
MASTER CTS

ASATEEN GROUP

CONTROLLED TECHNICAL EDITION

MASTER GCCM

DF-01 Technical Data Sheet

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1. Product Identity

Institutional Hierarchy

MASTER CTS
Construction Technology Systems
A Division of ASATEEN GROUP

Product Name

MASTER GCCM

Product Type

Geosynthetic Cementitious Composite Mat (GCCM)

2. Technical Overview

Pre-manufactured geosynthetic cementitious composite mat for lining, erosion control, and water infrastructure protection. Supplied in roll form. Activated with water to form a hardened cementitious layer with integrated impermeable backing.

- Cementitious matrix
- 3D spacer fabric
- HDPE geomembrane backing

Suitable for high-temperature and saline / sulfate environments.

3. Product Description

Roll-deployed composite lining system providing:

- Seepage control
- Impermeable barrier
- Abrasion resistance

Installation conditions:

- Dry
- Wet
- Underwater

4. Composition / Material Basis

Component	Description
Spacer fabric	3D structural reinforcement layer
Cementitious matrix	Dry integrated cementitious material
Backing layer	HDPE geomembrane
Activation	Water-activated hardening
Barrier system	Cementitious layer + HDPE backing

5. Key Technical Properties

Property	Value	Unit	Related Test Method
Installation rate	200	m ² /hour	-
Thickness options	5 / 8 / 10 / 12	mm	ASTM D8364
Mass per unit area	8.5 / 12 / 15 / 18	kg/m ²	ASTM D8364
Functional readiness	24	hours	-
Initial set	1-2	hours	-
Joint overlap (min)	100	mm	-
Peg length (typical)	250	mm	-
Anchor spacing	1-2	m	-
Welding temperature	250-300	°C	-
Roll size (standard)	5 x 2	m	ASTM D8364
Waterproofing	Yes	-	ASTM D8364
Moisture resistance	Yes	-	ASTM D8364
Fire resistance	Yes	-	ASTM E84
Crack resistance	Yes	-	ASTM D8364
Flexibility	High	-	ASTM D8364
Chemical resistance	Acid / alkali resistant	-	ASTM C267
Mechanical resistance	Pressure and bending resistant	-	ASTM D8364
Curing options	Quick / delayed	-	-

6. Performance Characteristics

Engineering Selection Trigger Conditions

Specify MASTER GCCM when the project requires	System response
Rapid deployment	Pre-manufactured roll system with high installation rate
Canal rehabilitation without full removal	Overlay application capability
Reduced seepage	Integrated impermeable HDPE-backed lining system
Installation in wet or underwater conditions	Dry / wet / underwater installation suitability
Reduced logistics and wet-trade dependence	Lower hauling, mixing, and site preparation demand
Saline / sulfate exposure	Suitable for Sabkha and aggressive soil environments
Localized settlement tolerance	Flexible composite system with movement accommodation
Emergency repair or accelerated return to service	Initial set in hours and functional readiness within 24 hours

System Logic

- Cementitious structural layer + HDPE geomembrane backing = integrated lining and barrier system
- Barrier function retained through HDPE backing layer in case of surface cracking
- Roll-deployed installation reduces dependence on cast-in-place concrete operations

Engineering Decision Snapshot

Criterion	MASTER GCCM
Installation speed	High (200 m ² /hour)
System type	Pre-manufactured, roll-deployed
Waterproofing	Integrated HDPE-backed system
Rehabilitation capability	Overlay without demolition
Installation environment	Dry / wet / underwater
Subgrade tolerance	Accommodates movement
Logistics demand	Reduced
Construction dependency	Reduced wet-trade reliance

Performance Metrics

Parameter	Value	Unit	Related Test Method
Seepage reduction	95	%	ASTM D8364
Abrasion resistance	5	× concrete	ASTM D8364
Weight reduction vs concrete	95	%	-
Construction time reduction	70-90	%	-
Transport reduction	90	%	-
Repair cost reduction	50-60	%	-
Shotcrete waste reduction	10-40	%	-
Service life	>50	years	ASTM D8364

Comparative Assessment - MASTER GCCM vs Traditional Concrete

Parameter	MASTER GCCM	Traditional Concrete
Installation rate	200 m ² /hour	Slower; requires site preparation and concrete placement
Site preparation	Pre-manufactured system	Mixing, measuring, and compaction required
Installation condition	Dry / wet / underwater	Weather-sensitive
Logistics and labor	Lower material handling and labor demand	Higher material and labor demand
Weight	Lower system mass	Higher structural and transport mass
Repair strategy	Overlay and rapid rehabilitation suitable	Demolition and replacement may be required
Construction duration	Reduced implementation time	Longer construction duration
Waterproofing system	Cementitious layer with HDPE backing	Depends on concrete integrity and additional waterproofing measures
Subgrade movement tolerance	Accommodates localized settlement	More rigid response
Canal rehabilitation	Suitable for overlay application	Usually requires heavier intervention

Selection / Specification Advantages

- Suitable where rapid installation is required
- Suitable where reduced logistics load is required
- Suitable where wet installation conditions may occur
- Suitable for overlay rehabilitation of existing lined channels
- Suitable where seepage control and impermeable lining are required
- Suitable where subgrade movement tolerance is required
- Suitable where reduced wet-trade dependency is preferred
- Suitable where transport and site handling constraints apply

Project-Relevant Use Criteria

Criterion	Relevance
Fast-track canal works	High installation rate and 24-hour functional readiness
Rehabilitation without full demolition	Overlay application suitable
Restricted-access sites	Reduced hauling and site mixing demand
High-temperature environments	Suitable for summer field conditions
Saline / sulfate subgrades	Suitable for Sabkha and aggressive soil environments
Wet working conditions	Can be installed in dry, wet, or underwater conditions
Seepage mitigation works	Integrated impermeable backing system
Erosion-control applications	Hardened lining with abrasion resistance

Controlled Engineering Notes

- Not intended as a structural concrete replacement in load-bearing applications
- Reduces site mixing requirements
- Reduces hauling volume relative to cast concrete solutions
- Reduces dependence on conventional wet concrete placement operations
- Supports rapid rehabilitation and emergency lining works
- Combines lining and impermeable barrier functions in one system
- Maintains barrier continuity through HDPE backing layer

Engineering Behavior

- Accommodates subgrade movement
- Maintains integrity under localized settlement
- HDPE layer provides primary impermeable barrier
- Secondary barrier maintained in case of surface cracking
- Barrier continuity maintained through HDPE backing in case of surface cracking

Environmental Resistance

- Suitable for saline and sulfate soils
- Thermal stability in high-temperature conditions (>50°C)
- Long service life with low environmental impact

7. Application Areas

Application	Use
Canal lining	Seepage reduction
Concrete repair	Reinforcement of damaged surfaces
Lagoon and slope lining	Waterproofing and protection
Dam and culvert lining	Structural protection
Saline soils	Sabkha applications
Emergency works	Rapid deployment
Gabions	Surface protection
Vegetation control	Growth prevention

8. Application Method / Usage Guidance

Subgrade Preparation

- Remove debris and vegetation
- Shape and compact surface

Installation

- Deploy in flow direction
- Textile face upward
- Maintain full contact with subgrade
- Provide 100 mm overlaps

Fixing

- Anchor with steel pegs
- Typical: 250 mm length at 1-2 m spacing

Sealing

- Thermal welding at 250-300°C

Hydration

- Apply low-pressure water
- Ensure full saturation
- Additional hydration required in high temperatures

Curing

- Initial set: 1-2 hours
- Functional readiness: 24 hours

9. Health & Safety

- Use protective gloves and safety goggles
- Avoid contact with skin and eyes
- Ensure adequate ventilation during installation
- Dispose of unused material according to local regulations

10. Packaging / Storage

Item	Description
Packaging	Roll format
Roll size	5 x 2 m
Custom sizes	Available
Storage	Dry conditions
Ground contact	Avoid direct contact
Exposure	Protect before installation

11. Referenced Test Methods / Standards

Type	Reference
Product standard	ASTM D8364
Chemical resistance	ASTM C267
Sulfate resistance	ASTM C1012
Fire performance	ASTM E84

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