TECHNICAL PERMIT – SOLID FILLED CONCRETE MASONRY

SPARROW Construction Limited REGISTERED MASTER BUILDERS

Based on **NZS 4210:2001**

This permit must be completed prior to any concrete masonry construction taking place.

PROJECT: **STAGE:**

ENSURE CONSTRUCTION DOCUMENTS *being used are current, have been fully read and understood and are adhered to, including drawings, specification and contract notices.*

REFERENCE DRAWINGS: **DATE:** / /

ENSURE *that we understand which NZ Standard has been used to design the blockwork.*

APPLICABLE DESIGN CODE	YES	N/A
NZS 3604 Timber framed buildings	☐	☐
NZS 4229 Concrete masonry buildings not requiring specific engineering design	☐	☐
NZS 4230 Design of reinforced concrete masonry structures	☐	☐

ENSURE *that the person carrying out the blocklaying is competent.*

REGISTRATION EITHER WITH:
NZ Masonry Trades Registration Board http://www.mtrb.org.nz/mtrb/mtrb-registration_list.htm
OR Department of Building and Housing http://lbp.dbh.govt.nz/publicregister

Mason *Registration #*

ENSURE *that scaffolding is strong enough to support the weight of the stacked concrete blocks, grout and workers (1 block = 15kg, one person = 100kg).*

	YES	N/A
Light duty working platform	NOT ALLOWED	
Medium duty working platform maximum duty loading = 450kg per 2.4m long bay (maximum concentrated load 150kg)	☐	☐
Heavy duty working platform maximum duty loading = 675kg per 1.8m long bay (maximum concentrated load 200kg)	☐	☐

ENSURE *that falsework or existing building or other structure is strong enough to support the weight of the concrete masonry.*

	YES	N/A
Existing building or other structure is strong enough to support weight of concrete masonry	☐	☐
Falsework has been designed	☐	☐

ENSURE *that block wall will not be blown over during construction.*

STABILITY OF CONCRETE MASONRY WALL DURING CONSTRUCTION
Bracing during construction – *refer clause 2.17*

190mm thick, 1.0m high unstable with wind gusts above 90km/hour
190mm thick, 2.4m high unstable with wind gusts above 60 km/hour
190mm thick, 3.6m high unstable with wind gusts above 26 km/hour

As defined by Met Service:

Severe gale	> 89 km/hour
Gale	60-89 km/hour
Strong wind	40-59 km/hour
Fresh wind	30-39 km/hour
Moderate wind	15-29 km/hour

		YES	NO
Wall subjected to wind loads during construction (note the incomplete wall has very little seismic resistance, hence the risk that there may be an earthquake during construction is taken as acceptable)		☐	☐
Method of mitigating effects of wind:			
a) Limit height of 190 series wall to <= 2.4m	Maximum wall height:	☐	☐
b) Brace wall	Design of bracing by:	☐	☐

ENSURE *that grouting method is selected prior to starting, as this dictates how the wall is to be constructed.*

Selection of grouting method – only the high lift method with expansive admixture and mechanical immersion vibration is authorised *(refer Appendix A for further explanation)*

	YES	NO
High lift grouting with expansive admixture, requiring cleanouts – *refer clause 2.12*	☐	☐
Modified low lift grouting (modified by including expansive agent) – *refer clause 2.14* 190 and 140 series, maximum lift 1200mm – *refer clause 2.7.5(b)* 90 series blockwork, maximum lift 400mm – *refer clause 2.7.5(a)* No cleanouts required	☐	☐

TECHNICAL PERMIT – SOLID FILLED CONCRETE MASONRY

SPARROW Construction Limited REGISTERED MASTER BUILDERS

Based on **NZS 4210:2001**

***ENSURE** that the effects of cold and hot weather are mitigated.*

Controls for weather	YES	NO
COLD WEATHER < 5°C – *refer clause 2.18*		
Protect for freezing for >= 24 hours after laying by covers, blankets, heated enclosure, etc to protect mortar from freezing, etc	☐	☐
No frozen materials shall be used	☐	☐
HOT WEATHER >= 25°C – *refer clause 2.19*		
Lightly dampen masonry units		
Manufacturer's instructions regarding surface damping in hot weather are:	☐	☐
Surface dampening required – *refer clause 2.7.2.2*	☐	☐
Keep all wall surfaces damp for 24hrs	☐	☐
CURE GROUT – either:		
Antivap (liphatic alcohol) ***OR*** cover with impermeable membrane ***OR*** maintain in damp condition	☐	☐

***ENSURE** starters are in the correct position and masonry units are laid on properly prepared surfaces.*

Preparation prior to laying blocks	YES	N/A
DRILLING STARTERS		
Survey carried out to ensure there are no embedded conduits, electric wires, etc that could be hit when drilling	☐	☐
Install starters to correct depths and with correct epoxy	☐	☐
Carry out testing to ensure epoxied starters meet pull out design requirements	☐	☐
Starters in correct position – tolerances +/- 6mm across thickness of wall, +/- 50mm or ¼ length of grouted cell, whichever is the less along the length of the wall, +/- 6mm for piers and columns – *refer clause 2.6.5.1*	☐	
Starter cover complies with clause 2.6.5.2 – *refer inserted Table 2.E1 appendixed*	☐	
Vertical alignment discrepancy of concrete base <= 20mm	☐	

Horizontal construction joint preparation – *refer clause 2.16.2*	YES	N/A
Surface of hardened grout – cleaned and all laitance *("a milky deposit on the surface of new cement or concrete, usually caused by too much water")* and loose and foreign matter removed	☐	☐

***ENSURE** correct reinforcing bars are secure in the correct position (refer Table 2.E1 appendixed for tolerances)*

The correct grade, type and size of reinforcing has been installed in the right positions so that concrete that is weak in tension acts as designed and the life span of the reinforced concrete is not compromised by insufficient cover to the inside face of the concrete block. In addition, the reinforcing must be adequately tied to ensure bars remain in the correct position.

Reinforcing	YES	N/A
Reinforcing cut and bent by recognised steel reinforcing fabricating company **OR**	☐	☐
Reinforcing cut and bent onsite by registered structural mason who has demonstrated familiarity with detailing, cutting and bending requirements of NZS 3109 or NZS 3124, except where modified by NZS 4210:2001 *(refer Appendix 2D)* or by specific design	☐	☐

Vertical bars	YES	N/A
Tied to starters	☐	
Held in position at top of walls at intervals not exceeding 1.2m for 10mm bars, 2.4m for 12mm bars or 3.6m for 16mm or larger bars Interval:	☐	
Centred unless shown otherwise by specific engineering design or detailed in accordance with NZS 4229	☐	

Horizontal bars	YES	N/A
25mm above or below mortar joint and fully embedded in grout	☐	
Tied to vertical reinforcement or positively held in position by specially designed units or steel spacers or links	☐	
In joint reinforcement where required by specific engineering design shall be steel, hot dipped galvanised after fabrication of 316 stainless steel – fully embedded in mortar with minimum side cover of 15mm	☐	☐
Minimum joint thickness 10mm	☐	

Laps	YES	N/A
Equal or greater than minimum length (Grade 300 >= 40 diameters, Grade 430 >= 54 diameters)	☐	☐
Grade 500 – specific engineering design	☐	☐
Laps avoided at corners	☐	☐
More than one vertical bar in cell stagger laps	☐	☐

TECHNICAL PERMIT – SOLID FILLED CONCRETE MASONRY

SPARROW Construction Limited REGISTERED MASTER BUILDERS

Based on **NZS 4210:2001**

***ENSURE** masonry units meet specification, are in good condition, are not wet to touch prior to laying and are laid to the correct tolerances.*

Masonry units	YES	N/A
MATERIAL REQUIREMENTS Unconfined compressive strength => 12.5mPa as per NZS 3604 and NZS 4229 – *refer clause 2.1.4.5A* Unconfined compressive strength specified but not < 10mPa as per NZS 4230 – *refer clause 2.1.4.5* Specified strength:	☐ ☐	☐ ☐
WORKMANSHIP REQUIREMENTS – *note that stack bonding is not permitted in NZS 3604 and NZS 4229* Masonry units laid in an air dry state, ie not wet to touch – *refer clause 2.7.2.2* First course is open-end bond beam laid upside down (to facilitate cleaning)	☐ ☐	
CLEANOUT OPENINGS REQUIRED – *refer clause 2.7.8* Height < 1.2m – cleanouts not required, as cleaning out should be carried out as work proceeds unless circumstances restrict the cleaning out as work proceeds Height > 1.2m – cleanouts required: 100mm x 75mm openings at a reinforcing bar position, maximum spacing 800mm centres	☐ ☐	☐ ☐
First course is open-end bond beam laid upside down (to facilitate cleaning) – *refer clause 2.7.8.2*	☐	☐
CLEANING OUT – selected method Water jet out at the end of each day **OR** Fine layer of sand at the bottom of the grout space blown or washed out after blocks laid	☐ ☐	☐ ☐
FACING BLOCKS PUT OVER CLEANOUTS	☐	

Tolerances – *refer clause 2.7.1.4*	YES	N/A
Deviation from position shown on plan for building > 1 storey <= 15mm	☐	☐
Deviation from vertical within a storey <= 10mm/	☐	
Deviation in total building height <= 20mm	☐	
Relative vertical displacement between masonry courses a) Nominated fair face (1 face only) <= 3mm b) Structural face <= 5mm	☐ ☐	
Relative displacement between load bearing walls in adjacent storeys intended to be in vertical alignment <= 5mm	☐	☐
Deviation form line in plan a) In any length up to 10m <= 5mm b) In any length over 10m <= 10mm total	☐ ☐	
Deviation of bed joint from horizontal a) In any length up to 10m <= 5mm b) In any length over 10m <= 10mm total	☐ ☐	
Average thickness of bed joint, cross joint or perpendicular joint +/- 3mm on thickness specified	☐	
Construction to NZS 4230 specified variances List variances: Complied with	☐ ☐	☐

***ENSURE** that only premixed proprietary mortar is used and is thrown out if it becomes non plastic. The mortar joints are to be tooled, any extrusions trimmed and mortar droppings cleaned out from the bottom of the wall prior to filling with block fill.*

Mortar	YES	N/A
MATERIAL REQUIREMENTS Proprietary premixed mortar – mandatory Compressive strength => 12.5mPa as per NZS 3604 and NZS 4229 – *refer clause 2.1.4.5* Compressive strength specified as per NZS 4230 – *refer clause 2.1.4.5* Specified strength:	☐ ☐ ☐	☐ ☐
WORKMANSHIP REQUIREMENTS Full mortar beads under face shells and same depth to vertical joints – *refer clause 2.7.3* Mortar soft and plastic when blocks laid – *refer clause 2.7.1.2* Mortar thickness bottom course <= 20mm – *refer clause 2.7.1.3* All other mortar joints 10mm +/- 3mm – *refer clause 2.7.1.3* Mortar protrusions <= 5mm from reinforcing – *refer clause 2.7.1.7* Mortar protrusions >= 5mm from reinforcing – *refer clause 2.7.1.7*	☐ ☐ ☐ ☐ ☐ ☐	
External wall mortar joints – *refer clause 2.7.7.1* Tooled to a depth <= 6mm Burnished after initial stiffening has occurred	☐ ☐	☐
***OR** External wall mortar joints – *refer clause 2.7.7.1* Raked out pointing and tooled to a depth <= 6mm Burnished after initial stiffening has occurred	☐	☐

TECHNICAL PERMIT – SOLID FILLED CONCRETE MASONRY

SPARROW Construction Limited
REGISTERED MASTER BUILDERS

Based on **NZS 4210:2001**

HOLD POINT: **SIGN OFF** **APPROVAL TO POUR** **SUBJECT TO WEATHER**	SCL person responsible: _____ Engineer: _____ Local authority: _____ Client: _____

ENSURE that the concrete grout:

STRENGTH *meets specification (ie 12.5mPa if NZS 3604 or NZS 4229, or mix design has been submitted and approved by the engineers if NZS 4230) and the production of and the correct number concrete test blocks has been arranged.*

VOLUME *has been correctly measured, including waste sensitivity.*

DELIVERY TIMES AND TRAVEL DISTANCES *have been determined from the ready mix plant to site, the plant has committed to meeting the delivery times and there is a contingency plan if the plant breaks down or there are traffic jams.*

PLACEMENT METHOD *has been determined (ie directly out of the truck/by wheelbarrow/by crane and skip/by concrete pump), including the sequence of placement. The initial corrupted concrete from pump line is to be thrown out. There also needs to be a contingency plan if the crane or concrete pump breaks down.*

COMPACTION METHOD *has been determined (ie spud vibrator or rodding).*

CURING SYSTEM ESTABLISHED *– impermeable cover (eg plastic) or water or membrane curing, curing materials on site.*

WEATHER FORECAST *has been checked, contingency plan in place, decision made to whether to pour or not.*

STAFF ARE COMPETENT *(ie supervisor, vibrator operator/s, placer/s, pump or crane operator).*

HOUSEKEEPING *– nominated washdown and waste concrete area (preference is for concrete truck to wash down back at the ready mix yard).*

Grout	YES	N/A
MATERIALS		
Grout type — Fine	☐	☐
Course	☐	☐
Mix design provided	☐	☐
Mix design approved	☐	☐
28 day compressive strength compressive strength => 12.5mPa as per NZS 3604 and NZS 4229 – *refer clause 2.1.4.5*	☐	☐
Compressive strength specified as per NZS 4230 – *refer clause 2.1.4.5* *Specified strength:*	☐	☐
VOLUME		
Volume measured	☐	☐
Volume ordered *(including allowance for pump line)* *Number of trucks:*	☐	☐
ON SITE ACTIVITIES		
Cavex (Sika) added – *refer information appendixed*	☐	☐
Spread test carried out	☐	☐
Test blocks taken	☐	☐
WORKMANSHIP		
Maximum height 3.6m	☐	☐
Semi-continuous operation	☐	☐
Consolidation during pour with mechanical immersion vibration or 16mmØ minimum rod	☐	☐
	☐	☐
	☐	☐
No pooling of water in bottom of cavities	☐	☐
Vibrator and backup on site *(two different energy types, eg petrol and electricity)*	☐	☐
Vibrator operators (names):		
Check docket before driver exits truck	☐	☐
First truck batching time	☐	☐
Dump initial discharge from pump	☐	☐
Last truck discharged time	☐	☐
Recompaction on completion post expansion by trowelling or weighted restraining board	☐	☐
Ensure horizontal construction joint flush with or no more than 20mm below top of masonry unit (preferably uppermost unit) – *refer clause 2.16.1*	☐	☐

TECHNICAL PERMIT – SOLID FILLED CONCRETE MASONRY

Based on **NZS 4210:2001**

Finishing	YES	N/A
Finishing tools on site	☐	☐
Curing or retarder type, eg water, spray film:		
Curing/retarder applied	☐	☐
Retarder required	☐	☐
Rain cover required	☐	☐
Frost protection required	☐	☐
Washdown area on site	☐	☐

Weather forecast checked	☐	☐

DECISION TO POUR	SCL person responsible: _____ Date: _____

TEST RESULTS	N/A	MPa	Pass	Fail
7 day	☐			
14 day	☐			
28 day	☐			

ANY CORRECTIVE ACTIONS REQUIRED:

NOTES

TECHNICAL PERMIT – SOLID FILLED CONCRETE MASONRY

Based on **NZS 4210:2001**

Method as defined by NZS 4210:2001 clause 2.11.6	**Key constraints**	**NZS 3604 timber framed buildings**	**NZS 4229 Concrete masonry buildings not requiring specific engineering design**	**NZS 4230 Design of reinforced concrete masonry structures**	**Selected method**
High lift grouting with expansive admixture clause 2.12 *Only allowed for 10 series blockwork to 0.4m height – clause 2.7.5(c)*	• maximum height 3.6m • semi continuous operation • consolidation during pour with mechanical immersion vibration or 16mmØ minimum rod • recompaction on completion post expansion by trowelling or weighted restraining board • Ensure horizontal construction joint flush with or no more than 20mm below top of masonry unit (preferably uppermost unit) – clause 2.16.1	complies	complies	if nominated as part of specific engineering design	Yes ☐ N/A ☐
High lift grouting without expansive admixture clause 2.13 *Not allowed for 10 series blockwork – clause 2.7.5(c)*	• maximum height 3.6m staged in series of 1.2m lifts at 15-60 minute intervals • semi continuous operation • consolidation during pour with mechanical immersion vibration • reconsolidation post completion • Ensure horizontal construction joint flush with or no more than 20mm below top of masonry unit (preferably uppermost unit) – clause 2.16.1	complies	complies	if nominated as part of specific engineering design	not allowed by Sparrow Construction
Low lift grouting clause 2.14 *10 series blockwork maximum lift 400mm – clause 2.7.5(c)*	• maximum height 1.2m [or 400mm where any dimension of grout space is < 50mm – for 10 series blockwork] • grout first lift • consolidate first lift with either immersion vibrator or 16mm rod • Ensure horizontal construction joint flush with or no more than 20mm below top of masonry unit (preferably uppermost unit) – clause 2.16.1 • prepare construction joint by cleaning the surface and removing all laitance and loose and foreign matter • repeat for subsequent lifts	complies	complies	if nominated as part of specific engineering design	not allowed by Sparrow Construction
High lift grouting with reduced compaction and without expansive admixture clause 2.15 *Not allowed for 10 series blockwork – clause 2.7.5(c)*	• maximum height 2.4m • continuous operation • consolidation during pour with mechanical immersion vibration • reconsolidation post completion at 15-60 minute intervals after finishing and top up with grout as required • Ensure horizontal construction joint flush with or no more than 20mm below top of masonry unit (preferably uppermost unit) – clause 2.16.1	complies	complies	if nominated as part of specific engineering design	not allowed by Sparrow Construction

Curing method – cover tops of grouted walls REQUIRED – *refer clause 2.11.5*

Table 2.E1 – Masonry durability requirements

Exposure categories		**Durability requirements**			
NZS 3604 zones	**NZS 3101 zones** (Note 1)	**Masonry units** (Note 2)	**Mortar** (Note 3)	**Classification built in components** (Note 4)	**Minimum cover to reinforcement** (Note 5)
Seaspray	B2	Exposed	M4	R4	30 (60)
1 & 4	B1	General purpose	M4	R3	20 (50)
2 & 3	A2	Protected	M3	R3	15 (45)
Closed interior	A1	Protected	M2	R1	5 (35)
Geothermal hotspot	U	Exposed	M4	R5	Specific engineering design consideration

NOTE –

(1) The NZS 3101 zones shall be as defined in section 5 of that Standard.

(2) These classifications are defined in AS/NZS 4456.10 for resistance to salt attack. The requirement is not needed for concrete masonry products.

(3) The requirements of the mortar to meet the classifications nominated in the table are given in 2.2.2.1 of this Standard.

(4) The classifications are defined in AS/NZ 2699:Part 1 Wall Ties, Part 2 Connectors and Accessories, Part 3 Lintel and shelf angles. A protection specification is given for the component which a manufacturer must meet and label the component to identify the level of corrosion protection.

(5) The cover is measured from the inside of the cell face of the unit. The figures in brackets are the approximate total cover to the outside face of the wall assuming a face shell thickness of 30 mm. Reinforcements shall be restrained so that the minimum covers are maintained during construction. Retaining walls shall be classed as B2 as specified in NZS 3101.

(6) When weatherproofed to the requirements of 2.21.2.2 – 2.21.2.5, Exposure Categories 1, 2, 3 & 4 (NZS 3604) or B1 & A2 (NZS 3101) can be reduced to "Closed Interior" or "A1".
When waterproofed to the requirements of 2.21.2.1 all exposure categories can be reduced to "Closed Interior" or "A1".

Construction

Product Data Sheet
Version no: 12/04 (reprinted 09/07)

Cavex

Expansion agent for masonry infill and grout injections

Positioning

Description	Cavex is an expansion agent containing a blend of aluminium powder and other ingredients and is used in cement grouting situations wherever a controlled expansion to compensate for water loss and plastic settlement is required. Cavex has been formulated for use in Portland cement grouts and masonry blockfill to provide expansion after placement of grout, before initial set occurs.
Uses	Cavex is ideal for all types of cement based grouts where a post placement volume increase of the wet mix is desirable to maintain adhesion to all adjacent surfaces. Applications range from neat cement/water grouts through to masonry blockfill. Typical uses are: • Ready mixed grout for blockwork, brickwork cavities. • Neat cement grouting for cable ducts, ground anchors, stabilisation work, etc. • Sand/cement mixes for grouting behind tunnel linings, pipe sleeves, etc.
Advantages	• Eliminates plastic settlement in the grouting mix. • Produces a controlled expansion before initial setting. As porous masonry blocks absorb water from the grout the plastic expansion maintains a contact pressure at the interface until the blockfill starts setting. The blockfill can then bond with the masonry unit to become a composite structure. • Provides improved bond between hardened masonry blockfill and both the reinforcement and inner surfaces of the masonry cells. • Provides a volume increase to wet mixes - helping to fill voids in tunnel linings, cable ducts, etc. • Eliminates the need for revibration - enabling grout lift height limitations to be relaxed, as allowed for in the NZ Masonry Filling Standards. • Produces a stable and plastic grout - prevents the upward movement of bleedwater which would otherwise become trapped underneath the lower faces of reinforcement and other projections.

Product Data

Form:	Powder
Colour:	Silver Grey
Storage & Shelf Life:	Six (6) months in unopened, original containers when stored in cool dry conditions below +25°C.
Packaging:	Cavex is supplied in 800g pots.

Technical Data

Chloride content:	Nil
TEA content:	Cavex does not contain triethanolamine (TEA)
Effect on setting:	None
Typical volume expansion of blockfill:	Approx. 4 - 5 % (Determined by measuring the rise of the upper level of blockfill in a glass cylindrical mould).
Application temp:	5°C to 30°C. Temperatures above 30°C will significantly increase volume change.
Suitability:	For all types of Portland cement based grouts and injections.
Compatibility with other Sika admixtures:	More effective when used in conjunction with water reducers. Retarders, accelerators or air entrainers should not be used without undertaking trials.
Dosage:	Ready Mixed Blockfill: Use 800g of Cavex for each m^3 of masonry blockfill.

Construction

Application Conditions

Instructions for use:

Ready Mixed Blockfill (Grout):

- Cavex should be added to the mix in the truck just prior to placement to ensure that the reaction period for the admixture is not exhausted before the grout is placed.
- Bring the blockfill mix back to the top of the bowl until it is easily accessible. Empty the predetermined dosage onto the surface of the mix.
- The mix should then be agitated for 5 minutes to ensure complete and thorough distribution of the Cavex has been achieved.

Site Batched Cement/Water Grouts and Injections:

- Wherever possible the required dosage of Cavex should be premixed with the gauging water just prior to the mixing of the grout. Alternatively the Cavex can be added directly to the dry cement of cement/sand mixture.
- The grout mixture must be continuously stirred prior to and during placement.

Important Notes

- Concrete masonry infill grouts should have a spread value greater than 450 mm before the introduction of Cavex.
- Specimens of blockfill for compressive strength testing must be prepared in moulds with a top plate that provides effective restraint to expansion. Compressive strength of specimens formed in these moulds is not significantly reduced.
- Expansion will not occur at temperatures below 5°C.
- All placing and consolidation work should be completed within 60 minutes at temperatures below 15°C and within 45 minutes at temperatures above 15°C.
- Restraint of plastic blockfill (containing Cavex) may be required along the top face of the blockwork to allow for effective expansion to occur.
- When using Cavex in a 'stacked block' system, it is important to ensure that the 'columns' of blocks at each end of the wall are well supported with props and braces (in the plane of the wall).

Notes

All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.

Local Restrictions

Please note that as a result of specific local regulations the performance of this product may vary from country to country. Please consult the local Product Data Sheet for the exact description of the application fields.

Safety Instructions

Protective Measures

- To avoid rare allergic reactions, we recommend the use of protective gloves. Change soiled work clothes and wash hands before breaks and after finishing work.
- Local regulations as well as health and safety advice on packaging labels must be observed.
- For further information refer to the Sika Material Safety Data Sheet which is available on request.
- If in doubt always follow the directions given on the pack or label.

Transport

Cavex has a dangerous goods classification for road transportation. Haz. Class 4.3, UN No.1396, Haz. Chem. 4[Y], Packing Group II.

Important Notes

- Residues of material must be removed according to local regulations. Fully cured material can be disposed of as household waste under agreement with the responsible local authorities.
- Detailed health and safety information as well as detailed precautionary measures e.g. physical, toxicological and ecological data can be obtained from the safety data sheet.

Legal Notes

Sika (NZ) Ltd
PO Box 19192
Avondale
Auckland
New Zealand

Phone: 0800 SIKA NZ 0800 745 269
Fax: 0800 SIKA FAX 0800 745 232
Email: info@nz.sika.com www.sika.co.nz