ISO 4762/DIN 912 Hexagon socket head cap screws, property class 12.9, with zinc flake coating

The zinc flake coating of these hexagon socket head cap screws, property class 12.9, has impressive properties: temperature resistance of up to +150 °C and chemical resistance, which also enables use in critical areas. Hydrogen cannot penetrate to the metal due to this coating process, almost completely preventing hydrogen-induced stress cracking corrosion (hydrogen embrittlement). This corrosion protection coating also enables outdoor use. The use of property class 12.9 screws means that, based on the same preloads, smaller bolt diameters can be used than those required for property classes 8.8 or 10.9. This is a significant advantage for the construction as it allows for more compact design. The standardisation of the coatings also facilitates the procurement process.

REYHER offers zinc flake coatings in accordance with ISO 10683 with a resistance of 480 hours based on ISO 9227 NSS and a total friction coefficient of μ = 0.09–0.14. The property class 12.9 product range is in stock and available for immediate delivery.

Information
The comprehensive portfolio of REYHER zinc flake coated fasteners ranges from hexagon socket head cap screws, hexagon head screws, nuts and washers in the property classes 8.8 and 10.9 right up to retaining rings and RIPP locking nuts and bolts. All items are in stock and available for immediate delivery.

Advantages

- **Items in stock available for immediate delivery**
- **Higher corrosion protection and reduced maintenance costs**
  480-hour salt spray test
- **Temperature resistance of coating up to +150 °C**
  Permits, e. g. use in encapsulated engine compartments
- **No risk of hydrogen-induced stress cracking corrosion (hydrogen embrittlement)**
- **More compact design possible**
  Based on identical preloads, smaller screw diameters for property class 12.9 screws can be used than for grade property classes 8.8 and 10.9 screws.
- **Chemical resistance of coating permits use in aggressive environments**
  Resistant against detergents, fuels, coolants and oils
- **Pre-set friction values enable defined assembly**
  Total friction value of μ = 0.09–0.14
- **Standardisation of coatings facilitates the procurement process**
  The brand products e. g. Delta Protekt KL 100 (+ VH 301), Delta Tone (+ Delta Seal GZ) and Geomet 321 (A) (+ L) (+ VL) have been consistently standardised with the designation "flZnnc", as well as their resistance in salt-spray tests and the friction value.

Item information

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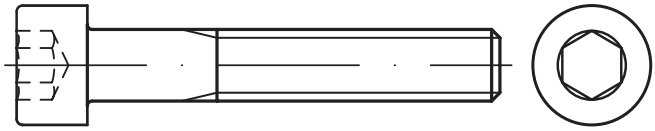
Sizes

M 6 x 12	– M 6 x 80
M 8 x 16	– M 8 x 90
M 10 x 20	– M 10 x 90
M 12 x 20	– M 12 x 100
M 16 x 30	– M 16 x 120
M 20 x 65	– M 20 x 180
M 24 x 80	– M 24 x 180



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Examples of application

- **Cranes**
- **Gearbox manufacturing**
  Gearboxes are used in, e. g. the nacelles of wind turbines or in mechanical and plant engineering
- **Railway transport**
  For seat connections and pantographs for trains and tramways
- **Special purpose vehicle construction**
  In all areas, especially when final painting has not been implemented

Technical information

What are zinc flake coatings?

Zinc flake coating systems are produced by applying a zinc flake dispersion, usually containing aluminium flakes, in a suitable medium onto the surface of a fastener. A metallic bond between the flakes and between the flakes and the substrate is formed following the application of heat (curing at temperatures of approx. 200–300 °C), this creates a sufficiently conductive inorganic surface coating that provides cathodic protection.

An additional coating, a top coat, can be applied to increase corrosion resistance and/or achieve specific characteristics such as, e. g. torque/preload behaviour, chemical resistance, appearance, colour or electrical insulation/conductivity.

Resistances of up to 1,000 hours can be achieved with these types of coatings.

What is hydrogen-induced stress cracking corrosion (hydrogen embrittlement)?

Hydrogen may be made available during an electroplated coating process and/or during pre-treatment (pickling) and this can penetrate the base material.
These hydrogen atoms "move" along the grain boundaries and can bond to form hydrogen molecules with up to approx. 30 times the volume of hydrogen atoms. This volume expansion then causes internal stresses in the material, which, in superimposition with external tensile stresses, e. g. caused by the pre-stressing of the bolted fastenings, can lead to a deformation-free fracture of the screw.
Characteristic for such fracture origins are on scanning electron microscope examinations so-called "crow's feet" and gaping grain boundary gaps.

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