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Technical Assessment of Mechanical Wedge Anchors

According to BIS 1946-4

General Part

Technical Assessment Body issuing the Technical Assessment Report:	Walchand College of Engineering, Sangli, Maharashtra, Kolhapur
Trade Name of the construction Product	ICFS TBA Anchors
Product Family	Testing and Assessment of Post-Installed Mechanical Anchoring Systems
Manufacturer	Manufacturing Unit of ICFS Avani Industry W-38, MIDC, Shiroli, Kolhapur 416122, Maharashtra, India
Manufacturing Plant	Avani Industry
This Technical Assessment Report Contains	11 pages including 3 annexes which form an integral part of this assessment
Basis of Technical Assessment Report	BIS1946−4

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10 JUN 2026

Specific Part

1) Technical description of the product

The Indo Spark TBA in the range of M6, M8, M10, M12, M16 and M20 is an anchor made of galvanized steel. The anchor is installed into a predrilled cylindrical hole and anchored by torque-controlled expansion. The anchorage is characterized by friction between expansion clip and concrete.

Product and installation descriptions are given in annexes A1 and A2.

2) Specification of the intended use in accordance with BIS 1946-4

The performances given in section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in annex B.

The verifications and assessment methods on which this Technical Assessment is based lead to the assumption of a working life of the anchor of at least 50 years. The indications given on the working life can not be interpreted as a guarantee given by the producer, but are to be regarded only as a mean to choosing the right products in relation to the expected economically reasonable working life of the works.

3) Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability

The essential characteristics regarding mechanical resistance and stability are included under the Basic Works Requirement **(BWR)** Safety in use.

3.2 Safety in case of fire

Essential characteristic	Performance
Reaction to fire	The steel element shall be classified as Non-combustible according to IS 3808-1991. Material shall meet requirements for Type 1 Construction as per NBC 2016, Part 4 ensuring zero flame spread and non-combustibility
Resistance to fire	See Annexure C3

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3.3 Safety and accessibility

Essential characteristic	Performance
Resistance to pull−out or concrete failure under tension loading	See Annexure C1
Characteristic resistance values under shear loads	See Annexure C2

3.4 General aspects

The verification of durability is part of testing the essential characteristics. Durability is only ensured if the specifications of intended use according to Annex B are taken into account.

4) Technical details necessary for the implementation of the Assessment and Verification of Consistency of Performance system

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Walchand College of Engineering, Sangli.

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WALCHAND COLLEGE OF ENGINEERING SANGLI

Head of Department
Department of Applied Mechanics
Walchand College of Engineering, Sangli

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Product and Identification

TBA (Though Bolt Anchor)

Identification on anchor:

Expansion Clip : Company logo +"TBA"+Metric size.

Anchor body : Metric X Length

ICFS Through Bolt Anchors (TBA)	**ANNEX A1**
Product Description Identification	

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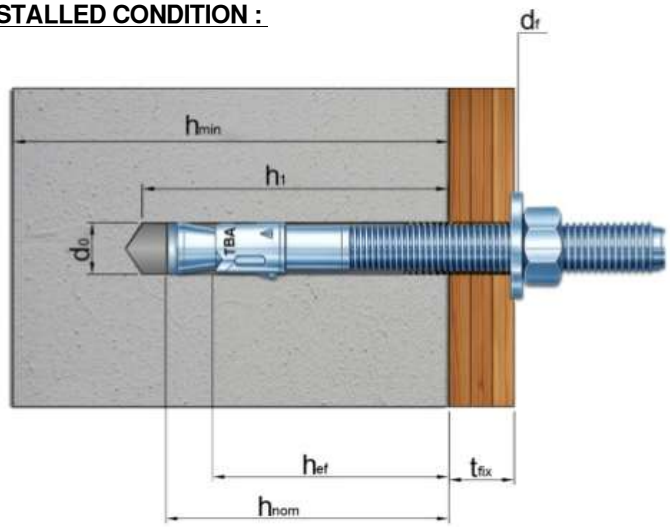
INSTALLED CONDITION :



Standard embedment depth (all sizes)

d_0:	Nominal diameter of drill bit
d_f:	Fixture clearance hole diameter
h_{ef}:	Effective Anchorage Length
h_1:	Depth of drilled hole
h_{nom}:	Overall anchor embedment depth in the concrete
h_{min}:	Minimum thickness of concrete member
t_{fix}:	Fixture thickness
T_{ins}:	Installation torque

Table A1: Materials

Item	Designation	Material for TBA
1	Anchor Body	Carbon Steel galvanised > 5µm ISO 4042 cold forged
2	Washer	DIN 125 galvanised > 5µm ISO 4042
3	Nut	DIN 936 class 6 > 5µm ISO 4042
4	Expansion Sleeve	Carbon Steel > 5µm ISO 4042

ICFS Through Bolt Anchors (TBA)	**ANNEX A2**
Product Description Installed Condition and Material	

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Specifications of intended use

Anchorages subjected to:

- Static or quasistatic loads: all sizes and embedment depths

Base materials:

- Reinforced and unreinforced concrete according to BIS 456
- Strength classes M20/25 to M50/60 according to BIS 456
- Non cracked concrete

Use conditions (Environmental conditions):

- The anchor shall be used in dry internal conditions: all anchor types
- Structural subjected to external atmospheric exposure (including industrial and marine environment) and to permanent internal conditions with no particular aggressive conditions exists: screw types made of stainless steel with marking A4. Such particular aggressive conditions are e.g. permanent, alternating immersion in sea water or the splash zone of sea water, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g.in desulphurization plants or road tunnels where de−icing materials are used).

- **Design:**
  - Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete.
  - Verifiable calculation rules and drawings are prepared taking into account of the loads to be attached. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.)
  - Anchorages under static or quasi−static loads are designed for design Method A in accordance with EN1992−4:2018 OR BIS 1946-2

- **Installation:**
  - Hammer drilling only.
  - Anchor installation carried out by appropriately qualified personal and under the supervision of the person responsible for technical matter soft hesite.
  - In case of aborted hole: new drilling at a minimum distance away of twice the depth of aborted hole or smaller distance if the aborted hole is filled with high strength mortar and if under shear or oblique tension load it is not the direction of the load application.

ICFS Through Bolt Anchors (TBA)	**ANNEX B1**
Intended Use Specifications	

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Table B1: Installation Parameters

TBA: GALVANISED ANCHOR			PARAMETERS		
			M8	M10	M12
d_0	Nominal diameter of drill bit:	[mm]	8	10	12
d_f	Fixture clearance hole diameter:	[mm]	7	9	12
T_{inst}	Nominal installation torque:	[Nm]	20	35	60
Standard Embedment Depth					
L_{min}	Minimum length of the bolt:	[mm]	75	85	100
h_{min}	Minimum thickness of concrete member:	[mm]	100	110	130
h_1	Depth of drilled hole	[mm]	65	75	85
h_{nom}	Overall anchor embed depth in concrete:	[mm]	59.5	66.5	77
$h_{ef,std}$	Effective anchorage depth:	[mm]	48	55	65
t_{fix}	Thickness of fixture for DIN125 washer d	[mm]	L−70	L−80	L−92
t_{fix}	Thickness of fixture for DIN9021 or DIN440 washer d	[mm]	L−71	L−80	L−94
s_{min}	Minimum allowable spacing:	[mm]	40	50	70
c_{min}	Minimum allowable distance:	[mm]	40	50	70

ICFS Through Bolt Anchors (TBA)	ANNEX B2
Intended Use Installation parameters	

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Table C1: Characteristic resistance values to tension loads of design method according to BIS 1946-4 for TBA Anchor

TBA: GALVANISED ANCHOR			PERFORMANCES		
			M8	M10	M12
STEEL FAILURE					
$N_{Rk,s}$	Characteristic resistance:	[kN]	13.0	23.7	33.3
$\gamma_{M,s}$	Partial safety factor:	[–]	1.40	1.40	1.40
PULLOUT FAILURE					
	Standard Embedment Depth				
$N_{Rk,p}$	Characteristic resistance in M20 /25 uncracked concrete:	[kN]	10.9	16.9	29.2
γ_{ins}	Installation safety factor:	[–]	1.0	1.0	1.0
		M30/37		1.22	
$Ø_c$	Increasing factors for $N^0_{k,p}$:	M40/50		1.41	
		M50/60		1.58	
	Cracked Concrete				
$N_{Rk,p}$	Characteristic resistance in M20 /25 cracked concrete:	[kN]	9.1	10.6	12.8
γ_{ins}	Installation safety factor:	[–]	1.0	1.0	1.0
		M30/37		1.22	
$Ø_c$	Increasing factors for $N^0_{k,p}$:	M40/50		1.41	
		M50/60		1.58	
CONCRETE CONE FAILURE AND SPLITTING FAILURE					
	Standard embedment depth				
$h_{ef,std}$	Effective anchorage depth:	[mm]	48	55	65
$k_{ucr,N}$	Factor for uncracked concrete:	[–]	11		
γ_{ins}	Installation safety factor:	[–]	1		
$s_{cr,N}$	Concrete cone failure:	[mm]	$3xh_{ef}$		
$c_{cr,N}$		[mm]	$1.5xh_{ef}$		
$s_{cr,sp}$	Splitting failure:	[mm]	192	220	260
$c_{cr,sp}$		[mm]	96	110	130

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Table C2: Characteristic resistance values under shear loads

TBA:GALVANISEDANCHOR:			PERFORMANCES		
			M8	M10	M12
STEELFAILUREWITHOUTLEVERARM					
$N_{Rk.s}$	Characteristic resistance:	[kN]	7.0	16.7	25.9
$\gamma_{M,s}$	Partial safety factor:	[–]	1.25	1.25	1.25
STEELFAILUREWITHLEVERARM					
$M^0_{Rk,p}$	Characteristic Bending Moment	[kN]	19.1	38.1	64.1
$\gamma_{M,s}$	Partial safety factor:	[–]	1.25	1.25	1.25
CONCRTEPRYOUTFAILURE					
k_8	Pryout factors for standard embedment:		1.0	1.0	2.0
γ_{inst}	Installation safety factor:		1.0		
CONCRETEEDGEFAILURE					
l_f	Effective Length of Anchor	[mm]	48	55	65
γ_{ins}	Installation safety factor:	[–]	1.0		

ICFS Through Bolt Anchors (TBA)	**ANNEX C2**
Performance Characteristic Resistance of Shear Load in concrete	

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Table C3: Characteristic values of resistance to tension loads under fire exposure

TBA : GALVANISED ANCHOR:			PERFORMANCES		
			M8	M10	M12
Characteristic Fire Resistance 90 min					
STEEL FAILURE					
NRk.s,fi	Characteristic resistance:	[kN]	0.3	0.6	1.1
PULL OUT FAILURE					
NRk,p,fi	CharacteristicresistanceinM20 /25crackedconcrete:	[kN]	2.27	2.65	3.2
γins	Installation safety factor:	[−]	1.0	1.0	1.0

ICFS Through Bolt Anchors (TBA)	ANNEX C3
Performance Characteristic Resistance of Pull Out in concrete, values under fire exposure	