PRODUCT SUBMISSION

RAMSET (SPIT) FIX Z XTREM A4

TORQUE CONTROLLED EXPANSION ANCHORS FOR CRACKED AND NON-CRACKED CONCRETE

Version: 2024/09 (1.1)

MCM CONSTRUCTION MATERIALS SUPPLY COMPANY LIMITED

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SAMPLE SUBMISSION AND APPROVAL FORM

Contract Title : _____ Ref. No. : _____
_____ Date : _____
_____ Ref. No. of Previous Submission : _____
Contract No. : _____ (1) _____
File Reference: _____ (2) _____

DETAILS OF SUBMISSION

To : Contract Manager's Representative (Attn:)

From : _____

The enclosed sample and catalogue* / technical data*/ test report* / job reference* as described below have been checked for compliance with the Specifications and Drawings, and are submitted for approval.

1. General Information

a. Materials Description : Ramset (Spit) FIX Z XTREM A4 Stud Anchors
b. Location : Anchor fixing for marble cladding, façade, steelworks, etc.
c. Specification Ref. Page : _____ Item : _____
d. Drawing Ref. No. : _____
e. B.Q. Ref. No. : _____
f. Anticipated Date of Approval : _____

2. Technical Information

The submitted sample has been checked against the specification and drawings as listed below:

a. Brand : Spit
b. Country of Origin : France
c. Manufacturer's Name & Address : ITW Spit
: 150 route de Lyon BP104 - 26501 Bourg-lès-Valence cedex - France
d. Factory's Name & Address : ITW Spit
: 150 route de Lyon BP104 - 26501 Bourg-lès-Valence cedex - France
e. Supplier Name & Address : MCM Construction Materials Supply Company Limited
: 733 Tai Kei Leng, Yuen Long, N.T., Hong Kong.
f. Appearance : See attached sample
g. Colour : See attached sample
h. Specification : _____
i. Manufacturer's Catalogue : Attached
j. Test Report : Attached
k. Previous Job Reference : Attached
l. Supplementary Information : Attached

For and on behalf of the Contractor

_____
( )

CONTRACT MANAGER'S COMMENTS

To : _____

From : Contract Manager's Representative ( )

_____

On the basis of the sample and information given, the above sample submitted is:

(1) * Approved
(2) * Approved subject to _____
(3) * Not approved because _____
_____
and re-submission is required.

Remarks: _____

Approval does not alter the requirements of the Contracts.

Contract Manager's Representative ( )

_____
Date:

(* Delete if inappropriate)

Submission

Ramset (Spit) – FIX Z XTREM A4

Torque Controlled Expansion Anchors for cracked and non-cracked concrete

FIX Z XTREM Stud Anchors for Cracked and Non-cracked Concrete

Ramset™

Approvals

ETA Option 1
no 04/0010
(FIX Z A4)

TR 020

XTREM
C1/C2
Seismic approval
FIX Z XTREM

Performance Related

Dynamic Load | Pull down | Cracked Concrete | Fire Resistant | Seismic

Material Specification

Zn Zinc Plated | A4 316 Stainless Steel

Description

The FIX Z XTREM Stud Anchor is a true-to-size, heavy duty, torque controlled expansion anchor, for permanent anchoring into standard and hard concrete. Designed for heavy duty anchoring in cracked and non-cracked concrete. Suitable for seismic and fire environments.

Features and Benefits

- 3 legs clip for a better expansion
- 6 lugs for a better fixing in concrete
- Improved efficiency with fewer hammer blows and turns for installation
- "Pull down" capabilities for secure fixings

Substrates

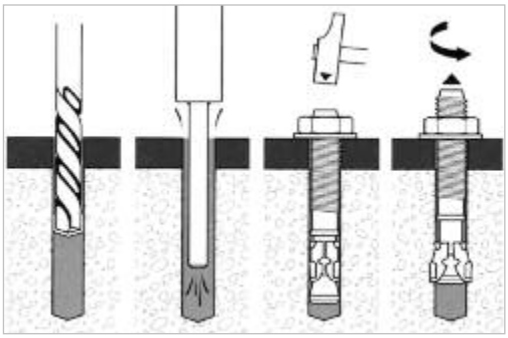
- Concrete (cracked and non-cracked), Solid Stone (applicable with care)

Installation

1. Drill the correct diameter hole to the same diameter as the FIX Z XTREM stud anchor selected.
2. Remove debris from hole by blowing out with compressed air or hand held blow out pump.
3. Install the anchor in the hole with a hammer until washer seats on fixture.
4. Tighten bolt with a torque wrench to recommended assembly torque.

Typical Applications

- Structural beams and columns
- Load bearing zones
- Cable trays
- Overhead piping
- Air condition ducts
- Securing of machines and equipment
- Tie back brackets for façade



FIX Z XTREM - Zinc Plated - Recommended Working Loads in 40N/mm² non-cracked Concrete

Thread Ø	Embedment Depth (mm)	Torque (Nm)	Shear Load (kN)*	Tension Load (kN)*
M8	46	20	4.6	3.8
M10	60	45	5.3	8.4
M12	70	60	7.7	12.5
M16	85	110	15.0	16.6
M20	100	160	20.4	21.3

* Safety factor for all loads = 3
* This table does not consider edge distance and anchor spacing effects. Please refer to Ramset Design Guide for more information.
* Pull out test for single anchor = working load x 1.5

FIX Z XTREM Stud Anchors - Zinc Plated

Part No.	Description	Thread Ø	Max Fixture Thickness (mm)*	Fixture Clearance Hole Ø (mm)	Overall Anchor Length (mm)	Drilled Hole Ø (mm)	Min Hole Depth (mm)*	Order Qty	Seismic Approval
057763	M8x65/5	M8	5	9	65	8	65	100	C1
057764	M8x75/15	M8	15	9	75	8	65	100	C1
057765	M8x90/30	M8	30	9	90	8	65	50	C1
057766	M8x120/60	M8	60	9	120	8	65	50	C1
057768	M10x85/25-5	M10	5	12	85	10	75	50	C1/C2
057769	M10x90/30-10	M10	10	12	90	10	75	50	C1/C2
057771	M10x120/60-40	M10	40	12	120	10	75	25	C1/C2
057773	M10x160/100-80	M10	80	12	160	10	75	25	C1/C2
057775	M12x105/30-10	M12	10	14	105	12	90	25	C1/C2
057776	M12x115/40-20	M12	20	14	115	12	90	25	C1/C2
057777	M12x135/60-40	M12	40	14	135	12	90	25	C1/C2
057779	M12x180/105-85	M12	85	14	180	12	90	25	C1/C2
057781	M16x145/45-25	M16	25	18	145	16	110	10	C1/C2
057782	M16x170/70-50	M16	50	18	170	16	110	10	C1/C2
057783	M16x180/80-60	M16	60	18	180	16	110	10	C1/C2
057785	M20x170/30	M20	30	22	170	20	130	10	C1/C2
057787	M20x220/80	M20	80	22	220	20	130	10	C1/C2

* Data based on minimum anchor depth

FIX Z XTREM A4 Stainless Steel - Recommended Working Loads in 40N/mm² non-cracked Concrete

Thread Ø	Embedment Depth (mm)	Torque (Nm)	Shear Load (kN)*	Tension Load (kN)*
M8	48	20	3.8	5.1
M10	58	35	6.0	6.8
M12	70	50	8.7	6.8
M16	86	100	15.2	12.7

* Safety factor for all loads = 3
* This table does not consider edge distance and anchor spacing effects. Please refer to Ramset Design Guide for more information.
* Pull out test for single anchor = working load x 1.5

FIX Z XTREM A4 Stud Anchors - Stainless Steel

Part No.	Description	Thread Ø	Max Fixture Thickness (mm)*	Fixture Clearance Hole Ø (mm)	Overall Anchor Length (mm)	Drilled Hole Ø (mm)	Min Hole Depth (mm)*	Order Qty
058616	M8x55/5 A4	M8	5	9	55	8	52	100
058617	M8x70/20-7 A4	M8	20	9	70	8	52	100
058618	M8x90/40-27 A4	M8	40	9	90	8	52	100
058619	M10x70/10	M10	10	12	70	10	55	50
058620	M10x95/35-15	M10	35	12	95	10	55	50
058621	M10x105/45-25	M10	45	12	105	10	55	50
058622	M10x130/70-50	M10	70	14	130	12	55	25
058623	M12x95/20	M12	20	14	95	12	70	25
058624	M12x110/35-15	M12	35	14	110	12	70	25
058625	M12x120/45-25	M12	45	14	120	12	70	25
058626	M12x140/65-45	M12	65	18	140	16	70	25
058627	M16x120/20	M16	20	18	120	16	90	20
058628	M16x140/40-20	M16	40	18	140	16	90	10

* Data based on minimum anchor depth
** Not belong to ETA, only for non-cracked concrete

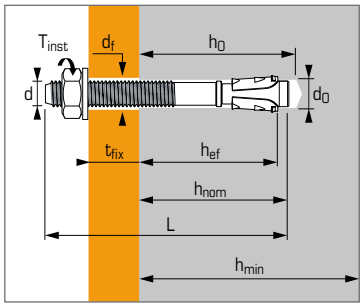
Ramset™

FIX Z XTREM - A4

stainless steel version

Torque controlled expansion anchor, for use in cracked and non-cracked concrete

ETA Option 1- 15/0388



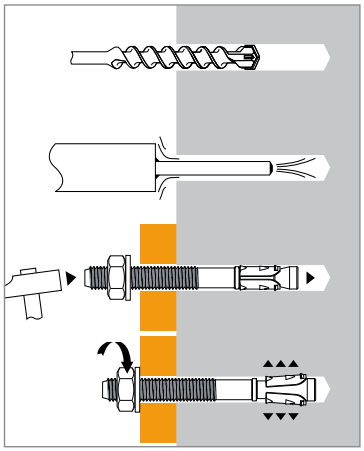
APPLICATION

- Safety barriers
- Cladding brackets
- Curtain-walls
- Steel and timber framework and beams
- Lift guide rails
- Industrial doors and gates
- Brickwork support angles
- Storage systems

MATERIAL

- **Body :**
steel N° 1.4404 (A4), 1.4578, NF EN 10088.3
- **Sleeve :**
cold laminated steel N° 1.4404, NF EN 10088.3
- **Nut :**
stainless steel A4-80, NF EN 20898-2
- **Washer :**
stainless steel A4, NF EN 20898

INSTALLATION



Technical data

Anchor size	Letter marking	Maximum anchorage depth					Minimum anchorage depth					Thread Ø	Drilling Ø	Clear-ance Ø	Total anchor length	Tighten torque	Code
		Effective anchor depth	Embed depth	Max. thick of part to be fixed	Drilling depth	Min. thick of base mate-rial	Effective anchor depth	Embed depth	Max. thick of part to be fixed	Drilling depth	Min. thick of base mate-rial						
		(mm) h_{ef}	(mm) h_{nom}	(mm) t_{fix}	(mm) h_0	(mm) h_{min}	(mm) h_{ef}	(mm) h_{nom}	(mm) t_{fix}	(mm) h_0	(mm) h_{min}	(mm) d	(mm) d_0	(mm) d_f	(mm) L	(Nm) T_{inst}	
8X55/5	0	48	55	-	65	100	35	42	5	52	100	M8	8	9	56	20	058616
8X70/20-7	1			7					20						71		058617
8X90/40-27	3			27					40						91		058618
10X70/10	1	60	68	-	75	120	40	48	10	55	100	M10	10	12	70	45	058619
10X95/35-15	2			15					35						95		058620
10X105/45-25	3			25					45						105		058621
10X130/70-50	4			50					70						130		058622
12X95/20	1	70	80	-	90	140	50	60	20	70	100	M12	12	14	95	75	058623
12X110/35-15	2			15					35						110		058624
12X120/45-25	3			25					45						120		058625
12X140/65-45	4			45					65						140		058626
16X120/20	1	85	98	-	110	170	65	78	20	90	130	M16	16	18	120	110	058627
16X140/40-20	2			20					40						140		058628

Anchor mechanical properties

Anchor size		M8	M10	M12	M16
Cross-section above cone					
f_{uk} (N/mm²)	Min. tensile strength	900	830	720	720
f_{yk} (N/mm²)	Yield strength	800	670	580	580
A_0 (mm²)	Stressed cross-section	22,9	35,3	52,8	103,8
Threaded part					
f_{uk} (N/mm²)	Min. tensile strength	750	730	730	600
f_{yk} (N/mm²)	Yield strength	680	580	580	480
A_s (mm²)	Stressed cross-section	36,6	58	84,3	156
W_{el} (mm³)	Elastic section modulus	31,2	62,3	109,2	277,5
$M^0_{rk,s}$ (Nm)	Characteristic bending moment	25,0	44,9	77,5	187,5
M (Nm)	Recommended bending moment	10,0	18,0	31,0	75,0

FIX Z XTREM - A4

stainless steel version

Ramset™

For detail design, please refer to CC method in following page.

Ultimate ($N_{Ru,m}$, $V_{Ru,m}$) and characteristic loads (N_{Rk}, V_{Rk}) in kN

Mean Ultimate loads are derived from test results in admissible service conditions, and characteristic loads are statistically determined.

TENSILE

Anchor size	M8	M10	M12	M16
Non-cracked concrete (C20/25)				
$h_{ef,min}$	**35**	**40**	**50**	**65**
$N_{Ru,m}$	12,5	16,6	23,2	34,5
N_{Rk}	9,0	12,4	17,4	25,8
$h_{ef,max}$	**48**	**60**	**70**	**85**
$N_{Ru,m}$	22,0	26,4	36,3	52,0
N_{Rk}	12,0	20,0	28,8	38,6
Cracked concrete (C20/25)				
$h_{ef,min}$	**35**	**40**	**50**	**65**
$N_{Ru,m}$	12,5	11,7	16,3	24,1
N_{Rk}	3,0	8,7	12,2	18,0
$h_{ef,max}$	**48**	**60**	**70**	**85**
$N_{Ru,m}$	15,9	20,2	28,2	39,5
N_{Rk}	4,1	9,0	16,1	20,0

SHEAR

Anchor size	M8	M10	M12	M16
Cracked & non-cracked concrete (C20/25)				
$V_{Ru,m}$	18,2	25,7	39,6	67,5
V_{Rk}	12,3	19,1	28,8	52,0

Design loads (N_{Rd}, V_{Rd}) for one anchor without edge or spacing influence in kN

$$N_{Rd} = \frac{N_{Rk}}{\gamma_{Mc}}$$

$$V_{Rd} = \frac{V_{Rk}}{\gamma_{Ms}}$$

TENSILE

Anchor size	M8	M10	M12	M16
Non-cracked concrete (C20/25)				
$h_{ef,min}$	**35**	**40**	**50**	**65**
N_{Rd}	6,0	8,3	11,6	17,2
$h_{ef,max}$	**48**	**60**	**70**	**85**
N_{Rd}	8,0	13,3	19,2	25,7
Cracked concrete (C20/25)				
$h_{ef,min}$	**35**	**40**	**50**	**65**
N_{Rd}	2,0	5,8	8,1	12,0
$h_{ef,max}$	**48**	**60**	**70**	**85**
N_{Rd}	2,7	6,0	10,7	13,3

$\gamma_{Mc} = 1,5$

SHEAR

Anchor size	M8	M10	M12	M16
Cracked & non-cracked concrete (C20/25)				
V_{Rd}	8,2	12,7	19,2	34,7

$\gamma = 1,5$

Recommended loads (N_{rec}, V_{rec}) for one anchor without edge or spacing influence in kN

$$N_{rec} = \frac{N_{Rk}}{\gamma}$$

$$V_{rec} = \frac{V_{Rk}}{\gamma}$$

TENSILE

Anchor size	M8	M10	M12	M16
Non-cracked concrete (C20/25)				
$h_{ef,min}$	**35**	**40**	**50**	**65**
N_{rec}	3,0	4,1	5,8	8,6
$h_{ef,max}$	**48**	**60**	**70**	**85**
N_{rec}	4,0	6,7	9,6	12,9
Cracked concrete (C20/25)				
$h_{ef,min}$	**35**	**40**	**50**	**65**
N_{rec}	1,0	2,9	4,1	6,0
$h_{ef,max}$	**48**	**60**	**70**	**85**
N_{rec}	1,4	3,0	5,4	6,7

$\gamma = 3$

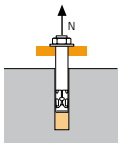
SHEAR

Anchor size	M8	M10	M12	M16
Cracked & non-cracked concrete (C20/25)				
V_{rec}	4,1	6,4	9,6	17,3

$\gamma = 3$

SPIT CC Method (values issued from ETA)

TENSILE in kN

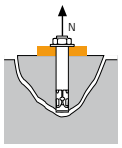


¬ Pull-out resistance

$N_{Rd,p} = N^0_{Rd,p} \cdot f_b$

$N^0_{Rd,p}$			Design pull-out resistance	
Anchor size	M8	M10	M12	M16
Non-cracked concrete (C20/25)				
$h_{ef,min}$	**35**	**40**	**50**	**65**
$N^0_{Rd,p}$	6,0	-	-	-
$h_{ef,max}$	**48**	**60**	**70**	**85**
$N^0_{Rd,p}$	8,0	13,3	20,0	26,7
Cracked concrete (C20/25)				
$h_{ef,min}$	**35**	**40**	**50**	**65**
$N^0_{Rd,p}$	2,0	-	-	-
$h_{ef,max}$	**48**	**60**	**70**	**85**
$N^0_{Rd,p}$	2,7	6,0	10,7	13,3

$\gamma_{Mc} = 1,5$

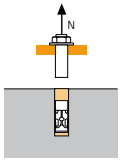


¬ Concrete cone resistance

$N_{Rd,c} = N^0_{Rd,c} \cdot f_b \cdot \Psi_s \cdot \Psi_{c,N}$

$N^0_{Rd,c}$			Design cone resistance	
Anchor size	M8	M10	M12	M16
Non-cracked concrete (C20/25)				
$h_{ef,min}$	**35**	**40**	**50**	**65**
$N^0_{Rd,c}$	6,8	8,3	11,6	17,2
$h_{ef,max}$	**48**	**60**	**70**	**85**
$N^0_{Rd,c}$	10,9	15,2	19,2	25,7
Cracked concrete (C20/25)				
$h_{ef,min}$	**35**	**40**	**50**	**65**
$N^0_{Rd,c}$	4,8	5,8	8,1	12,0
$h_{ef,max}$	**48**	**60**	**70**	**85**
$N^0_{Rd,c}$	7,6	10,7	13,4	18,0

$\gamma_{Mc} = 1,5$



¬ Steel resistance

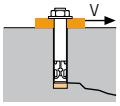
$N_{Rd,s}$			Steel design tensile resistance	
Anchor size	M8	M10	M12	M16
$N_{Rd,s}$	9,2	20,5	29,7	43,2

M8 : $\gamma_{Ms} = 1,81$; M10 and M12 : $\gamma_{Ms} = 1,76$; M16 : $\gamma_{Ms} = 2,11$

$N_{Rd} = \min(N_{Rd,p} ; N_{Rd,c} ; N_{Rd,s})$

$\beta_N = N_{Sd} / N_{Rd} \leq 1$

SHEAR in kN

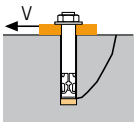


¬ Concrete edge resistance

$V_{Rd,c} = V^0_{Rd,c} \cdot f_b \cdot f_{\beta,V} \cdot \Psi_{S\text{-}C,V}$

$V^0_{Rd,c}$			Design concrete edge resistance at minimum edge distance (C_{min})	
Anchor size	M8	M10	M12	M16
Non-cracked concrete (C20/25)				
$h_{ef,min}$	**35**	**40**	**50**	**65**
C_{min}	60	60	60	90
$V^0_{Rd,c}$	4,9	5,2	5,5	10,4
$h_{ef,max}$	**48**	**60**	**70**	**85**
C_{min}	60	60	60	90
$V^0_{Rd,c}$	5,2	5,6	5,9	11,0
Cracked concrete (C20/25)				
$h_{ef,min}$	**35**	**40**	**50**	**65**
C_{min}	60	55	60	80
$V^0_{Rd,c}$	3,5	3,7	3,9	6,3
$h_{ef,max}$	**48**	**60**	**70**	**85**
C_{min}	60	55	60	80
$V^0_{Rd,c}$	3,7	3,5	4,2	6,7

$\gamma_{Mc} = 1,5$

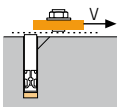


¬ Pryout failure

$V_{Rd,cp} = V^0_{Rd,cp} \cdot f_b \cdot \Psi_s \cdot \Psi_{c,N}$

$V^0_{Rd,cp}$			Design pryout resistance	
Anchor size	M8	M10	M12	M16
Non-cracked concrete (C20/25)				
$h_{ef,\ min}$	**35**	**40**	**50**	**65**
$V^0_{Rd,cp}$	6,8	8,3	11,6	34,4
$h_{ef,\ max}$	**48**	**60**	**70**	**85**
$V^0_{Rd,cp}$	10,9	30,5	38,4	51,4
Cracked concrete (C20/25)				
$h_{ef,\ min}$	**-**	**40**	**50**	**65**
$V^0_{Rd,cp}$	4,8	5,8	8,1	24,1
$h_{ef,\ max}$	**48**	**60**	**70**	**85**
$V^0_{Rd,cp}$	7,6	21,3	26,9	36,0

$\gamma_{Mcp} = 1,5$



¬ Steel resistance

$V_{Rd,s}$			Steel design shear resistance	
Anchor size	M8	M10	M12	M16
$V_{Rd,s}$	8,2	12,7	19,2	29,7

M8 to M12 : $\gamma_{Ms} = 1,5$; M16 : $\gamma_{Ms} = 1,75$

$V_{Rd} = \min(V_{Rd,c} ; V_{Rd,cp} ; V_{Rd,s})$

$\beta_V = V_{Sd} / V_{Rd} \leq 1$

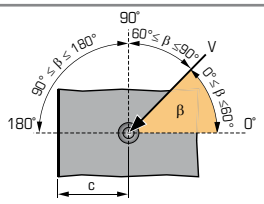
$\beta_N + \beta_V \leq 1,2$

f_b INFLUENCE OF CONCRETE

Concrete class	f_b		Concrete class	f_b	
	M8	M10-M16		M8	M10-M16
C25/30	1,12	1,05	C40/50	1,41	1,15
C30/37	1,22	1,08	C45/55	1,50	1,18
C35/45	1,32	1,12	C50/60	1,58	1,20

$f_{\beta,V}$ INFLUENCE OF SHEAR LOADING DIRECTION

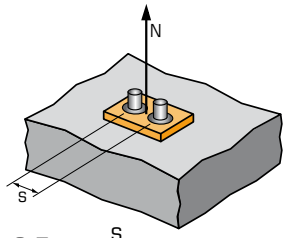
Angle β [°]	$f_{\beta,v}$
0 to 55	1
60	1,1
70	1,2
80	1,5
90 to 180	2



Ramset™

SPIT CC Method (values issued from ETA)

Ψ_s INFLUENCE OF SPACING FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD



$$\Psi_s = 0{,}5 + \frac{s}{6.h_{ef}}$$

$s_{min} < s < s_{cr,N}$

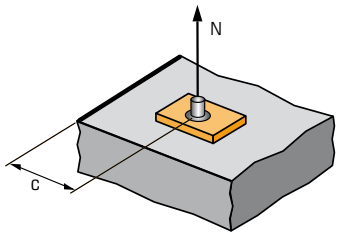
$s_{cr,N} = 3.h_{ef}$

Ψ_s must be used for each spacing influenced the anchors group

SPACING S	Reduction factor Ψ_s Minimum anchorage depth			
Anchor size	M8	M10	M12	M16
55	-	0,65		
60	0,79	0,75	0,70	
75	0,86	0,81	0,75	
90	0,93	0,88	0,80	0,73
105	1,00	0,94	0,85	0,77
120		1,00	0,90	0,81
150			1,00	0,88
180				0,96
195				1,00

SPACING S	Reduction factor Ψ_s Maximum anchorage depth			
Anchor size	M8	M10	M12	M16
50	0,67			
55	0,69	0,65		
60	0,71	0,67	0,64	
75	0,76	0,71	0,68	
90	0,81	0,75	0,71	0,68
110	0,88	0,81	0,76	0,72
130	0,95	0,86	0,81	0,75
145	1,00	0,90	0,85	0,78
180		1,00	0,93	0,85
210			1,00	0,91
255				1,00

$\Psi_{c,N}$ INFLUENCE OF EDGE FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD



$$\Psi_{c,N} = 0{,}26 + 0{,}49 \cdot \frac{c}{h_{ef}}$$

$c_{min} < c < c_{cr,N}$

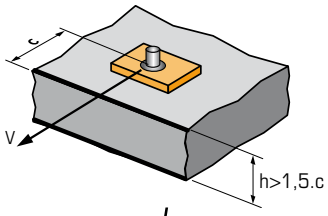
$c_{cr,N} = 1{,}5.h_{ef}$

$\Psi_{c,N}$ must be used for each distance influenced the anchors group.

EDGE C	Reduction factor $\Psi_{c,N}$ Minimum anchorage depth			
Anchor size	M8	M10	M12	M16
55	-	0,93		
60	1,00	1,00	0,85	
70			0,95	
80			1,00	0,86
90				0,94
100				1,00

EDGE C	Reduction factor $\Psi_{c,N}$ Maximum anchorage depth			
Anchor size	M8	M10	M12	M16
55	0,82			
60	0,87	0,75		
70	0,97	0,83	0,75	
80	1,00	0,91	0,82	
90		1,00	0,89	0,78
100			0,96	0,84
105			1,00	0,87
130				1,00

$\Psi_{s-c,V}$ INFLUENCE OF SPACING AND EDGE DISTANCE FOR CONCRETE EDGE RESISTANCE IN SHEAR LOAD

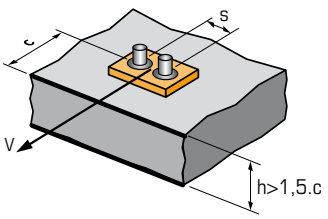


$$\Psi_{s-c,V} = \frac{c}{c_{min}} \cdot \sqrt{\frac{c}{c_{min}}}$$

For single anchor fastening

	Reduction factor $\Psi_{s-c,V}$ Cracked & non-cracked concrete											
$\frac{c}{c_{min}}$	1,0	1,2	1,4	1,6	1,8	2,0	2,2	2,4	2,6	2,8	3,0	3,2
$\Psi_{s-c,V}$	1,00	1,31	1,66	2,02	2,41	2,83	3,26	3,72	4,19	4,69	5,20	5,72

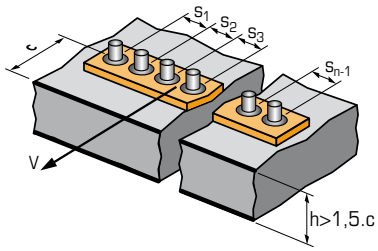
For 2 anchors fastening



$$\Psi_{s-c,V} = \frac{3.c + s}{6.c_{min}} \cdot \sqrt{\frac{c}{c_{min}}}$$

	Reduction factor $\Psi_{s-c,V}$ Cracked & non-cracked concrete											
$\frac{s}{c_{min}}$ \ $\frac{c}{c_{min}}$	1,0	1,2	1,4	1,6	1,8	2,0	2,2	2,4	2,6	2,8	3,0	3,2
1,0	0,67	0,84	1,03	1,22	1,43	1,65	1,88	2,12	2,36	2,62	2,89	3,16
1,5	0,75	0,93	1,12	1,33	1,54	1,77	2,00	2,25	2,50	2,76	3,03	3,31
2,0	0,83	1,02	1,22	1,43	1,65	1,89	2,12	2,38	2,63	2,90	3,18	3,46
2,5	0,92	1,11	1,32	1,54	1,77	2,00	2,25	2,50	2,77	3,04	3,32	3,61
3,0	1,00	1,20	1,42	1,64	1,88	2,12	2,37	2,63	2,90	3,18	3,46	3,76
3,5		1,30	1,52	1,75	1,99	2,24	2,50	2,76	3,04	3,32	3,61	3,91
4,0			1,62	1,86	2,10	2,36	2,62	2,89	3,17	3,46	3,75	4,05
4,5				1,96	2,21	2,47	2,74	3,02	3,31	3,60	3,90	4,20
5,0					2,33	2,59	2,87	3,15	3,44	3,74	4,04	4,35
5,5						2,71	2,99	3,28	3,71	4,02	4,33	4,65
6,0						2,83	3,11	3,41	3,71	4,02	4,33	4,65

For 3 anchors fastening and more



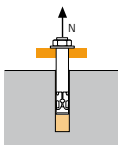
$$\Psi_{s-c,V} = \frac{3.c + s_1 + s_2 + s_3 + \ldots + s_{n-1}}{3.n.c_{min}} \cdot \sqrt{\frac{c}{c_{min}}}$$

FIX Z XTREM - A4

stainless steel version

SPIT CC Method (values issued from ETA - Seismic category C1)

TENSILE in kN



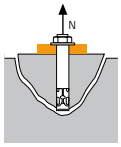
¬ Pull-out resistance

$$N_{Rd,p,C1} = N^{0}_{Rd,p,C1} \cdot f_b$$

$N^{0}_{Rd,p,C1}$ — Design pull-out resistance

Anchor size	M8	M10	M12	M16
Category C1 - Single anchor				
h_{ef}	**48**	**60**	**70**	**85**
$N^{0}_{Rd,p,C1}$ (C20/25)	2,7	4,9	10,7	13,3
Category C1 - Group of anchors (1)				
h_{ef}	**48**	**60**	**70**	**85**
$N^{0}_{Rd,p,C1}$ (C20/25)	2,3	4,2	9,1	11,3

(1) when more than one anchor of the group is submitted to tensile load
$\gamma_{Mc} = 1,5$



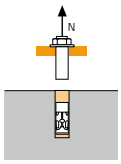
¬ Concrete cone resistance

$$N_{Rd,c,C1} = N^{0}_{Rd,c,C1} \cdot f_b \cdot \Psi_s \cdot \Psi_{c,N}$$

$N^{0}_{Rd,c,C1}$ — Design cone resistance

Anchor size	M8	M10	M12	M16
Category C1 - Single anchor				
h_{ef}	**48**	**60**	**70**	**85**
$N^{0}_{Rd,c,C1}$ (C20/25)	5,9	9,1	11,4	15,3
Category C1 - Group of anchors (1)				
h_{ef}	**48**	**60**	**70**	**85**
$N^{0}_{Rd,c,C1}$ (C20/25)	5,2	8,0	10,1	13,5

(1) when more than one anchor of the group is submitted to tensile load
$\gamma_{Mc} = 1,5$



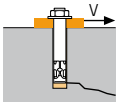
¬ Steel resistance

$N_{Rd,s,C1}$ — Steel design tensile resistance

Anchor size	M8	M10	M12	M16
$N_{Rd,s,C1}$	9,2	25,7	37,4	64,6

M8 : $\gamma_{Ms} = 1,81$; M10 and M12 : $\gamma_{Ms} = 1,4$; M16 : $\gamma_{Ms} = 1,41$

SHEAR in kN



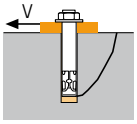
¬ Concrete edge resistance

$$V_{Rd,c,C1} = V^{0}_{Rd,c,C1} \cdot f_b \cdot f_{\beta,V} \cdot \Psi_{S\text{-}C,V}$$

$V^{0}_{Rd,c,C1}$ — Design concrete edge resistance at minimum edge distance (C_{min})

Anchor size	M8	M10	M12	M16
Category C1 - Single anchor				
h_{ef}	**48**	**60**	**70**	**85**
C_{min}	50	55	60	80
$V^{0}_{Rd,c,C1}$ (C20/25)	3,7	3,9	4,2	7,8
Category C1 - Group of anchors (1)				
h_{ef}	**48**	**60**	**70**	**85**
C_{min}	50	55	60	80
$V^{0}_{Rd,c,C1}$ (C20/25)	3,1	3,4	3,6	6,6

(1) when more than one anchor of the group is submitted to shear load
$\gamma_{Mc} = 1,5$



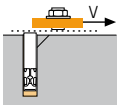
¬ Pryout failure

$$V_{Rd,cp,C1} = V^{0}_{Rd,cp,C1} \cdot f_b \cdot \Psi_s \cdot \Psi_{c,N}$$

$V^{0}_{Rd,cp,C1}$ — Design pryout resistance

Anchor size	M8	M10	M12	M16
Category C1 - Single anchor				
h_{ef}	**48**	**60**	**70**	**85**
$V^{0}_{Rd,cp,C1}$ (C20/25)	5,9	18,1	22,9	30,6
Category C1 - Group of anchors (1)				
h_{ef}	**48**	**60**	**70**	**85**
$V^{0}_{Rd,cp,C1}$ (C20/25)	5,2	16,0	20,2	27,0

(1) when more than one anchor of the group is submitted to shear load
$\gamma_{Mc} = 1,5$



¬ Steel resistance (2)

$V_{Rd,s,C1}$ — Steel design shear resistance

Anchor size	M8	M10	M12	M16
Category C1 - Single anchor				
$V_{Rd,s,C1}$	3,8	8,1	11,9	19,3
Category C1 - Group of anchors (1)				
$V_{Rd,s,C1}$	3,2	6,9	10,1	16,4

(1) when more than one anchor of the group is submitted to shear load
(2) In case of no hole clearance between anchor and fixture
M8 to M12 : $\gamma_{Ms} = 1,5$; M16: $\gamma_{Ms} = 1,75$

$$N_{Rd,C1} = \min(N_{Rd,p,C1} ; N_{Rd,c,C1} ; N_{Rd,s,C1})$$
$$\beta_N = N_{Sd} / N_{Rd,C1} \leq 1$$

$$V_{Rd,C1} = \min(V_{Rd,c,C1} ; V_{Rd,cp,C1} ; V_{Rd,s,C1})$$
$$\beta_V = V_{Sd} / V_{Rd,C1} \leq 1$$

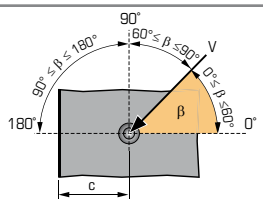
$$\beta_N + \beta_V \leq 1,2$$

f_b INFLUENCE OF CONCRETE

Concrete class	f_b		Concrete class	f_b	
	M8	M10-M16		M8	M10-M16
C25/30	1,12	1,05	C40/50	1,41	1,15
C30/37	1,22	1,08	C45/55	1,50	1,18
C35/45	1,32	1,12	C50/60	1,58	1,20

$f_{\beta,V}$ INFLUENCE OF SHEAR LOADING DIRECTION

Angle β [°]	$f_{\beta,V}$
0 to 55	1
60	1,1
70	1,2
80	1,5
90 to 180	2



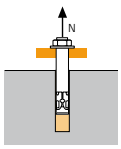
FIX Z XTREM - A4

stainless steel version

Ramset™

SPIT CC Method (values issued from ETA - Seismic category C2)

TENSILE in kN

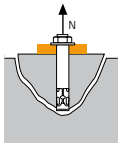


¬ Pull-out resistance

$$N_{Rd,p,C2} = N^{0}_{Rd,p,C2} \cdot f_b$$

$N^{0}_{Rd,p,C2}$			Design pull-out resistance
Anchor size	**M10**	**M12**	**M16**
Category C2 - Single anchor			
h_{ef}	**60**	**70**	**85**
$N^{0}_{Rd,p,C2}$ (C20/25)	1,7	4,0	9,7
Category C2 - Group of anchors [1]			
h_{ef}	**60**	**70**	**85**
$N^{0}_{Rd,p,C2}$ (C20/25)	1,5	3,4	8,3

[1] when more than one anchor of the group is submitted to tensile load
γ_{Mc} = 1,5

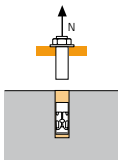


¬ Concrete cone resistance

$$N_{Rd,c,C2} = N^{0}_{Rd,c,C2} \cdot f_b \cdot \Psi_s \cdot \Psi_{c,N}$$

$N^{0}_{Rd,c,C2}$			Design cone resistance
Anchor size	**M10**	**M12**	**M16**
Category C2 - Single anchor			
h_{ef}	**60**	**70**	**85**
$N^{0}_{Rd,c,C2}$ (C20/25)	9,1	11,4	15,3
Category C2 - Group of anchors [1]			
h_{ef}	**60**	**70**	**85**
$N^{0}_{Rd,c,C2}$ (C20/25)	8,0	10,1	13,5

[1] when more than one anchor of the group is submitted to tensile load
γ_{Mc} = 1,5

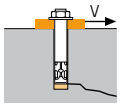


¬ Steel resistance

$N_{Rd,s,C2}$			Steel design tensile resistance
Anchor size	**M10**	**M12**	**M16**
$N_{Rd,s,C2}$	24,0	34,9	60,7

[1] when more than one anchor of the group is submitted to tensile load
M10 and M12 : γ_{Ms} = 1,4 ; M16 : γ_{Ms} = 1,41

SHEAR in kN

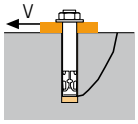


¬ Concrete edge resistance

$$V_{Rd,c,C2} = V^{0}_{Rd,c,C2} \cdot f_b \cdot f_{\beta,V} \cdot \Psi_{S\text{-}C,V}$$

$V^{0}_{Rd,c,C2}$			Design concrete edge resistance at minimum edge distance (C_{min})
Anchor size	**M10**	**M12**	**M16**
Category C2 - Single anchor			
h_{ef}	**60**	**70**	**85**
C_{min}	55	60	80
$V^{0}_{Rd,c,C2}$ (C20/25)	3,9	4,2	7,8
Category C2 - Group of anchors [1]			
h_{ef}	**60**	**70**	**85**
C_{min}	55	60	80
$V^{0}_{Rd,c,C2}$ (C20/25)	3,4	3,6	6,6

[1] when more than one anchor of the group is submitted to shear load
γ_{Mc} = 1,5

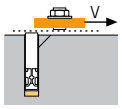


¬ Pryout failure

$$V_{Rd,cp,C2} = V^{0}_{Rd,cp,C2} \cdot f_b \cdot \Psi_s \cdot \Psi_{c,N}$$

$V^{0}_{Rd,cp,C2}$			Design pryout resistance
Anchor size	**M10**	**M12**	**M16**
Category C2 - Single anchor			
h_{ef}	**60**	**70**	**85**
$V^{0}_{Rd,cp,C2}$ (C20/25)	18,1	22,9	30,6
Category C2 - Group of anchors [1]			
h_{ef}	**60**	**70**	**85**
$V^{0}_{Rd,cp,C2}$ (C20/25)	16,0	20,2	27,0

[1] when more than one anchor of the group is submitted to shear load
γ_{Mc} = 1,5



¬ Steel resistance [2]

$V_{Rd,s,C2}$			Steel design shear resistance
Anchor size	**M10**	**M12**	**M16**
Category C2 - Single anchor			
$V_{Rd,s,C2}$	5,7	8,4	20,2
Category C2 - Group of anchors [1]			
$V_{Rd,s,C2}$	4,9	7,2	17,2

[1] when more than one anchor of the group is submitted to shear load
[2] In case of no hole clearance between anchor and fixture
M10 and M12 : γ_{Ms} = 1,5 ; M16: γ_{Ms} = 1,75

$$N_{Rd,C2} = \min(N_{Rd,p,C2} ; N_{Rd,c,C2} ; N_{Rd,s,C2})$$
$$\beta_N = N_{Sd} / N_{Rd,C2} \leq 1$$

$$V_{Rd,C2} = \min(V_{Rd,c,C2} ; V_{Rd,cp,C2} ; V_{Rd,s,C2})$$
$$\beta_V = V_{Sd} / V_{Rd,C2} \leq 1$$

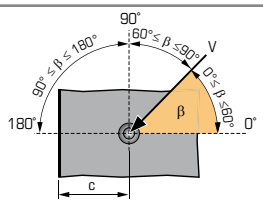
$$\beta_N + \beta_V \leq 1,2$$

f_b INFLUENCE OF CONCRETE

Concrete class	f_b	Concrete class	f_b
	M10-M16		M10-M16
C25/30	1,05	C40/50	1,15
C30/37	1,08	C45/55	1,18
C35/45	1,12	C50/60	1,20

$f_{\beta,V}$ INFLUENCE OF SHEAR LOADING DIRECTION

Angle β [°]	$f_{\beta,V}$
0 to 55	1
60	1,1
70	1,2
80	1,5
90 to 180	2



Mechanical Anchors

Ramset™ A Division of Illinois Tool Works Inc., USA

Ref No. 202109151R1 Total Pages incl. this: 2

Sep 28th, 2021

Attn: To Whom it may concern

Re. : Upgrade of Fix Z A4 to Fix Z Xtrem A4

Dear Sirs/Madams,

We are pleased to launch an upgraded version of wedge anchor Fix Z Xtrem A4 to replace the existing Fix Z A4. This new Fix Z Xtrem A4 is dedicated to cracked and non-cracked concrete, and seismic applications. The ETA number is ETA 15/0388 and local test BS5080 reports are done. Please refer to the existing Building Department Central Data Bank ref. no. for submission purposes.

The summary table of the range and dimension are stated below:

Fix Z A4 (Old)		Fix Z Xtrem A4 (New)		
Item No.	Description	Item No.	Description	BD CDB Ref. No
050441	M8x55	058616	M8x55	BD-AF 159
054610	M8x70	058617	M8x70	
055343	M8x90	058618	M8x90	
050367	M8x130			
050466	M10x65	058619	M10x70	BD-AF 140
054630	M10x75			
054640	M10x95	058620	M10x95	
		058621	M10x105	
050442	M10x120	058622	M10x130	
055344	M12x80	058623	M12x95	BD-AF157
055345	M12x100	058624	M12x110	
055394	M12x115	058625	M12x120	
054680	M12x140	058626	M12x140	
050443	M16x125	058627	M16x120	BD-AF 155
054700	M16x150	058628	M16x140	
050444	M16x170			

Ramset Fasteners (HK) Limited

Office Address: Unit D, 22/F., Capital Trade Centre, No 62 Tsun Yip Street, Kwun Tong, Kowloon, Hong Kong.

Tel: (852) 2380 5201 Fax: (852) 2397 0375 Email: info@ramset.com.hk

We trust the above information is of assistance to you.

Thank you.

Yours Faithfully,

Ramset Fasteners (HK) Ltd

James Ho

Business Development Manager

Deutsches Institut für Bautechnik
DIBt

Member of EOTA
www.eota.eu

Approval body for construction products and types of construction
Bautechnisches Prüfamt
An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-15/0388 of 5 October 2020

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	SPIT FIX Z XTREM, SPIT FIX Z XTREM/A4 torque-controlled expansion anchor
Product family to which the construction product belongs	Torque controlled expansion anchor for use in concrete
Manufacturer	SPIT SAS 150 Avenue de Lyon - BP 104 26501 BOURG LES VALENCE CEDEX FRANKREICH
Manufacturing plant	Spit
This European Technical Assessment contains	32 pages including 3 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 330232-01-0601 Edition 12/2019
This version replaces	ETA-15/0388 issued on 23 February 2016

STANGERS

1.0 Introduction

(a) Manufacturer : Ramset Fasteners (HK) Limited

(b) Anchor Type : Ramset FIX Z Xtrem A4 M8

(c) Mass concrete block size : 600mm x 600mm x 200mm

(d) Concrete grade : C25/20

(e) Drill hole diameter : 8mm

(f) Drill hole depth : 65mm

(g) Embedment depth : 48mm

(h) Applied torque : 20Nm

(i) Reference standard : BS 5080 Part 1: 1993 Cl. 6, 7.1.1 & 7.1.3

(j) Minimum Distance between the reaction frame and center of the fixing : 96mm

(k) Minimum Distance between the reaction frame and free edge : 144mm

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2.0 Test results

Anchor type	Ramset FIX Z Xtrem A4 M8				
Sample ID	1	2	3	4	5
Failure load (kN)	19.8	20.1	20.9	20.4	20.6
Failure mode	F2	F2	F2	F2	F2
Average failure load (kN)	20.36				
Standard deviation (kN)	0.4				

Failure mode

P = No sign of failure in anchor and/or substrate member
F1 = Breaking of anchor
F2 = Failure of substrate member in a shear cone
F3 = Pull out of anchor
F4 = Sign of separation, plastic deformation or deleterious effect of anchor
F5 = Failure in structural member with crack radiates outward from anchor
F6 = Other failure mode(s) : -

STANGERS

1.0 Introduction

(a) Manufacturer : Ramset Fasteners (HK) Limited

(b) Anchor Type : Ramset FIX Z Xtrem A4 M8

(c) Mass concrete block size : 1200mm x 1000mm x 500mm

(d) Concrete grade : C25/20

(e) Drill hole size : 8mm

(f) Drill hole depth : 65mm

(g) Embedment depth : 48mm

(h) Applied torque : 20Nm

(i) Reference standard : BS 5080: Part 2:1986 +Amd. 7602 Cl 7.1 & 7.2.3

(j) Minimum Distance between the reaction frame and center of the fixing : 96mm

(k) Minimum Distance between the reaction frame and free edge : 96mm

2.0 Test results

Anchor type	Ramset FIX Z Xtrem A4 M8				
Sample ID	1	2	3	4	5
Failure load (kN)	24.8	24.5	23.8	24.3	23.0
Failure mode	F4	F4	F4	F4	F4
Average failure load (kN)	24.08				
Standard deviation (kN)	0.70				

Failure mode

P = No sign of failure in anchor and/or substrate member
F1 = Breaking of anchor
F2 = Failure of substrate member in a shear cone
F3 = Pull out of anchor
F4 = Sign of separation, plastic deformation or deleterious effect of anchor
F5 = Failure in structural member with crack radiates outward from anchor/bar
F6 = Other failure mode(s) : -

STANGERS

1.0 Introduction

(a) Manufacturer : Ramset Fasteners (HK) Limited

(b) Anchor Type : Ramset FIX Z Xtrem A4 M10

(c) Mass concrete block size : 1500mm x 1500mm x 500mm

(d) Concrete grade : 30/20D

(e) Drill hole diameter : 10mm

(f) Drill hole depth : 75mm

(g) Embedment depth : 60mm

(h) Applied torque : 45Nm

(i) Reference standard : BS 5080 Part 1: 1993 Cl. 6, 7.1.1 & 7.1.3

(j) Minimum Distance between the reaction frame and center of the fixing : 120mm

(k) Minimum Distance between the reaction frame and free edge : 180mm

2.0 Test results

Anchor type	Ramset FIX Z Xtrem A4 M10				
Sample ID	1	2	3	4	5
Failure load (kN)	23.5	23.1	23.8	23.6	23.3
Failure mode	F3	F3	F3	F3	F3
Average failure load (kN)	23.5				
Standard deviation (kN)	0.3				

Failure mode

P = No sign of failure in anchor and/or substrate member
F1 = Breaking of anchor
F2 = Failure of substrate member in a shear cone
F3 = Pull out of anchor
F4 = Sign of separation, plastic deformation or deleterious effect of anchor
F5 = Failure in structural member with crack radiates outward from anchor
F6 = Other failure mode(s) : -

STANGERS

1.0 Introduction

(a) Manufacturer : Ramset Fasteners (HK) Limited

(b) Anchor Type : Ramset FIX Z Xtrem A4 M10

(c) Mass concrete block size : 1100mm x 1100mm x 300mm

(d) Concrete grade : 30/20D

(e) Drill hole size : 10mm

(f) Drill hole depth : 75mm

(g) Embedment depth : 60mm

(h) Applied torque : 45Nm

(i) Reference standard : BS 5080: Part 2:1986 +Amd. 7602 Cl 7.1 & 7.2.3

(j) Minimum Distance between the reaction frame and center of the fixing : 120mm

(k) Minimum Distance between the reaction frame and free edge : 120mm

2.0 Test results

Anchor type	Ramset FIX Z Xtrem A4 M10				
Sample ID	1	2	3	4	5
Failure load (kN)	31.2	32.0	31.0	31.6	31.7
Failure mode	F1	F1	F1	F1	F1
Average failure load (kN)	31.5				
Standard deviation (kN)	0.4				

Failure mode

P = No sign of failure in anchor and/or substrate member
F1 = Breaking of anchor
F2 = Failure of substrate member in a shear cone
F3 = Pull out of anchor
F4 = Sign of separation, plastic deformation or deleterious effect of anchor
F5 = Failure in structural member with crack radiates outward from anchor/bar
F6 = Other failure mode(s) : -

STANGERS

1.0 Introduction

(a) Manufacturer : Ramset Fasteners (HK) Limited

(b) Anchor Type : Ramset FIX Z Xtrem A4 M12

(c) Mass concrete block size : 1500mm x 1500mm x 500mm and 1100mmx1100mm x300mm

(d) Concrete grade : 30/20D

(e) Drill hole diameter : 12mm

(f) Drill hole depth : 90mm

(g) Embedment depth : 70mm

(h) Applied torque : 75Nm

(i) Reference standard : BS 5080 Part 1: 1993 Cl. 6, 7.1.1 & 7.1.3

(j) Minimum Distance between the reaction frame and center of the fixing : 140mm

(k) Minimum Distance between the reaction frame and free edge : 210mm

2.0 Test results

Anchor type	Ramset FIX Z Xtrem A4 M12				
Sample ID	1	2	3	4	5
Failure load (kN)	43.5	42.9	42.8	42.8	43.1
Failure mode	F2	F2	F5 and F2	F2	F2
Average failure load (kN)	43.0				
Standard deviation (kN)	0.3				

Failure mode

P = No sign of failure in anchor and/or substrate member
F1 = Breaking of anchor
F2 = Failure of substrate member in a shear cone
F3 = Pull out of anchor
F4 = Sign of separation, plastic deformation or deleterious effect of anchor
F5 = Failure in structural member with crack radiates outward from anchor
F6 = Other failure mode(s) : -

STANGERS

1.0 Introduction

(a) Manufacturer : Ramset Fasteners (HK) Limited

(b) Anchor Type : Ramset FIX Z Xtrem A4 M12

(c) Mass concrete block size : 1100mm x 1100mm x 300mm

(d) Concrete grade : 30/20D

(e) Drill hole size : 12mm

(f) Drill hole depth : 90mm

(g) Embedment depth : 70mm

(h) Applied torque : 75Nm

(i) Reference standard : BS 5080: Part 2:1986 +Amd. 7602 Cl 7.1 & 7.2.3

(j) Minimum Distance between the reaction frame and center of the fixing : 140mm

(k) Minimum Distance between the reaction frame and free edge : 140mm

2.0 Test results

Anchor type	Ramset FIX Z Xtrem A4 M12				
Sample ID	1	2	3	4	5
Failure load (kN)	47.0	47.8	48.2	47.8	48.6
Failure mode	F1	F1	F1	F1	F1
Average failure load (kN)	47.9				
Standard deviation (kN)	0.6				

Failure mode

P = No sign of failure in anchor and/or substrate member
F1 = Breaking of anchor
F2 = Failure of substrate member in a shear cone
F3 = Pull out of anchor
F4 = Sign of separation, plastic deformation or deleterious effect of anchor
F5 = Failure in structural member with crack radiates outward from anchor/bar
F6 = Other failure mode(s) : -

STANGERS

1.0 Introduction

(a) Manufacturer : Ramset Fasteners (HK) Limited

(b) Anchor Type : Ramset FIX Z Xtrem A4 M16

(c) Mass concrete block size : 1100mmx1100mmx300mm and 1500mm x 1500mm x 500mm

(d) Concrete grade : 30/20D

(e) Drill hole diameter : 16mm

(f) Drill hole depth : 110mm

(g) Embedment depth : 85mm

(h) Applied torque : 110Nm

(i) Reference standard : BS 5080 Part 1: 1993 CL 6, 7.1.1 & 7.1.3

(j) Minimum Distance between the reaction frame and center of the fixing : 170mm

(k) Minimum Distance between the reaction frame and free edge : 255mm

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2.0 Test results

Anchor type	Ramset FIX Z Xtrem A4 M16				
Sample ID	1	2	3	4	5
Failure load (kN)	59.0	58.8	59.2	59.3	59.7
Failure mode	F2	F2	F5 and F2	F2	F2
Average failure load (kN)	59.2				
Standard deviation (kN)	0.3				

Failure mode

P = No sign of failure in anchor and/or substrate member
F1 = Breaking of anchor
F2 = Failure of substrate member in a shear cone
F3 = Pull out of anchor
F4 = Sign of separation, plastic deformation or deleterious effect of anchor
F5 = Failure in structural member with crack radiates outward from anchor
F6 = Other failure mode(s) : -

STANGERS

1.0 Introduction

(a) Manufacturer : Ramset Fasteners (HK) Limited

(b) Anchor Type : Ramset FIX Z Xtrem A4 M16

(c) Mass concrete block size : 1100mm x 1100mm x 300mm

(d) Concrete grade : 30/20D

(e) Drill hole size : 16mm

(f) Drill hole depth : 110mm

(g) Embedment depth : 85mm

(h) Applied torque : 110Nm

(i) Reference standard : BS 5080: Part 2:1986 +Amd. 7602 CI 7.1 & 7.2.3

(j) Minimum Distance between the reaction frame and center of the fixing : 170mm

(k) Minimum Distance between the reaction frame and free edge : 170mm

2.0 Test results

Anchor type	Ramset FIX Z Xtrem A4 M16				
Sample ID	1	2	3	4	5
Failure load (kN)	74.0	73.0	76.0	75.0	76.0
Failure mode	F1	F1	F1	F1	F1
Average failure load (kN)	74.8				
Standard deviation (kN)	1.3				

Failure mode

P = No sign of failure in anchor and/or substrate member
F1 = Breaking of anchor
F2 = Failure of substrate member in a shear cone
F3 = Pull out of anchor
F4 = Sign of separation, plastic deformation or deleterious effect of anchor
F5 = Failure in structural member with crack radiates outward from anchor/bar
F6 = Other failure mode(s) : -

Hyder-Meinhardt Joint Venture
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www.asiainfrasolutions.com

asia infrastructure solutions MEINHARDT
HMJV

Your Ref : HKT2/BTP/MAS/VBW/PBD/001573/B
Our Ref : ED/2018/04/M25/240/22044

18 April 2024

Bouygues Travaux Publics
3/F, Island Place Tower,
510 King's Road,
North Point,
Hong Kong

Attn: Mr. Martin Ho

Dear Sir,

Contract No. ED/2018/04
Trunk Road T2 and Infrastructure Works
for Developments at the Former South Apron
Ramset (Spit) SS316 Anchor for Aluminium Cladding and Fins at West Ventilation Building

I refer to the above referenced submission dated 9 April 2024 regarding the captioned submission.

I have no objection on this submission, subject to the comments in the attached Submission Review Record being addressed satisfactorily.

Yours faithfully,

Edwin Ching
Supervising Officer's Representative

Encl.

c.c. AIS (Attn: Dr. Taj Ishola – w/encl.)
Meinhardt (Attn: Mr. Stephen Mak – w/encl.)

EC/AJW/KHG/JJN/PFN/KCC/kwu

IN-0560

By Fax (Fax no. 2397 5975) and Hand

水 務 署
Water Supplies Department
九龍灣大業里 11 號水務署九龍東區大樓
WSD Kowloon East Regional Building,
11 Tai Yip Lane, Kowloon Bay, Kowloon
電子郵遞 *e-mail* wsdinfo@wsd.gov.hk
電 話 *Telephone* 2152 5541 圖文傳真 *Facsimile* 2351 6949
檔 號 *Our Reference* (22) in WSD/M/7555/5/WSD/19/M25/300 Pt.12

4 February 2022

Ming Hing - Vasteam Joint Venture (MHVJV)
Unit 1809 - 12, Telford House,
16 Wang Hoi Road, Kowloon Bay,
Kowloon

Dear Sirs,

Contract No. 5/WSD/19
Improvement to Dongjiang Water Mains P4 at Sheung Shui and Fanling
Response to *Contractor's* Communication

Material Submission – Stainless Steel Stud Anchors

I refer to your letter ref. 5WSD19/CMS/CVL/ALL/JV00172A dated 11 October 2021 regarding the captioned subject.

In accordance with GS Clause 18.07, I hereby accept your proposed Stainless Steel Stud Anchors for fixing of pipe supports supplied by MCM Construction Materials Supply Company Limited and Manufactured by ITW Spit. Please be reminded to follow the manufacturer's instructions and recommendations on the usage of stud anchors.

Yours faithfully,

(Keith KF LEE)
Engineer/Construction (18)
Water Supplies Department

c.c. E/C(11), E/C(12), SWI/C(12), WI/C(21), WI/C(12)2, CEG/C(11), CEG/C(12)

JOB REFERENCE RECORD

RAMSET (SPIT) - FIX Z / FIX Z XTREM STUD ANCHORS

PROJECT NAME	PRODUCT	YEAR	TYPE
CONTRACT 1601 - KWU TUNG STATION ON EAST RAIL LINE	FIX Z XTREM M16X120 A4	2024	MTRC
高鐵站大樓升降機大堂及洗手間	FIX Z XTREM M8X55 A4	2024	MTRC
中大地盆 (SHUI ON)	FIX Z XTREM M12X110 A4	2024	
INTEGRATED WASTE MANAGEMENT FACILITIES PHASE 1	FIX Z XTREM M16X145	2024	EPD
MTR 1201 TUNG CHUNG LINE EXTENSION (TEMPORARY PLANT ROOM)	FIX Z XTREM M10X70 A4	2024	MTRC
CARCASS WORKS FOR LOT NO 1069 IN SURVEY DISTRICT NO 3 OFF ANDERSON ROAD	FIX Z XTREM M10X70 A4	2024	
KAI TAK - TRUNK ROAD T2 AND INFRASTRUCTURE WORKS (CKR)	FIX Z XTREM M8X90, M10X95 A4	2024	CEDD
合約編號: TC M942 為建築署保養及維修工程的定期合約 (黃大仙及沙田)	FIX Z XTREM M12X110 A4	2024	ASD
L2 LYRIC THEATRE COMPLEX AND EXTENDED BASEMENT RPOJECT FOR WEST KOWLOON CULTURAL DISTRICT AUTHORITY	FIX Z XTREM M8X75	2024	
屯門業旺路公屋	FIX Z M16X125 A4	2024	HOUSING
屏山坑頭村346	FIX Z M12X140 ZP	2024	
油塘內地段45號住宅發展項目	FIX Z XTREM M10X70, M10X95 A4	2024	
(ED/2019/02) PEDESTRAIN CONNECTIVITY FACILITIES WORKS AT ANDERSON ROAD	FIX Z XTREM M10X70 A4	2024	CEDD
CV2017/07 元朗橫洲公營房屋發展之工地平整及基礎設施工程	FIX Z XTREM M12X120 A4	2024	CEDD
3802 SMOKE VENT (AIRPORT)	FIX Z XTREM M12X110 A4	2024	
香港東邊街1-9號住宅發展項目	FIX Z XTREM M10X70 A4	2024	
港珠澳自動停車場	FIX Z XTREM M8X90 A4, FIX Z M8X130 A4	2024	HIGHWAYS
A&A WORKS FOR INSTALLATION OF THE 6TH LINEAR ACCELERATOR IN PRINCE OF WALES HOSPITAL	FIX Z XTREM A4 M8X70	2024	HKHA
DISCOVERY BAY NORTH DEVELOPMENT	FIX Z XTREM A4 M8X70, M16X140	2024	
MTR P1500 TUEN MUN SOUTH STATION	FIX Z XTREM M12X110, M16X140 A4	2024	MTRC
DC/2019 元朗污水處理	FIX Z XTREM M8X70, M10X70 A4	2024	DSD
深水埗興華街西	FIX Z XTREM M10X120 A4	2024	
CONSTRUCTION OF TRANSITIONAL HOUSING AND HOBBY FARM PROJECT AT TSAT SING KONG, YUEN LONG	FIX Z XTREM A4 M10X95	2024	
PINK VILLA - THE SALVATION ARMY (METAL BALUSTRADE, HANDRAILS, CAT LADDER)	FIX Z XTREM M10X95 A4	2024	
西貢華福街 DSD	FIX Z XTREM M8X70 A4	2024	
元朗橫洲宏樂街1號	FIX Z XTREM M8X70 A4	2024	

JOB REFERENCE RECORD

RAMSET (SPIT) - FIX Z / FIX Z XTREM STUD ANCHORS

PROJECT NAME	PRODUCT	YEAR	TYPE
SUPPORTING OPERATIONAL FACILITIES OF TSIM SHA TSUI FIRE STATION COMPLEX	FIX Z M8X130 A4	2024	ASD
半山地利根德里3號	FIX Z XTREM M12X110 A4	2024	
大埔泰亨村 華達苗甫	FIX Z XTREM M10X95 A4	2023	
3802 SEA WATER PUMP HOUSE 1	FIX Z XTREM M8X70, M12X110 A4	2023	AIRPORT
HK AIRPORT T2 EXPANSION	FIX Z XTREM M8X70, M8X90, M8X130, M10X95, M10X105, M10X130, M12X120, M12X140 A4	2023	AIRPORT
HKAA SWPH (SEA WATER PUMP HOUSE)	FIX Z XTREM M8X70, M12X120 A4	2023	AIRPORT
青鷺高端物流中心	FIX Z XTREM M8X55 A4	2023	AIRPORT
INTEGRATED WASTE MANAGEMENT FACILITIES PHASE 1	FIX Z XTREM M16X120 A4	2023	EPD
HIKING TRIAL BETWEEN YIP HING ST AND ABERDEEN COUNTRY PARK, CONTRACT NO. CV/2022/01	FIX Z M8X90 A4	2023	
NO.153 WAI YIP STREET, KWUN TONG	FIX Z XTREM M8X90 A4	2023	
SUPPORTING OPERATIONAL FACILITIES OF TSIM SHA TSUI FIRE STATION COMPLEX	FIX Z XTREM M16X140 A4	2023	ASD
康城公園	FIX Z XTREM M10X120 A4	2023	
LEI YUE MUN WATERFRONT ENHANCEMENT PROJECT (PH2)	FIX Z XTREM M12X120 A4	2023	
尖沙咀海員俱樂部	FIX Z M8X70, M8X130, M10X120, M12x140, M16X150 A4	2023	
將軍澳P2路	FIX Z XTREM M12X110 A4	2023	
5/WSD/19 - IMPROVEMENT TO DONGJIANG WATER MAINS P4 AT SHEUNG SHUI AND FANLING	FIX Z XTREM M10X70, M12X120 A4	2023	WSD
21-27 ASHLEY RAOD, TSIMSHATSUI	FIX Z XTREM M10X70, M10X130 A4	2023	
RESIDENTIAL DEVELOPMENT AT 4A-4P SEYMOUR RD, HONG KONG - STEEL STAIRCASES	FIX Z M12X140 A4	2023	
KAI TAK - STAGE 4 (ED/2018/01)	FIX Z XTREM M16X140 A4	2023	
粉嶺坪輋路88號浸信園	FIX Z XTREM M8X70, M8X130 A4	2023	
CONTRACT CV/2022/09 - RECONSTRUCTION OF YUNG SHUE WAN PUBLIC PIER AND SHEK TSAI WAN PIER	FIX Z XTREM M12X110 A4	2023	CEDD
PUBLIC HOUSING DEVELOPMENT AT TAI PO AREA 9	FIX Z XTREM M8X90, M10X95 A4	2023	HOUSING
HKHA20219053 - HING WAH (2) ESTATE	FIX Z A4 M16X125	2023	
觀塘偉業街6號	FIX Z XTREM A4 M12X110, M16X140	2023	
DC/2019/06-J039	FIX Z XTREM A4 M12X110	2023	
HOUSING DEVELOPMENT AT TUNG CHUNG AREA 100	FIX Z XTREM A4 M10X70	2023	HOUSING

JOB REFERENCE RECORD

RAMSET (SPIT) - FIX Z / FIX Z XTREM STUD ANCHORS

PROJECT NAME	PRODUCT	YEAR	TYPE
灣仔呂其教育中心	FIX Z XTREM A4 M8X90	2023	
白石角244地盤	FIX Z XTREM A4 M8X90	2023	
C3802 APM, BHS, EAP (HK AIRPORT)	FIX Z XTREM A4 M8X70, M8X90, M10X105, M12X120, M16X140	2023	AIRPORT
RESIDENTIAL & COMMERCIAL BUILDING AT NO. 53, 53A, 55A KWUN TONG ROAD	FIX Z XTREM A4 M8X90	2022	
T.M.T.L.NO.463 - SIU SAU CHUEN	FIX Z XTREM A4 M10X70	2022	
HY/2018/08 - CENTRAL KOWLOON ROUTE (CENTRAL TUNNEL)	FIX Z XTREM M16X145	2022	HIGHWAYS
凹頭水廠	FIX Z M10X95 A4	2022	WSD
ENHANCEMENT WORKS FOR KWUN TONG SEWAGE PUMPING STATION	FIX Z XTREM A4 M10X70, M12X110, M16X140	2022	DSD
SUBSIDISED SALE FLATS DEVELOPMENT AT ANDERSON ROAD QUARRY SITE R2-2	FIX Z XTREM A4 M8X90	2022	HOUSING
石湖墟污水處理廠	FIX Z XTREM M12X110 A4	2022	DSD
KOWLOON BAY HEALTH CLINIC	FIX Z XTREM M8X70 A4	2022	HKHA
ALUMINIUM SCREEN & CLADDING - MULTI-WELFARE SERVICES COMPLEX IN AREA 29 OF KWU TUNG NORTH	FIX Z M10X95 A4	2022	
九龍灣宏展街香港郵政大樓	FIX Z XTREM M10X70 A4	2022	
啟德站廣場第二期	FIX Z XTREM M8X55 A4	2022	
大埔白石角優景里63號	FIX Z XTREM M8X90 A4	2022	
日出康城地盤	FIX Z XTREM M8X70 A4	2022	
HKE LAMMA STATION	FIX Z XTREM M20X170	2022	HKE
T.M.T.L. NO. 463 (TUEN MUN SIU SAU CHUEN)	FIX Z XTREM M10X70 A4	2022	
石門骨灰龕火葬場	FIX Z M10X95 A4	2022	ASD
洪水橋 LYOS 洪元路2號 (CK)	FIX Z M10X70, M10X95, M12X100 A4	2022	
西沙地盤	FIX Z XTREM M16X145, M20X170	2022	
A&A COMMERCIAL BLDG AT NO.51 TSUN YIP ST, KWUN TONG	FIX Z 10X95 A4	2022	
MULTI-WELFARE SERVICES COMPLEX IN AREA 29 OF KWU TUNG NORTH DEVELOPMENT AREA	FIX Z XTREM M10X130, M12X140, M16X140 A4	2022	
SKYCITY, AIRPORT	FIX Z XTREM M10X70 A4	2022	AIRPORT
THE MAGISTRATES CLUB, HONG KONG	FIX Z XTREM M12X140 A4	2022	
C2113 SHING MUN PROJECT	FIX Z XTREM M12X110, M12X120 A4	2022	

JOB REFERENCE RECORD

RAMSET (SPIT) - FIX Z / FIX Z XTREM STUD ANCHORS

PROJECT NAME	PRODUCT	YEAR	TYPE
FANLING BY-PASS - STEEL LADDER BASEPLATE	FIX Z XTREM M12X110 A4	2022	
SKYCITY SHOPPING MALL	FIX Z XTREM M8X70, M10X70 A4	2022	AIRPORT
SAN WAI DSD SEWAGE PLANT	FIX Z XTREM M10X70, M10X95 A4	2022	DSD
TUEN MUN HOSPITAL - RE-ROOFING WORKS IN TMEC	FIX Z M16X125 A4	2022	
洪水橋 LYOS 洪元路2號 (CK)	FIX Z XTREM M10X70, M12X110 A4	2022	
36 WONG CHUK HANG ROAD	FIX Z 10X75 A4, FIX Z XTREM M10X70 A4	2022	
KWUN TONG SEWERAGE TREATMENT PLANT	FIX Z XTREM M10X95, M10X120, M16X140 A4	2022	DSD
屯門興貴街 (ABLE SITE)	FIX Z XTREM M8X55 A4	2022	
荃灣圖書館	FIX Z XTREM M12X115	2022	ASD
PUBLIC HOUSING DEVELOPMENT AT LAI CHO ROAD, KWAI CHUNG	FIX Z XTREM 10X75, 10X95 A4	2022	HOUSING
RESIDENTIAL DEVELOPMENT AT 93-95A WATERLOO ROAD	FIX Z XTREM A4 M10X70, M10X95	2022	
5/WSD/19 - IMPROVEMENT TO DONGJIANG WATER MAINS P4 AT SHEUNG SHUI AND FANLING	FIX Z M12X140 A4	2022	WSD
DC/2019/06 (河上鄉)	FIX Z M12X115 A4	2022	
PUBLIC HOUSING DEVELOPMENT AT TAI PO AREA 9	FIX Z XTREM M10X70 A4	2021	HOUSING
樂華邨恩華樓	FIX Z M8X90 A4	2021	
屯門欣寶路住宅發展項目 (SHK)	FIX Z M8X55 A4	2021	
SIU HONG, TMTL 483	FIX Z M8X55 A4	2021	
RESIDENTIAL DEVELOPMENT AT SIU HONG (SHK)	FIX Z M8X55 A4	2021	
TUNG CHUNG AREA 54	FIX Z 10X75 A4	2021	HOUSING
9/WSD/21	FIX Z XTREM M10X90	2021	WSD
屯門兆康住宅發展 (SHK)	FIX Z M8X55 A4	2021	
RESIDENTUAL DEVELOPMENT AT KAU TO SHAN	FIX Z M12X115 A4	2021	
NAM TIN TUNNEL	FIX Z XTREM M12X135	2021	HIGHWAYS
NE/2017/02 TSEUNG KWAN O - LAM TIN TUNNEL ROAD P2/D4 AND ASSOCIATED WORKS	FIX Z M8X90 A4	2021	HIGHWAYS
NO. 94 GRANVILLE ROAD, TST	FIX Z M10X95, M12X115 A4	2021	
EAST KOWLOON CULTURAL CENTRE	FIX Z XTREM M8X90, M12X115	2021	ASD

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PROJECT NAME	PRODUCT	YEAR	TYPE
大埔美心廚房	FIX Z M10X120, M16X150 A4	2021	
中環花園道山頂纜車站	FIX Z M8X70, M8X90 A4	2021	
上水營盤下村公廁	FIX Z 12X100 A4	2021	
TSEUNG KWAN O AREA 137	FIX Z M8X90 A4	2021	
TTP 太古坊	FIX Z M16X125 A4	2021	
THE HONG KONG POLYTECHNIC UNIVERSITY	FIX Z M8X90, M12X100 A4	2021	
CITY UNIVERSITY OF HONG KONG	FIX Z 10X75 A4	2021	
PUBLIC HOUSING DEVELOPMENT AT TAI PO AREA 9	FIX Z 10X75 A4	2021	HOUSING
PUBLIC HOUSING DEVELOPMENT AT LAI CHO ROAD, KWAI CHUNG	FIX Z 10X75, 10X95, 10X120 A4	2021	HOUSING
上環無極限廣場	FIX Z M10X120 A4	2021	
MULTI-WELFARE SERVICES COMPLEX IN AREA 29 OF KWU TUNG NORTH DEVELOPMENT AREA	FIX Z M10X75, M10X95 A4	2021	
WANCHAI COASTSIDE	FIX Z M10X95 A4	2021	
KWUN TONG REDEVELOPMENT	FIX Z 8X90, 12X100 A4	2021	
DC/2017/01 CHERRY STREET	FIX Z M16X150 A4	2021	
SAN WAI SEWAGE PLANT	FIX Z M10X65, M10X95 A4	2021	DSD
皇后山 QH1	FIX Z 10X75, 10X120, 12X100, 16X125, 16X150 A4	2021	HOUSING
RESIDENTIAL DEVELOPMENT AT LAI PING ROAD	FIX Z M8X90, M10X95, M12X115 A4	2021	
KAI FOOK ESTATE	FIX Z 8X70, 8X90 A4	2021	
RESIDENTIAL DEVELOPMENT AT ANDERSON ROAD	FIX Z 12X100 A4	2021	
皇后山 QH1	FIX Z 12X100, 16X125, 16X150 A4	2021	HOUSING
SECURITY IMPROVEMENT WORKS AT LEGCO	FIX Z 16X150 A4	2021	ASD
觀塘海濱公園	FIX Z XTREM M8X90	2021	
中環威靈頓街發展項目	FIX Z M10X95 A4	2020	
RESIDENTIAL DEVELOPMENT AT 43 ISLAND ROAD	FIX Z 10X75, 10X95 A4	2020	
啟德兒童醫院	FIX Z 8X55, 12X100 A4	2020	HKHA
EAST KOWLOON CULTURAL CENTRE	FIX Z XTREM 8X90, 12X115	2020	ASD

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RAMSET (SPIT) - FIX Z / FIX Z XTREM STUD ANCHORS

PROJECT NAME	PRODUCT	YEAR	TYPE
PUBLIC HOUSING DEVELOPMENT AT NORTH WEST KOWLOON RECLAMATION SITE 6 AND FAT TSEUNG WEST	FIX Z 16X125, 16X150 A4	2020	HOUSING
SKYCITY, AIRPORT	FIX Z 8X70, 10X75 A4	2020	AIRPORT
皇后山 QH1	FIX Z 10X95, 12X100, 12X115 A4	2020	HOUSING
上水 - 薰園	FIX Z 10X75 A4	2020	
AIRPORT AUTHORITY OFFICE TOWER	FIX Z M16X125 A4	2020	
LAMMA UNIT 11 COMBINED CYCLE POWER STATION - HONG KONG ELECTRIC	FIX Z 10X95 A4	2020	HKE
LOHAS PARK PHASE 8	FIX Z 10X75, 10X120 A4	2020	
TAI PO AREA 6 DEVELOPMENT	FIX Z 10X95 A4	2020	
啓德兒童醫院	FIX Z 10X95 A4	2020	ASD
SUBSIDISED SALE FLATS DEVELOPMENT AT TUNG CHUNG AREA 54	FIX Z 10X65, 16X150 A4	2020	HOUSING
大埔第九區基礎建設	FIX Z 8X90, 10X120 A4	2020	
日出康城10期 - 外牆鋁百葉安裝	FIX Z 10X75, 10X95, 10X120 A4	2020	
ANDERSEN ROAD DEVELOPMENT (TYPE II)	FIX Z 8X90 A4	2020	
古洞北發展 (SHUI ON)	FIX Z XTREM M12X115, M20X170	2020	
RESIDENTIAL DEVELOPMENT AT NO. 35 BARKER ROAD, THE PEAK	FIX Z M8X130, M10X75, M10X95, M10X120 A4	2020	
TKO AREA 86, SITE H	FIX Z M10X75 A4	2020	
柴灣環翠邨 (HKE3 - HONG KONG EAST CONTRACT)	FIX Z M12X140 A4	2020	HOUSING
T2 FOUNDATION & SUBSTRUCTURE WORKS, HONG KONG INTERNATIONAL AIRPORT	FIX Z M10X95 A4	2020	HKAA
TM541 屯門掃管笏 (中國建築地盤)	FIX Z M8X70 A4	2020	
SCIENCE PARK 3C	FIX Z M8X55 A4	2020	
MTR YUEN LONG STATION DEVELOPMENT	FIX Z M16X170 A4	2020	
DEVELOPMENT AT YUEN LONG MTR STATION	FIX Z M8X70 A4	2020	
WONG MA KOK'S SAMPLE FLAT	FIX Z M10X75 A4	2019	
何文田常盛街地盆	FIX Z 10X94 A4	2019	
HOTEL DEVELOPMENT AT WAI MAN ROAD, SAI KUNG	FIX Z M8X70 A4	2019	
TMCLKL - PROD - TUNNEL - IS, DRAINAGE PIPE INSTALLATION	FIX Z M12X115 A4	2019	HIGHWAYS

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RAMSET (SPIT) - FIX Z / FIX Z XTREM STUD ANCHORS

PROJECT NAME	PRODUCT	YEAR	TYPE
1124 - ADMIRALTY STATION	FIX Z M10X95 A4	2019	MTRC
TM541 屯門掃管笏	FIX Z M8X90&130, M10X95, M12X100, M16X125&170 A4	2019	
TKO - LAM TIN TUNNEL	FIX Z M10X120 A4	2019	HIGHWAYS
RESIDENTIAL DEVELOPMENT AT OIL STREET, NORTH POINT I.L.8920	FIX Z M10X95 A4	2019	
葵涌健全街項目 (建業) - DATA CENTRE	FIX Z M10X75, M10X95, M10X120 A4	2019	
HY/2012/08	FIX Z M12X140 A4	2019	HIGHWAYS
MTR SCL1155B	FIX Z M16X125 A4	2019	MTRC
LIANTANG - HEUNG YUEN WAI BOUNDARY CONTROL POINT	FIX Z M8X70, M10X95, M12X115 A4	2019	
啟德體育園區	FIX Z XTREM M10X90	2019	
DEVELOPMENT AT BORRETT ROAD	FIX Z M10X95 A4	2019	
YUEN LONG SAN WAI SEWAGE PLANT	FIX Z M10X65, M10X75, M10X95 A4	2019	DSD
柴灣環翠邨 (HKE)	FIX Z XTREM M16X180	2019	
MTRC SCL1111 - HUNGHOM TUNNELS	FIX Z M8X70 A4	2019	MTRC
將軍澳86區, SITE H (日出康城)	FIX Z M8X90, M10X75, M12X115 A4	2019	
T.M.T.L. 513 YAN CHING STREET, TUEN MUN	FIX Z M10X95, M10X120 A4	2019	
WEST RAIL YUEN LONG STATION PROPERTY DEVELOPMENT AT YUEN LONG TOWN LOT NO. 510	FIX Z M10X120, M12X100, M12X115 A4	2019	
HOUSING DEVEMENT AT SHEK KEI MEI (SHUI ON)	FIX Z M10X95, M16X125, M16X150 A4	2019	HOUSING
RESIDENTIAL DEVELOPMENT AT NAM CHEONG STATION	FIX Z M10X95 A4	2019	
大埔青年旅舍	FIX Z XTREM M16X145	2019	
NO. 105 CONCORDE ROAD, KAI TAK (POLICE STATION)	FIX Z XTREM M16X145	2019	
大埔水廠	FIX Z M12X140 A4	2019	
將軍澳86區	FIX Z M10X95 A4	2018	
竹園道鵬程苑	FIX Z M12X115 A4	2018	
OIL STREET, NORTH POINT I.L.8920, HONG KONG	FIX Z M12X100 A4	2018	
T.M.T.L. 513 YAN CHING STREET, TUEN MUN	FIX Z M16X150 A4, M16X170 A4	2018	
尖沙咀星光大道	FIX Z XTREM M16X145	2018	

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RAMSET (SPIT) - FIX Z / FIX Z XTREM STUD ANCHORS

PROJECT NAME	PRODUCT	YEAR	TYPE
SPORTS CENTRE IN AREA 24D SHATIN	FIX Z 10X95 A4	2018	
TUEN MUN HOSPITAL	FIX Z 12X100 A4	2018	HKHA
TUEN MUN TOWN PLAZA	FIX Z 12X100 A4	2018	
TMTL541 屯門掃管笏路住宅項目	FIX Z M12X100, M16X125 A4	2018	
TAI WAI STATION	FIX Z XTREM M16X145	2018	MTRC
7 CONNAUGHT ROAD WEST & 13 NEW MARKET STREET	FIX Z M10X120 A4	2018	
英皇道 121 號	FIX Z M10X95 A4	2018	
SSC505 LIANTANG	FIX Z M8X70 A4	2018	HIGHWAYS
SSC505 LIANTANG	FIX Z XTREM M8X75, M8X90	2018	
廣珠澳大橋(人工島)	FIX Z M10X95, M16X150 A4	2018	
HY/2011/09 HKLR09	FIX Z M8X55, M12X80 A4	2018	HIGHWAYS
T-PARK, NIM WAN	FIX Z M10X95 A4	2018	ASD
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT	FIX Z M10X75, M10X95, M12X115 A4	2018	
廣珠澳大橋(人工島)	FIX Z M8X55, M8X70, M8X90, M10X75, M10X95, M16X125 A4	2018	
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT (BCP) - ANCILLARY BLDG & OTHER ASSOCIATED BLDG	FIX Z M10X95 A4	2018	
TUEN MUN CHEK LAP KOK LINK	FIX Z M8X70, M8X90, M8X130, M10X75, M12X100 A4	2018	HIGHWAYS
TSUEN WAN WEST RESIDENTIAL DEVELOPMENT	FIX Z 8X130 A4	2018	
TUEN MUN CHEK LAP KOK LINK	FIX Z M12X115 A4	2018	HIGHWAYS
RESIDENTIAL DEVELOPMENT AT NAM CHEONG STATION, PHASE 2	FIX Z M8X70, M10X75 A4	2018	SHK
SO UK ESTATE, PHASE 2	FIX Z M10X95 A4	2018	HOUSING
MTR SCL1155B	FIX Z 10X95, 10X120 A4	2018	MTRC
CHINA RESOURCE BUILDING, WANCHAI	FIX Z M10X95 A4	2018	
HAPPY VALLEY SPORTS GROUND AT 2 SPORTS ROAD, WANCHAI	FIX Z M8X90 A4	2017	
羅氏中學	FIX Z M10X95, M16X125 A4	2017	
HKHA TUEN MUN AREA 54 PH 1&2	FIX Z M10X65 A4	2017	
DEVELOPMENT AT NO.420-422 PRINCE EDWARD ROAD WEST	FIX Z M10X120 A4	2017	

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RAMSET (SPIT) - FIX Z / FIX Z XTREM STUD ANCHORS

PROJECT NAME	PRODUCT	YEAR	TYPE
IL12110 TONG YAN SAN TSUEN, YUEN LONG	FIX Z M10X95, M10X120 A4	2017	
木廠街住宅發展	FIX Z M10X75 A4	2017	
SCOUT ASSOCIATION OF HK, 34 OI KWAN ROAD	FIX Z M10X95 A4	2017	
MTRC SCL 1112, HUNGHOM STATION	FIX Z M10X75 A4	2017	MTRC
新山道/炮仗街發展項目 (喜築)	FIX Z M10X95 A4	2017	URA
POLY UNIVERSITY	FIX Z M10X95 A4	2017	
HY/2011/09 HKLR09 - CABLE TROUGH	FIX Z M10X65 A4	2017	HIGHWAYS
廣珠澳大橋(人工島)	FIX Z M8X70, M8X90, M12X140, M16X125, M16X170 A4	2017	
OIL STREET, NORTH POINT I.L.8920, HONG KONG	FIX Z M8X70, M10X75, M16X150 A4	2017	
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT - METAL & EXTERNAL LOUVRE SYSTEMS	FIX Z M10X95 A4	2017	
元朗 朗晴居	FIX Z M12X115 A4	2017	
HOUSING DEVELOPMENT AT TUNG CHUNG AREA 56	FIX Z M10X75, M10X95 A4	2017	HOUSING
HK SLUDGE TREATMENT FACILITIES PROJECT	FIX Z M10X95 A4	2017	ASD
北角百福道項目	FIX Z M8X70, M10X120 A4	2017	
TSUEN WAN WEST RESIDENTIAL DEVELOPMENT	FIX Z 8X55 A4	2017	
大圍沙角街沙田頭邨	FIX Z 10X120 A4	2017	
HOTEL DEVELOPMENT AT SAI KUNG	FIX Z M8X70, M8X130, M10X75, M10X95, M12X115 A4	2017	
數碼港弘立書院	FIX Z M10X95 A4	2017	
LOT 513 LONG PING DEVELOPMENT, YUEN LONG	FIX Z M10X120 A4	2017	
廣珠澳大橋(人工島)	FIX Z M8X70, M8X90, M8X130, M10X95, M10X120 A4	2017	
屯門環保園	FIX Z M10X75, M10X95 A4	2017	
URBAN LANDFILLS RESTORATION CONTRACT	FIX Z 16X150 A4	2017	WSD
MTR SCL1155B	FIX Z 10X75 A4	2017	MTRC
DISNEYLAND DEVELOPMENT	FIX Z 8X70, 12X115 A4	2017	
沙灣徑大口環根德公爵夫人兒童醫院	FIX Z M12X115 A4	2016	
HOTEL DEVELOPMENT AT DISNEYLAND - H3MC	FIX Z 12X115 A4	2016	

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RAMSET (SPIT) - FIX Z / FIX Z XTREM STUD ANCHORS

PROJECT NAME	PRODUCT	YEAR	TYPE
MTR SCL1155B	FIX Z 8X70, 12X100 A4	2016	MTRC
宏業西街	FIX Z M10X95 A4	2016	
TSUEN WAN WEST RESIDENTIAL DEVELOPMENT	FIX Z 8X90 A4	2016	
將軍澳至善街3號	FIX Z M10X95 A4	2016	
廣珠澳大橋(人工島)	FIX Z M8X70, M12X140 A4	2016	HIGHWAYS
深水埗醫局街202號	FIX Z 8X90 A4	2016	
DISNEYLAND	FIX Z M8X70, M8X130 A4	2016	
MTRC KTE 1002 - WHAMPOO STATION	FIX Z M8X70 A4	2016	MTRC
RESIDENTIAL DEVELOPMENT AT NAM CHEONG STATION (SHK)	FIX Z M8X55 A4, M10X75 A4	2016	SHK
CLP KAI TAK CABLE TUNNEL	FIX Z M10X95, M12X115 A4	2016	CLP
JAT MIN CHUEN, SHATIN	FIX Z M10X95 A4	2016	HOUSING
大欖監獄	FIX Z M10X95, M10X120 A4	2016	
MTRC - DCCB REPLACEMENT	FIX Z M8X70 A4, M10X95 A4	2016	MTRC
澳門初級法院大樓	FIX Z M10X95 A4	2016	MACAU
數碼港弘立書院	FIX Z M10X95 A4	2016	
羅便臣道10號嘉兆台	FIX Z M10X95 A4	2016	
MTRC KTE 1002 - WHAMPOO STATION	FIX Z M12X115 A4	2016	MTRC
RESIDENTIAL DEVELOPMENT AT NAM CHEONG STATION (SHK)	FIX Z M12X100 A4	2016	MTRC
慈雲山人行道 - LOUVRE FIXING	FIX Z M8X70, M8X90 A4	2016	
DEVELOPMENT AT TAI PO ROAD 4781	FIX Z M10X95 A4	2016	
澳門青坊洲1-2地段公屋	FIX Z 12X115, FIX Z 16X135	2016	MACAU
DEVELOPMENT AT KAI YUEN STREET	FIX Z M8X70 A4	2016	
元朗安寧路大橋路安樂路 (YOHO)	FIX Z M10X95 A4	2016	
WANCHAI BYPASS	FIX Z M16X135	2016	
MTRC - CONTRACT 1001 (HOMANTIN)	FIX Z M8X130 A4	2016	MTRC
MTRC - CONTRACT 1002	FIX Z M10X95, M12X115, M12X140 A4	2016	MTRC

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RAMSET (SPIT) - FIX Z / FIX Z XTREM STUD ANCHORS

PROJECT NAME	PRODUCT	YEAR	TYPE
MTRC 904 - VE CLADDING	FIX Z M10X95 A4	2016	MTRC
MTRC - 1102, WHAMPOO STATION	FIX Z M12X100 / M12X115 A4	2016	MTRC
CLEAR WATER BAY ROAD RESIDENTIAL DEVELOPMENT	FIX Z M16X135	2016	
YWCA	FIX Z M8X90, M10X95	2015	
YWCA	FIX Z M12X100 A4	2015	
TAI PO SEWAGE PLANT	FIX Z M16X150 A4	2015	DSD
MTRC - CONTRACT 1002	FIX Z M8X90, M10X95 A4	2015	MTRC
CHU HAI COLLEGE AT CASTLE PEAK ROAD, TMTL 489, TUEN MUN	FIX Z M10X95 A4	2015	
小欖別墅	FIX Z M8X90 A4	2015	
HOUSING DEVELOPMENT AT ANDERSEN ROAD	FIX Z M8X70 A4, M8X90 A4, M12X100 A4	2015	HOUSING
MTRC SCL 1103	FIX Z M16X135	2015	MTRC
HOUSING DEVELOPMENT AT ANDERSEN ROAD	FIX Z M12X115 A4	2015	HOUSING
YLTL 2139 TONG YAN SAN TSUEN, YUEN LONG	FIX Z M10X95 A4	2015	
MTR KWUN TONG EXT	FIX Z M8X90	2015	MTRC
WYNN'S PALACE, MACAU	FIX Z M12X115, M12X140 A4	2015	MACAU
元朗沙埔北住宅發展 (SHK)	FIX Z M8X70/M8X130 A4	2015	SHK
慈雲山人行道	FIX Z M8X90 A4	2015	
銅鑼灣耀華街38號發展	FIX Z M12X115 A4	2015	
HOUSING DEVELOPMENT AT HUNG SHUI KIU	FIX Z M10X95 A4	2015	HOUSING
大欖監獄	FIX Z M10X95 A4	2014	ASD
旺角東方街住宅項目	FIX Z M10X95 A4	2014	
DEVELOPMENT AT LEE TUNG STREET	FIX Z M12X115 ZP	2014	
MTR-C5207-14E REPLACEMENT OF MICC CABLE FOR EMF & DAMPERS	FIX Z M10X95 A4	2014	MTRC

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