



CURTAIN WALL FACADES

/ 2018

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121 countries



25,000 employees



FAMILY business

1941

FOUNDED



INNOVATIVE solutions

Founded by Martin Hilti, as a small family business in the principality of Liechtenstein in 1941, the company has evolved into the worldwide Hilti Group of today.

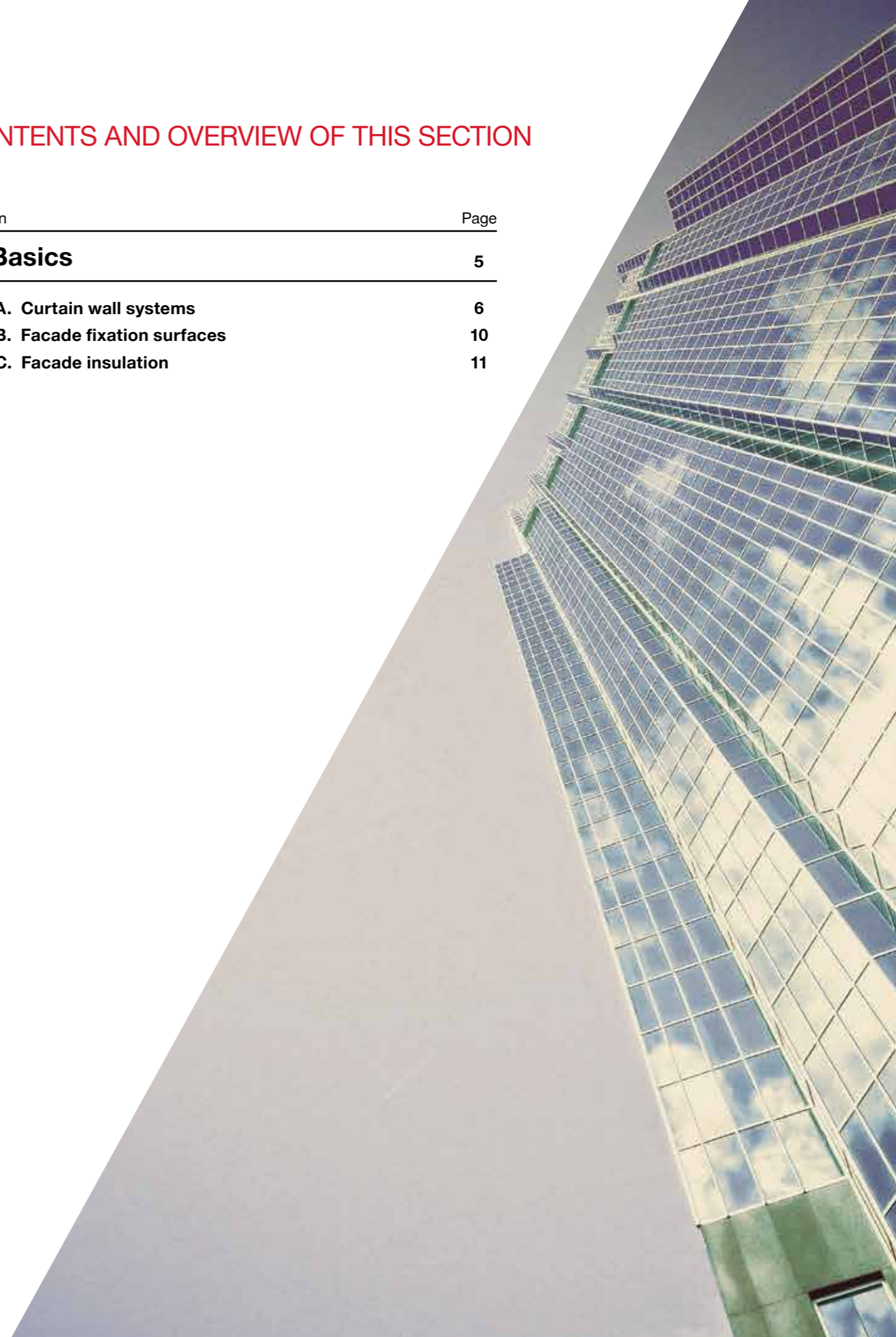
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1 BASICS A.CURTAIN WALL SYSTEMS

Curtain wall systems play a significant role in the construction industry as onsite installation is made simpler, provides a safe working environment and saves time and money. Hilti fixation systems are the link between modern curtain wall panels and buildings. They represent an efficient and effective method in installing curtain wall panels and to resist loads over a lifetime of a facade.

Complete facade elements can consist of concrete, glass, metal, and natural stone elements. Even intelligent solar power and air conditioning systems can be integrated.



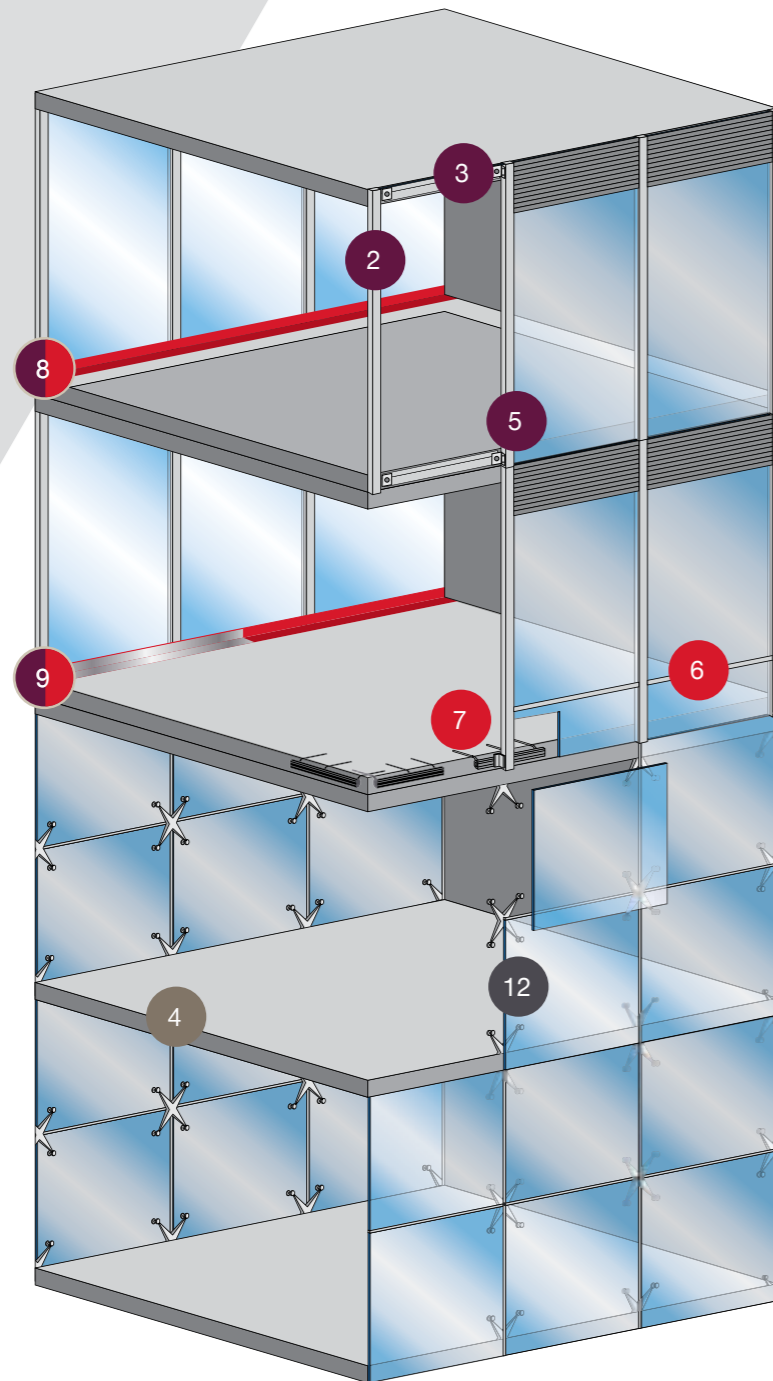
HILTI SOLUTIONS OVERVIEW FOR FAÇADE.

For optimum planning and implementation.



HILTI PROFIS ANCHOR CHANNEL & PROFIS ANCHOR

Design software.

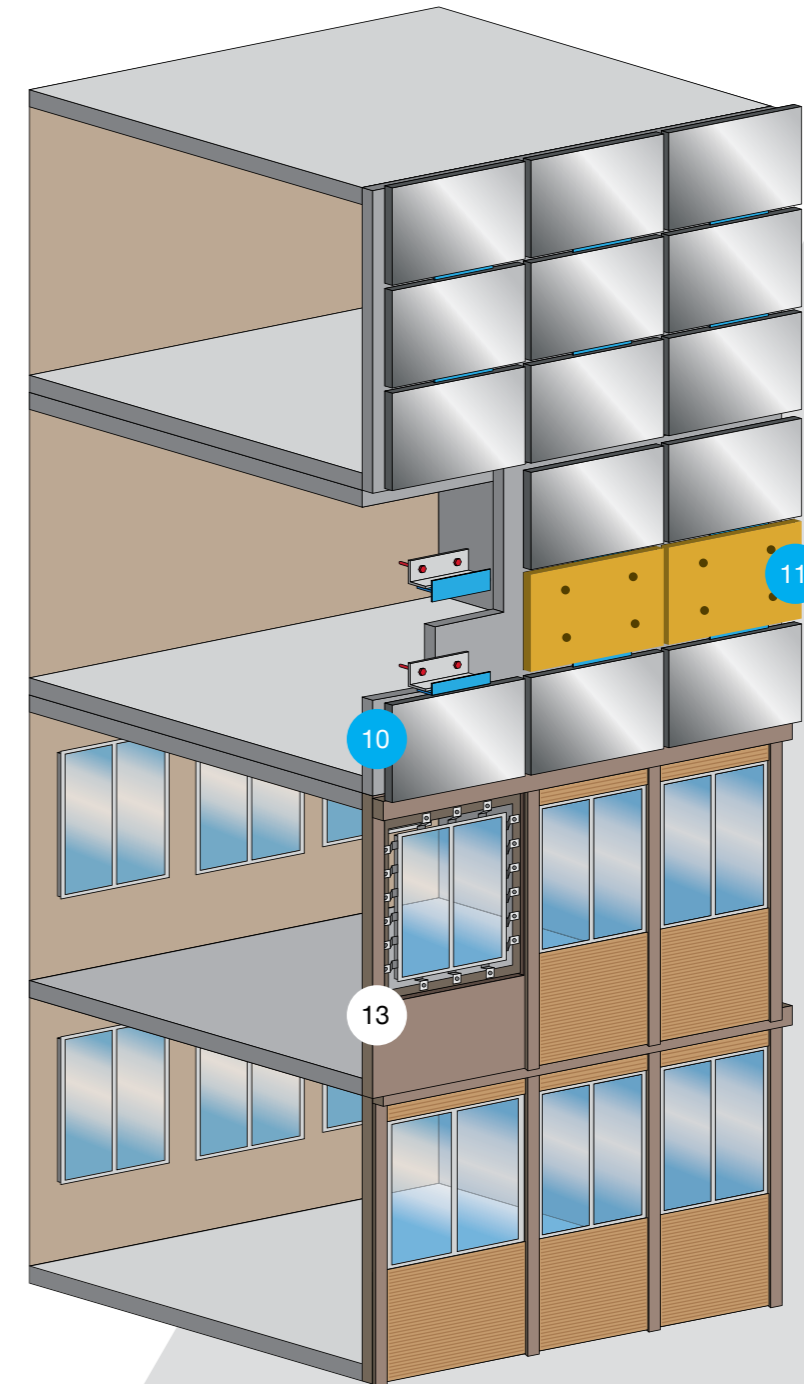


- 2 Curtain Wall Mullion
- 3 Curtain Wall Transom
- 4 Base Material
- 5 Brackets Stick System

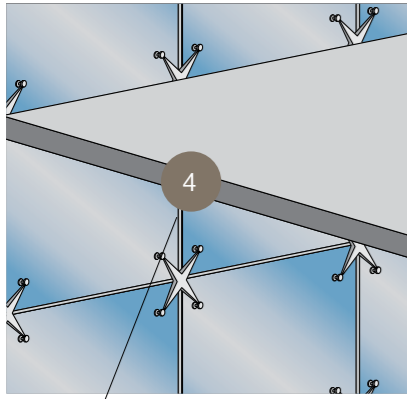
- 6 Unitized Panel
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- 8 Edge of Slab
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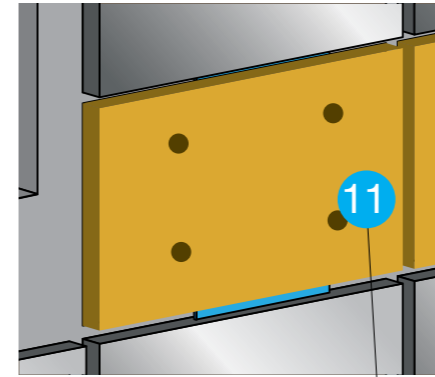
Please refer to page 8

1 BASICS B. FACADE FIXATION SURFACES

Surfaces to which the facade can be anchored may consist of standardized materials (e.g. concrete, brick, steel, timber, etc.) or non-standardized materials. Surface layers such as rendering, coatings or facings do not count as load-bearing materials.

The following are suitable base materials:

- Concrete
- Bricks
- Sand-lime block
- Aerated concrete
- Timber
- Composite lumber
- Steel frame structures
- Existing/unclassified masonry (load-bearing capacity must be verified by pull-out tests)
- Sandwich components (e.g. metal, concrete or lightweight concrete) may be considered suitable only after verification



Please refer to page 8

1 BASICS C. FACADE INSULATION

A layer of thermal insulation between the supporting surface and the ventilation cavity. Depending on the type of insulating material used, it may also fulfil fire protection and soundproofing requirements.

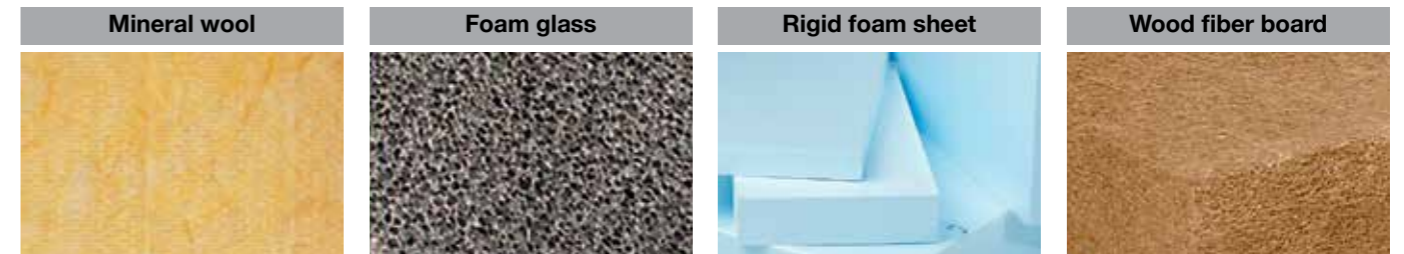
Thermal insulation for rain screen/ventilated facades must consist of an insulating material of a type suitable for the intended purpose (exterior wall insulation behind cladding).

The insulation must meet the following requirements:

- Able to retain its shape
- Able to retain its dimensions
- Completely hydrophobized and non-vapor retardent (as necessary)
- Non-flammable (as necessary)

The following types of facade insulation can be used, for example:

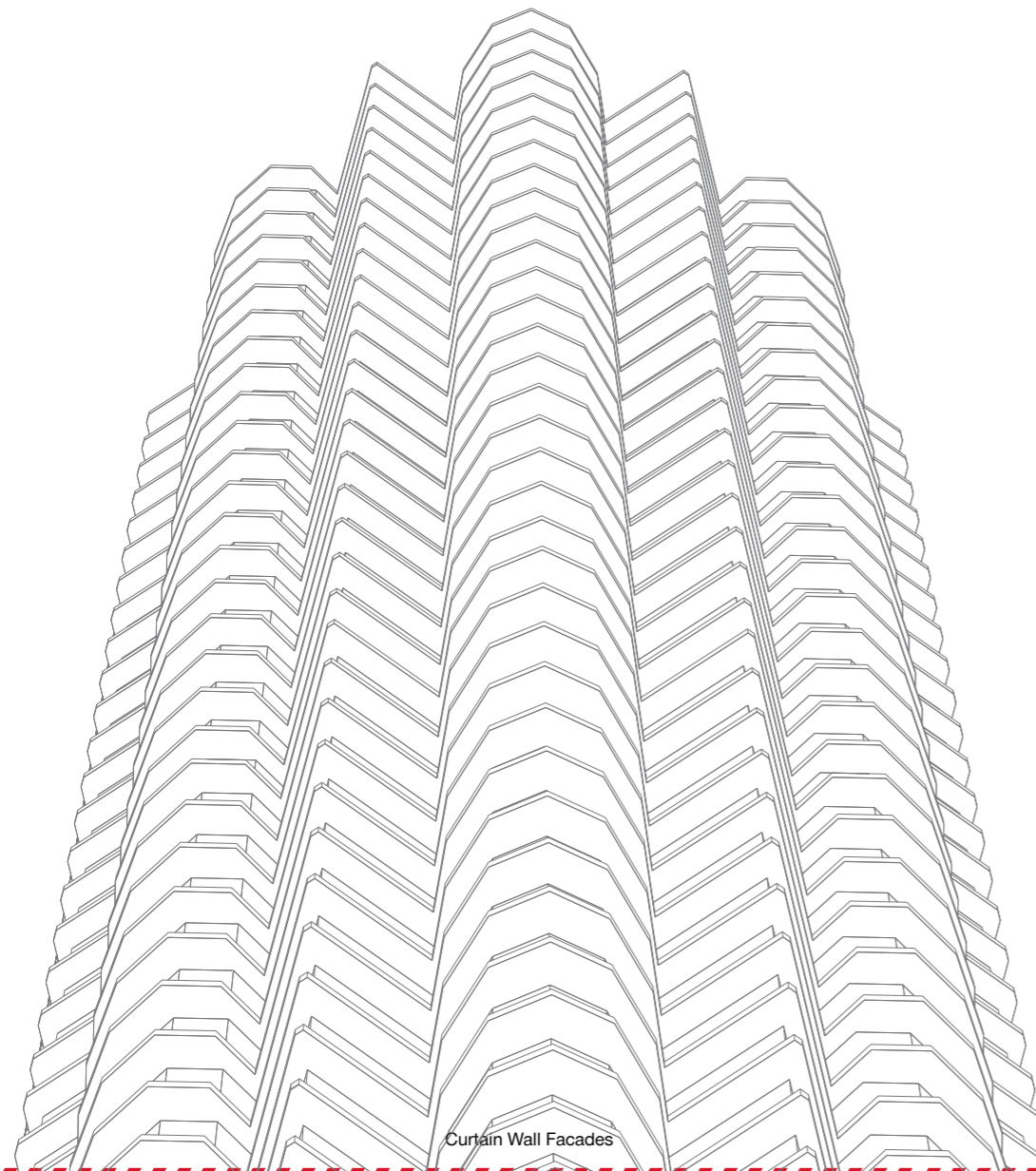
- Mineral wool
- Foam glass
- Rigid foam sheet
- Wood fiber board



- Insulation sheets must be tightly butted together and fitted in a “brickwork” pattern. This is particularly important at the corners of the building.
- The thermal insulation must be snugly fitted around the points where the substructure penetrates the insulating material.
- Where water spray is to be expected, moisture-resistant insulating material must be used.
- As a basic rule, national regulations and installation instructions issued by the manufacturer must be observed.

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2 GENERAL REQUIREMENTS AND REGULATIONS

A. BUILDING REGULATIONS

Emirate of Abu Dhabi

Governing body

- Department of Municipal Affairs (DMA)
- Ministry of Interior Civil Defense G.H.Q.

Legislative framework

- Abu Dhabi International Building Code
- Abu Dhabi International Energy Conservation Code
- UAE Fire and Life Safety Code of Practice

Emirate of Dubai

Governing body

- Dubai Municipality DM
- Dubai Civil Defense DCD

Legislative framework

- Structural Codes & Guidelines (issued by Dubai Municipality)
- Green Building Regulations & Specifications (issued by Dubai Municipality)
- Dubai wind code (issued by Dubai Municipality)
- UAE Fire and Life Safety Code of Practice (issued by General Headquarters of Civil Defense-Ministry of Interior United Arab Emirates)

Emirate of Sharjah

Governing body

- Sharjah Municipality SM
- Sharjah Civil Defense SHJCD

Legislative framework

- Construction rules and regulations (issued by Sharjah Municipality)
- UAE Fire and Life Safety Code of Practice (issued by General Headquarters of Civil Defense -Ministry of Interior United Arab Emirates)

Northern Emirates

Governing body

- Municipality
- Civil Defense

Legislative framework

- Construction rules and regulations (issued by the Municipality)
- UAE Fire and Life Safety Code of Practice (issued by General Headquarters of Civil Defense-Ministry of Interior United Arab Emirates)

2 GENERAL REQUIREMENTS AND REGULATIONS

B. GENERAL REQUIREMENTS

Structural stability

Curtain wall facades are mechanically connected to the load-bearing structure of the building and must remain structurally stable at all times. When considering this point, the following loads must be taken into account:

- Dead weight
- Wind loads (wind uplift and wind pressure)
- Snow and ice
- Dynamic (shock) loads
- Special cases (seismic loads, signage)

Proof of the structural stability of the curtain wall facade system, including all individual certificates, must be provided in a verifiable form in accordance with the state of the art and the applicable International and/or national regulations. The proof of structural stability must, in particular, include the structural stability calculations for the substructure, the cladding and the anchoring and connecting or fastening components.

The dead weight (own weight) is the sum of the weight of the cladding plus the substructure. The corresponding values can be taken from, for example, national regulations or the manufacturer's specifications.

A difference must be drawn between the two types of wind loads, i.e. wind uplift and wind pressure. The values to be applied in calculations depend, above all, on the shape and dimensions of the building, the type of facade cladding and how it is installed, and the location of the building.

Where necessary, the applicable special loads (impacts, balls being thrown, etc.) must be taken into account (more closely spaced substructure members) in areas where special stresses of this kind are to be expected.

Fire protection

Curtain wall facades must comply with the applicable national requirements regarding fire protection. The planning of fire protection measures is the responsibility of the planning specialist.

Thermal insulation and protection from dampness

The facade, in terms of its cladding and substructure, must be planned and constructed in such a way that any rainwater that finds its way behind the cladding and any condensation is drained away to the exterior in a controlled manner.

This shall ensure that the thermal insulation or any timber components in the substructure, and the material to which it is anchored, do not remain damp.

Facades with thermal insulation on the exterior of the wall present a very favorable solution in terms of building physics. In addition, the ventilation cavity allows any dampness that has found its way through the joints in the cladding to run off.

Airtightness

Requirements regarding the airtightness of the external envelope of the building are to be fulfilled by its design and construction. The curtain wall facade does not contribute to the airtightness of the building. Airtightness is ensured, for example, by the interior plasterwork and correctly installed doors and windows.

Soundproofing

Requirements in terms of soundproofing must be taken into account during planning of the complete structure and must comply with national regulations. A high sound reduction index can be achieved due to the high sound absorption properties of mineral insulation material in conjunction with thick cladding.

Lightning protection

Lightning protection requirements must be taken into account by the applicable specialists at the planning stage and must comply with national regulations.

Attention must be paid to the compatibility of the materials used for lightning conductors and any parts of the facade cladding that they come into contact with.

Deformation

Deformation may occur, in particular, due to temperature fluctuations and changes in humidity. Attention must be paid to the local temperature differences (ΔT) (usually within the -20° to $+80^{\circ}\text{C}$ range).

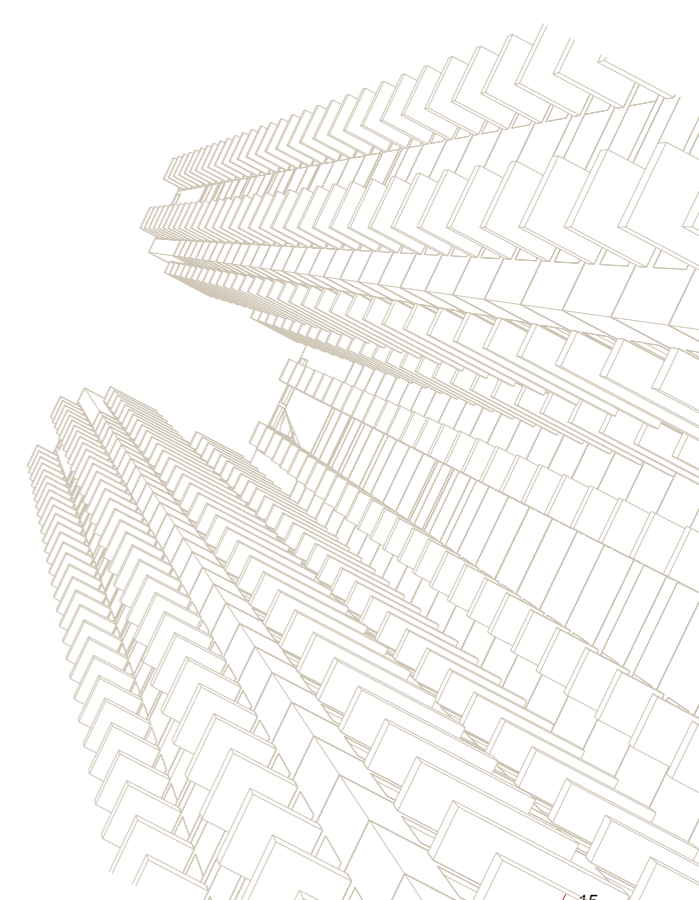
Deformation must not cause individual parts of the facade to work loose and must have no detrimental effect on the structural stability of the facade. Such effects can be avoided, for example, by the following:

- Division of the substructure and cladding into separate areas (e.g. height of each floor)
- The positioning of joints
- Avoidance of forces of constraint during installation of the facade cladding and substructure through use of fixed and sliding points or other suitable measures

Building expansion joints must be taken into account by the substructure and cladding and allowance made accordingly.

Tolerances

The surface of the facade cladding must be flat and even. Any unevenness of the load-bearing surface must be taken into account right at the planning stage and evened out by the supporting substructure. The permissible degree of unevenness of the load-bearing surface or facade must be defined or the applicable values taken from national regulations.



Corrosion

Corrosion is a process that affects metals due to their exposure to atmospheric influence. A greater concern is the safety risks, where corrosion can lead to significant impairment to the functionality of the fastening systems of the structural elements.

Selection of corrosion protection for anchors

Environmental Conditions	Fastened part	Anchors					
		HSA HUS HST HIT-V	HUS-HF	HSA-F HIT-V-F	HSA-R2	HUS-HR HSA-R HST-R HIT-V-R HIT-Z-R	HST-HCR
Coating/Material		Electro galvanize	Duplex coated carbon steel	HDG/sherardized 45-50 µm	A2 AISI 304	A4 AISI 316	HCR, e.g. 1.4529
Dry indoor	Steel (zinc-coated, painted), aluminum, stainless steel	■	■	■	■	■	■
Indoor with temporary condensation	Steel (zinc-coated, painted), aluminium	-	■	■	■	■	■
	Stainless steel	-	-	-	-	-	-
Outdoor with low pollution	Steel (zinc-coated, painted), aluminium	-	□*	□*	■*	■	■
	Stainless steel	-	-	-	-	-	-
Outdoor with moderate concentration of pollutants	Steel (zinc-coated, painted), aluminium	-	□*	□*	■*	■	■
	Stainless steel	-	-	-	-	-	-
Coastal areas	Steel (zinc-coated, painted), aluminium, stainless steel	-	-	-	-	■	■
Outdoor, areas with heavy industrial pollution	Steel (zinc-coated, painted), aluminium, stainless steel	-	-	-	-	■	■
Close proximity to roads treated with de-icing salts	Steel (zinc-coated, painted), aluminium, stainless steel	-	-	-	-	■	■
Special applications	-	Consult experts					■

- = expected lifetime of anchors made from this material is typically satisfactory in the specified environment based on the typically expected lifetime of a building. The assumed service life in ETA approvals for powder-actuated and screw fasteners is 25 years, and for concrete anchors it is 50 years.
- = a decrease in the expected lifetime of non-stainless fasteners in these atmospheres must be taken into account (≤ 25 years). Higher expected lifetime needs a specific assessment.
- = fasteners made from this material are not suitable in the specified environment. Exceptions need a specific assessment.

* From a technical point of view, HDG/duplex coatings and A2/304 material are suitable for outdoor environments with certain lifetime and application restrictions. This is based on longterm experience with these materials as reflected e.g. in the corrosion rates for Zn given in the ISO 9224:2012 (corrosivity categories, C-classes), the selection table for stainless steel grades given in the national technical approval issued by the DIBt Z.30.3-6 (April 2009) or the ICC-ES evaluation reports for our KB-TZ anchors for North America (e.g. ESR-1917, May 2013). The use of those materials in outdoor environments however is currently not covered by the European Technical Approval (ETA) of anchors, where it is stated that anchors made of galvanized carbon steel or stainless steel grade A2 may only be used in structures subject to dry indoor conditions, based on an assumed working life of the anchor of 50 years.

Environment categories

Applications can be classified into various environmental categories, by taking the following factors into account:

Indoor applications	
	Dry indoor environments (Heated or air-conditioning areas) without condensation, e.g. office buildings, schools.
	Indoor environments with temporary condensation (Unheated areas without pollutant) e.g. storage sheds

Outdoor applications	
	Outdoor, rural or urban environment with low population Large distance (> 10 km) from the sea
	Outdoor, rural or urban environment with moderate concentration of pollutants and/or salt from sea water Distance from the sea 1-10 km
	Coastal areas Distance from sea <1 km
	Outdoor areas with heavy industrial pollution Close to plants < 1 km (e.g. petrochemical, coal industry)
	Close proximity to roadways threatened with de-icing salts Distance to roadways < 10 m

Outdoor applications	
	Special applications Areas with special corrosive conditions, e.g. road tunnels with de-icing salt, indoor swimming pools, special applications in the chemical industry (exceptions possible).

Important notes

The ultimate decision on the required corrosion protection must be made by the customer. Hilti accepts no responsibility regarding the suitability of a product for a specific application, even if informed of the application conditions.

The tables are based on an average service life for typical applications.

For metallic coatings, e.g. zinc layer systems, the end of lifetime is the point at which red rust is visible over a large fraction of the product and widespread structural deterioration can occur – the initial onset of rust may occur sooner.

National or international codes, standards or regulations, customer and/or industry specific guidelines must be independently considered and evaluated.

These guidelines apply to atmospheric corrosion only. Special types of corrosion, such as crevice corrosion or hydrogen assisted cracking must be independently evaluated.

The tables published in this brochure describe only a general guideline for commonly accepted applications in typical atmospheric environments.

Suitability for a specific application can be significantly affected by localised conditions, including but not limited to:

Elevated temperatures and humidity; High levels of airborne pollutants; Direct contact with corrosive products, such as found in some types of chemically-treated wood, waste water, concrete additives, cleaning agents, etc. ;Direct contact to soil, stagnant water; Electrical current; Contact with dissimilar metals; Confined areas, e.g. crevices; Physical damage or wear; Extreme corrosion due to combined effects of different influencing factors; Enrichment of pollutants on the product

Facades / roofing				
Profiled metal sheets, curtain wall cladding, insulation fastenings, facade support framing		Outdoor, rural or urban atmosphere with low pollution	Indoor	Electrogalvanised
			Outside application	Hot-dipped galvanised / sherardized min. 45 microns, A2 (304) and A4 (316) steel
		Outdoor, rural or urban environment with moderate concentration of pollutants	Indoor	Electrogalvanised
			Outside application	Hot-dipped galvanised / sherardized min. 45 microns, A2 (304) and A4 (316) steel
		Outdoor, areas with heavy industrial pollution and (e.g. petrochemical and coal industry) or coastal areas	Indoor	Electrogalvanised
			Outside application	A4 (316) steel, Hilti HCR if chlorides and industrial pollution are combined,

The following table shows the suitability of the respective metal couple. It also shows which two metals in contact are permissible in field practice and which should rather be avoided.

Fastened part (Large area)	Fastener (small area)			
	Electrogalvanised	Duplex coated carbon steel	Hot-dipped galvanised	Stainless steel
Electrogalvanised	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hot-dipped galvanised	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aluminium	■	■	■	<input type="checkbox"/>
Structural or cast steel	■	■	■	<input type="checkbox"/>
Stainless steel (CrNi or CrNiMo)	■	■	■	<input type="checkbox"/>
Tin	■	■	■	<input type="checkbox"/>
Copper	■	■	■	<input type="checkbox"/>
Brass	■	■	■	<input type="checkbox"/>

- Slightly or no corrosion of fastener
- Moderate corrosion of fastener, technically acceptable in many cases
- Heavy corrosion of fastener

Seismic

Seismic anchorage applications can include strengthening or retrofitting an existing structure, as well as standard anchorage applications that exist both in seismic and non-seismic geographies. In addition to an engineers focus on the anchoring of structural elements, it is crucial for an adequate seismic design to attend to non-load bearing and non-structural elements. These elements failure can severely compromise the building/structure functionality or repair costs after a seismic event.

As a structure responds to earthquake ground motion it experiences displacement and consequently deformation of its individual members. This deformation leads to the formation and opening of cracks in members. Consequently all anchorages intended to transfer earthquake loads should be suitable for use in cracked concrete and their design should be predicted on the assumption that cracks in the concrete will cycle open and closed for the duration of the ground motion.

In the United States the anchor seismic resistance shall be evaluated in accordance with ACI 318 Appendix D. Created in accordance with the ACI 355.2 regulated testing procedures and acceptance criteria ICC-ES AC193 and AC308, pre-qualification reports provide sound data in a proper design format.

With the release of the ETAG 001 Annex E in the first half of 2013, the seismic pre-qualification of anchors became regulated in Europe. Anchors submitted to these new test procedures will now also incorporate in the ETA (European Technical Approval) all the required technical data for seismic design. Until the release of the EN 1992-4, planned for 2015, EOTA TR045 (Technical Report) will set the standard for the seismic design of steel to concrete connections.

Therefore, the design framework for the seismic design of anchors is already available through both the U.S. and European regulations.

After a strong or design earthquake occasion, the ultimate loading capacity of an anchor is considerably reduced (30 to 80% of the original resistance). Proper inspection shall then be carried to ensure the level of performance not only for a future earthquake but also for the static load combinations.

Fatigue

If an anchor is subjected to a sustained load that changes with respect to time, it can fail after a certain number of load cycles even though the upper limit of the load withstood up to this time is clearly lower than the ultimate tensile strength under static loading. This loss of strength is referred to as material fatigue. When evaluating actions causing fatigue also the planned or anticipated fastening life expectancy is of major importance.

The grade and quality of steel has a considerable influence on the alternating strength. In the case of structural and heat-treatable steels, the final strength (i.e. after 2 million load cycles or more) is approx. 25-35% of the static strength.

In the non-loaded state, concrete already has micro-cracks in the zone of contact of the aggregates and the cement paste, which are attributable to the aggregates hindering shrinkage of the cement paste. The fatigue strength of concrete is directly dependent on the grade of concrete. Concrete strength is reduced to about 55 - 65% of the initial strength after 2'000'000 load cycles.

Two main groups of fatigue type loading can be identified:

- Vibration type loading of fasteners with very high recurrence and usually low amplitude (e.g. ventilators, production machinery, etc.).
- Repeated loading and unloading of structures with high loads and frequent recurrence (cranes, elevators, robots, etc.).

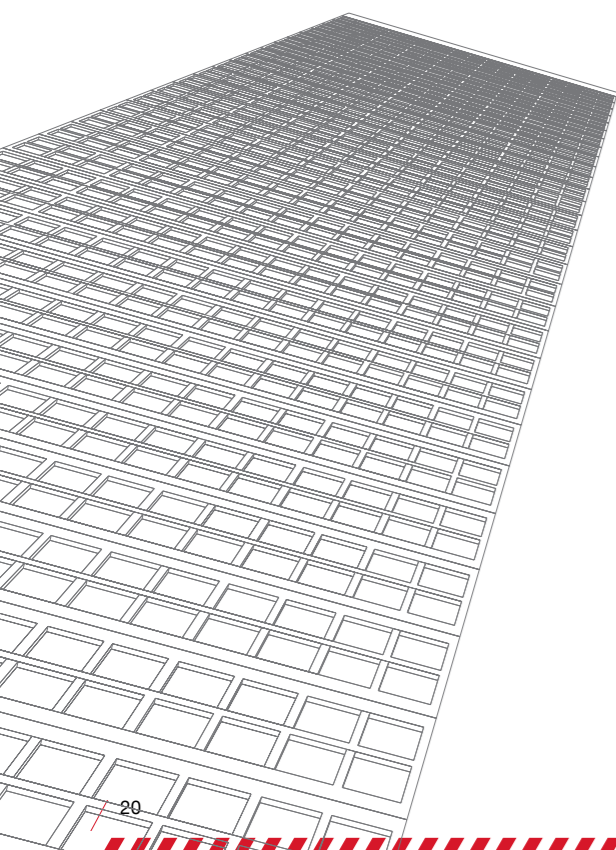
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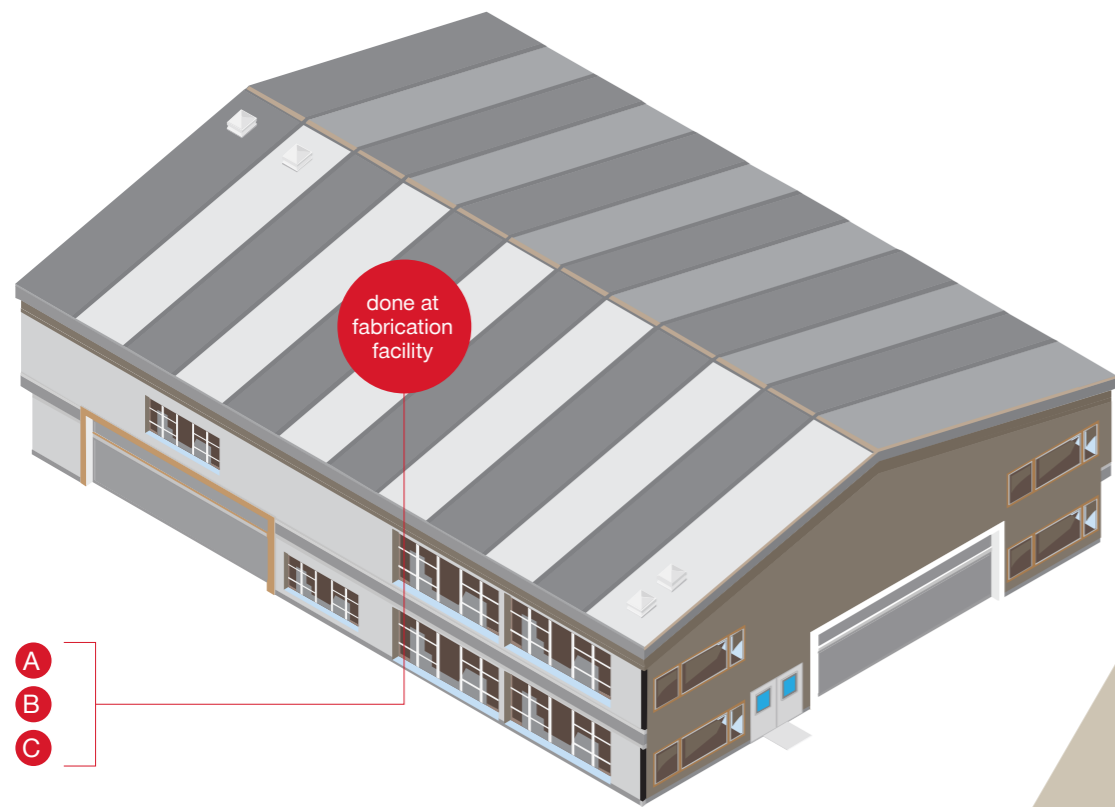
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Fabrication

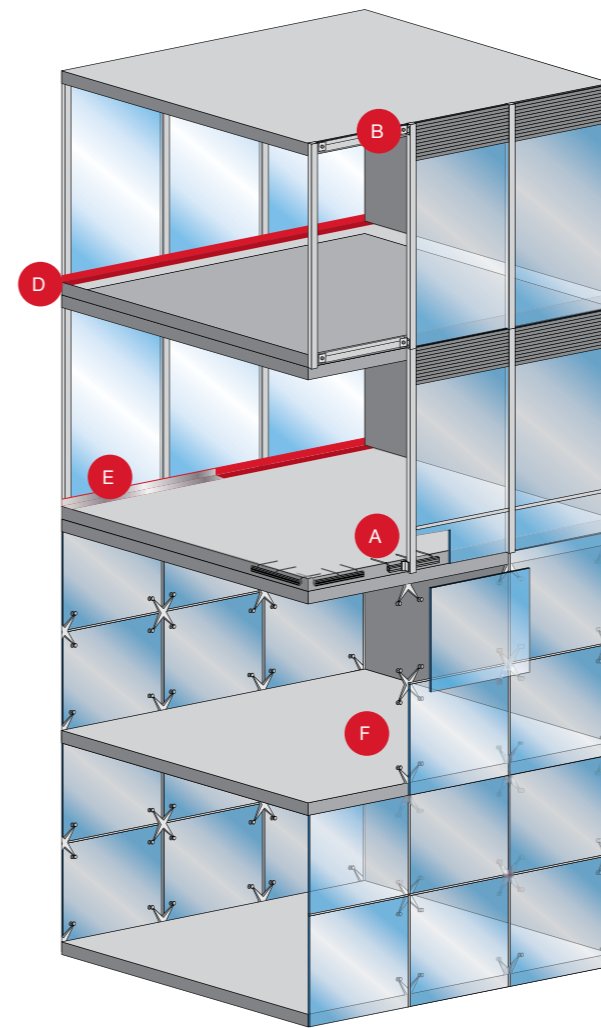
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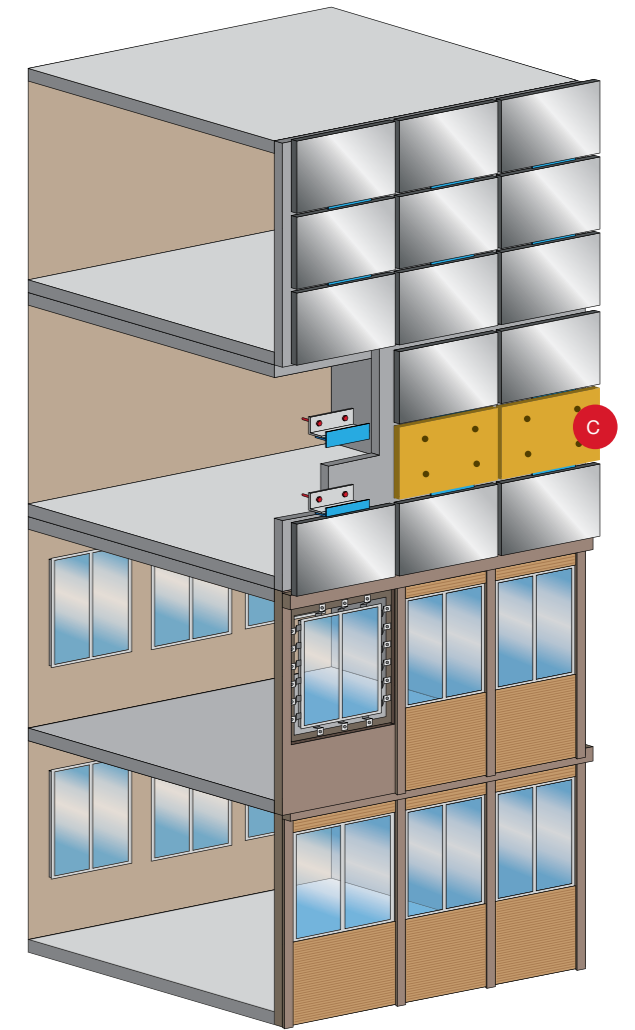
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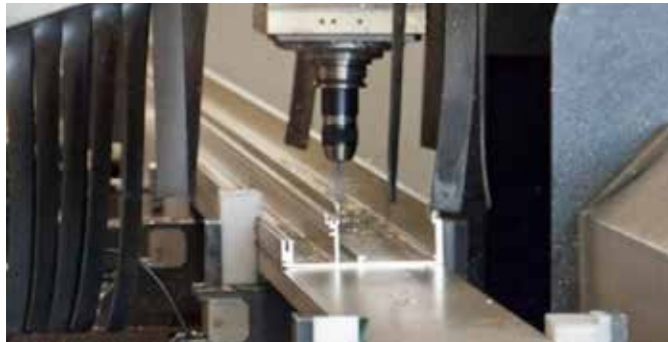






3 APPLICATION OVERVIEW
A. CURTAIN WALL
a. Fabrication
i. Drilling in metal

Curtain Wall elements such as mullions, transoms or unitized panels are prepared for installation in a controlled manufacturing environment. It requires high precision and tolerance to achieve fast assembly process on site. All components built in a factory will require engineered drawing and layouts for building code approval. Curtain Wall manufacturers will provide engineered designs, along with components and jobsite delivery.

Hilti offers ideal solution for drilling, cutting and panels assembly solutions.



Characteristics	HSS
Base material	HSS:
	
	medium alloyed steel, carbon steel, aluminum, plastics, wood
	HSS co:
	
	stainless steel, high-tensile steel, high-temperature alloys, heat-treated materials
Material coating	HSS: M2 steel HSS co: M35 steel
Diameters	HSS: 1 - 18.0 mm HSS co: 1.0 - 18.0 mm
Necessary accessory	UD 30

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to watch video




3 APPLICATION OVERVIEW
A. CURTAIN WALL
a. Fabrication
ii. Cutting/ Grinding metal frame panels

Framing components of the Curtain Wall such as transoms or mullions require precise cutting edges and often have to be modified or finished in the workshop conditions or even on site.

Hilti offers a range of solutions for cutting and grinding



Characteristics	AG 125-A22/ A36
	
Product description	Cordless angle grinder
Technology	Battery Li-Ion 22V
Discs Diameter	125 mm
Cutting discs	AC-D SP
Grinding discs	AG-D, AF-D (flap disc)
Necessary accessory	Battery charger C 4/36 Li-Ion 230V Battery pack B 22/2.6 Li-Ion Battery pack B 22/5.2 Li-ion

3 APPLICATION OVERVIEW

A. CURTAIN WALL

a. Fabrication

iii. Screwing and fixing frame panels

Framing components of the Curtain Wall unitized system must be assembled into unit frame. Commonly used tools are pneumatic or cordless drill drives.



Characteristics

SFC-22A



Product description	Compact cordless drill driver
Technology	Battery Li-Ion 22V
Number of gears	2
Necessary accessory	S-BS (S) standard bit set Battery charger C 4/36 Li-Ion 230V Battery pack B 22/2.6 Li-Ion

3 APPLICATION OVERVIEW

A. CURTAIN WALL

b. On site

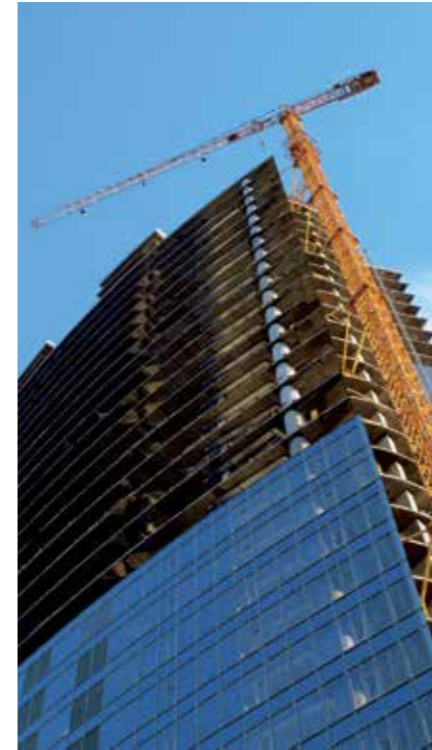
i. Fixing brackets for unitized systems

The shapes, styles and materials used in the construction of facades are becoming increasingly unconventional. Accordingly, the fastenings used to secure each section are frequently located in the heavily-reinforced edge zone of the supporting concrete structure. The demands placed on these fastenings in terms of their usability, loadbearing capacity and life expectancy are thus rising all the time.

Hilti offer a first-class product portfolio for the installation of curtain wall facades:

1. **Cast-in anchor channels** - the preferred solution for securing curtain wall facades
2. **Mechanical anchors** - optimized portfolio provides versatile, well-proven solutions for fastening all types of facades
3. **Chemical fast curing anchors** - safe and no hole cleaning solution with the HIT-Z anchor rod

All solutions are supported by state of the art Hilti PROFIS software - a complete family of compressive tools that help designers and specifiers get more done more efficiently.



1 Cast-in anchor channels

Since 2017 Hilti exclusively offers all three relevant production standards for Anchor Channel Profiles - TCRS (Temperature Controlled Roll Shaping), hot-rolled and cold-formed. Now you have the choice between three different Anchor Systems - depending on your applications.

All channels are ETA certified. Hilti also provides dedicated and tested solutions for e.g. corner, thin slab cases. Additionally, V-shape channels are approved for seismic, static and dynamic loads, as well as loads occurring in the event of fire.

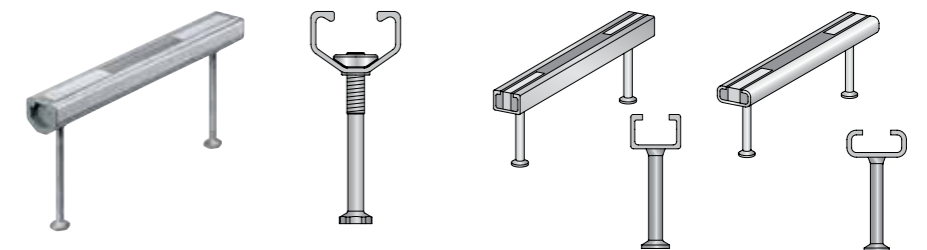


Characteristics

HAC

HAC-C

COMING 2018



Product description	Anchor channel V-shape	Anchor channel C-shape
Technology	Temperature Controlled Roll Shaping (TCRS)	Cold-formed Hot-rolled
Material	Hot-dip galvanized	Hot-dip galvanized Stainless steel A4
Necessary accessory	Torque controlled wrench for correct T-bolt fixation	
Other information	PROFIS Anchor Channel	

3 APPLICATION OVERVIEW

A. CURTAIN WALL

b. On site

i. Fixing brackets for unitized systems



2 Mechanical anchors

Complex curtain wall designs often present planners with a major challenge – especially when time is at a premium. Planning and execution of the work thus sometimes run almost parallel. Changes to plans at short notice can make it impossible to use anchor channels on all areas of the structure. For these situations, Hilti offers a range of stud anchors that provides versatile, well-proven solutions for fastening facades – which also includes the Hilti HUS3 undercut anchor.

Characteristics

HUS3



Product description	Ultimate performance screw anchor
Material	Carbon steel Carbon steel with multilayer coating
Base material	Cracked (concrete) Non-cracked (concrete)
Load conditions	Tensile zone Seismic ETA- C1 Fire resistance
Installation conditions	Hammer drilled holes
Other information	ETA CE conformity PROFIS Anchor design DIBt approval Reusability / Adjustability

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to watch video

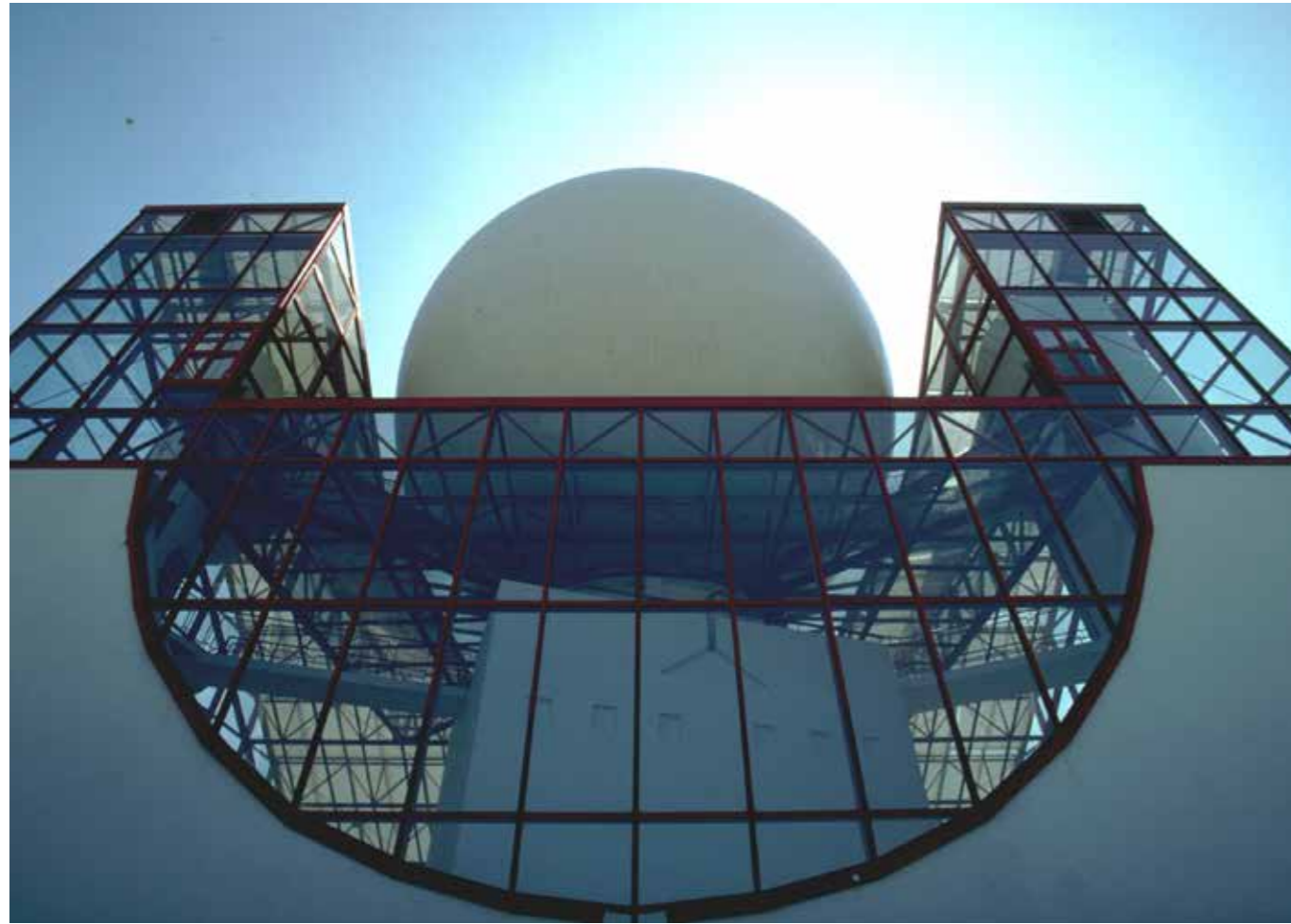


HUS3 SCREW ANCHOR - SETTING INSTRUCTIONS

Installation equipment

Anchor size	8	10	14	
Type	HUS3	H, C	H, C, HF	H, HF
Rotary hammer	TE 2 – TE 30	TE 2 – TE 30	TE 2 – TE 30	
Drill bit for concrete, solid clay brick and solid sand-lime brick	CX 8	CX 10	CX 14	
Drill bit for aerated concrete	CX 6	CX 8	-	
Socket wrench insert	S-NSD 13 1/2	S-NSD 15 1/2	S-NSD 21 1/2	
Torx	S-SY TX45	S-SY TX50	-	
Tube for temporary application (only for H type)	HRG 8	HRG 10	HRG 14	
Setting tool for concrete C12/15 to C50/60	SIW 22T-A			
Setting tool for solid brick and aerated concrete	SFH 22A			
Setting tool for hollow core slab	SIW 22 A			





HST3 STUD ANCHOR - SETTING INSTRUCTIONS

Installation equipment

Anchor size	M8	M10	M12	M16	M20	M24
Rotary hammer	TE2(-A) – TE30(-A)			TE40 – TE70		
Diamond coring tool	DD-30W, DD-EC1					
Setting tool	Setting tool HS-SC				-	
Hollow drill bit	-		TE-CD, TE-YD			
Other tools	hammer, torque wrench, blow out pump					

Setting instruction for M8

	HST3	HST3-R	HST3/-R BW	fix, 1	fix, 2
M8x75 -/10	✓	✓	✓	-	10
M8x95 -/30	✓	✓	-	-	30
M8x115 -/50	✓	✓	-	-	50

Characteristics	HST3/2	HSA	HSV
Product description	Ultimate performance stud anchor	Standard stud anchor ETA approved	Standard stud anchor Material
Material	Carbon steel Stainless steel A4	Carbon steel Carbon steel hot deep galvanized Stainless steel A2 Stainless steel A4	Carbon steel
Base material	Cracked (concrete) Non-cracked (concrete)	Non-cracked (concrete)	Non-cracked (concrete)
Load conditions	Static/ quasi static Seismic ETA- C1/C2 Fire resistance	Fire resistance	
Installation conditions	Hammer drilled holes Diamond drilled holes Hollow drill bit holes	Hammer drilled holes Diamond drilled holes Hollow drill bit holes	Hammer drilled holes
Other information	Hammer ETA CE conformity PROFIS Anchor design FM approved	ETA CE conformity PROFIS Anchor design	

Setting instruction for M10

	HST3	HST3-R	HST3/R BW	l _{fix,1}	l _{fix,2}
M10x70 10/-	✓	✓	-	10	-
M10x80 20/-	✓	✓	-	20	-
M10x90 30/10	✓	✓	-	30	10
M10x100 40/20	✓	✓	✓	40	20
M10x110 50/30	✓	✓	-	50	30
M10x130 70/50	✓	✓	-	70	50
M10x160 100/80	✓	✓	-	100	80
M10x200 140/120	✓	-	-	140	120

Setting instruction for M16

	HST3	HST3-R	HST3/R BW	l _{fix,1}	l _{fix,2}
M16x115 15/-	✓	✓	-	15	-
M16x135 35/15	✓	✓	-	35	15
M16x145 45/25	✓	✓	✓	45	25
M16x170 70/50	✓	✓	-	70	50
M16x220 120/100	✓	✓	-	120	100
M16x260 160/140	✓	✓	-	160	140
M16x300 200/180	✓	✓	-	200	180
M16x360 260/240	✓	-	-	260	240
M16x420 320/300	✓	-	-	320	300
M16x470 370/350	✓	-	-	370	350

Setting instruction for M12

	HST3	HST3-R	HST3/R BW	l _{fix,1}	l _{fix,2}
M12x85 10/-	✓	✓	-	10	-
M12x95 20/-	✓	✓	-	20	-
M12x105 30/10	✓	✓	-	30	10
M12x115 40/20	✓	✓	✓	40	20
M12x125 50/30	✓	✓	-	50	30
M12x145 70/50	✓	✓	-	70	50
M12x165 90/70	✓	✓	-	90	70
M12x185 110/90	✓	✓	-	110	90
M12x215 140/120	✓	✓	-	140	120
M12x235 160/140	✓	-	-	160	140
M12x255 180/160	✓	-	-	180	160
M12x295 220/200	✓	-	-	220	200
M12x345 270/250	✓	-	-	270	250

HSA STUD ANCHOR - SETTING INSTRUCTIONS

Machine tightening of the anchor for standard installation torque

Type	HSA, HSA-BW, HSA-R2, HSA-R																	
	M6			M8			M10			M12			M16			M20		
Anchor Size	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Setting position	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Nominal anchorage depth h _{nom} [mm]	37	47	67	39	49	79	50	60	90	64	79	114	77	92	132	90	115	130
Standard installation torque T _{inst} [Nm]	-			15			25			50			80			-		
Setting tool	-			S-TB HSA M8			S-TB HSA M10			S-TB HSA M12			S-TB HSA M16			-		
Impact screw driver	-			Hilti SIW 14-A Hilti SIW 22-A									Hilti SIW 22T-A			-		
Speed	-			1			1			3			- ¹⁾			-		
Setting time t _{set} [sec.]	-			3			3			4			-			-		

¹⁾ The impact screw driver operates with a fixed speed.



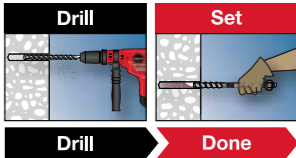


3 APPLICATION OVERVIEW
A. CURTAIN WALL
b. On site
i. Fixing brackets for unitized systems

3 Chemical fast curing anchors

Hilti provides an unique solution for façade brackets installation: HY 200 fast-curing adhesive with no cleaning required HIT-Z rod. This solution works in both cracked and non-cracked concrete.

The Hilt HIT-Z rod works as a torque-controlled bonded anchor. Because of their shape, rods are not affected by uncleaned holes.

Characteristics	HY 200	HIT-Z
		
Product description	Ultimate-performance hybrid mortar for heavy-duty anchoring	Ultimate performance anchor rod for injection
Material	Hybrid urethane methacrylate adhesive	Carbon steel Stainless steel A4 Multilayer coating
Base material	Cracked (concrete) Non-cracked (concrete)	
Load conditions	Tensile zone Fire resistance	
Installation conditions	Hammer drilled holes Diamond drilled holes	
Necessary accessories	HDE 500-A22 Cordless electric dispenser TE 7 Rotary hammer or TE 6-A36 cordless rotary hammer or TE 30-A36 cordless combi hammer TE-CX drill bits	

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3 APPLICATION OVERVIEW

A. CURTAIN WALL

b. On site

ii. Fixing mullions brackets

Bracket fasteners are used to anchor substructures to load-bearing base material. The bracket fasteners must comply with national regulations or approval requirements and must meet the manufacturer's installation specifications. Where applicable, corrosion protection measures must be also implemented and the compatibility of materials considered.

The load-bearing capacity of the bracket fastener must also be verified by carrying out on-the-spot pull-out tests in accordance with equivalent test method.

Depending on the base material, the most common bracket fastening methods are:

1. **Anchor fastening** (mechanical or chemical) on brick, hollow block or concrete
2. **Screw fastening on steel**
3. **Direct fastening on concrete or steel**

1 Anchor fastening (mechanical or chemical) on brick, hollow block or concrete



Base material								Installation method		Special features		Corrosion protection			Approvals					
Uncracked concrete	Cracked concrete	Natural stone	Lightweight concrete	Solid brick	Airbrick	Hollowcore	Plasterboard	Through set installation	Pre-set installation	Small edge distance	Data available in PROFIS Anchor 2	Electroplated	Additional protection against corrosion	Stainless steel	Fire	Shock load	Sprinkler	European technical approval	Dynamic load	CE Marking
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Anchor applications / approvals

Anchor specification (chemical & mechanical)

	HIT-HY 200 HIT Z Rod HIT V Rod HIS N Sleeve Rebar	No borehole cleaning required (when used with HIT Z), suitable for dry and water saturated concrete, suitable for use in diamond drilled holes, fast cure	M8-M20 HIT Z, HIS N M8-M30 HIT V D8-D32 Rebar
	HIT-HY 170 HIT V Rod HAS Rod HAS E Rod HIT SC Sleeve	Specially designed for masonry including clay bricks, sand lime bricks, hollow bricks, concrete blocks and natural stone	M6-M12 HIT V, HAS, HAS E M8-M12 HIT IC, HIT SC
	HIT-HY 270 HIT V/C HAS Rod	Chemical adhesive anchor for applications on masonry and hollow block, available in Profis Design Software	M6-M16 HIT V/C, HAS, HAS E
	HVU HAS Rod HAS E Rod HIS N Sleeve	Very high loading capacity, large diameter applications, suitable for dry and water saturated concrete	M8-M39 HAS, HAS E M8-M20 HIS
	HST 3	Safety wedge for follow up expansion	M8-M24
	HSA	3 different embedment depths, approved for diamond drilled holes	M6-M20
	HSV	High quality stud anchor for non-specified applications.	M8-M16
	HUS3	Reusable anchor available with hexagon and countersink heads. Up to 30% more load in compaction to stud anchors.	8-14 mm
	HRD	Excellent setting behaviour, versatile with regards base material, finishes and head types; hex, countersunk, pan	8, 10, 14 mm
	HPS	Impact and temperature resistant	4-8 mm
	HUD-1	Economical universal plastic anchor for light duty applications on various base materials	5-14mm
	HUD-L	Economical universal plastic anchor for light duty applications on various base materials	5-14mm



3 APPLICATION OVERVIEW
A. CURTAIN WALL
b. On site
ii. Fixing mullions brackets

2 Screw fastening on steel

Before the right screw for fastening brackets can be selected, the properties of the material, e.g. thickness of steel must be known.



Characteristics	Product description	Necessary accessories
Drilling thickness mm		
1.25 – 2.00 mm	S-MD 51 S	
2.00 – 6.00 mm	S-MD 53 S	Screwdriver Hilti ST 1800
4.60 – 12.00 mm	S-MD 55 S	



3 APPLICATION OVERVIEW
A. CURTAIN WALL
b. On site
ii. Fixing mullions brackets

3 Direct fastening on concrete or steel

With the direct fastening technology, a powder-actuated fastening tool is used to drive a nail or threaded studs into concrete or steel.

Provides high fastening rate and easy to use solution for curtain wall fastening. Due to constant exposure to external environment stainless steel nails or threaded studs to be used.

When pre-drilling in concrete for threaded studs fastening, it helps to guide the nail and ensures extremely high loads. Additionally, the hole is drilled to a depth of only 23 mm and no reinforcing bars are hit during the drilling.

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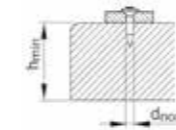


Characteristics	DX 5
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Product description	Powder actuated fastening tool
Technology	Hybrid urethane methacrylate adhesive
Magazine holds	DX 5-F8: single nail
Base material	concrete, steel

Thickness of base material concrete:	Nails: hmin ≥ 80.00 mm Threaded studs: hmin ≥ 100.00 mm
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Steel:	Nails: tl ≥ 6.00 mm Threaded studs: hmin ≥ 4.00 mm
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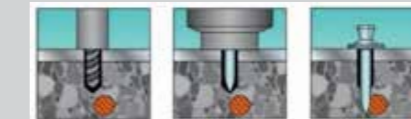


Thickness of fastened material (steel plate/ GI sheet)	Nails: tl ≤ 3.00 mm Threaded studs: tl ≈ up to 13 mm
--	---

Nails	concrete & steel nails: X-CR 14, 16, 21, 29 P8
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Threaded studs	concrete: X-CR M8 (requires pre-drilling) steel: X-CR M8 (no pre-drilling)
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Necessary accessory	Cartridge 6.8/11, drill bit TE-C-5/23B or TE-C-5/23, TE 4-A22
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3 APPLICATION OVERVIEW

A. CURTAIN WALL

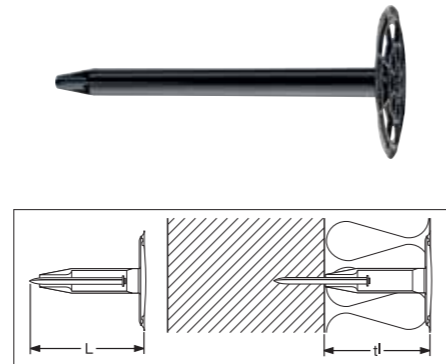
b. On site

iii. Fixing insulation in cladding area

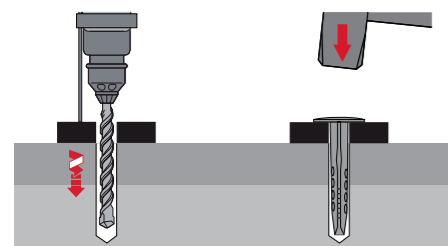
The insulation sheets must be fitted without gaps and reliably, permanently secured (depending on the type of substructure, anchors, adhesive, clamps or mechanical pressure may be used). The wind loads to be expected, also during construction, must be taken into account. Excessive compression of the insulating material at the fastening points should be avoided.

Hilti offers a range of insulation fasteners:

- Insulation fastener with direct fastening (X-IE, X-IE H)
- Insulation fastener (HIF)
- Insulation fastener with expansion pin (IZ)
- Fire-resistant metal insulation fastener (IDMR/IDMS)



Characteristics	X-IE
Base material	Concrete
Insulation thickness	60 – 200 mm
Load capacity	High (Refer Direct Fastening Technology Manual)
Washer diameter	90 mm
Insulation material	Mineral wool, EPS
Necessary accessories	DX 5-EI and cartridge 6.8/11



Characteristics	IDMR/IDMS
Base material	Concrete
Insulation thickness	60 – 240 mm
Load capacity	Medium
Washer diameter	90 mm
Insulation material	Mineral wool, EPS
Necessary accessories	Hammer

3 APPLICATION OVERVIEW

A. CURTAIN WALL

b. On site

iv. Sealing perimeter gap

The structure of a building changes dramatically during a fire. Components become deformed and facades bulge outwards. Conventional or static firestop solutions can compensate for these deformations only to a limited extent. Gaps and cracks open up between floor decks and walls or curtain wall facade sections, allowing flames, smoke and dangerous fumes to spread.

The perimeter barrier shall be intended to restrict the interior vertical passage of flame and hot gases from one floor to another at the location where the floor intersects the inside of an exterior curtain wall.

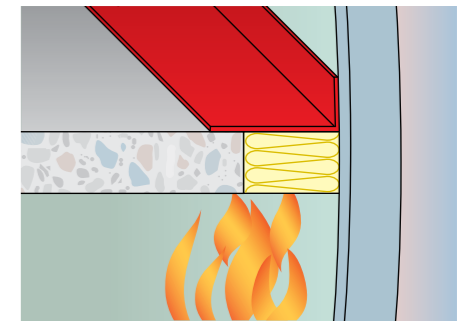
Only tested and listed firestop systems, which provide dynamic movement capabilities shall be used for slot gaps between edge of floor slabs and perimeter curtain walls.

The sealing membrane created by Hilti CFS-SP WB firestop joint spray is extremely elastic and capable of adapting to a gap, provides a reliable, fire-resistant membrane.

Characteristics	CFS-SP WB
Product flexibility	Meets 500 cycles requirements (as per ASTM E 1966 & UL 2079)
Movement capabilities	Up to 50%
Curing time	Approx. 24 hours @ 73°F (24°C), 50% humidity for 1/8" (3mm) depth
Insulation material	Mineral wool
Necessary accessory	Brush or spray machine
Tested in accordance with	ASTM E2307 BS EN 1364-4

Tested and listed firestop systems

- UL
- CW-D-1001, CW-D-1015, CW-D-1018, CW-D-2025, CW-D-2027, CW-D-2046, INTERTEK
- CEJ 127P, CEJ 216P, CEJ 244P, CEJ 245P, CEJ 246P, CEJ 259P, CEJ 260P, CEJ 261P, CEJ 262P, CEJ 263P, CEJ 264P, CEJ 265P, CEJ 307P, CEJ 308P, CEJ 309P, CEJ 310P, CEJ 314P, CEJ 315P, CEJ 316P, CEJ 400P, CEJ 421P, CEJ 425P, CEJ 526P, CEJ 529P, HI_BP 120-05, HI_BP 150-01 HI_BPF 120-11





3 APPLICATION OVERVIEW

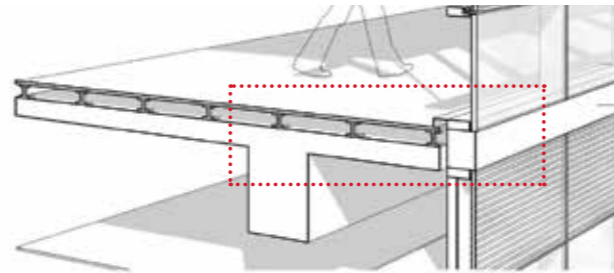
A. CURTAIN WALL

b. On site v. Fixing GI sheet

A metal sheet layer covering perimeter gap (over the sealed perimeter gap). Depending on thickness and type of metal sheet, it may provide an additional aesthetical finishing and soundproofing requirements, besides providing a cover for the rockwool with firestop.

Hilti offers a range of solutions for fixing GI sheet

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Characteristics	BX 3	GX 120	DX 5 / MX 72
Product description	Battery actuated fastening tool	Gas actuated fastening tool	Powder actuated fastening tool Technology
Technology	Battery actuated	Gas actuated	Powder actuated
Magazine holds	20 nails	40 nails	DX 5-F8: single nail DX 5 MX 72: 10 nails
Base material	filled block, concrete, steel	concrete, concrete block, steel	concrete, steel
Thickness of base material concrete:	concrete: hmin = 60.00 mm dnom = 3.00 mm	concrete: hmin = 60.00 mm dnom = 3.00 mm	concrete: hmin ≥ 80.00 mm
steel:	steel: tll ≥ 4.00 mm	steel: tll ≥ 4.00 mm	steel: tll ≥ 6.00 mm
Thickness of fastened material (steel plate/ GI sheet)	tl ≤ 2.00 mm	tl ≤ 2.00 mm	tl ≤ 3.00 mm
Nails	concrete nails: X-C 20/24 B3 MX Universal nail: X-P 20 B3	concrete nails X-GN 20/27 steel nails: X-EGN 14MX, 18MX, 20MX, 24MX	Concrete nails: X-C 20, X-C 27 High strength concrete: X-P 22, X-P 27 Universal nails: X-U 16, X-U 19
Necessary accessory	Battery charger C 4/36 Li-Ion 230V Battery pack B 22/2.6 Li-Ion	Gas can GC 21	concrete: X-CR M8 (requires pre-drilling) steel: X-CR M8 (no pre-drilling)
Necessary accessory			Cartridge 6.8/11, drill bit TE-C-5/23B or TE-C-5/23, TE 4-A22

*More details on Direct Fastening Technology Manual



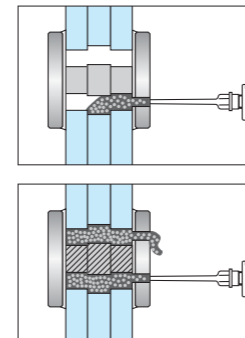
3 APPLICATION OVERVIEW

A. CURTAIN WALL

b. Onsite vi. Point fixing Glass Wall

The incorporation of structural glass in a building presents many challenges due to the transfer of alternating compressive and shear forces between the glass and the steel structure. Allowance must also be made for stresses generated by temperature fluctuations and the heat of the sun. A versatile, reliable high-strength fastening solution capable of meeting these demanding requirements is thus called for.

Hilti HIT-HY 270 injectable adhesive mortar is particularly suitable. In contrast to mechanical fastening solutions, this injectable mortar offers maximum flexibility in use and its high compressive strength combined with excellent ductility allows loads to be taken up reliably without transferring stress peaks to the glass.



Characteristics	HIT-HY 270
Product description	Ultimate performance hybrid mortar for all glass
Necessary accessories	HDE 500-A22 Cordless electric dispenser

Ordering designation	Content per can/cartidge	Package contents	Sales pack quantity
HIT-HY 270 330/2	330 ml	1x Foil pack, 2x Mixer, 1x Mixer extension	1 pc
HIT-HY 270 330/1/P(20)	330 ml	1x Foil pack, 1x Mixer, 1x Mixer extension	20 pc
HIT-HY 270 500	500 ml	1x Foil pack, 2x Mixer, 1x Mixer extension	1 pc

Chemical and mechanical compatibility

- Compatibility with PVB film (polyvinyl butyral film) in laminated glass
- Compatibility with EPDM films (ethylene propylene diene monomer rubber) in the case of seals
- Compatibility with silicone caulking compounds
- Compatibility with stainless steel and aluminum surfaces

3 APPLICATION OVERVIEW

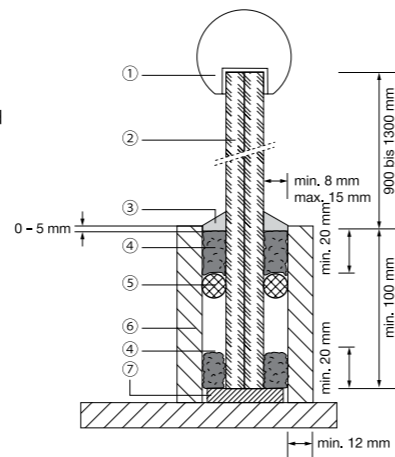
B. GLASS BALUSTRADE

Glass balustrades consist of a main frame of balusters (and top rail) with the glass used to form the infill panels. In such cases the glass is not designed to provide any support to the main frame. The glass in barriers should be designed and installed to resist the design infill loads that are appropriate to building type, and to provide containment.

This means that under impact at appropriate design loads the glass should not break or it should prevent penetration.



- ① Handrail
- ② Pane of laminated safety glass
- ③ Seal
- ④ Hilti HIT-HY 270
- ⑤ Round cord
- ⑥ Steel profile
- ⑦ Glass wedge



Characteristics	HIT-HY 270
Product description	Ultimate performance hybrid mortar for all glass
Necessary accessories	HDE 500-A22 Cordless electric dispenser

Ordering designation	Content per can/cartidge	Package contents	Sales pack quantity
HIT-HY 270 330/2	330 ml	1x Foil pack, 2x Mixer, 1x Mixer extension	1 pc
HIT-HY 270 330/1/P(20)	330 ml	1x Foil pack, 1x Mixer, 1x Mixer extension	20 pc
HIT-HY 270 500	500 ml	1x Foil pack, 2x Mixer, 1x Mixer extension	1 pc

Chemical and mechanical compatibility

- Compatibility with PVB film (polyvinyl butyral film) in laminated glass
- Compatibility with EPDM films (ethylene propylene diene monomer rubber) in the case of seals
- Compatibility with silicone caulking compounds
- Compatibility with stainless steel and aluminum surfaces

3 APPLICATION OVERVIEW

C. SKYLIGHT

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Skylight provides different usage of the natural day light. System usually consists of a steel structure with aluminum cladding or steel structure with spider glazing. Different solutions can be used at the same project.

Glazing transparent or translucent provides an additional UV protection & thermal insulation to the building.

Installation process is the most critical part for any of skylight systems and should be performed in accordance with the instructions and standards of the producer.



Characteristics	DX 5 / DX 450
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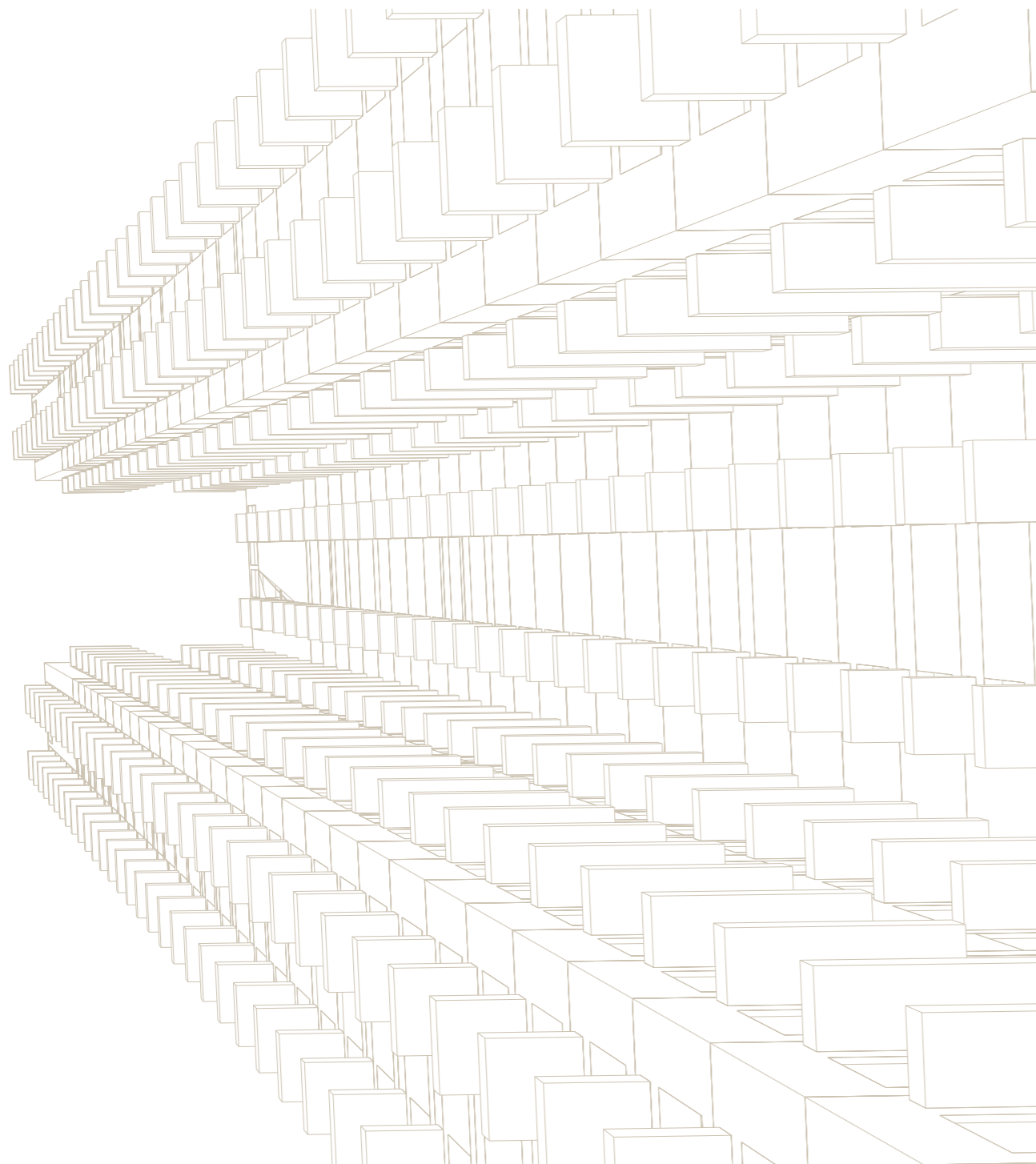
Product description	Powder actuated fastening tool
Technology	Powder actuated
Magazine holds	DX 5-F8: single nail
Base material	concrete, steel
Thickness of base material steel*:	Nails: tl ≥ 6.00 mm Threaded studs: X-CRM: hmin ≥ 4.00 mm X-BT: hmin ≥ 8.00 mm
Thickness of fastened material (steel plate/ GI sheet)	Nails: tl ≤ 3.00 mm Threaded studs: tl ≈ up to 13 mm
Nails*	steel nails: X-CR 14 P8
Threaded studs*	steel: X-CR M8 (no pre-drilling)
Threaded studs*	steel: X-BT M8 (pre-drilling required)
Necessary accessory	Cartridge 6.8/11, TX-TB 4/7 (for predrilling)

CONTENTS AND OVERVIEW OF THIS SECTION


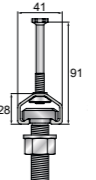
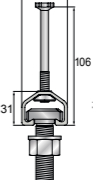
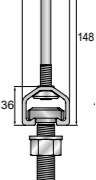
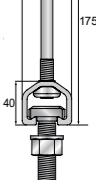
Section Page

4 Load tables

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HAC Anchor Channels with European Technical Assessment (ETA) & ICC-ES Report

Profile	HAC-30 Advanced TCRS	HAC-40 Advanced TCRS	HAC-50 Advanced TCRS	HAC-60 Advanced TCRS	HAC-70 Advanced TCRS	
Anchor	Round anchor					
	serrated profile 					
Material	Hot-dip galvanized	•	•	•	•	
	Stainless steel A4	not available	not available	not available	not available	
T-Bolts ¹⁾	HBC-B	HBC-C				
Thread	M10 - M12	M10 - M16				
Tension design resistance of channel lips ²⁾						
	$N_{Rd,s,l}$ [kN]	11,1	13,9	19,4	27,8	39,4
Shear design resistance of channel lips Y-direction ²⁾						
	$V_{Rd,s,l}$ [kN]	13,2	19,4	26,4	40,1	53,2
Geometry						
Effective anchorage depth min.						
	$h_{ef,min}$ [mm]	68	91	106	148	175
Width of channel						
	b_{ch} [mm]	41	41	42	43	45
Height of channel						
	h_{ch} [mm]	26	28	31	36	40
Min. edge distance						
	c_{min} [mm]	50	50	50	75	75
Min. anchor spacing						
	s_{min} [mm]	50	100	100	100	100
Max. anchor spacing						
	s_{max} [mm]	250	250	250	250	250
End spacing						
	x [mm]	25	25	25	25	25

Further product information available on Hilti.com or your local Hilti website.

¹⁾ Design resistance of the T-Bolt has to be proven additionally.

²⁾ The given resistance values are only steel capacities of channel lips per bolt. For the influence of other boundary conditions like concrete please use our software or contact your Hilti technical team.

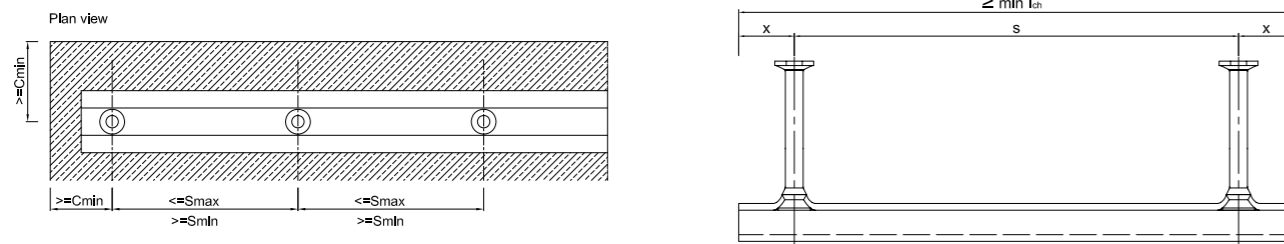
HAC Anchor Channels with European Technical Assessment (ETA)

Profile	HAC-C 28/15 Cold rolled	HAC-C 38/17 Cold rolled	HAC-C 40/25 Cold rolled	HAC-C 49/30 Cold rolled	HAC-C 54/33 Cold rolled	
Anchor	Round anchor					
Material	Hot-dip galvanized	•	•	•	•	
	Stainless steel A4	•	•	•	•	
T-Bolts ¹⁾	28/15	38/17	40/22	50/30	50/30	
Thread	M 10 - M 12	M 10 - M 16	M 12 - M 16	M 12 - M 20	M 12 - M 20	
Tension design resistance of channel lips ²⁾						
	$N_{Rd,s,l}$ [kN]	5,0	10,0	11,1	17,2	30,6
Shear design resistance of channel lips Y-direction ²⁾						
	$V_{Rd,s,l}$ [kN]	5,0	10,0	11,1	17,2	30,6
Geometry						
Effective anchorage depth min.						
	$h_{ef,min}$ [mm]	45	76	79	94	155
Width of channel						
	b_{ch} [mm]	28	38	40	50	53,5
Height of channel						
	h_{ch} [mm]	15	17	25	30	33
Min. edge distance						
	c_{min} [mm]	40	50	50	75	100
Min. anchor spacing						
	s_{min} [mm]	50	100	100	100	100
Max. anchor spacing						
	s_{max} [mm]	200	200	250	250	250
End spacing						
	x [mm]	25	25	25	25	35

Further product information available on Hilti.com or your local Hilti website.

¹⁾ Design resistance of the T-Bolt has to be proven additionally.

²⁾ The given resistance values are only steel capacities of channel lips per bolt. For the influence of other boundary conditions like concrete please use our software or contact your Hilti technical team.



HAC-C Cast-in Channels with European Technical Assessment (ETA)

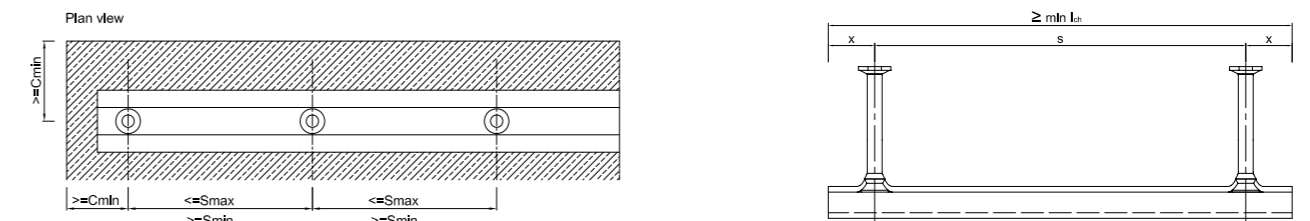
Profile	HAC-C 29/20 ¹⁾ Hot rolled	HAC-C 40/22 Hot rolled	HAC-C 50/30 Hot rolled	HAC-C 52/34 Hot rolled	
Anchor	Round anchor				
	serrated profile 				
Material	Hot-dip galvanized	•	•	•	
	Stainless steel A4	not available	•	•	
T-Bolts ²⁾	29/20	40/22	50/30	50/30	
Thread	M 12	M 12 - M 16	M 12 - M 20	M 12 - M 20	
Tension design resistance of channel lips ³⁾					
	$N_{Rd,s,l}$ [kN]	11,2	19,4	20,0	36,1
Shear design resistance of channel lips Y-direction ³⁾					
	$V_{Rd,s,l}$ [kN]	11,2	14,4	22,4	39,7
Geometry					
Effective anchorage depth min.					
	$h_{ef,min}$ [mm]	78	79	94	155
Width of channel					
	b_{ch} [mm]	29	40	50	52
Height of channel					
	h_{ch} [mm]	20	22	30	34
Min. edge distance					
	c_{min} [mm]	100	50	75	100
Min. anchor spacing					
	s_{min} [mm]	100	100	100	100
Max. anchor spacing					
	s_{max} [mm]	200	250	250	250
End spacing					
	x [mm]	25	25	25	35

¹⁾ No ETA Assessment, covered by China TB code




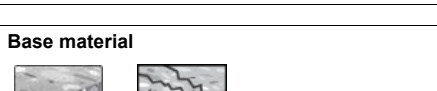
²⁾ Design resistance of the T-Bolt has to be proven additionally.













³⁾ The given resistance values are only steel capacities of channel lips per bolt. For the influence of other boundary conditions like concrete please use our software or contact your Hilti technical team.

⁴⁾ Value for steel to steel contact.



HST3 METAL EXPANSION ANCHOR

Anchor version	Benefits
 <p>HST3 Carbon steel</p>	<ul style="list-style-type: none"> - highest resistance for reduced member thickness, short spacing and edge distances - increased undercut percentage in combination with optimized coating - suitable for non-cracked and cracked concrete C 12/15 to C 80/95 - highly reliable and safe anchor for structural seismic design with ETA C1/C2 approval - flexibility with two embedment depths included in the ETA - minimum edge and spacing distances reduced by up to 25% compared to HST - design tension resistance increased by up to 66% compared to HST - product and length identification mark facilitates quality control and inspection
 <p>HST3-R Stainless steel</p>	
 <p>HST3-BW Carbon steel</p>	
 <p>HST3-R-BW Stainless steel</p>	





Base material	Load conditions
  <p>Concrete (uncracked) Concrete (cracked)</p>	   <p>Static/quasi-static Seismic ETA-C1/C2 Fire ETA</p>
Installation conditions	Other informations
   <p>Hammer drilled holes Diamond drilled holes Hollow drill-bit drilling</p>	    <p>European Technical Approval CE conformity PROFIS Anchor design Software FM approved</p>












Recommended loads

Anchor size	M8	M10		M12		M16		M20	M24	
Eff. Anchorage depth h_{ef} [mm]	47	40	60	50	70	65	85	101	125	
Non-cracked concrete										
Tensile N_{rec}^a										
HST3/HST3-BW	[kN]	5,7	6,1	9,5	8,5	11,9	12,6	18,8	24,4	28,6
HST3-R/HST3-R-BW	[kN]	5,7	6,1	9,5	8,5	11,9	12,6	18,8	24,4	28,6
Shear V_{rec}^a										
HST3/HST3-BW	[kN]	7,9	12,5	13,5	19,4	20,2	31,1	31,6	47,9	44,8
HST3-R/HST3-R-BW	[kN]	9,0	14,6	14,5	17,8	21,0	27,8	36,3	55,5	63,2
Cracked concrete										
Tensile N_{rec}^a										
HST3/HST3-BW	[kN]	3,6	4,3	5,7	6,1	9,5	9,0	13,4	17,4	19,0
HST3-R/HST3-R-BW	[kN]	3,6	4,3	5,7	6,1	9,5	9,0	13,4	17,4	19,0
Shear V_{rec}^a										
HST3/HST3-BW	[kN]	7,9	11,6	13,5	16,8	20,2	30,6	31,6	47,9	44,8
HST3-R/HST3-R-BW	[kN]	9,0	11,6	14,5	16,8	21,0	27,8	36,3	55,5	59,9

a) With overall partial safety factor for action $\gamma = 1,4$. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.

HST2 METAL EXPANSION ANCHOR

Anchor version	Benefits
 <p>HST2 Carbon steel</p>	<ul style="list-style-type: none"> - 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
 <p>HST2-R Stainless steel</p>	
 <p>HST2-BW Carbon steel</p>	
 <p>HST2-R-BW Stainless steel</p>	






Base material	Load conditions
  <p>Concrete (uncracked) Concrete (cracked)</p>	  <p>Static/quasi-static Fire ETA</p>
Installation conditions	Other informations
   <p>Hammer drilled holes Hollow drill-bit drilling Diamond drilled holes</p>	    <p>European Technical Approval CE conformity PROFIS Anchor design Software FM approved</p>

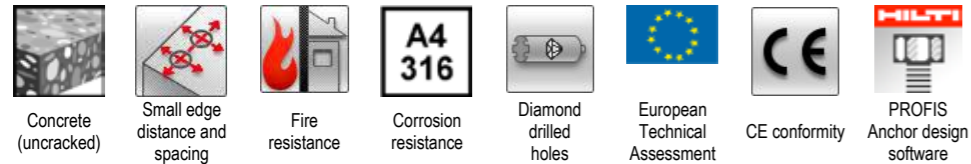
Recommended loads

Anchor size	M8	M10	M12	M16	
Eff. Anchorage depth h_{ef} [mm]	47	60	70	82	
Non-cracked concrete					
Tensile N_{rec}^a					
HST2/HST2-BW	[kN]	4,3	7,6	9,5	16,7
HST2-R/HST2-R-BW	[kN]	4,3	7,6	9,5	16,7
Shear V_{rec}^a					
HST2/HST2-BW	[kN]	6,5	12,3	17,9	31,6
HST2-R/HST2-R-BW	[kN]	9,0	14,5	21,0	35,7
Cracked concrete					
Tensile N_{rec}^a					
HST2/HST2-BW	[kN]	2,4	4,3	5,7	9,5
HST2-R/HST2-R-BW	[kN]	2,4	4,3	5,7	11,9
Shear V_{rec}^a					
HST2/HST2-BW	[kN]	6,5	12,3	17,9	31,6
HST2-R/HST2-R-BW	[kN]	9,0	14,5	21,0	31,8

a) With overall partial safety factor for action $\gamma = 1,4$. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.

HSA STUD ANCHOR

Anchor version	Benefits
 <p>HSA Carbon steel with DIN 125 washer</p>	<ul style="list-style-type: none"> - Fast & convenient setting behaviour - Reliable ETA approved torquing using impact wrench with torque bar for torque control - Small edge and spacing distances - High loads - Three embedment depths for maximal design flexibility - M12, M16 and M20 ETA approved for diamond cored holes using DD 30-W and matching diamond core bit - Suitable for pre- and through fastening - long lengths available suitable for wood structures fastening applications
 <p>HSA-R Stainless steel A4 with DIN 125 washer</p>	
 <p>HSA-R2 Stainless steel A2 with DIN 125 washer</p>	
 <p>HSA-BW Carbon steel with DIN 9021 washer</p>	
 <p>HSA-F Carbon steel hot dipped galvanized with DIN 125 washer</p>	



Recommended loads



Anchor size		M6			M8			M10		
Effective anchorage depth h_{ef} [mm]		30	40	60	30	40	70	40	50	80
Tensile $N_{rec}^{a)}$	HSA, HSA-BW	2,9	3,6	4,3	4,0	6,1	7,6	6,1	8,5	11,9
	HSA-R2, HSA-R	2,9	3,6	4,3	4,0	6,1	7,6	6,1	8,5	11,9
	HSA-F	2,9	3,6	4,3	4,0	6,1	7,6	6,1	8,5	11,9
Shear $V_{rec}^{a)}$	HSA, HSA-BW	3,7	3,7	3,7	4,0	6,1	6,1	10,8	10,8	10,8
	HSA-R2, HSA-R	4,0	4,1	4,1	4,0	7,0	7,0	12,9	12,9	12,9
	HSA-F	3,7	3,7	3,7	4,0	6,1	6,1	10,8	10,8	10,8

Anchor size		M12			M16			M20		
Effective anchorage depth h_{ef} [mm]		50	65	100	65	80	120	75	100	115
Tensile $N_{rec}^{a)}$	HSA, HSA-BW	8,5	12,6	16,7	12,6	17,2	23,8	15,6	24,0	29,7
	HSA-R2, HSA-R	8,5	12,6	16,7	12,6	17,2	23,8	15,6	24,0	29,7
	HSA-F	8,5	12,6	16,7	12,6	17,2	23,8	15,6 ^{b)}	24,0 ^{b)}	29,7 ^{b)}
Shear $V_{rec}^{a)}$	HSA, HSA-BW	16,9	16,9	16,9	29,1	29,1	29,1	31,2	49,0	49,0
	HSA-R2, HSA-R	16,7	16,7	16,7	32,3	32,3	32,3	31,2	52,5	52,5
	HSA-F	16,9	16,9	16,9	29,1	29,1	29,1	31,2 ^{b)}	49,0 ^{b)}	49,0 ^{b)}

a) With overall partial safety factor for action $\gamma = 1,4$. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.

b) Data covered by Hilti Technical Data.

HSV STUD ANCHOR

Anchor version	Benefits
 <p>HSV Carbon steel with DIN 125 washer</p>	<ul style="list-style-type: none"> - torque-controlled mechanical expansion allows immediate load application - setting mark - cold-formed to prevent breaking during installation - raised impact section prevents thread damage during installation - drill bit size is same as anchor size for easy installation.
 <p>HSV-BW Carbon steel with DIN 9021 washer and DIN 127b spring washer</p>	




Concrete

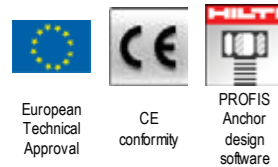
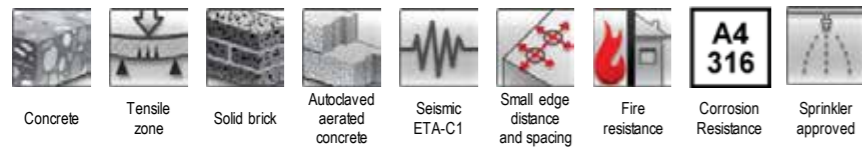
Recommended loads

Anchor size		M8		M10		M12		M16	
Effective anchorage depth $h_{ef} \geq$ [mm]		30	40	40	50	50	65	65	80
Tensile $N_{rec}^{a)}$ [kN]		3,3	4,8	5,7	6,7	6,9	9,5	10,5	14,3
Shear $V_{rec}^{a)}$ [kN]		4,0	4,9	6,1	8,2	8,5	12,9	24,2	24,2

a) With overall partial safety factor for action $\gamma = 1,4$. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.

HUS-CR/HR SCREW ANCHOR

Anchor version	Benefits
 HUS-HR 6 / 8 / 10 / 14 Stainless steel concrete screw with hexagonal head	- High productivity – less drilling and fewer operations than with conventional anchors - ETA approval for cracked and non-cracked concrete - Seismic approval ETA C1 - Small edge and spacing distances
 HUS-CR 10 Stainless steel concrete screw with countersunk head	








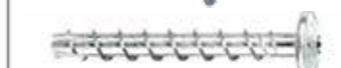

Recommended loads

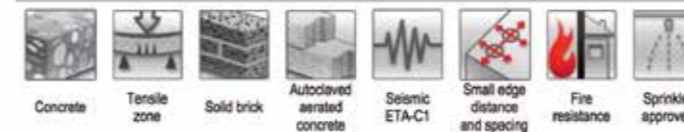
Anchor size	Non-cracked concrete				Cracked concrete				
	6	8	10	14	6	8	10	14	
Type	HUS	HR	HR	HR,CR	HR	HR	HR,CR	HR	
Extra reduced embedment (Hilti Tech Data)									
h_{nom}	[mm]	30	50	60	-	30	50	60	-
Tensile $N_{rec}^{a)}$	[kN]	- ^{b)}	3,6	4,8	-	- ^{b)}	2,0	3,0	-
Shear $V_{rec}^{a)}$	[kN]	- ^{b)}	11,2	15,0	-	- ^{b)}	8,0	10,7	-
Reduced embedment (ETA-08/0307)									
h_{nom}	[mm]	-	60	70	70	-	60	70	70
Tensile $N_{rec}^{a)}$	[kN]	-	4,8	6,3	7,5	-	2,4	3,6	4,8
Shear $V_{rec}^{a)}$	[kN]	-	12,4	15,7	18,0	-	11,0	13,6	12,9
Standard embedment (ETA-08/0307)									
h_{nom}	[mm]	55	80	90	110	55	80	90	110
Tensile $N_{rec}^{a)}$	[kN]	3,1	6,3	9,9	16,0	1,7	4,8	6,3	9,9
Shear $V_{rec}^{a)}$	[kN]	8,1	12,4	15,7	36,7	7,8	12,4	15,7	27,3

a) With overall partial safety factor for action $\gamma = 1,4$, The partial safety factors for action depend on the type of loading and shall be taken from national regulations,

b) Please refer to resistance table in all load directions for multiple use fastenings in section HUS 6 screw anchor for redundant fastening,

HUS3 SCREW ANCHOR

Anchor version	Benefits
 HUS3-H 6 / 8 / 10 / 14 Carbon steel concrete screw with hexagonal head	- High productivity – less drilling and fewer operations than with conventional anchors - ETA approval for cracked and non-cracked concrete - ETA approval for adjustability (unscrew-rescrew) - Seismic approval ETA C1 - High loads - Small edge and spacing distances - abZ (DIBt) approval for reusability in fresh concrete ($f_{a,0.05} = 10/15/20 \text{ Nmm}^2$) for temporary applications - Three embedment depths for maximum design flexibility - HUS3-HF with multilayer coatings for additional corrosion protection - Forged-on washer and hexagon head with no protruding thread - Through fastening
 HUS3-C 6 / 8 / 10 Carbon steel concrete screw with countersunk head	
 HUS3-HF 6 / 8 / 10 / 14 Carbon steel concrete screw with multilayer coating (≥14 μm) and hexagonal head	
 HUS3-A 6 Carbon steel concrete screw with hexagonal head	
 HUS3-I 6 Carbon steel concrete screw with hexagonal head	
 HUS3-P 6 Carbon steel concrete screw with pan head	
 HUS3-PS 6 Carbon steel concrete screw with pan head (small)	




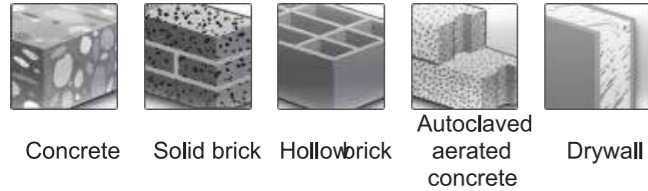
Recommended load

Anchor size	Data according ETA-13/1038, issue 2015-08-27.											
	6		8			10			14			
Type	HUS3	H, C, A, I	P,PS	H, C, HF			H, C, HF			H, HF	H	
Nominal embedment depth	h_{nom} [mm]	55	55	50	60	70	55	75	85	65	85	115
Non-cracked concrete												
Tensile $N_{Ru,m}$	[kN]	3,6	3,0	4,3	5,7	7,6	5,7	9,5	13,2	8,3	13,0	21,2
Shear $V_{Ru,m}$	[kN]	6,0	6,0	6,1	8,1	8,1	6,5	13,3	13,3	16,6	21,4	21,4
Cracked concrete												
Tensile $N_{Ru,m}$	[kN]	2,4	2,4	2,9	4,3	5,7	4,6	7,7	9,4	5,9	9,3	15,1
Shear $V_{Ru,m}$	[kN]	6,0	6,0	4,3	8,1	8,1	4,6	13,3	13,3	11,9	18,5	21,4

a) With overall partial safety factor for action $\gamma = 1,4$. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.

HUD-1 UNIVERSAL ANCHOR

Anchor version	Benefits
 HUD-1	<ul style="list-style-type: none"> - fast setting - flexibility of screw length - an anchor for every base material





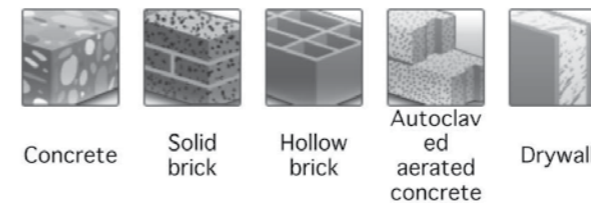
Recommended loads ^{e)}

Anchor size	Screw type ^{d)}	5x25		6x30		8x40		10x50		12x60	14x70
		W	C	W	C	W	C	W	C	W	W
Concrete ≥ C16/20	N _{rec} [kN]	0,3	0,1	0,55	0,35	0,85	0,5	1,4		2	3
	V _{rec} [kN]	0,4		0,9		1,25		2,2		3	5,6
Solid clay brick Mz 20	N _{rec} [kN]	0,17	0,06	0,35	0,15	0,6	0,35	0,8		1	1
	V _{rec} [kN]	0,24		0,3		0,44					
Solid sand-lime brick KS 12	N _{rec} [kN]	0,25	0,15	0,5	0,3	0,85	0,4	1		1,5	1,5
	V _{rec} [kN]	0,25		0,56		0,74		1,32			
Hollow clay brick HlzB 12	N _{rec} [kN]	0,08	0,05	0,1	0,08	0,2	0,12	0,25		0,28	0,32
	V _{rec} [kN]	0,23		0,35							
Hollow clay brick HlzB 12 – 15mm plastered	N _{rec} [kN]	0,08	0,05	0,15	0,1	0,25	0,15	0,3		0,35	0,4
	V _{rec} [kN]	0,23		0,35							
Autoclaved aerated concrete AAC 2	N _{rec} [kN]	0,06	0,04	0,1	0,06	0,15	0,1	0,2		0,25	0,3
	V _{rec} [kN]	0,04		0,05		0,08					
Autoclaved aerated concrete AAC 4	N _{rec} [kN]	0,1	0,06	0,15	0,1	0,3	0,2	0,4		0,5	0,6
	V _{rec} [kN]	0,13		0,18		0,3					
Gypsum board Thickness 12,5mm	N _{rec} [kN]	0,04	0,06	0,05	0,08	0,06	0,1		0,15		
	V _{rec} [kN]	0,09		0,14							
Gypsum board Thickness 2x12,5mm	N _{rec} [kN]	0,06	0,06	0,08	0,08	0,1	0,1	0,15	0,2	0,3	
	V _{rec} [kN]	0,09		0,14							
Fibre reinforced gypsum board Thickness 12,5mm	N _{rec} [kN]	0,09		0,12		0,18					
	V _{rec} [kN]	0,14		0,19		0,29					
Fibre reinforced gypsum board Thickness 2x12,5mm	N _{rec} [kN]	0,09		0,24		0,36		0,42			
	V _{rec} [kN]	0,14		0,38		0,58		0,67			

- a) only with screw diameter 6mm
b) only with screw diameter 8mm
c) only with screw diameter 10mm
d) Screw type: W: Wood-screw C: Chipboard screw
Load data are valid for the mentioned woodscrew type, if other types or different screws are used the load capacity may decrease.
e) With overall global safety factor $\gamma = 5$ to the characteristic loads and a partial safety factor of $\gamma = 1,4$ to the design values.

HUD-L UNIVERSAL ANCHOR

Anchor version	Benefits
 HUD-L 6 HUD-L 8	<ul style="list-style-type: none"> - universal plastic anchor for weak base materials and renovation - for many base materials - daily application - excellent setting behaviour
 HUD-L 10	

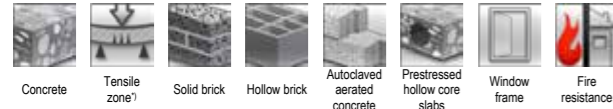


Recommended loads ^{d)}

Anchor size		HUD-L 6x50	HUD-L 8x60	HUD-L 10x70
	Screw type ^{c)}	Woodscrew 4,5x80 DIN 96	Woodscrew 5x90 DIN 96	Woodscrew 8mm DIN 571
Concrete ≥ C16/20	F _{rec} [kN]	0,23	0,28	1,8
Solid clay brick Mz 12	F _{rec} [kN]	0,17	0,2	-
Solid clay brick Mz 20	F _{rec} [kN]	-	-	1,4
Solid sand-lime brick KS 12	F _{rec} [kN]	0,17	0,2	0,4
Hollow clay brick Hlz 12 ^{a)}	F _{rec} [kN]	0,1	0,15	0,3
Hollow sand-lime brick KSL 12	F _{rec} [kN]	0,14	0,16	-
Autoclaved aerated concrete AAC 2 ^{a)}	F _{rec} [kN]	0,05	0,11	0,4
Gypsum board Thickness 2x12,5mm ^{a)}	F _{rec} [kN]	0,06	0,14	0,12 ^{b)}

- a) Drilling without hammering
b) Suitable for fitting hexagonal screws by hand
c) Load data are valid for the mentioned woodscrew type, if other types or different screws are used the load capacity may decrease.
d) With overall global safety factor $\gamma = 5$ to the characteristic loads and a partial safety factor of $\gamma = 1,4$ to the design values.

HRD FRAME ANCHOR



Anchor version	Benefits
HRD-C 8x HRD-CR 8x	Innovative screw design for better hold Suitable on practically all base materials
HRD-C 10x... HRD-CR 10x... HRD-CR2 10x...	Flexible embedment depth (approved at 50mm and 70mm)
HRD-H 10x... HRD-HR 10x... HRD-HR2 10x... HRD-HF 10x...	Suitable for fastening thicknesses up to 260mm
HRD-K 10x... HRD-KR 10x... HRD-KR2 10x...	Available in 4 different materials for optimum suitability in all corrosive environments
HRD-P 10x... HRD-PR 10x... HRD-PR2 10x...	Pre-assembled for optimum handling and fastening quality

Recommended loads ^{a)}

Anchor size	HRD 8		HRD 10	
	h_{nom} =50mm	h_{nom} =50mm	h_{nom} =70mm	h_{nom} =90mm
Concrete C 12/15	N_{rec} [kN]	0,8	1,2	2,4
	V_{rec} [kN]	3,9 / 3,7 ^{b)}	6,1 / 5,8 ^{b)} / 6,1 ^{c)}	-
Concrete C 16/20 –C 50/60	N_{rec} [kN]	1,2	1,8	3,4
	V_{rec} [kN]	3,9 / 3,7 ^{b)}	6,1 / 5,8 ^{b)} / 6,1 ^{c)}	-
Solid clay brick Mz 2,0 DIN V 10500 / EN 771	$f_b \geq 20$ N/mm ² F_{rec} [kN]	0,42	0,85 1,28 ^{d)}	f)
	$f_b \geq 10$ N/mm ² F_{rec} [kN]	0,34	0,57 0,85 ^{d)}	f)
Solid sand-lime brick KS 2,0 DIN V 106 / EN 771	$f_b \geq 20$ N/mm ² F_{rec} [kN]	0,7	0,85 1,28 ^{d)}	f)
	$f_b \geq 10$ N/mm ² F_{rec} [kN]	0,57	0,57 0,85 ^{d)}	f)
Lightweight solid block Vbl 0,9 DIN V 18151100 / EN 773	$f_b \geq 20$ N/mm ² F_{rec} [kN]	-	1,0 1,71 ^{d)}	f)
	$f_b \geq 10$ N/mm ² F_{rec} [kN]	-	0,71 1,28 ^{d)}	f)
	$f_b \geq 6$ N/mm ² F_{rec} [kN]	0,14	-	-
Ital. solid brick Tufo	$f_b \geq n/a$ F_{rec} [kN]	0,4	-	-
Hollow clay brick Hz B 12/1,2 A ^{e)}	brick $f_b \geq 12$ N/mm ² F_{rec} [kN]	0,14	-	-
Vertically perforated clay brick Hz 1,2-2DF F ^{e)}	brick $f_b \geq 8$ N/mm ² F_{rec} [kN]	-	0,42	-
	$f_b \geq 10$ N/mm ² F_{rec} [kN]	-	0,57	-
	$f_b \geq 12$ N/mm ² F_{rec} [kN]	-	0,57	-
Vertically perforated clay brick Hz 1,0-2DF G ^{e)}	brick $f_b \geq 8$ N/mm ² F_{rec} [kN]	-	0,11	0,21
	$f_b \geq 10$ N/mm ² F_{rec} [kN]	-	0,14	0,25
	$f_b \geq 12$ N/mm ² F_{rec} [kN]	-	0,17	0,25
Vertically perforated clay brick VHz 1,6-2DF brick H ^{e)}	$f_b \geq 20$ N/mm ² F_{rec} [kN]	-	0,25	0,42
	brick $f_b \geq 28$ N/mm ² F_{rec} [kN]	-	0,57	0,71
	$f_b \geq 50$ N/mm ² F_{rec} [kN]	-	0,85	1,0
Vertically perforated clay brick Poroton T8 M ^{e)}	brick $f_b \geq 6$ N/mm ² F_{rec} [kN]	-	0,21	0,42
Vertically perforated clay brick Hz 1,0-9DF L ^{e)}	brick $f_b \geq 8$ N/mm ² F_{rec} [kN]	-	0,34	0,42
	$f_b \geq 10$ N/mm ² F_{rec} [kN]	-	0,42	0,42
	$f_b \geq 12$ N/mm ² F_{rec} [kN]	-	0,42	0,57
	$f_b \geq 16$ N/mm ² F_{rec} [kN]	-	0,57	0,85


HRD FRAME ANCHOR (CONTINUED)

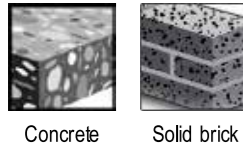
Recommended loads ^{a)}

Anchor size	HRD 8		HRD 10	
	h_{nom} =50mm	h_{nom} =50mm	h_{nom} =70mm	h_{nom} =90mm
Hollow sand-lime brick KSL 12/1,4 brick O ^{e)}	$f_b \geq 12$ N/mm ² F_{rec} [kN]	0,21	-	-
Vertically perforated sand-lime brick KSL 1,6-2DF brick P ^{e)}	$f_b \geq 8$ N/mm ² F_{rec} [kN]	-	0,42	-
	$f_b \geq 10$ N/mm ² F_{rec} [kN]	-	0,42	-
Vertically perforated sand-lime brick KSL 1,4-3DF brick Q ^{e)}	$f_b \geq 12$ N/mm ² F_{rec} [kN]	-	0,57	-
	$f_b \geq 8$ N/mm ² F_{rec} [kN]	-	-	0,57
Vertically perforated sand-lime brick KSL R 1,6-16DF brick R ^{e)}	$f_b \geq 10$ N/mm ² F_{rec} [kN]	-	-	0,71
	$f_b \geq 12$ N/mm ² F_{rec} [kN]	-	-	0,85
Vertically perforated sand-lime brick KSL R 1,6-16DF brick R ^{e)}	$f_b \geq 8$ N/mm ² F_{rec} [kN]	-	0,25	0,34
	$f_b \geq 10$ N/mm ² F_{rec} [kN]	-	0,34	0,42
	$f_b \geq 12$ N/mm ² F_{rec} [kN]	-	0,42	0,57
Lightweight hollow brick Hbl 2/0,8 brick S ^{e)}	$f_b \geq 16$ N/mm ² F_{rec} [kN]	-	0,57	0,71
	$f_b \geq 2$ N/mm ² F_{rec} [kN]	0,09	-	-
Lightweight concrete hollow block Hbl 1,2-12DF brick T ^{e)}	$f_b \geq 2$ N/mm ² F_{rec} [kN]	-	0,14	0,21
	$f_b \geq 6$ N/mm ² F_{rec} [kN]	-	0,34	0,57
Ital. Hollow brick Mattone brick E ^{e)}	$f_b \geq 22$ N/mm ² F_{rec} [kN]	0,43	-	-
Ital. Hollow brick Poroton P700 brick N ^{e)}	$f_b \geq 15$ N/mm ² F_{rec} [kN]	-	-	0,17
Ital. Hollow brick Doppio Uni brick C+I ^{e)}	$f_b \geq 25$ N/mm ² F_{rec} [kN]	0,25 (C)	-	0,42 (I)
Span. Hollow brick Rojo hidrofugano brick D ^{e)}	$f_b \geq 40$ N/mm ² F_{rec} [kN]	0,17	-	-
Span. Hollow brick Ladrillo perforado brick J ^{e)}	$f_b \geq 26$ N/mm ² F_{rec} [kN]	-	0,42	0,57
Span. Hollow brick Clinker mediterraneo brick K ^{e)}	$f_b \geq 75$ N/mm ² F_{rec} [kN]	-	-	0,42
French Hollow brick Brique Creuse brick B ^{e)}	$f_b \geq 6$ N/mm ² F_{rec} [kN]	0,14	-	-
Autoclaved aerated concrete AAC EN 774	AAC 2 F_{rec} [kN]	-	-	0,32
	AAC 4 F_{rec} [kN]	0,15	-	0,71
	AAC 6 F_{rec} [kN]	0,15	-	0,71
	F_{rec} [kN]	-	1,25 ^{d)}	1,6 ^{d)}

- a) With overall partial safety factor for action $\gamma = 1,4$. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.
- b) Values for hot-dip galvanized carbon steel
- c) Values for stainless steel
- d) Valid for edge distance $c \geq 150$ mm, intermediate values can be interpolated
- e) Specification of hollow base material brick types see separate table below
- f) Data can be determined by job-site testing, data for $h_{nom} = 50$ mm can be applied.

HRV FRAME ANCHOR

Anchor version	Benefits
 HRV-H 10x80 HRV-H 10x100 HRV-HF 10x80 HRV-HF 10x100	<ul style="list-style-type: none"> • Available in CS and HDG • Suitable for concrete and solid brick • Integrated plastic and steel washers




Concrete Solid brick

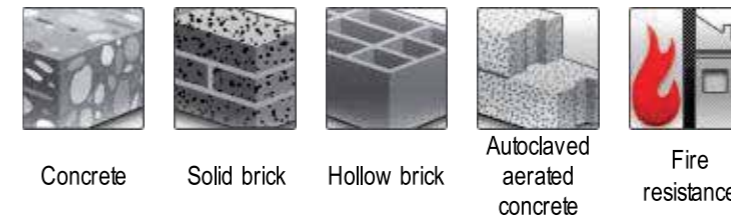
Recommended loads

Anchor size		HRV 10	
		$h_{nom} = 70mm$	
Concrete C16/20 – C50/60		N_{rec} [kN]	2,4
		V_{rec} [kN]	4,8
Solid clay brick Mz 1,8 DIN 105-100 / EN 771-1 LxVxH [mm]: 240x115x113 hmin [mm]: 115	$f_b \geq 10 \text{ N/mm}^2$	F_{rec} [kN]	0,57
	$f_b \geq 20 \text{ N/mm}^2$	F_{rec} [kN]	0,86
Russian solid clay brick Density [kg/dm ³]: 1,9 LxVxH [mm]: 250x120x65 hmin [mm]: 120	$f_b \geq 10 \text{ N/mm}^2$	F_{rec} [kN]	0,57
	$f_b \geq 20 \text{ N/mm}^2$	F_{rec} [kN]	0,86

^{a)} With overall partial safety factor for action $\gamma = 1,4$. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.

HT METAL FRAME ANCHOR

Anchor version	Benefits
	<ul style="list-style-type: none"> - fastening door and window frames - no risk of distortion or forces of constraint - expansion cone can not be lost



Concrete Solid brick Hollow brick Autoclaved aerated concrete Fire resistance

Recommended loads

		HT 8	HT10
Concrete, $f_{cc} = 30 \text{ N/mm}^2$	N_{rec} [kN]	1,4	1,7
	V_{rec} [kN]	0,5	0,5
Aerated Concrete PP2 ^{a)}	N_{rec} [kN]	-	0,1
	V_{rec} [kN]	-	0,15
Solid brick Mz 12	N_{rec} [kN]	0,6	0,8
	V_{rec} [kN]	-	0,5
Sand-lime solid brick, KS 12	N_{rec} [kN]	0,6	0,8
	V_{rec} [kN]	-	0,5
Sand-lime hollow brick, KSL	N_{rec} [kN]	-	0,5
	V_{rec} [kN]	-	0,15

a) Rotary drilling only

HY 200 MORTAR WITH HIT-Z ROD

Injection mortar system		Benefits
	Hilti HIT-HY 200-A 500 ml foil pack (also available as 330 ml foil pack)	<ul style="list-style-type: none"> - SafeSet: drilling and installing the HIT-Z rod without borehole cleaning - unmatched seismic performance with the highest ETA C1 and C2 approvals - maximum load performance in cracked concrete and uncracked concrete - suitable for cracked and non-cracked concrete C 20/25 to C 50/60 - suitable for use with diamond cored holes in non-cracked or cracked concrete with no load reductions - two mortar (Hilti HIT-HY 200-A and Hilti HIT-HY 200-R) versions available with different curing times and same performance
	Hilti HIT-HY 200-R 500 ml foil pack (also available as 330 ml foil pack)	
	Static mixer	
	HIT-Z HIT-Z-R rod	

Concrete	Tensile zone	Seismic ETA-C1/C2	Fire resistance	Corrosion resistance	No cleaning required for approved loads	Hilti SafeSet with hollow drill bit

European Technical Approval	CE conformity	PROFIS Anchor design software

Recommended loads ^{a)}: concrete C 20/25 – $f_{ck,cube} = 25 \text{ N/mm}^2$, element HIT-Z

Anchor size		M10	M12	M16	M20
Non-cracked concrete					
Tensile N_{rec}	HIT-Z [kN]	11,4	18,1	25,9	58,1
Shear V_{rec}	HIT-Z [kN]	6,9	10,9	15,4	41,7
Cracked concrete					
Tensile N_{rec}	HIT-Z [kN]	10,0	14,6	19,8	41,4
Shear V_{rec}	HIT-Z [kN]	6,9	10,9	15,4	41,7

a) With overall partial safety factor for action $\gamma = 1,4$. The partial safety factors for action depend on the type of loading and shall be taken from national regulations.

HIT-HY 270 MORTAR

Technical data HIT-HY 270 with HIT-V, HIT-V-R, HIT-V-HCR rods and HIT-IC sleeves in solid bricks



Base material Solid masonry bricks	Compressive strength f_b [N/mm ²]	Brick type	ETA-131036					HIT-V, HIT-V-R, HIT-V-HCR rod					HIT-IC sleeve						
			M8	M10	M12	M16	M20	M8	M10	M12	M16	M20	M8	M10	M12	M16	M20		
Solid clay brick Mz, 1DF	12,0		Tensile recommended loads	N_{td} [kN]	0,57	1,0 (1,1*)	2,0 (2,3*)	0,57	1,0 (1,1*)	2,0 (2,3*)	0,57	1,0 (1,1*)	2,0 (2,3*)	1,0 (1,1*)	1,3 (1,6*)	1,9 (2,1*)	0,34	0,43	0,57
	20,0			N_{td} [kN]	0,7 (0,86*)	1,3 (1,6*)	2,6 (3,0*)	0,7 (0,86*)	1,3 (1,6*)	2,6 (3,0*)	0,7 (0,86*)	1,3 (1,6*)	2,6 (3,0*)	1,0 (1,1*)	1,3 (1,6*)	1,9 (2,1*)	0,34	0,43	0,57
	40,0			N_{td} [kN]	1,0 (1,1*)	1,9 (2,1*)	3,4 (3,4*)	1,0 (1,1*)	1,9 (2,1*)	3,4 (3,4*)	1,0 (1,1*)	1,9 (2,1*)	3,4 (3,4*)	1,0 (1,1*)	1,9 (2,1*)	3,4 (3,4*)	0,34	0,43	0,57
	12,0			V_{td} [kN]	0,34	0,43	0,57	0,34	0,43	0,57	0,34	0,43	0,57	0,34	0,43	0,57	0,34	0,43	0,57
	20,0			V_{td} [kN]	0,43	0,57	0,71	0,43	0,57	0,71	0,43	0,57	0,71	0,43	0,57	0,71	0,43	0,57	0,71
Solid clay brick Mz, ZDF	12,0		Tensile recommended loads	N_{td} [kN]	0,7 (0,86*)	1,0 (1,14*)	1,7 (2,0*)	0,7 (0,86*)	1,0 (1,14*)	1,7 (2,0*)	0,7 (0,86*)	1,0 (1,14*)	1,7 (2,0*)	1,0 (1,14*)	1,3 (1,6*)	1,9 (2,1*)	0,34	0,43	0,57
	20,0			N_{td} [kN]	1,0 (1,14*)	1,7 (2,0*)	3,0 (3,4*)	1,0 (1,14*)	1,7 (2,0*)	3,0 (3,4*)	1,0 (1,14*)	1,7 (2,0*)	3,0 (3,4*)	1,0 (1,14*)	1,3 (1,6*)	1,9 (2,1*)	0,34	0,43	0,57
	28,0			N_{td} [kN]	1,3 (1,6*)	2,6 (3,0*)	4,3 (4,3*)	1,3 (1,6*)	2,6 (3,0*)	4,3 (4,3*)	1,3 (1,6*)	2,6 (3,0*)	4,3 (4,3*)	1,3 (1,6*)	2,6 (3,0*)	4,3 (4,3*)	0,34	0,43	0,57
	12,0			V_{td} [kN]	0,34	0,43	0,57	0,34	0,43	0,57	0,34	0,43	0,57	0,34	0,43	0,57	0,34	0,43	0,57
	20,0			V_{td} [kN]	0,43	0,57	0,71	0,43	0,57	0,71	0,43	0,57	0,71	0,43	0,57	0,71	0,43	0,57	0,71
Solid calcium silicate brick KS, ZDF	12,0		Tensile recommended loads	N_{td} [kN]	2,00	2,43	3,43	2,00	2,43	3,43	2,00	2,43	3,43	2,00	2,43	3,43	1,14	1,71	2,57
	20,0			N_{td} [kN]	2,50	3,14	4,43	2,50	3,14	4,43	2,50	3,14	4,43	2,50	3,14	4,43	1,14	1,71	2,57
	28,0			N_{td} [kN]	3,00	3,43	4,43	3,00	3,43	4,43	3,00	3,43	4,43	3,00	3,43	4,43	1,14	1,71	2,57
	12,0			V_{td} [kN]	2,8	2,57	2,57	2,8	2,57	2,57	2,8	2,57	2,57	2,8	2,57	2,57	1,14	1,71	2,57
	20,0			V_{td} [kN]	2,57	2,57	2,57	2,57	2,57	2,57	2,57	2,57	2,57	2,57	2,57	2,57	1,14	1,71	2,57
Solid lightweight concrete brick Vbl, ZDF	4,0		Tensile recommended loads	N_{td} [kN]	0,86 (1,0*)	1,43	1,86 (2,0*)	0,86 (1,0*)	1,43	1,86 (2,0*)	0,86 (1,0*)	1,43	1,86 (2,0*)	0,86 (1,0*)	1,43	1,86 (2,0*)	0,57	0,71	0,86
	6,0			N_{td} [kN]	1,1	1,7 (1,86*)	2,3 (2,43*)	1,14	1,7 (1,86*)	2,3 (2,43*)	1,14	1,7 (1,86*)	2,3 (2,43*)	1,14	1,7 (1,86*)	2,3 (2,43*)	0,57	0,71	0,86
	4,0			V_{td} [kN]	0,57	0,71	0,71	0,57	0,71	0,71	0,57	0,71	0,71	0,57	0,71	0,71	0,57	0,71	0,86
	6,0			V_{td} [kN]	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,86
	6,0			N_{td} [kN]	0,86	1,14	1,57	0,86	1,14	1,57	0,86	1,14	1,57	0,86	1,14	1,57	0,86	1,14	1,57
Solid normal weight concrete brick Vbn, ZDF	6,0		Tensile recommended loads	N_{td} [kN]	0,86	1,14	1,57	0,86	1,14	1,57	0,86	1,14	1,57	0,86	1,14	1,57	0,86	1,14	1,57
	16,0			N_{td} [kN]	1,14	1,57	1,57	1,14	1,57	1,57	1,14	1,57	1,57	1,14	1,57	1,57	1,14	1,57	1,57
	6,0			V_{td} [kN]	0,86	1,14	1,57	0,86	1,14	1,57	0,86	1,14	1,57	0,86	1,14	1,57	0,86	1,14	1,57
	16,0			V_{td} [kN]	1,14	1,57	1,57	1,14	1,57	1,57	1,14	1,57	1,57	1,14	1,57	1,57	1,14	1,57	1,57
	16,0			N_{td} [kN]	1,86	1,86	1,86	1,86	1,86	1,86	1,86	1,86	1,86	1,86	1,86	1,86	1,86	1,86	1,86
			Installation parameters																
			Values depends on brick type and size - refer to ETA-131036																
			Edge distance																
			Spacing																
			Maximum diameter of clearance hole in the fixture																
			Thread engagement length																
			Minimum wall thickness																
			Maximum torque moment																
			Breach HIT-RB																

Conditions in category C1 - installation and use in structures subject to dry internal conditions.
 Load values for Manual Cleaning (MC)
 Tension and shear resistance at edge distance $c \geq c_{e1}$ for single anchor applications
 Drilling in solid bricks: numeric mode
 In-device temperature range [a: -40 °C to +40 °C]
 * Compressed Air-Cleaning (CAC)
 For masonry made of other solid, hollow or perforated bricks, the characteristic resistance of the anchor may be determined by job site tests according to ETAG 029, Annex B under consideration of the β factor according to Annex C1.
 Table C1.
 Follow ETA-131036 for installation parameters of threaded rod, HIT-V... with HIT-SC sleeves for setting through the fixture and/or through the non-loadbearing layer in hollow brick and solid brick.

Technical data HIT-HY 270

with HIT-V, HIT-V-R, HIT-V-HCR rods and HIT-IC sleeves in hollow bricks


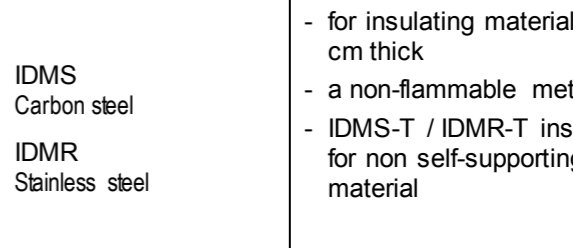


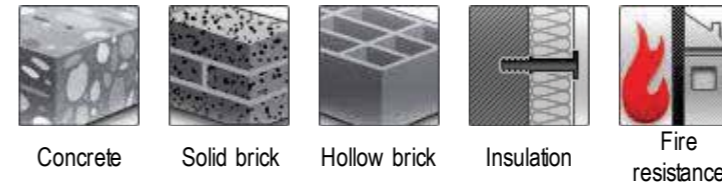
Base material Solid masonry bricks	ETA-13/1036 HIT-V, HIT-V-R, HIT-V-HCR rod with HIT-SC composite sleeve										HIT-IC sleeve with HIT-SC composite sleeve				
	Approval		Anchor element		M8		M10		M12		M16		M16		M12
Brick type	Compressive strength f_b [N/mm ²]	Nominal diameter of drill bit		Effective embedment depth		Tensile recommended loads		Tensile recommended loads		Tensile recommended loads		Tensile recommended loads		Tensile recommended loads	
		d_b [mm]	d_a [mm]	h_{ef} [mm]	$N_{t,Rk}$ [kN]	$V_{s,Rk}$ [kN]	$N_{t,Rk}$ [kN]	$V_{s,Rk}$ [kN]	$N_{t,Rk}$ [kN]	$V_{s,Rk}$ [kN]	$N_{t,Rk}$ [kN]	$V_{s,Rk}$ [kN]	$N_{t,Rk}$ [kN]	$V_{s,Rk}$ [kN]	$N_{t,Rk}$ [kN]
Hollow clay brick Hz, 10DF	12.0	1.57		80	130	1.14	0.57	1.14	0.57	1.14	0.57	1.14	0.57	1.14	0.57
	20.0	2.0		80	130	1.57	0.86	1.57	0.86	1.57	0.86	1.57	0.86	1.57	0.86
	20.0	2.0		80	130	1.57	0.86	1.57	0.86	1.57	0.86	1.57	0.86	1.57	0.86
Hollow calcium silicate brick KSL, 8DF	12.0	1.57		80	130	1.14	0.57	1.14	0.57	1.14	0.57	1.14	0.57	1.14	0.57
	20.0	2.0		80	130	1.57	0.86	1.57	0.86	1.57	0.86	1.57	0.86	1.57	0.86
	20.0	2.0		80	130	1.57	0.86	1.57	0.86	1.57	0.86	1.57	0.86	1.57	0.86
Hollow normal weight concrete brick - parpaing creux	2.0	1.57		80	130	0.43	0.26	0.43	0.26	0.43	0.26	0.43	0.26	0.43	0.26
	6.0	2.0		80	130	0.71	0.43	0.71	0.43	0.71	0.43	0.71	0.43	0.71	0.43
	2.0	1.57		80	130	0.43	0.26	0.43	0.26	0.43	0.26	0.43	0.26	0.43	0.26
Hollow calcium silicate brick KSL, 8DF	4.0	1.57		80	130	0.26	0.15	0.26	0.15	0.26	0.15	0.26	0.15	0.26	0.15
	10.0	2.0		80	130	0.57	0.26	0.57	0.26	0.57	0.26	0.57	0.26	0.57	0.26
	4.0	1.57		80	130	0.26	0.15	0.26	0.15	0.26	0.15	0.26	0.15	0.26	0.15
Hollow clay brick (for ceiling)	10.0	1.57		80	130	0.43	0.26	0.43	0.26	0.43	0.26	0.43	0.26	0.43	0.26
	Type DS-1.0 $p \geq$ [kg/dm ³]	1.57		80	130	0.43	0.26	0.43	0.26	0.43	0.26	0.43	0.26	0.43	0.26

Installation parameters									
Values depends on brick type and size - refer to ETA-13/1036									
Edge distance	Spacing	Maximum diameter of clearance hole in the fixture	Thread engagement length	Drill hole depth	Minimum wall thickness	Maximum torque moment	Brush HIT-IB	Number of strokes HDM	Number of strokes HDE 500-A (volume setting knob)
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[Nm]			
9	12	14	18	14	145	180	145	180	145
95	145	180	180	180	115	195	115	195	115
115	195	230	230	230	3	4	3	4	3
16	16	16	16	16	6	6	6	6	6
4+6	4+6	4+6	4+6	4+6	8	8	8	8	8
5	5	5+5	5+5	5+5	6	6	6	6	6
3+5	3+5	5+5	5+5	5+5	6	6	6	6	6
3+6	3+6	6+6	6+6	6+6	8	8	8	8	8
6+6	6+6	8+8	8+8	8+8	8	8	8	8	8
8+8	8+8	10+10	10+10	10+10	8	8	8	8	8
8	8	8	8	8	8	8	8	8	8
5	5	5	5	5	5	5	5	5	5

Conditions in category 010 - Installation and use in structures subject to dry internal conditions.
 Load values for Manual Cleaning (MC)
 Tension and shear resistance at edge distance $e \geq e_{cr}$ for single anchor applications
 Drilling in hollow bricks: rotary (not hammer) mode
 In-service temperature range T_s : -40 °C to +40 °C
 * Compressed Air Cleaning (CAC)
 For masonry made of other solid, hollow or perforated bricks, the characteristic resistance of the anchor may be determined by job site tests according to ETAG 029, Annex B under consideration of the β factor according to Annex C1, Table C1.

IDMS / IDMR INSULATION FASTENER

Anchor version	Benefits
 IDMS Carbon steel	<ul style="list-style-type: none"> - for insulating material up to 15 cm thick - a non-flammable metal fastener - IDMS-T / IDMR-T insulation plate for non self-supporting insulation material
 IDMR Stainless steel	



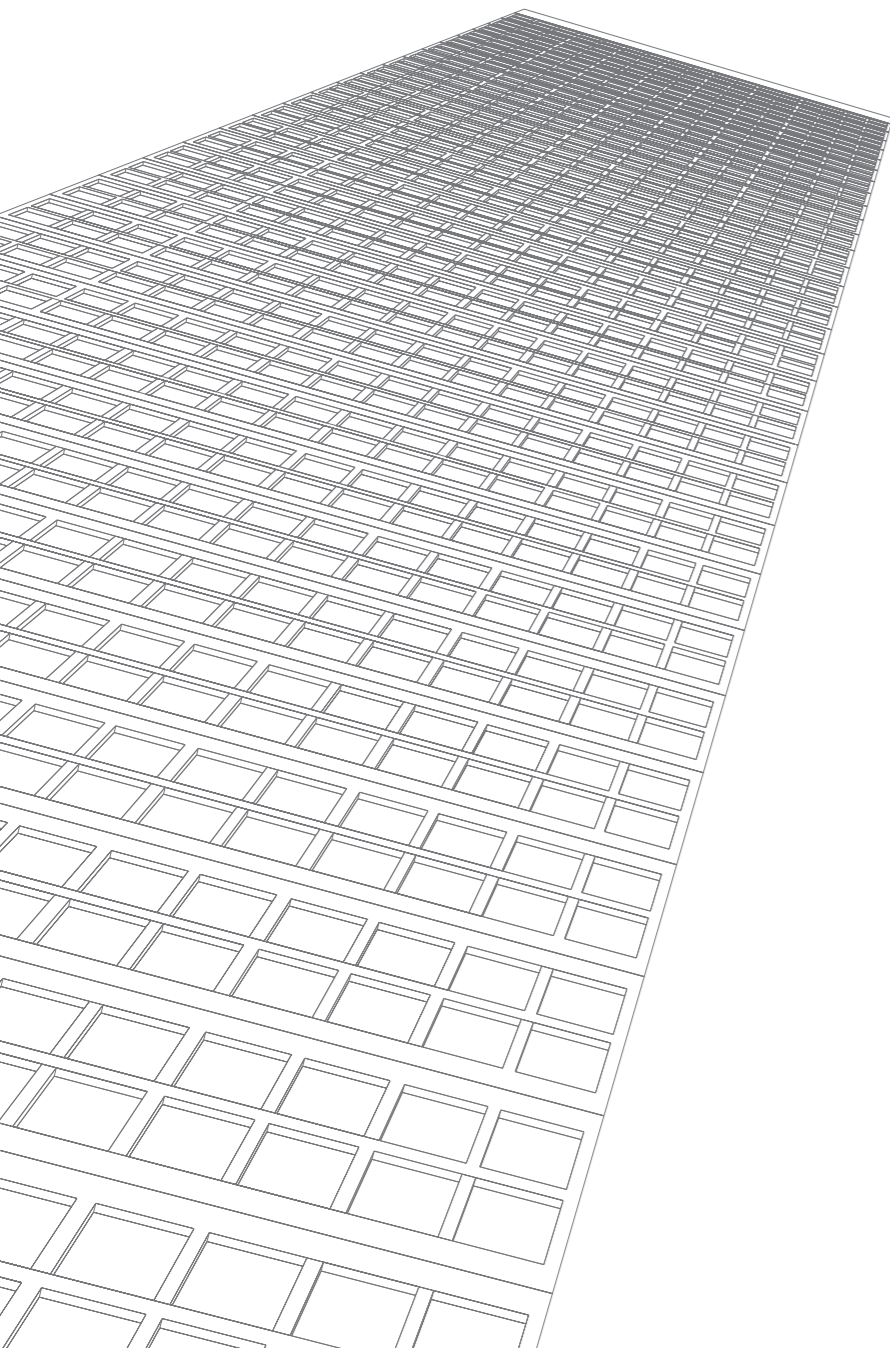
Recommended loads

		IDMS / IDMR
Concrete \geq C16/20	N_{rec} [kN]	0,1
Solid clay brick Mz 20 - 1,8 - NF	N_{rec} [kN]	0,1
Solid sand-lime brick KS 12 - 1,6 - 2DF	N_{rec} [kN]	0,1
Hollow clay brick Hz 12 - 0,8 - 6DF	N_{rec} [kN]	0,04 ^{a)}
Hollow sand-lime brick KSL 12 - 1,4 - 3DF	N_{rec} [kN]	0,04

a) Drilling without hammering

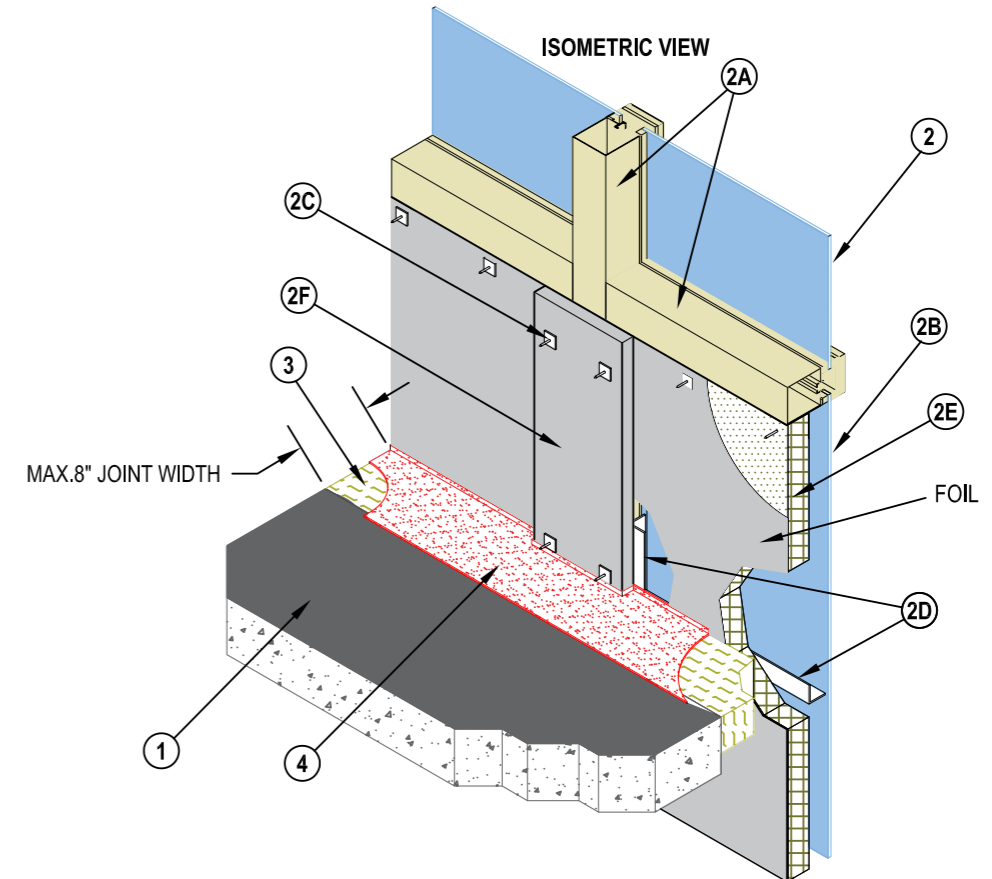
CONTENT AND OVERVIEW OF THIS SECTION

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5 FIRESTOP SYSTEMS & TYPICALS A. TYPICALS

TYPICAL FIRESTOP DETAIL FOR PERIMETER JOINT
F-RATING = 1-HR. OR 2-HR. OR 3-HR.
MOVEMENT CAPABILITIES - 10% - 15% COMPRESSION OR EXTENSION



ITEM NO.	ITEM DESCRIPTION
①	CONCRETE FLOOR ASSEMBLY (1-HR. OR 2-HR. OR 3-HR. FIRE-RATING).
②	CURTAIN WALL ASSEMBLY (NON-FIRE RATED).
②A	ALUMINUM FRAMING : HORIZONTAL TRANSOMS & VERTICAL MULLIONS.
②B	SPANDREL PANEL : GLASS OR ALUMINUM OR STONE PANEL.
②C	STEEL IMPALING PINS.
②D	REINFORCING STEEL ANGLE.
②E	CURTAIN WALL MINERAL WOOL INSULATION *.
②F	VERTICAL MULLION MINERAL WOOL COVER *.
③	COMPRESSED MINERAL WOOL AS BACKING MATERIAL *.
④	HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR CFS-SP SIL SILICONE JOINT SPRAY *

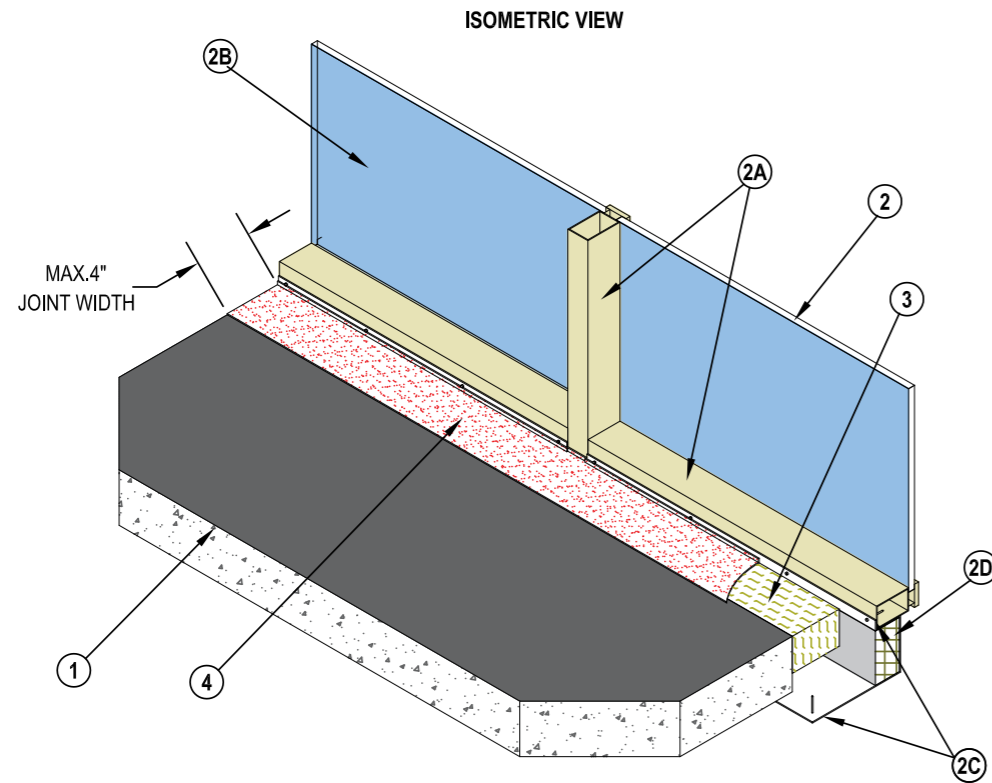
* LISTED WITH UL OR INTERTEK.

Notes:

- The application limitations on this detail are for guidance purpose only. For further details, refer to Hilti Firestop specialist.
- The application including firestop system has been tested as per ASTM-E 2307 Standard.
- All installations shall be carried out in accordance with Hilti's installation instructions, by competent and experienced installers using Hilti branded products.

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TYPICAL FIRESTOP DETAIL FOR PERIMETER JOINT
F-RATING = 2-HR.
MOVEMENT CAPABILITIES - STATIC SYSTEM



ITEM NO.	ITEM DESCRIPTION
①	CONCRETE FLOOR ASSEMBLY (2-HR. FIRE-RATING).
②	CURTAIN WALL ASSEMBLY (NON-FIRE RATED).
②A	ALUMINUM FRAMING : HORIZONTAL TRANSOMS & VERTICAL MULLIONS.
②B	GLASS PANEL.
②C	GALVANIZED SHEET METAL PAN: MIN. 18 GA GALVANIZED STEEL SECTION FIXED TO THE ALUMINUM FRAMING AND TO THE CONCRETE FLOOR.
②D	CURTAIN WALL MINERAL WOOL INSULATION*.
③	COMPRESSED MINERAL WOOL AS BACKING MATERIAL*.
④	HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR CFS-SP SIL SILICONE JOINT SPRAY*

* LISTED WITH UL OR INTERTEK.

Notes:

- The application limitations on this detail are for guidance purpose only. For further details, refer to Hilti Firestop specialist.
- The application including firestop system has been tested as per ASTM-E 2307 Standard.
- All installations shall be carried out in accordance with Hilti's installation instructions, by competent and experienced installers using Hilti branded products.

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FIRESTOP SYSTEMS & TYPICALS

B. SYSTEMS

Overview of selected perimeter fire barrier systems

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CW-D-1015 - Firestop spray overlaps aluminum transom	70
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System No. CW-D-1015

F Rating — 2 Hr

T Rating — 1/2 Hr

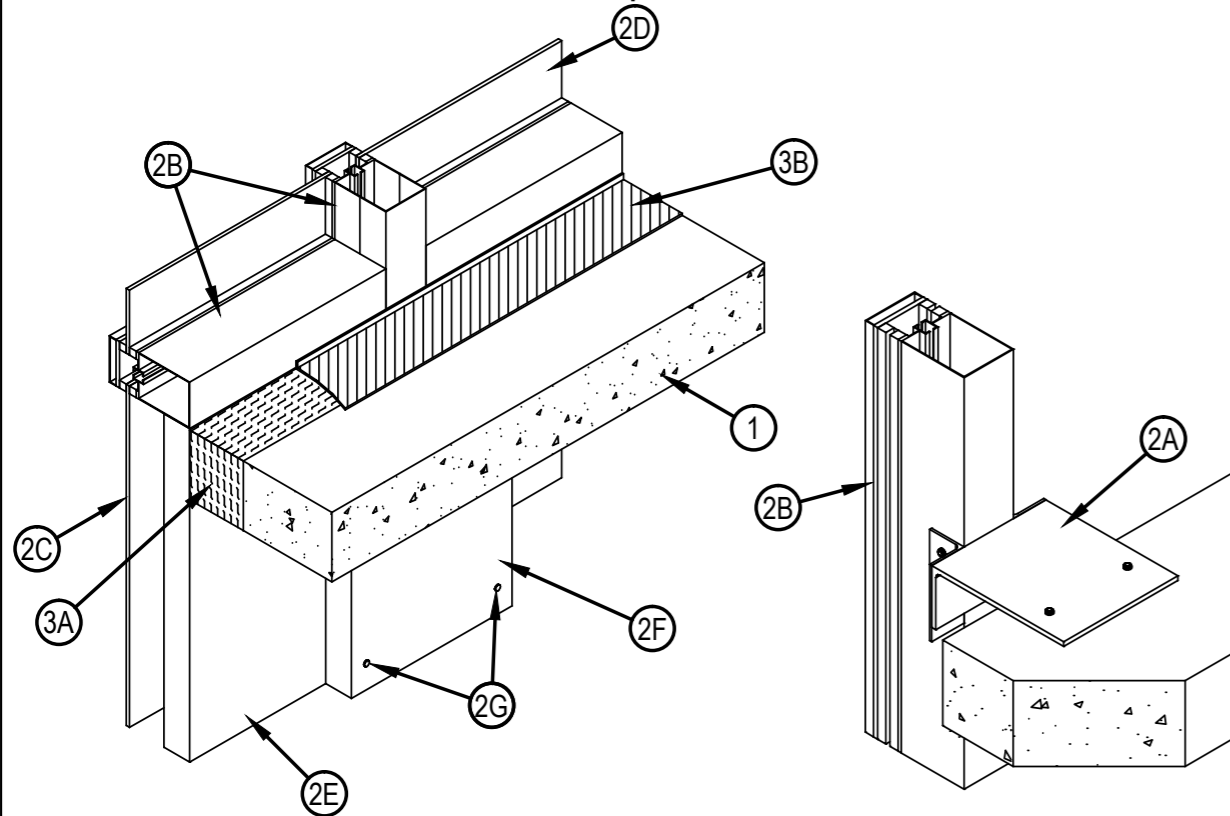
Linear Opening Width — 4 In. Max

L Rating At Ambient — Less Than 1 CFM/sq ft

L Rating At 400 F — Less Than 1 CFM/sq ft

Class II Movement Capabilities — 5% Vertical Shear

CWD 1015



1. Floor Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete.

2. Curtain Wall Assembly — The curtain wall assembly shall incorporate the following construction features:

A. Mullion Mounting Brackets — Min 3 in. (76 mm) by 3 in. (76 mm) by 1/4 in. steel angles attached through the mullion on each side with min 3/8 in. (10 mm) diam steel bolts with steel nuts and washers. The brackets are attached to a min 8 in. (203 mm) by 3-1/4 in. (83 mm) by 1/2 in. (13 mm) thick steel angles with a min 4 in. (51 mm) long with min 1/2 in. (13 mm) diam steel bolts with steel nuts and washers. The 8 in. (203 mm) by 3-1/4 in. (83 mm) angle is secured to the top of floor with two min 1/2 in. (13 mm) diam steel masonry anchors in conjunction with steel washers.

A1. Mullion Mounting Brackets — As an alternate to Item 2A, min 8 in. (203 mm) wide by 3/4 in. (19 mm) thick extruded aluminum Halfen mounting brackets with one nom 2 in. (51 mm) high leg for support and attachment of mullion and with one leg at least 6 in. (152 mm) longer than width of linear opening between floor assembly and mullion. Mounting bracket attached to top of floor with two min 1/2 in. (13 mm) diam steel masonry anchors in conjunction with washer plates supplied with mounting bracket.



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System No. CW-D-1015

CWD 1015

B. Framing — The two-piece rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. (64 mm) wide by 7-1/2 in. (191 mm) deep and shall be formed from min 0.100 in. (2.5 mm) thick aluminum. Mullions spaced max 60 in. (1.52 m) OC and secured to mullion mounting brackets (Item 2A) at each floor level. Interior face of mullions to be max 4 in. (102 mm) from edge of floor assembly. Transoms to be spaced min 24 in. (610 mm) OC. The minimum height from the top of the floor to the bottom of the vision panel sill is 0 in. The maximum height from the top of the floor to the bottom of horizontal transom is 3 in. (76 mm).

C. Spandrel Panels — The spandrel panels shall consist of one of the following types:

- Glass Panels — Nom 1/4 in. (6 mm) thick opaque heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
- Aluminum Panels — Nom 1/8 in. (3 mm) thick aluminum panels with 1/4 in. (6 mm) thick edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
- Stone Panels — Nom 1-3/16 in. (46 mm) thick polished granite spandrel panels with 1 in. (25 mm) thick gauged edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.

D. Vision Panels — Nom 1/4 in. (6 mm) thick transparent heat-strengthened glass or nom 1 in. (25 mm) thick insulated glass units with two layers of nom 1/4 in. (6 mm) thick transparent heat-strengthened glass separated by a 1/2 in. (25 mm) air space. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.

E. Curtain Wall Insulation* — Min. 2 in. (51 mm) thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder. Impasse® Horizontal Hangers are installed in the insulation batt 6 in. (152 mm) from each mullion end and spaced max 16 in. (406 mm) OC across at the window sill transom. One Impasse® Vertical Hanger is installed along both vertical mullion sides of the insulation batt at 6 in. (152 mm) up from the bottom of the insulation batt. Insulation batt is then installed in spandrel area flush with the interior surface of the framing with no vertical or horizontal seams. Impasse® Horizontal Hangers are screw attached to top horizontal transom, Impasse® Vertical Hangers are screw attached to vertical mullions using min No. 10 by min. 1/2 in. (13 mm) self-drilling/self-taping screws. No attachment to the lower horizontal transom is required.

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F. Mullion Covers - Curtain Wall Insulation* — Nom 2 in. (51 mm) thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 24 by 48 in. (610 by 1219 mm) boards. Min. 12 in. (305 mm) wide strips to be centered over mullions secured to curtain wall insulation (Item 2E) with a min. of four Spiral Anchors (Item 2G) spaced a max 12 in. (305 mm) OC. Mullion covers to tightly abut the bottom of the forming material (Item 3A).

THERMAFIBER INC — FIRESpan® 90

G. Light Gauge Framing* - Spiral Anchor — Galv steel wire spiral anchors used to secure the curtain wall insulation (Item 2F and 2G). Nom length of spiral anchors to be 3-3/4 in. (95 mm), spaced max 12 in. (305 mm) OC.

THERMAFIBER INC — Spiral Anchor

3. Safing System — Max separation between edge of floor assembly and face of framing members (at time of installation) is 4 in. (102 mm). The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width. The safing system shall incorporate the following construction features:

A. Forming Material* — Nom 4 pcf (64 kg/m³) density mineral wool batt insulation. Batt sections cut to a 4 in. (102 mm) width and stacked to a thickness which is min 25 percent greater than the width of the linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional piece of forming material to be friction-fit into gap between batt sections above mullion mounting clip at each mullion location.

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B. Fill, Void or Cavity Material* — Min 1/8 in. (3 mm) wet thickness (min 1/16 in. (1.5 mm) dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. (13 mm) onto the top surface of the floor and onto the curtain wall insulation (Item 2E) and mullion covers (Item 2F). When CFS-SP SIL is used, min wet (and dry) thickness of spray is 2 mm.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-SP WB Firestop Joint Spray and CP 672 FC Firestop Joint Spray, CFS-SP SIL Firestop Silicone Joint Spray

*Bearing the UL Classification Mark



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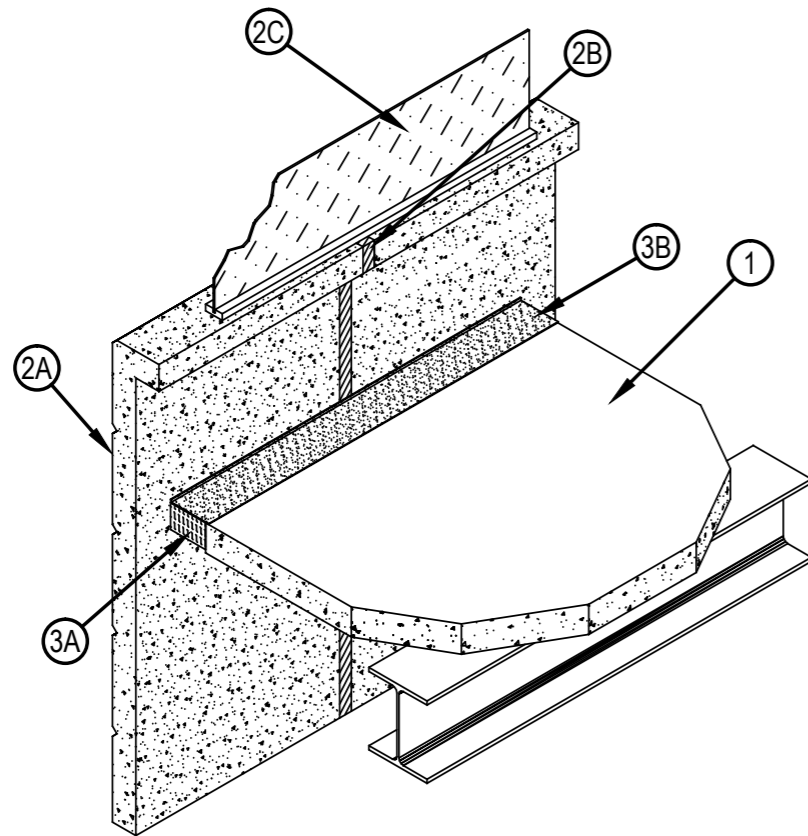
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System No. CW-D-1018
F Rating — 3 Hr
T Rating — 1/4 Hr
Linear Opening Width - 3 In. Max
Class II Movement Capabilities - 5% Vertical Shear (See Item 3)

CWD 1018



1. Floor Assembly — Min 5 in. (127 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete. Floor assembly to be supported at perimeter edges by spandrel beams having a Restrained or Unrestrained Beam Rating of 3 hr.



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System No. CW-D-1018

CWD 1018

2. Curtain Wall Assembly — The curtain wall assembly shall incorporate the following construction features:
 - A. Spandrel Panels — Min 36 in. (914 mm) high by min 4 in. (102 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete spandrel panels. Wall may also consist of min 4 in. (102 mm) thick steel-reinforced lightweight or normal weight concrete tilt-up panels with a min 36 in. (914 mm) vertical separation between window openings. Panels provided with steel dead load anchors welded to steel reinforcing bars embedded in the concrete for attachment to the steel columns and spandrel beams. Panels also provided with steel lateral anchors or braces. The dead load anchors which are located in the linear gap between the concrete floor slab and the spandrel panel or tilt-up panel are to be spaced max 72 in. (1829 mm) OC. The top of the dead load anchor is to be recessed min 1/2 in. (13 mm) from top surface of floor.
 - B. Joint System — (Not Shown) — Vertical joints between spandrel panels or tilt-up panels to be protected using Joint System No. WW-S-0042.
 - C. Framed Window — Metal framed window with nom 1/4 in. (6 mm) thick heat-strengthened glass. Sill of window to be min 6 in. (152 mm) above top of floor.
3. Safing System — Max separation between edge of floor assembly and concrete spandrel or tilt-up panel is 3 in. (76 mm). The safing system is designed to accommodate vertical shear movement of up to 5 percent of its installed width. The safing system shall incorporate the following construction features:
 - A. Forming Material* — Nom 4 pcf (64 kg/m³) density mineral wool batt safing material to be installed between the concrete spandrel or tilt-up panel and the edge of the concrete floor slab. Safing material to be cut to a min 4-3/4 in. (121 mm) width and stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the concrete spandrel or tilt-up panel and the edge of the concrete floor slab. The safing material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between dead load anchors. An additional min 1/2 in. (13 mm) thick piece of mineral wool batt safing material to be installed to cover top surface of each dead load anchor.
THERMAFIBER INC — SAF
 - B. Fill, Void or Cavity Material* — Min 1/8 in. (3.2 mm) wet thickness (1/16 in. or 1.6 mm dry) of fill material spray-applied over top of forming material and lapping min 1 in. (25 mm) onto the top surface of the concrete floor and onto the concrete spandrel panel or tilt-up panel. When CFS-SP SIL is used, min wet (and dry) thickness of spray is 2 mm.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 672 FC Firestop Joint Spray, CFS-SP SIL Firestop Silicone Joint Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark



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System No. CW-D-2046

F Rating — 2 Hr

T Rating — 1/4 Hr

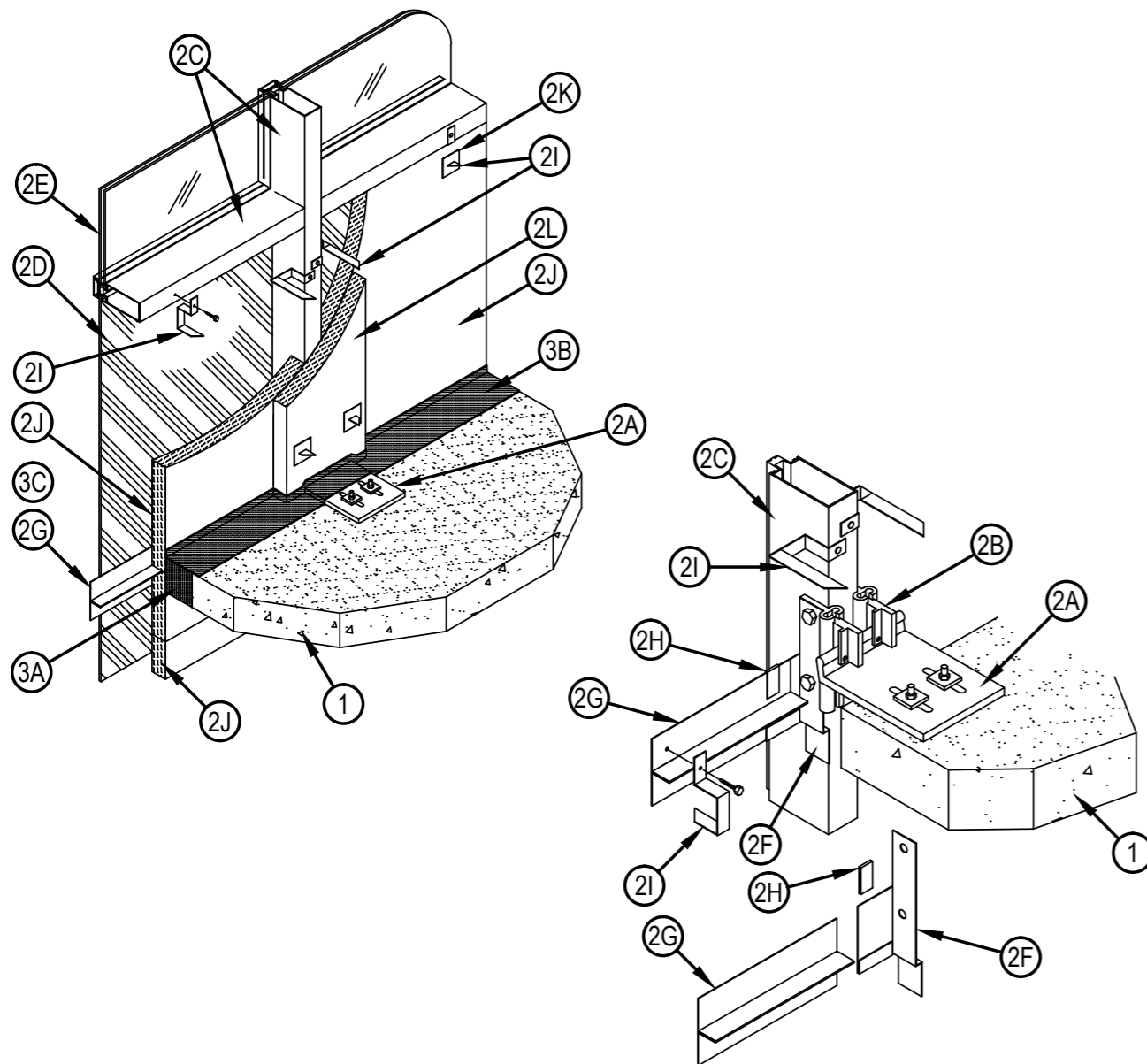
Integrity Rating — 2 Hr

Insulation Rating — 1/4 Hr

Linear Opening Width — 4 In. Max

Class II Movement Capabilities - 5% Vertical Shear (See Item 3)

CWD 2046



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System No. CW-D-2046

CWD 2046

1. Floor Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete.
2. Curtain Wall Assembly — The curtain wall assembly shall incorporate the following construction features:
 - A. Mullion Anchor Plates — Nom 7 in. (178 mm) wide by 9-1/4 in. (235 mm) long by 5/8 in. (16 mm) thick extruded aluminum plates with a nominal 1-3/4 in. (44 mm) high raised lip along one end to engage hooked ends of mullion mounting clips (Item 2B). Plates anchored to top surface of floor at each mullion location with steel wedge anchor bolts in conjunction with extruded aluminum washers.
 - B. Mullion Mounting Clips — Nominal 3 in. (76 mm) wide by 7 in. (178 mm) high extruded aluminum anchor slides with tapped holes and with separate extruded aluminum hooks designed to engage the raised lip of the anchor plate (Item 2A). Anchor slides bolted to each side of mullion at each floor with 1/2 in. (13 mm) diam stainless steel screws with locking washers. Anchor hooks secured to anchor slides with steel jacking screws and secured to raised lip of anchor plate with steel set screw.
 - C. Framing — The one-piece or split rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 6 in. deep and shall be formed from min 0.125 in. (3.2 mm) thick aluminum. Mullions spaced max 60 in. (1524 mm) OC and secured to mullion anchor plates (Item 2A) with mounting clips (Item 2B) at each floor level. Interior face of mullions to be max 4 in. (102 mm) from edge of floor assembly. Transoms to be spaced min 69 in. (1753 mm) OC. The minimum height from the top of the floor to the bottom of the vision panel sill is 33 in. (838 mm).
 - D. Spandrel Panels — The spandrel panels shall consist of one of the following types:
 - a. Glass Panels — Nom 1/4 in. (6 mm) thick opaque heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
 - b. Aluminum Panels — Nom 1/8 in. (3 mm) thick aluminum panels with 1/4 in. (6 mm) thick edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
 - c. Stone Panels — Nom 1-3/16 in. (46 mm) thick polished granite spandrel panels with 1 in. (25 mm) thick gauged edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
 - E. Vision Panels — Nom 1 in. (25 mm) thick insulated glass units with two layers of nom 1/4 in. (6 mm) thick transparent heat-strengthened glass separated by a 1/2 in. (13 mm) air space. Each panel installed on silicone rubber setting blocks and secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
 - F. Light Gauge Framing* - T-Bar Support Brackets — Nom 2 in. (51 mm) wide brackets formed from galv steel and designed to bridge extruded aluminum anchor slides of mullion mounting clips (Item 2B). Each T Bar support bracket provided with nominal 3 in. (76 mm) wide by 3 in. (76 mm) high leg with a nominal 3/4 in. (19 mm) hemmed edge to receive the bottom edge of the T-Bar (Item 2G). T Bar support bracket secured to each side of mullion using the same bolts used to attach the anchor slides of the mullion mounting clips. The hemmed edge of the T Bar support bracket is to be located 3-1/2 in. (89 mm) below the top surface of the floor slab such that, when installed, the stem of the T Bar (Item 2G) will be located 2 in. below the top plane of the floor slab. Angle of T Bar support bracket to be recessed from interior face of framing as necessary to accommodate the thickness of the curtain wall insulation (Item 2J).
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 - G. Light Gauge Framing* - T-Bar — Nom 3 in. (76 mm) wide by 1-1/2 in. (38 mm) high tee section formed from galv steel. T Bar installed between mullions at each floor level to restrain curtain wall insulation (Item 2J) against outward movement when forming material (Item 3A) is installed. The T Bar shall be installed with a clearance of 1/2 to 3/4 in. (13 to 19 mm) at each end. The bottom edge of the T Bar shall rest in and be supported by the hemmed edge of the T Bar support bracket (Item 2F) at each end. The top edge of the T Bar shall be locked in place with a locking clip (Item 2H) at one end and by a min No. 10 by 1/2 in. (13 mm) long self-drilling, self-tapping steel screw at the opposite end. Each T Bar shall be located with its stem at an elevation 2 in. (51 mm) below the top plane of the floor.
THERMAFIBER INC
 - H. Light Gauge Framing* - T-Bar Locking Clip — Nom 1 by 1-1/4 in. (25 to 32 mm) clips formed from galv steel and designed to lock top of T Bar (Item 2G) to T Bar support brackets (Item 2F).
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System No. CW-D-2046

CWD 2046

I. Light Gauge Framing* - Vertical and Horizontal Hangers — Vertical and horizontal hangers formed from 1 in. (25 mm) wide galv steel strips, supplied in two configurations with length as needed to accommodate thickness of curtain wall insulation (Item 2J) and mullion cover (Item 2L). Vertical hangers (with 90 deg twist) screw-attached to interior face of mullions with No. 10 by min 1/2 in. (13 mm) long self-drilling, self-tapping steel screws. Vertical hangers on mullions to be located near each corner of each piece of curtain wall insulation except for the nominal 7 to 9 in. (178 to 229 mm) high piece of curtain wall insulation located immediately beneath the stem of the T Bar. The 7 to 9 in. (178 to 229 mm) high piece of curtain wall insulation immediately beneath the stem of the T Bar requires only one vertical hanger near its' midheight at each end. Horizontal hangers (without twist) screw-attached to T Bar (Item 2G) and to transom at top of spandrel panel (sill of vision panel) with No. 10 by min 1/2 in. (13 mm) long self-drilling, self-tapping steel screws. Horizontal hangers on T Bar to be located within 6 in. (152 mm) of mullion at each end and spaced max 16 in. (406 mm) OC. Horizontal hanger on transom at top of spandrel panel to be located at center of transom. No hangers are to be used on the transom at the bottom of spandrel panel (lintel of vision panel).

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J. Curtain Wall Insulation* — Min 2 in. (51 mm) thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. (914 mm) wide batts. Insulation batts to be installed with no vertical seams. A horizontal seam is to be located 7 to 9 in. (178 to 229 mm) below the stem of the T Bar in each spandrel area and is to be sealed with aluminum foil tape. In the spandrel area beneath the stem of the T Bar, insulation panels tightly-fitted between vertical mullions and between the stem of the T Bar (Item 2G) and the transom, flush with the interior surface of framing. Insulation panels impaled on vertical and horizontal hangers (Item 2I) and secured in place with nom 2 by 2 in. (51 by 51 mm) steel locking washers (Item 2K).

THERMAFIBER INC — Firespan 90

K. Light Gauge Framing* - Locking Washers — Nom 2 by 2 in. (51 by 51 mm) clips formed from galv steel and designed to secure curtain wall insulation and mullion covers on vertical and horizontal hangers (Item 2I).

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L. Mullion Covers - Curtain Wall Insulation* — Nom 2 in. (51 mm) thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 24 by 48 in. (610 by 1219 mm) boards. Nom 12 in. (305 mm) wide strips to be centered over mullions and impaled on the same vertical hangers used to secure the spandrel panel insulation and secured in place with nom 2 by 2 in. (51 by 51 mm) locking washers (Item 2K). Mullion covers to abut the forming material (Item 3A) above and below the floor.

THERMAFIBER INC — Firespan 90

M. Light Gauge Framing* - Spiral Anchor — (Not Shown) - As an alternate to the vertical hangers (Item 2I), galv steel wire spiral anchors may be used to secure the framing covers (Item 2L) to the curtain wall insulation (Item 2J) on each side of the mullion. Nom length of spiral anchors to be equal to thickness of curtain wall insulation plus thickness of framing cover. Spiral anchors driven through mullion covers and into curtain wall insulation and spaced max 12 in. (305 mm) OC.

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3. Safing System — Max separation between the edge of the floor and the face of the framing members (at time of installation) is 4 in. (102 mm). The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width. The safing system shall incorporate the following construction features:

A. Forming Material* — Nom 4 pcf (64 kg/m³) density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. (114 mm) width and stacked to a thickness which is min 25 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab to attain a min 20 percent compression in the thickness direction. The forming material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly. Forming material to extend completely beneath mullion mounting plate (Item 2A). A max of two tightly-butted seams are permitted in the forming material between mullions.

THERMAFIBER INC — Type SAF

B. Fill, Void or Cavity Material* — Min 1/8 in. (3.2 mm) wet thickness (min 1/16 in. or 1.6 mm dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. (13 mm) onto the top surface of the floor and onto the curtain wall insulation, mullion anchor plate (Item 2A) and framing covers. When CFS-SP SIL is used, min wet (and dry) thickness of spray is 2 mm.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 672 FC Firestop Joint Spray, CFS-SP SIL Firestop Silicone Joint Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark



Hilti Firestop Systems

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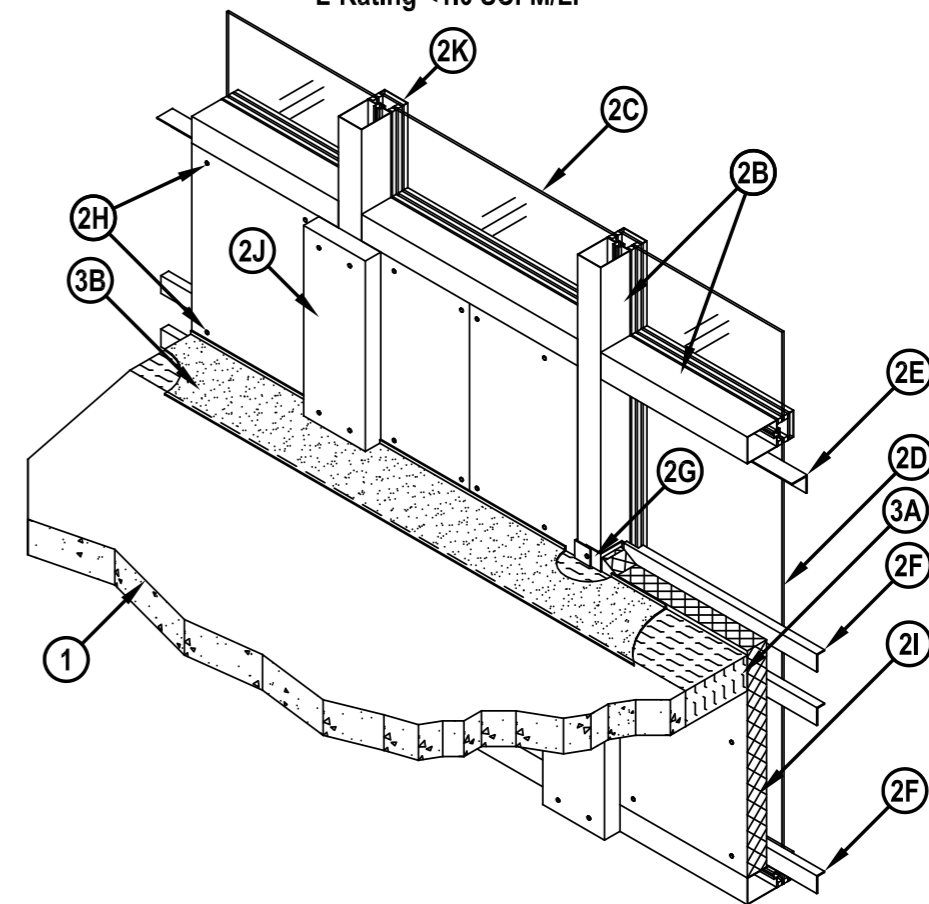
Design No. CEJ 307 P (HI/BP 180-01) PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
ASTM E 2307
Table 1

CEJ 307 P

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	3-HR.	3-HR.
T-RATING	1 3/4-HR.	1 3/4-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	± 11.25 ± 5	± 7.5 ± 5

L-Rating <1.0 SCFM/LF



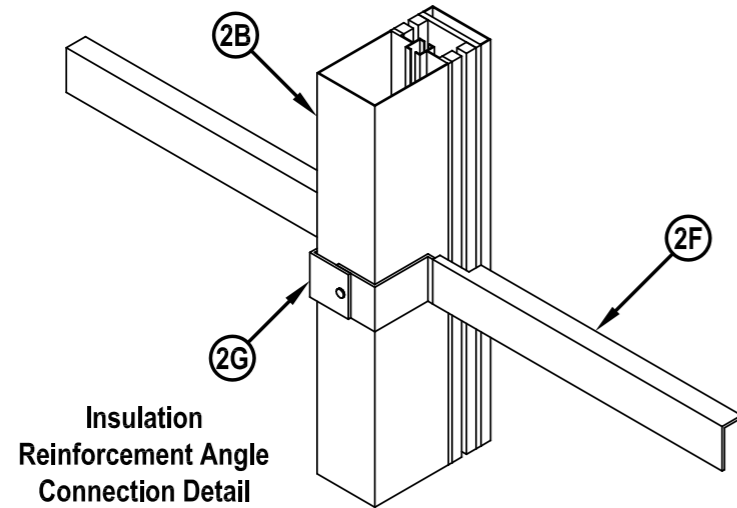
Hilti Firestop Systems

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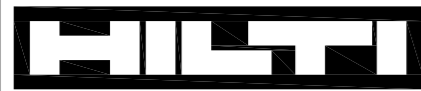
Design No. CEJ 307 P (HI/BP 180-01)

CEJ 307 P



Insulation Reinforcement Angle Connection Detail

1. CONCRETE FLOOR ASSEMBLY: Two-hour rated concrete floor assembly made from either lightweight or normal weight concrete with a density of 100-150 pcf, with a min. thickness of 4-1/2 in. at the joint face. Overall slab thickness may vary to accommodate various blockout depths (longitudinal recesses) formed in the concrete, to house the architectural cover plate. The blockout width may also vary without restriction.
2. CURTAIN WALL ASSEMBLY: The curtain wall assembly shall incorporate the following construction features:
 - A. Mounting Attachment: (Not shown) Attachment of the curtain wall framing to the structural framing shall be according to the curtain wall manufacturer's instructions to allow vertical shear movement only. When required, the mounting attachments to the floor slab shall be connected to the joint face of the floor slab, according to the curtain wall manufacturer's instructions. Max. distance between mounting attachments shall be 10 feet. One optional method is to use min. 8 in. wide by 3/4 in. thick extruded aluminum Halfen mullion mounting brackets with one nom. 2 in. high leg for support and attachment to the mullion and with one leg at least 6 in. longer than nominal joint width. Attach the mounting bracket to the top of the floor with two min. 1/2 in. dia. steel masonry anchors in conjunction with washer plates supplied with the mounting brackets.
 - B. Aluminum Framing: Rectangular aluminum tubing mullions and transoms, sized according to the curtain wall system manufacturer's guidelines. Min. overall dimensions of the extruded framing sections are 0.100 in. thick aluminum with a min. 5-1/4 in. depth and a min. of 2-1/2 in. width. Mullion and Transom covers are added to the external side of the framing, giving the framing system a total depth of min. 6-3/4 in. Mullions are to be spaced a min. 56-1/2 in. on center (oc) and transoms are to be spaced a min. 49 in. oc For the spandrel region, the lower transom must be placed a min. of 21 in. below the concrete floor (as measured from the underside of the floor to the top side of the transom) and the upper transom must be placed a min. of 21-1/2 in. above the floor (as measured from the top surface of the floor to the underside of the transom) while maintaining the min. 46-1/2 in. spandrel panel height. One optional fastening method is to space the mullions as noted herein and secure the mullion mounting anchors (Item 2A) at each floor level in conjunction with extruded aluminum clips bolted to the sides of the mullions and designed to engage the vertical leg of the Halfen mullion mounting bracket in conjunction with an extruded aluminum hook/leveling connector.
 - C. Vision Glass Panels: Glass panels shall be sized and attached to curtain wall framing according to the curtain wall system manufacturer's guidelines. Use a min. 1/4 in. thick, clear heat-strengthened (HS) glass or tempered glass with a max. width and height less than the aluminum framing o.c. spacing, which allows the glass to be secured between the notched shoulder of the aluminum framing and pressure bar. Panels are secured with a thermal break (rubber extrusion), pressure bar (aluminum extrusion), min. 1/4-20 x 5/8 in. long screws, and a snap face (aluminum extrusion).



Hilti Firestop Systems

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Design No. CEJ 307 P (HI/BP 180-01)

CEJ 307 P

- D. Spandrel Panels: Either glass or aluminum spandrel panels may be applied to the spandrel exterior: If Glass Spandrel Panels: Glass panels shall be sized and installed to curtain wall framing according to the curtain wall system manufacturer's guidelines. Use a min. 1/4 in. thick clear, heat-strengthened (HS) glass or tempered glass with a max. width and height less than the aluminum framing o.c. spacing, which allows the glass to be secured between the notched shoulder of the aluminum framing and pressure bar. Panels are secured with a thermal break (rubber extrusion), pressure bar (aluminum extrusion), min. 1/4-20 x 5/8 in. long screws, and a snap face (aluminum extrusion). Aluminum Spandrel Panels: Aluminum panels used in the spandrel shall be sized and attached to curtain wall framing according to the curtain wall system manufacturer's guidelines. Use a min. 1/8 in. sheet aluminum panel.
- E. Insulation Retainer Angle: Secure a minimum 2 in. x 2 in. 20 GA galvanized steel angle to the underside of the top spandrel transom extending the full length of the transom between each vertical framing member. Position so that the curtain wall insulation (2I), when placed flush against the back surface of the angle, is flush with the internal surface of the vertical framing members. Secure the angle to the transom with min. 1 in. No. 10 self-tapping sheet metal screws spaced a maximum 12 in. o.c.
- F. Insulation Reinforcement Angle: Place min. 1 in. x 2 in. 20 GA galvanized steel angle horizontally in the spandrel area to reinforce the curtain wall insulation (2I). The 2 in. leg is placed flush against the exterior surface of the curtain wall insulation and the 1 in. dimension is positioned at the top of the 2 in. leg, perpendicular to and outward from the insulation as illustrated. Place a minimum of 3 angles in each spandrel cavity between vertical framing members. Two angles are required to be spaced a max. 6 in. o.c. in the perimeter fire barrier region, with the top angle centered 1 in. above the floor. Outside of the perimeter fire barrier region, the spacing of these reinforcement angles is a max. 18 in oc On both ends of each angle, cut the 1 in. leg of the angle 2 in. from the end and fold down to form a slot that is slid onto the flange of the Z-Clip (2G).
- G. Z Clips: Position min. 2 in. wide Z-Clips having 2 in. long web and flange dimensions, constructed of min. 18 GA. galvanized steel, onto the mullion at the required elevation locations of the Insulation Reinforcement Angles (2F). Two Z-Clips are to be positioned at each location so that one clip extends on each side of the mullion, placed tightly against the mullion. The Z-clips are secured to the interior face of the mullion with a single 1 in. No. 10 self-tapping sheet metal screw placed at the center of the Z-Clips.
- H. Insulation Retaining Screws: In the field of the curtain wall insulation between framing covers (2J) attach curtain wall insulation (2I) to the insulation retainer angle (2E) and insulation reinforcement angle (2F) with min. 3 in. long No. 8 bugle head self-tapping screws fitted with min. 1-1/2 in. diameter steel clinch shields or self-locking washer clips. These are spaced a max. 12-3/4 in. oc and a max. 4 in. on each side of vertical seams. Where the framing covers (2J) overlap onto the curtain wall insulation (2I) secure framing covers (2J) and curtain wall insulation (2I) to the insulation retainer angle (2E) and insulation reinforcement angle (2F) with min. 5 in. long No. 10 bugle head self-tapping screws and min. 1-1/2 in. diameter steel clinch shields or self-locking washer clips in accordance with details in 2J.
- I. Curtain Wall Insulation: A nom. 2 in. thick, 8pcf density mineral wool batt insulation**, faced on one side with aluminum foil scrim (vapor retarder) which faces the room interior, is installed to fill all cavities of the spandrel region between the framing. The batt is to be fitted tightly to the framing, and is secured to the Insulation Retainer Angle (2E) and Insulation Reinforcement Angle (2F) with Insulation Retaining Screws and min. 1-1/2 in. diameter steel clinch shields or self-locking washer clips. (2H). A minimum 3 in. air space is created between the insulation and panel. All meeting edges of insulation are sealed with nom. 4 in. wide pressure sensitive aluminum foil faced tape centered over the junction so that approx. 2 in. of tape covers each edge of the adjacent insulation. The 36 in. wide batts shall be installed with a maximum of 1 vertically oriented seam in each spandrel cavity, between vertical framing members, spaced a min. 18 in. from any vertical framing member, and continuous vertically without horizontal seams.
- J. Framing Covers: Strips made of 2 in. thick by 8 in. wide, 8 pcf, mineral wool batt insulation, faced one side with aluminum foil scrim (vapor retarder) which faces the room interior, are centered over each vertical framing member and secured to the Insulation Retainer Angle (2E) and Insulation Reinforcement Angle (2F) with Insulation Retaining Screws spaced 1 in. from both edges of the framing cover. Framing covers do not pass through the perimeter joint treatment. They are butted to the top and bottom surfaces of the perimeter joint treatment.
- K. Panel Attachment: Secure panels with a thermal break (thermal-set rubber extrusion), pressure bar (aluminum extrusion), 1/4-20 x 5/8 in. long screws, and a snap face (aluminum extrusion). The spandrel panels shall be insulated according to 2I.



Hilti Firestop Systems

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Design No. CEJ 307 P (HI/BP 180-01)

CEJ 307 P

3. PERIMETER JOINT PROTECTION: The perimeter joint (linear opening) shall not exceed an 8-in. nom. joint width (joint width at installation) and the perimeter joint treatment shall incorporate the following construction features:

A. Packing Material: Use a min. 4 in. thick, 4 pcf density, mineral wool** batt insulation installed with the fibers running parallel to the slab edge and curtain wall. The packing material shall be compressed 33% in the nominal joint width. Compress the batt insulation into the perimeter joint such that the top surface of the batt insulation is flush with the top surface of the concrete floor slab. Splices (butt joints) in the lengths of mineral wool batt insulation are to be tightly compressed together with min. compression of 0.25 in. per piece. Reference the Introduction to Fire Resistive Joint Systems Section of this Directory for more details on how to determine the cut width of the insulation to be installed in the nominal joint width, and how to determine the compressed percentage of a known insulation width installed in a known nominal joint width.

B. CERTIFIED MANUFACTURER: Hilti, Inc.

CERTIFIED PRODUCT: Joint Spray or Sealant

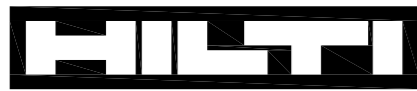
MODEL: Firestop Joint Spray CFS-SP WB or Silicone Joint Spray CFS-SP SIL

Fill, Void or Cavity Material: To be applied (sprayed, brushed, or trowled) to cover the exposed surface of the mineral wool installed in the perimeter joint. Apply at the thickness specified in Table 1 and overlap the material a min. 1/2 in. onto the adjacent curtain wall assembly and concrete floor slab assembly. If the spraying process is stopped and the applied liquid cures to an elastomeric film before process is restarted, then overlap the edge of the cured material at least 1/8 in. with the spray. Reference Product Section of this Directory for more details about the Listed product.

Note 1 – Before testing, the spliced test specimen was cycled 500 times at 30 cpm according to ASTM E 1399 and ICBO ES AC 30 (Jan. 1997)

(** Product Certified by Intertek Testing Services bearing a WH Mark)

This Design Listing was created using the information outlined in the Introduction to the Fire-Resistant Joint Systems Section. Please refer to that Introduction to complement the Design Listing.



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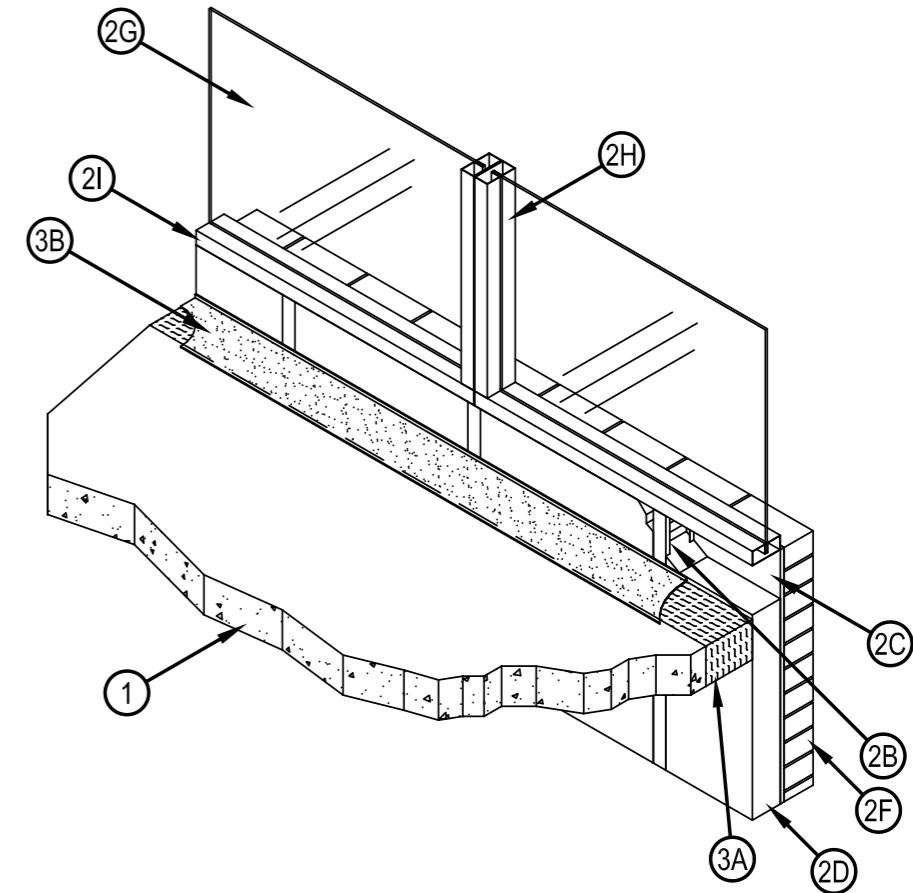
Design No. CEJ 314 P (HI/BP 165-01) PERIMETER FIRE BARRIER SYSTEM

CEJ 314 P

Hilti, Inc.
ASTM E 2307
Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2 3/4-HR.	2 3/4-HR.
T-RATING	1-HR.	1-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%)		
HORIZONTAL	± 8.3	± 7.5
VERTICAL	± 5	± 5
SEE NOTE 1		

L-Rating <1.0 SCFM/LF



Hilti Firestop Systems

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1. CONCRETE FLOOR ASSEMBLY: Max. two-hour rated concrete floor assembly made from either lightweight or normal weight concrete with a density of 100-150 pcf, with a min. thickness of 4-1/2 in. at the joint face. Overall slab thickness may vary to accommodate various blockout depths (longitudinal recesses) formed in the concrete, to house the architectural cover plate. The blockout width may also vary without restriction.
2. CURTAIN WALL ASSEMBLY: The curtain wall assembly shall incorporate the following construction features:
 - A. Mounting Attachment: (Not shown) Attachment of the curtain wall framing to the structural framing shall be according to the curtain wall manufacturer's instructions. When required, the mounting attachments to the floor slab shall be connected to the joint face of the floor slab, according to the curtain wall manufacturer's instructions. Max. distance between mounting attachments shall be 24 in..
 - B. Steel-Stud Framing: Vertical framing members shall be a min. 3-5/8 in. by 1-5/8 in., 18 GA steel "C" studs secured in an 18 GA steel track top and bottom using #6 x 1.25 in. Bugle head SD PT screws. Vertical framing shall not exceed a spacing of 24 in. oc.
 - C. Sandwiched Wall Surface: Use a min. 1/2 in. thick, 48 in. wide by 96 in. long, exterior grade gypsum wallboard (ASTM C 79), cement board, or fiberglass sheathed gypsum wallboard placed over and secured to framing with min. 1-1/4 in. long Type S drywall screws 8 in. oc.
 - D. Curtain Wall Insulation: Use a nom. 24 in. wide by min. 4 in. thick min. 4 pcf faced or un-faced mineral wool** batt insulation cut to size as required. The curtain wall insulation shall completely fill the recess of the min. 3-5/8 in., by 1-5/8 in., by 18 GA steel "C" studs. If the stud cavity is deeper than 3-5/8 in., use thicker insulation to accommodate the additional depth so that the cavity is full from the front of the stud to the rear of the stud. Install curtain wall insulation in each stud cavity so that min. 6 in. of curtain wall insulation is above the surface of the perimeter joint protection and a min. of 6 in. is below the underside of the floor, while maintaining the min. 24 in. continuous vertical length of insulation in the spandrel region. The 24 in. width is fitted tightly between vertical framing members filling all studs in the spandrel region. Because the insulation is required to be continuous in both width and length, without butted joints, use of aluminum foil tape to seal between the insulation and the studs is optional. (** Listed with Intertek)
 - E. Exterior Curtain Wall Insulation: (Optional - Not Shown) Expanded polystyrene foam (EPS) insulation. The EPS foam boards measure 24 in. wide by 48 in. long by 4 in. thick with a nominal density of 1 pcf. The EPS foam is attached to the sandwiched wall surface using mechanical fasteners or an adhesive in accordance with manufacturer's recommendations. Install the EPS boards in a running bond (brick-like) pattern and staggered over sandwiched wall surface (2C) joints. Apply pressure to the EPS boards to assist in the bonding process. All EPS boards must be butted together with no gaps or voids between them. Allow a min. of 12 hours before continuing the application process when using adhesive. The EPS boards must be rasped to remove all irregular seams and establish a continuous flat surface.
 - F. Exterior Curtain Wall Finish: Use brick and mortar of any type. Mortar joints not to exceed 7/8 in. . Secure bricks to wall assembly using conventional acceptable masonry techniques.
 - G. Glass Vision Panels: Glass vision panels shall be installed to curtain wall framing according to the curtain wall system manufacturer's guidelines. Use a min. 1/4 in. thick, clear tempered glass that is fitted to the framing, having a min width of 24 in. and a min. height of 24 in.
 - H. Window Gaskets: Secure glass vision panels with a thermal break (thermal-set rubber extrusion).
 - I. Window Framing: Steel framing members shall be a min. 3-5/8 in. by 1-5/8 in. 18 GA steel "U" channel or similar construction that is compatible with steel-stud framing (2B). Locate window framing at least 6 in. above the top surface of the floor assembly.
3. PERIMETER JOINT PROTECTION: The perimeter joint (linear opening) shall not exceed a 6 in. nom. Joint width (joint width at installation) and the perimeter joint treatment shall incorporate the following construction features:
 - A. Packing Material: Use a min. 4 in. thick, 4 pcf density, mineral wool batt insulation** installed with the fibers running parallel to the slab edge and curtain wall. The packing material shall be compressed 25% in the nominal joint width. Compress the batt insulation into the perimeter joint such that the top surface of the batt insulation is flush with the top surface of the concrete floor slab and the insulation is compressed against the interior surface of the curtain wall insulation (2D). Splices (butt joints) in the lengths of mineral wool batt insulation are to be tightly compressed together. Reference the Introduction to Fire Resistive Joint Systems Section of this Directory for more details on how to determine the cut width of the insulation to be installed in the nominal joint width, and how to determine the compressed percentage of a known insulation width installed in a known nominal joint width. (** Listed with Intertek)

- B. CERTIFIED MANUFACTURER: Hilti, Inc.
 CERTIFIED PRODUCT: Joint Spray or Sealant
 MODEL: Firestop Joint Spray CFS-SP WB or Silicone Joint Spray CFS-SP SIL
 Fill, Void or Cavity Material: To be applied (sprayed, Brushed, or painted) to cover the exposed surface of the mineral wool installed in the perimeter joint. Apply at the thickness specified in Table 1 and overlap the material a min. 1/2 in. onto with Curtain Wall Insulation (2D) and Concrete Floor Assembly (1). If the spraying process is stopped and the applied liquid cures to an elastomeric film before process is restarted, then overlap the edge of the cured material at least 1/8 in. with the spray. Reference Product Section of this Directory for more details about the Listed product.

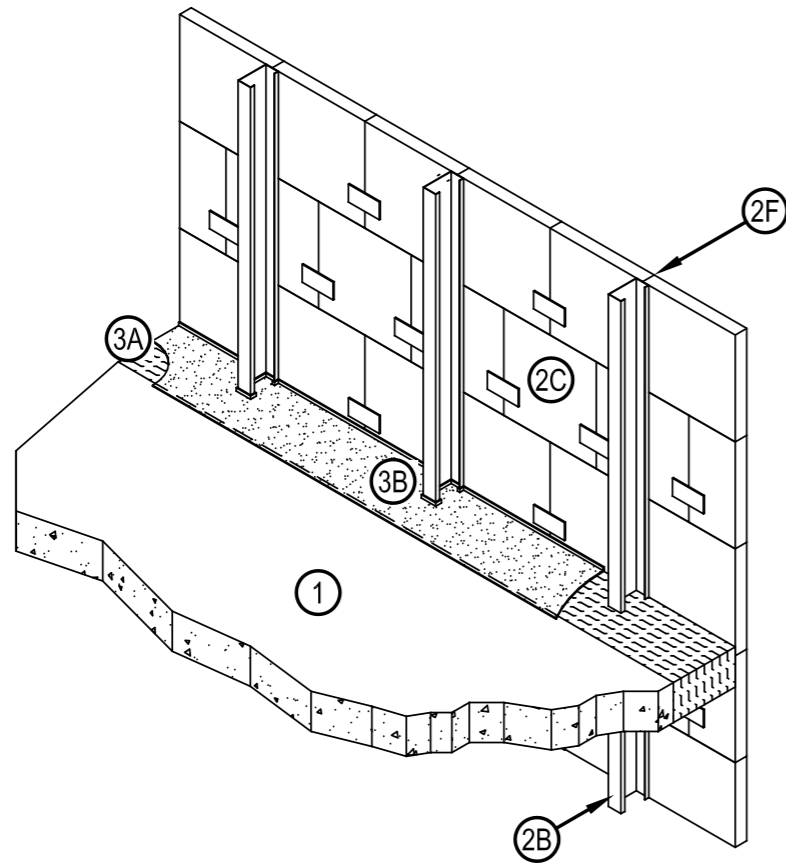
**Before testing, the spliced test specimen was cycled 500 times at 30 cpm according to ASTM E 1399 and ICBO ES AC 30 (Jan. 1997).

Design No. CEJ 400 P (HI/BP 120-02)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

CEJ 400 P

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2-HR.	2-HR.
T-RATING	0-HR. OR 45-MIN. (SEE ITEM 2C)	0-HR. OR 1-HR. (SEE ITEM 2C)
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	±9.25 NONE	±7.5 NONE



Hilti Firestop Systems

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Design No. CEJ 400 P (HI/BP 120-02)

CEJ 400 P

1. CONCRETE FLOOR ASSEMBLY: Min. two-hour rated concrete floor assembly made from either lightweight or normal weight concrete with a density of 100-150 pcf, with a min. thickness of 4-1/2 in. at the joint face. Optional – Provided the two-hour concrete floor assembly rating is not compromised, the overall slab thickness may vary to accommodate various blockout depths (longitudinal recesses) formed in the concrete, to house an optional architectural joint system. The blockout width may also vary without restriction.
 2. CURTAIN WALL ASSEMBLY: The curtain wall assembly shall incorporate the following construction features:
 - A. Mounting Attachment: (Not shown) Attachment of the curtain wall framing to the structural framing shall be according to the curtain wall manufacturer's instructions. When required, the mounting attachments to the floor slab shall be connected to the joint face of the floor slab, according to the curtain wall manufacturer's instructions. Max. distance between mounting attachments shall be 10 ft.
 - B. Steel-Stud Framing: Vertical framing members shall be a min. 3-5/8 in. by 1-5/8 in., 18 GA steel "C" studs secured in an 18 GA steel track top and bottom using min. #6 x 1.25 in. Bugle head SD PT screws. Vertical framing shall not exceed a spacing of 56 in. on center and shall be completely covered by the GFRC panels (2c). Attachment of vertical framing shall be according to the curtain wall system manufacturer's guidelines.
 - C. GFRC Panels: Glass fiber reinforced concrete panels shall be at least 1 in. thick and attached in accordance with the manufacturer's installation instructions. The system is a monolithic assembly without expansion or control joints. NOTE: T-Rating is 0-hours when min. 1 in. thick GFRC panels are used. T-Rating is 1-hour or 45 minutes when min. 2 in. thick GFRC panels are used.
 - D. Impaling Pins: (Not Shown - Optional) When required by insulation manufacturer, use with insulation. The pins shall be located, sized and installed according to the curtain wall system manufacturer's guidelines.
 - E. Curtain Wall Insulation: (Not Shown - Optional) Curtain wall insulation is not required. However, it can be installed above or below the perimeter joint protection. When used, secure the insulation in accordance with the manufacturer's installation instructions. Mineral wool** or glass fiber** batt insulations are acceptable.
 - F. GFRC Panel Joint: Vertical and horizontal concrete panel joints created between panels can be either flush type (butt joint) or key way type (tongue and groove). Concrete panel edges must be in contact with each other. If required, the surface of the panel joints can be sealed with gaskets or sealants.
 - G. Framing Covers: (Not Shown - Optional) Framing covers used over the mullions and transoms are optional. When used, the framing covers shall be located, sized and installed according to the curtain wall system manufacturer's guidelines. Framing covers do not pass through the perimeter joint treatment. They are butted to the top and bottom surfaces of the perimeter joint treatment without deforming it. Either mineral wool** or fiberglass batt insulation** may be used.
 3. PERIMETER JOINT PROTECTION: The perimeter joint (linear opening) shall not exceed an 8 in. nom. joint width (joint width at installation) and the perimeter joint treatment shall incorporate the following construction features:
 - A. Packing Material: Use a min. 4 in. thick, 4 pcf density, mineral wool batt insulation** installed with the fibers running parallel to the slab edge and curtain wall. The packing material shall be compressed 50% in the nominal joint width. Compress the batt insulation into the perimeter joint such that the top surface of the batt insulation is flush with the top surface of the concrete floor slab. Splices (butt joints) in the lengths of mineral wool batt insulation are to be tightly compressed together. Reference the Introduction to Fire Resistive Joint Systems Section of this Directory for more details on how to determine the cut width of the insulation to be installed in the nominal joint width, and how to determine the compressed percentage of a known insulation width installed in a known nominal joint width.
 - B. CERTIFIED MANUFACTURER: Hilti, Inc.
 CERTIFIED PRODUCT: Joint Spray or Sealant
 MODEL: Firestop Joint Spray CFS-SP WB or Silicone Joint Spray CFS-SP SIL
 Fill, Void or Cavity Material: To be applied (sprayed, brushed, or painted) to cover the exposed surface of the mineral wool installed in the perimeter joint. Apply at the thickness specified in Table 1 and overlap the material a min. 1/2 in. onto the adjacent curtain wall assembly and concrete floor slab assembly. If the spraying process is stopped and the applied liquid cures to an elastomeric film before process is restarted, then overlap the edge of the cured material at least 1/8 in. with the spray. Reference Product Section of this Directory for more details about the Listed product.
 - C. Support Clips: (Not Shown - Optional) Use standard Z-shaped clips that are min. 20 GA galvanized steel with the following nom. dimensions: 1 in. wide by 3 in. high with a 2 in. upper leg and 3 in. lower leg Note 1 – Before testing, the spliced test specimen was cycled 500 times at 30 cpm according to ASTM E 1399 and ICBO ES AC 30 (Jan. 1997)
- (** Product Certified by Intertek Testing Services bearing a WH Mark)



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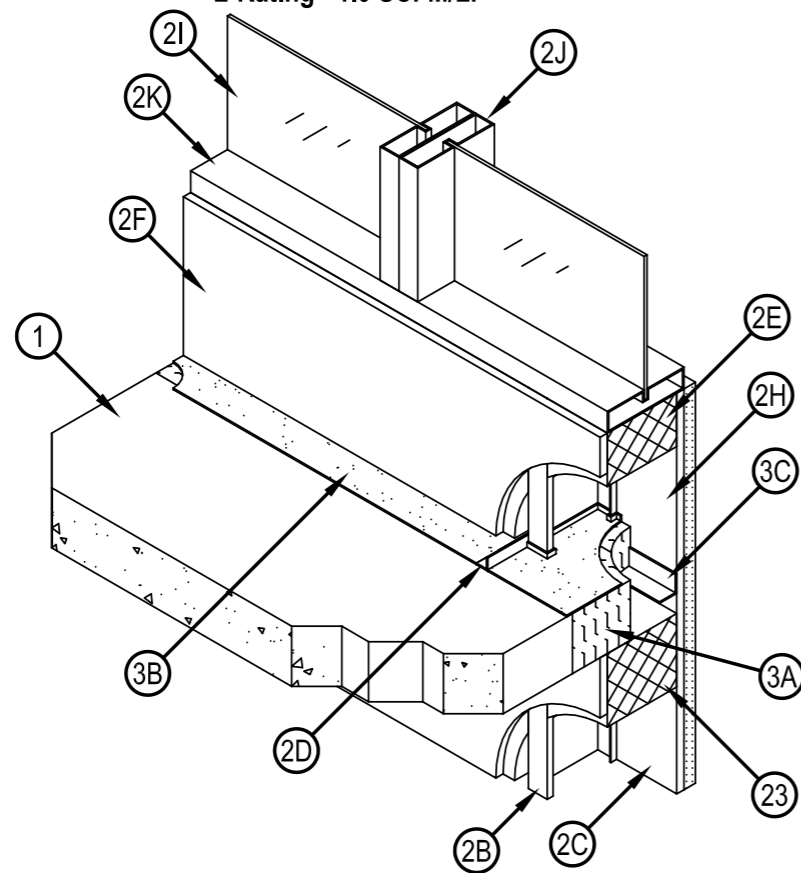
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Design No. CEJ 421 P (HI/BP 120-03)
PERIMETER FIRE BARRIER SYSTEM

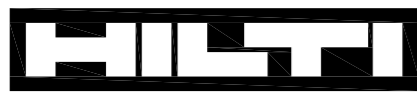
Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2-HR.	2-HR.
T-RATING	1-HR.	1-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	NONE NONE	NONE NONE

L-Rating <1.0 SCFM/LF



CEJ 421 P



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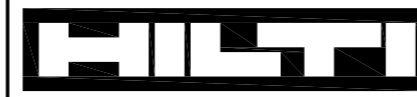


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Design No. CEJ 421 P (HI/BP 120-03)

1. CONCRETE FLOOR ASSEMBLY: Min. two-hour rated concrete floor assembly (Item 1) made from either lightweight or normal weight concrete with a density of 100-150 pcf, with a min. thickness of 4-1/2 in. at the slab edge (joint face). Optional – Provided the two-hour concrete floor assembly (Item 1) rating is not compromised, the overall slab thickness may vary to accommodate various breakout depths (longitudinal recesses) formed in the concrete, to house an optional architectural joint system. The breakout width may also vary without restriction.
2. CURTAIN WALL ASSEMBLY: The curtain wall assembly shall incorporate the following construction features:
 - A. Mounting Attachment: (Not shown) Attach the steel-stud framing to the structural framing according to the curtain wall manufacturer's instructions. When required, connect the mounting attachments to the concrete floor assembly (Item 1) at the slab edge (joint face), according to the curtain wall manufacturer's instructions. Use a max. 10 ft. distance between mounting attachments.
 - B. Steel-Stud Framing: Use min. 6 in. by 1-5/8 in., 18 GA steel "C" studs as vertical framing members with a max. spacing of 24 in. on center (oc) secured in 18 GA steel tracks, top and bottom, using min. #6 x 1/2 in. pan or hex head SD PT screws. Secure the steel-stud framing to the concrete floor assembly (Item 1) with curtain wall clips (Item 2D). Alternate Method: Use multiple 16 GA steel studs positioned horizontally and secured together either by mechanical fasteners or welds to form a solid box.
 - C. Sandwiched Wall Surface: Use a minimum 5/8 in. thick, 48 in. wide by 96 in. long, exterior grade fiberglass sheathed gypsum board placed over and secured to steel stud framing (Item 2B) with min. 1-1/4 in. long Type S drywall screws 12 in. on center in field and 8 in. oc at perimeter.
 - D. Curtain Wall Clips: Affix min. 20 GA 1 x 1 in. steel angle using 5/8 in. long sheet metal screws to the vertical framing (Item 2B) and to the surface of the concrete floor assembly (Item 1) using min. 1/4 in. diameter by 1 in. long concrete screws, or an equivalent fastening method in accordance with the curtain wall manufacturer's installation instructions.
 - E. Optional Curtain Wall Insulation: Curtain wall insulation is not required. However, it can be installed above or below the perimeter joint protection. When used, secure the insulation in accordance with the manufacturer's installation instructions. Mineral wool or glass fiber batt insulations are acceptable. Only Intertek Certified Mineral Wool Manufacturer's product meeting the above min. requirements.
 - F. Optional Interior Curtain Wall Surface: An interior curtain wall surface is not required. However, it can be installed above or below the perimeter joint protection. When used, secure the interior curtain wall surface in accordance with the manufacturer's installation instructions. Gypsum board is acceptable.
 - G. Optional Knee-Wall: (Not Shown) A "knee-wall" is not required. Install above the perimeter joint protection. When using a knee-wall with 6 in. steel stud construction, the 6 in. wide steel track at the bottom of the knee-wall can replace the curtain wall clips. The 6 in. steel track shall be attached to each vertical framing member (Item 2B) using 5/8 in. long sheet metal screws and to the concrete floor assembly using min. 1/4 in. diameter by 1 in. long concrete screws.
 - H. Exterior Curtain Wall Finish: The exterior finish shall not create voids or openings in the sandwiched wall surface and shall extend at least 6 in. above and at least 24 in. below the surface of the concrete floor assembly. The following finishes are acceptable: (1) Exterior Insulation Finish System: Any Listed and Labeled EIFS composed of an expanded polystyrene foam (EPS) insulation, and an Exterior Curtain Wall Finish consisting of the following: A plaster, base coat and reinforcing mesh applied over the sandwiched wall surface. Precut the mesh as needed. The mesh is a woven fiberglass reinforcement fabric that is compatible with the plaster base coat and finish coat materials. Apply 1/16 to 1/8 in. thick plaster base coat to the exposed surface of the EPS foam. The EPS foam boards nominally measure 24 in. wide by 48 in. long by a max. of 4 in. thick with a nominal density of 1 pcf. The EPS foam is attached to the sandwiched wall surface using mechanical fasteners or an adhesive in accordance with manufacturer's recommendations. Install the EPS boards in a running bond (brick-like) pattern and staggered over sandwiched wall surface joints. Apply pressure to the EPS boards to assist in the bonding process. All EPS boards must be butted together with no gaps or voids between them. Allow a min. of 12 hours before continuing the application process when using adhesive. The EPS boards must be rasped to remove all irregular seams and establish a continuous flat surface. Apply the mesh over the EPS; embed the mesh into the plaster base coat using a trowel. Start at the middle and work outwards towards edges. The final thickness of the plaster base coat with the mesh embedded should be approximately 1/16 in.. Let the base coat dry completely before applying the plaster finish coat. The plaster finish coat is a gypsum based wall coating which may contain silica sand or marble aggregates. Apply the plaster finish coat using a trowel in the same manner as the plaster base coat. Other installation techniques are acceptable when detailed by the manufacturer. The EIFS system is a monolithic assembly without expansion or control joints. (2) Glass Panels: Glass panels shall be sized and installed to curtain wall framing according to the curtain wall system manufacturer's guidelines. Use a min. 1/4 in. thick, clear,

CEJ 421 P



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Design No. CEJ 421 P (HI/BP 120-03)

CEJ 421 P

heat-strengthened (HS) glass or tempered glass with a max. width and height less than the framing oc spacing, which allows the glass to be secured between the notched shoulder of the framing and pressure bar. Panels are secured with a thermal break (rubber extrusion), pressure bar (extrusion), min. 1/4-20 x 5/8 in. long screws, and a snap face (extrusion) or other manner as detailed by the manufacturer. The system is a monolithic assembly without expansion or control joints. (3) Aluminum Panels: Min. 1/8 in. thick aluminum panels secured to the steel-stud framing (Item 2B) in accordance with the manufacturer's installation instructions. When framing for the aluminum panels is required, it is to be installed with the manufacturer's installation instructions. The system is a monolithic assembly without expansion or control joints. (4) Brick: Use any conventional brick and mortar type. Any brick pattern is acceptable. Mortar joints not to exceed 7/8 in. Secure bricks to wall assembly using conventional acceptable masonry construction techniques. The system is a monolithic assembly without expansion or control joints. (5) Stucco: Any Listed and Labeled stucco system is acceptable provided that the following is abided by: When EPS is used, the EPS foam boards nominally measure a maximum of 4 in. thick with a nominal density of 1 pcf. The stucco manufacturer confirms the stucco is compatible with the sandwiched wall surface. The system is a monolithic assembly without expansion or control joints. (6) Stone: Use any conventional stone panel and mortar type measuring at least 1 in. thick. Any stone pattern is acceptable. Mortar joints not to exceed 7/8 in.. Secure stones to wall assembly using conventional acceptable masonry construction techniques. The system is a monolithic assembly without expansion or control joints. (7) Siding: Any Listed and Labeled siding system is acceptable provided that the following is abided by: The siding shall be classified as non-combustible. The system is a monolithic assembly without expansion or control joints. (8) GFRC Panels: Glass fiber reinforced concrete panels shall be at least 1 in. thick and attached in accordance with the manufacturer's installation instructions. The system is a monolithic assembly without expansion or control joints.

- I. Optional Vision Glass Panels: Glass panels shall be sized and installed to curtain wall framing according to the curtain wall system manufacturer's guidelines. Use a min. 1/4 in. thick, clear, heat-strengthened (HS) glass or tempered glass with a max. width and height less than the aluminum framing oc spacing, which allows the glass to be secured between the notched shoulder of the aluminum framing and pressure bar. Panels are secured with a thermal break (rubber extrusion), pressure bar (aluminum extrusion), min. 1/4-20 x 5/8 in. long screws, and a snap face (aluminum extrusion).
 - J. Optional Window Gaskets: When required by the manufacturer, secure glass vision panels with a thermal break (thermal-set rubber extrusion).
 - K. Optional Window Framing: Framing material shall be non-combustible. Locate window framing at least 6 in. above the top surface of the floor assembly.
3. PERIMETER JOINT PROTECTION: The perimeter joint (linear opening) shall not exceed a 9 in. nom. joint width (joint width at installation) between the interior face of the sandwiched wall surface and the vertical face of the concrete floor assembly. The perimeter joint treatment shall incorporate the following construction features:
- A. Packing Material: Use a min. 4 in. thick, 4 pcf density, mineral wool batt insulation. Install the top surface of the packing material flush with the top surface of the concrete floor assembly (Item 1). Only Intertek Certified Mineral Wool Manufacturer's product meeting the above min. requirements. Compress the lengths of packing material together at least 1/2 in. at splices (butt joints). Install packing material (Item 3A) using one of the following methods:
 Method 1 – Two-step installation process. (1) Install pieces of packing material (Item 3A) between the vertical framing members (Item 2B). Cut and install the packing material (Item 3A) with the fibers running horizontally (perpendicular) to the slab edge (joint face). Cut the pieces of packing material (Item 3A) at least 1/4 in. longer than the distance between the vertical framing members (Item 2B) and 1/8 in. greater than the width of the steel-stud framing. (Cut packing material (Item 3A) 24-1/4 in. long for a max. 24 in. spacing between vertical framing members (Item 2B). Cut packing material (Item 3A) 6-1/8 in. wide for 6 in., 18 GA steel "C" studs.) Allow no voids between vertical framing members (Item 2B) or between sandwiched wall surface and packing material (Item 3A). (2) Install pieces of packing material (Item 3A) in the max. 3 in. nominal joint width (joint width at installation) between the interior face of the steel stud framing (Item 2B) and the vertical face of the concrete floor assembly (Item 1). Cut and install the packing material (Item 3A) with the fibers running vertically (parallel) to the slab edge (joint face). Cut packing material (Item 3A) 3-3/4 in. wide for a max. 3 in. nominal joint width. Compress the packing material (Item 3A) min. 20% and install in nominal joint width.



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Method 2 – Two-step installation process. (1) Install pieces of packing material (Item 3A) between the vertical framing members (Item 2B). Cut and install the packing material (Item 3A) with the fibers running vertically (parallel) to the slab edge (joint face). Cut the pieces of packing material (Item 3A) at least 1/4 in. longer than the distance between the vertical framing members (Item 2B). (Cut packing material (Item 3A) 24-1/4 in. long for a max. 24 in. spacing between vertical framing members (Item 2B).) Cut packing material (Item 3A) 9 in. wide for 6 in., 18 GA steel "C" studs. Install the packing material (Item 3A) (min. compression 33%). Allow no voids between vertical framing members (Item 2B) or between sandwiched wall surface and packing material (Item 3A). (2) Install pieces of packing material (Item 3A) in the max. 3 in. nominal joint width (joint width at installation) between the interior face of the steel stud framing (Item 2B) and the vertical face of the concrete floor assembly (Item 1). Cut and install the packing material (Item 3A) with the fibers running vertically (parallel) to the slab edge (joint face). Cut packing material (Item 3A) 4-1/2 in. wide for a max. 3 in. nominal joint width. Compress the packing material (Item 3A) min. 33% and install in nominal joint width.

B. CERTIFIED MANUFACTURER: Hilti, Inc.

CERTIFIED PRODUCT: Joint Spray or Sealant

MODEL: Firestop Joint Spray CFS-SP WB or Silicone Joint Spray CFS-SP SIL

Fill, Void or Cavity Material: Spray apply over exposed surface of the packing material (Item 3A). Apply at the thickness specified in Table 1 and overlap the material a min. 1/2 in. onto the adjacent curtain wall assembly and concrete floor slab assembly. When the spraying process is stopped and the applied liquid cures to an elastomeric film before application process is restarted, then overlap the edge of the cured material at least 1/8 in. with the spray.

C. Reinforcing Angle: Required for packing material (Item 3A) installed using Method 1 when mineral wool batt insulation in Optional Curtain Wall Insulation (Item 2E) or gypsum board in Optional Interior Curtain Wall Surface (Item 2F) is not present. Mount a min. 20GA, 1-1/2 in. x 1-1/2 in. galvanized steel angle to the vertical framing members (Item 2B) using min.#6 x 1.25 in. Bugle head SD PT screws. Notch the ends of each piece so that the vertical leg contacts to the 1-5/8 in. face of the vertical framing members (Item 2B) in contact with the sandwiched wall surface (Item 2C). Position the reinforcing angle so that the horizontal leg extends into a continuous 1-1/2 in. deep slit located longitudinally in the mid height of the packing material (Item 3A).



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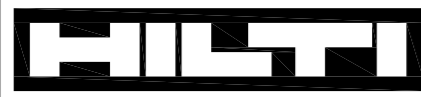
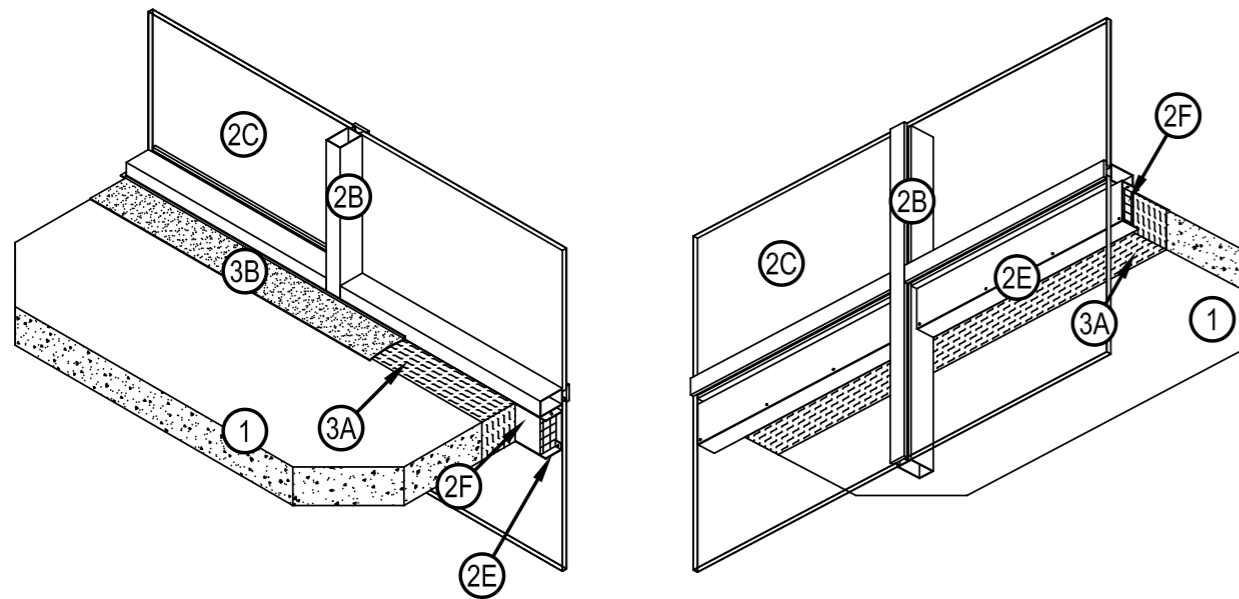
Design No. HI/BPF 120-11
PERIMETER FIRE BARRIERS
Firestop Joint Spray CFS-SP WB
ASTM E 2307

HI/BPF 120-11

Table 1.

	Firestop Joint Spray CFS-SP WB	Silicone Joint Spray CFS-SP SIL
F-Rating	2 Hour	2 Hour
T-Rating	45 Minute	45 Minute
Application Thickness	1/8 in. wet film (1/16 in. dry)	2 mm (0.08 in.) wet film
Cycling (%)		
Horizontal	±12.5%	±12.5%
Vertical	±12.5%	±12.5%

UL 2079
L-Rating <1.0 SCFM/LF



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Design No. HI/BPF 120-11

HI/BPF 120-11

- CONCRETE FLOOR ASSEMBLY:** 2 hour rated concrete floor assembly made from either lightweight or normal weight concrete with a density of 100 to 150 pcf, having a min. thickness of 6 in. at the joint face. When a longitudinal recess (blockout) is required to contain an architectural joint system, increase concrete floor assembly thickness to maintain a min. thickness of 6 in. and accommodate depth of blockout formed in the concrete: blockout width unrestricted.
- CURTAIN WALL ASSEMBLY:** The curtain wall assembly shall incorporate the following construction features:
 - Mounting Attachment (Not shown):** Attach aluminum framing (Item 2B) to the structural framing according to the curtain wall manufacturer's instructions. Connect the mounting attachments to the joint face of the concrete floor assembly (Item 1) according to the curtain wall manufacturer's instructions.
 - Aluminum Framing:** Use hollow rectangular aluminum extruded tubing with min. overall dimensions of 0.100 in. thick, 4 in. high and 2-1/2 in. wide. Locate mullions (vertical aluminum framing) min. 60 in. oc. Locate the transom (horizontal aluminum framing) such that the bottom surface of the transom is at the same height as the top surface of the floor assembly.
 - Glass Panels:** Sized and installed into aluminum framing (Item 2B) in accordance with the curtain wall manufacturer's instructions. Use min. 1/4 in. thick, clear, heat strengthened (HS) or tempered glass with a max. width and height less than the aluminum framing (Item 2B) oc spacing. OC spacing shall allow glass to be secured to the aluminum framing (Item 2B) between the notched shoulders. Secure glass panels with a thermal break (rubber extrusion), pressure bar (aluminum extrusion), min. 1/4-20 by 5/8 in. long screws, and a snap face (aluminum extrusion).
 - Aluminum Anchor Brackets (Not shown):** Use min. 1/2 in. thick aluminum anchor brackets to serve as part of the mounting attachment (Item 2A) rigidly secured to the aluminum framing (Item 2B) and the concrete floor assembly (Item 1).
 - Galvanized Sheet Metal Pan:** Attach 18 GA galvanized steel composed of two L-shaped sections to the aluminum framing with No. 10 self-drilling sheet metal screws at 12 in. oc. The first galvanized steel angle that is attached to the aluminum framing shall be formed such that it has a 3 in. leg and a 6 in. leg. The 3 in. leg is attached to the aluminum framing with No. 10 self-drilling sheet metal screws spaced 12 in. oc. The second, 1 in. x 3 in. angle is attached to the first with the 1 in. leg secured to the 6 in. leg of the first angle with No. 10 self-drilling sheet metal screws spaced 12 in. oc to create a cavity that is 3 in. deep and 6 in. tall underneath the aluminum member to house the curtain wall insulation (Item 2F). The 3 in. portion of the 3 in. x 1 in. angle is to be sized such that a 6 in. leg can be bent and formed into a vertical leg at the ends to secure the angle to the vertical framing members on each side with No. 10 self-drilling sheet metal screws (two installed at the top and two at the bottom). Install a bead of Hilti CFS-S SIL GG Firestop Silicone on the underside of the horizontal member prior to installation of the 3 in. x 6 in. 18 GA steel angle.
 - Curtain Wall Insulation:** Fill the cavity of the metal pan (Item 2E) with nominal 3 in. thick, min. 6 in. tall, 8 pcf density, mineral wool batt insulation. Tightly fit, compress at least 1/8 in. in all directions. Use only Intertek certified products meeting the above min. requirements.
- PERIMETER JOINT PROTECTION:** Do not exceed a 4 in. nominal joint width (joint width at installation). Incorporate the following construction features for the perimeter joint protection (also known as perimeter fire barrier system):
 - Packing Material:** Use only mineral wool bearing an Intertek certified product label and meeting the following min. requirements. Use min. 6 in. tall, 4-pcf density, mineral wool batt insulation and cut packing material width to achieve 25% compression when installed in the nominal joint width and use no more than two adjacent strips. Install insulation with the fibers running parallel to the edge of concrete floor assembly (Item 1) and curtain wall assembly (Item 2A). Tightly compress together splices (butt joints) in the lengths of packing material by using min. 1/4 in. compression per piece of packing material. Locate the top surface of the packing material flush with the top surface of the concrete floor assembly (Item 1).
 - CERTIFIED MANUFACTURER:** Hilti Corporation
CERTIFIED PRODUCT: Firestop Joint Spray CFS-SP WB or Silicone Joint Spray CFS-SP SIL
Fill, Void, or Cavity Material: Apply over the packing material (Item 3A) as discussed below.
 Apply at the thickness specified in Table 1 and overlap the material 1/2 in. onto the adjacent curtain wall assembly and concrete floor slab assembly. When the spraying process is stopped and the applied liquid cures to an elastomeric film before application is restarted, overlap the edge of the cured material at least 1/8 in. with the spray. Reference Product Section of the Intertek Directory for more details on the Listed product.



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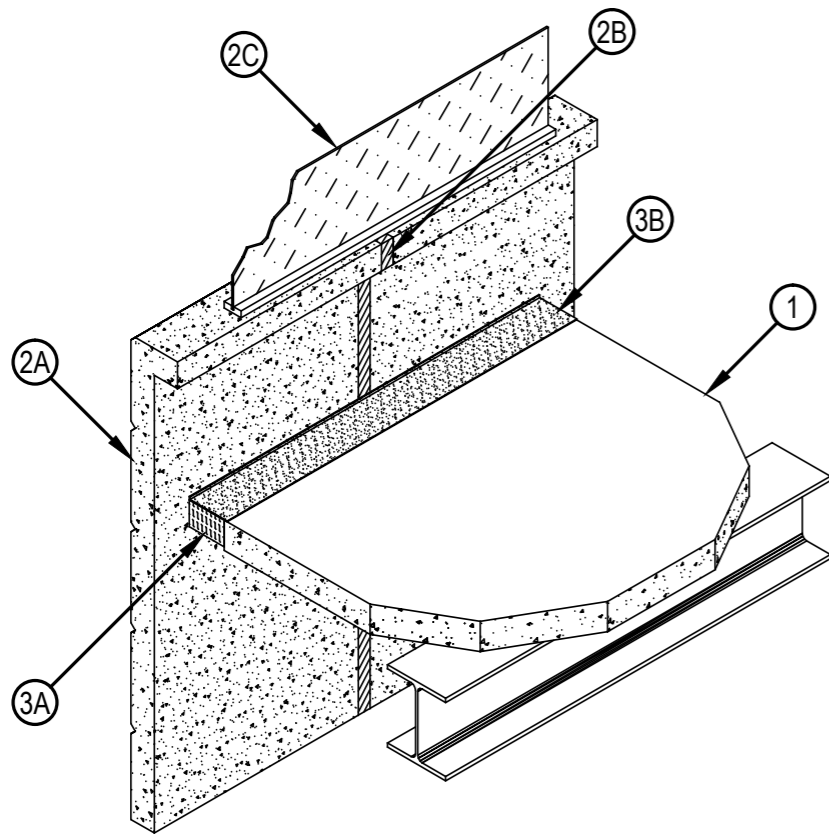
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to ASTM E2307

System No. CW-D-1001
F Rating — 2 Hr
T Rating — 1/4 Hr
Linear Opening Width - 6 In. Max
Class II Movement Capabilities - 5% Vertical Shear (See Item 3)

CWD 1001



1. Floor Assembly — Min 4-1/2 in. (114 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete. Floor assembly to be supported at perimeter edges by spandrel beams having a Restrained or Unrestrained Beam Rating of 2 hr.
2. Curtain Wall Assembly — The curtain wall assembly shall incorporate the following construction features:
 - A. Spandrel Panels — Min 36 in. (914 mm) high by min 4 in. (102 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete spandrel panels. Wall may also consist of min 4 in. (102 mm) thick steel-reinforced lightweight or normal weight concrete tilt-up panels with a min 36 in. (914 mm) vertical separation between window openings. Panels provided with steel dead load anchors welded to steel reinforcing bars embedded in the concrete for attachment to the steel columns and spandrel beams. Panels also provided with steel lateral anchors or braces. The dead load anchors which are located in the linear gap between the concrete floor slab and the spandrel panel or tilt-up panel are to be spaced max 72 in. (1829 mm) OC. The top of the dead load anchor is to be recessed min 1/2 in. (13 mm) from top surface of floor
 - B. Joint System — (Not Shown) - Vertical joints between spandrel panels or tilt-up panels to be protected using Joint System No. WW-S-0042
 - C. Framed Window — Metal framed window with nom 1/4 in. (6 mm) thick heat-strengthened glass. Sill of window to be min 6 in. (152 mm) above top of floor.



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System No. CW-D-1001

CWD 1001

3. Safing System — Max separation between edge of floor assembly and concrete spandrel or tilt-up panel is 6 in. (152 mm). The safing system is designed to accommodate vertical shear movement of up to 5 percent of its installed width. The safing system shall incorporate the following construction features:
 - A. Forming Material* — Nom 4 in. (102 mm) thick mineral wool batt safing material to be installed between the concrete spandrel or tilt-up panel and the edge of the concrete floor slab. Safing material to be cut to a min 4-1/2 in. (114 mm) width and stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the concrete spandrel or tilt-up panel and the edge of the concrete floor slab. The safing material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between dead load anchors. An additional min 1/2 in. (13 mm) thick piece of mineral wool batt safing material to be installed to cover top surface of each dead load anchor.
THERMAFIBER INC — SAF
 - B. Fill, Void or Cavity Material* — Min 1/8 in. (3.2 mm) wet thickness (1/16 in. or 1.6 mm dry) of fill material spray-applied over top of forming material and lapping min 1 in. (25 mm) onto the top surface of the concrete floor and onto the concrete spandrel panel or tilt-up panel. When CFS-SP SIL is used, min wet (and dry) thickness of spray is 2 mm.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 672 FC Firestop Joint Spray, CFS-SP SIL Firestop Silicone Joint Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark



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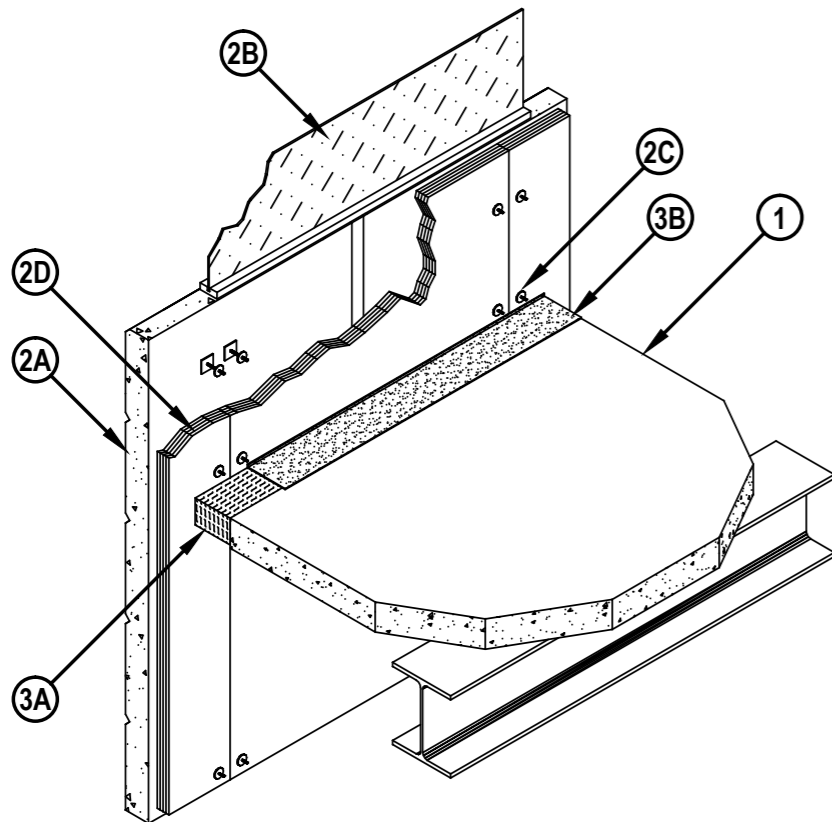
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Classified by
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System No. CW-D-2025
F Rating — 2 Hr
T Rating — 1/4 Hr
Linear Opening Width - 8 In. Max
Class II Movement Capabilities - 5% Vertical Shear (See Item 3)

CWD 2025



1. Floor Assembly — Min 4-1/2 in. (114 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete. Floor assembly to be supported at perimeter edges by spandrel beams having a Restrained or Unrestrained Beam Rating of 2 hr. Edge of concrete floor to be max 8 in. from interior surface of spandrel panel (Item 2A).
2. Curtain Wall Assembly — The curtain wall assembly shall incorporate the following construction features:
 - A. Spandrel Panels — Min 36 in. (914 mm) high by min 4 in. (102 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete spandrel panels. Wall may also consist of min 4 in. (102 mm) thick steel-reinforced lightweight or normal weight concrete tilt-up panels with a min 36 in. (914 mm) vertical separation between window openings. Panels provided with steel dead load anchors welded to steel reinforcing bars embedded in the concrete for attachment to the steel columns and spandrel beams. Panels also provided with steel lateral anchors or braces. The dead load anchors, which are located in the linear gap between the concrete floor slab and the spandrel panel or tilt-up panel, are to be spaced max 72 in. (1829 mm) OC. The top of the dead load anchor is to be recessed min 1/2 in. (13 mm) from top surface of floor.
 - B. Framed Window — Metal framed window with nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Sill of window to be min 6 in. above top of floor.
 - C. Impaling Pins — No. 12 gauge steel pins, min 1/2 in. (13 mm) longer than thickness of insulation boards (Item 2D), swaged to nom 2 by 2 in. (51 by 51 mm) galv steel base plate. Steel base plates secured to concrete spandrel panel with steel concrete screws or powder-driven steel fasteners. Impaling pins to be spaced 3 in. (76 mm) from edges of insulation boards (Item 2D) on each side of seams and spaced max 24 in. (610 mm) OC both vertically and horizontally. A min of two horizontal arrays of impaling pins are required to be located on spandrel panel above top surface of floor.



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System No. CW-D-2025

CWD 2025

- C1. Clutch Clips — (Optional, Not Shown) - Nom 2 by 2 in. (51 by 51 mm) wide by 1-1/4 in. (32 mm) high V-shaped steel clutch clips used in conjunction with impaling pins (Item 2C) to offset curtain wall insulation (Item 2D) from spandrel panel (Item 2A). Clutch clips to be used on all impaling pins. When clutch clips are used, a row of impaling pins shall be located max 3 in. (76 mm) from top and bottom surfaces of floor assembly and spaced max 18 in. (457 mm) OC.
- D. Curtain Wall Insulation* — Min 2 in. (51 mm) thick mineral wool board insulation, faced on one side with aluminum foil/scrim vapor retarder, supplied in min 24 by 48 in. (610 by 1219 mm) boards. Insulation boards installed vertically with tightly-butted seams to cover interior surface of concrete spandrel panel. Horizontal seams of insulation boards (if necessary) to be located min 24 in. (610 mm) above and min 6 in. (152 mm) below planes of floor. Insulation boards secured to spandrel panel with impaling pins in conjunction with min 1-1/2 in. (38 mm) diameter galv steel clinch shields. Butted seams to be covered with aluminum foil tape.
 ROCKWOOL MALAYSIA SDN BHD — CurtainRock 80
 ROXUL INC — CurtainRock 80
3. Saffing System — Max separation between edge of floor assembly and curtain wall insulation is 8 in. The saffing system is designed to accommodate vertical shear movement of up to 5% of its installed width. The saffing system shall incorporate the following construction features:
 - A. Forming Material* — Mineral wool batt saffing material to be cut into min 4-1/2 in. (114 mm) wide pieces and stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the curtain wall insulation (Item 2D) and the edge of the concrete floor slab. The stacked saffing material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly butted seam is permitted between spandrel panel attachment plates or tubes. An additional min 1/2 in. (13 mm) thick piece of mineral wool batt saffing material is to be installed to cover top surface of each dead load anchor.
 ROCKWOOL MALAYSIA SDN BHD — SAFE
 ROXUL INC — SAFE
 - B. Fill, Void or Cavity Material* — Min 1/8 in. (3.2 mm) wet thickness (1/16 in. or 1.6 mm dry) of fill material spray-applied over top of forming material and lapping min 1 in. (25 mm) onto the top surface of the concrete floor and onto the curtain wall insulation. When CFS-SP SIL is used, min wet (and dry) thickness of spray is 2 mm.
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 672 FC Firestop Joint Spray, CFS-SP SIL Firestop Silicone Joint Spray or CFS-SP WB Firestop Joint Spray

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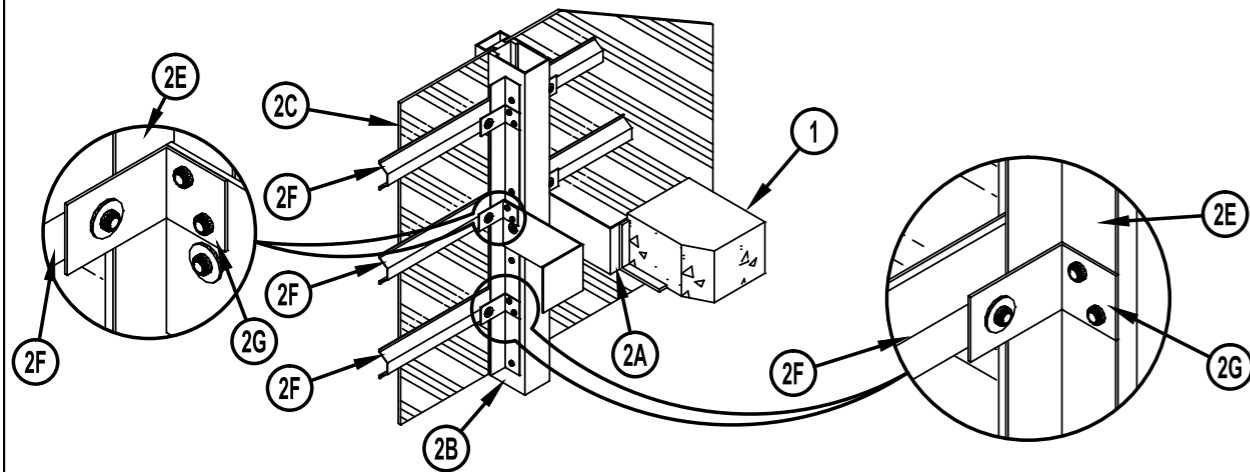
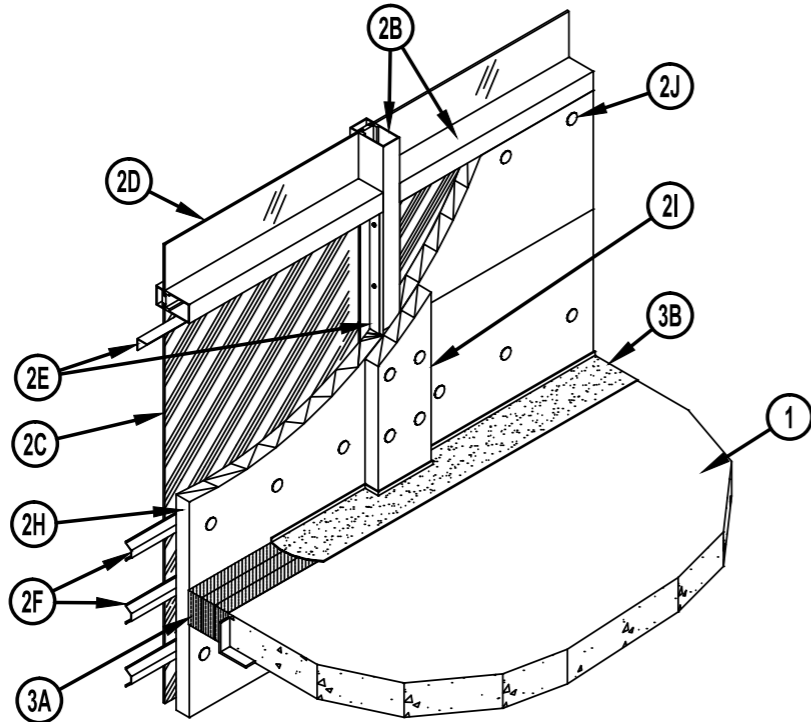
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Classified by
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System No. CW-D-2027
F Rating — 2 Hr
T Rating — 1/4 Hr
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 In. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

CWD 2027



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System No. CW-D-2027

CWD 2027

1. Floor Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete. Perimeter of floor assembly to be provided with min 4 by 4 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. Curtain Wall Assembly — The curtain wall assembly shall incorporate the following construction features:
 - A. Mullion Mounting Clips — Min 4 in. (102 mm) long angles with one nom 4 in. (102 mm) leg for attachment to edge of floor assembly and with one leg approx 4 in. (102 mm) longer than distance to nearest face of mullion. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Each clip to be provided with elongated holes to accommodate designed amount of movement. Top edge of each mounting angle to be recessed min 3/4 in. (19 mm) below top surface of floor.
 - B. Framing — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. (64 mm) wide by 5 in. (127 mm) deep and shall be formed from min 0.100 in. (2.5 mm) thick aluminum. Mullions spaced max 60 in. (1524 mm) OC and secured to mullion mounting clips (Item 2A) at each floor level with two 1/2 in. (13 mm) diam by 4 in. (102 mm) long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. (203 mm) from edge of floor assembly. Transoms framing top and bottom edges of spandrel panels (Item 2C) to be spaced min 72 in. (1829 mm) OC. Transom forming sill of vision panel (Item 2D) to be located such that its bottom surface is at height of 33 in. (838 mm) above the top surface of the floor (Item 1).
 - C. Spandrel Panels — Nom 1/4 in. (6 mm) thick opaque heat-strengthened glass, nom 1/8 in. (3.2 mm) thick aluminum panels with 1/4 in. (6 mm) thick edges or nom 1-3/16 in. (30 mm) thick polished granite spandrel panels with 1 in. (25 mm) thick gauged edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
 - D. Vision Panels — Nom 1/4 in. (6 mm) thick transparent heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
 - E. Spandrel Panel Perimeter Angles — Nom 1-1/2 by 1-1/2 in. (38 by 38 mm) No. 22 gauge galvanized steel angles installed around entire perimeter of each spandrel panel. Angles recessed from interior face of framing as necessary to accommodate thickness of curtain wall insulation (Item 2H). Angles notched as necessary to be continuous over mullion mounting clips (Item 2A). Angles screw-attached to mullions and transom along sides and top of each spandrel panel with No. 10 by 1/2 in. (13 mm) long self-drilling, self-tapping steel screws spaced max 12 in. (305 mm) OC. Angle along bottom of each spandrel panel to be screw-attached to leg of angle on mullion at each end without any direct attachment to transom.
 - F. Stiff Back Channel — Nom 2-1/2 in. (64 mm) wide by 7/8 in. (22 mm) deep hat-shaped channel formed of 22 gauge galv steel to be installed to stiffen curtain wall insulation between mullions above, below and at elevation of safin joint. One stiff back channel to be located with its centerline approx 6 in. below floor and one stiff back channel to be located with its centerline approx 6 in. above floor. A third stiff back channel is to be located near the midheight of the safin joint. A clearance of 1/4 to 1/2 in. (6 to 13 mm) shall be maintained between the ends of the stiff back channels and the mullions. Stiff back channel secured to mullion at each end with channel attachment clip (Item 2G) in conjunction with a No. 8 by 1/2 in. (13 mm) long self-drilling, self-tapping wafer head steel screw or a 3/16 in. diam steel bolt with nut and washer.
 - G. Channel Attachment Clips — Nom 1-1/2 by 2-1/2 by 1-1/2 in. (38 by 64 by 38 mm) long angle formed of 16 gauge galv steel. The 2-1/2 in. (64 mm) leg is provided with a 1/4 in. (6 mm) wide by 1-1/2 in. (38 mm) long slot along its centerline for attachment of the stiff back channel. Clips secured to mullions mounting clips (Item 2A) and mullions, through perimeter angles, with two No. 10 by 1/2 in. (13 mm) long self-drilling, self-tapping steel screws. Channel attachment clips attached to mullion mounting clips to be provided with elongated holes to accommodate designed amount of movement. Channel clips installed with 2-1/2 in. (64 mm) leg recessed from interior face of mullion to accommodate thickness of curtain wall insulation (Item 2H).



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System No. CW-D-2027

CWD 2027

H. Curtain Wall Insulation* — Min 2 in. (51 mm) thick mineral wool board insulation, unfaced or faced on one side with aluminum foil/ scrim vapor retarder, supplied in min 36 in. (914 mm) wide boards. Insulation boards to be installed with no vertical seams. A full-width board shall be centered at the midheight of floor and tightly fitted between vertical mullions, flush with interior surface of framing. The centered board shall be secured to the stiff back channels (Item 2F) located approx 6 in. (152 mm) above and below the floor with cup head weld pins (Item 2J) spaced max 10 in. (254 mm) OC along each channel. The remainder of the spandrel panel framing above and below the centered full-width board shall be filled in with additional lengths of board cut to fit tightly between mullions and with the horizontal seams between boards sections tightly butted. The boards shall be secured to the spandrel panel perimeter angles with cup head weld pins at each corner of each board and spaced max 10 in. (254 mm) OC. When faced boards are used, butted seams to be covered with min 4 in. (102 mm) wide aluminum foil tape.

ROCKWOOL MALAYSIA SDN BHD — CurtainRock 80
ROXUL INC — CurtainRock 80

I. Framing Covers - Curtain Wall Insulation* — Min 8 in. (203 mm) wide strips cut from the same min 2 in. (51 mm) thick mineral wool batt insulation used for the curtain wall insulation (Item 2H). Framing covers to be centered over mullions, and secured to the spandrel panel perimeter angles (Item 2E) with cup head weld pins (Item 2J) spaced max 12 in. (305 mm) OC. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. (203 mm) wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safig material (Item 3A) above and below floor.

ROCKWOOL MALAYSIA SDN BHD — CurtainRock 80
ROXUL INC — CurtainRock 80

J. Weld Pin — No. 12 gauge galv steel weld pin with nom 1-3/16 in. (30 mm) diam galv steel cup head. Cup head weld pins provided in two lengths. One length to be equal to thickness of curtain wall insulation (Item 2H) and second length to be equal to thickness of curtain wall insulation plus thickness of framing cover (Item 2I). Cup head weld pins inserted through curtain wall insulation and mullion covers and welded to spandrel panel perimeter angles at max OC spacings referenced in Items 2H and 2I.

3. Safing System — Max separation between edge of floor assembly and face of framing member at time of installation is 8 in. (203 mm). The safing system is designed to accommodate vertical shear up to 5% of its installed width. The safing system shall incorporate the following construction features:

A. Forming Material* — Nom 4 in. (102 mm) thick, mineral wool batt safig material to be installed in continuous pieces between mullion clips. Safing material to be cut to a min 4-1/2 in. (114 mm) width and stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the curtain wall and the edge of the concrete floor slab. The safig material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top-surface of the floor assembly and such that it is friction-fit between mullion mounting angles. Additional pieces of safig material to be friction-fit into space between mullion mounting clips at each mullion location with top edges of mullion clips covered with a min 1/2 in. (13 mm) thickness of compressed safig material.

ROCKWOOL MALAYSIA SDN BHD — SAFE
ROXUL INC — SAFE

B. Fill, Void or Cavity Material* — Min 1/16 in. (1.6 mm) dry (1/8 in. or 3.2 mm wet) thickness of fill material applied over top of forming material and lapping min 1 in. onto top surface of concrete floor and onto the curtain wall insulation and framing covers. When CFS-SP SIL is used, min wet (and dry) thickness of spray is 2 mm.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 672 FC Firestop Joint Spray, CFS-SP SIL Firestop Silicone Joint Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark



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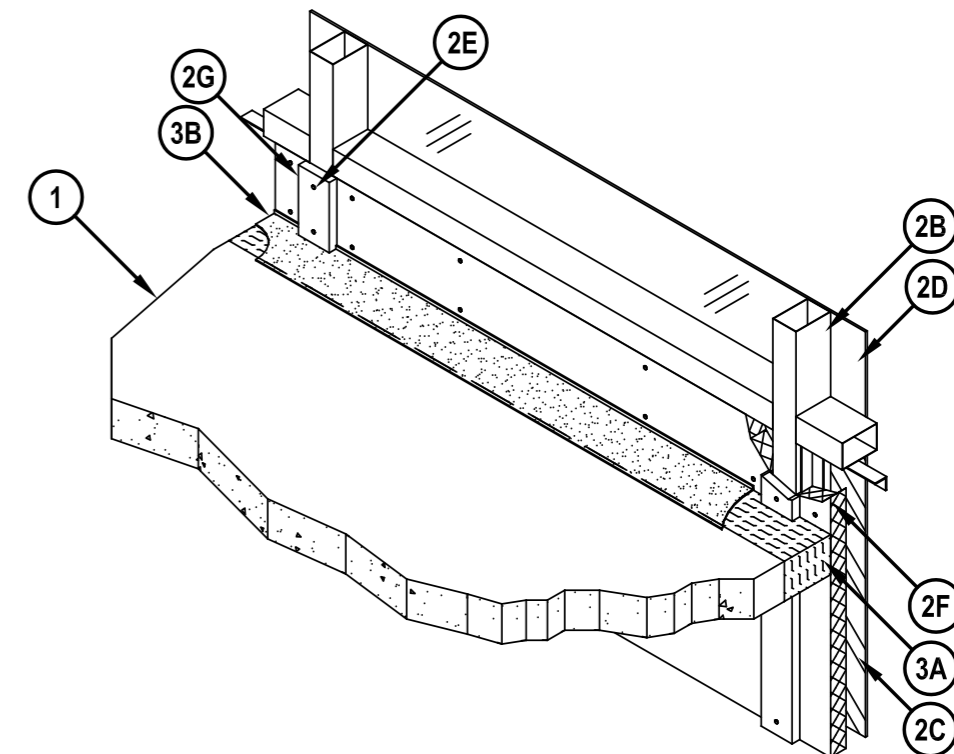
Design No. CEJ 216 P (HI/BP 120-06) PERIMETER FIRE BARRIER SYSTEM

CEJ 216 P

Hilti, Inc.
ASTM E 2307
Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2-HR.	2-HR.
T-RATING	1-HR.	1-HR.
APPLICATION THICKNESS	1/8" WET FILM	2mm (0.079") WET FILM
CYCLING (%)		
HORIZONTAL	± 15	± 7.5
VERTICAL	± 5	± 5
SEE NOTE 1		

L-Rating N/A



Hilti Firestop Systems

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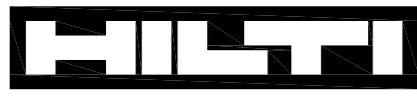
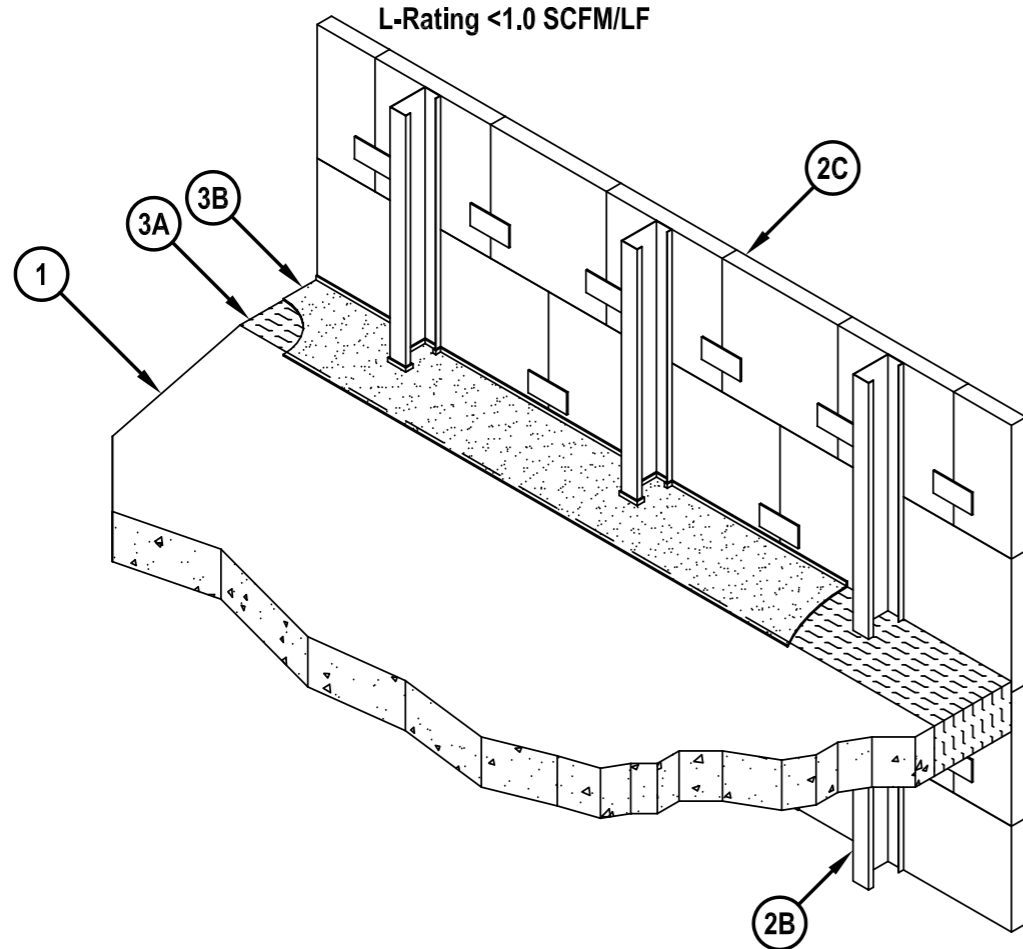
Design No. CEJ 244 P (HI/BP 120-07)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2-HR.	2-HR.
T-RATING	1-HR.	1-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	± 9.5 ± 5	± 7.5 ± 5

CEJ 244 P

L-Rating <1.0 SCFM/LF



Hilti Firestop Systems

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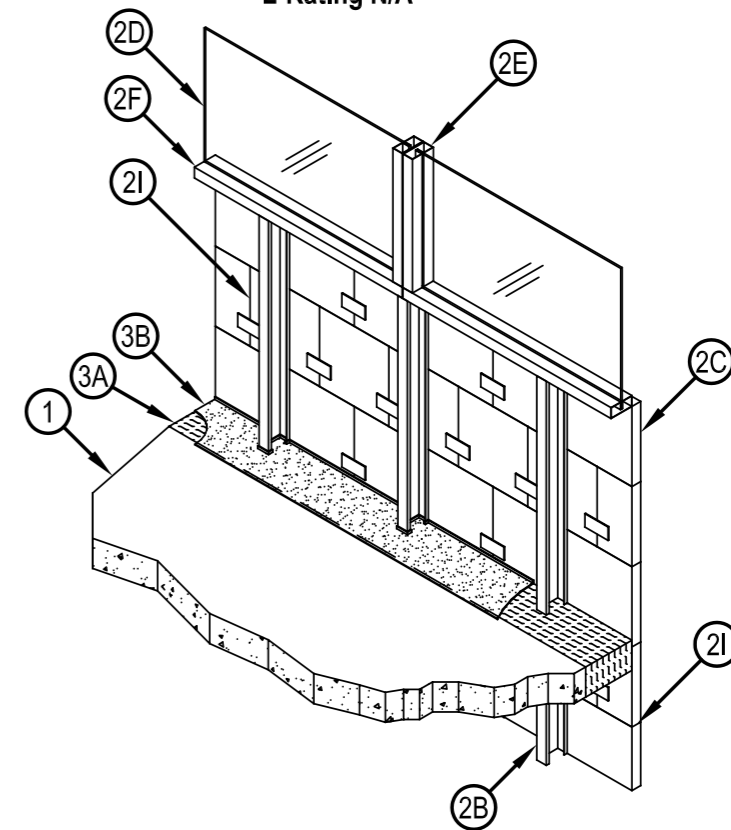
Design No. CEJ 245 P (HI/BP 135-01)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2 1/4-HR.	2 1/4-HR.
T-RATING	2 1/4-HR.	2 1/4-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	± 12.5 ± 5	± 7.5 ± 5

CEJ 245 P

L-Rating N/A



1. CONCRETE FLOOR ASSEMBLY: Two hour rated concrete floor assembly made from either lightweight or normal weight concrete with a density of 100-150 pcf, with a min. thickness of 4-1/2 in. at the joint face. Overall slab thickness may vary to accommodate various blockout depths (longitudinal recesses) formed in the concrete, to house the architectural cover plate. The blockout width may also vary without restriction.



Hilti Firestop Systems

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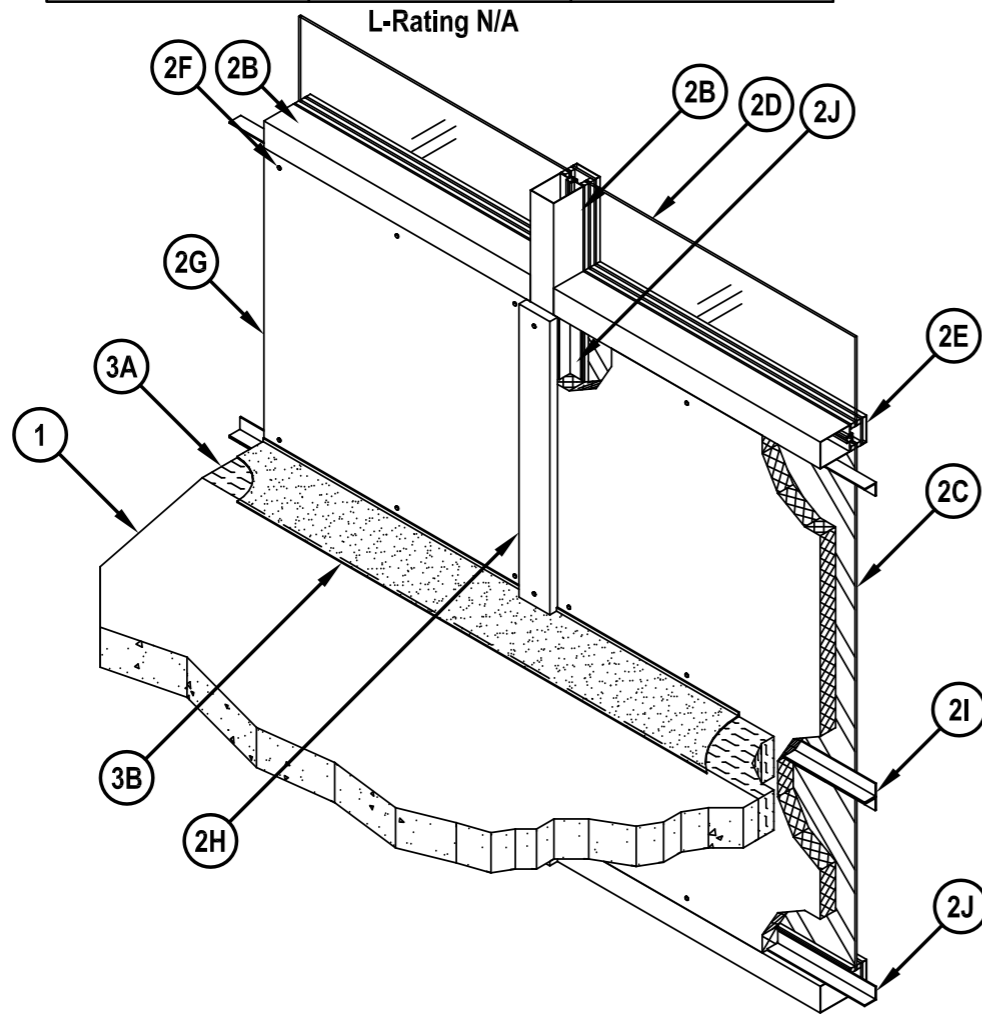
Page: 1 of 2

Design No. CEJ 246 P (HI/BP 120-01)
PERIMETER FIRE BARRIER SYSTEM

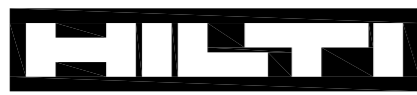
Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	1 3/4-HR.	1 3/4-HR.
T-RATING	1 1/4-HR.	1 1/4-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	± 15 ± 5	± 7.5 ± 5

L-Rating N/A



CEJ 246 P



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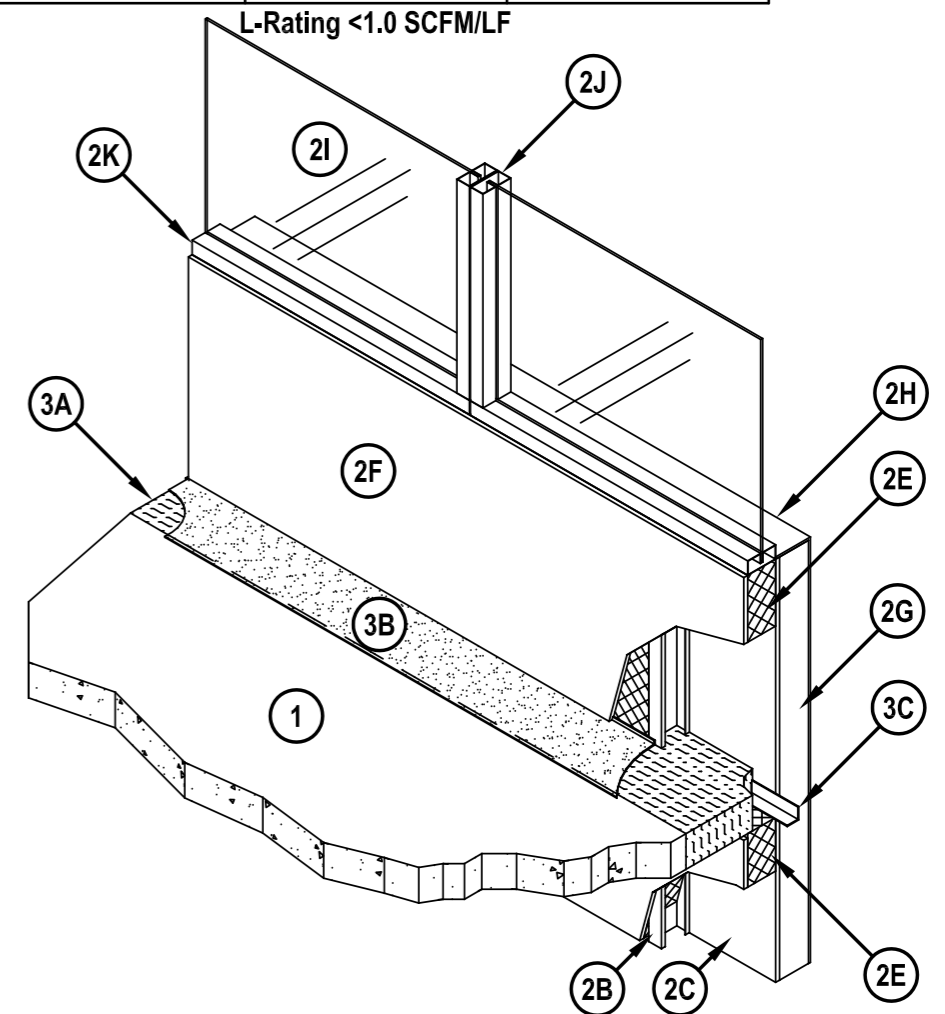
Page: 1 of 3

Design No. CEJ 259 P (HI/BP 120-08)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2-HR.	2-HR.
T-RATING	1-HR.	1-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	± 7.5 ± 5	± 7.5 ± 5

L-Rating <1.0 SCFM/LF



CEJ 259 P



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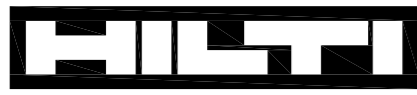
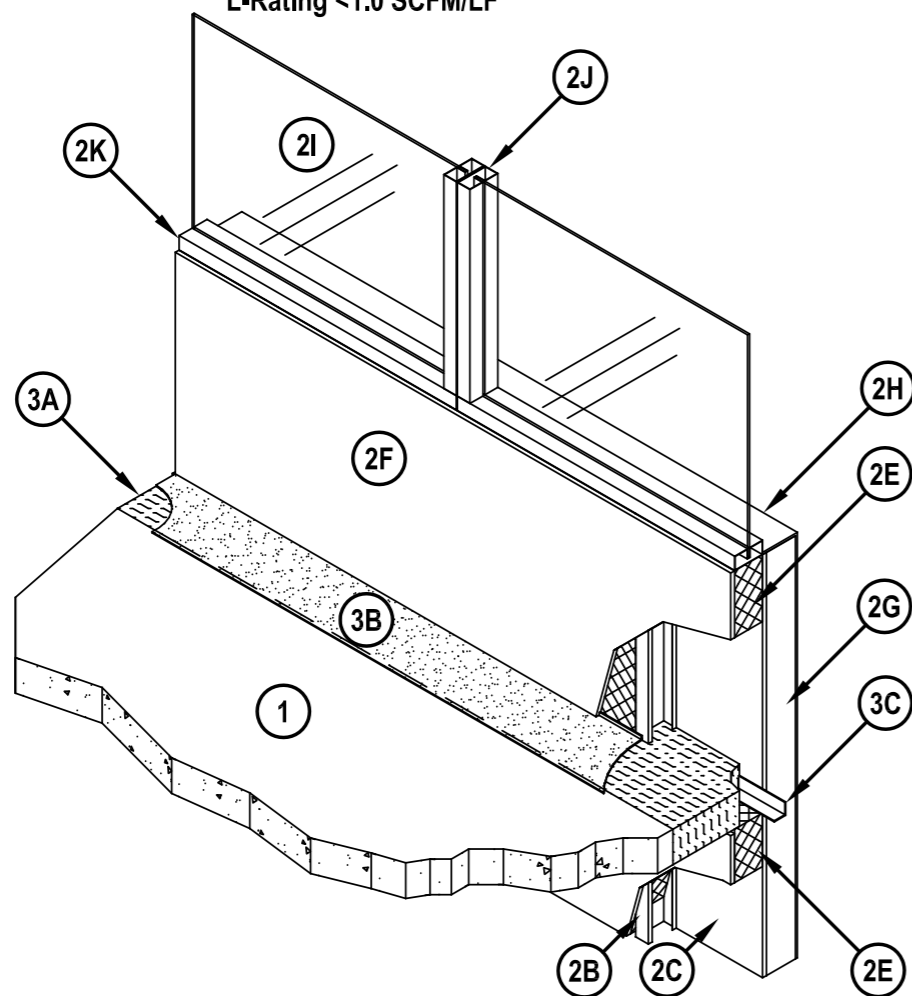
Page: 1 of 3

Design No. CEJ 260 P (HI/PHV 120-06)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2-HR.	2-HR.
T-RATING	1-HR.	1-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	± 7.5 ± 5	± 7.5 ± 5

L-Rating <1.0 SCFM/LF



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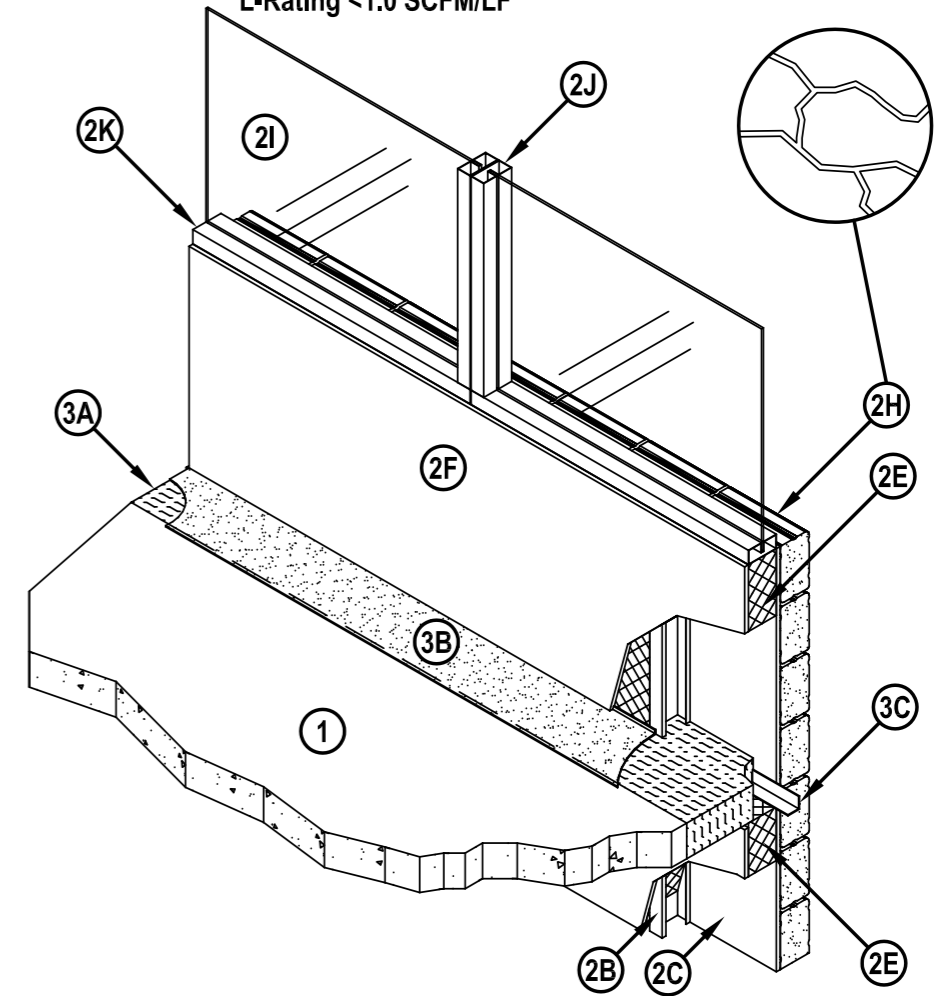
CEJ 260 P

Design No. CEJ 261 P (HI/PHV 120-07)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2-HR.	2-HR.
T-RATING	1-HR.	1-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	± 7.5 ± 5	± 7.5 ± 5

L-Rating <1.0 SCFM/LF



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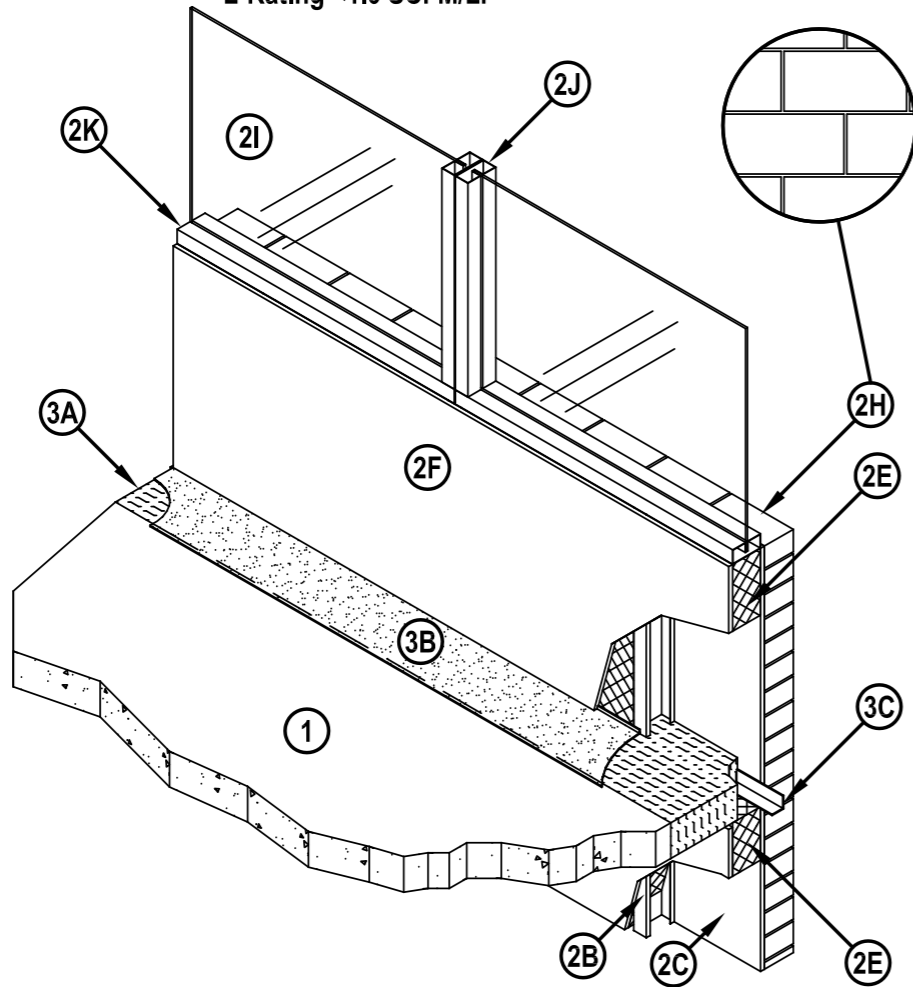
CEJ 261 P

Design No. CEJ 262 P (HI/PHV 120-08)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2-HR.	2-HR.
T-RATING	1-HR.	1-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	± 7.5 ± 5	± 7.5 ± 5

L-Rating <1.0 SCFM/LF



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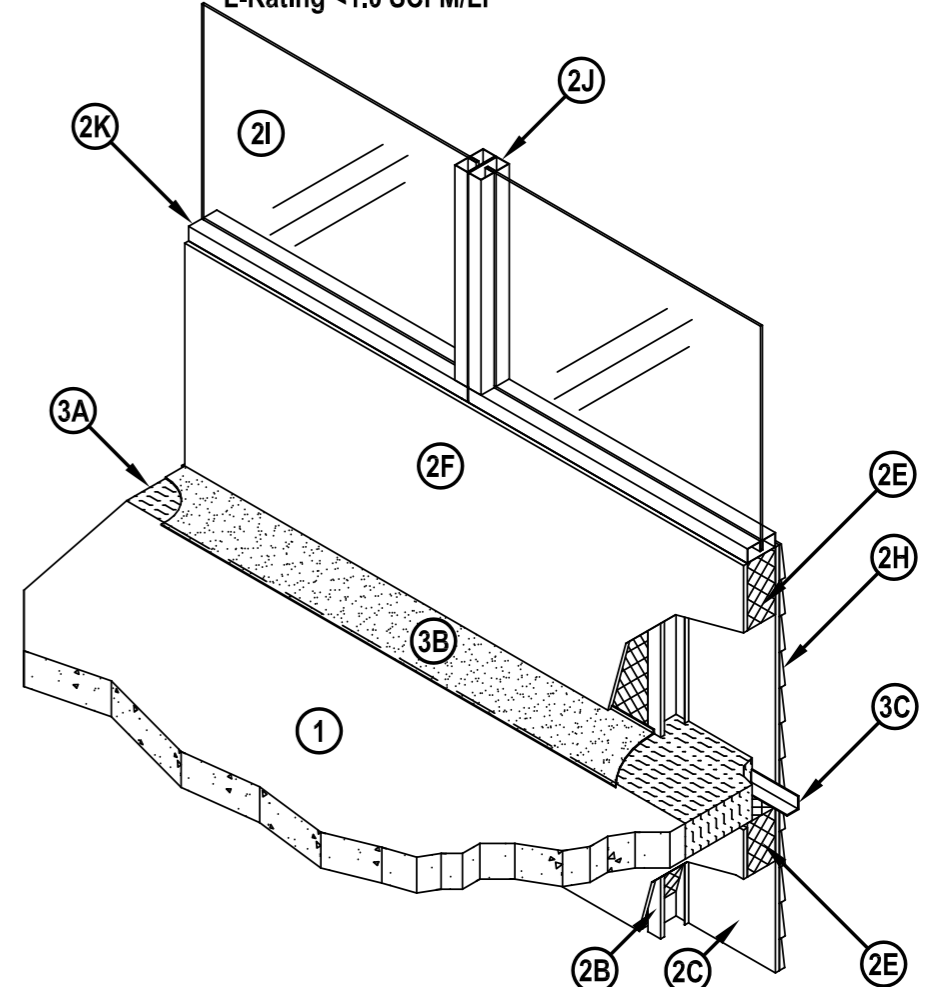
CEJ 262 P

Design No. CEJ 263 P (HI/PHV 120-09)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2-HR.	2-HR.
T-RATING	1-HR.	1-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	± 7.5 ± 5	± 7.5 ± 5

L-Rating <1.0 SCFM/LF



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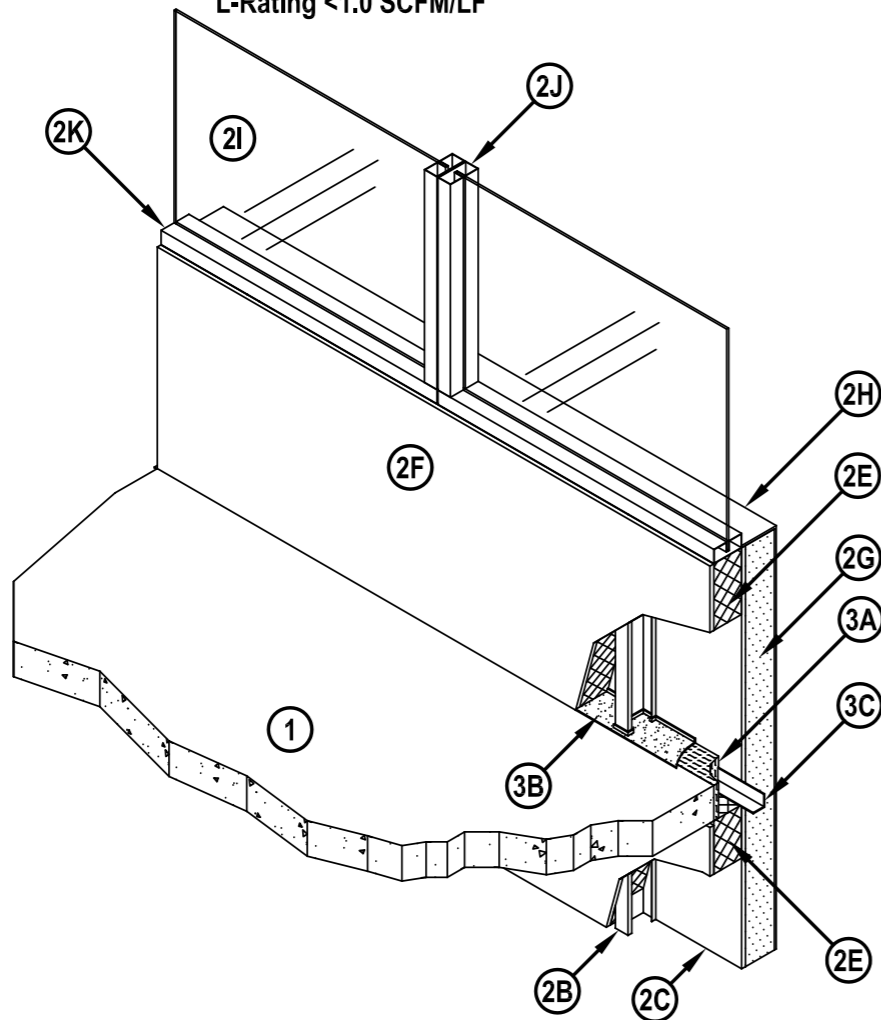
CEJ 263 P

Design No. CEJ 264 P (HI/PHV 120-10)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2-HR.	2-HR.
T-RATING	1-HR.	1-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%)	NONE	NONE

L-Rating <1.0 SCFM/LF



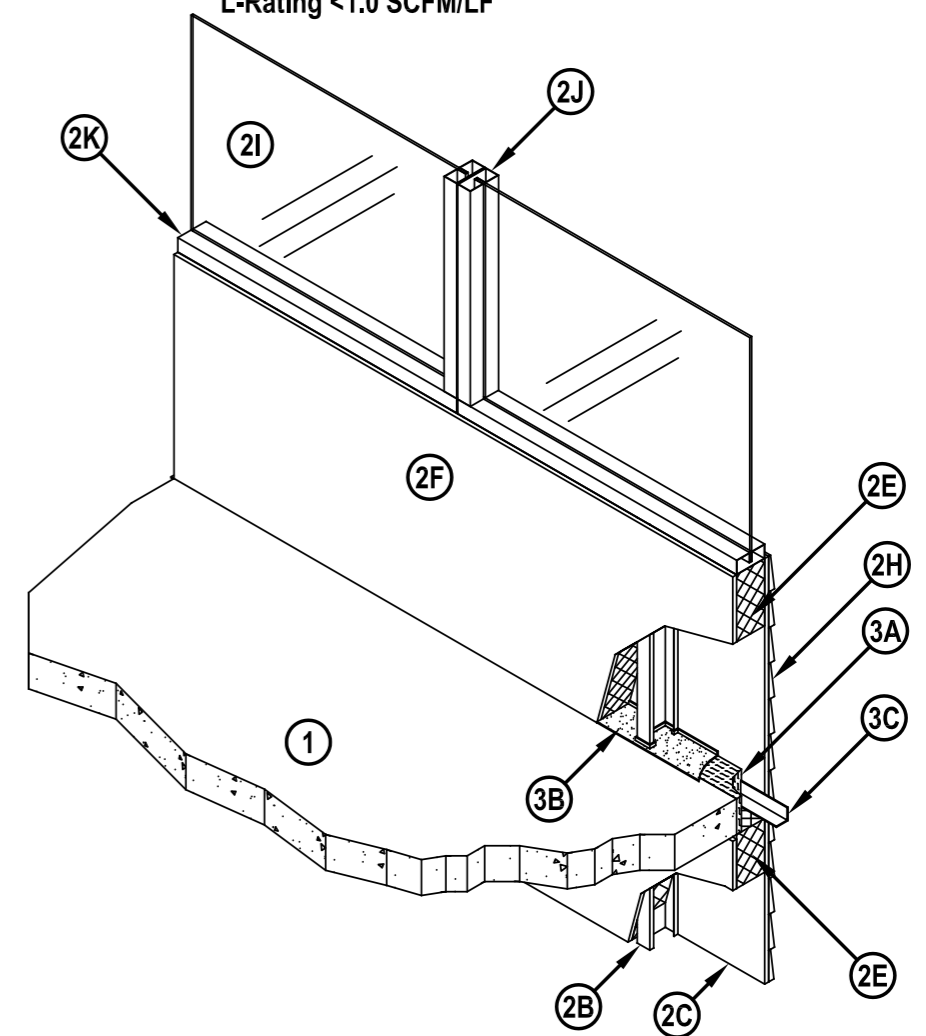
CEJ 264 P

Design No. CEJ 265 P (HI/PHV 120-11)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2-HR.	2-HR.
T-RATING	1-HR.	1-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%)	NONE	NONE

L-Rating <1.0 SCFM/LF



CEJ 265 P

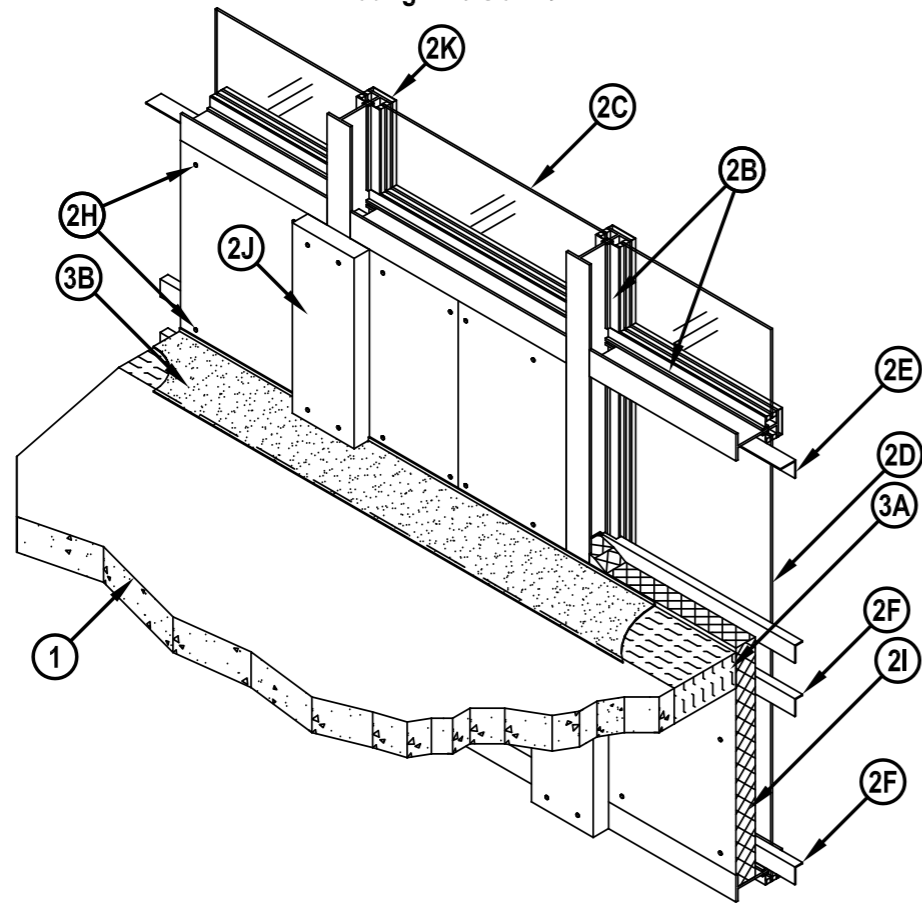
Design No. CEJ 308 P (HI/BP 180-02)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

CEJ 308 P

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	3-HR.	3-HR.
T-RATING	1 3/4-HR.	1 3/4-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	± 11.25 ± 5	± 7.5 ± 5

L-Rating <1.0 SCFM/LF



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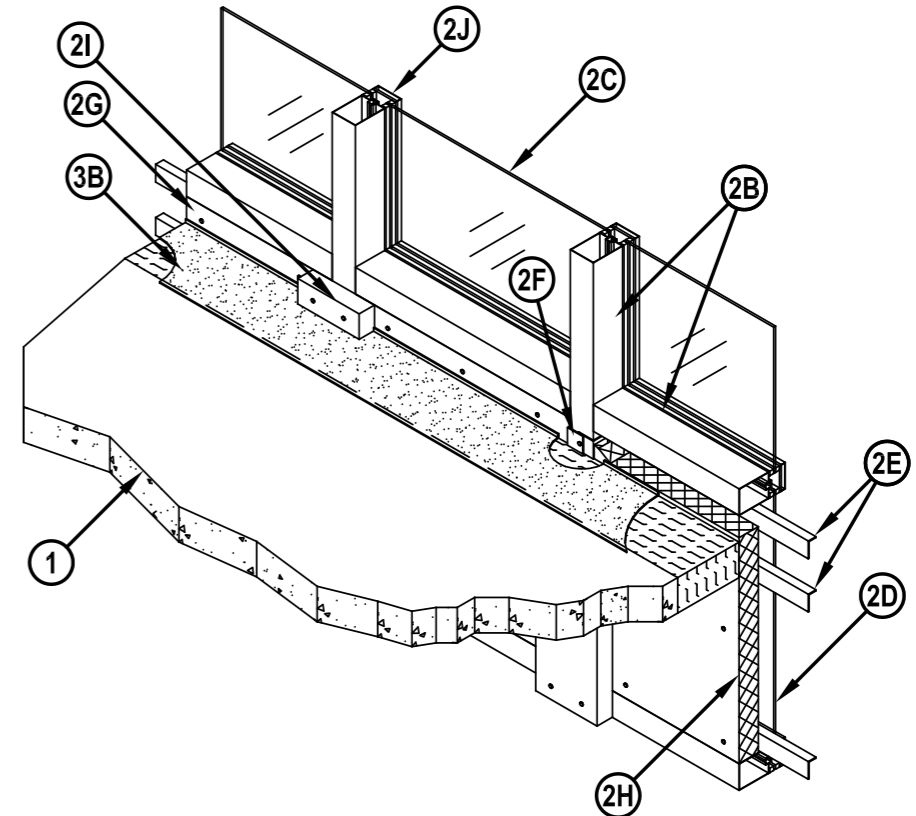
Design No. CEJ 309 P (HI/BP 105-01)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

CEJ 309 P

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	1 3/4-HR.	1 3/4-HR.
T-RATING	1 1/4-HR.	1 1/4-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	± 11.25 ± 5	± 7.5 ± 5

L-Rating <1.0 SCFM/LF



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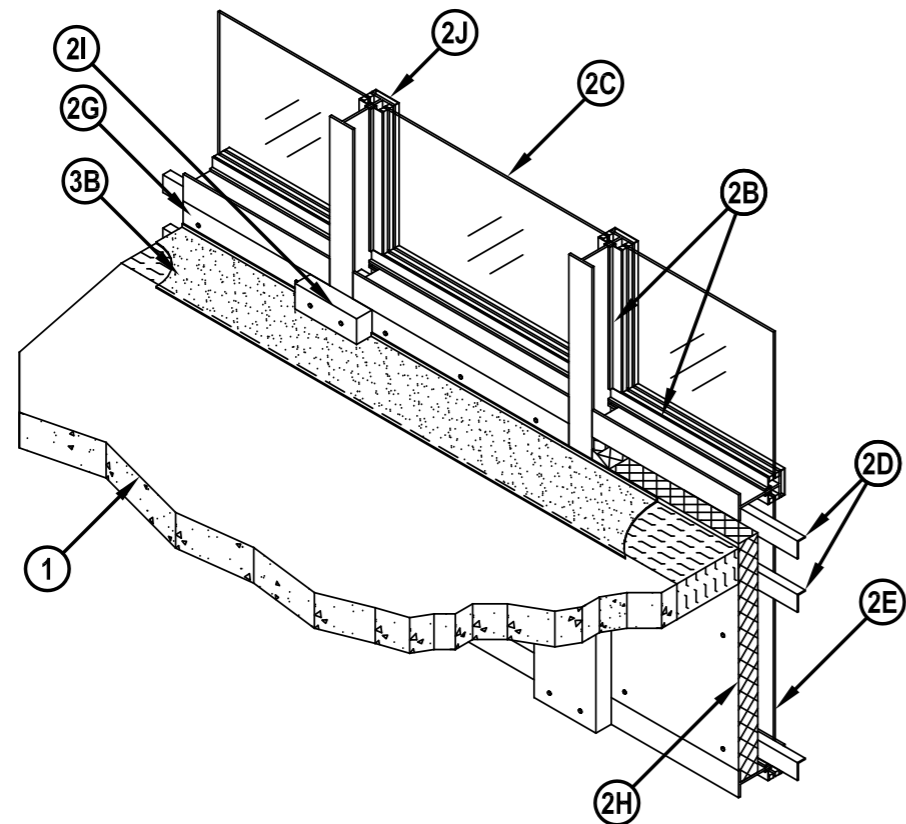
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Design No. CEJ 310 P (HI/BP 105-02)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	1 3/4-HR.	1 3/4-HR.
T-RATING	1 1/4-HR.	1 1/4-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	± 11.25 ± 5	± 7.5 ± 5

L-Rating <1.0 SCFM/LF



CEJ 310 P



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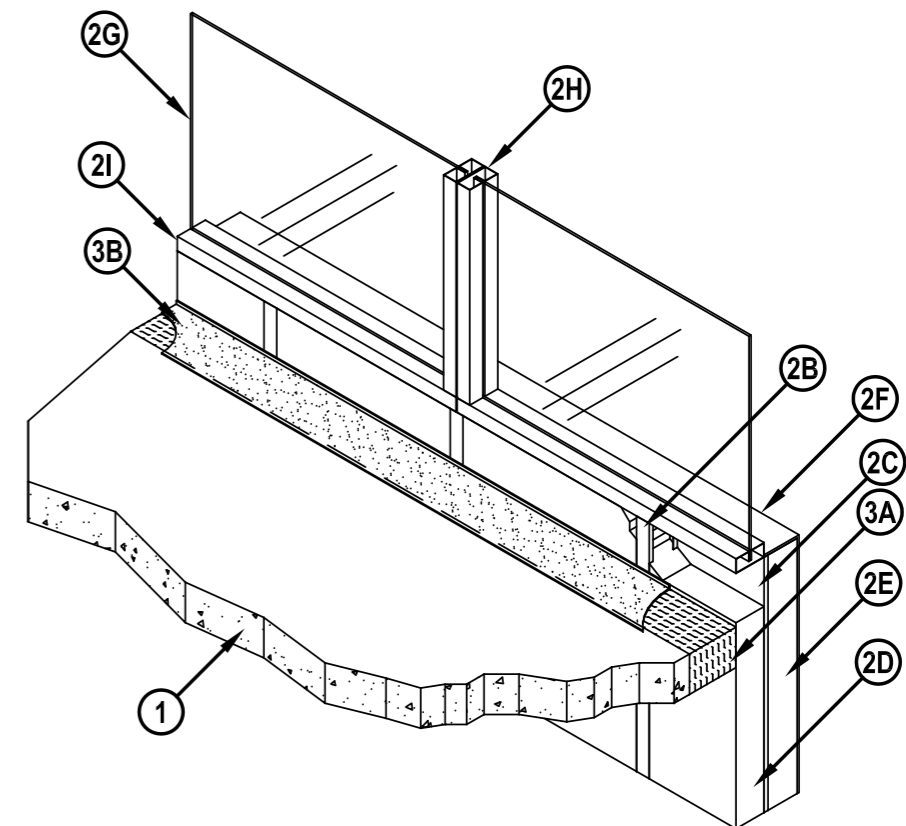
Page: 1 of 4

Design No. CEJ 315 P (HI/BP 165-02)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2 3/4-HR.	2 3/4-HR.
T-RATING	1-HR.	1-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	± 8.3 ± 5	± 7.5 ± 5

L-Rating <1.0 SCFM/LF



CEJ 315 P



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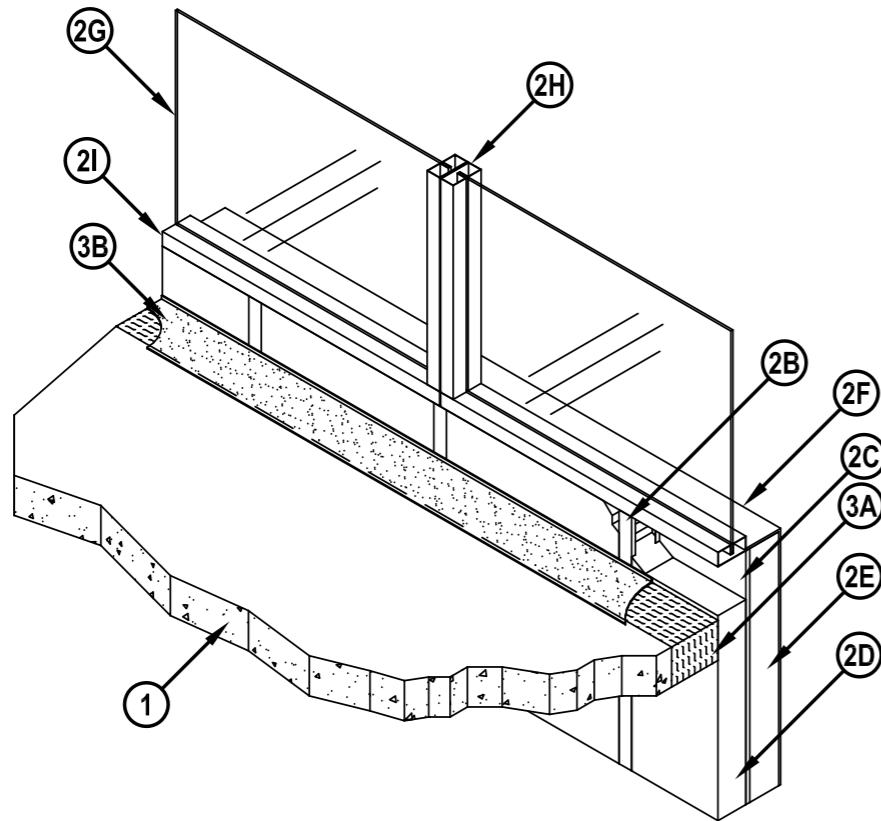
Page: 1 of 3

Design No. CEJ 316 P (HI/BP 165-03)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2 3/4-HR.	2 3/4-HR.
T-RATING	1-HR.	1-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	± 8.3 ± 5	± 7.5 ± 5

L-Rating <1.0 SCFM/LF



CEJ 316 P

Design No. CEJ 425 P (HI/BP 120-04)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2-HR.	2-HR.
T-RATING	1-HR.	1-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE NOTE 1	NONE NONE	NONE NONE

HEAD OF WALL JOINT SYSTEM

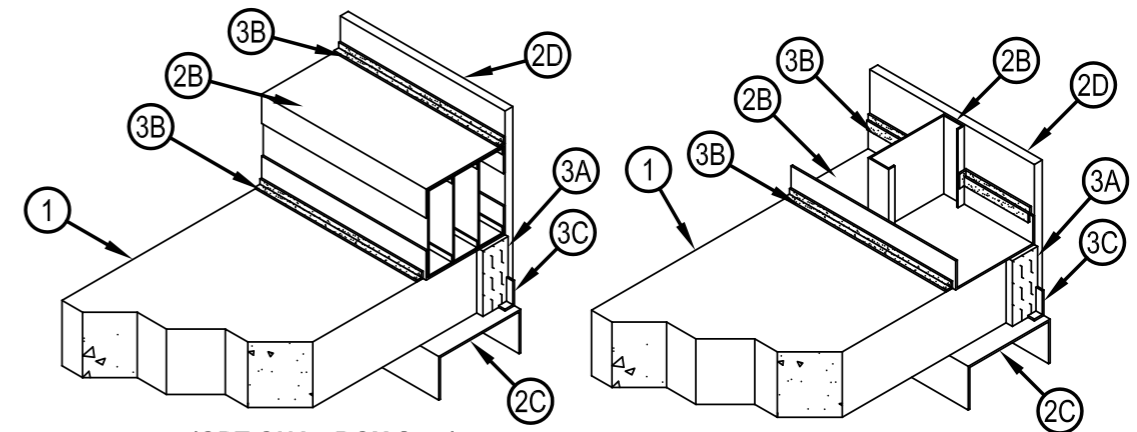
ASTM E 2307-04 Section 14.1 Movement

L-Rating <1.0 SCFM/LF

Rated for ± 0 % horizontal movement

Rated for - 100% downward vertical shear movement (3/4 in.) Class II 500 Cycles

Rated for + 0% upward vertical shear movement



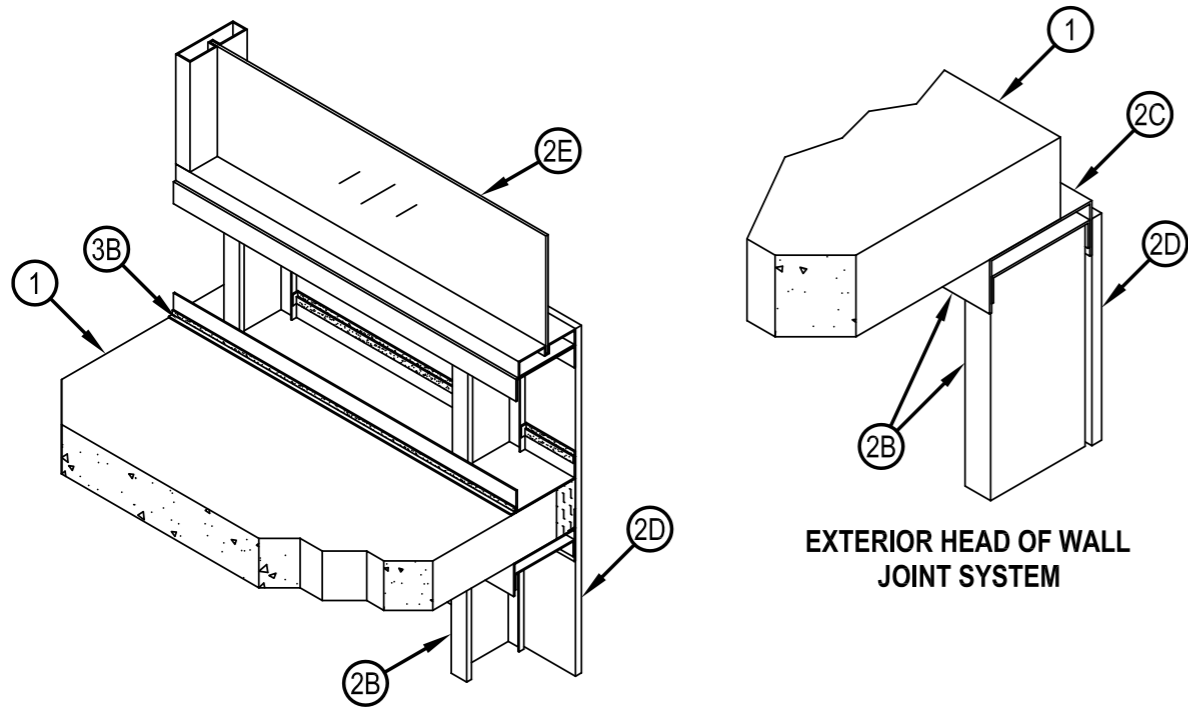
(OPTIONAL BOX SILL)

PERIMETER JOINT SYSTEM

CEJ 425 P

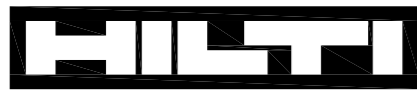
Design No. CEJ 425 P (HI/BP 120-04)

CEJ 425 P



EXTERIOR HEAD OF WALL JOINT SYSTEM

1. CONCRETE FLOOR ASSEMBLY: Min. two-hour rated concrete floor assembly (Item 1) made from either lightweight or normal weight concrete with a density of 100-150 pcf, with a min. thickness of 4 to 4-1/2 in., respectively, at the slab edge (joint face). Optional – Provided the two-hour concrete floor assembly (Item 1) rating is not compromised, the overall slab thickness may vary to accommodate various blockout depths (longitudinal recesses) formed in the concrete, to house an optional architectural joint system. The blockout width may also vary without restriction.
2. CURTAIN WALL ASSEMBLY: The curtain wall assembly shall incorporate the following construction features:
 - A. Mounting Attachment: (Not shown) Attach the steel-stud framing to the structural framing according to the curtain wall manufacturer's instructions. When required, connect the mounting attachments to the concrete floor assembly (Item 1) at the slab edge (joint face), according to the curtain wall manufacturer's instructions. Use a max. 10 ft. distance between mounting attachments.
 - B. Steel-Stud Framing: Use min. 6 in. by 1-5/8 in., 16 GA steel "C" studs cut to length as vertical framing members spaced a max. of 16 in. on center (oc), secure the ends of the steel studs in compatible sized 20 GA steel tracks, using min. #6 x 1/2 in. pan or hex head screws. Cantilever the floor track nominally 2 in. past the vertical face of the concrete floor assembly (Item 1). Secure the floor track to the top of the concrete floor assembly (Item 1) with 1/4 in. diameter x 2 in. long concrete screws (or either powder actuated fasteners or steel expansion bolts having equivalent strength and performance) spaced a max. of 24 in. oc. Insert the ceiling track inside the "slip-track (deflection channel)" to create a 3/4 in. gap between channels to allow for downward movement. Alternate Lighter Gauge Slotted Ceiling Track: Alternate to ceiling track above, use min. 24 GA galvanized steel channel with slotted flanges sized to accommodate min. 6 in. by 1-5/8 in., 16 GA steel "C" studs. Alternate Framing Box Sill: Alternate to steel-stud framing (Item 2B) created between window assembly and top of the concrete floor assembly (Item 1), use multiple min. 16 GA galvanized structural steel tracks or steel studs placed horizontally and secured together using min. #6 x 1/2 in. pan or hex head screws or welds and capped top and bottom with floor and ceiling tracks or use multiple min. 16 GA galvanized punched steel tracks or steel studs with all openings sealed with mineral wool placed horizontally and secured together using min. #6 x 1/2 in. pan or hex head screws or welds and capped top and bottom with floor and ceiling tracks.



Hilti Firestop Systems

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Courtesy of Intertek Group
June 20, 2014



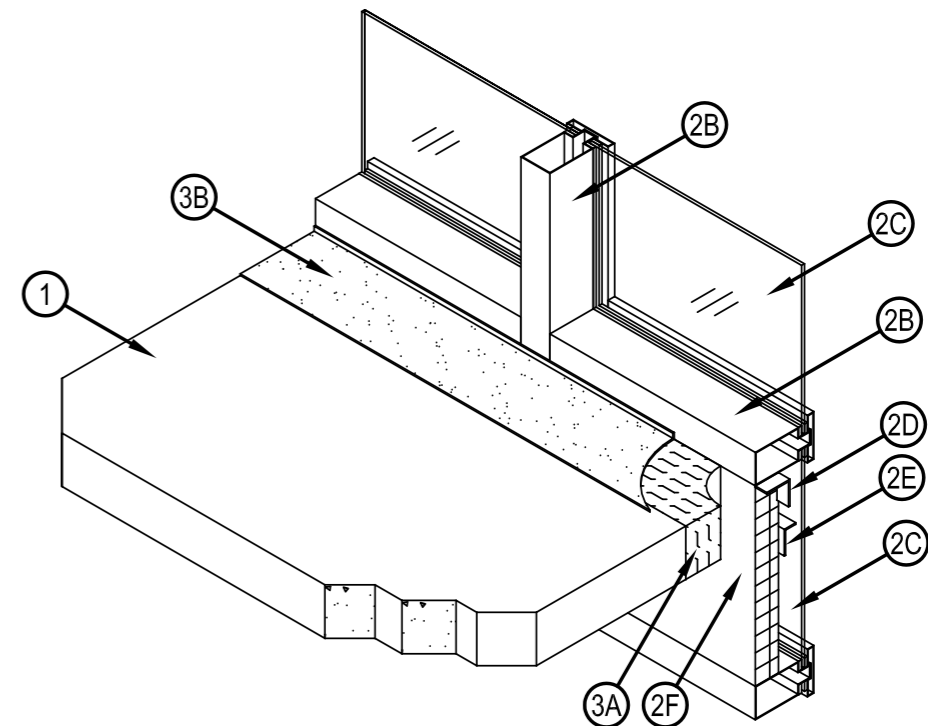
Page: 2 of 5

Design No. CEJ 526 P (HI/BP 60-01)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
ASTM E 2307
Table 1

CEJ 526 P

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	1-HR.	1-HR.
T-RATING	54-MIN.	54-MIN.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) VERTICAL SEE NOTE 1	±5	±5



Hilti Firestop Systems

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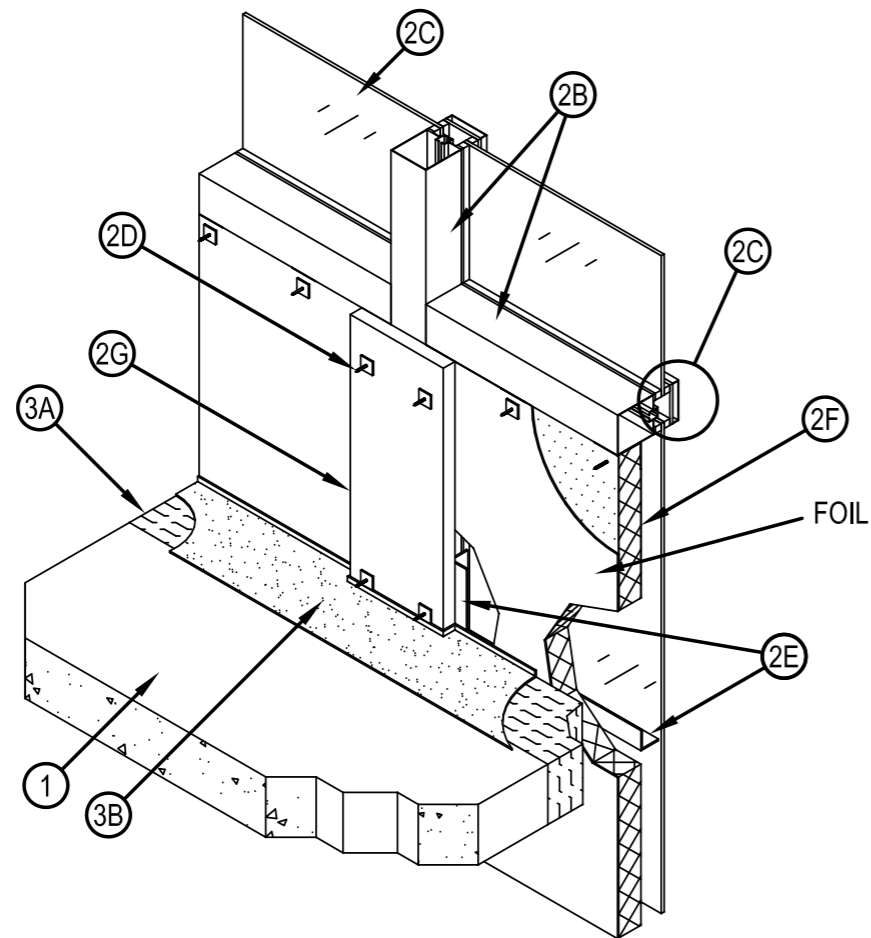
Page: 1 of 3

Design No. CEJ 529 P (HI/JS 120-04)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2-HR.	2-HR.
T-RATING	1 1/2-HR.	1 1/2-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE ITEM 3A	NONE ±25 (25% COMPRESSION)	NONE ±25 (25% COMPRESSION)

CEJ 529 P



Hilti Firestop Systems

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Page: 1 of 3

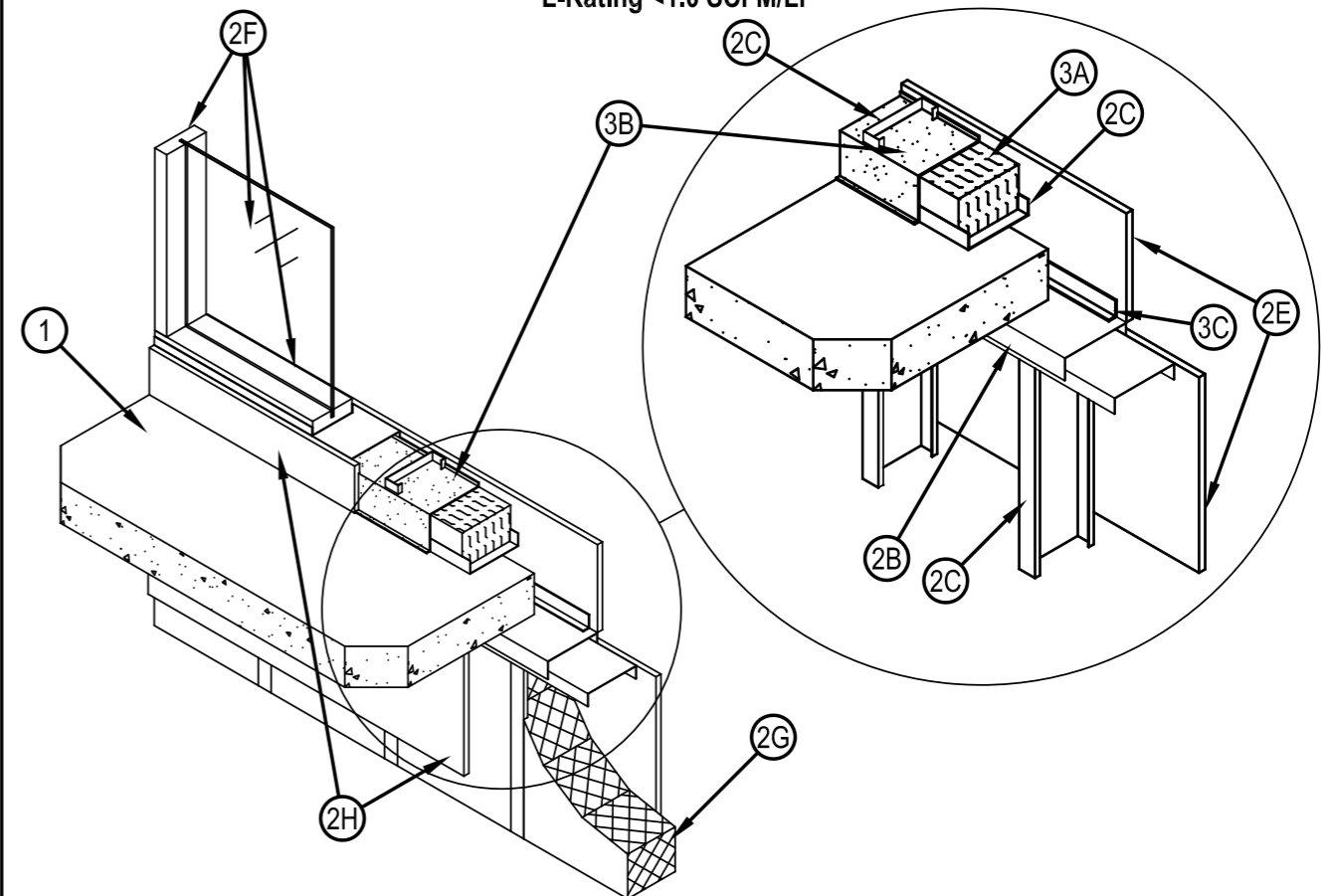
Design No. HI/BP 120-05
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2-HR.	2-HR.
T-RATING	1-HR.	1-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM

HI/BP 120-05

Rated for ± 0 % horizontal movement
 Rated for - 100% downward vertical shear movement (3/4 in.) Class II 500 Cycles
 Rated for + 0% upward vertical shear movement
 UL 2079
 L-Rating <1.0 SCFM/LF



Hilti Firestop Systems

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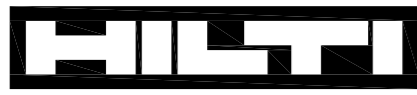
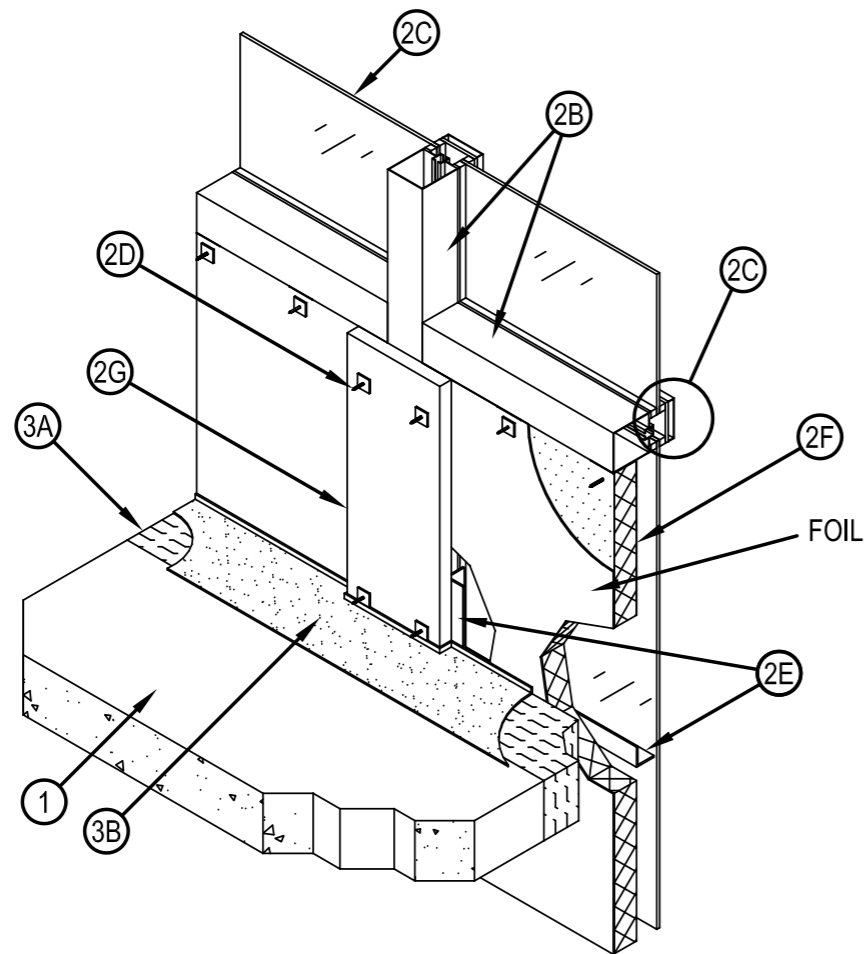
Page: 1 of 4

Design No. CEJ 127 P (HI/JS 120-05)
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

CEJ 127 P

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2-HR.	2-HR.
T-RATING	2-HR.	2-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL SEE ITEM 3A	NONE ±6.25 (25% COMPRESSION)	NONE ±6.25 (25% COMPRESSION)



Hilti Firestop Systems

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Page: 1 of 3

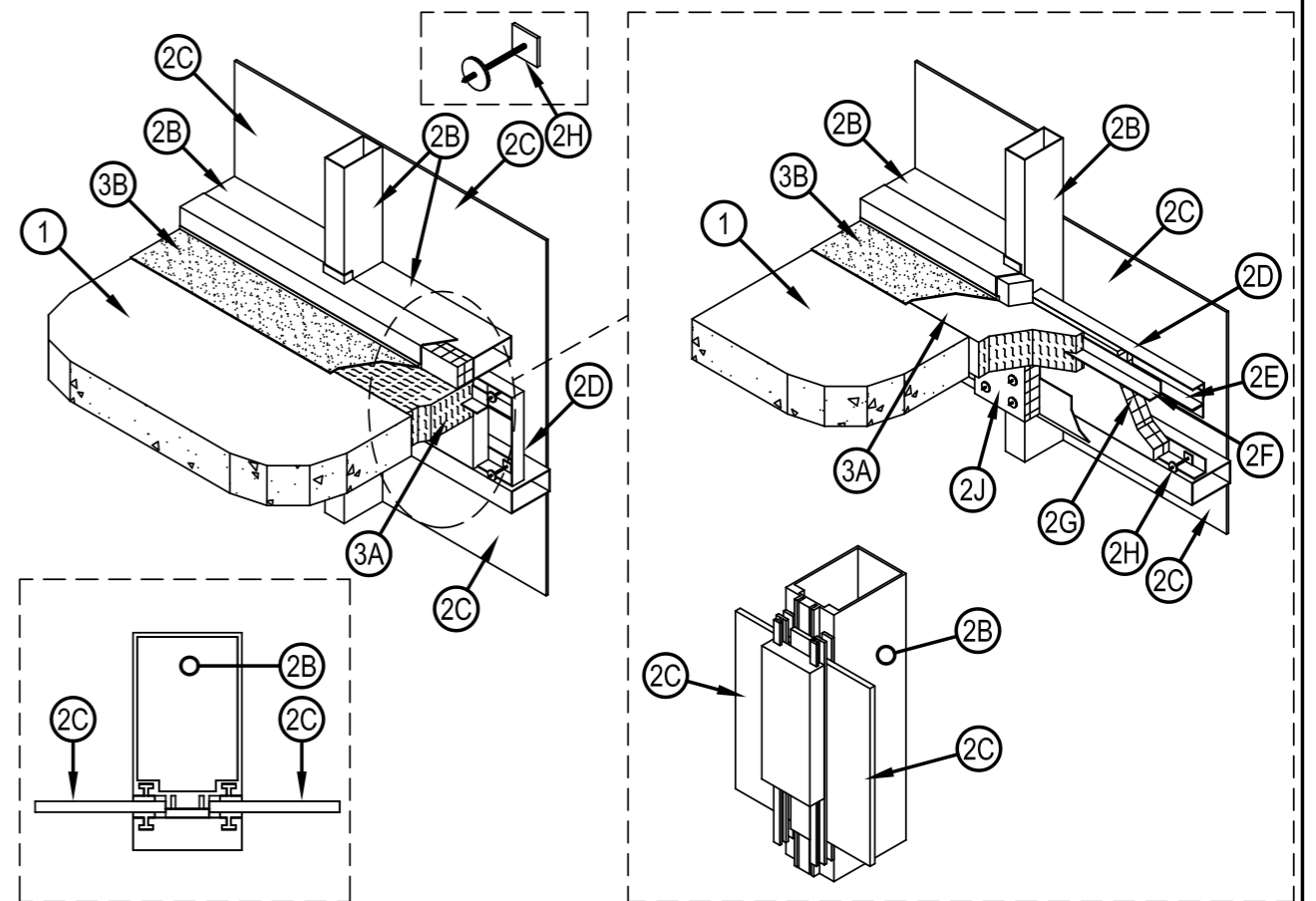
Design No. HI/BP 150-01
PERIMETER FIRE BARRIER SYSTEM

Hilti, Inc.
 ASTM E 2307
 Table 1

HI/BP 150-01

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	150 MINUTES	150 MINUTES
T-RATING	1-HR.	1-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%) HORIZONTAL VERTICAL	± 12.5 ± 5	± 7.5 ± 5

ASTM E 2307/ASTM E 1399 Cycling
 Class IV: 500 cycles @ 30 cpm
 UL 2079L-Rating <1.0 SCFM/LF



Hilti Firestop Systems

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Page: 1 of 3

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**Burj Khalifa Tower & Podium
Dubai, UAE**
Hilti solution(s): fixation with anchors & firestop protection



**Fairmont Hotel
Abu Dhabi, UAE**
Hilti solution(s): curtain wall fixation with anchors & firestop protection

**The Address Hotel
Downtown
Dubai, UAE**
Hilti solution(s): firestop protection in renovation phase



**Dubai Opera
Dubai, UAE**
Hilti solution(s): curtain wall fixation with anchors & direct fastening





**The Cube
Birmingham, UK**
Hilti solution(s): curtain
wall fixation with anchors,
direct fastening & firestop
protection`



**Louis Vuitton
Shanghai, China**
Hilti solution(s): curtain
wall fixation with cast-in
channels & anchors

**Iberdola Tower
Bilbao, Spain**
Hilti solution(s): curtain wall
fixation with anchors
& firestop protection



**Barangaroo
Sydney, Australia**
Hilti solution(s): curtain wall
fixation with anchors



CONTENTS AND OVERVIEW OF THIS SECTION

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HILTI SERVICES

Support from our Experts

We want to work with you across the entire value chain - from Customer Service, Engineering, Marketing, Repair, Finance, Logistics, Training and Human Resources - to bring you in direct contact with our experts, so you can experience the full power of Hilti.



We're Nearby

We want to develop a long-term business relationship with you by bringing an individual approach and tailor-made solutions you can rely on.

By listening and understanding your challenges we want to wow and engage you with value-adding, world-class services and VIP treatment.

Give us your trust and we will show you our innovation, enthusiasm and commitment.



CUSTOMER SERVICE

We're ready to answer your questions, take your orders, and meet your requests.



HILTI REPRESENTATIVE

At your service on your job-sites, bringing experience that helps you stay a step ahead by providing application know-how and solutions for complex solutions, helping you select the optimum product for the job, as well as giving on-site demonstrations of innovative products.



HILTI STORE

here Hilti products are available off the shelf - backed by the know-how and experience of our competent staff. Ask for a product demonstration and be sure to leave with the right solution for your needs. Bring us your Hilti tool if it needs servicing - we will check it in the Hilti Store and suggest the best course of action.



HILTI ONLINE

Order, manage your tools, check stock availability and more. Hilti's website is available around the clock for advice and information, including an online catalogue of products, a technical library, and details of your local Hilti Store.

Use our Mobile App when you are on the move.

THE SPEED OF SIMPLICITY

Anytime you buy a Hilti tool, you buy more than just a tool. You also get the incredibly simple, extra fast Hilti Tool Service. 1 click or a call does it all: we'll pick-up your tool for repair and get it back to you within 3 days, or the service is free.



HILTI ENGINEERING COMPETENCE CENTER

Highly-trained Hilti Engineers will provide you optimum solutions for any challenges on your project

Professional & Tailormade Solutions to help you solve all technical challenges on your jobsite



GET FAST SERVICE!

CALL 800-HILTI (44584)
HILTI CUSTOMER SERVICE

Always an easy fix -
It's uniquely simple

Your Hilti tool is made to work - that's why we've set up the simplest, fastest repair service in the industry. Just give us a call or visit hilti.com - we'll take care of the rest. No matter where you are, you're guaranteed a convenient, straight-forward repair, with no proof of purchase or registration required.

Hilti Tool Service makes it incredibly simple for you:

- Hilti tools are automatically registered to your name during purchase, so no proof of purchase is required for service
- 1 click or a call does it all: simply dial 800-HILTI (44584) Hilti Customer Service. We'll take care of the rest!
- On-site pick-up and delivery
- Know at a glance where your tool is with our new track and trace app



AS EASY AS IT GETS: 1 CLICK OR A CALL DOES IT ALL

Visit hilti.com or just dial 800-HILTI (44584) Hilti Customer Service. We'll take care of the rest - from on-site pick-up to on-site delivery.

Unique speed:
3 days or free

Get your tool serviced and cleaned in 3 days - only with Hilti Tool Service!

- Tried and true repair process - guaranteed or it's free: 1 day inbound, same day repair, 1 day outbound.
- Smooth, on-site pick-up and delivery from one of our trusted carriers.
- With our modern Hilti Tool Service Centers around the world, your tool is in good hands and will be nearby.

Unique coverage:
Full cost control - no exceptions

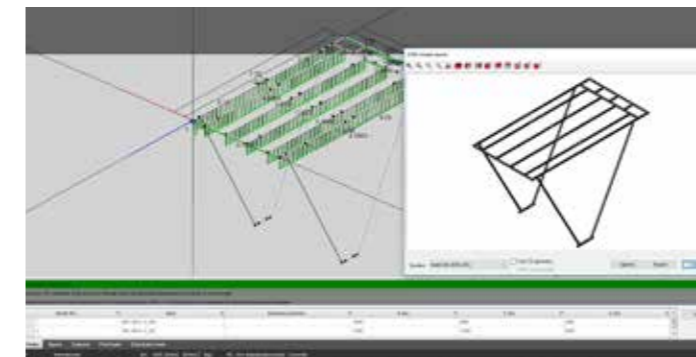
Uniquely predictable, so there's never any financial guess-work.

- Up to 2 years no cost, including wear and tear, pick-up and delivery
- After 2 years, repair costs are capped - no exceptions!
- Manufacturer's warranty against parts and manufacturer irregularities
- No costs for 3 months after each paid repair.

DESIGN AND DRAWING

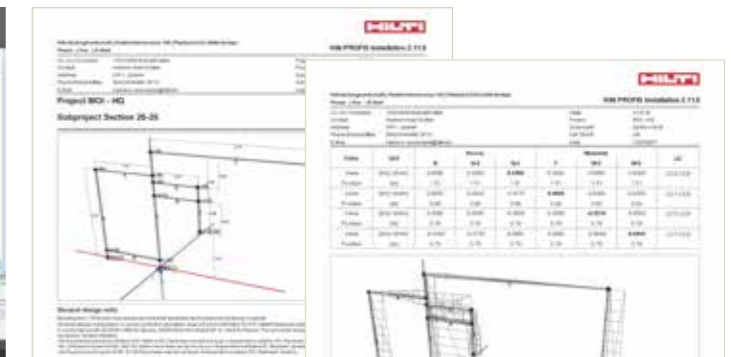
Whenever you need support in identifying the most suitable, cost effective and approved solution for any project, our professional in house engineering team will be on your side.

- Anchors & rebar design
- MEP modular support solutions
- Firestop
- CAD & BIM details



DESIGN AND DRAWING SERVICES

- Design of modular support for MEP services
- 2D and 3D CAD drawings
- Anchor fixation design
- Post installed rebar design
- Composite slab designs
- Elevator related design services
- Integrated floor & raised floor systems
- High voltage and electrical cabinet support design



FIRESTOP ENGINEERING JUDGEMENT

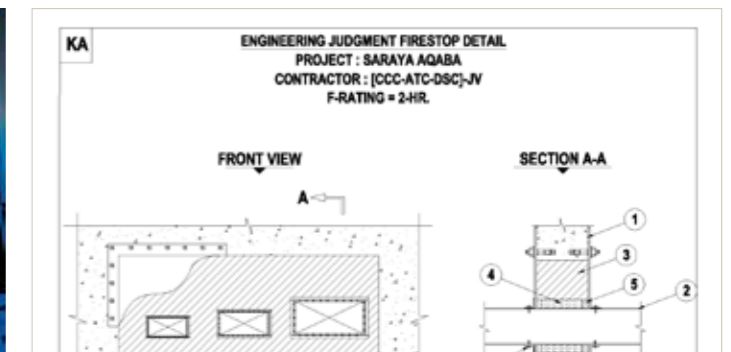
Our Hilti firestop solutions are tested against the most stringent test standards such as ASTM/UL and EN1366-3 and -4.

- Engineering Judgements (EJ's) are designed for applications, which aren't approved by international or national guidelines.
- EJ's are provided by specialized Hilti FireProtection Engineers, to pass stated ratings and requirements for these specific situations.



FIRESTOP ENGINEERING JUDGEMENT SERVICES

- Design of modular support for MEP services
- 2D and 3D CAD drawings
- Anchor fixation design
- Post installed rebar design
- Composite slab designs
- Elevator related design services
- Integrated floor & raised floor systems
- High voltage and electrical cabinet support design



HILTI FINANCE & LOGISTICS SERVICES

If you need it, we'll supply it. No matter how simple or complex the order, our worldwide distribution network will make sure your order goes where it needs to go.

Whether you want to pick up your order at one of our Hilti Stores, delivered the same day, or delivered at the crack of dawn on a specific jobsite, we'll do everything we can to meet your needs. Just call 800... for more details."



HILTI CONSTRUCTION SERVICES

Complete Range of Professional Trainings, Webinars, and On-site testing specially designed by our technical experts and delivered by certified professionals.

A perfect blend of theory and hands on training that ensures correct installation, reduced material wastage, increased safety of operations and great cost savings.

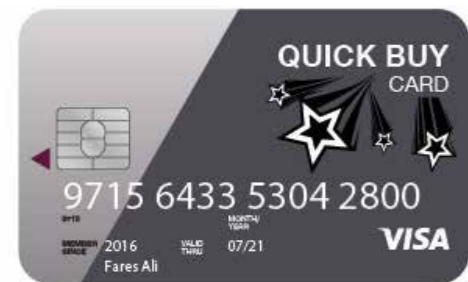


Options Designed to Meet Your Work Regime

FLEXIBLE PAYMENT METHODS

Whether it was a product or a service - Hilti offers you several payment options that can be used for your order.

- Cash
- Cheques (CDC/PDC)
- Credit Card
- Letter of Credit
- Bank Transfer



Fast, Reliable Delivery Wherever You Need It

STANDARD 48 HOUR DELIVERY

- 48 hours across UAE excluding remote areas
- Service level of 98%
- Track & Trace your delivery status, keeping you in control of your deliveries with our Stock locator App and order status Apps



CUTTING, KITTING & PRE-ASSEMBLY OPTIONS

Value added solution warehouse

- Our experienced team cuts and assembles your highly engineered structure



PROFESSIONAL TRAININGS

- Specially designed for foremen, installers, engineers and project managers
- Wide array of topics ranging from product training to application training
- Choice of training locations; online or onsite
- Individual certificate issued to take away



ON-SITE TESTING

Professional on-site testing

- Ensure correct anchor installation
- Performed by professional and certified Hilti engineers
- Carried out by Hilti certified equipment
- Detailed test report and evaluation report issued



MECHANICAL ANCHOR TRAINING

- A mix of theory and hands on training designed for installers and foremen
- Learn and practice key rules for correct installation
- Identify the most suitable anchor for different applications Individual certificate issued to take away



ORDER ONLINE & PAY UPON DELIVERY

The fastest way to order and pay on our website.

- Register online on www.hilti.ae
- Select your products
- Pay by cash or credit card upon delivery*



TAILORED DELIVERY SOLUTIONS

Need it next day? Before 9 am? Speak to our Customer Services team who can work with you to make sure you get what you need, when you need it.



STOCK LOCATOR & ORDER STATUS APPS

Find the product you need in the nearest or most convenient Hilti Store for any urgent matter. Once you've ordered a product or service from Hilti, there's no need to worry - with the Hilti Order Status app, you can keep track of your orders and repairs, no matter where you are



WEBINARS

Continuous professional development on the go

- Live and interactive sessions
- Product and application based
- View them live or at a later time that suits your schedule



ANCHOR REBAR TRAINING

- The first and only professional rebar training program on the UAE market
- The perfect blend of theory and hands on application
- Ensure rebar application is productive and safe
- Reduce material wastage
- Flexible



FIRESTOP INSTALLERS

Our Hilti Firestop Training is a theoretical and hands-on training for installers, site managers and foremen to find out more about how to install firestop systems

- A perfect blend of theory and hands on applications
- How to select the right product for your application
- How to read and understand firestop system design
- Correct installation procedures



For more info. Call 800-HILTI (44584)

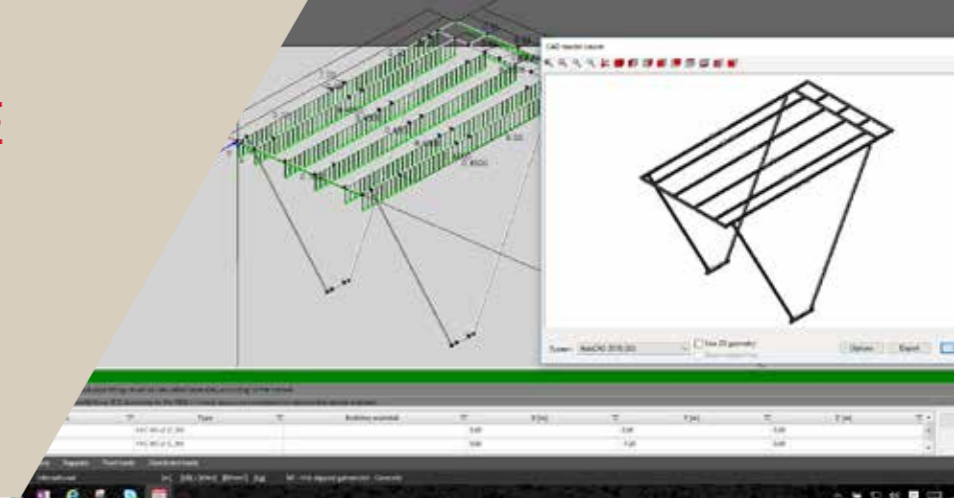
* While paying by credit or debit card the person indicated on the checkout process should be the one paying. The total bill should not exceed 5,000 AED.

HILTI CONSTRUCTION SERVICES



PROFIS SOFTWARE

Get Your Design Anywhere, Anytime and only with a few clicks



FIRESTOP SPECIFIERS

Professional on-site testing

- Designed specially for consultants
- Key theories behind firestop
- Overview of applicable codes and approvals
- Inspection procedures for firestop applications



HEALTH & SAFETY TRAINING

- Find out how to prevent injury onsite
- How to take effective action in event of an emergency
- Reduce physical risks and insurance claims on the jobsite



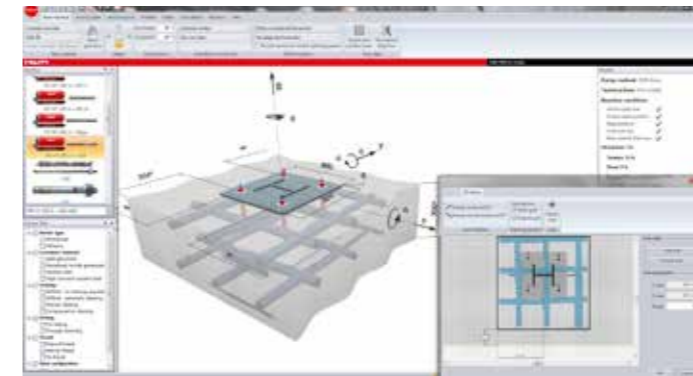
HEAVY TESTING

Onsite tests for post-installed rebar and fastenings offers professional testing during design phase and after installation.

- On site testing of anchor and rebar
- Specially trained and certified Hilti engineers conduct testing
- Onsite testing can be carried using a destructive pull-out test or a non-destructive proof load test



PROFIS ANCHOR SOFTWARE.



Design safe, reliable anchor systems more efficiently than ever

- Hilti PROFIS Anchor technology allows designers and specifiers to quickly, easily evaluate Hilti anchor products and systems—and then choose the best solution for any conditions

PROFIS INSTALLATION SOFTWARE



Design and structural analysis of supports and 3D structures built using Hilti installation systems plus selection of the appropriate Hilti products

DX OPERATOR TRAINING

Competence development through professional, effective and hands on learning

- Know tool applications and features
- Be able to safely operate tools and make fastenings
- Learn and practice trigger safety
- Do's and don't's before, during and after fastening operation
- Tool cleaning and basic maintenance



WEBINARS

After attending one of our webinars, you will receive an attendance certificate via email. Hilti webinars are eligible for CPD points. Our online presentations are held on a regular basis with the below upcoming topics and dates currently available. Register by simply clicking on the relevant link for the webinar of your choice.

- Approximately one hour live and interactive sessions
- Anchor design principles
- Post installed rebar design principles
- Passive fire protection

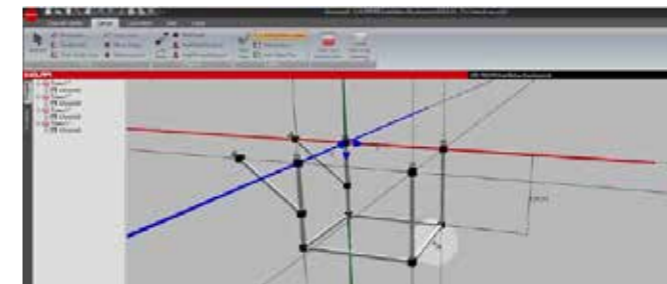


LIGHT TESTING

- On site testing of anchor and rebar
- For loads ≤ 180 kN
- Specially trained and certified Hilti engineers conduct testing



PROFIS REBAR SOFTWARE



Post-installed rebar design at your fingertips

- Hilti PROFIS Rebar application makes the calculation of rebar overlap lengths and embedment depths easier than ever before – it quite simply puts the design of post-installed rebar connections at your fingertips.

PROFIS ENGINEERING



- Engineering functionalities beyond pure anchor design for higher workflow coverage
- Higher productivity by full coverage including welds
- Higher accuracy and productivity by easy item number selection, BOM generation and Hilti online integration
- Jobsite module provides job site access to installation information

HILTI CFS-DM FIRESTOP DOCUMENTATION MANAGER

Track and share your firestop documentation and speed up your firestop process.

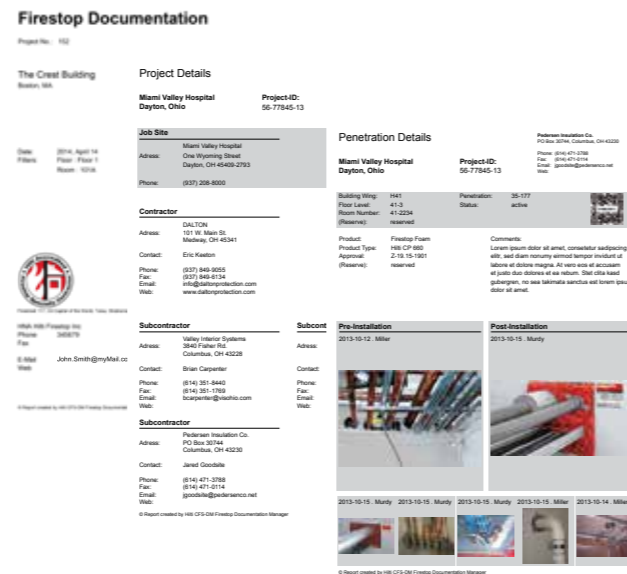


HILTI CFS-DM FIRESTOP DOCUMENTATION MANAGER

Firestop documentation can get very complex. There's a lot of documentation involved including technical data, approval documents, designs and photos of installations.

Our Hilti Firestop Documentation Manager is designed to speed up your project and help to save you time. You can use it to:

- Track all your paperwork and documentation during your build, for inspections and installation
- Manage a building, so you can see what's installed and where – helping to make refurbishments and new firestop installations easier to implement
- Access your installation design, approvals and product documentation all in one place
- Save installation photos from your mobile phone, taken before and after firestop installations and store them with all your other documentation
- Create full project reports with all the details of floor plan markers, pictures, PDFs of the approval systems used for each penetration – plus details of who installed what and how
- Download the free app for iOS or Android that comes with our Hilti Firestop Documentation Manager so you can use the software onsite or in the office
- Remove the need for any special device – access your documents from your computer or on any of your own mobile devices – from the mobile phone in your pocket to your tablet



HILTI ON!TRACK

One of the major challenges facing the construction industry is keeping track of plant and materials, especially for contractors who operate across multiple sites and locations.

Sound familiar? Hilti have a professional solution for managing all of your assets, regardless of manufacturer.



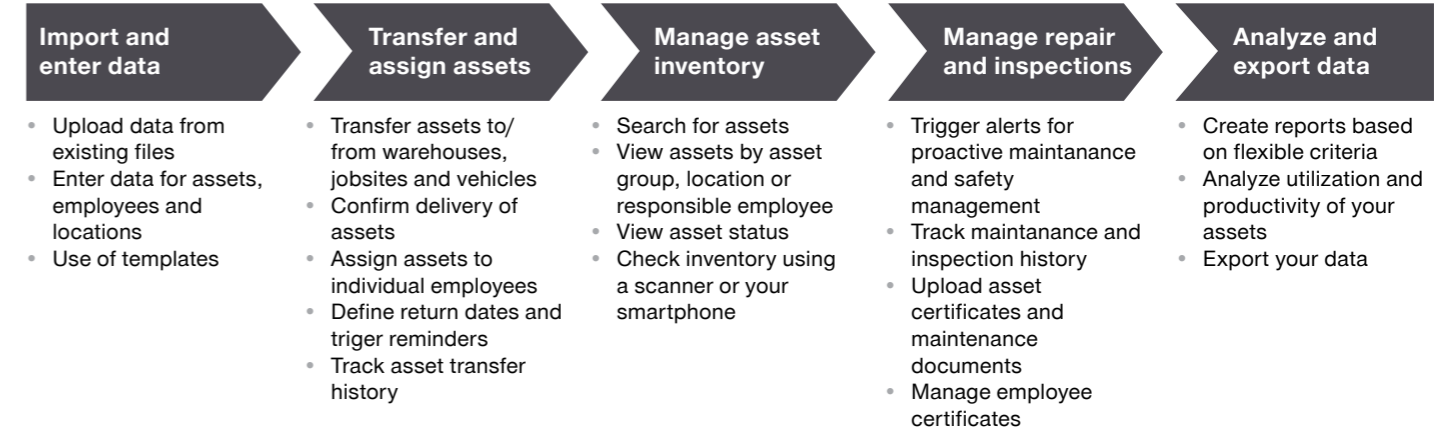
Manage Your Assets Optimally

THE HILTI ON!TRACK SOLUTION.



- All your assets, irrespective of type or manufacturer
- Employees
- Locations
- Assets are marked with tags that include a visual ID, barcode and RFID chip
- Robust portfolio of tags developed for the construction environment
- Fast and reliable data capture using a scanner or your smartphone
- Cloud-based – secure data storage, no software installation and always access to the latest version
- Web and mobile app - flexible and easy to use
- Manage your assets anywhere at anytime

HOW HILTI ON!TRACK WORKS IN PRACTICE.



- Upload data from existing files
- Enter data for assets, employees and locations
- Use of templates
- Transfer assets to/from warehouses, jobsites and vehicles
- Confirm delivery of assets
- Assign assets to individual employees
- Define return dates and trigger reminders
- Track asset transfer history
- Search for assets
- View assets by asset group, location or responsible employee
- View asset status
- Check inventory using a scanner or your smartphone
- Trigger alerts for proactive maintenance and safety management
- Track maintenance and inspection history
- Upload asset certificates and maintenance documents
- Manage employee certificates
- Create reports based on flexible criteria
- Analyze utilization and productivity of your assets
- Export your data





HILTI CALIBRATION SERVICES

It's clear: with better visibility comes better productivity.

We offer a calibration service to test and readjust your Hilti measuring tools. We therefore recommend that you calibrate your tools regularly, at least once a year.



We Have the Asset Management Know How

WHY WE HAVE THE RIGHT SOLUTION.

1

More than 60 years of experience in the optimization of jobsite processes

- Decades of experience in the construction industry and other trades
- Over 10 years of experience with solutions for the management of tools and equipment
- Experienced staff who know about the challenges faced by our customers



2

Our know-how brings innovation to the construction industry

- Research and development specifically to meet the needs of the industry - we are pioneers in the field of power tools and fastening systems
- Hardware - rugged RFID and barcode scanners and robust tags for the construction environment
- Software - secure and user-friendly web and mobile application



3

Reliable service and support

- Process consulting for the management of your tools and equipment
- Individualized implementation support, including asset tagging
- Trainings and quick advice by phone or online



IN OUR CALIBRATION SERVICE WE TEST AND READJUST YOUR HILTI MEASURING TOOLS AND LASER LEVELS INCLUDING:

- Laser distance meters
- Point, line and multiline lasers
- Rotating laser levels
- Optical levels and theodolites
- Detection tools
- Total stations and construction layout tools



Did you know that Hilti Fleet Management includes free use of our calibration service?

If you are a Hilti Fleet customer, unlimited free use of our calibration service, including documentation of your tool's calibration status is included in the price!

Take the opportunity to regularly test and readjust your Hilti measuring tool to ensure it meet its original product specifications. As part of the service, you'll get a service certificate, documenting the tool's calibration status at the time it was tested.

We recommend that you send your tool for regular calibration - at least once a year.

Our tools are designed to be high precision instruments, but sometimes their accuracy can be affected by harsh conditions, such as inappropriate storage, temperature fluctuations or mishandling. Accuracy can also be affected over time by the rigorous conditions of everyday use.

Order your next calibration service online, through our customer service agents or Hilti store and schedule the pick-up and return delivery to your jobsite.



FACTS AND FIGURES:
HOW MUCH IS ASSET
MANAGEMENT
COSTING YOU?

90 HRS

PER MONTH
are spent by companies
searching for assets across
jobsites.

\$10K

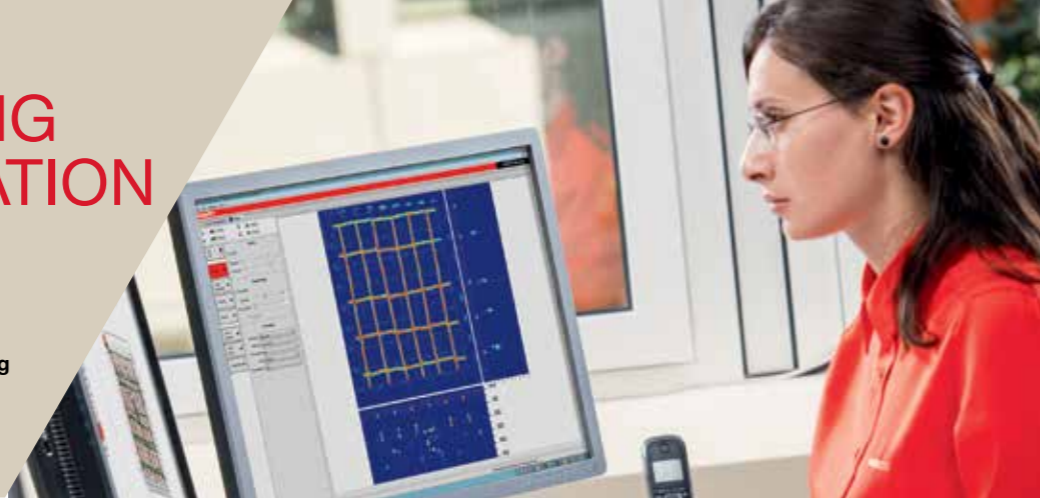
ON AVERAGE
Six assets are lost every
month, potentially adding up to
\$100,000 a year.

65%

OF CUSTOMERS
having trouble managing
certification and
monitoring due dates.

HILTI SCANNING AND OPTIMIZATION SERVICES

Save time and money by having your data analyzed by certified experts, and avoiding rework.



ADVANTAGES

- Offers professional scanning assistance with high-quality detection tools
- Saves valuable working time and minimizes the risk of hitting an object and causing other structural damage
- Helps ensure greater productivity
- Saves costs
- Provides scan documentation for added safety and building quality checks

Our scanning service helps jobsite managers complete projects quickly, to a high standard and on time. Leave nothing to chance! Reliable scanning results help you minimize the risk of errors.

Certified experts support you by applying our PROFIS detection software to optimize the data from the Hilti PS 250 Ferrosan or Hilti PS 1000 X-Scan detection system.

SCOPE OF THE SERVICE

- Localization of embedded objects, for example rebars or tendon cables, with the Hilti X-Scan PS 1000 system
- Checking the level of concrete cover with the Hilti Ferrosan PS 250 system
- If required, we will provide detailed scan documentation with optimized scan data in 2D and 3D as well as a scan report and scan images.



HILTI UPGRADE SERVICES FOR DIRECT FASTENING TOOLS

Thanks to our upgrade service, you can now get much more out of your powder-actuated tool.



UPGRADE TO THE DIGITAL ERA

Thanks to our upgrade service, you can now get much more out of your powder-actuated tool.

If your current DX tool doesn't have a service indicator, maybe it's time to upgrade it and start enjoying the benefits of owning a smart tool.

With the service indicator, you'll see at a glance, when it's time to service the tool and meet your jobsite challenges head on every day, as it helps you to:

- Extend tool lifetime
- Reduce the risk of unexpected downtime
- Keep repair costs under control
- Keep a record of the status of the tool

Bluetooth communication and the **Hilti Connect** app will allow you to stay up to date on the status of the tool, gain immediate access to relevant how-to videos and manuals and check related products that will help you get the job done more efficiently.



You'll be only a few clicks away from booking a maintenance service and our tool service experts will take care of the rest. It's easy as that!

Download the **Hilti Connect** app now by scanning the QR-code!

DX UPGRADE SERVICE INCLUDES:

- Integration of the service indicator on the tool
- New piston and buffer set
- New toolbox
- Tool diagnosis and inspection
- Replacement of worn and damaged components
- Cleaning and lubrication of all essential parts
- Testing for safety and performance
- Warranty extension

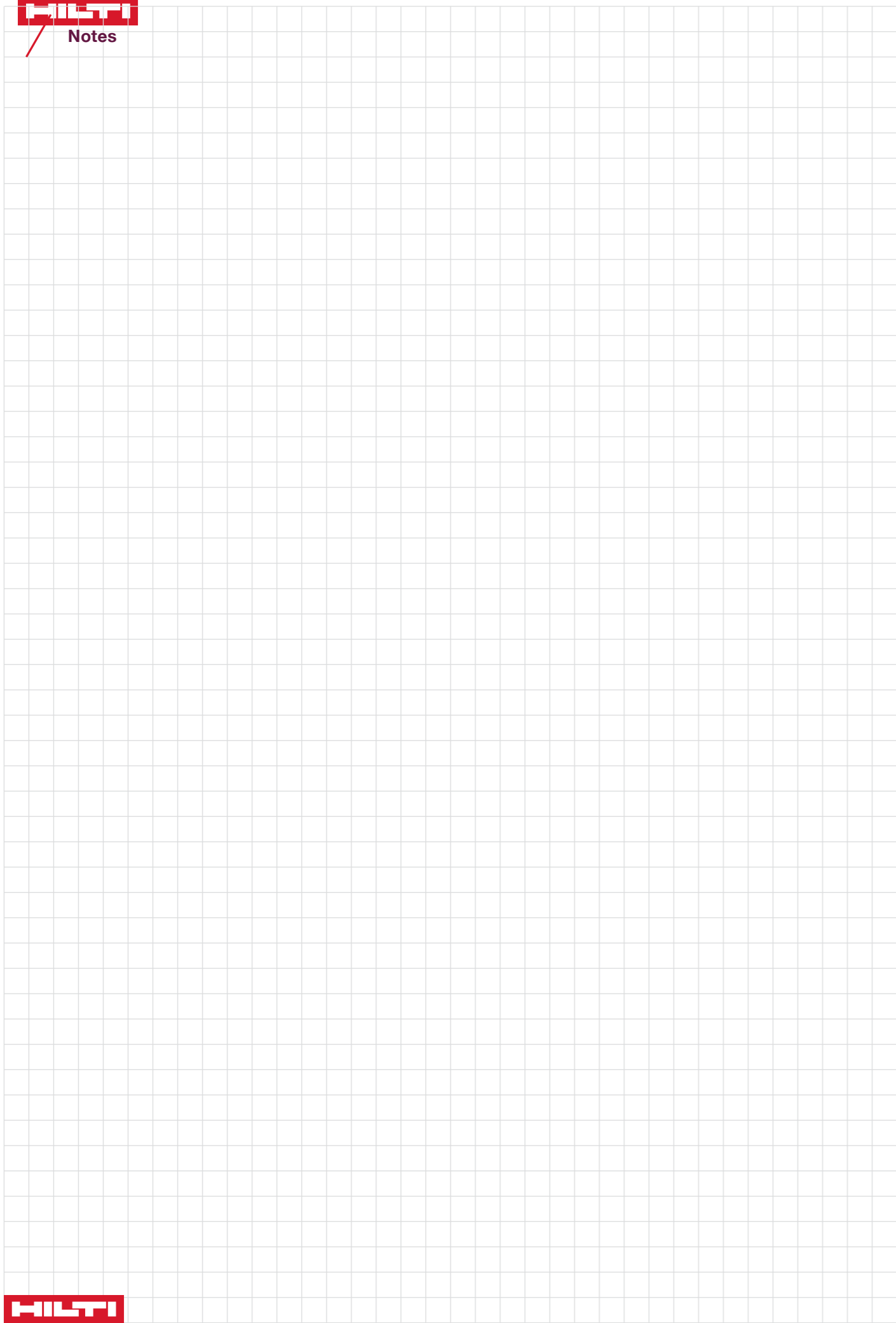


Note: The number of fastenings made before integration of the service indicator display will not be taken into account in the data stored by the tool.

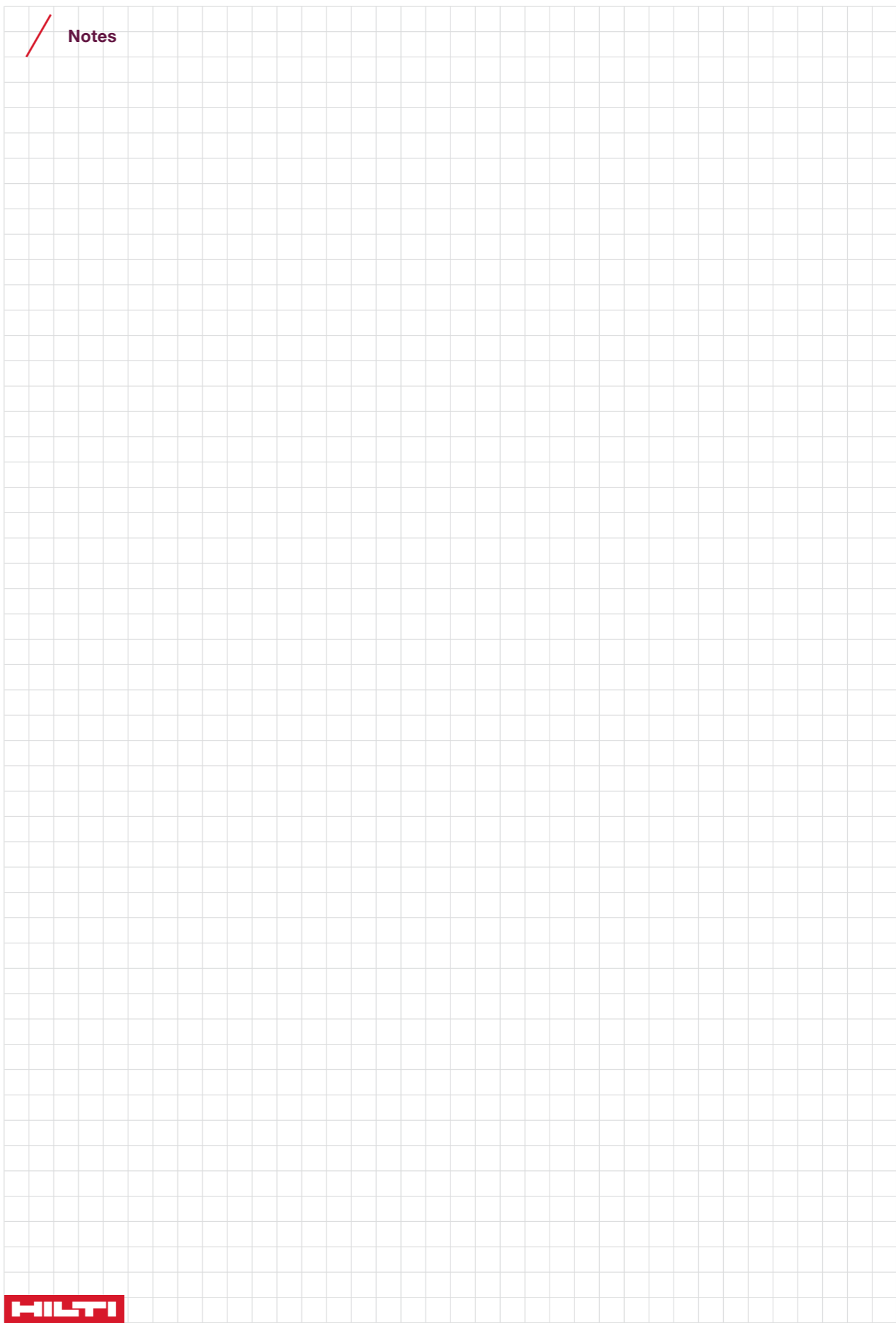




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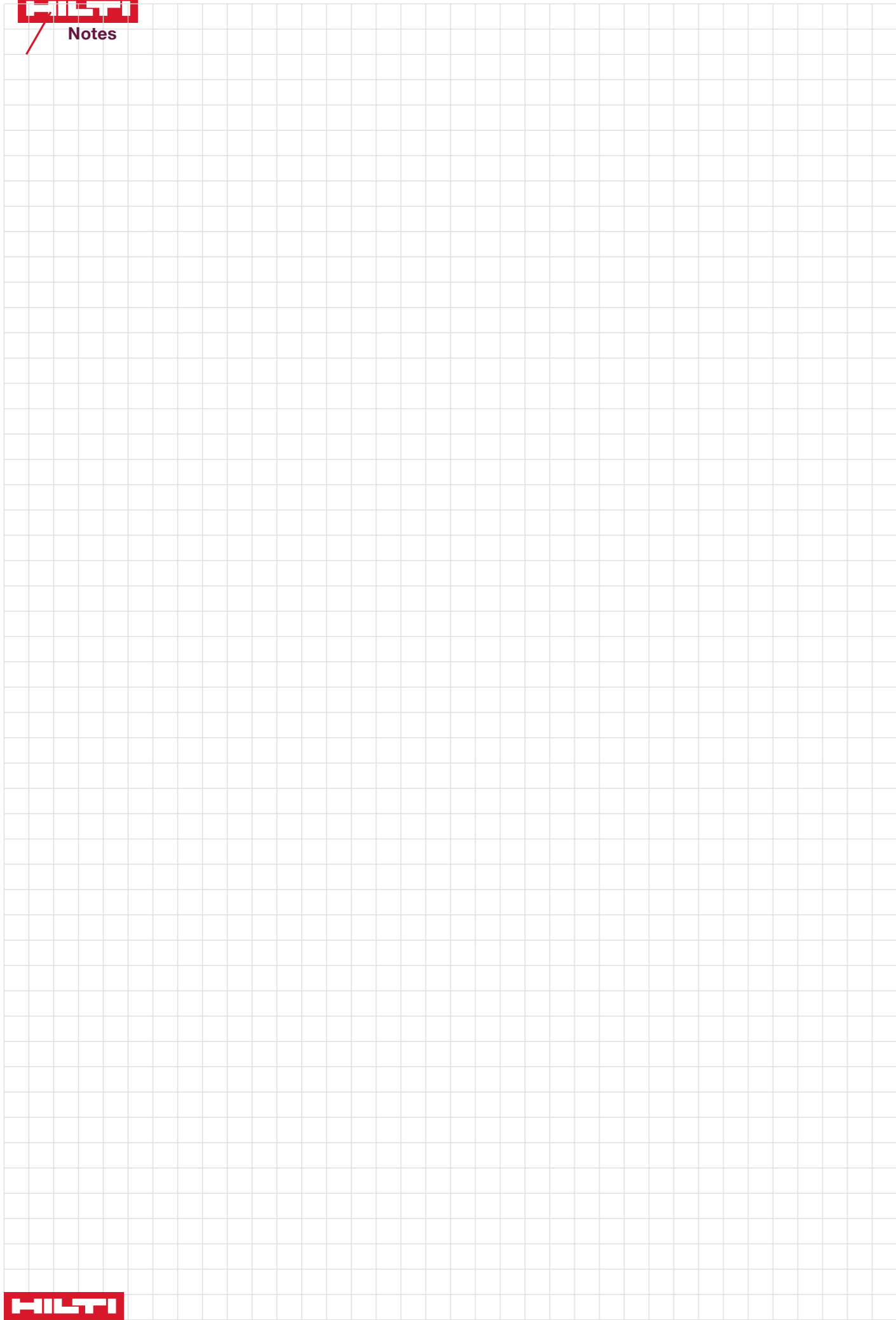


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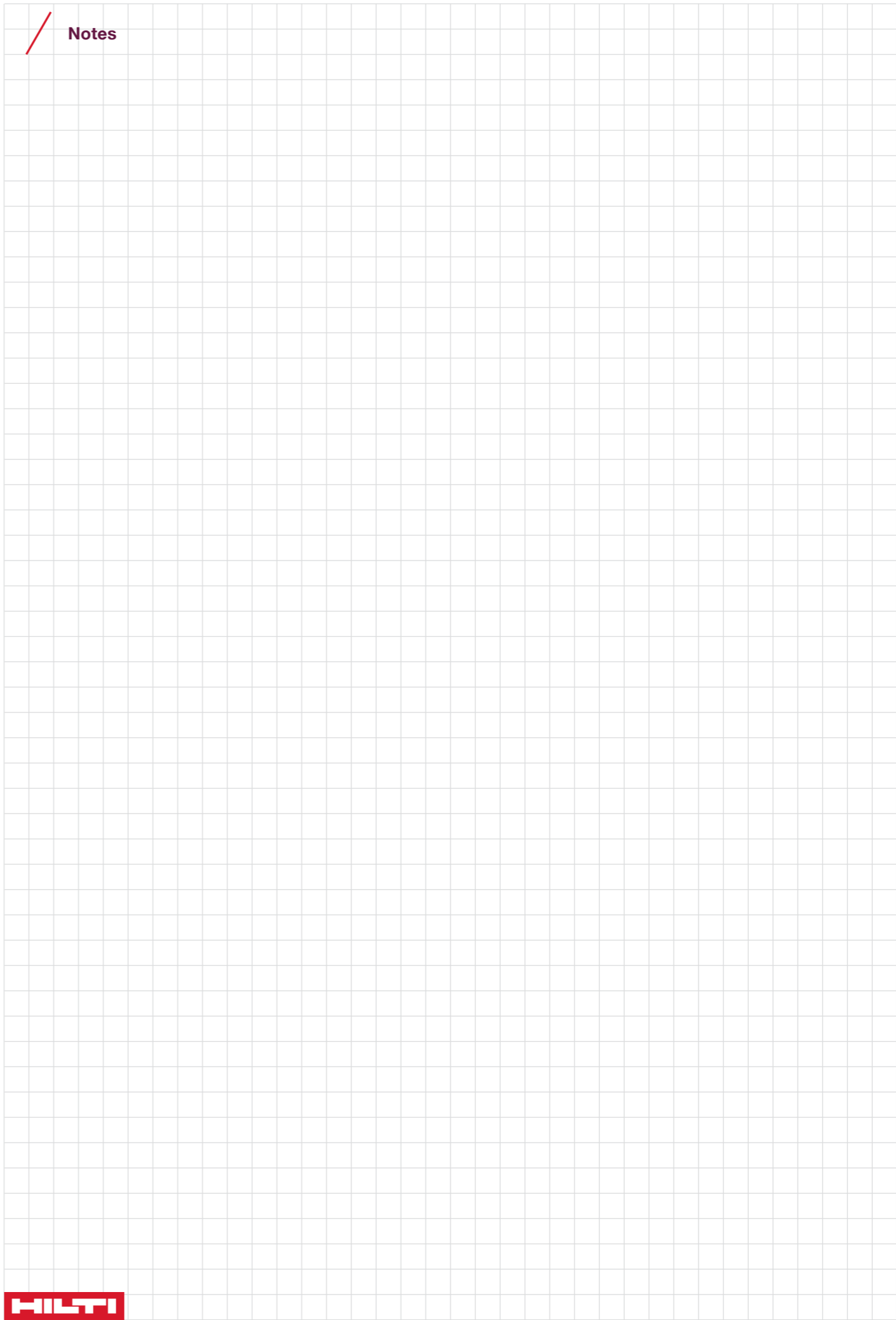




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