HI

Denomination: **HI ANCHOR**	Codes: **AHICA, AHICI, AHITO, AHIES, AHIAR, AHIGA**		
Reference: **FT HI-en**	Date: **17/01/20**	Revision: **0**	Page: **1 of 6**

AHICA

AHICI

AHITO

AHIES

AHIAR

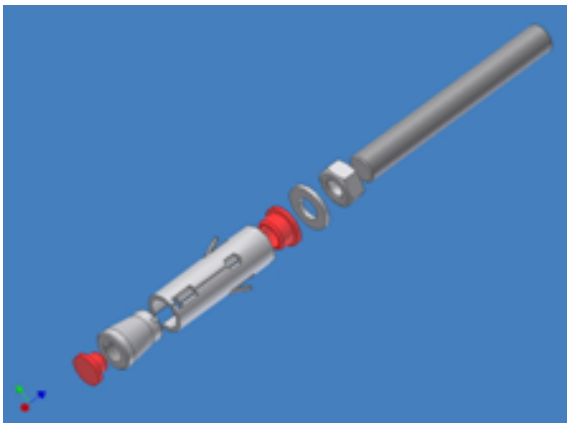
AHIGA

1.-CHARACTERISTICS

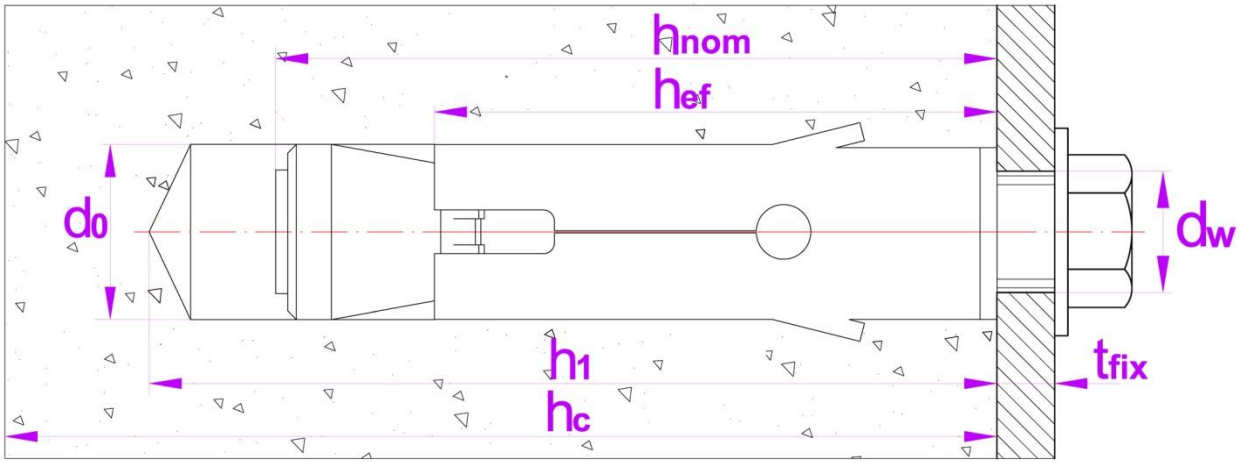
- Metallic anchor, with functioning principle by expansion and installation by controlled torque.
- Male thread
- Use in non-cracked concrete
- Easy assembly
- Use for medium loads
- Anchor must be installed before the fixture
- Versions:
  - Shield
  - Stainless steel shield
  - 6.8 loose bolt
  - Projecting bolt
  - Eye bolt
  - Hook bolt
- Zinc plated covering and stainless steel.

2.- DIMENSIONS

METRICA		M6	M8	M10	M12	M16
Shield code		AHICA0645	AHICA0855	AHICA1065	AHICA1275	AHICA1690
Stainless steel shield code		AHICI0645	AHICI0855	AHICI1065	---	---
6.8 Loose bolt code		AHITO0645	AHITO0855	AHITO1065	AHITO1275	AHITO1690
Bolt projecting code		AHIES0645	AHIES0855	AHIES1065	AHIES1275	AHIES1690
Eye bolt code		AHIAR0645	AHIAR0855	AHIAR1065	AHIAR1275	AHIAR1690
Hook bolt code		AHIGA0645	AHIGA0855	AHIGA1065	AHIGA1275	AHIGA1690
D: outer diameter	[mm]	12	14	16	20	24
l: shield lenght	[mm]	50	60	70	80	90
d: thread diameter	[mm]	M6	M8	M10	M12	M16
d_2: washer diameter	[mm]	18	20	23.5	40	50
s_2: washer thickness	[mm]	1.6	1.5	2.0	3.0	3.0
s_w: nut key	[mm]	10	13	17	19	24
d_3: eye bolt inner diameter	[mm]	10	11.6	14.5	17	23.5
e: hook bolt minimum gap	[mm]	8	10	12.5	16	19



3.- INSTALLATION DATA



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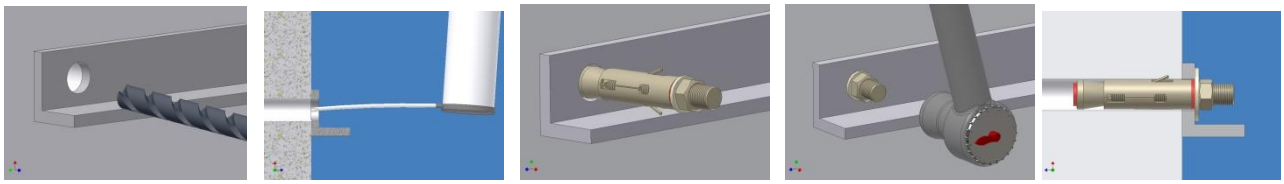
Eye bolt code		AHIAR0645	AHIAR0855	AHIAR1065	AHIAR1275	AHIAR1690
Hook bolt code		AHIGA0645	AHIGA0855	AHIGA1065	AHIGA1275	AHIGA1690
d_0: drill diameter	[mm]	12	14	16	20	24
h_{nom}: embedment depth	[mm]	45	50	60	70	100
h_1: drill minimum depth ≥	[mm]	60	65	75	90	105
h_{ef}: effective minimum depth	[mm]	30	35	45	55	75
h_c: base material min thickness ≥	[mm]	100	100	100	110	140
d_w: fixture diameter ≤	[mm]	7	9	12	14	18
T_{ins}: torque	[Nm]	10	20	40	65	150
t_{fix}: fixture max thickness ≤	[mm]	3	8	17	22	17
s_{cr}: spacing	[mm]	90	105	135	165	210
c_{cr}: edge distance	[mm]	45	55	70	85	105

4.- INSTALLATION PROCEDURE



- Before installation, check the concrete's strength in order to make sure its class is not lower than required and to which the characteristic loads apply.
- The concrete base must be compact and porosity insignificant.
- Installation temperature range for base material: -5 / + 40 ºC (80 ºC for a short period of time).
- Minimum installation depth values must always be respected: for anchors' depth, for anchor-to-anchor distances and for anchor-to-edge distances.
- Drilling must be performed by respecting the specified minimum depth and diameter, perpendicular to the base material's surface. The holes on the material to be fixed may be used as templates.
- When drilling near any reinforcement areas, special care must be taken to avoid damaging them. If drilling is aborted because a reinforcement area has been encountered, it is advisable to drill a new hole at a minimum distance of at least twice the aborted drill hole. This advisable distance may be reduced, as long as the aborted hole is previously filled up with high-resistant mortar. In any case, if the aborted hole is not filled up with mortar, no shear or oblique tension load in the direction of load application will be tolerated at a shorter distance than the installation depth value h_{nom}.
- It is necessary to clean the holes thoroughly free of dust and debris.
- When temperature is below 0ºC, make sure water does not seep into the hole, as this fact could cause subsequent cracks on the concrete, due to ice pressure.
- Introduce the anchor through the material to be fixed into the hole up to the embedment depth, according to the values on the table. It is possible to use a hammer to ensure the required depth. Do not apply any intermediate layer between the meterial to be fixed and the washer, such as sealing products.
- Apply the specified torque with a torque wrench.
- In the case the holes on the material to be fixed have a bigger diameter than required, it is necessary to insert a thicker washer and of a bigger diameter. But please, note that this procedure does not ensure a correct distribution of shear loads amongst all the anchors of a same group, and this shear load is applied only to the anchors with a correct diameter on the material to be fixed.

5.- CHARACTERISTIC RESISTANCES

5.1.- Characteristic resistances* in concrete C20/25** for an isolated anchor (without spacing and edge distances effects) are as per this table:

METRIC			M6	M8	M10	M12	M16
Loose bolt		$N_{R,k}$ tension [KN]	8.3	10.4	15.2	20.6	29.5
		$V_{R,K}$: shear [KN]	8.3	10.4	15.2	*33.7*	59.0
Stainless steel loose bolt		$N_{R,k}$ tension [KN]	9.1	13.7	17.8	---	---
		$V_{R,K}$: shear [KN]	*7.0*	*12.8*	17.8	---	---
Projecting bolt		$N_{R,k}$ tension [KN]	8.3	10.4	15.2	20.6	29.5
		$V_{R,K}$: shear [KN]	*4.2*	*7.7*	*12.2*	*17.7*	*33*
Eye bolt		$N_{R,k}$ tension [KN]	*4.2*	*11.4*	*15.9*	*16.9*	29.5
		$V_{R,K}$: shear [KN]	--	--	--	--	--
Hook bolt		$N_{R,k}$ tension [KN]	*1.64*	*3.2*	*5*	*8.2*	*14.0*
		$V_{R,K}$: shear [KN]	--	--	--	--	--

1KN ≈ 100 kg

* The characteristic resistance of an anchor is that with a 95% probability to be achieved in a tension test. It depends on the mean ultimate resistance, the number of tests and the scatter of the results.

** Concrete C20/25 per ENV206: characteristic resistance for a specimen ≥ 28 days old:

- Cylindrical sample ø 150 mm. x 300 height ≥ 200 N/mm^2
- Cubic sample 150 mm. side ≥ 250 N/mm^2

Underline and cursive values correspond to steel failure.

Characteristic resistance for tension and shear must be considered separately.

5.2.- Recommended safety factors

SAFETY COEFFICIENTS			REDUCTION COEFFICIENT FOR RESISTANCES		INCREASING COEFFICIENT FOR LOADS
			CONCRETE FAILURE	*STEEL FAILURE*	
Loose bolt		Tension	1.80	--	1.4
		Shear	1.50	*1.33*	
Stainless steel loose bolt		Tension	1.80	--	1.4
		Shear	1.50	*1.56*	
Projecting bolt		Tension	1.80	--	1.4
		Shear	--	*1.24*	
Eye bolt		Tension	1.80	*1.50*	1.4
		Shear	--	--	--
Hook bolt		Tension	--	*1.50*	1.4
		Shear	--	--	--

5.3.- Calculation example

Fixing a load tension of 1.500 kg

1.500 kg ≈ 15 KN	
Increasing coefficient for loads:	1.4
Using two M10 AC anchors	
Pull load characteristic resistance for M12 HI anchor:	20.6 KN
Concrete failure	
Concrete reduction for resistances coefficient:	1.8

Checking: increased load must be lower than reduced resistance

15 KN x 1.4 ≤ 2 x 20.6 KN / 1.8

Wedges distance must be longer than 165 mm and distance to any edge must be longer than 85 mm as well.