

Approval Certificate



This is to certify, that the undernoted products have been approved in accordance with the relevant requirements of the GL Approval System.

Certificate No. 12 272 - 10 HH

Company Hilti Aktiengesellschaft
PO Box 333
9494 Schaan, LIECHTENSTEIN

Product MECHANICAL FASTENING SYSTEMS

Type HILTI X-BT STAINLESS STEEL THREADED FASTENERS

Technical Data / Application DESCRIPTION / TECHNICAL DATA
Hilti X-BT mechanical fastening system, comprising fastening and drilling tools and stainless steel threaded studs and accessories whereby fastening are made by using powder actuated tools to drive the fasteners into their final positions into a pre-drilled hole and without having to penetrate the base materials, in a process of pressing and fusing.

X-BT FASTENING SYSTEM:

Stainless steel threaded studs:

X-BT M6-24-6 SN 12-R X-BT W6-24-6 SN 12-R
X-BT M8-15-6-R X-BT M8-15-6 SN 12-R
X-BT M10-24-6-R X-BT M10-24-6 SN 12-R
X-BT W10-24-6-R X-BT W10-24-6 SN 12-R

Composite fasteners:

X-FCM-R, X-FCM-M

Drilling tool: XBT 4000-A drill, TX-BT 4/7 step drill bits

Fastening tools: DX 351 BTG for M8-types, DX 351 BT for M6/W6 and M10/W10-types

Cartridge: 6.8/11M brown "High Precision"

Approval Standard • Test processes in accordance with international recognized standards
• EN 1993-1-9: Eurocode 3: Design of Steel Structures – Part 1.9: Fatigue

Documents • Hilti X-BT Threaded Fastener Specification dated 2010/12, Supplement 2011/11
• Hilti Direct Fastening Technology Manual
• Test report Ermüdungsklassifikation gemäß EC 3 no. SO-ES 2011.101
• GL Approval Ref.-No. 11-069328, 12-004312

Remarks • RANGE OF APPLICATION/ FATIGUE DESIGN/ LIMITATION refer to page 2 and 3

Valid until 2015-11-15

File No. XI.B.09

Germanischer Lloyd

Hamburg, 2012-01-12

Handwritten signature of Hanspeter Raschle in blue ink.

Hanspeter Raschle

Handwritten signature of Sven Dudzus in blue ink.

Sven Dudzus

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RANGE OF APPLICATION to CARBON/ STAINLESS STEEL BASE MATERIAL

The above mentioned products may be used for fastening various materials to base metals of carbon / stainless steel in ship structures and steel towers for wind turbines as follows:

- metal and fiberglass gratings to steel
- cable, conduit and tubing connectors to steel
- trays, channels and struts to steel for cable, conduit and tubing runs
- instrumentation, junction boxes, lighting
- pipe hangers
- signage
- door frames
- mounting cabinets, securing furniture, utensils, etc.
- grounding and bonding equipment

The fasteners may also be used for applications other than those listed above, subject to special consideration either by the local GL Surveyor or Germanischer Lloyd Head Office.

The minimum base material strengths are to be at least 360 [N/mm²]. In general the installation of the fasteners may be carried out in areas where welding or drilling for bolting is permissible. Fasteners are not be installed closer than 6 [mm] from the edge of a flange or cutout and closer than 15 [mm] between fasteners.

FATIGUE DESIGN to CARBON STEEL BASE MATERIAL

The X-BT fasteners are allowed to be used on structural members made from carbon steel that require fatigue verification. Fatigue verification of structural members in ship structures has to be made with the corresponding GL Rules for Classification and Construction and is subject to special consideration of Germanischer Lloyd Head Office.

Fatigue verification of steel towers for wind turbines are to be made in compliance with Eurocode 3 (EN 1993-1-9: Eurocode 3: Design of Steel Structures – Part 1.9: Fatigue). For fatigue verification of normal stresses the detail category 90 according to Fig. 7.1 of EN-1993-1-9 applies.

Description of constructional detail:

Structural steel base material with Hilti X-BT powder-actuated fastener driven in pre-drilled hole.
Imperfect fastener installations as pulled-out fasteners or pre-drilled holes without fasteners are covered.

Requirements/ Limitations:

The nominal stress range [N/mm²] is to be calculated by the gross cross-section fulfilling the requirements of the nominal stress approach.

Plate thickness: $8 \text{ [mm]} \leq t \leq 60 \text{ [mm]}$

Minimum edge distance: 15 [mm]

Structural steel grades: S235 up to S460 according to EN 10025-2, EN 10025-3, EN 10025-4 and EN 10225

Germanischer Lloyd

Hamburg, 2012-01-12

Two handwritten signatures in blue ink are present. The first signature is 'Hanspeter Raschle' and the second is 'Sven Dudszus'. Both signatures are written over a horizontal line.

Hanspeter Raschle

Sven Dudszus

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RANGE OF APPLICATION to CAST IRON BASE MATERIAL

The X-BT fasteners may also be used for fastening various materials to spheroid graphite cast iron components (e.g. components in the nacelle of towers for wind turbines) as follows:

- cable, conduit and tubing connections
- trays, channels and struts for cable, conduit and tubing runs
- instrumentation, junction boxes, lighting
- T-bars for cable and conduit connections
- pipe hangers
- signage

The fasteners may also be used for applications other than those listed above, subject to special consideration either by the local GL Surveyor or Germanischer Lloyd Head Office.

The recommended working loads as given in the X-BT Thread Fastener Specification (Supplement 2011/11) cover the effect of dynamic loading on the fasteners.

Cast iron specification:
EN-GJS-400 to EN-GJS-600 according to EN 1563

Requirements/ Limitations

Material thickness: $t \geq 20$ [mm]
Minimum edge distance: 6 [mm]
Minimum fastener spacing: 15 [mm]

LIMITATION

The X-BT fasteners are not to be used for the following locations:

- for attachment of structural fire protection insulation
- on bulkheads and decks with a thickness less than 8 [mm]
- on the shell plating, sea chests and collision bulkheads

The selection of the HILTI X-BT Fastening System for the corresponding application and the proper assembly are to be in accordance with the instructions of the manufacturer and the current Rules of Germanischer Lloyd as applicable.

Germanischer Lloyd

Hamburg, 2012-01-12

Hanspeter Raschle i.d. *Sven Dudszus*

Hanspeter Raschle

Sven Dudszus