



INTEGRATED CURTAIN WALL SOLUTIONS: FROM DESIGN TO CONSTRUCTION AND INSPECTION

FOREWORD

Today's buildings have to fulfil many expectations: they must be aesthetically pleasing, environmentally friendly and meet the demands of creative and groundbreaking architecture. At the same time, they need to provide protection against extreme temperatures, noise, fire and other adverse conditions.

Curtain wall façades are perfectly suited to fulfil all these demands. That's why they are playing a growing role in the construction industry.



Major curtain wall projects can be challenging. A project in one location can bring together main contractors, façade contractors and consultants from other regions who may not have experience of local compliance requirements.

Hilti not only has this experience to draw on, but we have developed an array of integrated and building code compliant curtain wall solutions based on the three pillars of hardware, software and services. With these, Hilti can support you at every stage of the process, from curtain wall design to positioning, installation, perimeter sealing and documentation.

Our curtain wall solutions bring you major benefits, including optimized design, correct installation, expert support across the world, certified solutions and significant cost and time reductions.

This brochure is designed to show you how Hilti's solutions can transform your projects, no matter how complex your design or how challenging the conditions in which you need to build. We're here to support you throughout the process, regardless of where you are based and where your project is executed.



Ignacio Cuenca
Global Head of Façade

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INTRODUCING HILTI



We passionately create enthusiastic customers and build a better future.

At Hilti we design and manufacture leading-edge technology, software and services, which power the professional construction industry.

We're global, based in over 120 countries with more than 30,000 employees.

Founded in 1941 in Schaan, Liechtenstein, Hilti is still wholly family owned, with all shares held by the Martin Hilti Family Trust. Hilti generated annual sales of CHF 5.9 billion (US\$ 5.2 billion) in 2019.

6% of our sales revenue is invested into R&D and we ranked among the top 100 applicants for European patents in 2019. A growing number of our 2,000 active patent families relate to products used for curtain wall design and construction. Our curtain wall technology is regularly used on cutting-edge buildings across the world, from San Francisco to Kuala Lumpur and London to Sydney.

A truly global company, we have links with businesses and universities across the world. Our clients include many of the world's largest brands, all of which have come to rely on Hilti's expert blend of quality, innovation and customer service.

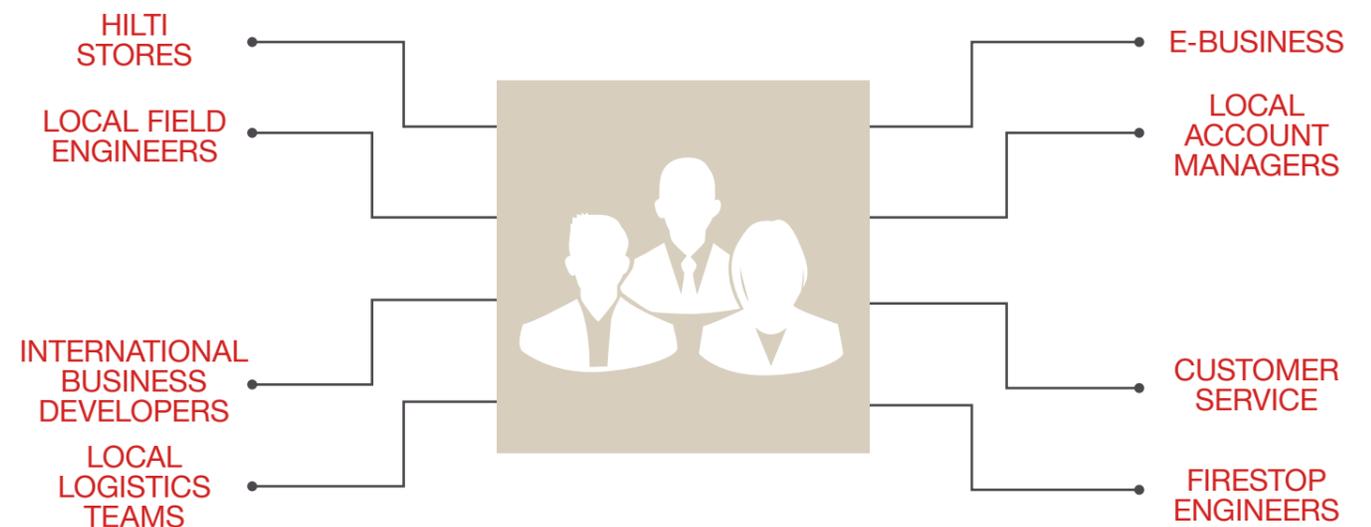
YOUR DEDICATED GLOBAL TEAM

Bringing you knowledge on a global scale

With dedicated teams based around the world, Hilti's global reach enables us to help you design, build, inspect and maintain your projects on any continent – bringing you efficiencies, speeding up your project execution and delivering savings.

Our teams bring together all the people you need, in the region you need them and speaking your language, from specialist curtain wall engineers and business developers to local account managers and customer service teams. We also have a network of local Hilti Stores for immediate product pick-up and even Click & Collect. In addition, digital resources like the Hilti website are available to support you 24/7.

Team members on the ground can offer you expert experience of managing projects just like yours. No matter where in the world you are building, they bring you local knowledge on a global scale.



INTEGRATED SOLUTIONS



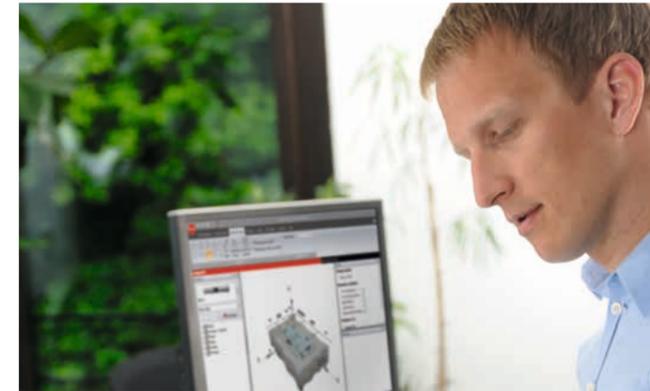
From bracket fixing software to a perimeter sealing system that is designed specifically for curtain wall applications, we have the solutions you need and can partner with you every step of the way.*

As you read on, you'll learn how we bring together software that helps you design curtain wall brackets fixing solutions with innovative hardware that helps you fix them. You'll also find out about our range of services that cover everything from design to engineering support and training on the jobsite. Few other partners can offer you such a complete, end-to-end solution, on a global scale.



HARDWARE

- **Innovative bracket fixing solutions:** Hilti anchor channels (HAC), as well as mechanical and chemical anchors, can be designed for 2D and 3D loads, seismic events, fire and fatigue, making curtain wall panel installation efficient and able to resist loads over the lifetime of a façade.
- **Firestop solutions:** Effective, simple-to-install firestop solutions that can help seal your perimeter and assist in reducing, smoke, fire, gases and water passing from one floor to the next.
- **Measuring systems:** Digital systems that make anchor fixing both accurate and fast.
- **Scanning tools:** High performance tools that quickly reveal hidden obstacles such as rebar and post-tension cables, helping to ensure you don't drill into them.
- **Power tools:** Designed to deliver the speed and flexibility you need while helping you to comply with health and safety requirements on dust and vibration.



SOFTWARE

- **PROFIS Engineering Suite:** All-in-one anchor design software that calculates and analyzes different elements of a steel-to-concrete connection, all from one cloud-based tool.
- **PROFIS Anchor Channel design software:** For the efficient optimization of anchor channel design, with calculations based on the latest international design provisions.
- **BIM / CAD Library:** An extensive library of Hilti products as 3D and 2D BIM/CAD objects – all able to integrate directly into leading construction design software, such as AutoCAD®, Revit® and Tekla® Structures.
- **CFS-DM Firestop Documentation Manager:** This system ensures your projects are organized and up to date and makes compliance reporting simple.



SERVICES

- **Comprehensive technical advice:** Our design engineers and field engineers can support you from design to execution, ensuring your project is compliant with local standards and legislation while helping you to gain productivity.
- **Engineering judgements:** Every project is unique: we provide you with engineering judgements to ensure your firestop solution meets specification requirements, helping you avoid the need for expensive and time-consuming project-specific tests.
- **Onsite installation training:** On request, Hilti staff will consult and train you on the best fastening method for your brackets and firestop installation.
- **Logistics services:** Major projects require large amounts of material. We help you boost productivity and reduce mistakes by scheduling your deliveries based on your project schedule.
- **Onsite testing:** We can test whether your brackets have been installed as specified in your design or if remedial work has been carried out correctly.

* Not all solutions and services are available in all markets. Please consult your local Hilti representative for region-specific information and availability.

UNDERSTANDING YOUR CHALLENGES



Curtain wall design and construction can be highly complex, especially when it needs to meet the demands of challenging conditions. Time, cost and compliance are the three major concerns for any project.

Building code compliant solutions

Mistakes at the early stages can have a major knock-on effect on timescales and budgets, so it's essential to keep errors to a minimum. Hilti's bracket fixing and perimeter sealing solutions help you to achieve this.

Although bracket fixing and perimeter sealing only represent up to 2% of the total cost of a curtain wall project, they typically account for about 30% of the time spent on it. Our compliant curtain wall solutions can not only reduce your design time by up to 20%, but also save you up to 10% in material costs while cutting your execution time by up to 15%.*

Major projects need to bring together main contractors, façade consultants and façade contractors from different parts of the globe. Their challenge is to make sure that curtain wall design and installation is fully compliant with the regulations and standards of the region in which the project is located.

Hilti's close co-operation with engineering and consultant offices around the world makes us highly knowledgeable about regional compliance requirements. Our global network of local experts is always on hand to helping to ensure that your projects are compliant, from design to construction and inspection.

Engineering judgements

During the design phase of your project, we can support you with engineering judgements that help you optimize your bracket fixing solutions, select the correct bracket sizes, reduce embedment depths and develop reliable and building code compliant solutions for challenging firestop configurations. This helps make sure problems are solved before construction begins.

Engineering support and installation

You want to solve installation issues as they arise, reduce mistakes and correct them as soon as possible. Our local engineering teams can give you onsite support to solve design and onsite installation problems, as well as keeping mistakes to a minimum – and fixing them fast. We can also provide you with reports and shop drawings at all stages of the project helping to ensure that designed solutions are correctly installed.

Documentation

We can provide relevant documentation for the fixing and fire protection solutions relevant to your design, bidding and inspection activities.

Global support

As a global organization, we can provide the products you know best and deliver them to over 120 countries, assist you to significantly speeding up and cutting your overall design and execution costs. Because we also have team members based all over the world, you can rely on face-to-face support from people who are not only Hilti experts but local experts.

* Figures based on Hilti project experience. These can vary, depending on your specific project requirements.

STREAMLINING YOUR PROJECTS



Hilti offers an integrated ecosystem of hardware, software and service solutions to improve your curtain wall design and construction.

INTEGRATED CURTAIN WALL SOLUTIONS

Design

PROFIS software allows you to design your projects in the most efficient way, select the correct bracket fixings and helping you to comply with the most stringent regulations, including those related to fatigue, seismic and fire resistance. We can also support your team by building code compliant edge-of-slab perimeter sealing solutions, preparing all necessary engineering judgements and technical documentation for all of your projects – regardless of where in the world they are being carried out.

Position

Positioning of fastening systems and brackets becomes faster and more accurate thanks to Hilti digital tools. Total stations allow you to measure and mark positions and elevations accurately. Scanners help to ensure that you can easily locate rebar and other embedded objects. Rotating lasers make it simple to carry out horizontal levelling, vertical alignment, grading and squaring.

Fix the brackets

With Hilti systems, installation is flexible and adjustable and helps reduce jobsite labor. Innovative anchor channel and bolt solutions that are developed specifically for facade applications provide the link between curtain wall panels and buildings. These solutions are an effective and efficient method of panel installation helping ensure panels resist current and future conditions. The design of our T-bolts and anchors guarantees that outer loads are transferred through the brackets and into the concrete structure. Our adaptive torque (AT) system recognizes and records when you have applied the right amount of torque to make installation easier and more compliant than ever. We also offer dust removal systems for a safer jobsite.

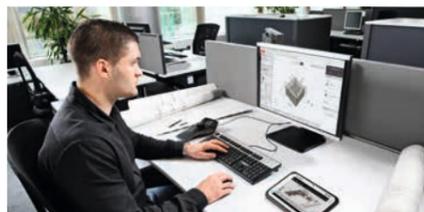
Seal the perimeter gap

A curtain wall can be challenging to seal, but Hilti offers smart solutions that can withstand movement, fire and other adverse conditions. Our edge-of-slab firestop solutions can provide a flexible barrier around the perimeter of a slab that offers increased resistance to flames, smoke, gas and water – and has movement capabilities that help meet the most stringent legal and technical requirements.

Document

Hilti CFS-DM Firestop Documentation Manager can be used to record the perimeter sealing solution you have used during your project installation, as well as any future retrofits. You can use it to generate reports and complete details of floor plans, take pictures or create PDFs of approvals, or record installer and contractor details. Trained Hilti engineers can also carry out on-site testing, working with accurate, calibrated equipment helping to ensure that all fastening systems are correctly installed.

Design



Position



Fix the brackets



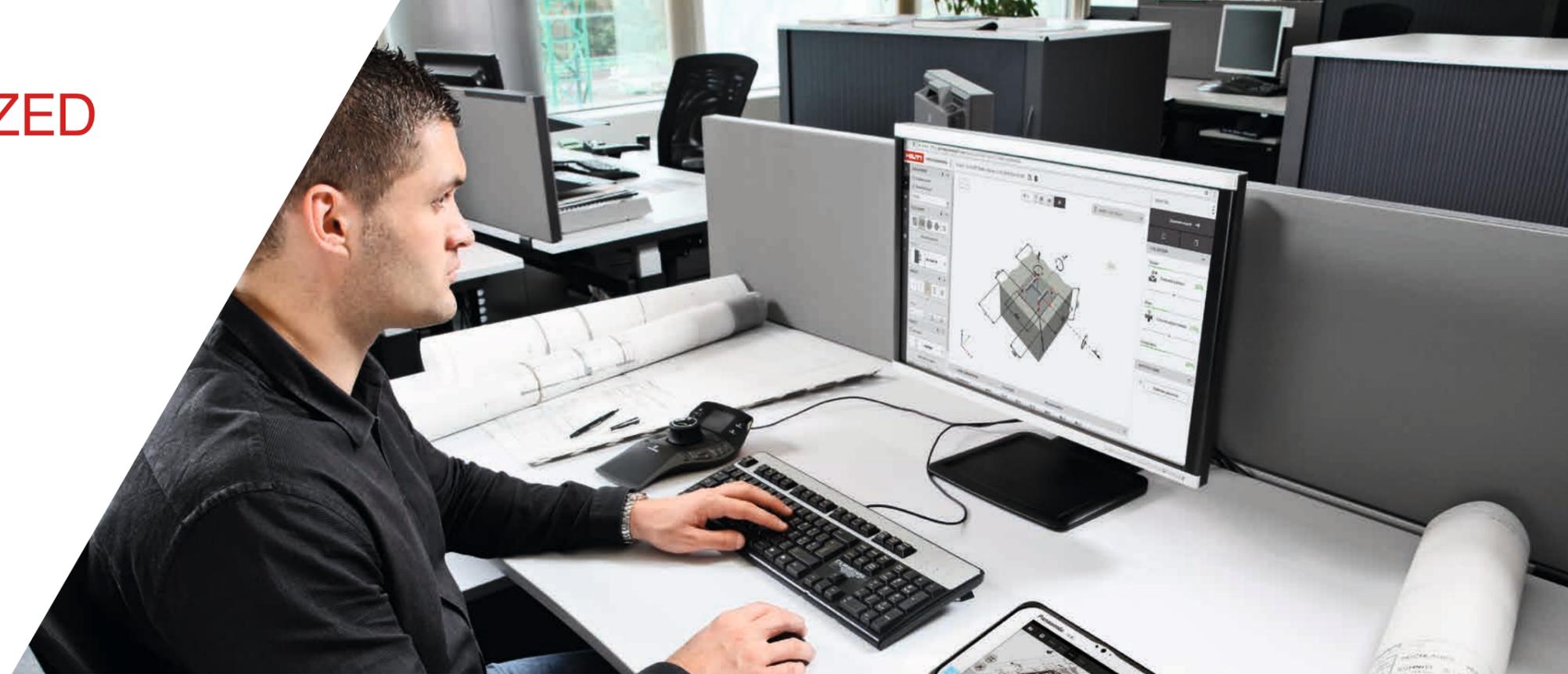
Seal the perimeter gap



Document



SOFTWARE FOR OPTIMIZED CURTAIN WALL DESIGN



Hilti offers you a range of powerful software solutions to design your bracket fixing to the last detail.

PROFIS ENGINEERING

PROFIS Engineering is fully compliant with the following building codes and regulations – Eurocode design (EN 1992-4), European Technical Assessment Guidelines (ETAG) and American Concrete Institute (ACI) – and performs calculations accurately and automatically, taking account of selected jobsite constraints.

Simple, easy-to-use tools within PROFIS Engineering allow you to:

- **Reduce:** design time and validation with detailed calculations for each project condition
- **Collaborate:** from calculation, to product selection to report generation, with an all-in-one cloud-based solution
- **Reduce errors and rework:** automatic load transfer from structural SW packages or Excel, simultaneous multiple load combination processing, and BIM/CAD model generation
- **Improve productivity:** integrated data sharing in a single platform means stakeholders access to the most up-to-date design files and reports. This helps to improve transparency, remove communication logjams and increase efficiency

PROFIS ANCHOR CHANNEL DESIGN SOFTWARE

Façade designers rely on our PROFIS Anchor Channel software for the efficient specification of anchor channels. Design calculations are based on the following international design Eurocode 2, EOTA TR047, EOTA TR050 and CEN TR17080 for European standards and AC232 for UL standards. The software is kept up to date by a dedicated team of fastening and software experts.

The software includes the latest versions of 3D and seismic designs. Other benefits include:

- Fast, flexible and user-friendly software, based on the proven PROFIS application platform
- Well-structured calculation reports show design assessments in detail
- Choice of leading international design provision
- Database link to DWX/DWG files in 2D and 3D for integration in CAD drawings.

HILTI BIM/CAD LIBRARY

BIM is essential for many projects and, in some countries is critical if you want to compete. From the Hilti BIM/CAD library, you can add your chosen solutions to your 3D building model with a few mouse clicks. In the Hilti BIM/CAD library, we have set up our products including the technical data in 2D format and as 3D objects in the native file format of your planning software. This gives you a direct, end-to-end work process for your curtain wall projects.

CFS-DM FIRESTOP DOCUMENTATION MANAGER

Hilti Firestop Documentation Manager can help you keep your projects organized and up to date and ensure compliant reporting and documentation. It allows you to:

- Manage a whole building or project, helping to make refurbishments and new firestop installations easier to implement
- Access your installation design, approvals and product documentation all in one place
- Upload photos from your cell phone, taken before and after firestop installations
- Create full project reports with details of floor plan, pictures, PDFs of the approvals plus installer and contractor details
- Give limited, short-term access to your projects for inspections - no more paperwork
- Use the system via iOS and Android apps.

SUPERIOR ANCHOR CHANNEL SYSTEMS



Anchor channel systems form the link between modern curtain wall panels and buildings. They give you an efficient and effective method to install curtain wall panels that can resist loads over the lifetime of a façade.

HILTI ANCHOR CHANNELS AND T-BOLTS

Curtain wall systems are usually pre-configured in a factory and lifted with a crane into position at the jobsite. The design of Hilti anchor channels including the T-bolts, guarantees that the outer loads are transferred through the bracket, T-bolts and channels into the concrete structure.

This system may bring you major benefits, including adjustability and reduced labor time and costs during installation.

Hilti anchor channels can be designed according to Eurocode 2-4 and US standards to handle 3D loads, seismic conditions, blast pressure, fire and fatigue. They can be used in extreme design conditions, including slabs or pockets that are under 100 mm in thickness, for lightweight concrete or in sections exposed to strong wind suction.

A system of end caps and innovative foam inserts helps to protect the inside of channels during concreting. Thanks to

a unique tear-out strip, the foam can be removed from the channel easily, quickly and in a virtually residue free manner, without damaging corrosion protection. A hot-dip galvanized system also offers a proven degree of safety. The unique slide geometry of the channels means that there is only type of T-bolt needed for the installation of all the different channel sizes. Products can be customized on demand, while eco-friendly production makes these products perfect for projects with high environmental standards.



HAC anchor channels

- ESR and ETA approved for 3D, seismic, fire and fatigue loads
- Solutions for extreme design conditions available



HAC-C anchor channels

- Traditional profiles for everyday requirements
- ETA approved for 2D loads



T-head bolts

- Notched and serrated T-bolts for loads in all three directions
- Universal fit of HBC-C T-bolts for HAC-40 to HAC-70 HAC anchor channels
- Wide range of hot-dipped and stainless steel sizes from M12 to M20

SPECIAL SOLUTIONS FOR CHALLENGING DESIGNS



Hilti offers innovative anchor channels to overcome challenges of 3D loads, concrete edge breakout and front-of-slab applications.

HAC-T serrated anchor channels

Serrations on the channel lips and T-bolts allow easy positioning and adjustability, leading to a quicker installation. Channels can be put into position with up to 50% less installation torque, meaning smaller impact wrench can be used in many applications. These channels are certified and approved in accordance with ESR-3520, allowing for complete assessment for static and seismic loads. In Europe, they are ETA approved and CEN TR 17080 allows 3D design.



HAC-EDGE

Rather than relying on the relatively low tensile capacity of the concrete to prevent edge breakout, HAC-Edge brings superior concrete edge performance by optimizing the load transfer for small edge distances, thin concrete members, low concrete compressive strengths and lightweight concrete.

HAC-EDGE channels with a new rebar edge confinement plate provide you with reinforcing bars installed on the back of the channel, giving you with a solution that outperforms standard anchor channels by up to a factor of five.



HAC-CRFoS CHANNELS

These front-of-slab channels are anchored into concrete using rebars – thereby transferring loads away from the edge into the concrete slab. The rebars are kinked to allow their use in corners and it's easy to overlap rebars that run perpendicular to each other.



All of the anchor channel and special solutions on this page are compliant with UL, ETA. Please note that available products may differ by country. Please ask your local Hilti contact for details.

COMPLETE POST-INSTALLED ANCHOR PORTFOLIO

Curtain wall designs can be challenging and subject to change at short notice. In these circumstances, it can be impractical to use anchor channels in all areas of a structure. Instead, you need a solution that can be deployed effectively when time is at a premium or when curtain wall planning and execution are running almost in parallel or you need to carry out some remedial work during the project.

Hilti helps you meet these demands, thanks to an innovative range of mechanical and chemical post-installed anchors.



Mechanical anchor solutions

Mechanical stud anchors give you versatile, well-proven systems for fastening façades.

Fast-cure adhesive anchoring systems give you a unique method of securing façade brackets in both cracked and non-cracked concrete. For example, by combining HY-200 fast-curing adhesive with the specialist HIT-Z rod, you can quickly install torque-controlled bonded anchors where they are needed.

Increased strength coupled with design and installation flexibility, also make post-installed anchors an attractive option for curtain wall projects.



HST3/HST3-R

Ultimate-performance wedge anchor for demanding static and seismic loads in cracked concrete (carbon steel)

- Material, corrosion: carbon steel, zinc-plated
- Head configuration: externally threaded
- Approvals / test reports: BZS/shock, ETA, fire, seismic
- Available also in stainless steel for use in corrosive environment



HST2

Optimized expansion cone and wedge design combined with special steel and coatings.

- Suitable for non-cracked and cracked concrete
- Product and length identification mark facilitates quality control and inspection
- ETA and FM approvals



HSA

A stainless steel anchor for use in highly corrosive environments.

- Small edge and spacing distances
- High loads
- Three embedment depths for maximal design flexibility
- ETA approved

Chemical fast curing anchor solutions



HIT-HY 200-A

Ultimate-performance injectable hybrid mortar with approvals for rebar connections and heavy-duty anchoring

- Base materials: concrete (cracked and uncracked)
- Base material condition: dry, wet
- Approvals / test reports: ETA, Fire



HIT-HY 170

High-performance injectable hybrid mortar with everyday approvals for anchoring in concrete and masonry

- Base materials: concrete (cracked and uncracked)
- Base material condition: dry, wet
- Approvals / test reports: ETA

PERIMETER SEALING SOLUTIONS



Hilti is a global leader in firestop solutions for many different applications.

For curtain wall construction, one of your biggest challenges is sealing the gap between your floor slabs and the façade. This small void is actually the largest joint in a building and can add hundreds of square meters of open space, potentially allowing gas, smoke and flames to rise from floor to floor. Little wonder that almost all international construction codes recognize the crucial importance of perimeter barriers to overall building safety.

Ambitious designs and strict schedules mean that perimeter fire containment must be quick and easy to install correctly.

Movement, acoustic and thermal requirements can't be ignored either.

With these industry trends in mind, we have developed fire compartmentation solutions that can not only help save lives but can also assist in solving other engineering and installation challenges.

We also provide engineering judgements based on local and international regulations, plus evidence from extensive tests that go far beyond standards requirements.

Versatile spray sealant

Our traditional, water-based sealant – CFS-SP WB – is a versatile spray for curtain wall or edge-of-slab applications.

As with other Hilti spray sealants, CFS-SP WB has high-performance movement capabilities that meet leading industry test standards.

The ultimate sealant

CFS-SP SIL is a highly elastic firestop sealant for edge-of-slab applications. This silicone-based spray is flexible enough to meet differential movements requirements meaning its application is not weather-dependent.

The movement capabilities of CFS-SP SIL meet leading industry standards, and its water-resistance helps to reduce moisture damage to the joint.

FAST AND RELIABLE EXECUTION



Hilti provides a wide range of state-of-the-art tools and measuring systems, designed to make your projects more productive, efficient and accurate.

These are just some of our solutions for curtain wall construction.



PS 1000 x-scan system

- Concrete scanner for structural analysis
- Easily locates embedded objects in multiple layers
- Detects up to a depth of 400 mm



PLT 300 construction layout tool

- One-person operation for productivity gains
- Automatic tilt compensation to avoid manual leveling
- Lays out 2D and 3D positions on the jobsite



PR30-HVSG A12 rotating laser

- The fastest way to align control points over long distances
- Can be used for levelling, aligning, squaring and grading



SIW cordless impact wrenches

- Ideal for installing T-head bolts in brackets
- Low vibration gearbox
- Centered balance point for precise handling



SI-AT-A22 adaptive torque module

- Module for SIW wrenches
- For fast anchoring and bolting to approved torques
- Documents all executed fastenings



TE 30 AVR

- Rotary hammer for heavy duty concrete drilling and corrective chiseling
- Includes AVR (Active Vibration Reduction)
- Perfect balance, low weight and compact design.

FROM START TO FINISH AND BEYOND

Hilti is here to support you at every stage of your project, no matter where you are based or where your project is being executed.



Engineering Service

Our specialists can support you from design and execution to inspection, helping ensure your project is compliant with local conditions, standards and legislation.

Our engineering teams can draw on their global experience to give you engineering judgements that assist in ensuring that you create compliant designs, even for the most challenging conditions. They can also optimize your design to save material and reduce installation time.

Field teams are on also hand to support your projects locally, helping you to avoid installation errors and complete work more quickly and with a higher quality installation.



Hilti Tool Service

Unforeseen or hidden factors like repair costs can lead to serious budget issues. Our service offering can help you avoid these additional costs and stay within budget.

Even though our tools are built to last, we will pay any repair costs of your tool for up to 2 years from the date of purchase. This includes labor costs, replacement of faulty parts (subject to wear and tear) as well as pick-up and delivery.

After the expiration of the initial no-cost period we put a limit on what a repair can cost you. For the lifetime of the tool we guarantee that the repair cost will not exceed a certain price. If the cost of the repair remains below this limit, you only pay the actual cost. Our lifetime warranty covers manufacturing failures for 20 years. We will repair or replace parts that break due to defects in materials or workmanship for a duration of 20 years.



Fleet Management

When you are constructing a curtain wall, the last thing you need to worry about is organizing repairs, paying maintenance charges or replacing stolen tools. Hilti Fleet Management is an all-inclusive service where your tool costs are covered by a fixed monthly fee. This means no money up front* and predictable costs in the future. Let us manage your tools, so you can manage your business.

Budgeting is easy because a fixed monthly fee covers all tool and servicing costs. Repairs are free of charge during the contract, while freight, battery exchange and drop cover are also included. Tools are labelled with your logo and an exchange service keeps you equipped with the latest. A loan service keeps you up and running when tools are being repaired, and you'll also enjoy theft cover for complete peace of mind.

*Subject to credit checks



ON!Track Asset Management

At the touch of a screen or the click of a mouse, the Hilti ON!Track asset management system tells you exactly what equipment you have, where it is and who is using it. When items need maintenance or calibration it alerts you. When it's time to renew training or certification it tells you in advance. With this critical information at your fingertips, it's simple to keep your work on track, profitable and fully compliant.

Rugged barcode and Bluetooth tags on your equipment communicate with cloud-based asset management software that runs on mobile or desktop devices – meaning you can find your assets in an instant. And with our best-in-class services and support, we're always on hand to help you get the best from the system. So, if you want to stay productive and stay compliant as simply as possible, it's time to get ON!Track.

GLOBAL PROJECT EXPERIENCE



Hilti solutions have been used in major curtain wall projects across the world, allowing many iconic landmarks to be built in compliance with local standards and regulations.



AMERICAS

BUILDING NAME	Country
Brock Commons Tallwood House	Canada
Capitol Tower	USA
The Union - Office Tower	USA
111 West 57 th Street	USA
Virgin Hotel	USA
One Gotham Center	USA
Three Gotham Center	USA
New Brunswick Performing Arts Center	USA
Coda at Tech Square	USA
Centene Plaza Two	USA
Reforma 180	USA
Torre Reforma Latino	USA



EUROPE

BUILDING NAME	Country
Allianz Tower	Italy
Lakhta Center	Russia
Roche Turm Bau 1	Switzerland
Nidakule Levent	Turkey
Providence Tower	UK
Riverwalk	UK
Angel Court	UK
The Corniche, Building 2	UK
The Scalpel	UK



META

BUILDING NAME	Country
Talan Tower 1 & 2	Kazakhstan
Golden Tower	Saudi Arabia
Burj Khalifa Tower & Podium	UAE
Dubai Opera	UAE
Fairmont Hotel	UAE
The Address Hotel Downtown	UAE



APAC

BUILDING NAME	Country
Raffles City Hangzhou Tower 1	China
Raffles City Hangzhou Tower 2	China
Shenzhen Energy Headquarters North Tower	China
Shenzhen Energy Headquarters South Tower	China
Suzhou IFS	China
Yujiapu Yinglan International Finance Center	China
World Crest	India
Trump Tower @ The Park	India
Menara Pertiwi	Indonesia
Gramercy Park I	Singapore
Gramercy Park II	Singapore
V on Shenton Residential Tower	Singapore
DUO Residences	Singapore



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