

1. Introduction

1.1 Definitions and general terminology

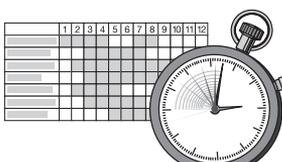
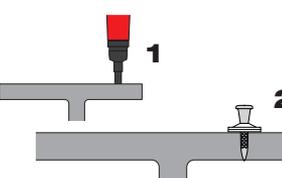
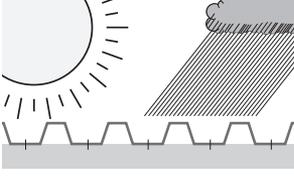
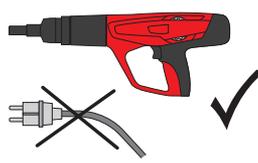
Hilti direct fastening technology is a technique in which specially hardened nails or studs are driven into steel, concrete or masonry by a piston-type tool. Materials suitable for fastening by this method are steel, wood, insulation and some kinds of plastic. Fastener driving power is generated

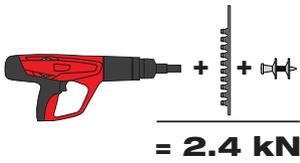
by a power load (a cartridge containing combustible propellant powder, also known as a “booster”), combustible gas or compressed air. During the driving process, base material is displaced and not removed. In Hilti terminology, **DX** stands for “powder-actuated” and **GX** for “gas-actuated” systems.

1.2 Reasons for using powder- or gas-actuated fastening

The illustrations below show some of the main reasons why many contractors take

advantage of the benefits of powder or gas-actuated fastening.

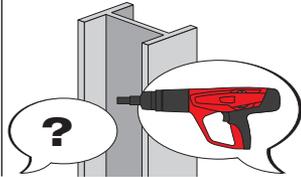
		
<p>Speed is important.</p>	<p>An easy-to-use, uncomplicated fastening system is required.</p>	<p>A weather-independent fastening system is required.</p>
		
<p>Electric power is not available or electric cables would hinder the work.</p>		



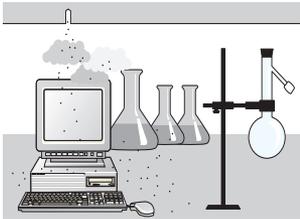
A complete fastening system with assured strength is required.



Drilling is not viable because of noise.



Drilling would be too difficult.

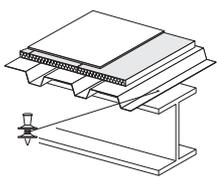
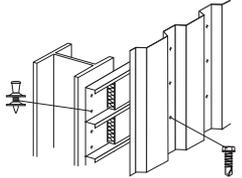
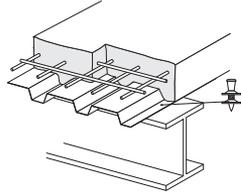
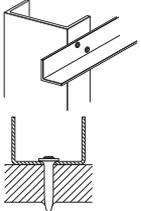
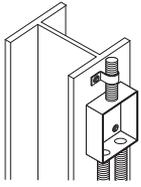
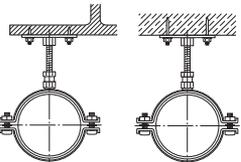
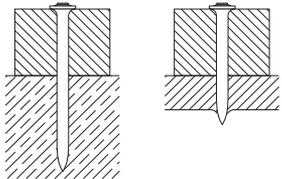
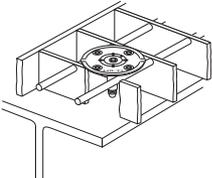
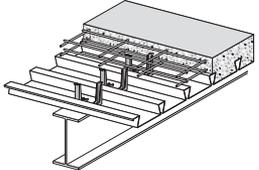


Drilling would cause too much dust.

1.3 Direct fastening applications

Typical applications for powder- or gas-actuated fastening are shown in the illustrations below:

- Fastening thin metal sheets: roof decking wall liners and floor decking
- Fastening thicker steel members: e.g. metal brackets, clips
- Fastening soft materials such as wooden battens or insulation to steel, concrete or masonry
- Threaded studs for suspended ceilings, installing building services, bar gratings or chequer plate floors
- Connections for composite structures: fastening nailed composite shear connectors

		
<p>Roof decking</p>	<p>Wall liners</p>	<p>Floor decking</p>
		
<p>Metal brackets, clips and tracks</p>	<p>Fixtures for mechanical and electrical installations</p>	<p>Hangers with threaded connectors</p>
		
<p>Wooden battens fastened to steel or concrete</p>	<p>Grating fastenings</p>	<p>Shear connectors</p>

Hilti direct fastening systems are specially designed for each application and trade.

Key applications and the corresponding fastening systems are shown below.

Roof and floor decking in steel & metal construction



X-ENP-19 L15



DX 76 PTR



Gratings in the petrochemical and other industries

X-BT +
X-FCM R

DX 351 BTG



Interior partition walls (drywall) in interior finishing



X-GN



GX 120



Concrete forms in building construction

X-FS

DX 460

**Conduit clips and ties in mechanical and electrical installations**

X-EKS, X-ECT

GX 120-ME

