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European Technical Assessment

ETA 13/0681 of 20/03/2018

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

Ramsetreid
A division of ITW Australia Pty Ltd
1 Ramset Drive, Chirnside Park, VIC 3116
Australia

Manufacturing plant

Ramsetreid Plant

**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 330499-00-0601

This version replaces

ETA 13/0681 issued on 07/06/2013

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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 anchor is intended to be used with embedment depth from 8 diameters to 12 diameters.

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. 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 for tension loads	See Annex C 1
Characteristic resistance for shear loads	See Annex C 2
Displacement	See Annex C 3

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorage satisfy requirements for Class A1
Resistance to fire	No performance assessed

3.3 Hygiene, health and environment (BWR 3)

Regarding dangerous substances contained in this European Technical Assessment, there may be requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Regulation (EU) No 305/2011, these requirements need also to be complied with, when and where they apply.

3.4 Safety in use (BWR 4)

For basic requirement safety in use the same criteria are valid as for Basic Requirement Mechanical resistance and stability.

3.5 Sustainable use of natural resources (BWR 7)

For the sustainable use of natural resources no performance was determined for this product.

3.6 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 Commission¹ 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

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

5.1 **Tasks of the manufacturer**

The manufacturer may only use raw materials stated in the technical documentation of this European Technical Assessment.

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 Technický a zkušební ústav stavební Praha, s.p.² The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

5.2 **Tasks of the notified bodies**

The notified body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

The notified certification body involved by the manufacturer shall issue an certificate of constancy of performance of the product stating the conformity with the provisions of this European Technical Assessment.

In cases where the provisions of the European Technical Assessment and its control plan are no longer fulfilled the notified body shall withdraw the certificate of constancy of performance and inform Technical and Test Institute for Construction Prague without delay.

Issued in Prague on 20.03.2018

By

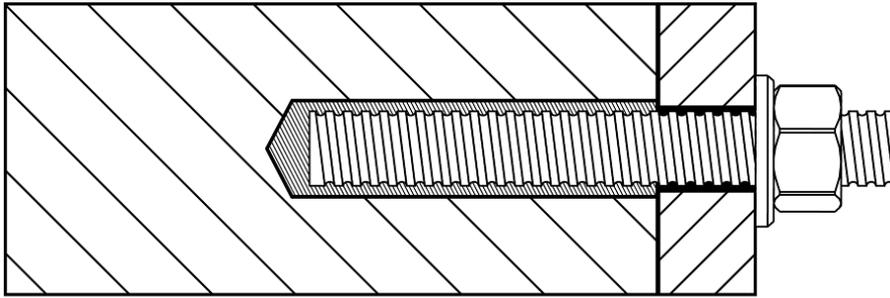
Ing. Mária Schaan

Head of the Technical Assessment Body

¹ Official Journal of the European Communities L 254 of 08.10.1996

² 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



Chemset™ 101 Plus, Ultrafix™Plus

Product description
Installed conditions

Annex A 1

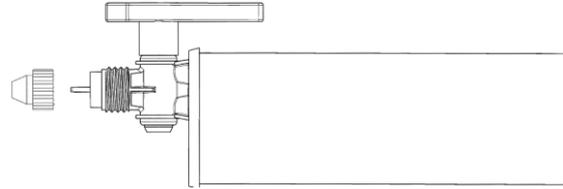
Coaxial cartridge (Coax)

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

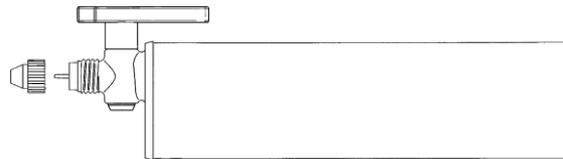


Coaxial cartridge with incorporated tap (Coax WT)

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

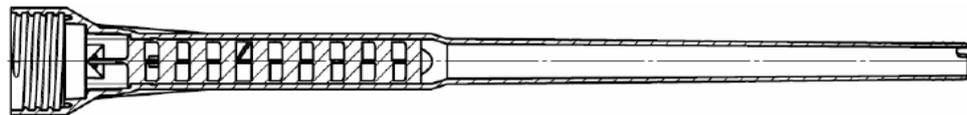
Identifying mark of the producer, Trade name, Charge code number, Storage life, Curing and processing time

Mixing nozzle

RSM



SQM

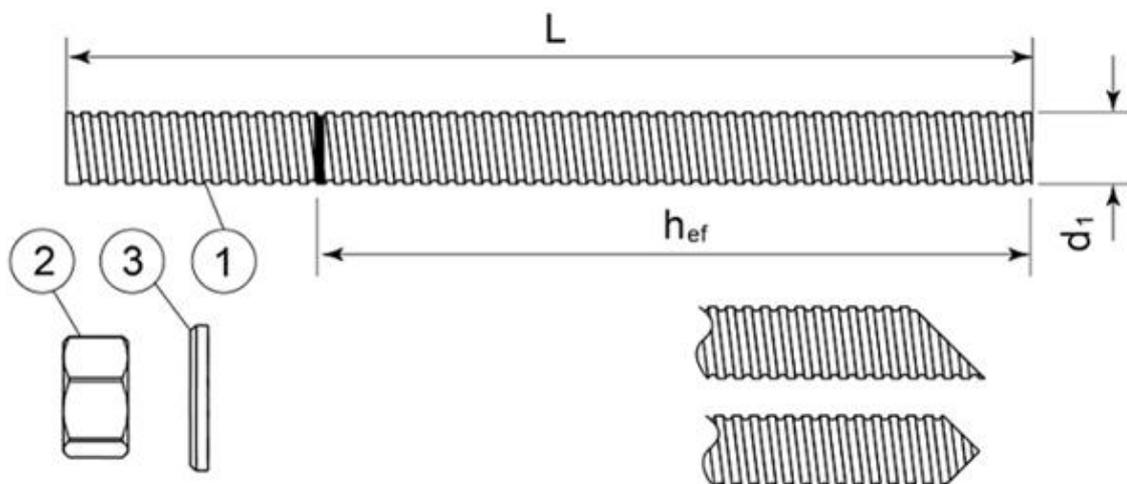


Chemset™ 101 Plus, Ultrafix™Plus

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
Steel, zinc plated $\geq 5 \mu\text{m}$ acc. to EN ISO 4042 or Steel, Hot-dip galvanized $\geq 40 \mu\text{m}$ acc. to EN ISO 1461 and EN ISO 10684 or Steel, zinc diffusion coating $\geq 15 \mu\text{m}$ acc. to EN 13811		
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
Stainless steel		
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
High corrosion resistant steel		
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)

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

Use categories:

- Category 2 – installation in dry, wet concrete or flooded hole.

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:

- Dry or wet concrete or flooded hole.
- 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.

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 WT 380 Coax WT 750	Coax WT 380 Coax WT 750	FCC 850

Cleaning brush



Chemset™ 101 Plus, Ultrafix™Plus

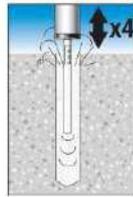
Intended use
Applicator guns
Cleaning brush

Annex B 2

Installation procedure



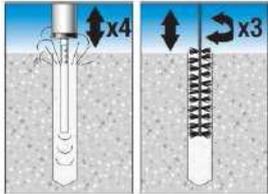
1. Drill hole to specified diameter and depth with Ramset™ DynaDrill™



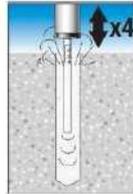
2. Blow dust and debris from hole using 2 swift pumps of Hole Blower



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



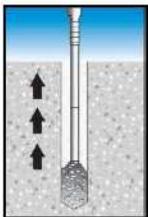
7. Follow any special opening instructions on the cartridge label and attach mixing nozzle



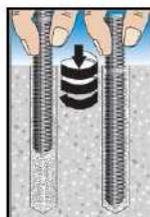
8. Load cartridge into applicator



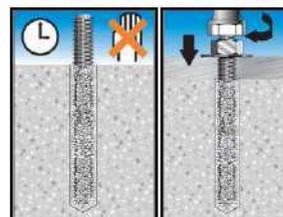
9. Dispense initial 1 or 2 trigger pulls to waste to ensure correct mixing



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 $h_{ef,min} = 8d$	h_0	[mm]	64	80	96	128	160	192
Depth of drill hole for $h_{ef,max} = 12d$	h_0	[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: Cleaning

All diameters
- 2 x blowing
- 2 x brushing
- 2 x blowing
- 2 x brushing
- 2 x blowing

Table B3: 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

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

Combined pullout and concrete cone failure in uncracked concrete C20/25							
Size		M8	M10	M12	M16	M20	M24
Characteristic bond resistance in uncracked concrete							
Dry/wet concrete and flooded hole	$\tau_{Rk,ucr}$ [N/mm ²]	9	8	9	9,5	8,5	8
Installation safety factor	$\gamma_2^{(1)} = \gamma_{inst}^{(2)}$ [-]	1,2					
Factor for concrete	C30/37	1,12					
	C35/45	1,19					
	C50/60	1,30					

Concrete cone failure							
Factor for concrete cone failure	$k_1^{(1)}$	10,1					
	$k_{ucr,N}^{(2)}$	11					
Edge distance	$c_{cr,N}$ [mm]	1,5 h_{ef}					

Splitting failure							
Size		M8	M10	M12	M16	M20	M24
Edge distance	$c_{cr,sp}$ [mm]	2,0 h_{ef}			1,5 h_{ef}		
Spacing	$s_{cr,sp}$ [mm]	4,0 h_{ef}			3,0 h_{ef}		
Partial safety factor	$\gamma_{Msp}^{(1)}$ [-]	1,8					

¹⁾ Design according EOTA Technical Report TR 055

²⁾ Design according EN 1992-4:2016

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

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

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

Concrete edge failure								
Size			M8	M10	M12	M16	M20	M24
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	F	[kN]	6,3	7,9	11,9	23,8	29,8	45,6
Displacement	δ_{N0}	[mm]	0,2	0,2	0,3	0,5	0,7	0,9
	$\delta_{N\infty}$	[mm]	0,4	0,4	0,4	0,4	0,4	0,4
Shear load	F	[kN]	5,2	8,3	12,0	22,4	35,0	50,4
Displacement	δ_{V0}	[mm]	0,1	0,1	0,2	0,4	0,8	1,5
	$\delta_{V\infty}$	[mm]	0,2	0,2	0,3	0,6	1,2	2,3

Chemset™ 101 Plus, Ultrafix™Plus

Performances
Displacement

Annex C 3