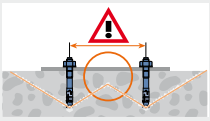
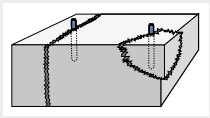
Dictionary Fastening Technology

1 Spacing distance



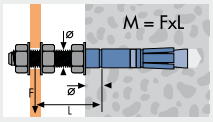
Consideration must be given to the minimum distances required when setting groups of fixings to avoid failure of the building material. A factor of 3 times the setting depth must be used to achieve maximum loads.

2 Edge distance



Consideration must be given to the minimum edge distances to avoid failure of the building material.

3 Bending moment M

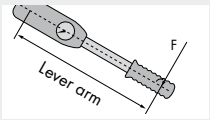


For some applications anchors are subjected to bending moments. For example, at a distance fixing.

4 Screw types

1. Hexagon
2. PZ2/3
3. T25/T30/T40
4. Hexagon, T40, collar

5 Torque



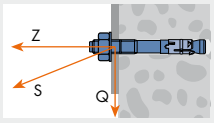
Force (F) x lever arm, measured at fulcrum,
Nm = Newton meter

The anchor should be set using the recommended torque settings.

6 Installation torque

When the anchor is set using the correct torque a guaranteed fixing can be achieved.

7 Load directions



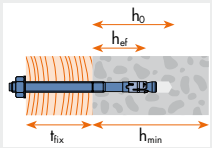
Tension (Z), Shear (Q), Combined (S)

8 Force

The force is indicated in Kilo-Newton (kN) / Newton (N)

1kN=1000N=100dN ≈ 100kg
10N=1dN ≈ 1kg

9 Setting data



h_{ef}: Effective anchorage depth
h_0: Drilling depth
h_{min}: Minimum thickness of concrete member
t_{fix}: Usable length

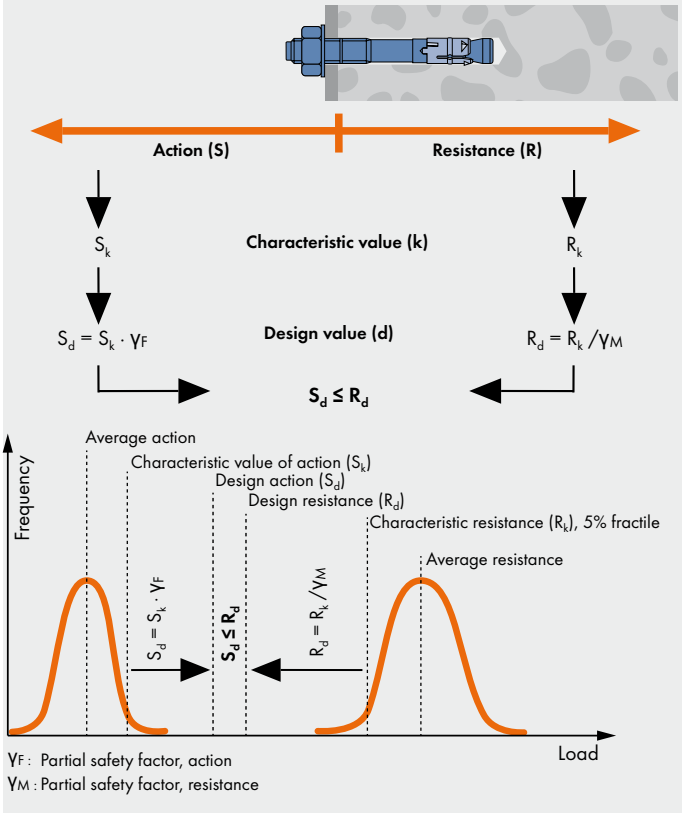
10 Breaking load

Failure of fixing (pt. 17)

11 Approved and recommended loads

Approved loads are those given in the corresponding approval. Working loads for products with European Technical Assessment include a partial safety factor given by ETAG. Recommended loads are not always equal to approved loads. Recommended loads are determined under laboratory conditions and do not consider any influence of edge or centre distances.

12 Partial safety factor concept



γ_F : Partial safety factor, action
γ_M : Partial safety factor, resistance

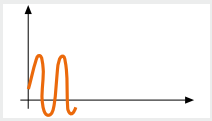
Dictionary Fastening Technology

13 Load classification

Static loads

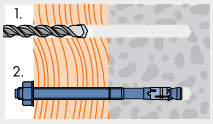
Dynamic loads / Pulsating

Dynamic loads / Shock

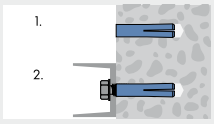


Dynamic loads / Alternative

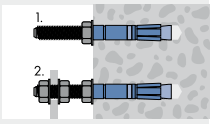
14 Methods of application



Through fixing



Pre installation



Distance fixing

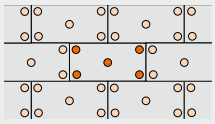
15 Drilling process

Rotary drilling with wood drills and carbide drills: Drilling without percussion. Application: wood, plywood, particle board, wood fibreboard, gypsum plasterboard, fibrecementboard, aerated concrete, perforated brick.

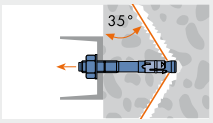
Percussion drilling with carbide drills: Drilling at high speed with fast, short impacts. Application: brickwork made of solid blocks.

Hammer drilling with SDS-drills: Drilling at low speed with slow, strong impacts. Application: concrete and natural stone.

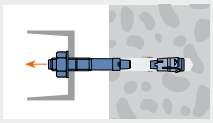
16 Setting pattern of insulation fixings



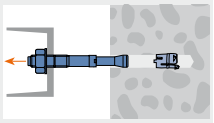
17 Modes of failure



Concrete failure

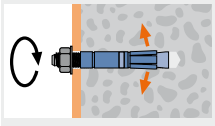


Steel failure

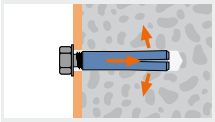


Anchor failure

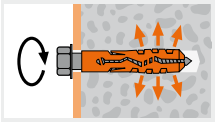
18 Different anchor types



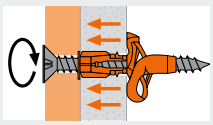
Torque controlled expansion anchors (e.g. m2, MSL). Expansion achieved by application of torque.



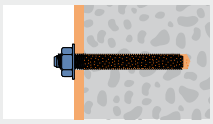
Hammer set expansion anchor (e.g. MEA). Expansion is achieved by hammering a cone in the body of the anchor.



Nylon plug (e.g. MN, MQ, MU, MNA, ML, MQL, MB, MBR, MDD). Performance is achieved by the introduction of an expansion component which is screwed or driven into the anchor body. The anchor body is thus firmly blocked against the sides of the drilled hole.



Cavity wall anchor (e.g. MU, MHD-S). The head of the plug is pushed down onto the base material with the screw, and the anchor body is drawn against the interior of the base material by deformation.



Chemical anchor (e.g. MIT, MVA). The anchor consists of a fixing element (male or female rod) and a synthetic-based mortar. Manufactured from 2 components, hardener and resin which when mixed together create the chemical reaction, which hardens to create the fixing by bonding to the base material. Adhesive anchors do not generate stress in the building material.

Concrete Screw (e.g. MCS): The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread, thus small edge and spacing distances and high loads.

19 Minimum setting depth

The indicated minimum setting depths may not be under-run. Non bearing layers such as plaster, flagstones, insulating materials etc. do not count as setting depths.

20 Fire protection

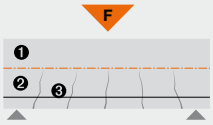
Fixings, for which fire rated anchors are required, Mungo offers a considerable range of metal anchors and MIT Injection Technique.

MQL/MB/MBR are approved for fixing of curtain walls without any restriction. The expansion part in the building material remains fire-resistant for at least 90 minutes.

21 Corrosion protection

Anchors made from galvanic zinc coated steel are used for fixings of fixtures indoors, with the exception of wet rooms. The thickness of the zinc coating is 5 microns. For external applications, wet rooms, areas of high humidity found in industrial atmospheres etc and locations in close proximity to the sea, require fixings of stainless steel A4 (1.4401 or 1.4571).

22 Concrete non-cracked/cracked



1. Compression strength: concrete non-cracked
2. Tensile strength: concrete cracked
3. Reinforcing steel

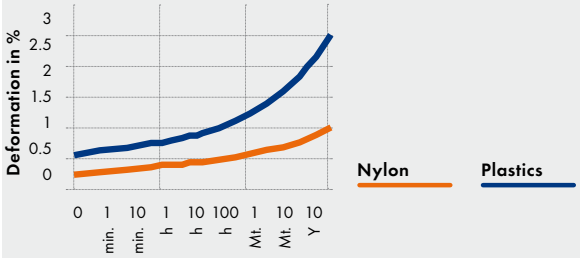
23 Nylon Quality PA6

Mungo nylon products are made from high-grade polyamide PA6. Due to its excellent characteristics PA6 can be described as the most valuable material in the fastening world.

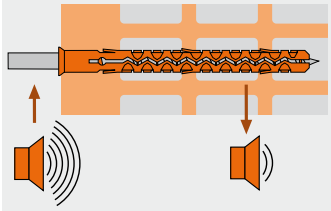
- Large temperature range of –40°C up to +100°C
- Resistance to humidity maintains important technical features such as impact strength and low deformation risk
- Excellent stability in terms of dynamic loads
- Low flammability and self-extinguishing
- Halogen-free material

24 Deformation

The deformation characteristics of polyamide PA6 clearly offers better value in comparison to conventional materials.

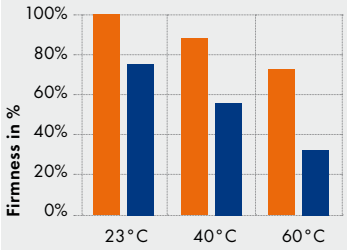


25 Sound absorption



Polyamide PA6 reduces the sound transmission between fastening and building material.

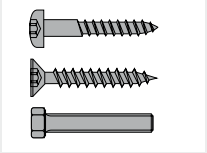
26 Solidity under temperature influences



PA6 exhibits higher strength under temperature influences compared to conventional plastics.

27 Screw types

The following screw types can be used with Mungo nylon plugs:

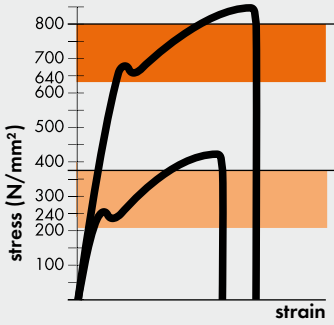


Wood screws

Chipboard screws

Metric screws

29 Grades of steel



8.8
tensile strength **8**00 N/mm²
yield point **8**0% of tensile strength
640 N/mm²

4.6
tensile strength **4**00 N/mm²
yield point **6**0% of tensile strength
240 N/mm²

30 GreenTec® Corrosion resistant zinc alloy layer

GreenTec® is a special alloy layer system on a zinc and nickel foundation which provides hard, wear and tear resistant layers with a very high corrosion resistance, even with the lowest layer thicknesses. The layer system **GreenTec®** with its excellent metal distribution and constant alloy layer composition can be used for various purposes, given the right after care.
Due to its excellent corrosion resistance, **GreenTec®** is even used with the lowest layer thicknesses, especially for high quality purposes in the automobile hydraulic and electronic industry. The layer system provides further advantages through the hydrogen de-embrittlement of highly solid components without a loss of properties. Typical applications are coatings of connecting elements in the mid-cost area with corrosion and wear and tear requirements as well as high quality applications and applications in the high-tech industry.
An important economic factor for the use of **GreenTec®** is the excellent extension of the durability in comparison with conventional zinc coatings which have a much lower layer thickness.

CR(VI) Chrom(VI)-frei Chromium(VI)-free 100% CR-Free

SWISS TESTING

DIN EN ISO 17025 ACCREDITED LABORATORY

DIN EN ISO 9227 SALT SPRAY TEST

ilac-MRA

31 Zinc flake coating

Zn FLAKE

Zinc flake coatings are non-electrolytically applied coatings, which provide good protection against corrosion. These coatings consist of a mixture of zinc and aluminium flakes. Further characteristics: uniform appearance, high protection against corrosion, chemical resistance and good friction characteristics.

28 Corrosion behavior in a salt spray test