

MasterSeal M 689

A high elastic, ultra-fast curing, spray applied 100% polyurea membrane for use in waterproofing applications

MATERIAL DESCRIPTION

MasterSeal M 689 is a solvent free, two-component waterproofing membrane. It is highly reactive and can only be applied by special two-component hot spray equipment.

FIELDS OF APPLICATION

MasterSeal M 689 is used in a variety of waterproofing applications, especially where a high degree of chemical and mechanical resistance is required.

This includes:

- Waste-water treatment plants (urban and industrial), both in the inflow and outflow areas.
- Sewage effluent pipelines.
- Steel and concrete pipes.
- Secondary containment bunds in chemical and petrochemical industries.

Additionally, **MasterSeal M 689** can be applied on:

- Flat and architectural roofs.
- Horizontal and vertical substrates.
- Internal and external areas.
- Concrete, cementitious mortar or steel substrates.
- Reinforced concrete to protect it against carbonation, chloride induced corrosion or chemical attack in industrial environments.

Contact your local Master Builders Solutions representative regarding any application required not mentioned here.



FEATURES AND BENEFITS

- Spray delivered and ultra fast curing: enables easy application to form a monolithic waterproofing membrane on simple and complex surfaces.
 - Application to vertical surface without runs.
 - Easy application to complicated details.
- Rapid curing:
 - Rain resistance after only 30 seconds.
 - Allows early serviceability.
 - Fully trafficable after only 12 hours.
- Continuous membrane: monolithic – no laps, welds or seams.
- Excellent chemical resistance.
- Waterproof and resistant to standing water.
- Fully bonded to substrate: can be applied to a wide range of substrates with the appropriate primer.
- High water vapour permeability: low risk of blistering.
- High resistance to carbon dioxide diffusion: Protects concrete from rebar corrosion.
- High abrasion and impact resistance: Withstand mechanical traffic.
- High elasticity and crack bridging capability: o remains elastic at low temperatures; Tg approx. – 45 °C o High durability and protection with reduced cracking due to embrittlement.
- Thermoset – does not soften at high temperatures.

APPROVALS AND CERTIFICATES

- CE marked according EN 1504 part 2.
- Chemical resistance according EN 13529.
- Z 59. xxxx according WHG (in preparation).
- Fire resistance according EN 13501 part 1.
- ETA-11/0147 according ETAG 005 part 6 (in preparation).

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APPLICATION METHOD

Surface Preparation:

The preparation of the substrate and the use of the appropriate primer are of paramount importance. All surfaces to which **MasterSeal M 689** is applied should be sound, clean and dry and free from oil or grease, loose particles and any other substances which may impair adhesion. For substrate pre-treatment prior to the primer application see primer technical data sheet.

Concrete and cementitious screed

Concrete and other cementitious substrates must have a minimum pull off strength of 1.5 N/mm². Any laitance present on the surface must be removed mechanically. Shot blasting is the preferred method. Release oil and other contaminants which may impair adhesion must be removed prior to the application of the primer.

Iron / Steel

Should be sand blasted to a Sa 2 ½ finish prior to application of the primer.

Primer

Use the following guide to select the appropriate primer:

Substrate	Primer
Concrete	MasterSeal P 770
Humid mineral substrates	MasterSeal P 385
Plywood	MasterTop P 660 or MasterSeal P 691
GRP	MasterSeal P 691
Iron / steel (not stainless)	MasterSeal P 681
Non-ferrous metals (e.g. aluminium, zinc)	MasterSeal P 684
Aged MasterSeal (PU) waterproofing membranes	MasterSeal P 691

In some circumstances, other primers may be more appropriate. For further details, please consult your local sales office.

Mixing:

Dose and mix with suitable air driven or electrical two-part hot spray equipment. The accuracy of mixing and dosage must be controlled regularly with the equipment.

Stir well Part A drums before use to homogenise the content. Precondition the membrane components to the correct temperature 70 – 80 °C prior to application.

Check mix ratios are correct at the start of spraying and regularly throughout the spraying procedure.



Application:

MasterSeal M 689 can only be applied by means of a suitable two-component heated, high pressure, proportioning spray equipment (e.g. Graco, GlasCraft, Gusmer, Wiwa, Gama or any other suitable). The choice of machine depends to a large extent on the type and size of work contemplated. For advice, please contact Master Builders Solutions.

MasterSeal M 689 should only be applied to properly prepared substrates. For best results substrate and air temperature should be in a range 5 – 35 °C. However, in very cold conditions the use of barrel heaters may be required to ensure the optimal operation of barrels pumps.

MasterSeal M 689 should be applied within the recommended temperature and relative humidity limits. The temperature of the substrate should be min. 3 K above the dew point. Due to the fast reaction, it is possible to rapidly build thicknesses from 1.5 to > 6 mm.

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Surrounding areas should be protected from overspray by masking off. Care should be taken to prevent spray mist being carried by wind by erecting suitable barrier

Topcoat:

MasterSeal M 689 can be used directly in exposed applications as the mechanical properties are not affected but has limited aesthetical UV resistance.

Do not topcoat **MasterSeal M 689** in case of application exposed to harsh chemical environments.

The use of pigmented **MasterSeal M 689** can avoid the application of topcoat but not avoid the Surface yellowing of the membrane.

To increase UV resistance, several topcoats are available including **MasterSeal TC 259** for most standard applications, and **MasterSeal TC 258** which can be broadcast with dry silica sand to provide a hard wearing, slip resistant finish. Other topcoats may be more suitable for specific applications, consult your local sales office for further details.

COVERAGE

MasterSeal M 689 is normally applied at 2.2 – 2.5 kg/m². This corresponds to a thickness of approx. 2.0 – 2.3 mm. Details require a higher coverage rate up to 4.0 kg/m² or more. The above consumption figures are intended as a guide only and may be higher on very rough or porous substrates

FINISHING AND CLEANING

Re-useable tools should be cleaned carefully with Cleaner 40 or e.g. solvent naphtha.

PACKAGING

Part A 200 kg in 200 l drums

Part B 225 kg in 200 l drums

COLOUR

MasterSeal M 689 is available in the following colour combination:

Part A:

- approx.. RAL 7042,
- approx.. RAL 7043,

- black
- colourless (to be coloured with Master Builders Solutions authorized pigment paste by approx.. 3 %. Stir well before use!)

Part B: Unpigmented

STORAGE AND SHELF LIFE

Store in original containers under dry conditions at a temperature between 15° – 25° C. Do not expose to direct sunlight. For maximum shelf life under these conditions see "Best before....." label.

WATCHPOINTS

This product conforms to the EU directive 2004/42/EG (Deco-Paint directive) and contains less than the maximum allowable VOC limit (Stage 2, 2010).

According to the EU directive 2004/42, the maximum allowable VOC content for the Product Category IIA / j is 500 g/l (Limit: Stage 2, 2010). The VOC content for MasterSeal M 689 is < 500 g/l (for the ready to use product).

HANDLING AND PRECAUTIONS

In its cured state, **MasterSeal M 689** is physiologically non-hazardous. The following protective measures should be taken when working with this material:

Wear safety gloves, goggles and protective clothing. Avoid contact with the skin and eyes. In case of eye contact, seek medical attention. Avoid inhalation of the fumes. Respiratory protection must be worn when spraying or when in the vicinity of the spraying operation.

When working in well ventilated areas, a combined charcoal filter and particle filter mask (A-P2) should be worn. When working in less well ventilated and in confined spaces, air-fed helmets are to be worn by sprayer and assistant(s) When working with the product do not eat, smoke or work near a naked flame.

For additional references to safety-hazard warnings, regulations regarding transport and waste management please refer to the relevant Material Safety Data Sheet.

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The regulations of the local trade association and/or other authorities, regulating safety and hygiene of workers handling polyurethane and isocyanates must be followed.

CE-MARKING (EN 1504-2)

EN 1504-2:2004	
Surface protection product - coatings EN 1504-2: ZA.1d, ZA.1f and ZA.1g	
Linear shrinkage	NPD
Compressive strength	NPD
Abrasion resistance	≤ 3000 mg
Permeability to CO ₂	Sd > 50
Permeability to water vapour	Class I
Capillary absorption and permeability to water	< 0.1 kg/(m ² xh0,5)
Thermal compatibility after freeze-thaw cycling	≥ 1.5 N/mm ²
Resistance to severe chemical attack	Reduction of hardness < 50 %
Impact resistance	Class III
Adhesion strength by pull-off test	≥ 1.5 N/mm ²
Reaction to fire	Cfl-s1
Skid resistance	NPD

NPD = No performance determined. Performance determined in system build up **MasterSeal M 689**.

CE-MARKING (EN 13813)

EN 13813: 2002
Synthetic resin screed for use internally in buildings EN 13813: SR-B1,5-AR1-IR4

TECHNICAL DATA*

Essential characteristics	Performance
Fire behaviour	Efl
Release of corrosive substances	SR
Water permeability	NPD
Wear resistance	< AR 1
Bond strength	> B 1,5
Impact resistance	> IR 4
Impact sound insulation	NPD
Sound absorption	NPD
Heat insulation	NPD
Chemical resistance	NPD
Slip/Skid resistance	NPD
Emissions behaviour	NPD

NOTE

Technical support, where provided, does not constitute supervisory responsibility. For additional information contact your local MB Construction Chemicals Solutions South Africa (Pty) Ltd representative. MB Construction Chemicals Solutions South Africa (Pty) Ltd shall not be liable for technical advice provided.

MB Construction Chemicals Solutions South Africa (Pty) Ltd reserves the right to have the true cause of any difficulty determined by accepted test methods. Undertaking such tests is not, and shall not be deemed to be, an admission of liability or an assumption of any risk, loss, damage or liability.

QUALITY AND RESPONSIBLE CARE

All products originating from MB Construction Chemicals Solutions South Africa (Pty) Ltd are manufactured under a management system independently certified to conform to the requirements of the quality standards ISO 9001, environmental and occupational health and safety standards.

* Properties listed are based on laboratory controlled tests.

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Properties	Standard	Data	Unit
Chemical base	-	100% Polyurea	-
Mixing ratio:	A : B	100 : 100 100 : 112	by volume by weight
Density (at 20 °C)	Component A Component B	1.00 1.11	g/cm ³
Viscosity (at 25 °C)	Component A Component B	220 800	mPas
Processing temperature (Flow heater, Hose heater)	Component A Component B	70 – 80 70 – 80	°C °C
Processing pressure	Component A Component B	120 – 200 120 - 200	bar bar
Substrate and ambient temperatures (during application)	-	min. 5 max. 35	°C °C
Maximum relative humidity (during application)	-	90	%
Maximum substrate moisture (during application)	-	4	%
Reaction time (sprayed)	-	5 – 7	sec
Dry to touch after	at +20°C	30	sec
Ready for pedestrian traffic after	at +20°C	0,5	Hours
Fully cured – ready for car traffic after	at +20°C	12	Hours
Exposure to chemicals after	at +20°C	24	Hours

TECHNICAL DATA AFTER CURING*

Properties	Standard	Data	Unit
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Density of mixed material	EN ISO 2811-1	approx. 1,1	g/cm ³
Shore-A-hardness	-	92	-
Shore-D-hardness	-	42	-
Tensile strength	DIN 53504	21	N/mm ²
Elongation at break	DIN 53504	425	%
Tear strength	DIN 53515	58	N/mm ²
Static crack bridging	EN 1062-7 (A)	A5 (+23°C)	-
Dynamic crack bridging	EN 1062-7 (B)	B4.2 (-20°C)	-
Fire behaviour	EN 13501-1	C _{FL} -s1	-
Capillary water absorption	EN 1062-3	0,002	Kg/m ² /h ^{0,5}
Water vapor permeability (SD)	EN ISO 7783-1	< 5 / Class I (μ = 3658)	m
CO ₂ permeability (SD)	EN 1062-6	>120 (μ = 68950)	m
Adhesion to concrete	EN 1542	>3	N/mm ²
Adhesion strength after freeze-thaw cycles	EN 13687-1	>3	N/mm ²
Behaviour after artificial weathering	EN 1062-11	No changes	-
Abrasion resistance (Taber H22, 1000 g, 1000 c)	EN ISO 5470 -1	Mass loss < 150	mg
Impact resistance	EN ISO 6272/2	>20 (Class III)	Nm
Slip/Skip resistance	EN 13036-4	Dry: 63 (Class II) Wet: 30	-
Service temperature (dry)	-	- 20 to +130	°C
Service temperature (high moisture, but not wet)	-	0 to +80	°C
Service temperature (wet)	-	0 to +55	°C

* The above figures are intended as a guide only and should not be used as a basis for specifications.

CHEMICAL RESISTANCE (ACCORDING EN 13529)

Group	Description	Test Liquid	Result
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DF 1	Gasoline	47,5% Toluol + 30,4% Isooktan + 17,1% n-Heptan + 3% Methanol + 2% 2-Methyl-Propanol-(2)	Class II
DF 2	Aviation fuels	50% Toluene + 50% isooctane Aviation fuel 100 LL NATO code F18 Turbo fuel A1 NATO Code F34/F35	Class I
DF 3	Fuel oil, Diesel fuel and other unused combustion motor oils	80,0 % n-Paraffin (C12 bis C18) 20,0 % Methylnaphthalene	Class III
DF 4	All hydrocarbons as well as mixtures containing benzol with max. 5 Vol. %	60% Toluene + 30% Xylene + 10% Methylnaphthalene	Class I
DF 4a	Benzene and benzene containing mixtures (incl.4)	30% Benzene + 30% Toluene + 30% Xylene + 10% Methylnaphthalin	No
DF 4b	Crude oils		Class III
DF 4c	Used combustion motor oil and used automotive transmission oil with a flash point > 55 °C	80% motor oil + 10% toluene + 9,9% water + 0,1% anionic tenside	Class III
DF 5	Mono- and polyvalent alcohols (up to a max. 48 vol.-% methanol), glycol ethers	48 Vol.-% methanol + 48 Vol.-% IPA + 4% water	Class I (7d)
DF 5a	All alcohols and glycol ethers (incl. 5 and 5b)	Methanol	Class I
DF 5b	Single and multi-valent alcohols ≥ C2	48 Vol.-% methanol + 48 Vol.-% IPA + 4% water	Class I (7d)
DF 6	Halogen hydrocarbons ≥ C2 (incl. 6b)	Trichloro-ethylene	No
DF 6a	All halogen hydrocarbons (incl. 6 and 6b)	Dichloro-methane (methylene chloride)	No
DF 6b	Aromatic halogen hydrocarbons	Monochloro-benzine	No
DF 7	All organic esters and ketones (including. 7a)	50 % ethyl acetate + 50 % methyl isobutylketone acid	No
DF 7a	Aromatic esters and ketones	50% methyl salicylate acid + 50% acetophenone	No
DF 7b	Biodiesel fuel	Rape-oil fatty acid methylester,	Class III
DF 8	Aqueous solutions of aliphatic aldehyde up to 40 %	Formaldehyde (35% - 40%) 50% Butanal + 50% Heptanal	Class I (7d)
DF 9	Aqueous solutions of organic acids (carboxylic) up to 10 % as well their salts	10 % aqueous acetic acid	Class III
DF 9a	Organic acids (carboxylic, apart from formic acids) as well as their salts	50 Vol.-% acetic acid +50 Vol.-% propionic acid	No
DF 10	Mineral acids (non-oxidizing) up to 20% and inorganic salts in aqueous solution (pH	Sulphuric acid (20%)	Class III
DF 11	Inorganic lye (except oxidizing) and inorganic salts in aqueous solution (pH>8)	Sodium hydroxide solution (20%)	Class III
DF 12	Aqueous solutions of inorganic non-oxidizing salts with a pH value between 6 and 8	Aqueous sodium chloride solution (20%)	Class III
DF 13	Amines as well as their salts (in aqueous solution)	35 % Triethanolamine + 30 % n-Butylamine + 35 % N, N-Dimethylaniline	Class I
DF 14	Aqueous solutions of organic surfactants		Class III
DF 15	Cyclic and acyclic ethers (including 15a)	Tetrahydrofuran (THF)	No

ADDITIONALLY

Diphenylmethandisocyanat (MDI)	Class III
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Toluylendiisocyanat (TDI)	Class III
Polyetherpolyol	Class III
Polyesterpolyol	Class III
Monoethylengycol	Class III

Class I: 3 d without pressure	Reduction in hardness of less than 50% when measured according to Buchholz method, EN ISO 2815, or Shore method EN ISO 868 24 h after the coating is removed from immersion in the test liquid.
Class II: 28 d without pressure	
Class III: 28 d with pressure	

DISCLAIMER

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