**Description**

Hilti DX fastening tools are powder-actuated fastening tools. They are designed for professional use in fastening applications where nails, threaded studs and composite fasteners are driven into various base materials.

DX fastening tools drive fasteners into structural elements by using hot, expanding gases to propel a captive steel piston against the fastener. The piston principle provides an optimum of working and fastening safety.

Until resistance to driving is encountered, 95% of the driving energy remains in the piston, which is captive in the tool.

The driving velocity, which is in most applications between 50 and 70 m/s, never exceeds 100 m/s. Compared to the high-velocity or direct acting tools the driving process stops when the piston is captured by the DX tool. Once a high-velocity tool is fired the fastener is a projectile and therefore a very high safety risk.

**Hilti DX Fastening Technology provides 5 main safety features:**

1. Driving velocity below 100 m/s so that in case of a base material miss or low driving resistance, there are no high-velocity projectiles.
2. Ignition safety so that the tool cannot fire when simply pressed against a surface.
3. Drop safety to prevent firing in case that a tool is dropped. All Hilti DX tools must withstand the standardised CIP fall test in which a loaded and cycled tool is dropped 3 times from a height of 3 m and 12 times neither firing nor firing pin impact on the cartage is acceptable.
4. Press safety, which prevents firing unless the tool is fully compressed against a firm surface (required fore 50N).
5. Trigger safety that precludes firing if the tool, with the trigger pulled, is compressed.

**Hilti powder-actuated fastening systems feature 5-way safety. Any persons deliberately bypass these mechanisms will contravene the Health and Safety in Employment Act 1992.**

**Regulations and Safety**

1. The powder-actuated fastening tool, fasteners and charges should only be used according to the Manufacturer's Instruction, the Health and Safety in Employment Act 1992 and the Approved Code Powder Actuated Hand Held Fastening Tools issued by the Minister of Labour.
2. Only those people who are fully trained in the safe use of a powder-actuated fastening tool (or under direct supervision by a trained operator) should use this equipment.
3. Only load powder-actuated fastening tool at the place where it is intended to be used and immediately prior to its use.
4. Never carry a loaded powder-actuated fastening tool, except when it cannot be unloaded because of mechanical failure.
5. If the powder-actuated fastening tool has been loaded but is not used immediate, remove both charge and fastener.
Personal Protection

During firing of the powder-actuated fastening tool, operators should ensure that all persons, required to be in the immediate vicinity of the firing activities, wear suitable eye and ear protection. Because of splintering base material a hard hat is also recommended.

Material Characteristics

When you are fixing materials together with powder-actuated fastening tools, use only materials which are suitable for this fixing method. When firing into materials the operator should comply with the following:

1. Where a concrete structure is of pre-stressed or post-tensioned type, advice should be sought from its designer or other suitably qualified party, regarding the suitability and placement of fasteners to be set into these structures.
2. Due to the risk of disintegration of the materials, fasteners should not be driven into concrete, or similar material, under the following circumstances:
   a) Nearer than 70mm to an edge;
   b) Nearer than 70mm to another fastening;
   c) Where the thickness of the material is less than 80mm
   d) Nearer than 150mm to where another fastener as failed to fully penetrate and has damaged the surrounding base material (spalling).
3. Where fixings are made into steel with a higher strength than common grades of structural steel (i.e. above grade 350), advice should be sought to ensure the correct selection of powder-actuated fastening tool, fasteners and charges.
4. Fasteners should not be driven into steel under the following circumstances:
   a) Nearer than 16mm to an edge;
   b) Nearer than 25mm to another fastening;
   c) Nearer than 100mm to a heat affected zone;
   d) Less than 4mm in thickness or 3mm in thickness when specialised fasteners are intended to be used.

Unsuitable Materials

Some fastening materials are considered to be unsuitable to be fixed together using power-actuated fastening tools:

1. Do not drive fasteners into brittle materials which are liable to shatter and materials which are too hard. Unsuitable brittle materials include iron, marble, glazed tiles, slate, natural stones, fired clay bricks. Concrete and concrete products with a compressive strength greater than 60 MPS are also unsuitable as they are too hard.
2. Do not drive fasteners into areas of that have been affected by welding, flame cutting or similar processes.
3. Do not drive fasteners into joints in masonry, for example brickwork or stonework joints.
4. Do not drive fasteners into timber where timber is the base material. A timber member is unsuitable for the purpose of securing another timber member to it. Manufactured products such as plywood, hardboard and particle board are considered to be timber where those products have similar physical characteristics to timber.
5. Do not drive fasteners into soft materials with a low compressive strength (i.e. concrete of less than 10 MPA) as they are unsuitable for use as a base material. Unsuitable materials include plaster board and lightweight, aerated or weak concrete.

As a general rule, do not fire into any material which dulls the point of the fastener if used as a centre punch. This material is too hard for the fastener to penetrate.
**Pin Selection**

Recommended embedment to CONCRETE:
1. 22mm to 27mm for most concrete excluding pre cast
2. 16mm to 22mm for pre-cast concrete due to increase of MPA
3. **Formula** = material thickness + recommended embedment

Recommended embedment to STEEL:
4. 5mm to 7mm embedment for 4mm to 6mm steel thickness = standard nail 3.7mm shank (X-DNi)
5. 10mm to 12mm embedment for 8mm and above steel thickness = universal nail 4mm shank (X-U)
6. **Formula** = material thickness + recommended embedment for steel thickness

**Charges**

<table>
<thead>
<tr>
<th>Colour code</th>
<th>Power Level</th>
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<tbody>
<tr>
<td>Green</td>
<td>Low</td>
</tr>
<tr>
<td>Yellow</td>
<td>Medium</td>
</tr>
<tr>
<td>Red</td>
<td>Heavy</td>
</tr>
<tr>
<td>Black</td>
<td>Extra Heavy</td>
</tr>
</tbody>
</table>

Block work & new concrete > **GREEN** or **YELLOW**
Older concrete, pre-cast, steel **RED** or **BLACK**
Operating the Powder-actuated Fastening tool

1. Check all external parts of the tool for damage and check that all controls operate properly. Do not operate the tool when parts are damaged or when controls do not operate properly.

2. Ensure the barrel of a loaded or unloaded powder-actuated fastening tool is always pointed in a safe direction away from the operator's body. It must never point towards any person, especially when a charge that has misfired is being removed.

3. Only certificated operators, and where necessary their assistants or other nominated persons, should be permitted in the immediate vicinity of the firing place. Other persons must be kept out of the immediate vicinity of the firing place. Powder-actuated fastening tools should not be operated in areas congested with people.

4. Operators should ensure they are in a safe and well-balanced position before firing.

5. Never place a hand over the barrel's end with a power load in the cartridge chamber.

6. Always use the weakest charge when firing for the first time into previously untried material.

7. When there is a possibility that a fastener may pass completely through the material, the area on the opposite side to the operating location must be kept clear of the persons in all directions for a distance which will ensure that injury from the fastener or associated debris cannot occur. The area on the opposite side to the operating location should be cordoned to restrict entry with appropriate CAUTION signs being displayed.

8. Never attempt to fasten a pin through a pre-drilled hole unless using Hilti DX-Kwik system.
Working Environment

The operator must ensure that the following do not present a hazard:

1. Particles on work surfaces which may fly off during fastening. Work surface should be clear of such material.
2. Concealed pipes or electrical wiring. Check the location of pipes and electrical wiring to ensure that they are not concealed within the materials at the point of firing.
3. The presence of any explosive or flammable gas, dust or vapour, or an atmosphere which is compressed. Do not use a powder-actuated fastening tool in these circumstances.
4. The presence of excessive heat, which may cause the charge to be unintentionally exploded. Do not use a powder-actuated fastening tool in these circumstances.

Use of Caution Signs

At all times when a powder-actuated tool is being used, a notice or notices bearing the following words - CAUTION: POWDER ACTUATED TOOL IN USE - should be displayed so as to be clearly legible to all persons who are in, or near, the place where the tool is being used. Signs are available from Hilti (New Zealand) LTD.

Misfire Procedure

1. In event of a misfire:
   a) First - wait 20 seconds before releasing the powder-actuated fastening tool from its depressed condition.
   b) Second - release the powder-actuated fastening tool from the work surface without changing the direction in which the tool is pointing.
   c) Finally - remove the charge and store it safely for later disposal.
2. Any charges which have misfired must not be used again. Rather they should be returned to the supplier for destruction.
3. If numerous misfires occur from one batch of chargers, that batch should be returned to the supplier for destruction.

NOTE: refer to specific instruction provided with each model of Hilti tool.

Maintenance and Storage

Before and after using the powder-actuated fastening tool, the operator should ensure:

1. The powder-actuated fastening tool is cleaned due to corrosion.
2. A charges and nails are removed prior to cleaning and storage.
3. The ventilation slots must be unobstructed and kept clean at all times.
4. Do not disassemble the tool while it is hot.
5. The charges and unloaded powder-actuated fastening tool are in their box or case.
6. The case or container is locked and stored, where only permitted persons have access.
Servicing and Repair

1. Only replacement of worn parts indicated by the operating instructions may be undertaken by the operator. All other repairs must be carried out by a Hilti representative.

Modifications

1. Ensure that only those fasteners and charges comply with AS/NZS 1873.3:1994 and AS/NZS 1873.4:1994 are used in the powder-actuated fastening. These items must be clearly marked and packaged to show the name and model of tool for which the charge or pin is nominated as being suitable.
2. Ensure the fasteners and their attachments are not modified after manufacture, particularly if modified to achieve interchange ability between types and makes of powder-actuated fastening tools.

All Hilti tools are designed as a technical unit, therefore it’s strongly recommended to use only genuine Hilti fasteners with Hilti tools. This way an optimal fastening can be assured.

Instruction manual and Technical advice

For instruction manual and technical advice, please see the operating instructions, which come with every Hilti tool. It is essential that the operating instructions are read before any tool is operated for the first time. Please feel free to contact 0800 444 584 for further Information.