



Instructions for the use and maintenance of concrete surfaces treated with MasterSeal 6100 FX.

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1. Definitions.

Construction Products Directive Guidance Paper F: DURABILITY AND THE CONSTRUCTION PRODUCTS DIRECTIVE.

Working life (works) - the period of time during which the performance of the works will be maintained at a level compatible with the fulfilment of the essential requirements.

Working life (product) - the period of time during which the performance of a product will be maintained at a level that enables a properly designed and executed works to fulfil the Essential Requirements (i.e. the essential characteristics of a product meet or exceed minimum acceptable values, without incurring major costs for repair or replacement).

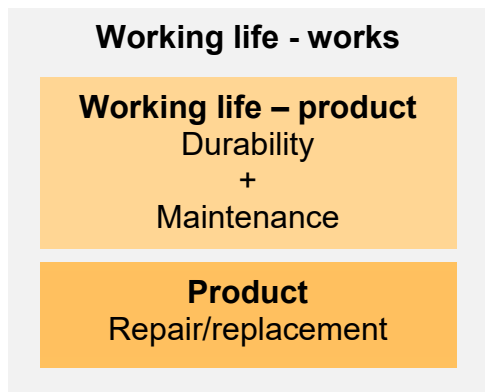
The working life of a product depends upon its inherent durability and normal maintenance.

Durability of a product - the ability of a product to maintain its required performance over a given or long time, under the influence of foreseeable actions. Subject to normal maintenance, a product shall enable a properly designed and executed works to fulfil the Essential Requirements for an economically reasonable period of time (working life of the product).

EN 15643-5 Sustainability of construction works –Sustainability assessment of buildings and civil engineering works– Part 5: Framework on specific principles and requirement for civil engineering works.

Durability: the ability to maintain the required technical performance throughout the service life subject to specified maintenance, under the influence of foreseeable action taken into account in the scenarios.

- Foreseeable actions are related to “normal” agents that could be expected to act on the works or parts thereof. Potential degradation agents include, for example, temperature, humidity, water, UV radiation, abrasion, chemical attack, biological attack, corrosion, weathering, frost, freeze–thaw and fatigue.



Maintenance: *The combination of all technical and associated administrative actions during the service life to retain a civil engineering works or an assembled system (part of works) in a state in which it can perform its required functions*

- *Maintenance includes cleaning, servicing, repainting, replacing parts of the civil engineering works where needed, etc. (Construction Products Directive Guidance Paper F).*
- *(Adapted from the definition in ISO 15686-1:2011, ISO 6707-1:2014 and in Construction Products Directive Guidance Paper F).*

2. Quality Control.

MasterSeal 6100 FX meets the performance requirements of EN 1504: *Products and Systems for the protection and repair of concrete structures. Definitions, requirements, quality control and evaluation of conformity. Part 2: Surface protection systems for concrete* and has CE certification according to Annex ZA Attestation of conformity system type 2+.

The manufacturing process of MasterSeal 6100 FX is quality controlled by a Factory Production Control Plan according the requirements of EN 1504 part 2 to ensure that the requirements for consistency in quality and performance are maintained.

To ensure optimal technical performance and durability of the applied membrane, the installation procedures indicated in the Technical Data Sheet must be followed carefully. Considering the need to maintain the waterproofing and protection performance of MasterSeal 6100 FX, the thickness and hardening conditions of the membrane require special attention.

Annex 1 provides an Inspection Point Plan as a guide of procedures and processes that need to be inspected and monitored during the application of MasterSeal 6100 FX to ensure correct installation and conditions for long-term durability.

3. Use.

MasterSeal 6100 FX can be applied both indoors and outdoors, be exposed to sunlight, humidity, and be permanently immersed. Under these conditions the technical performance of the product must be maintained to a degree where the protection and waterproofing capacity meets or exceeds functional requirements.

During the entire service life of MasterSeal, care must be taken to avoid actions that can limit the protection and waterproofing capacity (elasticity and crack bridging) and the integrity of the membrane due to chemical, mechanical or environmental influences. In particular:

- MasterSeal 6100 FX cannot be exposed to acidic substances or solvents as the membrane would suffer irreversible damages that would limit functionality.
- Direct impacts and abrasion must be limited or preferably avoided to reduce wear and loss of thickness of the membrane
- In case of fire, the membrane will be immediately inspected, and their properties evaluated according to the check list in Annex 2.

4. Inspection.

4.1 Frequency:

Surfaces treated with MasterSeal 6100 FX should be cleaned and inspected one year after the application of the membrane and later at least once every 3 years.

4.2 Check lists:

Annex 2 provides a check list as a guide of procedures and processes that need to be controlled or inspected during the periodical or exceptional inspections of structures waterproofed or protected with MasterSeal 6100 FX. It also gives indication of minimum accepted performance and when repair measures are required.

In particular, for the waterproofing seal and concrete protection performance of MasterSeal 6100 FX to be maintained, thickness and surface condition, especially abrasion, damage or reflective cracks on the membrane must be reported in detail.

4.3 Corrective measures after the inspection:

When damage or deterioration of the membrane is detected during the inspection (periodical or exceptional) it is mandatory to proceed with the repair of the damage within a period not longer than 2 months to avoid further deterioration that could lead to longer downtimes and more expensive refurbishment work.

5. Maintenance.

When determined after an inspection (periodical or exceptional) the affected surface shall be repaired according to the following instructions:

5.1 Cleaning Procedure:

- Choose a user-friendly, non-toxic, PH neutral detergent.
- Use a water jet in combination with the selected detergent. It is important that the water pressure shall not exceed 80 bar and turbo/rotating tips must be avoided! Fan tips are recommended for safer cleaning applications.
- Warm water (<40 C) can be used for efficient cleaning.
- Keep the gun at a distance >30 cm.
- Once the area has been cleaned, rinse the entire surface thoroughly with clean water to remove any detergent residue
- Air dry or use compressed air if completely dry and free of oil.

5.2. Repair Procedures:

5.2.1 Crack injection

Concrete possesses a natural tendency to crack which can be influenced by one or many factors including choice of materials, design, construction methods, service loads and exposure conditions. Cracks occur when forces or chemical changes act on or within a structure and are greater than it can withstand.

Although MasterSeal 6100 FX is specifically designed to bridge cracks in the substrate, wider cracks (with an opening wider than the one the membrane could tolerate), may become visible on the membrane surface.

Prior to proceeding with a crack repair by epoxy injection the cause and the structural repair requirements must be determined and the movement stabilized. Cracks caused by corroding reinforcing steel should not be repaired by epoxy injection because corrosion will continue and cause new cracks to appear.

Cracks can also be the result of bad design of the expansion joints. Expansion joints should be reconstructed and sealed using the correct joints sealant or joint tapes from MasterSeal product range.

Stabilized cracks should be repaired with MasterInject 1360 injection resin to fill and seal cracks and voids of concrete elements. Cracks which are exposed to small movements should be repaired with MasterInject 1330, flexible injection resin.

For more detailed injection procedures follow the instructions in the latest version of the Technical Data Sheet and/or Method Statement. For horizontal surfaces self-levelling resins are not recommended.

5.2.2 Patch Repair

For large, extensive failures, remove and replace the entire membrane. For small, local failures patch repair remains the most effective solution to sustain the surface integrity of the MasterSeal 6100 FX system.

The following repair procedure should be followed for patch repairs:

- Outline the area of the membrane to be repaired and then cut to the concrete substrate using a suitable masonry cutting disk.
- The failed membrane and the primer beneath must be removed using a paint scraper or other suitable equipment.
- The perimeter of the repair area shall be assessed for sufficient adhesion of at least 1.0 MPa and an average value of >1.5 MPa.
- Grind all outline edges of the repair area using 60 – 80 grit oxide discs for an overlap distance of at least 10 cm from the edge of the repair area.
- All exposed concrete surfaces shall be thoroughly prepared to a CSP3 to CSP5 surface profile.
- All repair areas shall be masked off using duct tape.
- Hand apply MasterSeal 6100 FX to the prepared surface by following the described procedures in relevant sections of the technical data sheet.
- Remove the masking tape immediately after membrane application.
- Adhere to the curing and overcoating times given in the technical data sheet.

5.2.2 Overcoating the existing membrane

Regular inspections are crucial for confirming the performance of MasterSeal 6100 FX systems.

Check the total thickness of the system and ensure that a sufficient layer thickness of at least 1,8 mm is available. If the membrane thickness has been reduced, recoat the areas concerned with MasterSeal 6100 FX.

- Clean the relevant surface as described in section 5.1 to remove all foreign matter which may hinder surface bonding.
- Hand or spray apply MasterSeal 6100 FX to the cleaned surface by following the described procedures in relevant sections of the technical data sheet to return the total layer thickness to minimum 2 mm.

6. Reporting.

This document has been developed to assist owners with regular maintenance, operation, and inspection activities and includes checklists to support the documentation of the results and findings. Every inspection and all maintenance work should also include pictures documenting details and the condition of the membrane. Maintenance works shall be documented and recorded to include information about the materials used, the repair measures, the contact information of the company carrying out the work and shall be kept for future reference.

In the Operation and Maintenance phase of an existing structures there are many systems available to manage files and data.

Although integration of maintenance management in BIM can support maintenance processes, decisions and planning increasing efficiency, current practices often do not integrate these systems and the unformatted data is still manually processed, stored and distributed.

The use of a BIM model can assist facility managers in the scheduling of tasks, managing down times and documentation of the facility throughout its entire service life. The implementation of BIM models with related information of facilities maintenance is thus highly recommended.

Annex 1
Inspection Point Plan

Inspection & Maintenance Program (I&M)	<name of company>	MasterSeal 6100 FX
Jobsite	<name or description of job>	
Description of works	Finishing Job Inspection MasterSeal 6100 FX	
Surface size (m ²)		
Job finishing date		

		EVALUATION				
Acceptance criteria		Method / Equipment	Frequency of control	Yes	No	Comments
Cleaning	Clean the whole surface with low pressure water. Surface is free of dust, dirt and any other substances.	Visual	All applied surface			
Visual Inspection	Document condition of finished membrane A set of pictures is delivered including general and detail views of the jobs done. An element to establish the real size of the job has to be included in the picture.	Pictures	1 every individual element applied (wall, floor) or 1 every 100m ²			This documentation will be the basis for inspections after 1 year
Continuity of membrane	Colour of the membrane Colour is homogeneous. No strips or areas where different colours suggest lack of consumption. There are not installations that require anchorings or drills that Document installations done after the application have penetrated the membrane and have interrupted its continuity.	Visual / Magnifying lens	All applied surface			Repair the affected surface following the instructions of the "MasterSeal 6100 FX"
Optional	Adhesion There are no signs of peeling. Adhesion Minimum: ≥ 1.0 N/mm ² . Substrate cohesive failure Dry Thickness Membrane minimum 1.9 mm	Visual / Magnifying lens Pull-off adhesion tester Non destructive testing (N)	All applied surface 1 every individual element applied (wall, floor) or 1 every 100m ² At least 3 tests At least 3 tests			Repair the affected surface following the instructions of the "MasterSeal 7000 CR Application Manual" Repair the affected surface following the instructions of the "MasterSeal 7000 CR Application Manual" Repair the affected surface following the instructions of the "MasterSeal 7000 CR Application Manual"

Inspection Points Program (IPP)	<name of company>	Applied products	MasterSeal 6100 FX
Jobsite	<name or description of job>		
Description of works	Application of MasterSeal 6100 FX		
Surface size (m ²)			

		EVALUATION						
Application Conditions	Acceptance criteria	Method / Equipment	Frequency of control	Yes	No	Comments	Date	Signature
Substrate temperature	+5 < t < +35 °C	Thermometer	During application					
Air temperature	+5 < t < +35 °C	Thermometer	During application					
Surface humidity	Damp without standing water	Visual	1 each day			If not, pre-wet the surface		
Rain	No rain within the first 24 hours or protected	Visual	During application					
	Clean container	Visual	1 each day					
	Water dosage: 5,6 to 6,2 liters/bag	Graduated cylinder	All bags					
Mixing of product	Mixed with handheld electric mixer at a low speed (max. 400 rpm) for at least 90 seconds.	Visual	All bags					
	Measuring time 1 - 2 minutes	Visual	All bags					
	Homogeneous colour and viscosity of the mix	Visual	All bags					
Application: 1st layer	With brush or spray equipment. Homogeneous	Visual	1 every individual element applied (wall, floor)					
Consumption 1st layer	Minimum 1 kg of mixed product (0.75 kg powder/m ²); Maximum 1,2 kg of mixed product (0.9 kg powder/m ²)	Calculated average	1 every individual element applied (wall, floor)					
Thickness 1st layer	Minimum 0,8 mm	Thickness gauge on fresh membrane	1 every individual element applied (wall, floor) or 1 every 100m ²					
Hardening 1st layer	Homogeneous, no pinholes, bubbles etc	Visual	1 every individual element applied (wall, floor)					
Hardening (recoating)	Waiting time between 2 and 5 hours	Watch	1 every individual element applied (wall, floor)					
Application 2nd layer	With brush or spray equipment. Cross-cut to first layer. Homogeneous	Visual	1 every individual element applied (wall, floor)					
Consumption 2nd layer	Minimum 1,2 kg of mixed product (0,9 kg powder/m ²); Maximum 1,5 kg of mixed product (1,1 kg powder/m ²)	Calculated average	1 every individual element applied (wall, floor)					
Thickness 2nd layer	Minimum 1,2 mm	Thickness gauge on fresh membrane	1 every individual element applied (wall, floor) or 1 every 100m ²					
Hardening 2nd layer	Fog-spray in case of hot or excessive drying conditions	Visual	1 every individual element applied (wall, floor)					
	Homogeneous, no pinholes, bubbles etc	Visual	1 every individual element applied (wall, floor)					

Annex 2

Inspection & Maintenance Program (I&M)

Inspection & Maintenance Program (I&M)		<name of company>		MasterSeal 6100 FX				
Job site	<name or description of job>	Applied products						
Description of works		Finishing Job Inspection MasterSeal 6100 FX						
Surface size (m ²)								
Job finishing date								
EVALUATION								
	Acceptance criteria	Method / Equipment	Frequency of control	Yes	No	Comments	Date	Signature
Cleaning	Clean the whole surface with low pressure water. Surface is free of dust, dirt and any other substances.	Visual	All applied surface					
Visual Inspection	Document condition of finished membrane	A set of pictures is delivered including general and detail views of the job site. An element to establish the real size of the job has to be included in the picture.	Pictures	1 every individual element applied (wall, floor) or 1 every 100m ²		This documentation will be the basis for inspections after 1 year		
Visual Inspection	Colour of the membrane	Colour is homogeneous. No strips or areas where different colours suggest lack of consumption.	Visual	All applied surface				
Continuity of membrane	Document installations done after the application	There are not installations that require anchorings or drills that have penetrated the membrane and have interrupted its continuity.	Visual	All applied surface		Repair the affected surface following the instructions of the "MasterSeal 6100 FX"		
Continuity of membrane	Continuity of membrane	No cracks, no bubbles, no pores	Visual / Magnifying lens	All applied surface		Repair the affected surface following the instructions of the "MasterSeal 7000 CR Application Manual"		
Optional	Adhesion	There are no signs of peeling.	Visual	1 every individual element applied (wall, floor) or 1 every 100m ²		Repair the affected surface following the instructions of the "MasterSeal 7000 CR Application Manual"		
Optional	Adhesion	Minimum $\geq 1,0 \text{ N/mm}^2$; Substrate cohesive failure	Pull-off adhesion tester	At least 3 tests		Repair the affected surface following the instructions of the "MasterSeal 7000 CR Application Manual"		
Optional	Dry Thickness	Membrane minimum 1,9 mm	Non destructive testing (N)	At least 3 tests				

Inspection & Maintenance Program (I&M)	<name of company>	MasterSeal 6100 FX
Jobsite	<name or description of job>	Applied products
Description of works	Finishing Job Inspection MasterSeal 6100 FX	
Surface size (m ²)		
Job finishing date		

EVALUATION						
	Acceptance criteria	Method / Equipment	Frequency of control	Yes	No	Comments
Cleaning	Clean the whole surface with low pressure water. Surface is free of dust, dirt and any other substances.	Visual	All applied surface			
Visual inspection	Document condition of finished membrane A set of pictures is delivered including general and detail views of the jobs done. An element to establish the real size of the job has to be included in the picture.	Pictures	1 every individual element applied (wall, floor) or 1 every 100m ²			This documentation will be the basis for inspections after 1 year
Visual inspection	Colour of the membrane Colour is homogeneous. No strips or areas where different colours suggest lack of consumption.	Visual	All applied surface			
Continuity of membrane	Document installations done after the application There are not installations that require anchorings or drills that have penetrated the membrane and have interrupted its continuity.	Visual	All applied surface			Repair the affected surface following the instructions of the "MasterSeal 6100 FX"
Continuity of membrane	Continuity of membrane No cracks, no bubbles, no pores	Visual / Magnifying lens	All applied surface			Repair the affected surface following the instructions of the "MasterSeal 7000 CR Application Manual"
Adhesion	Adhesion There are no signs of peeling.	Visual	1 every individual element applied (wall, floor) or 1 every 100m ²			Repair the affected surface following the instructions of the "MasterSeal 7000 CR Application Manual"
Adhesion	Adhesion Minimum: ≥ 1,0 N/mm ² . Substrate cohesive failure	Pull-off adhesion tester	At least 3 tests			Repair the affected surface following the instructions of the "MasterSeal 7000 CR Application Manual"
Dry Thickness	Dry Thickness Membrane minimum 1.9 mm	Non destructive testing (N)	At least 3 tests			

Inspection & Maintenance Program (IM)	<name of company>	MasterSeal 6100 FX
Jobsite	<name or description of job>	
Description of works	Finishing Job Inspection MasterSeal 6100 FX	
Surface size (m ²)		
Job finishing date		
Applied products		

		EVALUATION						
	Acceptance criteria	Method / Equipment	Frequency of control	Yes	No	Comments	Date	Signature
Cleaning	Clean the whole surface with low pressure water / Surface is free of dust, dirt and any other substances.	Visual	All applied surface					
Visual inspection	Document condition of finished membrane A set of pictures is delivered including general and detail views of the jobs done. An element to establish the real size of the job has to be included in the picture.	Pictures	1 every individual element applied (wall, floor) or 1 every 100m ²			This documentation will be the basis for inspections after 1 year		
Continuity of membrane	Colour of the membrane Colour is homogeneous. No strips or areas where different colours suggest lack of consumption. Document installations done after the application There are not installations that require anchorings or drills that have penetrated the membrane and have interrupted its continuity.	Visual	All applied surface			Repair the affected surface following the instructions of the "MasterSeal 6100 FX"		
Optional	Continuity of membrane Adhesion Adhesion Dry Thickness No cracks, no bubbles, no pores There are no signs of peeling. Minimum: ≥ 1,0 N/mm ² . Substrate cohesive failure Membrane minimum 1,9 mm	Visual / Magnifying lens Visual Pull-off adhesion tester Non destructive testing (N)	All applied surface 1 every individual element applied (wall, floor) or 1 every 100m ² At least 3 tests At least 3 tests			Repair the affected surface following the instructions of the "MasterSeal 7000 CR Application Manual" Repair the affected surface following the instructions of the "MasterSeal 7000 CR Application Manual" Repair the affected surface following the instructions of the "MasterSeal 7000 CR Application Manual"		