

Date of Issue: April 16, 2015

**Marine Grade Polyester For Multi-Purpose Anchoring Applications**



**Substrates**

- Solid Concrete
- Hollow Brick & Block

**Applicable Standards**

- ETAG001-5 Option 7
- 50 Year Design Life
- Sustained Loading

**CHEMSET 101 PLUS is a multi-purpose Polyester mortar for anchoring threaded studs and starter bars in solid and hollow substrates**

**Overview**

CHEMSET™ 101 PLUS is formulated using high performance, marine grade resin, which allows full load capacity in flooded holes to be attained.

The load performance of CHEMSET™ 101 PLUS has assessed to ETAG 001-5 Option 7 in solid concrete, including flooded holes.

CHEMSET™ 101 PLUS is styrene free for lower odour and low VOC when cured.

**Product Advantages**

Multi Purpose	Solid and hollow substrates
Fast Cure	50 minutes at 20°C for improved productivity
Fast and Easy Cold Weather Dispensing	Improved productivity
Styrene Free	Low VOC and Low odour
50 year design life	Security and peace of mind
Dry, wet and flooded holes	No weather delays

**Applications**

- Timber Frame Hold Down
- Hollow block & Brick Connections
- Structural Steel Connections
- Column Hold Down, Shelf Angles
- Public Seating, Hand Rails
- Fence and Balustrade posts
- Starter Bars

### Installation Properties

**LOAD RANKING\***

↑

DRY FLOODED

★★★★ ★★★★★

Rebar Size Range - ø8 to ø24

Threaded Bar Size Range - M8 to M24

Installation Temperature Range

Adhesive 5°C to 30°C

Substrate 0°C to 40°C

Anchoring Environments	
Hole Condition	Drilled holes                      Flooded holes
Anchoring Environment	Dynamic loading
Substrates	Solid Concrete                      Hollow applications
Operating Temperature Range	Long Term:                      -40°C                      50°C                     Max Short Term:                      80°C

\*Load Ranking is the relative load compared with other Chemical Anchoring products in the Ramset range and is intended to assist with product selection. The Load Ranking scale is from 1 (lowest) to 5 (highest) load capacity in tension. Load Ranking is not intended to assist with load design. For load capacity and design information, consult the Ramset Specifiers Anchoring Resource book available from Ramset in hard copy or download from the website.

### Working and Loading Times

Substrate Temperature	Working Time	Time to Full Load Capacity	
		Dry and Damp	Flooded and Underwater
5°C	18 min	145 minutes	145 minutes
10°C	10 min	85 minutes	85 minutes
20°C	6 min	50 minutes	50 minutes
25°C	5 min	40 minutes	40 minutes
30°C	4 min	35 minutes	35 minutes

### Material:

CHEMSET 101 PLUS consists of 2 parts: Part A is a mixture of marine grade polyester polymer and inorganic filler. Part B is a Benzoyl Peroxide catalyst.

### Typical Properties

Properties	Typical Value	
Appearance	Part A: White Part B: Black	Mixed: Grey
Density	1.69 kg / litre @ 20°C	
Heat Distortion Temperature (ISO 75)	80°C	
Shore D Hardness (ISO 7619)	90	
Compressive Strength (ASTM 695)	70 MPa	
Tensile Strength (ASTM D638)	12.2 MPa	
Flexural Strength (ASTM D638)	28.3 MPa	

(Typical properties at 7 days unless otherwise specified)

### Approvals

#### Certification

#### Approval Number / Report Number

European Technical Approval (ETA) 001-5 Option 7

ETA 13/0681

### Chemical Resistance

Chemical Environment	Concentration	Resistant	Non-Resistant
Aqueous Solution Acetic Acid	10%	R	
Acetone	100%		NR
Aqueous Solution Aluminium Chloride	Saturated	R	
Aqueous Solution Aluminium Nitrate	10%	R	
Ammonia Solution	5%		NR
Jet Fuel	100%		NR
Benzene	100%		NR
Benzoic Acid	Saturated	R	
Benzyl Alcohol	100%		NR
Sodium Hypochlorite Solution	5 – 15%	R	
Butyl Alcohol	100%	C	
Calcium Sulphate Aqueous Solution	Saturated	R	
Carbon Monoxide	Gas	R	
Carbon Tetrachloride	100%	C	
Chlorine Water	Saturated		NR
Chloro Benzene	100%		NR
Citric Acid Aqueous Solution	Saturated	R	
Cyclohexanol	100%	R	
Diesel fuel	100%	C	
Diethylene Glycol	100%	R	
Ethanol	95%		NR
Ethanol Aqueous Solution	20%	C	
Heptane	100%	C	
Hexane	100%	C	
Hydrochloric Acid	15%	R	
Hydrochloric Acid	25%	C	
Hydrogen Sulphide Gas	100%	R	
Isopropyl Alcohol	100%		NR
Linseed Oil	100%	R	
Lubricating Oil	100%	R	
Mineral Oil	100%	R	
Parafin / Kerosene (Domestic)	100%	C	
Phenol Aqueous Solution	1%		NR
Phosphoric Acid	50%	R	
Potassium Hydroxide	10% / pH 13	C	
Sea Water	100%	C	
Styrene	100%		NR
Sulphur Dioxide Solution	10%	R	
Sulphur Dioxide (40°C)	5%	R	
Sulphuric Acid	10%	R	
Sulphuric Acid	50%	R	
Turpentine	100%	C	
White Spirit	100%	R	
Xylene	100%		NR

#### Key:

<b>R</b>	Retains 80% of properties when exposed up to 75°C
<b>C</b>	Occasional contact up to 25°C
<b>NR</b>	Not resistant

### Storage and Shelf Life

Shelf life is 12 months from date of manufacture stored in a cool, dry place between 5°C and 25°C away from direct sunlight. See USE BY date on package.

### Product Range – ChemSet™ 101 Plus Anchoring Adhesive

Description	Part No	Order Quantity
ChemSet™ 101 Plus Cartridge 380 ml + 2 Nozzles	C101C	20
ChemSet™ 101 Plus Jumbo 750 ml + 2 Nozzles	C101J	12
ChemSet™ 101 Plus Kit (2 x 380 ml) + 4 Nozzles	ISKP	10
ChemSet™ Universal Applicator	CUAP	1
ChemSet™ Universal 18V Battery Applicator	CUAR18	1
Mixing Nozzles for Non-Epoxies	ISNP	5

### Installation Details – Post Installed Reinforcing Bar in Solid Concrete

Refer to Engineer's drawings for specified dimensions. In the absence of Engineer specification, the following dimensions are required. Refer to Ramset Specifier's Anchoring Resource Book for load design (Available from Ramset™ or the website [www.ramset.com.au](http://www.ramset.com.au))

Bar Size	Drill Hole Size, $d_h$ (mm)	Minimum Drill Hole Depth in Substrate (mm)	Minimum Edge Distance, $e_c$ (mm)	Minimum Anchor Spacing, $a_c$ (mm)	Minimum Structural Thickness, $b_m$ (mm)
ø10	14	70	40	60	100
ø12	16	90	50	70	120
ø16	20	120	65	100	160
ø20	25	150	80	120	200
ø24	30	180	100	145	240
ø28	35	210	115	170	280
ø32	40	240	130	195	320
ø36	45	270	145	220	360
ø40	50	300	160	240	400



Table 1. Chemical Anchor Installation Details for Post-Installed Reinforcing Bar in solid Concrete

### Installation Details – Threaded Bar and ChemSet™ Anchors Studs in Solid Concrete

Refer to Engineer's drawings for specified dimensions. In the absence of Engineer specification, the following dimensions are required. Refer to Ramset Specifier's Anchoring Resource Book for load design (Available from Ramset™ or the website [www.ramset.com.au](http://www.ramset.com.au))

Thread Size	Drill Hole Size, $d_h$ (mm)	Drill Hole Depth in Substrate (mm)	Maximum Fixture Clearance (mm)	Maximum Fixture Thickness (mm)	Tightening Torque, $T_r$ (Nm)	Minimum Edge Distance, $e_c$ (mm)	Minimum Anchor Spacing, $a_c$ (mm)	Minimum Structural Thickness, $b_m$ (mm)
M8	10	80	10	15	10	35	50	100
M10	12	90	12	25	20	40	60	120
M12	14	110	15	30	40	50	75	140
M16	18	125	20	40	95	65	100	160
M20	24	150	24	80	180	80	120	190
		170						220
M24	26	160	28	105	315	100	145	200
		210						270
M30	32	270	32	-	650	120	180	300
M36	38	330	38	-	1150	145	220	365



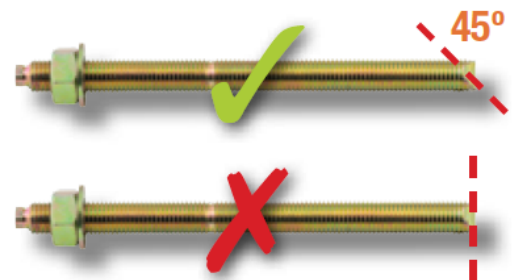
Table 2. Chemical Anchor Installation Details for Threaded Bar and ChemSet™ Anchor Studs in solid Concrete

### Installation Details – Precautions

Read safety directions on the pack and the MSDS before opening or using. In general, wear safety goggles, gloves and hearing protection when drilling and using chemical anchoring adhesive.

Before you start:

- Do not install chemical anchor into concrete less than 3 days old
- Chemical anchor may be installed in concrete aged between 3 and 28 days but will not carry full load capacity until concrete is at least 28 days old.
- Threaded rod must have one end cut at approximately 45° to prevent unthreading from the cured adhesive



### Installation Details – Drilling



Carbide Drilled

- Consult engineers drawings for hole dimensions; otherwise refer to table 1 (Post Installed Rebar) and table 2 (Threaded Bar) above
- Drill hole to specified dimensions using carbide drill bit
- Ramset™ Dustless Drilling System is recommended as the fastest most certain method of removing drilling debris and dust and eliminates post-drilling hole cleaning.
- Otherwise drilling debris and dust must be removed by brushing and blowing out of drilled holes as described below.

### Hole Cleaning – Carbide Drilled

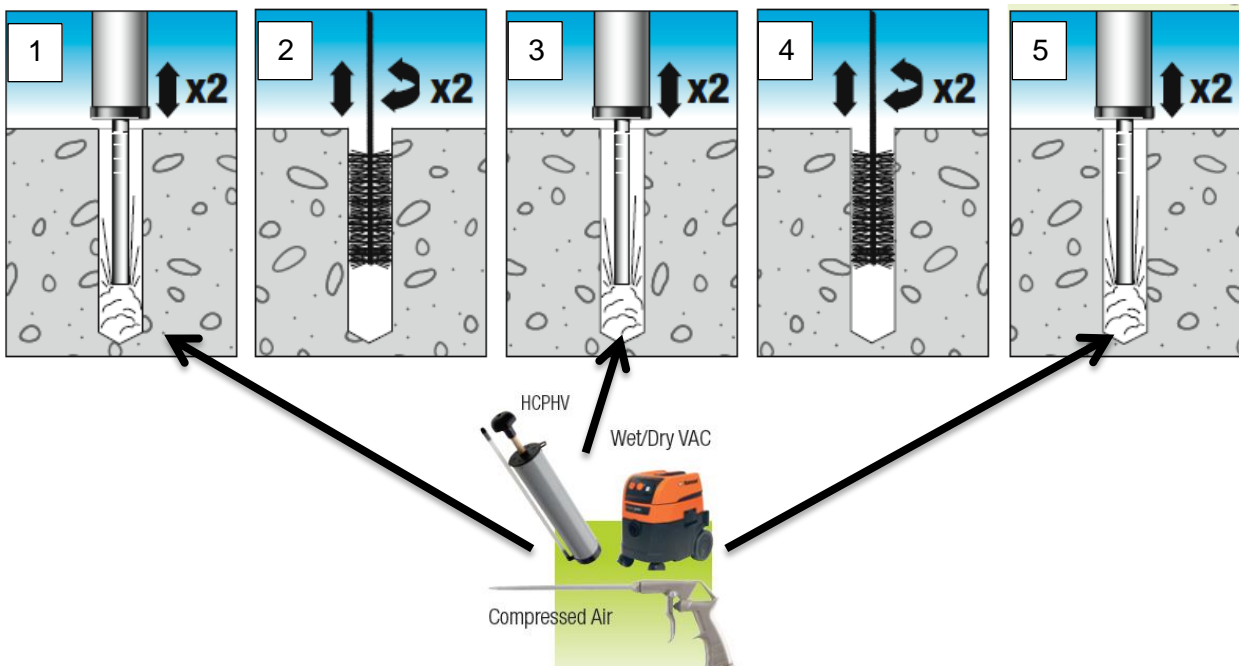


Carbide Drilled

Dust removal and cleaning is not required with Ramset™ Dustless Drilling System.

Drilling debris and dust must be removed from holes drilled with standard carbide as follows:

1. Using Ramset™ blower (Part Number HCPHV), compressed air blast or wet / dry vacuum (Ramset™ AC1630P), remove dust with 2 swift pumps.
2. Using the appropriate sized brush, with a twisting / rotating motion, insert brush to the bottom of the hole and remove 2 times.
3. Remove dust residue with air blower (2 pumps), compressed air blast or wet / dry vacuum.
4. Repeat brushing per step 2
5. Repeat blowing out residual dust per step 3



If holes are left for more than 24 hours after cleaning, they must be cleaned again (including holes drilled with Dustless Carbide)

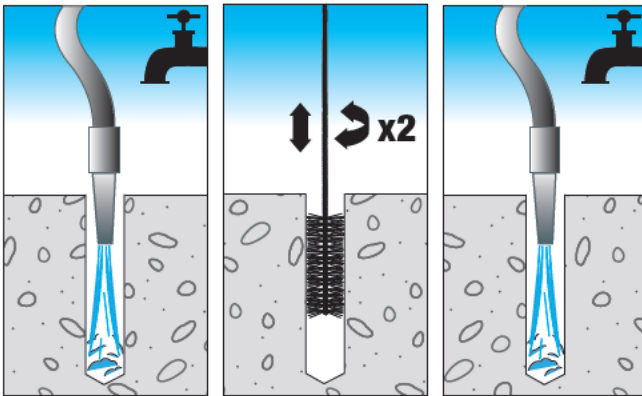
### Hole Cleaning – Flooded Holes



Flooded holes

Remove dust and drilling debris from flooded holes as follows:

1. Flush holes with clean running water until water is clear.
2. Using the appropriate sized brush, with a twisting / rotating motion, insert brush to the bottom of the hole and remove 2 times.
3. Flush holes with clean running water until water is clear.

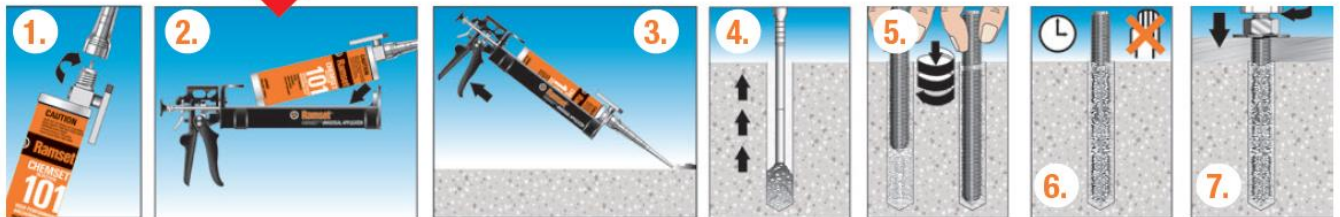


### Opening And Using Cartridge

Manual CUAP

18V Battery CUAR18

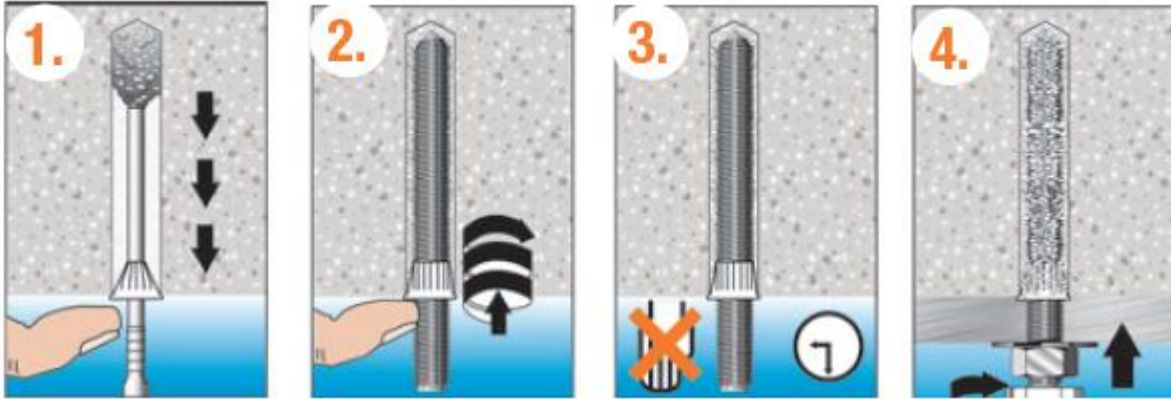
Pneumatic CUAPN



1. Remove cap from cartridge and attach mixing nozzle Part Number ISNP
2. Load cartridge into dispensing gun (Ramset Part Numbers CUAP (Manual), CUAPN (Pneumatic) and CUAR18 (18V Battery Powered))
3. Dispense a small quantity of adhesive (2 to 3 trigger pulls) to waste to ensure both adhesive components are balanced
4. Insert mixing nozzle tip to bottom of hole (to avoid air bubbles) and inject adhesive. Gradually withdraw nozzle to keep the nozzle tip at the surface of the adhesive. Continue injecting until hole is about  $\frac{3}{4}$  filled
5. Insert fixing using a twisting / rotating motion into adhesive and wipe away any excess
6. Allow adhesive to cure. Refer to Working and Loading Times table on Page 2
7. Load anchor and apply torque (to threaded fixings) after appropriate cure time

### Overhead Installation

Note: Dustless carbide system is recommended to eliminate falling dust and debris during overhead drilling. Retaining collars are available from Ramset™ for M12 (P/N ISR12) and M16 (P/N ISR16) threaded rod. For other threaded rod sizes and rebar, use plastic wedges after the anchor has been installed.



1. Insert mixing nozzle tip to bottom of hole (to avoid air bubbles) and inject adhesive. If using retaining collar, place it in the hole and insert nozzle as illustrated. Gradually withdraw nozzle to keep the nozzle tip at the surface of the adhesive. Continue injecting until hole is about  $\frac{3}{4}$  filled. Dosing Cap (Part Number 055969) is recommended for deep holes and hole diameters > 18 mm.
2. Insert fixing using a twisting / rotating motion into adhesive and wipe away any excess. Retaining collar will hold rod in place while adhesive sets. With no retaining collar, hold fixings in place by inserting 4 x plastic wedges between the fixing and the concrete.
3. Allow adhesive to cure. Refer to Working and Loading Times table on Page 2
4. Load anchor and apply torque (to threaded fixings) after appropriate cure time.

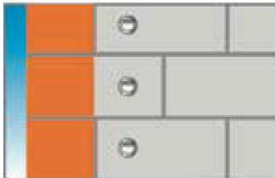


### Hollow Block, Hollow Brick and Hollow Core Panels

The following installation instructions are for ChemSet™ 101 Plus and Ultrafix™ Plus anchoring adhesives into hollow pre-manufactured masonry units.

#### Fixing positions Hollow Block

1. One fixing per block cavity only.
2. Minimum edge distance - ½ block



Do not fix in orange areas



Correct installation



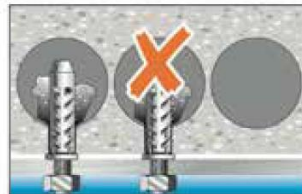
Incorrect installation - not recommended

#### Fixing positions Hollow Brick

1. Only one fixing recommended per brick.
2. Minimum edge distance – 1 brick



Performance will be significantly reduced



Incorrect installation - not recommended



Do not fix in orange areas

### Installation Instructions:

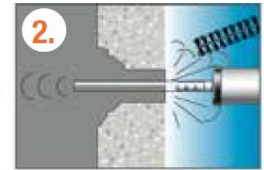
Read the "Precautions" section of these instructions prior to use. Setting and technical data provided applies to:

- Holes drilled with Rotary Hammers using carbide drill bits and where holes have been cleaned using a brush and air pump.
- Always wear safety goggles.

1. Drill hole using correctly sized drill bit through wall of hollow block or brick, see pack or product information.

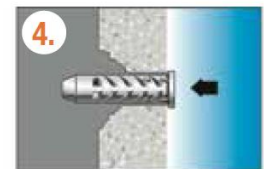


2. Clean hole with correctly sized hole cleaning brush with stiff nylon or wire bristles. Using a combination Push/Pull and twisting (rotation) motion, ensure the sides of the hole are scrubbed at least 3 times for the full depth of the hole.



3. Hollow block studs, threaded studs or threaded rod to be used should be cleaned and free from oil, grease, flaking rust or debris.

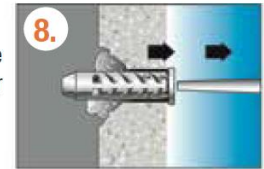
4. Insert correct sleeve or sieve into hole,



5. Remove nut from the cartridge and attach the correct Ramset mixing nozzle. (Ultrafix™ Plus pull out and cut plastic bag)

6. Mount assembled cartridge into the Ramset Universal Applicator (Mount Ultrafix™ Plus in regular caulking gun).

7. Open the orange valve (Not necessary for Ultrafix™ Plus). Turn so arrow points forward. Dispense adhesive to waste until an even, uniform grey is achieved. Approximately 2-3 trigger pulls should be adequate. The initial flow is unsuitable for fastening and must not be used.



8. Inject adhesive until the sleeve/sieve is filled, slowly withdraw nozzle and complete filling.

9. Once the required fill is obtained release the pressure by pressing rear trigger.

10. Push the stud into the hole using a slow twisting motion. Wipe away excess material.



11. Do not touch anchor until mixture has hardened and do not load anchor until curing is complete.

12. Attach fixture and tighten nut in accordance with recommended tightening torque.

### Transport and Storage

Classified as flammable for transport and storage.  
Class 3 (Flammable), Packaging Group III according to Australian Dangerous Goods code.

### Occupational Health and Safety



- ◆ Avoid contact with skin and eyes
- ◆ Avoid breathing vapour
- ◆ Wear protective gloves when mixing or using.
- ◆ If poisoning occurs, contact a doctor or Poisons Information Centre.
- ◆ If swallowed, **do not** induce vomiting. Give glass of water.
- ◆ If skin contact occurs, remove contaminated clothing and wash skin thoroughly.
- ◆ If in eyes, hold eyes open, flood with water for at least 15 minutes and seek medical assistance.
- ◆ **Do not** use in poorly ventilated or confined space.

For more detailed information refer to the Material Safety Data Sheet available from Ramset or the website.

# CHEMSET™ ACCESSORIES

## Fixings – Chemset™ Anchor Studs



### ChemSet™ Anchor Studs

Thread Size	Description	Zn ZINC	GAL Galvanised	A4 316 Stainless Steel 316	Box Quantity
M8	ChemSet™ Anchor Stud M8 x 110 Zinc	CS08110	CS08110GH	CS08110SS	10
M10	ChemSet™ Anchor Stud M10 x 130 Zinc	CS10130	CS10130GH	CS10130SS	10
M12	ChemSet™ Anchor Stud M12 x 160 Zinc	CS12160	CS12160GH	CS12160SS	10
M12	ChemSet™ Anchor Stud M12 x 180 Zinc	CS12180			10
M16	ChemSet™ Anchor Stud M16 x 190 Zinc	CS16190	CS16190GH	CS16190SS	10
M20	ChemSet™ Anchor Stud M20 x 260 Zinc	CS20260	CS20260GH	CS20260SS	6
M24	ChemSet™ Anchor Stud M24 x 300 Zinc	CS24300	CS24300GH	CS24300SS	6

### ChemSet™ Anchor Studs Range

## Hole Cleaning Accessories

Description	To Suit	Part Number	Pack Quantity
Hole Cleaning Pump (High Volume)	All hole sizes	HCPHV	1
Hole Cleaning Brush 13 mm	8 – 12 mm Diameter Holes	HCBT13	1
Hole Cleaning Brush 20 mm	14 – 20 mm Diameter Holes	HCBT20	1
Hole Cleaning Brush 26 mm	20 – 24 mm Diameter Holes	HCBT26	1
Hole Cleaning Brush 20 mm x 1m	14 – 20 mm Diameter Holes	HCBT261000	1
Hole Cleaning Brush 26 mm x 1m	20 – 24 mm Diameter Holes	HCBT201000	1
Hole Cleaning Brush 36 mm x 1m	26 – 34 mm Diameter Holes	HCBT361000	1
Hole Cleaning Brush 42 mm x 1m	36 – 40 mm Diameter Holes	HCBT421000	1

### ChemSet™ Hole Cleaning Accessories


## Hollow Substrate Accessories

Description	Hole	To Suit	Part Number	Pack Quantity
Nylon Sleeve 12 mm Diameter	12mm	M8 Thread	ISS08	100
Nylon Sleeve 14 mm Diameter	14mm	M10 Thread	ISS10	100
Nylon Sleeve 16 mm Diameter	16mm	M12 Thread	ISS12	100
Fine Metal Mesh Sleeve 12 x 1000 mm	12mm	M8 Thread	ISM08	1
Fine Metal Mesh Sleeve 16 x 1000 mm	16mm	M10 / M12 Thread	ISM12	1
Fine Metal Mesh Sleeve 22 x 1000 mm	22mm	M16 Thread	ISM16	1

### Ramset™ R3™ Dustless Drilling Carbide

Suitable for use with all SDS-Max Hammer Drills and professional worksite vacuum cleaners (Ramset™ AC1630P)

Part No.	Type	Size (mm)	Hole Depth (mm)	Drill Length (mm)
DDEM14400	U3Max	14	400	600
DDEM16400	U3Max	16	400	600
DDEM18400	R3Max	18	400	600
DDEM20400	R3Max	20	400	600
DDEM22400	R3Max	22	400	600
DDEM25400	R3Max	25	400	600
DDEM28400	R3Max	28	400	600
DDEM30400	R3Max	30	400	600
DDEM32400	R3Max	32	400	600
DDEM35400	R3Max	35	400	600



### Ramset™ Dustless Drilling Carbide Bits

To purchase or obtain further information contact *Ramset* or your nearest *Ramset* distributor

NEW ZEALAND  
 PHONE: 0800 726 738  
 WEB: [www.ramset.co.nz](http://www.ramset.co.nz)

AUSTRALIA  
 PHONE: 1300 780 063  
 WEB: [www.ramset.com.au](http://www.ramset.com.au)

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