



HIT-RE 500 V4 injection mortar

Technical data not covered by ETA-20/0541

Injection mortar system



Information covered

HIT-RE 500 V4 and Threaded Rods

M33, M36, M39

Hilti Technical data HIT-RE 500 V4

Scope and Specification of intended use

- The technical data in this document are not covered by ETA-20/0541 (issued 04.09.2021).
- Applicability of the technical data provided by this document is limited to an expected service life of maximum 50 years. This information is intended to provide an indication to choose the right product in relation to the expected economically reasonable working life of the works however, this cannot be interpreted as a guarantee (given by Hilti) of a service life of 50 years.
- Durability and serviceability of the Hilti product are ensured only, if the specifications of intended use according to Annex B of ETA-20/0541 (issued 04.09.2021) are considered and the installation instructions, supplied with the Hilti injection mortar, are obeyed unless deviating directives are provided in this document.
- Application is valid for static and quasi-static loading, only.
- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work. Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the fastener is indicated on the design drawings. The anchorages are designed in accordance with EN 1992-4.
- Fastener installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.

Special note:

It is especially needed that **drill hole cleaning** is performed following the installation instructions supplied with the Hilti injection mortar. Special interest shall be put on blowing out with compressed air **until the borehole is completely dried and the mortar must be injected immediately after drill hole cleaning.**

Reference: ARA 20-003

Release: 26.01.2022

Validity: 26.01.2024 or new version released





Version	Date	Comment
1.0	26.01.2022	First release



Application Scope

Anchorage subject to static and quasi static loading	
Base material	<ul style="list-style-type: none"> Concrete strength C20/25 to C50/60 Compacted reinforced or unreinforced normal weight concrete without fibers according to EN 206:2013+A1:2016 Uncracked concrete, only
Concrete condition	dry or wet concrete (not in water-filled drill holes)
Embedment depth	see Installation parameters
Installation direction	acc. ETA-20/0541 (issued 04.09.2021) special note for horizontal and overhead installation: only if steel element is supported from sinking and movement in the borehole during installation and curing
Temperature in base material at installation	acc. ETA-20/0541 (issued 04.09.2021)
Temperature in base material in-service	acc. ETA-20/0541 (issued 04.09.2021)
Drilling technique	Hammer drilling
Cleaning	acc. ETA-20/0541 (issued 04.09.2021) and Installation instructions supplied with the Hilti injection mortar Compressed air cleaning ($\geq 140 \text{ m}^3/\text{h}$); accessories are available in each size as a Hilti product (if not stated otherwise) (see parameters of drilling, cleaning and setting tools)
Setting	acc. ETA-20/0541 (issued 04.09.2021) and Installation instructions supplied with the Hilti injection mortar accessories are available in each size as a Hilti product (if not stated otherwise) (see parameters of drilling, cleaning and setting tools); for overhead installation: usage of e. g. wedges as shown in the installation instruction is highly recommended to avoid movement of the steel element

Parameters of drilling, cleaning and setting tools

Steel element	Drill and clean		Installation
	Hammer drilling	Brush	Piston plug
			
Size	d_0 [mm]	HIT-RB	HIT-SZ
M33	37	37	37
M36	40	40	40
M39	42 ¹⁾	42	42

¹⁾ not available as Hilti product

Installation parameters

Threaded rod		M33	M36	M39
min. h_{ef}	[mm]	132	144	156
max. h_{ef}	[mm]	660	720	780
Minimum base material thickness h_{min}	[mm]	$h_{ef} + 2 d_0$		
Diameter of clearance hole in the fixture d_f	[mm]	36	39	42
Minimum spacing s_{min}	[mm]	165	180	195
Minimum edge distance c_{min}	[mm]	165	180	195
Installation torque max. T_{inst}	[Nm]	330	360	390

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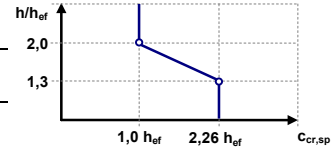
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Essential characteristics

TENSION LOAD					
Threaded rod			M33	M36	M39
Steel failure			acc. EN 1992-4		
Installation factor			1,2		
Hammer drilling (dry and wet concrete)	γ_{inst}	[-]	1,2		
Concrete cone failure			acc. EN 1992-4		
Splitting failure					
Edge distance $c_{cr,sp}$ [mm] for	$h / h_{ef} \geq 2,0$		$1,0 \cdot h_{ef}$		
	$2,0 > h / h_{ef} > 1,3$		$4,6 \cdot h_{ef} - 1,8 \cdot h$		
	$h / h_{ef} \leq 1,3$		$2,26 \cdot h_{ef}$		
Spacing		$s_{cr,sp}$	[mm]	$2 \cdot c_{cr,sp}$	
Combined pullout and concrete cone failure for a working life of 50 years					
Characteristic resistance in uncracked concrete C20/25 in hammer drilled holes					
Temperature range I:	40°C / 24°C	$\tau_{Rk,ucr}$	[N/mm ²]	12	11
Temperature range II:	55°C / 43°C	$\tau_{Rk,ucr}$	[N/mm ²]	10	9,5
Temperature range III:	75°C / 55°C	$\tau_{Rk,ucr}$	[N/mm ²]	4,0	3,5
Influence factors ψ on bond resistance τ_{Rk} in uncracked concrete					
Influence of concrete strength					
Temperature range I to III:		ψ_c	[-]	$(f_{ck}/20)^{0,1}$	
Influence of sustained load					
Temperature range I:		40°C / 24°C	ψ_{sus}^0	[-]	0,88
Temperature range II:		55°C / 43°C	ψ_{sus}^0	[-]	0,72
Temperature range III:		75°C / 55°C	ψ_{sus}^0	[-]	0,69



SHEAR LOAD					
Threaded rod			M33	M36	M39
Steel failure without lever arm					
Characteristic resistance	$V_{Rk,s}^0$	[kN]	$k_8 \cdot A_s \cdot f_{uk}$ with k_8 acc. EN 1992-4		
Partial factor	$\gamma_{Ms,v}$	[kN]	acc. EN 1992-4		
Ductility factor	k_7	[-]	1,0		
Steel failure with lever arm					
Characteristic resistance	$M_{Rk,s}^0$	[Nm]	$1,2 \cdot W_{el} \cdot f_{uk}$		
Ductility factor	k_7	[-]	1,0		
Concrete pry-out failure and concrete edge failure			acc. EN 1992-4 with $k_8 = 2,0$		

DISPLACEMENTS					
Threaded rod			M33	M36	M39
TENSION LOAD					
Temperature range I:	40°C / 24°C	δ_{N0}	[mm/(N/mm ²)]	0,09	0,09
		$\delta_{N\infty}$	[mm/(N/mm ²)]	0,20	0,22
Temperature range II:	55°C / 43°C	δ_{N0}	[mm/(N/mm ²)]	0,11	0,11
		$\delta_{N\infty}$	[mm/(N/mm ²)]	0,24	0,26
Temperature range III:	75°C / 55°C	δ_{N0}	[mm/(N/mm ²)]	0,11	0,11
		$\delta_{N\infty}$	[mm/(N/mm ²)]	0,25	0,27
SHEAR LOAD					
Temperature range I to III:		δ_{v0}	[mm/kN]	0,02	0,02
		$\delta_{v\infty}$	[mm/kN]	0,03	0,02

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