Leviat®
A CRH COMPANY

HALFEN

HALFEN CAST-IN CHANNELS
Technical Product Information

B 23-EN

Leviat®
A CRH COMPANY

We are one team.
We are Leviat.

Leviat is the new name of CRH's construction accessories companies worldwide.

Under the Leviat brand, we have united the expertise, skills and resources of HALFEN and its sister companies to create a world leader in fixing, connecting and anchoring technology.

The products you know and trust, including the Halfen Cast-in channels, will remain an integral part of Leviat's comprehensive brand and product portfolio. As Leviat, we can offer you an extended range of specialist products and services, greater technical expertise, a larger and more agile supply chain and better, faster innovation.

By bringing together CRH's construction accessories family as one global organisation, we are better equipped to meet the needs of our customers, and the demands of construction projects, of any scale, anywhere in the world.

This is an exciting change. Join us on our journey.

Read more about Leviat at Leviat.com

Our product brands include:

Ancon®

HALFEN

PLAKA

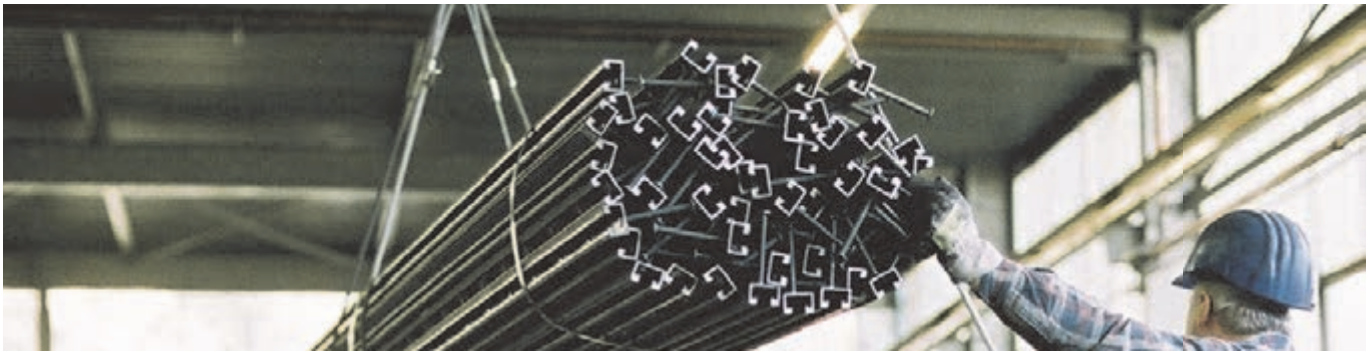
60 locations

sales in **30+** countries

3000 people worldwide

Imagine. Model. Make.

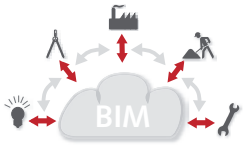
Leviat.com

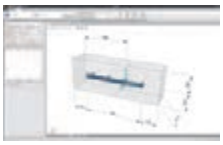


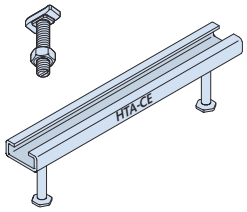
HALFEN CAST-IN CHANNELS

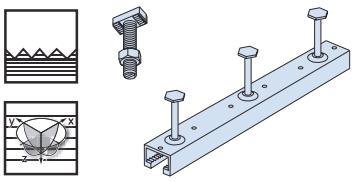
Content

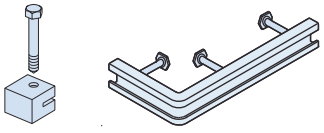
1 General Information	
Integrated Quality – from start to finish	6
Sustainability, Quality, BIM	7
Product families in Overview	8
Product range - for preliminary computation	9
Application segments and application examples	10–11
Materials/ Corrosion protection	12–13
2 Dimensioning	
Verification method	14
Calculation basics, Verification flow chart	15
HTA-CE/HZA Software	16-17
Tender text example HTA-CE	17
3 Halfen HTA-CE Cast-in Channels	
The benefits at a glance	18
Application examples	19
Halfen HTA-CE Product range – overview channels and bolts	20–21
Halfen Bolts type HS – overview	22–23
Halfen Bolts type HS identification, bolt length, design resistance, torque values	24–25
Halfen HSR Bolts	26
Dynamic loads, edge and bolt spacing	27
Fire resistance	28
HTA-CE standard lengths, HTA-CS Channels “curved solution”	29
4 Halfen HZA Cast-in Channels, serrated – DYNAGRIP®	
The benefits at a glance	30
Application examples	31
Halfen HZA Product range – Overview channels and bolts	32
Halfen HZA standard lengths, HZA-CS Channels “curved solution”	33
Halfen HZS Bolts	34–35
Edge and bolt spacings/bolt lengths	36
Fire resistance	37
Dynamic loads, Tender text example HZA	38
5 HTA-CE/HZA Installation	
Installation aids, further channel parts	39
Channel installation to formwork or concrete	40
Installing Halfen Bolts and attached structures	41
Installation in pre-stressed concrete – channels with stainless steel anchors	42







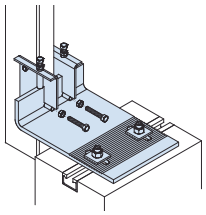


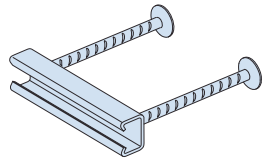


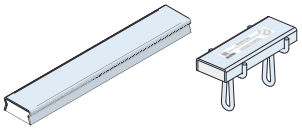
© 2023 · B 23-EN · www.halfen.com

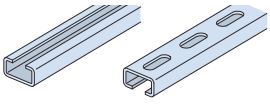
HALFEN CAST-IN CHANNELS
Content

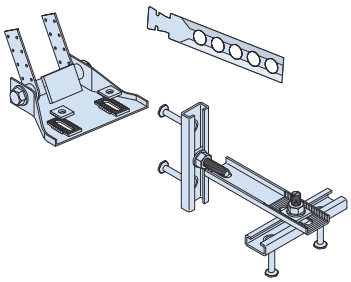
6 Halfen Curtain Wall System	
The benefits at a glance	43
Application examples	44
General information, post and beam facade and modular facade	45
Product range	46–47
Halfen Channel HCW 52/34	48–49
Halfen Cast-in channels HTA-R and HZA-R with rebar anchors	50
Edge of slab brackets HCW-ED	51
Dimensioning, interaction diagrams	52
Design Loads using two HCW-EW brackets, loads in the Halfen Bolts (HCW-ED)	53
Top of slab brackets HCW-B1 and HCW-B2	54–55
7 Halfen HGB Channels – handrail connection	
The benefits at a glance	56
Application examples	57
Regulations and standards	58
Materials, corrosion protection	59
Product range, ordering examples	60
Installation	61
Dimensioning with calculation example	62–69
8 Halfen HTU Channels	
Halfen HTU-S cast-in channel for fixing Profiled Sheet Metal	70–72
C-shaped channels with welded anchors	73–76
9 Halfen Framing Channels	
The benefits at a glance	77
Application examples	78
Type overview – an extract from the framing channel catalogues	79
10 Roof and wall	
The right solution for each application	80
Application examples	81
HSF Rafter shoe	82
HNA Timber fixing strap	83
Brick tie anchor systems ML + BL	84–86
Halfen Anchor bolt systems	87
Restraint ties SPV, HKZ, HKZ-GF/-GU	88–90
HVL Precast connection	91
HKW Corner guard	92
11 Accessories	
The benefits at a glance	93
Nuts and washers	94
Threaded rods, hexagonal head bolts, coupler sleeves, ring nuts	95
Rail clips	96
Appendix	
Index	97
References/ Contact, technical support	98–99

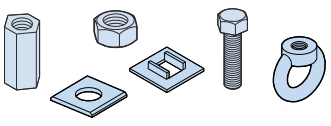












HALFEN CAST-IN CHANNELS
Integrated Quality – from Start to Finish

Quality and safety are the ultimate targets in the production of original Halfen Anchor channel system. Therefore all our production locations are ISO 9001 certified to provide products that meet strict quality management standards. On the one hand this involves continual inspections, machine maintenance and quality testing during the manufacturing process and on the other hand it involves stringent quality control procedures of incoming raw materials right through to dispatch of the finished product.

Quality always comes first for our products and is guaranteed during each step of production! The extent, type and frequency of production checks carried out by us is determined by standards set and recorded.

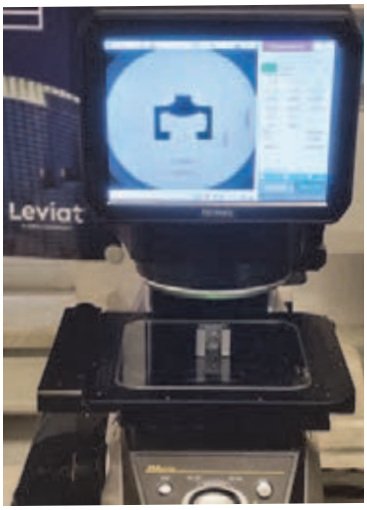
Halfen Anchor channels and T-bolts, originating from our certified manufacturing plants, are produced of strictly regulated raw material. The complete raw material or semi-finished goods are procured solely from resources that meet our stringent in-house material specifications. Our suppliers must be ISO 9001 certified and must provide complete documentation on the required performance and quality. Therefore, our suppliers have to prove compliance with our material specifications with a 3.1 inspection certificate in accordance to DIN EN 10204.

The inspection of incoming material is not limited to visual examination and dimensional checks. Every consignment is also analysed via spectral analysis. Moreover, the required tensile strength values, yield stress and rupture points are tested. Raw material is released for production only if all tests results are satisfying and comply with the provided 3.1 certification. The Halfen Anchor channels and T-bolts are continually checked during production for dimensional precision. The required frequency for measurement is set in our quality control procedures.

At the end of the production process, before dispatch or storage, our (quality management system QMS) regulations require visual checks, dimensional control and tensile tests on a predetermined percentage of finished products. All tested anchor channels must prove a minimum safety factor against steel failure.

Our stringent Quality Assurance and Quality Control processes, part of the implemented QMS at our factories, ensure strict compliance to required quality standards and warrant the complete process chain, from the receipt of the raw material until final delivery of the finished products, are controllable and traceable. Therefore, complete traceability and a guarantee of the required performance and quality can be provided for all our products. Our focused approach on high quality and continuous improvement has been one of the reasons that our stakeholders have trusted us for the last almost 100 years! We are fully aware of our responsibility and will continue to maintain our excellent reputation with high quality products!

SZI
DIN EN ISO 9001:2015
certified
www.szigmbh.de



References

TUNNELS

Lötschberg-Base tunnel, Switzerland

BRIDGES

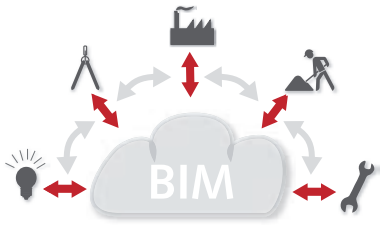
Passerelle Simone de Beauvoir, Paris/France

© 2023 · B 23-EN · www.halfen.com

HALFEN CAST-IN CHANNELS
General

BIM

Having completed various projects using BIM methodology, we have considerable experience as a BIM partner. All Leviat engineers are trained to supervise this process in precise detail. Our combination of extensive experience and highly-trained engineers means we are perfectly placed to meet the increasing demand for BIM projects. Examples of our previous projects developed using BIM can be found at **www.halfen.com ▻ Service ▻ BIM ▻ BIM references**.



Sustainability

An EPD® (Environmental Product Declaration) provides transparent and comparable ecological data which helps to evaluate the sustainability of a building.
Already during the planning phase the data provided here is of great significance for architects and planners. The data provided also helps to ensure the high demands on the environmental performance of the building are met. Health Product Declarations (abbrev. = HPD) complement our information on sustainability. The HPDs include a list of all components and information on the health effects of these components. The new HPD for hot-dip galvanized Halfen Cast-in channels helps to achieve additional points in the Leed v4 system. **www.halfen.com ▻ Downloads ▻ Brochures ▻ Environmental/Health declarations**

Fire-resistance / Material fatigue

A wide variety of Halfen Cast-in channels are tested under fire exposure (according to TR 020 "Evaluation of anchorages in concrete with regard to fire resistance") as well as under cyclic loading. More details, characteristic resistances under fire exposure and fatigue resistances, are provided in the respective European Technical Assessments.

Additional information on the internet
Current valid approvals and much other information for HTA and HZA Anchor channels can be found at
www.halfen.com ▻ ...products ▻ Halfen Cast-in channels ▻ Documents/Software
www.halfen.com ▻ ...products ▻ Halfen Cast-in channels toothed ▻ Documents/ Software

SPORTS

Rheinenergiestadion, Cologne/Germany

CURTAIN WALL

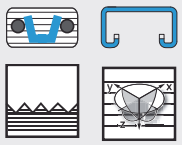
Edificio Gas Natural, Barcelona/Spain

HALFEN CAST-IN CHANNEL

Product Families in Overview

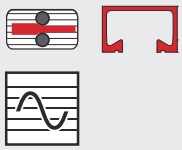
HTA-CE cold-formed

- Low to medium performance
- As with all HALFEN Channels, perfect for adjustable, surface-flush fixings
- Economic solution



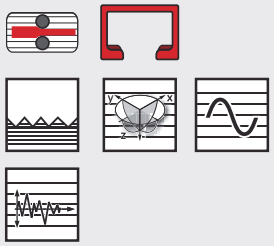
HZA cold-formed, serrated

- Suitable for 3-D loads
- Medium load capacities in longitudinal direction



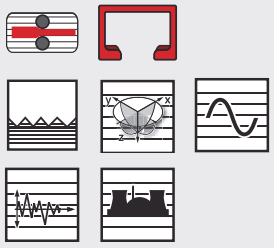
HTA-CE hot-rolled

- Medium to high load capacity
- low stress profile with high resistance to dynamic and impact loads, unmatched by cold-rolled alternatives
- High resistance against local flexure due to optimized channel lip geometry
- In combination with Halfen HSR bolts, *medium load bearing in longitudinal channel direction is possible. (*proportionally to the channel cross-section area, load bearing is lower than in application of serrated channels)



HZA DYNAGRIP® hot-rolled, serrated

- Superior performance
- High load capacities in longitudinal direction due strong mechanical interlock between serrated channel lips and T-bolt heads
- Best suitable in seismic regions



HZA-PowerSolution hot-rolled, serrated

- Highest performance level
- Developed for applications in safety relevant structures with highest requirements
- Suitable for crack width up to 1.5mm
- Tested for extra-ordinary impact loads

There are international approvals for the Halfen Cast-in channels. This means that Halfen Cast-in channels can be used world-wide with planning reliability.

All data in this catalogue is based on European Technical Assessments, resp. Eurocode EN 1990 – EN 1999. For ICC standard catalogues or approvals, please contact your local distributor. Adresses can be found at the end of this catalogue.

CE European Technical Assessments

ICC ES

BBA APPROVAL INSPECTION TESTING CERTIFICATION UKTA - 22/6115

serrated

suitable for applications in safety relevant areas in nuclear facilities

3D-Loads

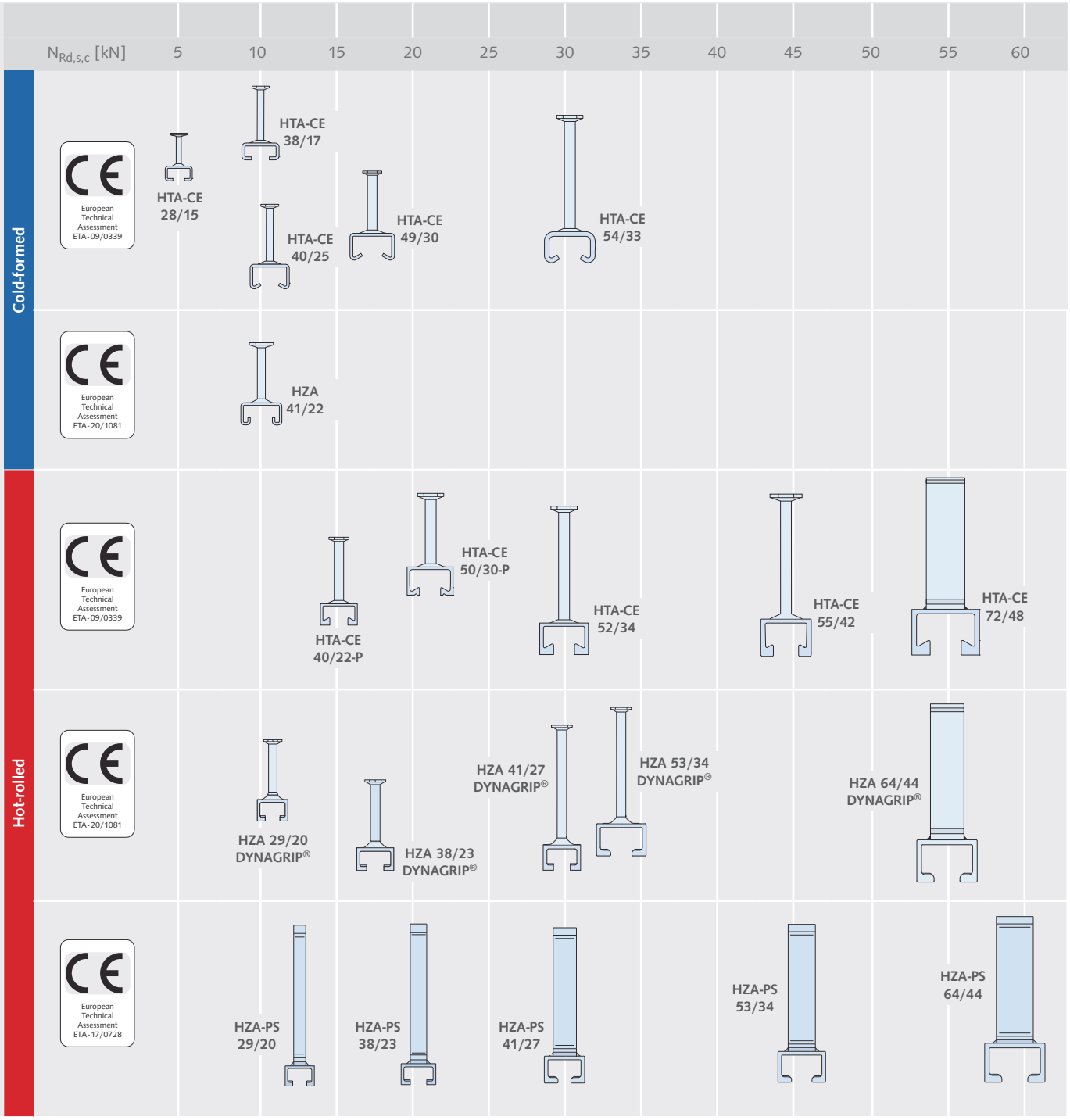
suitable for seismic loading

suitable for dynamic loads

© 2023 · B 23-EN · www.halfen.com

HALFEN CAST-IN CHANNEL

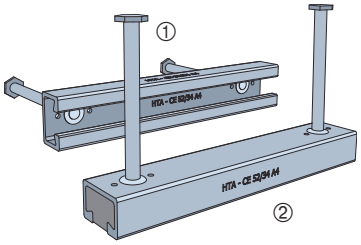
Product Range - for Preliminary Computation



Type identification

① Inside on the bottom of the channel.
② Additionally on the channel side

Channel material	Type identification example
1.0038 / 1.0044	HTA-CE 38/17 HZA 53/34
A4: 1.4404 / 1.4571	HTA-CE 38/17 - A4 HZA 53/34 - A4
HCR: 1.4529 / 1.4547	HTA-CE 38/17 - HCR



HALFEN CAST-IN CHANNELS
Application Segments and Application Examples

Traffic infrastructure:

Tunnels, bridges, roads, airports and railway stations

Application examples

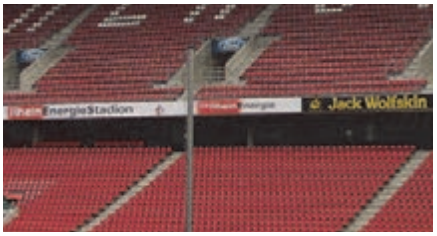
- OCS support
- drainage pipe installation
- fixing of signage or traffic lights
- fixing of rescue gates, stairways, emergency or maintenance ways
- various adjustable fixings to concrete whether with a straight or rounded shape

Public and residential Buildings:

Stadiums, sports and leisure, trade and utility buildings, office and residential towers or detached houses

Application examples

- adjustable fixing of all kind of elements – concrete, masonry, steel, wood or synthetics to concrete
- curtain wall façades
- stadium seatings
- lifts and elevators
- brickwork, concrete, or natural stone facade claddings
- rail and banister fixings



© 2023 · B 23-EN · www.halfen.com

HALFEN CAST-IN CHANNELS
Application Segments and Application Examples

General infrastructure:

Power plants, energy & infrastructure, energy storage or transport, water and sewage projects

Application examples

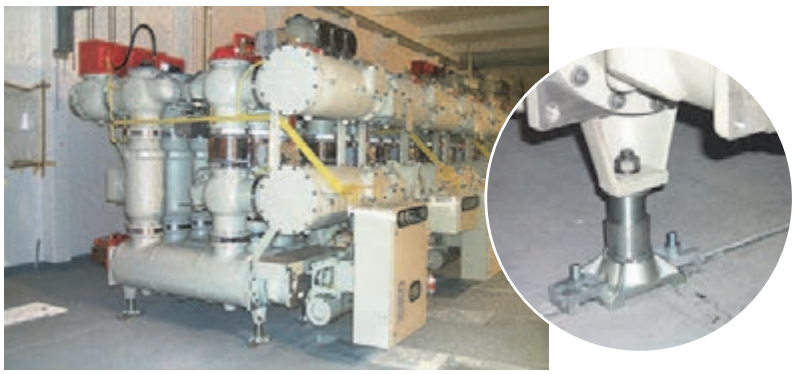
- cable tray support
- pipe support
- ventilation duct support
- fixing of stairs, ladders, signage, switch cabinets etc.
- application in critical buildings with high seismic risk or where protection against high impact loads is required

Industry:

All kind of plants; production, automotive, agriculture, building industry ...

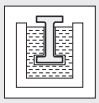
Application examples

- machinery fixing
- fixing of general infrastructure
- fixing of stairs, ladders, maintenance levels etc.
- fixings in highly stressed areas or when exposed to chemical environments
- fixing of elements exposed to dynamic loads

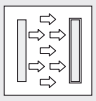


HALFEN CAST-IN CHANNELS
General – all Channels

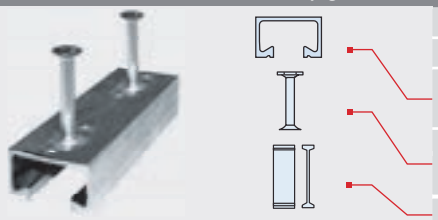
Hot-dip galvanized FV:
Dipped in galvanizing bath, with a temperature of app. 460°C; this method is used for the Halfen Anchor Channels and a range of Halfen T-bolts.



Zinc galvanized GVs:
Halfen T-bolts are hot-dip galvanized or electrogalvanized. We always guarantee the best possible corrosion protection. Passivation layers are Cr(VI)-free.



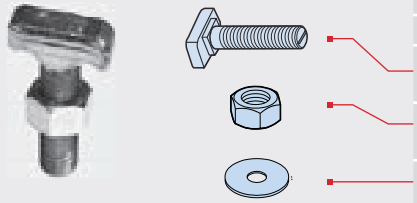
Halfen Cast-in channels, steel, hot-dip galvanized



	Steel		
	Material	Standard	Zinc coat
Channel profile	1.0038 ☐	EN 10 025-2 ①	FV: ≥ 55 µm
	1.0044 ☐	EN 10 025-2 ①	FV: ≥ 55 µm
Bolt anchor B6	Steel ☐	EN 10263 or EN 10269	FV: ≥ 55 µm
Weld-on anchor	Steel ☐	EN 10 025-2	FV: ≥ 55 µm

① Steel according to EN 10 025-2 and Halfen specification

Halfen Bolts, galvanized steel



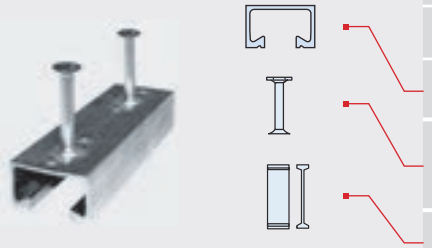
	Steel		
	Material	Standard	Zinc coat
Bolt	Steel (Sc) 4.6 or (Sc) 8.8 ☐ ☒	EN ISO 898-1	FV: ≥ 50 µm GVs: ≥ 12 µm
Hexagonal nut	Steel (Sc) 5 or (Sc) 8 ☐ ☒	EN 898-2	FV: ≥ 50 µm GVs: ≥ 12 µm
Washer	Steel ☐ ☒	EN ISO 7089, EN ISO 7093	FV: ≥ 50 µm GVs: ≥ 12 µm

Stainless steel (NR):
Chromium is the most important alloy element in stainless steel. A specific chromium concentration ensures the generation of a passive layer on the surface of the steel that protects the base material against corrosion. This explains the high corrosion resistance of stainless steel.

Materials:
(Sc) = Strength class

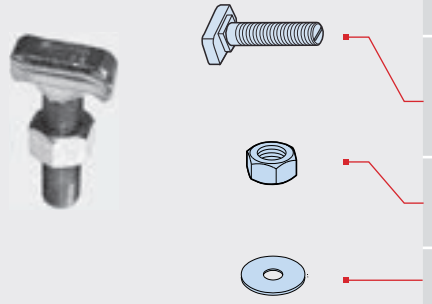
- ☐ **WB** = Steel, mill finished
- ☐ **FV** = Steel, hot-dip galvanized
- ☒ **GVs** = Steel, zinc plated (special coating)
- ☐ **A4** = Stainless steel 1.4571 / 1.4404 / 1.4578
- ◩ **FA** = Stainless steel 1.4462
- ☒ **HCR** = Stainless steel 1.4547 / 1.4529

Halfen Cast-in channels, stainless steel



	Stainless steel		
	Material	Standard	Corrosion resistance class ②
Channel profile	1.4404 or 1.4571 ☐	EN 10 088	III
	1.4529 or 1.4547 ☒		V
Bolt anchor B6	1.4404, 1.4571 or 1.4578 ☐	EN 10 088	III
	1.4529 or 1.4547 ☒		V
Weld-on anchor	1.4404 or 1.4571 ☐	EN 10 088	III
	Steel ③ ☐	EN 10 025-2	

Halfen Bolts, stainless steel



	Stainless steel		
	Material	Standard	Corrosion resistance class ②
Bolt	1.4404, 1.4571, 1.4578 (A4-50 or A4-70④) ☐	EN 3506-1 and EN 10 088	III
	1.4462 (FA-70④) ◩		III ④
	1.4529, HCR-50 ☒	EN 3506-1	V
Hexagonal nut	1.4404, 1.4571, 1.4578 (A4-50, A4-70) ☐	EN 3506-2 and EN 10 088	III
	1.4529, HCR-50 ☒		V
Washer	1.4404, 1.4571 ☐	EN 10 088	III
	1.4529 or 1.4547 ☒		V

② See EN 1993-1-4, table A.3; ③ Corrosion protection of mill finished anchor, see page 13

④ Stainless steel, strength class 70 bolts are delivered subject to availability from stock in A4-70 grade material or in a higher FA-70 (1.4462) grade material. This applies to all Halfen Bolts listed as A4-70 and FA-70 material in this catalogue.

© 2023 · B 23-EN · www.halfen.com

HALFEN CAST-IN CHANNELS
General – all Channels

Corrosion protection requirements

Material and applications

Description	1 **Dry interior rooms**	2 **Damp interior rooms**	3 **Medium corrosion level**	4 **High level of corrosion**
Definition of application areas	Anchor channels may only be used in components in indoor environments. **For example:** living and office spaces, schools, hospitals, commercial shops with the exception of wet rooms as in column **2**.	Anchor channels may also be used in components in areas with normal humidity **For example:** kitchens, bathrooms and laundry-rooms in residential buildings. Exceptions; where permanent steam is present, and under water.	Anchor channels may also be used in outdoor environments (including industrial environments and coastal regions) or in wet rooms, if conditions are not especially aggressive (for example: continual immersion in sea water etc. as in column **4**).	Anchor channels may also be used in exceptionally aggressive environments (for example: continual immersion in sea water) or in seawater spray zones, chloride environments in swimming pools or in environments with an extremely aggressive chemical atmosphere (for example: flue gas desulphurization plants or road tunnels where de-icer systems are in use).
Channel profile	Steel 1.0038, 1.0044; EN 10025 Hot-dip galvanized ≥ 55 µm ⑥	Steel 1.0038, 1.0044; EN 10025 Hot-dip galvanized ≥ 55 µm ⑥ Stainless steel 1.4307, 1.4567, 1.4541; EN 10088	Stainless steel 1.4404, 1.4571, 1.4062, 1.4162, 1.4362 EN 10088	Stainless steel 1.4462 ②, 1.4529, 1.4547 EN 10088
Anchor	Steel 1.0038, 1.0214, 1.0401, 1.1132, 1.5525; EN 10263, EN 10269 Hot-dip galvanized 55 µm ⑥	Steel 1.0038, 1.0214, 1.0401, 1.1132, 1.5525; EN 10263, EN 10269 Hot-dip galvanized ≥ 55 µm ⑥ Stainless steel 1.4307, 1.4567, 1.4541; EN 10088	Stainless steel 1.4404, 1.4571, 1.4362, 1.4578 EN 10088 Mill finish, 1.0038 ③	
Special Halfen Bolts with shaft and bolts in accordance with EN ISO 4018	Steel strength class 4.6/8.8 EN ISO 898-1 Zinc galvanized ≥ 5 µm ④	Steel strength class 4.6 / 8.8; EN ISO 898-1, Hot-dip galvanized ≥ 50 µm ① ⑤ Stainless steel, strength class 50, 70 1.4307, 1.4567, 1.4541 EN ISO 3506-1	Stainless steel Strength class 50, 70 1.4404, 1.4571, 1.4362, 1.4578 EN ISO 3506-1	Stainless steel Strength class 50, 70 1.4462 ②, 1.4529, 1.4547 EN ISO 3506-1
Washers EN ISO 7089 and EN ISO 7093-1 Product classification A, 200 HV	Steel EN 10025 Zinc galvanized ≥ 5 µm ④	Steel EN 10025 Hot-dip galvanized ≥ 50 µm ① ⑤ Stainless steel Steel grade A2, A3; EN ISO 3506-1	Stainless steel Steel grade A4, A5 EN ISO 3506-1	Stainless steel 1.4462 ②,1.4529, 1.4547 EN ISO 3506-1
Hexagonal nut EN ISO 4032	Steel strength class 5/8 EN ISO 898-2 Zinc galvanized ≥ 5 µm ④	Steel strength class 5/8 EN ISO 898-2 Hot-dip galvanized ≥ 50 µm ① ⑤ Stainless steel, strength class 70, 80 Steel grade A2, A3 EN ISO 3506-2	Stainless steel Strength class 70, 80 Steel grade A4, A5 EN ISO 3506-2	Stainless steel Strength class 70, 80 1.4462 ②, 1.4529, 1.4547 EN ISO 3506-2

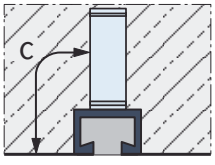
① or zinc galvanized with special coating ≥ 12 µm
② 1.4462 not suitable for swimming baths
③ Steel in accordance with EN 10025, 1.0038 not for anchor channels 28/15 and 38/17
④ Zinc galvanized in accordance with EN ISO 4042
⑤ Hot-dip galvanized in accordance with EN ISO 10684
⑥ Hot-dip galvanized in accordance with EN ISO 1461

Halfen Channels (NR) mill finish welded-on anchors

Corrosion protection of the mill finished weld-on anchor is based on the following concrete cover c:

Concrete cover c [mm]	30	35	40	50	60
Profile HTA-CE	-	40/22P	52/34	55/42	72/48
	-	40/25	54/33	-	-
	-	-	50/30P	-	-
	-	-	49/30	-	-
Profile HZA	38/23	41/22	53/34	64/44	-

The minimum concrete cover depends on local environmental conditions and bid specifications.



Concrete cover c

Halfen Channels (NR) made completely in stainless steel

The Halfen Cast-in channels "entirely of stainless steel" are not restricted to any minimum concrete cover as no relevant corrosion occurs.

Areas of application

- bridge and tunnel construction (fastening of pipes, etc.)
- construction of sewage treatment plants (fixing of spillovers)
- chemical industry (installations exposed to aggressive substances)
- ventilated façades, e. g. masonry renders
- also for all structural reinforced concrete elements with higher demands on the concrete cover

Halfen Channels made in stainless steel – HCR

The high corrosion resistance (HCR) Halfen Cast-in channels are mandatory when high concentrations of chlorides, sulphur and nitrogen oxides are present.

Areas of application

- road tunnels
- structures in salt water
- indoor swimming pools
- areas not routinely cleaned
- poorly ventilated parking garages
- in narrow, major city streets