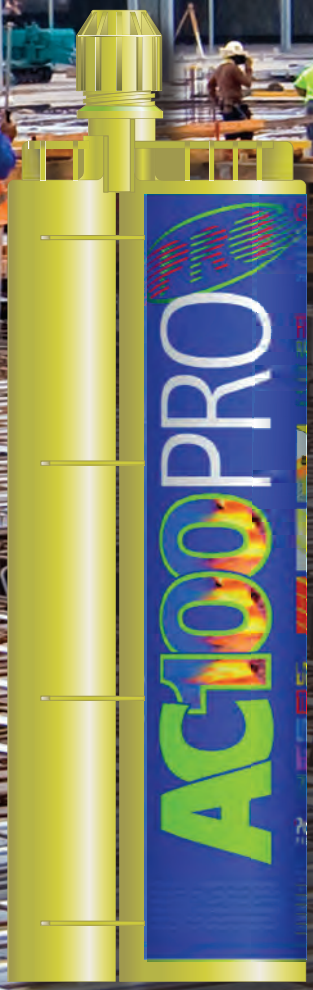
Powers

AC100® PRO

high performance
fast cure
styrene free
fire rated
low VOC content
Green Star Compliant -
Office Design V2 IEQ-13
V3 IEQ-13 V1.1 IEQ-11



VOC COMPLIANT

CE 0756
Powers Fasteners Australasia Pty Ltd
Factory 3
09
0756-cpd-0315
ETA-09/0233
ETAG 001-1 Option 7
M8 – M16

FIRE RATED

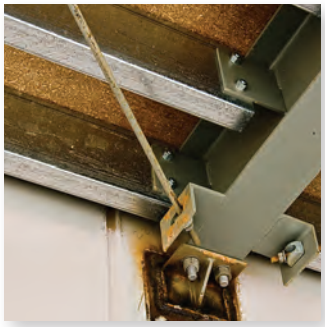
Edition: June 2013

Powers offers the widest range of mechanical and adhesive fasteners in the market place. Powers products cover the full traditional anchoring range while specialising in innovative products that provide the architect, engineer and end user with aesthetic, high performance, labour saving fastening solutions.
For fast technical advice, free samples and free on site demonstrations, visit our website www.powers.com.au

Other Powers adhesive systems

PURE150-PRO
Heavy duty
Low odour
Epoxy anchoring adhesive

V12
High performance
Economical
Versatile
Vinyl ester resin



AC100e
Standard caulking gun
Easy to apply
Environmentally friendly

KF2
Economical
Easy to apply

Support

Training Facility
Melbourne

In-house Product & Application Testing Service
Melbourne

National on Site Anchor Testing Service

National On Site Service
Powers Training Vehicles (PTV)

Contents

AC100® PRO

Introduction

AC100®PRO is a two component, styrene free system which contains methacrylic ester as the reactive solvent. AC100®PRO contains low levels of Volatile Organic Compounds (VOCs). It is a fast curing adhesive specially designed for anchoring in a wide range of weather conditions. AC100®PRO is resistant to many chemicals including alkali media. The AC100PRO Adhesive Anchor System consists of a two part adhesive cartridge, a specially designed static mixing nozzle, and a dual piston dispensing tool. The adhesive contained within the cartridge is a vinylester which can be used in a wide range of weather applications for the installation of threaded rod in solid concrete and masonry materials. It can also be used with Powers screen tubes and threaded rod in hollow masonry base materials. AC100®PRO adhesive bonds the anchor rod to the base material so no expansion forces are exerted against the walls of the hole. This makes it ideal for use in anchoring to a variety of base materials ranging from soft common brick to hard marble or granite.

Designed in a compact 385ml size, or the latest Jumbo 585ml size, the cartridge and dispensing tool are lightweight which simplifies handling. This makes the system ideal for use in tight areas such as applications where the user must work on scaffolding. Each cartridge is formed from an engineered plastic with a specially sealed tip to provide optimum shelf life and prevent leakage during storage. If the adhesive is not completely used, the cartridge can be sealed and saved for future use. To ensure proper mixing of the adhesive components, the AC100®PRO System uses a specially designed static mixing nozzle to automatically combine the components as they are dispensed. This reduces the possibility of mixing errors.

For easy dispensing, the AC100®PRO manual tool (CG 585ml) has a dual piston design which applies even, consistent pressure to the cartridge to ensure proper dispensing of the adhesive material. The tool has a cradle style frame for easy cartridge loading and a pump style drive mechanism for fast dispensing of the AC100®PRO adhesive. The main handle assembly is manufactured from precision cast steel for long life. To further increase productivity, the tool incorporates a wear compensation mechanism which reduces the number of strokes required to dispense a cartridge. This specially designed mechanism also ensures consistent pumping over the life of the tool.

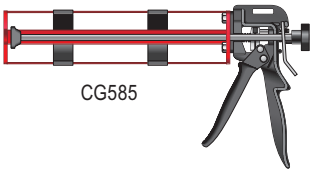
AC100®PRO is a fast curing, non-sag adhesive which makes it ideal for horizontal applications as well as vertical ones. Unlike other systems on the market, one formulation is used for both solid and hollow applications, reducing the chances of job site installation errors. The fast curing characteristics of the AC100®PRO formulation make it ideal for use in a broad range of weather applications.

AC100® PRO Selection guide

AC100®PRO Cartridges

PART NO	DESCRIPTION	QTY
AC100PRO	385ml Cartridge + 2 mixing nozzles	1
AC100PRO-585	585ml Cartridge + 2 mixing nozzles	1

Manual injection tools



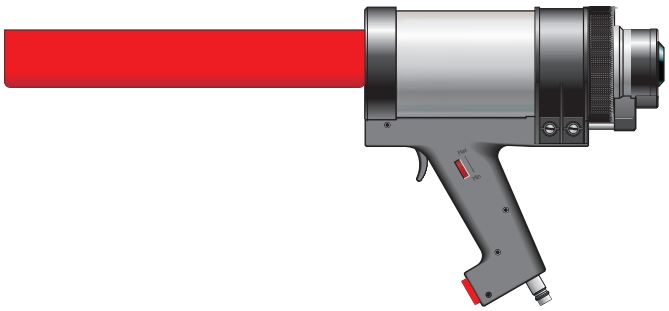
The CG 585 manual injection tool is designed with a pump style drive mechanism which has a high pump ratio to provide fast dispensing. The base unit and the handle assembly is manufactured from a precision steel casting for long life. A specially designed wear compensation mechanism ensures consistent pumping over the life of the tool. The tool is designed for use with the 385ml and 585ml cartridge only.

The Multi-PRO (CG PRO-4) manual injection tool is designed with a pump style drive mechanism which has a high pump ratio to provide fast dispensing. The base unit is a unique design which allows for the dispensing of different cartridge sizes consisting of different component ratios. The CG PRO-4 will dispense the 385ml (3:1) cartridge, the 585ml (3:1) cartridge, 380ml (10:1) cartridge, and 300ml (10:1) cartridge. CG PRO-4 is ideal for those who use the entire Powers adhesive range.

PART NO	DESCRIPTION	QTY
CG585	Dispensing gun for 385ml and 585ml cartridge	1
CGPRO-4	Dispensing gun for all Powers adhesives	1

Pneumatic injection tool

The pneumatic injection tool is designed for large jobs. The main cylinder is formed using top quality aluminum to provide a lightweight, durable tool. The dispensing trigger is designed to provide instant pressure relief from the cartridge which reduces waste.



PART NO	DESCRIPTION	QUANTITY
CGPN585	Pneumatic Dispensing gun for 385ml and 585ml cartridge	1

Maximum Operating Pressure - 110 psi
Normal Operating Range - 80 to 100 psi
Maximum Free Air Required - 1 CFM based on average use

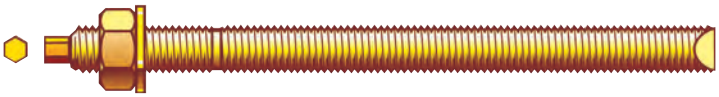
Cartridge system nozzle

The unique design allows one nozzle to be used with all anchor hole sizes. On small jobs, anchor holes as small as 10mm in diameter and 150mm in depth can be easily filled. For larger jobs, the AC100®PRO nozzle can be used in conjunction with the mixer nozzle extension for anchor holes larger than 18mm and depth of up to 350mm.

PART NO	DESCRIPTION	QTY
8482	Nozzle	10
MNEXT	Nozzle extension (200mm)	10

Threaded Rod – STM™ (STUDS)

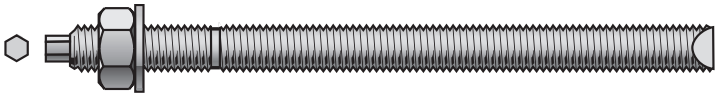
Powers Fasteners supplies a range of adhesive anchor studs (STM™) for use based on standard embedment depth applications. For alternate embedment depths, studs should be cut to specified size as per application requirements. Studs not sourced from Powers Fasteners must be from a reputable source and material properties should be verified as being compliant to specified material property grades i.e. class 5.8. Powers Fasteners supplies studs in stainless steel, galvanised steel and zinc plated steel, environmental factors and application factors should be considered carefully prior to selecting the correct stud.



STM™ – Chisel Point Stud 5.8

Carbon Steel Yellow Passivated

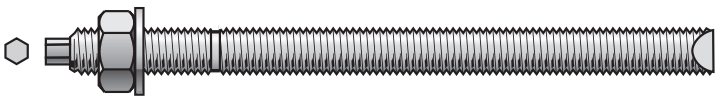
PART NO.	DESCRIPTION	mm	mm	mm	QTY	QTY
STM8110	8 x 110 with Nut and Washer	10	80	17	10	200
STM10130	10 x 130 with Nut and Washer	12	90	28	10	200
STM12160	12 x 160 with Nut and Washer	14	110	36	10	100
STM16190	16 x 190 with Nut and Washer	18	125	42	10	50
STM20260	20 x 260 with Nut and Washer	24	170	72	5	25
STM24300	24 x 300 with Nut and Washer	28	210	66	5	20



STM™ – Chisel Point Stud Galvanised Class 5.8

Carbon Steel Galvanised

PART NO.	DESCRIPTION	mm	mm	mm	QTY	QTY
STM8110G	8 x 110 with Nut and Washer	10	80	17	10	200
STM10130G	10 x 130 with Nut and Washer	12	90	28	10	200
STM12160G	12 x 160 with Nut and Washer	14	110	36	10	100
STM16190G	16 x 190 with Nut and Washer	18	125	42	10	50
STM20260G	20 x 260 with Nut and Washer	24	170	72	5	25
STM24300G	24 x 300 with Nut and Washer	28	210	66	5	20



STM™ – Chisel Point Stud 316 Stainless Steel

316 Stainless Steel

PART NO.	DESCRIPTION	mm	mm	mm	QTY	QTY
STM8110SS	8 x 110 with Nut and Washer	10	80	17	10	200
STM10130SS	10 x 130 with Nut and Washer	12	90	28	10	200
STM12160SS	12 x 160 with Nut and Washer	14	110	36	10	100
STM16190SS	16 x 190 with Nut and Washer	18	125	42	10	50
STM20260SS	20 x 260 with Nut and Washer	24	170	72	5	25
STM24300SS	24 x 300 with Nut and Washer	28	210	66	5	20

Threaded rod retaining cap

For use in overhead applications (Ref. Adhesive Anchoring Systems Design Manual)

PART NO	DESCRIPTION	DRILL Ø mm	STUD Ø mm	QUANTITY
RC8	8mm Retaining Cap	10	8	10
RC10	10mm Retaining Cap	12	10	10
RC12	12mm Retaining Cap	14	12	10
RC16	16mm Retaining Cap	18	16	10
RC20	20mm Retaining Cap	24	20	10

AC100®PRO material properties

The AC100®PRO adhesive is a vinylester styrene free resin. The performance criteria for use as an anchoring system for threaded rods and reinforcing bars are described in the sections that follow.

Shelf life	18 month
Storage conditions	Store dry at 5º to 25º C.
Colour	Grey
Usable volume	385 ml and 585ml

AC100®PRO setting time

The setting times listed for the AC100®PRO adhesive vary according to the base material temperature. The working time is the maximum time during which the adhesive can be dispensed before it begins to set. The curing time is the minimum time required for the AC100®PRO adhesive to reach its published capacities.

BASE MATERIAL TEMP. (ºC)	WORKING TIME (Minutes)	CURING TIME (Minutes)
5	25	120
10	15	80
20	6	45
30	4	25
35	2	20

VOC Content certification

Powers AC100®PRO Injection System has been tested in accordance with SCAQMD Method 304-91 Determination of Volatile Organic Compounds (VOC) in various materials as referenced by South Coast Air Quality Management Division (SCAQMD) Rule 1168.
The VOC content of Powers AC100®PRO has been determined and the product conforms to the Green Building Council of Australia specification as outlined under Green Star Office Design V2 IEQ-13, V1.1 IEQ-11 And V3 IEQ-13. Copy of test certificate available on request.

VOC COMPLIANT


VOC Content Test Certificate

Resistance of AC100®PRO adhesive to chemicals

The resistance of the cured AC100®PRO adhesive to various chemicals was determined by laying moulded samples of the resin in the respective chemical agents. The samples were subjected to a bending strength test before and after a 12 month exposure to the chemicals. The adhesive was rated as resistant if there was no visible deterioration and less than 25% reduction in bending strength. This exposure is extreme. Under normal installation conditions, the adhesive is exposed to the chemical agents only at the surface of the concrete around the top of the anchor hole.

CHEMICAL AGENT	CONCENTRATION	RESISTANT	NON RESISTANT
Accumulator acid		●	
Acetic Acid	40		◆
Acetic acid	10	●	
Acetone	10		◆
Ammonia, aqueous solution	5	●	
Aniline	100		◆
Beer	100	●	
Benzine (kp 100-140 °C)	100	●	
Benzole	100		◆
Boric acid, aqueous solution		●	
Calcium carbonate, suspended in water	All	●	
Calcium chloride, suspended in water		●	
Calcium hydroxide, suspended in water		●	
Carbon tetrachloride	100	●	
Caustic soda solution	40		◆
Citric acid	All	●	
Chlorine	All	●	
Diesel oil	100	●	
Ethyl alcohol, aqueous solution	50		◆
Formaldehyde,aqueous solution	30	●	
Formic Acid	100		◆
Freon		●	
Fuel oil		●	
Glycol (Ethylene Glycol)		●	
Hydrogen peroxide	30		◆
Hydrochloric acid	Conc.	●	
Isopropyl alcohol	100		◆
Lactic acid		●	
Linseed oil	100	●	
Lubricating oil	100	●	
Magnesium chloride, aqueous solution	All	●	
Methanol	100		◆
Motor Oil (SAE 20 W-50)	100	●	
Nitric acid	30		◆
Nitric acid	10	●	
Oleic acid	100	●	
Perchloroethylene	100	●	
Petroleum	100	●	
Phenol, aqueous solution	8		◆
Phosphoric acid	85	●	
Potash Lye (Potassium Hydroxide,10% and 40% solutions)		●	
Potassium carbonate, aqueous solution	All	●	
Potassium chlorite, aqueous solution	All	●	
Potassium nitrate, aqueous solution	All	●	
Premium gasoline	100	●	
Sodium carbonate, aqueous solution	All	●	
Sodium chloride, aqueous solution	All	●	
Sodium phosphate, aqueous solution	All	●	
Sodium silicate	All	●	
Sulfuric acid	70		◆
Sulfuric acid	10	●	
Tartaric acid	All	●	
Tetrachoraethylene	100	●	
Toluene			◆
Turpentine	100	●	
Trichloraethylene	100		◆

Performance data

For anchor spacing, edge distance and combined loading information, please refer to Section 8 of the Specification Guide. For critical spacing and edge distance R_s=1.00 and $R_{e(t\ \&\ s)}$=1.00.

Spacing and Edge Distance

Working stress design

Allowable working loads are based on the lesser of the allowable bond strength and allowable steel strength.

Tension

				CONCRETE 32MPa	ALLOWABLE STEEL STRENGTH (kN)		
ANCHOR SIZE mm	DRILL SIZE mm	EMBED. DEPTH mm	TORQUE RANGE Nm	ALLOWABLE BOND STRENGTH kN	CLASS 5.8 Zinc & Gal	CLASS 8.8 Zinc & Gal	316 SS A4-50
M8	10	80	10	7.0	7.6	11.7	8.1
M10	12	90	20	10.0	12.1	18.6	12.8
M12	14	110	40	14.9	17.5	27.0	18.6
M16	18	125	80	21.0	32.7	50.0	24.5
M20	24	170	120	30.8	51.0	81.2	53.9
M24	28	210	160	38.2	73.4	117.2	77.9

Shear

				CONCRETE 32MPa	ALLOWABLE STEEL STRENGTH (kN)		
ANCHOR SIZE mm	DRILL SIZE mm	EMBED. DEPTH mm	TORQUE RANGE Nm	ALLOWABLE BOND STRENGTH kN	CLASS 5.8 Zinc & Gal	CLASS 8.8 Zinc & Gal	316 SS A4-50
M8	10	80	10	5.6	4.2	6.5	5.0
M10	12	90	20	7.7	6.7	10.4	7.9
M12	14	110	40	13.2	9.8	15.1	11.5
M16	18	125	80	20.9	18.6	28.6	21.4
M20	24	170	120	34.7	29.0	46.3	33.4
M24	28	210	160	63.0	41.8	66.7	48.3

Incorporated Safety Factors (tension and shear): *Allowable bond strength (concrete) f_{sc}=3*
Allowable steel strength f_{ss}=2.5

Limit state design

Anchor design capacities are based on the lesser of the design capacity concrete and design steel capacity

Anchor Design Tension Capacities

			CONCRETE 32MPa	DESIGN STEEL CAPACITY (kN)		
ANCHOR SIZE mm	DRILL SIZE mm	EMBED. DEPTH mm	DESIGN CAPACITY ϕN_A(kN)	CLASS 5.8 ϕN_{tf}(kN)	CLASS 8.8 ϕN_{tf}(kN)	316 SS A4-50 ϕN_{tf}(kN)
M8	10	80	12.6	15.2	23.4	16.2
M10	12	90	18.2	24.1	37.1	25.6
M12	14	110	26.5	35.1	53.9	37.2
M16	18	125	37.9	65.3	100.0	69.0
M20	24	170	55.5	101.9	162.4	107.8
M24	28	210	68.7	146.8	234.4	155.8

Anchor Design Shear Capacities

			CONCRETE 32MPa	DESIGN STEEL CAPACITY (kN)		
ANCHOR SIZE mm	DRILL SIZE mm	EMBED. DEPTH mm	DESIGN CAPACITY ϕV_A(kN)	CLASS 5.8 ϕV_f(kN)	CLASS 8.8 ϕV_f(kN)	316 SS A4-50 ϕV_f(kN)
M8	10	80	10.1	8.5	13.0	10.1
M10	12	90	13.9	13.5	20.8	15.9
M12	14	110	23.8	19.7	30.2	23.1
M16	18	125	37.6	37.1	57.1	42.8
M20	24	170	62.5	58.0	92.6	66.8
M24	28	210	113.4	83.6	133.4	96.6

NOTE: Performance data is based on critical spacing and edge distance design criteria.

Design for strength limit state

Design is based on the lesser of the concrete and steel capacities.

N*	≤	$\phi N_{A,tf}$	Tension
V*	≤	$\phi V_{A,f}$	Shear
$(N^*/\phi N_{A,tf})^{5/3} + (V^* / \phi V_{A,f})^{5/3} \leq 1$			Combined loading

Where:

N*	=	Design tension force (kN)
V*	=	Design shear force (kN)
$\phi N_{A,tf}$	=	Anchor design tension capacity (kN)
ϕV_{Af}	=	Anchor design shear capacity (kN)

Concrete:

N_A	=	Characteristic ultimate tension load capacity (kN)
V_A	=	Characteristic ultimate shear load capacity (kN)
ϕ	=	0.6 [Strength reduction factor]– tension and shear

Steel:

N_{tf}	=	Nominal tension capacity of steel (kN)
V_f	=	Nominal shear capacity of steel (kN)
ϕ	=	0.8 [Capacity factor – tension and shear]

Reinforcing bar limit state design data

BAR Ø mm	DRILL Ø mm	ANCHOR DESIGN TENSION CAPACITIES (CONCRETE / BOND) kN (ϕN_A)									BAR DEVELOPMENT STRENGTH F_{SY} (kN)	DEVELOPMENT LENGTH $L_{sy,t}$
N10	12	28.8	34.6	40.4	46.1						**39.3**	204
N12	15		43.3	50.5	57.7	64.9					**56.5**	235
N16	20			67.3	76.9	86.5	111.9				**100.5**	314
N20	25				85.6	96.3	124.8	142.6	178.4		**157.0**	440
N24	30						134.6	153.8	192.3	230.4	**226.0**	588
INSTALLED LENGTH L_{inst}		150	180	210	240	270	350	400	500	600		mm

Notes:

1. Anchor Design Tension Capacities ϕN_A incorporate a strength reduction factor ϕ=0.6, in accordance with AS3600-2009
2. f'_c=32MPa minimum (For f'_c > 32 MPa assume C_f=1.0, where C_f=Compressive Strength Factor
3. Capacities based on Grade 500N rebar, in accordance with AS/NZS 4671:2009
4. Anchor Design Capacities are based on minimum spacing between anchors of 8 x d and edge distance (tension) of 6 x d. Where d = Bar Diameter.
5. Base Material Thickness (BMT) must be minimum 150% of anchor embedment when rebars are utilised as anchors. For reinforcing applications, the requirements of AS3600-2009 shall be followed for stress development in reinforcement.

Development Length and Splicing of Reinforcement for Stress Development

- Applications requiring stress development of deformed bars for reinforcing applications, LHS of equation 13.1.2.2 (with k1 = 1, for post-installed bars) and

other relevant clauses of AS3600-2009 shall be considered when deriving the development length. The greater of the development length as per AS3600-2009 (or local code/standard) or length from the above table shall be adopted for design purposes to satisfy the code/standard requirements.

- Splicing of reinforcement shall be in accordance with Clause 13.2 of AS3600-2009 or local code/standard.

Characteristic ultimate load capacities in masonry walls

The strength of masonry varies widely, therefore, job site tests to develop load capacities are recommended. The loads in these tables should be used as guidance only. The appropriate safety factors listed below must be applied to values listed in the tables.

Guide load capacities in masonry walls

The following tables list the characteristic ultimate load capacities for the AC100®PRO when tested with class 4.6 threaded rod. The data contained in these tables should be used as a guide since the consistency of masonry base materials varies greatly. Job site tests are advisable to determine actual load capacities.

Characteristic Ultimate load capacities in grout filled block

The following loads are based on tests conducted using threaded rod installed in a wall constructed from hollow block filled with fine grout. The actual amount of material will vary depending upon job site installation procedures and waste.

ANCHOR SIZE mm	HOLE SIZE mm	EMBEDMENT DEPTH mm	GROUT FILLED BLOCK	
			TENSION kN	SHEAR kN
M8	10	50	9.9	12.5
M10	12	90	21.2	16.2
M12	14	100	29.4	23.2
M16	18	125	34.0	26.0

400 x 200 x 200mm block

Block Compressing Strength: 12MPa

Grout Compressing Strength: 20MPa

Characteristic Ultimate load capacities in hollow block

The following loads are based on tests conducted using threaded rods and mesh sieves installed in a wall constructed from hollow block. The actual amount of material will vary depending upon job site installation procedures and waste.

ANCHOR SIZE mm	HOLE SIZE mm	SIEVE PART No.	HOLLOW BLOCK	
			TENSION kN	SHEAR kN
M8	12	MS885	8.5	8.5
M10	16	MS1095	9.4	9.4
M12	18	MS1295	10.5	10.5
M16	Not recommended in Hollow Block			

400 x 200 x 200mm block

Block Compressing Strength: 12MPa

Note: Refer to the Adhesive Anchoring Systems Design Manual for masonry design criteria

Design guidelines: ***Working stress design***

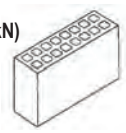
Divide characteristic ultimate load capacities by a factor of safety of 3.

Limit state design

Multiply characteristic ultimate load capacities by ϕ= 0.6

Allowable working loads using AC100® PRO + Powers sieves in WA bricks

Tensile and shear strength (kN)
Brick dimensions:
305 x 90 x 162mm




STUD SIZE mm	METRO BRICK	MIDLAND	ARMACLAY	MIDLAND
M8	2.3	2.3	2.3	2.3
M10	3.0	3.0	2.8	2.5
M12	3.0	3.0	2.8	2.5
M16	3.0	3.0	3.0	3.0

NOTE: Drill depth and sieve embedment must not exceed 75mm

SPECIFICATION EXAMPLE: M8 x 75* threaded rod used in conjunction with Powers AC100 PRO injection system and plastic sieve Part No PSM850. Installation in accordance with Powers Fasteners installation instructions for hollow base material.
*To calculate length of rod, combine **SIEVE LENGTH + 16mm + FIXTURE THICKNESS**

Fire resistance

FIRE RATED

Fire resistance of AC100®PRO injection system in combination with anchor rods of sizes M8 to M16 in CLASS 5.8 galvanised steel. Fire resistance relates to maximum allowable tension loads for various durations of time in solid reinforced concrete of minimum strength 25MPa.

Designation	Powers AC100® PRO			
Fire resistance time t_u (minutes)	Maximum tensile load* F (kN)			
	M8	M10	M12	M16
Minimum set depth (mm)	80	90	110	125
30	1.00	2.80	4.10	7.65
60	0.60	1.75	2.55	4.80
90	0.40	1.25	1.80	3.30
120	0.30	0.95	1.40	2.60

NOTE: For report details please contact Powers Fasteners Technical Department

Estimating guide

Refer to Powers website, **www.powers.com.au**, downloads section and under software you can download the latest **Powers Adhesive Volume Calculator**

Installation instructions

For installation instruction refer to the Adhesive Anchoring Systems Design Manual

Health and safety

Material safety data sheet available on request. (Ref. Chemwatch report 4726-10 and 4726-11) or via the Powers website.

Suggested specification

AC100®PRO Injection System
Stud/Re-Bar Size + Length
Drill Size (mm)
Embedment Depth (mm)

Contact Powers Fasteners for CAD Specification file.

Notes

Notes

Notes

Contact Information for Powers Fasteners Australasia

Head Office

Address : Factory 3, 205 Abbotts Road
Dandenong South VIC 3175

Telephone : (03) 8795 4600
Fax : (03) 8787 5899

Website : www.powers.com.au

E-mail : info@powers.com.au

Distributor: