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PART 1 – GENERAL

1.1 REFERENCES

- .1 CSA Standards
 - .1 CSA A-179 Mortar and grout for unit masonry
 - .2 CSA A-371 Masonry for buildings
- .2 ASTM Standards
 - .1 C207 Standard Specification for Hydrated Lime for Masonry Purposes
 - .2 C270 Standard Specification for Mortar for Unit Masonry
 - .3 C1713 Standard Specification for mortar for the Repair of Historic Masonry
 - .4 C1707 Pozzolanitic Hydraulic lime for Structural Purposes
- .3 Documents from the *Institut de la Maçonnerie du Québec (IMQ)*
 - .1 Travaux de maçonnerie pour les bâtiments
 - .2 Bulletins techniques No 7-8R (Le mortier)
- .4 *Institut de recherche en construction (CNRC-NCR)*
 - .1 Solution constructive No 68

1.2 DOCUMENTS/SAMPLES/INFORMATION TO SUBMIT FOR APPROVAL

- .1 Submit the required technical data sheets and the samples conforming to section 01 33 00 – Documents and samples to submit
- .2 Submit three (3) samples of each mortar selected by the architect. The samples must be presented in the U-shaped plastic extrusions measuring 10 mm X 10 mm X 100 mm in length. The samples must be correctly identified.
- .3 Submit the product data sheet of each mortar or grout used. The document must include the product's characteristics, performance criteria and limits.
- .4 Submit two (2) copies of the material's safety data sheet (for each mortar or grout used).
- .5 No requests for equivalency will be accepted after the bid closing date.

1.3 PRE-EXISTING CONDITIONS

- .1 Identify the structural weaknesses that might cause problems and report them before commencing work.
- .2 Examine the joint profiles and the methods to reproduce them before repointing.

- .3 Examine the vertical and horizontal joints in order to determine which were done first and if they all have the same profile; also keep in mind the other execution details that define the authenticity of the original work.

1.4 HANDLING AND STORAGE

- .1 The bags of mortar and grout must be delivered in their original packaging with the legible identification of the manufacturer.
- .2 The mortar and grout bags must be stored on wooden pallets and protected against inclement weather.

1.5 WALL MOCK-UP

- .1 Build a wall mock-up with a minimum height and length of 1000 mm X 1000 mm.
- .2 Build a wall mock-up for each mortar and grout specified.
- .3 The wall mock-up should display what the final colour and texture of the joint will look like.
- .4 The wall mock-up must form an integral part of the works.
- .5 Do not start work until the wall mock-up have been approved by the architect.

1.6 PLACEMENT CONDITIONS

- .1 Cold weather placement during construction:
 - .1 -4 °C to +4 °C:
The mortar shall have a minimum temperature of +4°C and a maximum temperature of +50 °C.
 - .2 -7 °C to -4 °C:
 - 1- The mortar shall have a minimum temperature of +4°C and a maximum temperature of +50 °C.
 - 2 – Source heat shall be provided on both sides of the walls under construction
 - 3- Windbreaks shall be employed when the wind speed exceeds 25 km/h
 - .3 -7 °C and below:
 - 1- The mortar shall have a minimum temperature of +4 °C and a maximum temperature of +50 °C

2- Enclosures and supplementary heat shall be provided to maintain an air temperature above 0 °C

.2 Cold weather protection for completed masonry or section not in progress

- .1 0 °C to +4 °C: Masonry shall be protected from rain or snow for 48 hours
- .2 -4 °C to 0 °C: Masonry should be completely covered for 48 hours
- .3 -7 °C to -4 °C: Masonry shall be completely covered with insulating blankets for 48 hours
- .4 -7 °C and below: The masonry temperature shall be maintained above 0 °C for 48 hours by enclosure and supplementary heat.

.3 Minimum temperature of the element

- .1 The temperature of the element at the time of installation should not be below +4 °C

.4 Hot weather placement:

- .1 Cover the opening with a waterproof tarpaulin to prevent it from drying too quickly. Make sure to use a tarpaulin that does not stain.

.5 Mortar shall never be directly exposed to the sun or to high wind for a long period.

1.7 PROTECTIVE MEASURES

- .1 When the works are interrupted for a period of more than two (2) hours, the masonry work must be wrapped with waterproof tarps that do not stain. Unfinished masonry works must be wrapped with waterproof tarpaulins that do not stain. The tarpaulins must cover the walls and extend them by 600 mm on each side to protect the works against gusts of rain caused by wind until the works are completely finished.
- .2 Finished masonry works must be protected from mortar spatter by covering them with non-staining tarpaulins or polyethylene.
- .3 Protect the windows, frames, doors and sills from spatter or other damaging elements.

PART 2 – PRODUCTS

2.1 MATERIALS

- .1 Mortar and grout materials must be provided by the same supplier.
- .2 All mortar and grout must be manufactured in a plant where processes are certified ISO 9001:2015.
- .3 Portland Type GU Cement, conforming to standard CSA A-3000.
- .4 Hydraulic lime Type "S", conforming to standard ASTM C207 (2011).
- .5 Mortar should contain an air entraining admixture.
- .6 Sand: Fine-grain sand size conforming to table 1 of standard CSA A-179.
- .7 Water: Only use clean, potable water, free of contaminants such as oils, acids, salts, and organic matters
- .8 Pigments: Must be ASTM C979 compliant. Use only pigments distributed by Sika Canada Inc. The percentage of pigments should not exceed 10 % of the binder density.
- .9 It is strictly prohibited to use any type of additive to alter the setting time, workability, or any other property of the plastic or cured mortar.

2.2 TYPES OF MORTAR

- .1 All mortars described hereafter are low-compressive strength mortars and are manufactured by the company Sika Canada Inc.
- .2 Each type of mortar must be factory pre-blended with the raw materials, and then mixed with water at the construction site according to the manufacturer's instructions.
- .3 For each type of mortar:
 - **Low to medium** compressive strength is considered for regular walls
 - **Medium to high** compressive strength is considered for parapets, chimneys, foundation walls, retaining walls or stairs.
- .4 **For structures built before 1900:**

Installation of elements requiring low to medium compressive strength: Use a mortar formulated with hydraulic lime such as King®HLM-500

Installation of elements requiring medium to high compressive strength: Use a mortar formulated with hydraulic lime such as King® HLM-500

Repointing requiring low to medium compressive strength: Use a mortar formulated with hydraulic lime such as King® HLM-350

Repointing requiring medium to high compressive strength: Use a mortar formulated with hydraulic lime such as King® HLM-500

- .5 **For structures built between 1900 and 1940:**

Installation of elements requiring a low to medium compressive strength: Use a mortar formulated with hydraulic lime such as King® HLM-500 mortar, or with Portland cement and type S lime such as King® MasonMix.

Installation of elements requiring medium to high compressive strength: Use a mortar formulated with Portland cement and type S lime such as King® MasonMix 600

Repointing requiring low to medium compressive strength: Use a hydraulic lime-based mortar such as King® HLM-350 or a Portland cement and type S lime mortar such as King® MasonCare 300 or King® MasonCare 1258.

Repointing requiring medium to high compressive strength: Use a mortar formulated with hydraulic lime such as King® HLM-500

- .6 **For structures built between 1940 and 1975:**

Installation of elements requiring low to medium compressive strength: Use a mortar formulated with hydraulic lime such as King® HLM-500 mortar, or with Portland cement and type S lime such as King® MasonMix

Installation of elements requiring medium to high compressive strength: Use a mortar formulated with Portland cement and type S lime such as King® MasonMix 600

Repointing requiring low to medium compressive strength: Use a type O mortar formulated with Portland cement and type S lime such as King® MasonCare 300, or King® MasonCare 1258

Repointing requiring medium to high compressive strength: Use a mortar formulated with hydraulic lime such as King® HLM-500 or with Portland cement and type S lime such as King® MasonMix 600

.7 For structures built after 1975:

Installation of elements requiring low to medium compressive strength: Use a mortar formulated with Portland cement and type S lime such as King® 1-1-6

Installation of elements requiring medium to high compressive strength: Use a mortar formulated with Portland cement and type S lime such as King® 2-1-9

Repointing requiring low to medium compressive strength: Use a type O mortar formulated with Portland cement and type S lime such as King® MasonCare 300, or King® MasonCare 1258

Repointing requiring medium to high compressive strength: Use a mortar formulated with Portland cement and type S lime such as King® 1-1-6, or King® 2-1-9

2.3 TYPES OF GROUT

NOTE: All grouts mentioned hereafter are for filling voids that appear over time. In case of doubt, it is essential to consult a structural engineer.

.1 All grouts mentioned hereafter are low-compressive-strength grouts and are manufactured by Sika Canada Inc.

.2 It is strictly prohibited to use mortar as grout.

.3 For each type of grout, the raw materials are mixed in the factory and then mixed with the water on site according to the manufacturer's instructions.

.4 For structures built before 1900:

Use a hydraulic-lime-based grout such as King® HL-5.

.5 For structures built between 1900 and 1975:

Use a hydraulic lime-based grout such as King® HL-5, or a Portland cement and type S lime-based grout such the King® RPL-6

.6 For structures built after 1975:

Use a Portland cement and type S lime-based grout, such as the King® RPL-6 or King® RPL-20

PART 3 – EXECUTION

3.1 PREPARATORY WORKS

- .1 Prepare the surface to be repaired in order to remove loose particles and faulty mortar on a thickness corresponding at least to twice the thickness of the joint to be repaired or up to obtaining a healthy mortar. During the works described hereafter, the contractor-mason must be very diligent to prevent any damage to the stone, or the biscuit and the edge of the brick.
- .2 Verify the state of the joints and remove deteriorated mortar using one of the following methods:
 - .1 Using a chisel, either by hand or attached to a compressed air cannon, apply a light pressure so as not to damage the masonry unit.
 - .2 Using a radial saw (with a 100 mm-diameter diamond blade) for the horizontal joints. However, this can only be done by experienced workers who are recognized for their ability to do this kind of work. If this is the case, then only drill at the centre of the joint and finish the job using a chisel.
 - .3 Remove the waterproofing product around the edge of the openings (doors, windows, etc.) in order to be able to re-point as much of the surface as possible.
 - .4 Determine whether or not the voids need to be refilled.
 - .5 Before repointing, the contractor must inform the architect if he/she finds any voids that are not specified on the plans and are structurally abnormal.

3.2 MIXING THE MORTAR

Important: In order to avoid segregation issues, always mix the total content of one bag. If less than 30 kg is required, dry mix - without water – the total contents of the bag in a clean container, take the required amount, and then add water to the amount withdrawn from the mixture

- .1 Mix the mortar using a clean mortar mixer or an electric drill fitted with an appropriate and clean mixing paddle (exempt of dried mortar, traces of rust and other contaminants); do not thaw

equipment with salt or other anti-freeze agents.

.2 Conformity: Comply with the requirements, recommendations and specifications indicated on the manufacturer's product data sheet.

.3 For repointing mortars, mix the mortar until you get a consistency that's firm enough to form a ball with your hands. If using King® MasonCare 300, let the material rest for about 30 minutes before applying.

.4 The total mixing time should not take less than three (3) minutes or longer than five (5) minutes. Coloured mortar should be mixed between 8-10 minutes.

3.3 MIXING THE GROUT

Important: In order to avoid segregation issues, always mix the total content of one bag. If less than 30 kg is required, dry mix - without water – the total contents of the bag in a clean container, take the required amount, and then add water to the amount withdrawn from the mixture

.1 Mix the grout using an electric drill fitted with an appropriate and clean mixing paddle (exempt of dried mortar or traces of rust and other contaminants) or using a conventional grout mixer. If using King® HL-5 grout, use a high-shear mixer. Do not thaw equipment with salt or other anti-freeze agents.

.2 Conformity: Comply with the requirements, recommendations and specifications indicated on the manufacturer's technical data sheet.

3.4 PLACEMENT TIMEFRAME FOR MORTAR AND GROUT

.1 Mortar: If room temperature is equal to or greater than +25 °C, mortar must be placed in under 1 h 30 min after mixing. If room temperature is less than +25 °C, mortar must be placed in under 2 h 30 min hours after mixing.

.2 Grout: Grout must be placed in under 1 h 30 min after mixing.

3.5 REMIXING

.1 With the exception of hydraulic-lime-based mortars, remixing is done to ensure the necessary workability of the mortar.

.2 Once the desired consistency is obtained, it is not recommended to add water to the colored mortars in order to compensate for the loss of water caused by evaporation. Adding water could affect the final color of the product.

3.6 REPOINTING

- .1 Use potable water to wash off all dust and residue from the exposed joints.
- .2 Leave a bit of moisture in the existing joints to prevent water from absorbing too quickly into the old and pre-existing mortar.
- .3 Apply a first layer of mortar in the joints in a manner to obtain a uniform depth (± 25 mm) using a pointing trowel to fill in the joints; once this layer has cured (24 h), apply successive layers of 6 mm. Make sure each layer is well compacted to prevent air pockets, and allow each layer to lightly cure before applying the next one, until you are level with the wall surface. Finish the new joints in the same way as the original ones.
- .4 For joints of 25 mm and less, repoint with several successive layers of approximately 6mm, leaving slightly to harden between each layer. The layers of mortar are applied wet on wet. If work is interrupted, moisten the joint again before resuming work
- .5 For joints of 25 mm and more, apply a first layer of mortar (± 25 mm) in the joints so as to obtain a uniform depth and create a rough finish. Wait 24 hours before continuing to repoint in successive layers of approximately 6 mm. Compact well to avoid air pockets and allow to harden slightly between each layer, until reaching flush with the facing surface.

3.7 COLOUR UNIFORMITY

- .1 In order to ensure colour uniformity of the mortar, the contractor must:
 - .1 Use the same supplier for all mortar and grout.
 - .2 Once the desired consistency is obtained, it is not recommended to add water to the colored mortars to compensate for the loss of water caused by evaporation. Adding water could affect the final color of the product.
 - .3 Ensure that the quantity of water in the mortar joints remains the same while smoothing them.
 - .4 Always use a clean mixer.

3.8 CURING

- .1 Curing is essential to optimize the physical properties of mortar.
- .2 Curing must be done using a moist cure starting with the initial setting of the mortar.
 - .1 During working hours, spray the mortar lightly with water using a sprayer.

- .2 After working hours and on weekends, create a system whereby the mortar is enclosed with a jute, which is in turn enclosed by polyethylene, and constantly moist it so that it remains humid creating a greenhouse effect. If needed, please refer to the document: ***How to perform a moist cure for masonry***, published by Sika Canada Inc. and available on our [Website](#).
- .3 The jute and polyethylene should never come in direct contact with the mortar. Leave a minimum space of 100 mm (4 in) between the jute and the wall surface to allow air to circulate.
- .4 The curing period should last 3 to 7 days.

3.9 CLEANING

- .1 Once the work is finished, remove the excess mortar using a wooden pallet. Once the mortar has hardened sufficiently, the contractor must:
 - .1 Starting at the bottom, moisten the siding with clear water;
 - .2 Starting from the top, rub the siding with water and a nylon bristle brush;
 - .3 Unless otherwise advised by the architect, the use of acid in any form is prohibited.
 - .4 If the use of cleaning product is necessary, contact the product manufacturer to validate the compatibility of the product and the procedure to follow. The coloured mortars manufactured by Sika Canada Inc. contain iron and/or titanium oxides
 - .5 Regardless of the technique or product selected, it is essential to preserve the integrity of the mortar
 - .6 Proceed with a witness section of 2000 mm high X 2000 mm long minimum.
 - .7 Wait for approval of the cleaning control zone by the professional responsible for the project before proceeding with the entire building.

END OF SECTION