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## European Technical Assessment

**ETA 13/0681  
of 03/04/2024**

**Technical Assessment Body issuing the ETA:** Technical and Test Institute  
for Construction Prague

**Trade name of the construction product**

Chemset™101 Plus  
Ultrafix™Plus

**Product family to which the construction  
product belongs**

Product area code: 33  
Bonded injection type anchor for use  
in uncracked concrete

**Manufacturer**

Ramset Reid  
A Division of ITW Australia Pty Ltd  
1 Ramset Drive, Chirnside Park. Vic 3116  
Australia

**Manufacturing plant**

Ramset Reid Plant 3

**This European Technical Assessment  
contains**

13 pages including 10 Annexes which form  
an integral part of this assessment

**This European Technical Assessment is  
issued in accordance with regulation  
(EU) No 305/2011, on the basis of**

EAD 330499-01-0601  
Bonded fasteners for use in concrete

**This version replaces**

ETA 13/0681 issued on 20/03/2018

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

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## 1. Technical description of the product

The Chemset™101 Plus, Ultrafix™Plus with steel elements is bonded anchor (injection type).

Steel elements can be galvanized or stainless steel.

Steel element is placed into a drilled hole filled with injection mortar. The steel element is anchored via the bond between metal part, injection mortar and concrete.

The illustration and the description of the product are given in Annex A.

## 2. Specification of the intended use in accordance with the applicable EAD

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 provisions made in this European Technical Assessment are based on an assumed working life of the anchor of 50 years and/or 100 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the 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 (BWR 1)

Essential characteristic	Performance
Characteristic resistance to tension load (static and quasi-static loading)	See Annex C 1
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C 2
Displacements under short-term and long-term loading	See Annex C 3

### 3.2 Hygiene, health and environment (BWR 3)

No performance determined.

### 3.3 General aspects relating to fitness for use

Durability and serviceability are only ensured if the specifications of intended use according to Annex B 1 are kept.

## 4. Assessment and verification of constancy of performance (AVCP) system applied with reference to its legal base

According to the Decision 96/582/EC of the European Commission<sup>1</sup> the system of assessment verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table apply.

Product	Intended use	Level or class	System
Metal anchors for use in concrete	For fixing and/or supporting to concrete, structural elements (which contributes to the stability of the works) or heavy units.	-	1

<sup>1</sup> Official Journal of the European Communities L 254 of 08.10.1996

**5. Technical details necessary for the implementation of the AVCP system, as provided in the applicable EAD**

The factory production control shall be in accordance with the control plan which is a part of the technical documentation of this European Technical Assessment. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited at Technical and Test Institute for Construction Prague.<sup>2</sup> The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

Issued in Prague on 03.04.2024

By

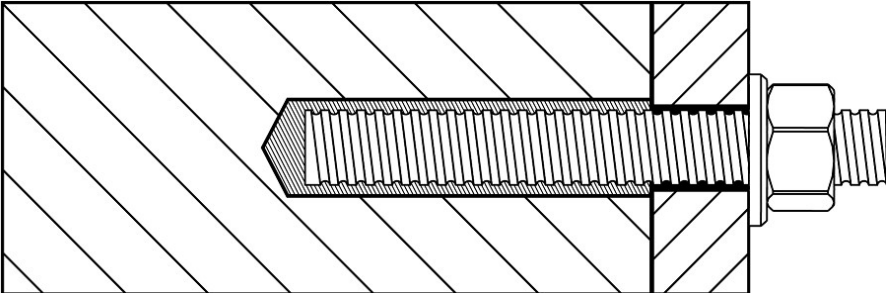
**Ing. Jiří Studnička, Ph.D.**  
Head of the Technical Assessment Body



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<sup>2</sup> The control plan is a confidential part of the documentation of the European Technical Assessment, but not published together with the ETA and only handed over to the approved body involved in the procedure of AVCP.

**Threaded rod**



<b>Chemset™101 Plus, Ultrafix™Plus</b>	<b>Annex A 1</b>
<b>Product description</b> Installed conditions	

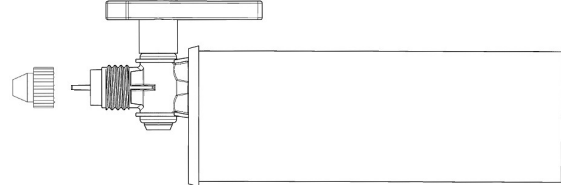
**Coaxial cartridge (Coax)**

Chemset™101, Ultrafix™Plus  
380 ml  
400 ml  
410 ml  
600 ml

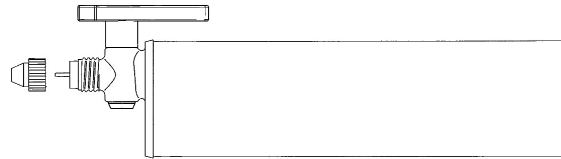


**Coaxial cartridge with incorporated tap (Coax WT)**

Chemset™101, Ultrafix™Plus  
380 ml



Chemset™101, Ultrafix™Plus  
750 ml



**Foil capsule cartridge (FCC)**

Chemset™101, Ultrafix™Plus  
300 ml  
550 ml  
850 ml



**Marking of the mortar cartridges**

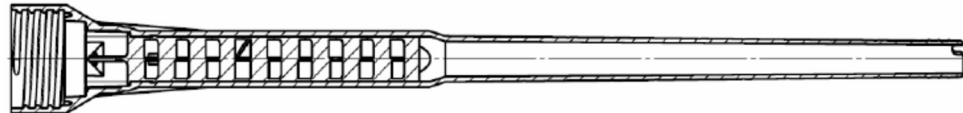
Identifying mark of the producer, Trade name, Charge code number, Storage life, Curing and processing time

**Mixing nozzle**

RSM



SQM

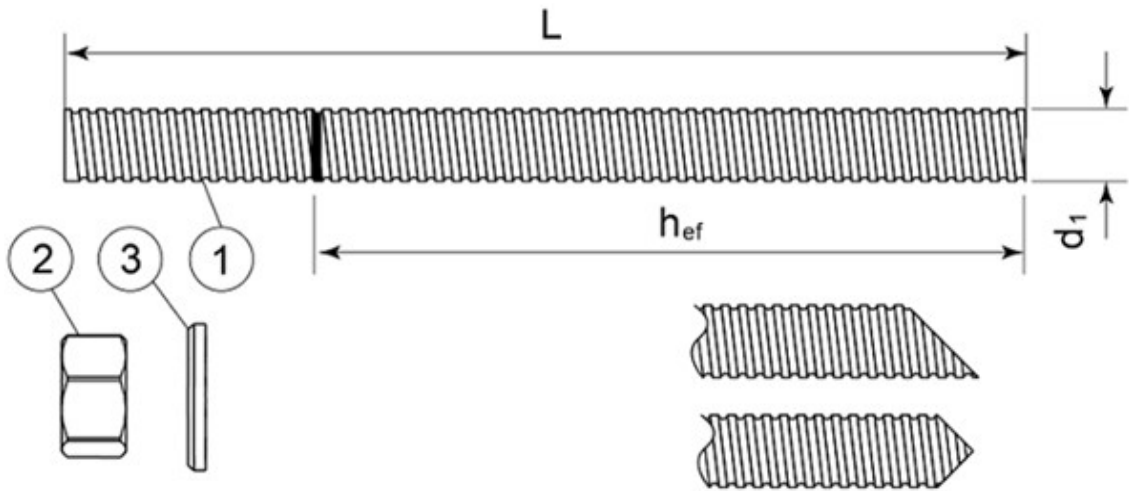


**Chemset™101 Plus, Ultrafix™Plus**

**Product description**  
Injection system

**Annex A 2**

**Threaded rod M8, M10, M12, M16, M20, M24**



Standard commercial threaded rod with marked embedment depth

Part	Designation	Material
<b>Steel, zinc plated <math>\geq 5 \mu\text{m}</math> acc. to EN ISO 4042 or Steel, Hot-dip galvanized <math>\geq 40 \mu\text{m}</math> acc. to EN ISO 1461 and EN ISO 10684 or Steel, zinc diffusion coating <math>\geq 15 \mu\text{m}</math> acc. to EN 13811</b>		
1	Anchor rod	Steel, EN 10087 or EN 10263 Property class 5.8, 8.8, 10.9* EN ISO 898-1
2	Hexagon nut EN ISO 4032	According to threaded rod, EN 20898-2
3	Washer EN ISO 887, EN ISO 7089, EN ISO 7093 or EN ISO 7094	According to threaded rod
<b>Stainless steel</b>		
1	Anchor rod	Material: A2-70, A4-70, A4-80, EN ISO 3506
2	Hexagon nut EN ISO 4032	According to threaded rod
3	Washer EN ISO 887, EN ISO 7089, EN ISO 7093 or EN ISO 7094	According to threaded rod
<b>High corrosion resistant steel</b>		
1	Anchor rod	Material: 1.4529, 1.4565, EN 10088-1
2	Hexagon nut EN ISO 4032	According to threaded rod
3	Washer EN ISO 887, EN ISO 7089, EN ISO 7093 or EN ISO 7094	According to threaded rod

\*Galvanized rod of high strength are sensitive to hydrogen induced brittle failure

**Chemset™101 Plus, Ultrafix™Plus**

**Product description**  
Threaded rod and materials

**Annex A 3**

## Specifications of intended use

### Anchorage subject to:

- Static and quasi-static load.

### Base materials

- Uncracked concrete.
- Reinforced or unreinforced normal weight concrete of strength class C20/25 at minimum and C50/60 at maximum according EN 206-1:2000-12.

### Temperature range:

- -40°C to +80°C (max. short. term temperature +80°C and max. long term temperature +50°C)

### Use conditions (Environmental conditions)

- (X1) Structures subject to dry internal conditions (zinc coated steel, stainless steel, high corrosion resistance steel).
- (X2) Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist (stainless steel A4, high corrosion resistant steel).
- (X3) Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particular aggressive conditions exist (high corrosion resistant steel).

Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, 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).

### Concrete conditions:

- I1 – installation in dry or wet (water saturated) concrete and use in service in dry or wet concrete.
- I2 – installation in water-filled (not sea water) and use in service in dry or wet concrete

### Design:

- The anchorages are designed in accordance with the EN 1992-4 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 anchor is indicated on the design drawings.

### Installation:

- Hole drilling by hammer drill mode.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.

### Installation direction:

- D3 – downward and horizontal and upwards (e.g. overhead) installation

**Chemset™101 Plus, Ultrafix™Plus**

**Intended use**  
Specifications

**Annex B 1**

**Applicator gun**



Applicator gun	A	B	C	D	E (E1)	F	G
Cartridge	Coax 380 Coax 400 Coax 410	Coax 380 Coax 400 Coax WT 380	FCC 300 FCC 550	FCC 300	Coax 600 Coax WT 380 Coax WT 750	Coax 600 Coax WT 380 Coax WT 750	FCC 850

**Cleaning brush**



**Chemset™101 Plus, Ultrafix™Plus**

**Intended use**  
Applicator guns  
Cleaning brush

**Annex B 2**



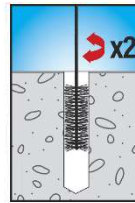
## Installation procedure



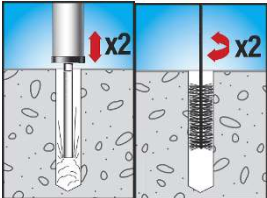
1. Drill hole to specified diameter and depth with Ramset™ DynaDrill™



2. Blow dust and debris from hole using 2 swift pumps of Hole Blower



3. Brush 2 times for the full depth of the hole



4. Repeat Steps 2. and 3.



5. Blow dust and debris from hole using 2 swift pumps of Hole Blower

6. If water is present, brush sides of hole



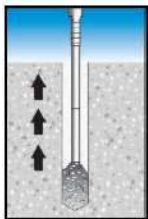
7. Follow any special opening instructions on the cartridge label and attach mixing nozzle



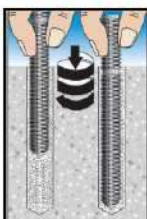
8. Load cartridge into applicator



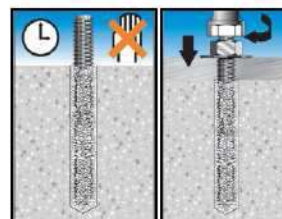
9. Dispense initial 1 or 2 trigger pulls to waste to ensure correct mixing



10. Insert end of nozzle to bottom of hole and squeeze trigger to dispense adhesive, withdrawing nozzle as hole fills



11. Insert fixing with a twisting motion to release trapped air



12. Do not disturb fixing until curing time has elapsed. Attach fixture and tighten nut to recommended torque

**Chemset™101 Plus, Ultrafix™Plus**

**Intended use**  
Installation procedure

**Annex B 3**

**Table B1: Installation parameter**

Size			M8	M10	M12	M16	M20	M24
Nominal drill hole diameter	$\varnothing d_0$	[mm]	10	12	14	18	22	26
Diameter of cleaning brush	$d_b$	[mm]	14	14	20	20	29	29
Torque moment	$\max T_{fix}$	[Nm]	10	20	40	80	150	200
Depth of drill hole for $h_{ef,min}$	$h_0 = h_{ef}$	[mm]	64	80	96	128	160	192
Depth of drill hole for $h_{ef,max}$	$h_0 = h_{ef}$	[mm]	96	120	144	192	240	288
Minimum edge distance	$c_{min}$	[mm]	35	40	50	65	80	96
Minimum spacing	$s_{min}$	[mm]	35	40	50	65	80	96
Minimum thickness of member	$h_{min}$	[mm]	$h_{ef} + 30 \text{ mm} \geq 100 \text{ mm}$				$h_{ef} + 2d_0$	

**Table B2: Minimum curing time**

Resin cartridge temperature [°C]	T Work [mins]	Base material Temperature [°C]	T Load [mins]
min +5	18	min +5	145
+5 to +10	10	+5 to +10	
+10 to +20	6	+10 to +20	85
+20 to +25	5	+20 to +25	50
+25 to +30	4	+25 to +30	40
+30		+30	35

T work is typical gel time at highest temperature

T load is set at the lowest temperature

**Chemset™101 Plus, Ultrafix™Plus**

**Intended use**  
Installation parameters  
Curing time

**Annex B 4**

**Table C1:** Design method EN 1992-4  
Characteristic values of resistance to tension load

<b>Steel failure – Characteristic resistance</b>									
<b>Size</b>			<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	<b>M20</b>	<b>M24</b>	
Steel grade <b>5.8</b>	$N_{Rk,s}$	[kN]	18	29	42	79	123	177	
Partial safety factor	$\gamma_{Ms}$	[-]	1,5						
Steel grade <b>8.8</b>	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	
Partial safety factor	$\gamma_{Ms}$	[-]	1,5						
Steel grade <b>10.9</b>	$N_{Rk,s}$	[kN]	37	58	84	157	245	353	
Partial safety factor	$\gamma_{Ms}$	[-]	1,4						
Stainless steel grade <b>A2-70, A4-70</b>	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	
Partial safety factor	$\gamma_{Ms}$	[-]	1,9						
Stainless steel grade <b>A4-80</b>	$N_{Rk,s}$	[kN]	29	46	67	126	196	282	
Partial safety factor	$\gamma_{Ms}$	[-]	1,6						
Stainless steel grade <b>1.4529</b>	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	
Partial safety factor	$\gamma_{Ms}$	[-]	1,5						
Stainless steel grade <b>1.4565</b>	$N_{Rk,s}$	[kN]	26	41	59	110	172	247	
Partial safety factor	$\gamma_{Ms}$	[-]	1,9						

<b>Combined pullout and concrete cone failure in uncracked concrete C20/25</b>									
<b>Size</b>			<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	<b>M20</b>	<b>M24</b>	
<b>Characteristic bond resistance in uncracked concrete for a working life of 50 years and 100 years</b>									
Dry/wet concrete and flooded hole	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	9	8	9	9,5	8,5	8	
Installation safety factor	$\gamma_{inst}$	[-]	1,2						
Factor for influence of sustained load for a working life 50 years	$\psi^0_{sus}$	[-]	0,78						
Factor for concrete	C30/37	$\psi_c$	[-]	1,12					
	C35/45			1,19					
	C50/60			1,30					

<b>Concrete cone failure</b>								
Factor for concrete cone failure	$k_{ucr,N}$	[-]	11					
Edge distance	$c_{cr,N}$	[mm]	1,5h <sub>ef</sub>					

<b>Splitting failure</b>								
<b>Size</b>			<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	<b>M20</b>	<b>M24</b>
Edge distance	$c_{cr,sp}$	[mm]	2,0h <sub>ef</sub>			1,5h <sub>ef</sub>		
Spacing	$s_{cr,sp}$	[mm]	4,0h <sub>ef</sub>			3,0h <sub>ef</sub>		

**Chemset™101 Plus, Ultrafix™Plus**

**Performances**  
Characteristic resistance for tension loads

**Annex C 1**

**Table C2:** Design method EN 1992-4  
Characteristic values of resistance to shear load

<b>Steel failure without lever arm</b>							
<b>Size</b>		<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	<b>M20</b>	<b>M24</b>
Steel grade <b>5.8</b>	$V_{Rk,s}$ [kN]	9	15	21	39	61	88
Partial safety factor	$\gamma_{Ms}$ [-]	1,25					
Steel grade <b>8.8</b>	$V_{Rk,s}$ [kN]	15	23	34	63	98	141
Partial safety factor	$\gamma_{Ms}$ [-]	1,25					
Steel grade <b>10.9</b>	$V_{Rk,s}$ [kN]	18	29	42	79	123	177
Partial safety factor	$\gamma_{Ms}$ [-]	1,5					
Stainless steel grade <b>A2-70, A4-70</b>	$V_{Rk,s}$ [kN]	13	20	30	55	86	124
Partial safety factor	$\gamma_{Ms}$ [-]	1,56					
Stainless steel grade <b>A4-80</b>	$V_{Rk,s}$ [kN]	15	23	34	63	98	141
Partial safety factor	$\gamma_{Ms}$ [-]	1,33					
Stainless steel grade <b>1.4529</b>	$V_{Rk,s}$ [kN]	13	20	30	55	86	124
Partial safety factor	$\gamma_{Ms}$ [-]	1,25					
Stainless steel grade <b>1.4565</b>	$V_{Rk,s}$ [kN]	13	20	30	55	86	124
Partial safety factor	$\gamma_{Ms}$ [-]	1,56					
<b>Characteristic resistance of group of fasteners</b>							
Ductility factor $k_7 = 1,0$ for steel with rupture elongation $A_5 > 8\%$							

<b>Steel failure with lever arm</b>							
<b>Size</b>		<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	<b>M20</b>	<b>M24</b>
Steel grade <b>5.8</b>	$M^o_{Rk,s}$ [N.m]	19	37	66	166	325	561
Partial safety factor	$\gamma_{Ms}$ [-]	1,25					
Steel grade <b>8.8</b>	$M^o_{Rk,s}$ [N.m]	30	60	105	266	519	898
Partial safety factor	$\gamma_{Ms}$ [-]	1,25					
Steel grade <b>10.9</b>	$M^o_{Rk,s}$ [N.m]	37	75	131	333	649	1123
Partial safety factor	$\gamma_{Ms}$ [-]	1,50					
Stainless steel grade <b>A2-70, A4-70</b>	$M^o_{Rk,s}$ [N.m]	26	52	92	233	454	786
Partial safety factor	$\gamma_{Ms}$ [-]	1,56					
Stainless steel grade <b>A4-80</b>	$M^o_{Rk,s}$ [N.m]	30	60	105	266	519	898
Partial safety factor	$\gamma_{Ms}$ [-]	1,33					
Stainless steel grade <b>1.4529</b>	$M^o_{Rk,s}$ [N.m]	26	52	92	233	454	786
Partial safety factor	$\gamma_{Ms}$ [-]	1,25					
Stainless steel grade <b>1.4565</b>	$M^o_{Rk,s}$ [N.m]	26	52	92	233	454	786
Partial safety factor	$\gamma_{Ms}$ [-]	1,56					
<b>Concrete pry-out failure</b>							
Factor for resistance to pry-out failure	$k_8$ [-]	2					

<b>Concrete edge failure</b>							
<b>Size</b>		<b>M8</b>	<b>M10</b>	<b>M12</b>	<b>M16</b>	<b>M20</b>	<b>M24</b>
Outside diameter of fastener	$d_{nom}$ [mm]	8	10	12	16	20	24
Effective length of fastener	$l_f$ [mm]	min ( $h_{ef}$ , 8 $d_{nom}$ )					

**Chemset™101 Plus, Ultrafix™Plus**

**Performances**  
Characteristic resistance for shear loads

**Annex C 2**

**Table C3:** Displacement under tension and shear load

Anchor size		M8	M10	M12	M16	M20	M24
Tension load							
$\delta_{N0}$	[mm/kN]	0,03	0,03	0,03	0,02	0,02	0,02
$\delta_{N\infty}$	[mm/kN]	0,06	0,05	0,03	0,02	0,02	0,02
Shear load							
$\delta_{V0}$	[mm/kN]	0,02	0,01	0,02	0,02	0,02	0,03
$\delta_{V\infty}$	[mm/kN]	0,04	0,02	0,03	0,03	0,03	0,05

**Chemset™101 Plus, Ultrafix™Plus****Performances**  
Displacement**Annex C 3**