

# MasterRoc<sup>®</sup> SA 193

Alkali-free, liquid high performance set accelerator for sprayed concrete

## Material Description

MasterRoc SA 193 is a high-performance, suspension type alkali-free set accelerator for sprayed concrete. The dosage can be varied to the desired setting and hardening requirements.

## Areas of Application

- Temporary and permanent ground support in tunneling and mining
- Slope stabilization
- Also suitable for acceleration of cementitious grouts, such as for annulus grout in TBM tunnels, cemented ground injection and foam concrete.
- All applications where high early strength, high final strength, very large layer thickness in a single application are required

## Characteristics and Benefits

MasterRoc SA 193 is ideally suited for wet mix sprayed concrete for ground support:

- The quick setting property allows rapid work progress and the ability to construct thick sprayed concrete linings via layered application during one construction sequence.
- The unique product formulation provides fast setting, continuous early-age strength development high durability and good long-term strength.
- Very low dust generation during application and therefore a good working environment.
- Possibility of low rebound applications when using the correct nozzle angle and distance.
- Non-aggressive properties provide improved working safety, reduced environmental impact and lower handling costs.
- Alkali-free
- Chloride free: no impact on reinforcement steel

## Packaging

MasterRoc SA 193 is typically supplied in 200 liter drums, 1000 liter containers or in bulk.

## Technical Data

Form		Suspension
Color		Beige to White
Density (+20 °C)	g/ml	1.46 ± 0.03
pH value		3.2 ± 0.5
Viscosity <sup>1)</sup>	mPa.s	appr. 500
Thermal stability	°C	+5 °C to +35 °C
Chloride content	%	<0.10
Na <sub>2</sub> O Equivalent	%	<1 %

1) Brookfield, + 20 °C. Viscosity is dependent on degree of product agitation and temperature; typical variation ±40%. Suspensions show a thixotropic behaviour after storage.

## Application Procedure

The substrate should be clean and free from loose particles and preferably damp.

It is recommended to use only fresh cement as the age of the cement can have a negative influence on the setting characteristics of the mix.

Set accelerators can be sensitive to the type of cement and are also influenced by mix design. With some cements the setting characteristics can be too slow.

We recommend the use of reactive cements and testing of system performance beforehand according to the below table. MasterRoc SA 193 also works well with composite cement types (blended cements, fly-ash/slag). In all cases, it is strongly recommended to carry out preliminary tests to check Vicat setting and the 24 h strength of the cements planned for use in a project.

Evaluation of setting and 24 h strength can be carried out on a test in accordance with EFNARC European Specification for Sprayed Concrete (1996), Appendix 1, Clause 6.3. (w/c+b ratio is 0,35; accelerator dosage in the average typical range)



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The following results should be taken as a performance guide only:

Initial set	Final set	24 h strength	Rating
< 2 min	< 6 min	> 15 N/mm <sup>2</sup>	good
2- 5 min.	8-13 min	10-15 N/mm <sup>2</sup>	OK
> 5 min	> 13 min.	< 10 N/mm <sup>2</sup>	poor

Site spray trials are recommended to get confirmation of the performance.

## Concrete Mix

When MasterRoc SA 193 is used for wet mix spraying, the w/c+b ratio should be below 0.5 and preferably <0.45. When targeting extremely high early strength, 0.40 or lower. The lower w/c+b ratios provide faster setting, higher early strength, better durability, lower accelerator dosage and thicker layers can be applied overhead. Please contact your local Master Builders Solutions technical representative for further assistance with testing and mix design. A wide range of Master Builders Solutions admixtures is compatible with MasterRoc SA 193 and allows a adjustment of all fresh concrete properties.

## Dosing System

MasterRoc SA 193 is added at the nozzle. It is essential to have a constant and accurate dosage of accelerator into the concrete stream. To ensure quality sprayed concrete, follow the pump selection guidelines given below:

Works very well with:

- Mono pumps (progressing cavity, stator / rotor pumps)
- Peristaltic hose pumps (Bredel)

The required dosage (flow) shall be checked frequently.

Should not to be used with:

- Piston or gear pumps
- All pumps with ball and seat valves
- Pressure tanks

Do not use a filter in the suction hose as this causes obstructions. Preferably the material should be drawn from the bottom of the drum/container.

## Compatibility with Other Accelerators

MasterRoc SA 193 can be interchanged with most of Master Builders Solutions alkali-free accelerators. For advice, please contact your local Master Builders Solutions representative.

Do not mix or interchange MasterRoc SA 193 with any type of accelerator produced by another manufacturer, as this can cause immediate clogging of dosing pumps and hoses.

## Consumption

The consumption of MasterRoc SA 193 also depends on the w/c+b ratio, temperature conditions (concrete and ambient), cement reactivity and on required layer thickness, setting time and early strength development. The consumption is normally in the range of 3 to 10 % of binder weight.

Overdosing (typically > 10 %) may result in a decreased final strength compared to moderately accelerated sprayed concrete. In case that an excessive dosage is needed, the impact on the strength shall be evaluated.

## Cleaning of Dosage Pump

Before longer standstills the dosing pump and other parts of the system must be thoroughly cleaned with plenty of water. Failure to do so provokes blockages in the dosing system when next used. Make sure that all operators involved in testing and application are fully informed.

## Storage and Shelf Life

- Must be stored between +5 °C to +35 °C (optimum temperature for storage and performance +20 °C).
- Must be kept in closed containers made of plastic, glass fiber or stainless steel.
- Must not be stored in normal steel containers.

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- If stored in tightly closed original containers under the above conditions, it has a shelf life of 6 months. Periodical remixing can extend the shelf life further.
- Please contact your local Master Builders Solutions representative prior to the use of any product that has been frozen.
- After prolonged storage, performance testing should always be carried out before use.
- For the storage in bulk tanks the use of agitation and / or circulation systems is highly recommended.
- After prolonged storage or transport we recommend to fully agitate it prior to use by mechanical stirring or re-circulation pumping.

## Safety Precautions

The same precautions as with handling and use of cementitious products should be observed. Avoid eye and skin contact and wear rubber gloves and safety glasses. If contact occurs, rinse with plenty of water. In case of eye contact seek medical advice. For further information, refer to the Material Safety Data Sheet or contact your local Master Builders Solutions representative .

## Disclaimer

The information given here is true, represents our best knowledge and is based not only on laboratory work but also on field experience. However, because of numerous factors affecting results, we offer this information without guarantee and no patent liability is assumed. For additional information or questions, please contact your local representative.

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