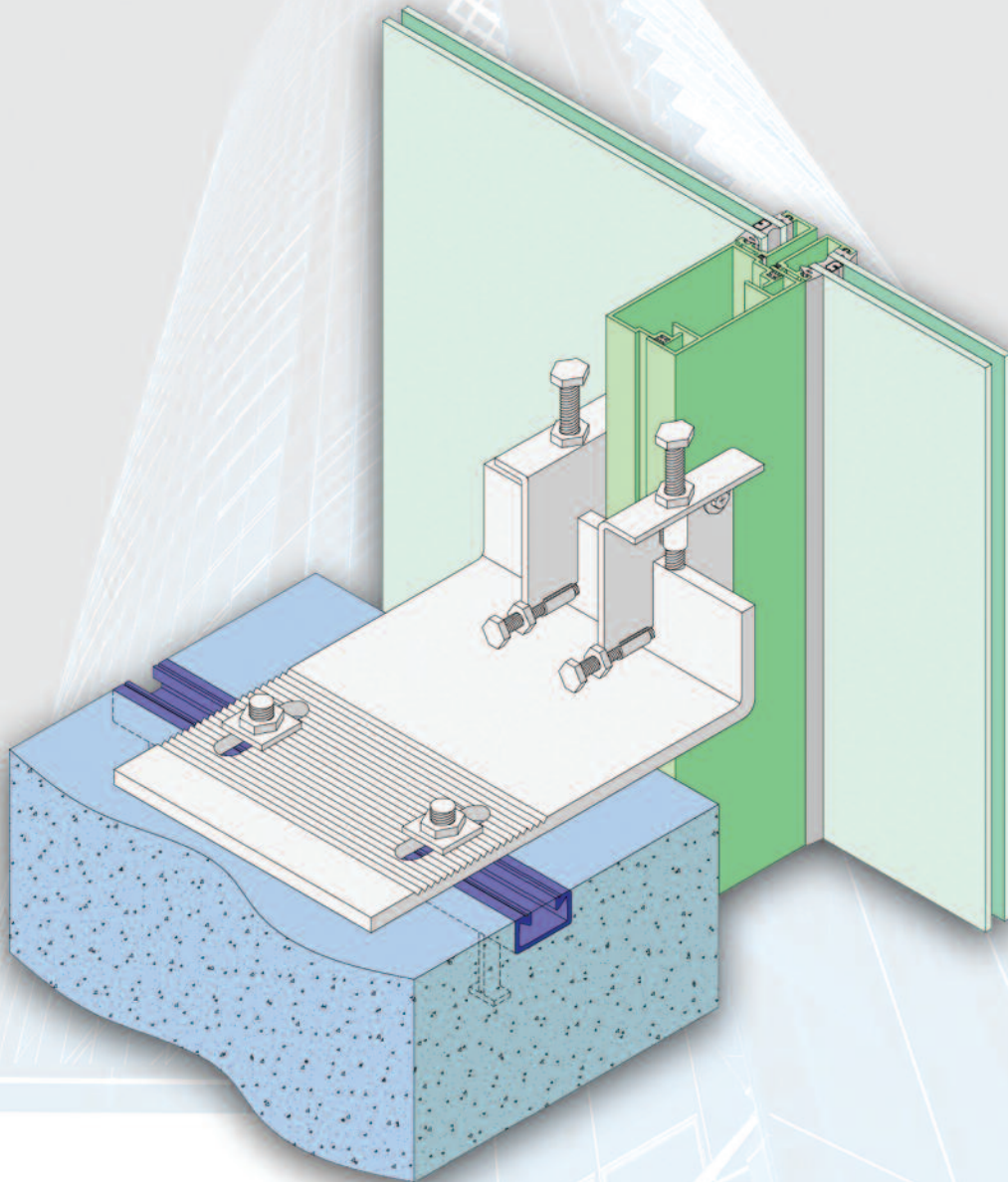


# CURTAIN WALL ANCHORING

## Top of Slab Condition



## HTS Series: Standard Top-of-slab embeds

### HTS6112 top of slab embed:

Pullout load capacity: 10,000 lbs.

Shear load capacity: 11,200 lbs.\*

Assuming the following conditions:

- Nominal edge distance for full capacity: 6"
- Pullout capacity with minimum edge distance of 2 1/4": 7,900 lbs.
- Minimum recommended slab thickness: 7 1/4"

### HTS6112TAL top of slab embed, trimmed anchor-long:

Pullout load capacity: 7,650 lbs.

Shear load capacity: 11,200 lbs.\*

Assuming the following conditions:

- Nominal edge distance for full capacity: 5"
- Pullout capacity with minimum edge distance of 2 1/4": 6,250 lbs
- Minimum recommended slab thickness: 6"

### HTS6512TAS top of slab embed, trimmed anchor-short:

Pullout load capacity: 4,850 lbs.

Shear load capacity: 11,200 lbs.\*

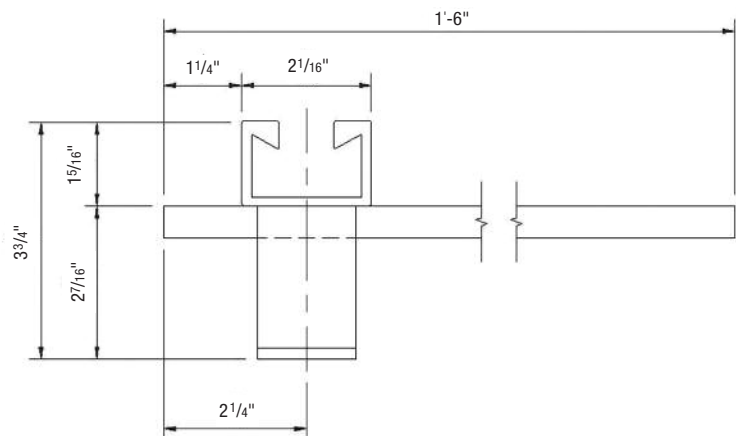
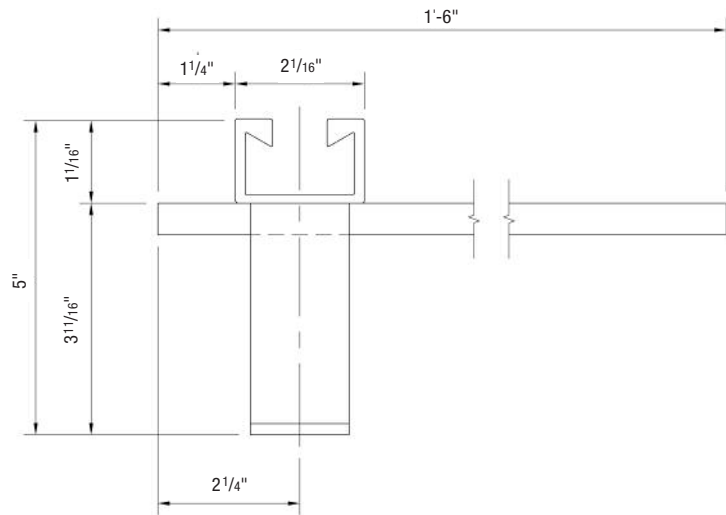
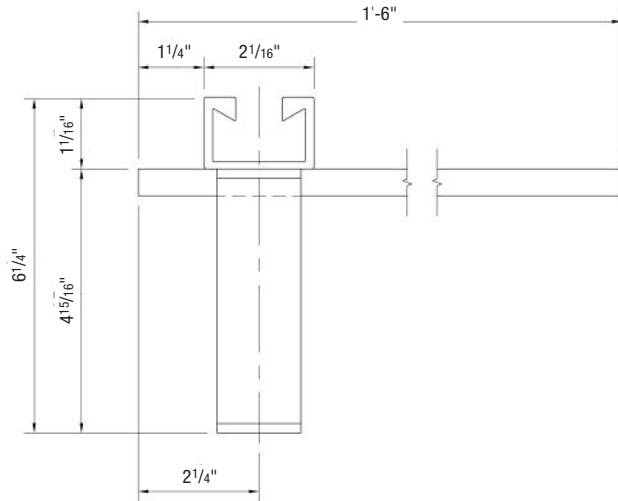
Assuming the following conditions:

- Nominal edge distance for full capacity: 4"
- Pullout capacity with minimum edge distance of 2 1/4": 4,450 lbs.
- Minimum recommended slab thickness: 4 1/4"

Tension Reduction Factor			
Edge Distance	HTS6112	HTS6112TAL	HTS6112TAS
6"	1.0	1.0	1.0
5"	.96	1.0	1.0
4"	.93	.96	1.0
3"	.86	.89	.96
2 1/2"	.82	.85	.94
2 1/4"	.79	.82	.92

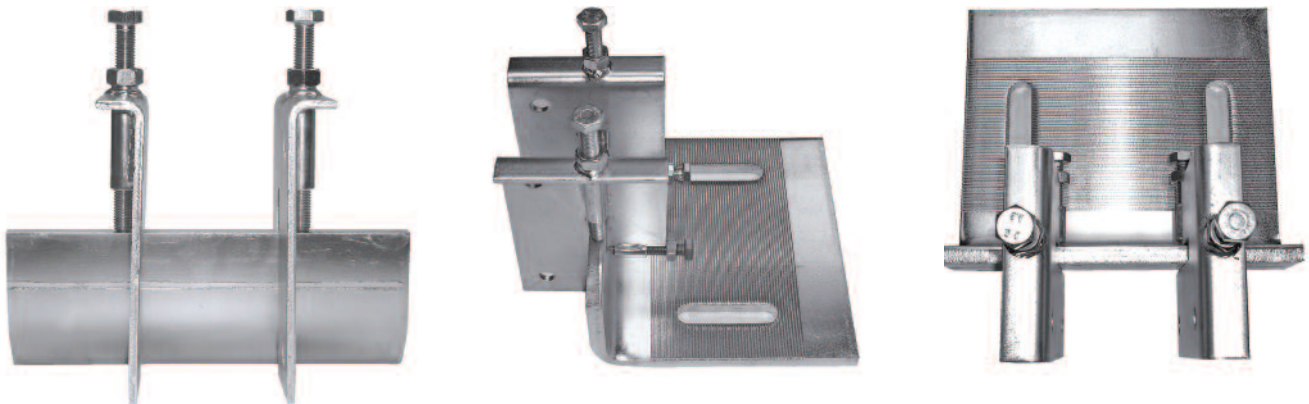
1. Values marked with \* have no reduction factor with reduced edge distance.
2. Tension capacity is controlled by concrete strength.
3. Stated loads are for un-reinforced normal-weight concrete (3000 psi).
4. Tension capacity may be increased for higher concrete strength up to maximum of 5000 psi using the factor  $\sqrt{f_c/3000}$
5. Check interaction using:  $(T_{actual}/T_a)^{5/3} + (V_{actual}/V_a)^{5/3}$

## HTS Series: Standard Top-of-slab embeds

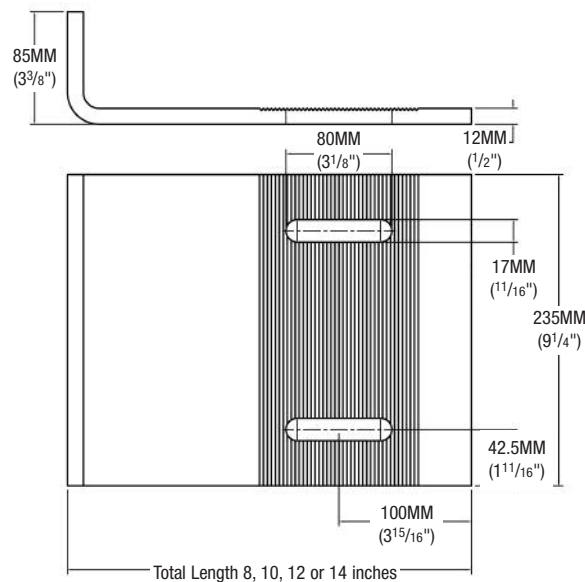


## HTOS All-Steel Serrated Brackets

Halfen HTOS brackets are designed to efficiently anchor utilized or stick curtain walls to the stop of concrete slabs. When used along with suitable Halfen cast-in channels and T-bolts, HTOS brackets allow 3-dimension adjustability. Their all-steel construction translates to ample adjustment and safe working load capacities to match many curtain wall applications. HTOS brackets may be surface-mounted on the finished concrete slab, or installed within a pocket if used along with a Halfen sheet metal blockout.



The steel body features deep serrations and two slotted holes for in-out adjustment. Two serrated washers, designed to accommodate M16 bolts, set the bracket in place. Four standard lengths (8", 10", 12" and 14") are available to cover virtually any anchoring geometry. Two adjustable clips are furnished along with each bracket. Each clip includes a vertical dead bolt and a horizontal bolt, which may be pointed or flat-tipped. Pointed bolts provide a fixed point to anchor one side of a unitized panel, allowing for thermal expansion-contraction, while restricting the permanent position of the panel. Additionally, a pointed bolt also serves as an anti-life device for seismic conditions.



## HTOS All-Steel Serrated Brackets

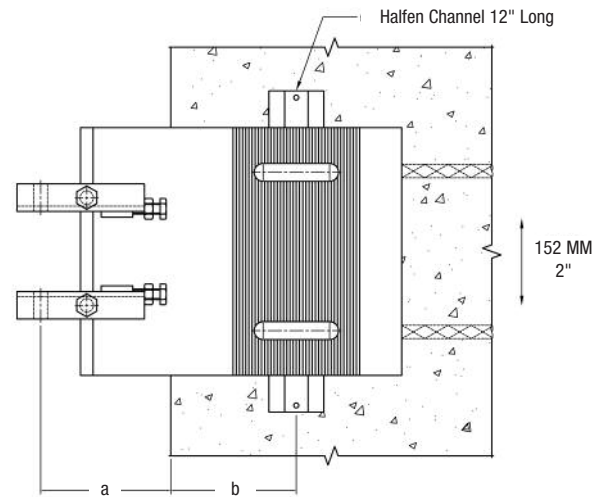
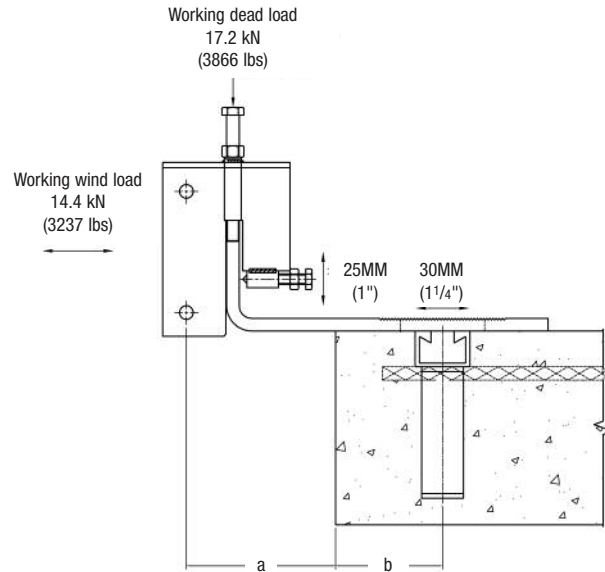
### Adjustability:

HTOS brackets offer 3-dimension adjustability when installed with Halfen cast-in channels and T-bolts.

Halfen recommends the use of HTS-series embeds and M16 (5/8"), high-tensile T-bolts to work along with HTOS brackets. Please contact Halfen engineering for application assistance and product selection.

- Up-Down: ±25 mm (± 1")
- In-Out: ±30 mm (± 1-1/4")
- Left-Right: ±50 mm\* (±2")

\* Indicated left-right adjustment considering installation with 12" Halfen embed.



		Distance "a": from edge of slab to centerline of mullion bolts				
		2-1/2-2-5/8	2-5/8-3-5/8	3-5/8-4-5/8	4-5/8-5-5/8	5-5/8-6-5/8*
Distance "b": from centerline of embed to edge of slab (inches):	2 1/2"	HTOS08	HTOS08	HTOS08	HTOS10	HTOS10
	3"	HTOS08	HTOS08	HTOS10	HTOS10	HTOS12
	3 1/2"	HTOS08	HTOS08	HTOS10	HTOS10	HTOS12
	4"	HTOS08	HTOS10	HTOS10	HTOS12	HTOS12
	4 1/2"	HTOS10	HTOS10	HTOS10	HTOS12	HTOS12
	5"	HTOS10	HTOS10	HTOS12	HTOS12	HTOS14
	5 1/2"	HTOS10	HTOS10	HTOS12	HTOS12	HTOS14
	6"	HTOS10	HTOS12	HTOS12	HTOS14	HTOS14
6 1/2"	HTOS10	HTOS12	HTOS12	HTOS14	HTOS14	

\* Conditions in last column have reduced allowable load capacities. Check application with Halfen engineering.

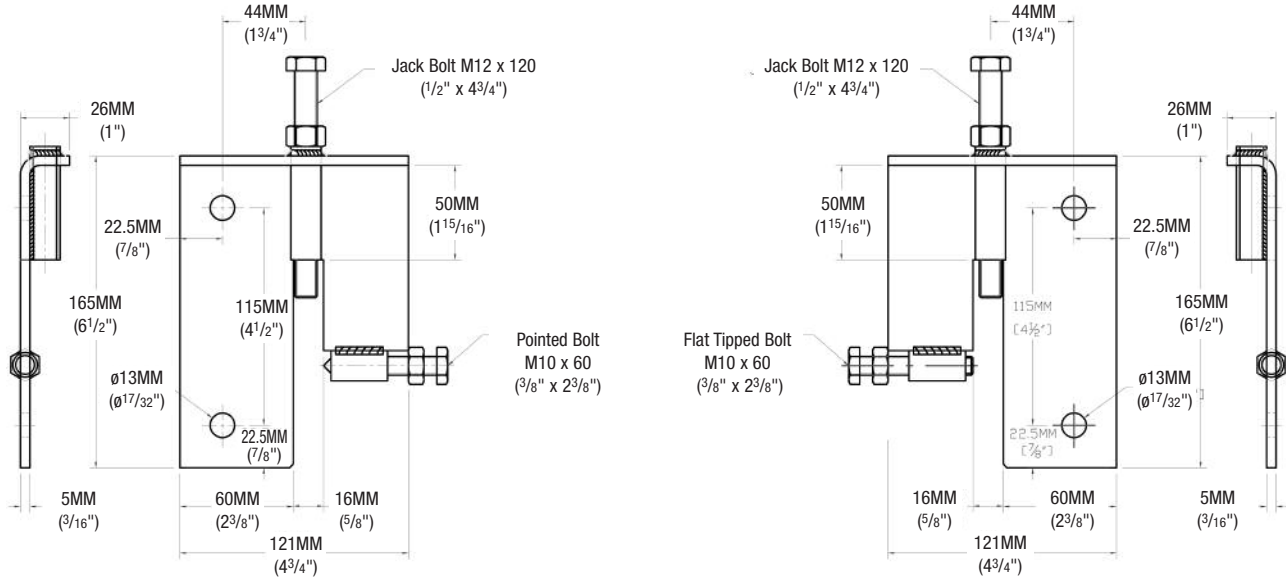
HTOS08 : 8" body, range [4 5/8" - 7 1/8"]

HTOS10 : 10" body, range [6 5/8" - 9 1/8"]

HTOS12: 12" body, range [8 5/8" - 11 1/8"]

HTOS14: 14" body, range [10 5/8" - 13 1/8"]

## HTOS All-Steel Serrated Brackets

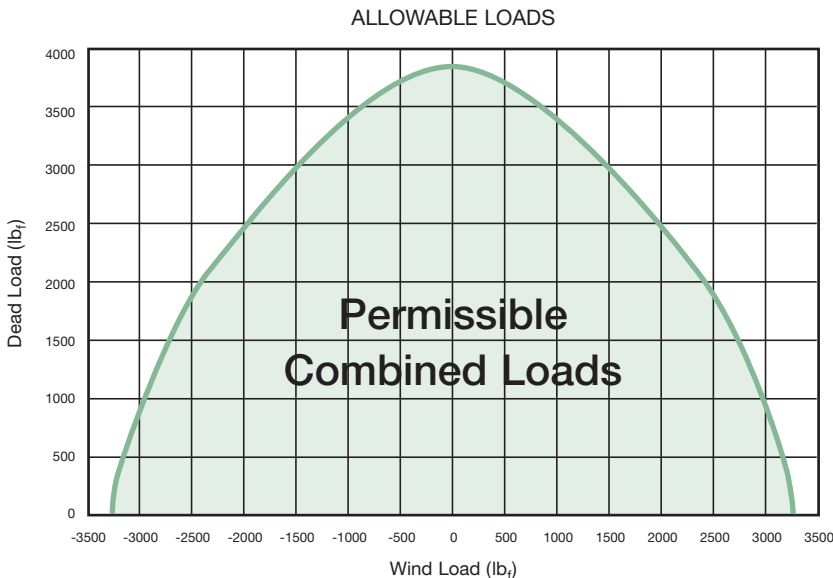


### Working load capacity

Wind load (WLa)	3240 lbf	(14.4 kN)
Dead load (DLa)	3870 lbf	(17.2 kN)
Uplift load	790 lbf	(3.5 kN)

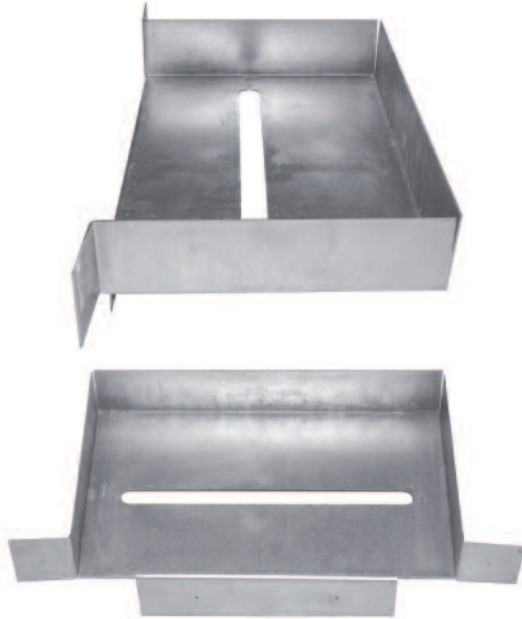
Check interaction using:  
 $(DL/DLa)^{3/2} + (WL/WLa)^{3/2} < 1.0$

- Working loads calculated using a global safety factor of 2.5
- Uplift load based on test results using pointed bolt torqued at 35 ft-lbs. Applying this torque value may pre-load system, affecting overall load capacity of bracket.



Interaction graph shows allowable combined wind load and dead load for HTOS brackets. A conservative approximation was used to generate symmetrical shape of interaction curve. Full anchoring system including brackets, embeds, and T-bolts shall be engineered by Halfen or others to verify suitability of complete connection and product selection.

## Blockouts for Top of Slab Pocket



*Halfen Blockouts*



*Pre-foamed blockout assembled to Halfen Embed*

Halfen offers custom-designed blockouts, which work along with Halfen cast-in channels for in-pocket, top of slab anchoring conditions. Blockouts are typically ordered foam filled, ready to be assembled to Halfen embeds at the jobsite. Standard construction is with 16 gauge pre-galvanized sheet, bent to shape without welds. Side and bottom flaps with pre-punched holes allow easy installation to formwork. Nail holes at either side of the slotted hole match nail holes on Halfen embeds for easy assembly with screws & nuts (not included). Blockouts are fabricated to customer's dimension specifications. Corners and other custom shapes have been successfully designed and built for many major construction projects.

Once assemblies are set and concrete has been poured, foam is stripped and anchoring systems are installed and adjusted. Once anchoring bolts have been set to specified torque values, pocket is filled with grout for a flush concrete slab with no surface obstructions.

# HALFEN ANCHORING SYSTEMS

Halfen Anchoring Systems, the world leader in adjustable anchoring technology for curtain wall systems, now offers the most complete line of anchors and accessories for top-of-slab anchoring. The line includes standard embeds with I-anchors and rebar tails, anchor brackets with 3-dimension adjustability, and sheet metal blockouts for conditions that require anchoring inside a pocket for flush finished floor applications. Using pre-engineered, tested, off-the-shelf components, curtain wall architects, engineers, and contractors can now design and specify complete anchoring systems with confidence.

## HALFEN



### LITERATURE AVAILABLE FROM HALFEN

#### GLAZING

- Curtain Wall Anchoring
- Multi-adjustable Curtain Wall Clips
- Anchors for Glazing
- Top of Slab Bracket for Curtain Wall

#### MASONRY

- Adjustable Concealed Lintel System
- Anchors for Masonry
- Fleming Masonry Veneer Restraint System

#### STONE

- Anchors for Stonework
- HRM Stone Fixing Clips

#### PRECAST

- Precast Panel Anchors
- Application Details Anchors for Precast
- Double-Tee Stem Anchors

#### STAINLESS

- Halfen Products for Corrosive Environments

#### TENSION RODS

- Detan Tension Rod System

#### SOFTWARE

- AnkerCalc 1.1
- AnkerCAD

#### TECHNICAL

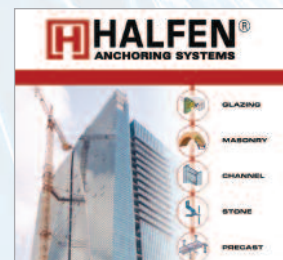
- Dynagrip Toothed Anchor Channels
- Halfen Tech Manual (Anchor Channels, T-bolts & Profiles)

#### SPECS

- CSI 3-Part Specifications
- Product Data Sheets

#### AVAILABLE FORMATS

- Hard Copy Catalogs
- CD-Rom
- Website



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