INNOVATION INFOSHEET

NedLite®700

Ultra-High Tensile Strength Aluminum

Light as aluminum, strong as steel

Following years of research and development, Nedschroef has come up with NedLite®700: an aluminum alloy that can reach 700MPa tensile strength and remains stable up to 100°C. These properties enable the use of aluminum fasteners in applications that formerly required steel fasteners for strength reasons.

NedLite®700 is the strongest aluminum alloy for cold forming available on the market. It combines the key properties and advantages of aluminum, taking full advantage of lower weight while almost fully emulating the strength properties of steel. The aluminum fastener meets the specification (strength loss of less than 10% under the effects of temperature (2000 hours at 100°C)), in relation to its nominal strength. This means aluminum bolts can be used instead of 8.8 class steel bolts.

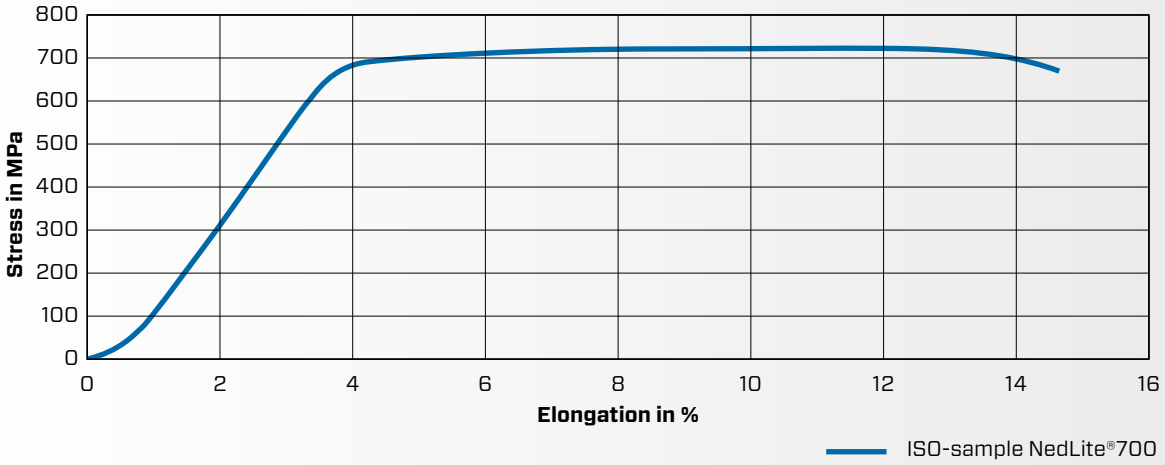
The greatest benefit of NedLite®700 is in applications where product weight combined with high tensile strength is key. For example:

- Bolts and screws.
- Automotive applications such as castings to be joined with flanges.
- Cold formed products (without thread), assembled parts and complex parts.
- Electrical components.
- Secondary operations possible (e.g. drilling, milling, turning)

NEDSCHROEF

ALWAYS CONNECTING FORWARD

Stress-strain diagram NedLite®700



Compared to grade 8.8 steel screws, NedLite®700 can compete on strength, settling behavior, and pre-load (up to 100°C).

TECHNICAL SPECIFICATIONS

- Diameter range M5 – M12 (length 16 – 80 mm).
- Strength: 680 – 720 MPa.
- High tensile strength of 700 MPa in combination with low Young's modulus.
- Yield strength around 640 MPa (fatigue test on bolt $\sigma_{a50} \geq 25$ MPa).
- Improved elongation already at lower preload compared with steel. (5 – 10% depending on application).

Characteristics	Test Method	Results
R_m	Standard	**Bolt 680 – 710 MPa** **ISO 700 – 720 MPa**
$R_{p0.2}$	Standard	**Bolt > 640 MPa** **ISO > 670 MPa**
A_5	Standard	**Bolt > 5.5%** **ISO > 10%**
Heat resistance 2.000 hours	ZF, Daimler	**100°C** **R_{mT} > 90% R_m**
Fatigue test	DIN 969	**$\sigma_{a50} \geq 25$ MPa**
Irreversible thermal extension	Daimler	**± 0,010% @ 100°C**

Advantages

STRENGTH & WEIGHT

- Aluminum fasteners can replace steel bolts (8.8 class).
- High strength, low weight: aluminum fastener = 1/3 of weight of a steel fastener.
- Significant weight reduction.
- Strongest low-weight option currently on the market.

EXCELLENT CLAMP LOAD PERFORMANCE

- Possible to achieve high clamp loads using low-stiffness fasteners.
- Low preclamping loss with short clamp length.

MUCH LARGER THERMAL EXPANSION COEFFICIENTS THAN STEEL

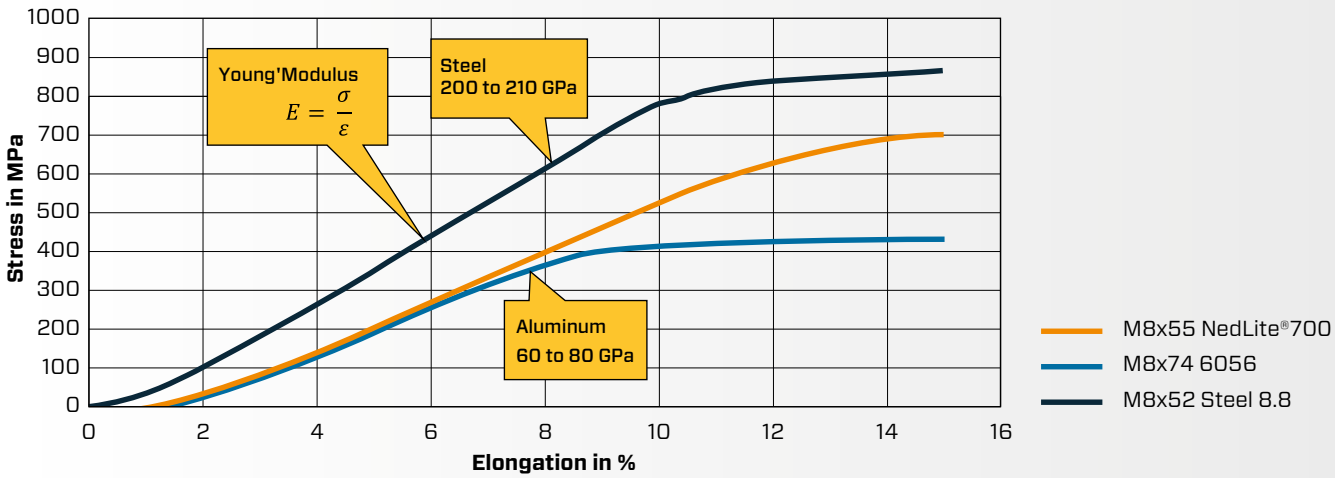
CORROSION PROTECTION BY DESIGN

- NedProtect® coating allows NedLite®700 to meet automotive industry requirements for protection against intercrystalline corrosion such as MBN8839 or VW60469.

MANUFACTURING AND PROCESSING

- Easy integration into existing manufacturing processes.
- Suitable for cost-efficient mass production.
- Cold forming, extrusion, and / or machining possible.
- Better material pairings (depending on coating used).
- Thread engagement equal to steel.
- Possibility to avoid use of bushings or decrease clamping length, saving space and material.
- High preloads.
- Good electrical conductivity.
- Solution to technical challenges:
  - Contact corrosion.
  - Contact resistance in electric applications.
  - Settling of the connection.

Stress-strain diagram NedLite®700



POTENTIAL AREAS OF APPLICATION

STEEL REPLACEMENT AUTOMOTIVE

- Gearboxes/transmissions
- Electrical boxes
- Cockpit beams
- Doorframes, Seat frames, Steering wheels
- Car batteries
- Car relay boxes
- EV engines
- EV powertrains
- Seat mountings
- Cockpits (compound material)
- Bike motors
- Spoke nipples
- Electronic Parking Brakes
- Wheelchairs, walkers, mobility scooters
- Thread forming in Aluminum and Magnesium pre-drilled holes

MECHANICAL

- Fasteners in robotics (motor, arm, mechanics)
- Door systems
- Tail gates

COMBINED WITH PLASTIC-MOLDED PARTS

- Electric plugs
- Charging components
- Overmolding general
- Overmolding inserts bushings.
- Overmolding in seatings
- Gears

GENERAL WEIGHT AND SPACE SAVING APPLICATIONS

- Aviation
- Drones
- Power tools
- Bicycles

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Want to learn more?
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