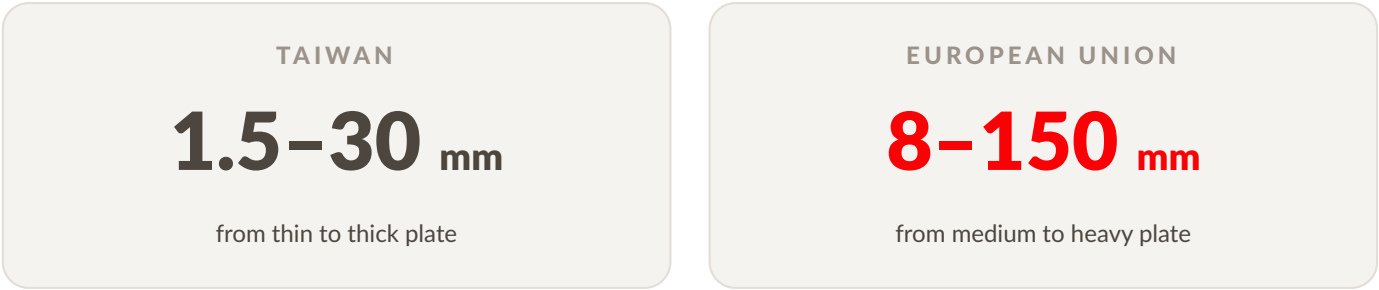
UHSS structural steel. EN 10149-2 / 10025-6 / 10029. High fatigue limit, atmospheric corrosion-resistant options, good weldability.

Grade designations and standards on the detailed datasheets; all specifications to be confirmed per inquiry.

5 What we can produce — today

CURRENT PRODUCTION CAPABILITY

Without a plant of our own, we currently produce GIFLO plate through **existing, qualified manufacturing bases**. Current thickness capability in two regions:



Combined thickness range: 1.5–150 mm





Defense industry — proven performance

BALLISTIC TESTS • MIL-DTL-46100E

On independent ballistic tests (TNO, NTS), GIFLO armor plates are proven to **exceed the MIL-DTL-46100E military standard** and compete with the market-leading armor plates (SSAB Armox, ThyssenKrupp Secure).

Producer / type	C%	Thickness (mm)	V50 required (m/s)	V50 achieved (m/s)	% over MIL
GIFLO Promax 1800	0.37	10.0	650	710	+9.1%
GIFLO Promax 2000	0.42	10.39	664	757	+13.91%
SSAB Armox 600T	0.47	10.45	666	754	+13.27%
SSAB Armox Advance	0.47	10.28	660	788	+19.3%
ThyssenKrupp Secure M600	0.40	10.5	670	780	+16.4%

0.50 APM2 projectile, 30° obliquity. GIFLO Promax achieves this in “T” delivery condition (not Q&T) — hence the size-independent homogeneity.

7

References and partners

WHAT WE HAVE DELIVERED SO FAR

Featured reference · Brisbane River port — ship lift

The ship lift of the port on the Brisbane River is made of GIFLO steel — the material's marine/river advantages (anti-fouling: algae and mussels do not settle, excellent corrosion and fatigue resistance) are validated by the most demanding aquatic environment. A reference in the high-strength, low-maintenance marine structures segment.

Rail engineering references

- Solving MÁV BZ axle fractures (2007) — a new steel grade eliminated the cause of the fractures; later we also produced BZ axles from our own M-2000 steel.
- Brake-system bushings and pins — tens of thousands of pcs (Debrecen, Dunakeszi, Szolnok, Kőbánya, Ganz Hunslet).
- Rail-clamp bolts (10.9 / 12.9), bogie-cradle bolts, forged axles.
- Projects: Bombardier Intercity refurbishment, brake systems for 500 RoLa wagons, Ganz Hunslet GH120 bogie.

Production sites (GIFLO steel)

GIFLO steel has been produced in mills across three continents — proving industrial reproducibility:

Hungary

USA

Italy

Switzerland

France

Czechia

Poland

Romania

Taiwan

User partners (excerpt)

MÁV

GANZ MÁVAG

GANZ Danubius

Bombardier

Siemens (AT)

Aselsan (TR)

RWE Hungary

IKARUS

Visonta Mining

North American Mining (USA)

NOV (CA)

University of Sydney (AU)

Trigonomics (AU)

12 PERFORMANCE-ORIENTED INDUSTRIES

Wherever the performance, weight, price or service life of conventional steel is a constraint, GIFLO steel is a real alternative.

Defense

Armor plate, gun and weapon barrels, chassis, pontoon bridges, mobile towers.

Automotive

Stabilizers, wheel hubs, crumple zones, forged parts.

Railway

Axles (solid/hollow), bogies, brake-system parts.

Aerospace

Landing-gear parts, mobile stairs.

Surface mining

Digger and ripper teeth, wear plates, bucket chains.

Underground mining

Drill shields, canopies, wear plates for conveyors.

Energy

Pressure vessels, wear plates, bolts, shafts, H₂ storage.

Environmental

Drainage chains, cutting edges, ripper teeth, wear plates.

Oil & gas

Drill pipe, tubing, tanks, drill bits.

Food industry

Stainless conveyors, mixing/storage tanks, fittings.

Shipbuilding

Ship lifts, pontoon bridges, structural elements — with anti-fouling advantage.

Cement

Heavy wear plates, grinding balls.

Contact

GS Tech Magyarország Kft. • GIFLO Steels

HQ: 1068 Budapest, Király utca 80. • Office: 3508 Miskolc, Pesti út 40.

gstech@giflosteels.hu • www.giflosteels.hu

The GIFLO steel technology is the GIFLO family's intellectual property, a continuously developed trade secret. Figures are indicative and to be confirmed per inquiry. © GIFLO Steels.