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Admixtures for concrete

High performance and specialisation

Today's concrete production market has become more demanding and requires more precision in terms of managing installation and placing times and when designing a concrete mix's technical performance properties in order to comply with the needs of the construction industry.

For manufacturers of ready-mixed concrete and precast concrete components, it has also become increasingly important to take into consideration both economic and environmental parameters. In order to achieve these parameters, manufacturers need to use a specific mix of innovative products combined with their in-depth technical knowledge and extensive experience in this particular sector.

For more than thirty years, Mapei has been supplying solutions and products in the field of concrete technology to meet the various requirements of its customers, offering both excellent technical support and products with an exceptional level of quality. Our aim is to be a partner not only for our customers, but also for all those involved in the design, planning and control processes of a component, structure made from concrete.

Along with our mission to constantly develop new technologies for our customers, this makes Mapei the "perfect partner" in the concrete industry. As an Admixtures team, we are experts in all areas regarding the use and application of concrete, particularly:

- Self-compacting concrete
- Concrete with high mechanical performance properties and durability
- Concrete for industrial and commercial flooring without joints
- Waterproof concrete
- Concrete resistant to freezing conditions
- Roller-compacted concrete
- Fibre-reinforced concrete
- Concrete with high initial mechanical properties, both with and without thermal cycles
- Pervious concrete
- Sustainable concrete
- Shotcrete for tunneling, mining and underground construction applications
- Products for concrete repair and maintenance

Choosing the right admixture for concrete

Mapei admixtures for concrete are designed to overcome the most varied challenges encountered during application. Once the specific application method has been specified and the main parameters of the mix design have been defined, the next step is to select the most appropriate Mapei admixture with the support of a local technical specialist.

Admixtures for high performance

Mapei admixtures for high-performance concrete are available on the market as commercially branded products such as Mapefast, Mapetard, Mapeplast, Mapefluid, Dynamon, Mapeair, Vibromix and Idrocrete, which are all compliant with AS1478.1. All these products enable concrete of the highest quality to be produced (high durability and high mechanical properties) and are used in the most prestigious projects.

- Mapefast accelerators
- Mapefluid water reducers
- Mapetard retardants
- Mapeair air-entraining admixtures
- **Dynamon** Polycarboxylic Ether (PCE) technology including water reducers, accelerators and superplasticizers
- Vibromix and Idocrete admixtures for Manufactured Concrete Products

Special admixtures

Mapei special admixtures are products specifically developed to overcome specific technical problems in the concrete industry. Using these admixtures means that concrete with a high level of added value can be produced and enables new production technologies to be adopted that exceed current limits. And to this end Mapei is constantly committed to an ongoing improvement project and the constant development of new products and technologies that provide a genuine advantage to the development of the market.

- The **Re-Con Line** for sustainable reuse of returned concrete and aggregates
- Mapecure SRA and Expancrete for Mapecrete System technology
- Idrocrete KR 1000 mass crystallising waterproofer
- Viscostar 3K viscosity modifier
- Mapeair LA for filler concrete
- Mapeplast UW anti-washout admixtures
- Mapetard hydration control stabilisers
- Mapecure SRA shrinkage-reducing agent
- Expancrete for expansive, shrinkage-compensating concrete
- Dynamon XTend workability extenders

AS1478 marking for admixtures

Since the admixtures for concrete can have extremely different performances and usage, the Australian Standard for concrete admixtures AS1478.1 has different classification categories, different tests and minimum performance levels for every single admixture type.

CLASSIFICATION	DESCRIPTION	TABLE
AEA	Air-entraining admixture	Table 1
WR	Water reducing admixture	Table 2
WRRe	Water reducing, set-retarding admixture	Table 2
WRAc	Water reducing set-accelerating admixture	Table 2
Re	Set-retarding admixture	Table 3
Ac	Set-accelerating admixture	Table 4
HRWR	High range water reducing admixture	Table 5
HWRRe	High range water-reducing and set-retarding	Table 6
MWR	Medium-range WR, normal setting admixture	Table 7
SN	Special Purpose, Normal Setting (Water resisting)	Table 8
SN	Viscosity modifying admixture	Table 8

Admixtures that also have important secondary functions can also obtain the certification for two or more categories at the same time. Therefore, it is possible to study the effects of admixtures on concrete, when both fresh and hardened.

In order to see whether the products meet the requirements, the specific tests for each type of admixture must be carried out:

- when the certificate is first issued;
- when a new formula or type of admixture is developed;
- when a modification of the formula could significantly influence the admixture's performance;
- when a modification of the raw material could significantly influence the admixture's performance.

Classification of admixtures for concrete

The following table lists the classification of **MAPEI** admixtures for concrete, the abbreviations and the Standard table that defines the minimum requirements.

ADMIXTURES FOR CONCRETE	- AS1478.1	
ADMIXTURES	CLASSIFICATION	TABLE
DYNAMON EASY 36N	WR	2
DYNAMON HAA	Ac	4
DYNAMON NRG 1010	HWR	5
DYNAMON NRG 1022	HWR	5
DYNAMON NRG 1060	HWR	5
DYNAMON SX50	WRAc	2
DYNAMON SX 148	MWR	7
DYNAMON Easy 40R	WRRe	2
DYNAMON XTEND W150	HWRRe	6
IDROCRETE DM	SN	8
IDROCRETE KR 1000	SN	8
MAPEAIR LA/P	AEA	1
MAPEAIR A 30F	AEA	1
MAPEAIR AE 20	AEA	1
MAPECURE SRA 25	SN	8
MAPECURE SRA	SN	8
MAPEFAST C	Ac	4
MAPEFLUID NP	HWR	5
MAPEFLUID R19	WRRe	2
MAPEFLUID R14	WRRe	2
MAPEPLAST PMX	SN	8
MAPEPLAST UW	SN	8
MAPETARD	Re	3
MAPETARD SD180	Re	3
VIBROMIX A1	SN	8
VIBROMIX L2	SN	8
VIBROMIX L4	SN	8
VISCOSTAR 3K	SN	8
OTHER ADMIXTURES		
ADMIXTURES	CLASSIFICATION	TABLE
EXPANCRETE		9
ADMIXTURES FOR PERMEABLE CONCRETE		9
POLYFIBRES		9
ADMIXTURES FOR SUSTAINABILITY		9
CURING COMPOUNDS		9
SURFACE FINISH AND FORM RELEASE AGENTS		9
RE-CON AGG 100		9
RE-CON AGG 200		9
ADMIXTURES FOR SHOTCRETE		9
PRODUCTS FOR CONCRETE REPAIR AND MAINTENANCE		9

High-performance admixtures for concrete

TABLE 1

Air-entraining agent (AS1478.1 - Type AEA)

Air-entraining admixtures designed to improve concrete cohesiveness, workability, bleed control, resistance to freeze/thaw and overall concrete durability.

Product classification

Commercial name and description

Mapeair AE 20

Low solid conent air-entraining agent for improved concrete cohesiveness, workability, bleed control, freeze/thaw resistance and overall durability.

Mapeair A30F

High perforance air entraining agent for impove concrete cohesiveness, workability, bleed control, resistance to freeze/thaw and overall durability.

Ideal for use in concretes containing High LOI Flyash.

Mapeair LA/P

Powdered foam-forming air-entraining for lightweight concrete and fluid fillers

Application technology

- Concrete resistant to freeze-thaw cycles
- Ready-mixed concrete
- Precast/pre-stressed concrete
- Lightweight concrete
- Fluid filler concrete and mortar

TABLE 2

Product classification

Water Reducers
Water-reducing
(AS1478.1 - Type WR)

Water-reducing and Set accelerating (AS1478.1 - Type WRAc)

Water-reducing and Set retarding

(AS1478.1 - Type WRRe)

Mapei multi-purpose plasticisers are designed for use in standard concrete for water reduction therefore improved strength, set-control either neutral set, retardation or acceleration, improved concrete cohesiveness and durability.

Commercial name and description

Dynamon Easy 36N (WR)

Polycarboxylate ether (PCE) based neutral set water reducer for ready-mixed and precast concrete applications in mild climates

Dynamon SX50 (WRAc)

Polycarboxylate ether (PCE) based water reducing accelerator for ready-mixed and precast concrete applications in cold climates

Dvnamon Easy 40R (WRRe)

Polycarboxylate ether (PCE) based water reducing retarder for ready-mixed and precast concrete applications in hot climates

Mapefluid R14

Lignin based water reducing retarder for general purpose ready-mixed and precast concrete applications

Mapefluid R19

Lignin based water reducing retarder for general purpose ready-mixed and precast concrete applications

Application technology

- Normal class Ready-mixed concrete
- Ready-mixed concrete for domestic and commercial applications

TABLE 3

Product classification	Commercial name and description	Application technology
Product classification	Commercial name and description	Application technology
Retardants (AS1478.1 - TYPE Re)	Mapetard Set retarding admixture	Concrete in hot climates
Retarding admixtures for extending working time including slump		Pumped concrete
retention, time to place and finish, particularly in hot weather concreting conditions.		Concrete without construction joints
conditions.	Mapetard SD 180 Set retarding admixture via hydration control	Concrete for long haul applications
		Concrete requiring slump retention
		Extend working times
		Shotcrete apllications
TABLE 4		
Product classification	Commercial name and description	Application technology
Accelerators (AS0478.1 - Type	Mapefast C	Concrete in cold climates
Ac) Mapei concrete accelerators for shortened working time and	Setting accelerator with chlorides for non- reinforced concrete	Concrete resistant to freezing conditions
enhanced early age concrete		Concrete for rapid traffic
strengths, particulary in cold weather concreting conditions.	Dynamon HAA	reopening
	Chloride-free set accelerator for reinforced concrete with high initial mechanical strength	Ready-mixed concrete
		Precast/pre-stressed concrete
	Mapequick AF701D Shotcrete accelerator for mining, tunneling and underground construction applications	Shotcrete for Tunneling, Mining and Underground Construction
	Mapequick AF701S Shotcrete accelerator for mining, tunneling and underground construction applications	

High-performance admixtures for concrete

TABLE 5

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Product classification	Commercial name and description	Application technology	
High Range Water Reducer (Superplasticisers) (AS1478.1 - Type HWR) For ready-mixed, precast and prestressed concrete applications, Mapei's Dynamon NRG line of polycarboxylate ether-based superplasticising admixtures. offer high range water reduction for high range slump and self-compacting concrete applications. Overall concrete workability, placeability and durability benefit significantly.	Dynamon NRG 1010 Polycarboxylate ether (PCE) superplasticising accelerator for extremely quick stripping operations (6-8 hours) without steam curing Dynamon NRG 1022 Polycarboxylate ether (PCE) superplasticising with good maintenance of workability and quick stripping operations without steam curing Dynamon NRG 1060 Polycarboxylate ether (PCE) superplasticiser enabling quick stripping times, ideal for mechanised precast applications	 Structural precast concrete Panels and pillars Roofing tiles Pre-stressed beams Precast segments for road and rail tunnels 	
	Mapefluid NP Naphthalene-based superplasticiser for concrete (ie non-polycarboxylate ether based)	Normal and special class readymixed and precast concrete applications	
TABLE 6			
Product classification	Commercial name and description	Application technology	
High range water-reducing and set-retarding (AS1478.1 - Type HWRRe) Mapei's line of retarding polycarboxylate based superplasticising admixtures for ready-mixed concrete are specifically designed for concrete that require more time than normal superplasticisers. Projects requiring extended travel or placement times are typical applications	Dynamon XTend W150 Highly effective Polycarboxylate ether (PCE) based superplasticiser with excellent water reducing and slump retention capabilities	 Ready-mixed concrete Concrete in hot climates Concrete with long delivery times Concrete for extended concrete casting 	
TABLE 7			
Product classification	Commercial name and description	Application technology	
Medium-range WR, normal setting (AS1478.1 - Type MWR) The Mapei line of polycarboxylate ether (PCE) based medium-range water reducers offer mid-range water reduction and slump for general ready-mixed and precast concrete applications	Dynamon SX148 Polycarboxylate ether (PCE) based mediumrange plasticiser with medium range water reducing properties.	Normal and Special class readymixed and precast concrete applications.	

TABLE 8

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Product classification	Commercial name and description	Application technology	
Plasticisers for extruded and vibro-compressed concrete (AS1478.1 - Type SN) Vibromix is the Mapei range of admixtures specifically designed to optimise the production phases of drycast concrete applications	Vibromix A1 Specialised admixture for vibro-compressed and extruded concrete increasing compaction when vibrated Vibromix L2 Specialised admixture for vibro-compressed and extruded concrete increasing compaction when vibrated, with set acceleration	 Improved cast finish Concrete blocks Self-locking blocks Manholes Roadside kerbing Pipes 	
	Vibromix L4 Plasticising admixture for extruded and vertically cast concrete components, particularly dry-slightly damp mix consistency		
Viscosity modifiers (AS1478.1 - Type SN) Mapei viscosity modifying admixtures are designed to control surface bleeding and segregation in selfcompacting concrete mixes.	Viscostar 3K Multi-purpose viscosifying admixture for the production of self-compacting concrete without fillers	Self-compacting concreteConcrete with a low fine contentPumped concrete	
Anti-washout admixtures These admixtures permit concrete to be placed in running water without the risk of leaching or losing material.	Mapeplast UW Powdered cohesion-inducing admixture for placing underwater concrete with no leaching	Underwater concrete	
Efflorescence control for Manufactured Concrete Product For the production of concrete blocks and self-locking blocks, reducing water absorption, efflorescence and enhancing colour.	Idrocrete DM Water-repellent admixture for concrete and mortar with low water absorption and reduced efflorescence	Concrete blocksSelf-locking blocksConcrete with low water absorption	
Waterproofing additive Admixtures to reduce the permeability of concrete through a process of secondary crystallisation within the pores of concrete.	Idrocrete KR 1000 Powdered crystallising admixture for waterproof concrete	FoundationsRetaining wallsStorage tanks	
Special Purpose, Normal Setting Admixture (AS1478.1 - Type SN) Liquid admixtures that drastically reduce concrete drying shrinkage by reducing surface water tension. Mapecure SRA admixtures are part of the Mapecrete System for reduced control and construction joints in concrete.	Mapecure SRA Admixture to reduce hydraulic shrinkage and the formation of cracks in shrinkage compensating mortar and concrete Mapecure SRA 25 Admixture to reduce hydraulic shrinkage and the formation of cracks for shrinkage compensating concrete and floors without joints	Concrete requiring reduced drying shrinkage Concrete for industrial flooring without joints made using Mapecrete System technology Concrete at risk of shrinkage cracks formation	

Special products for concrete

Concrete pumping aid admixtures Admixtures to increase the viscosity to improve cohesiveness and pumpability.	Mapeplast PMX Admixtures for enhancing the pumpability of concrete	Pumped concreteConcrete with a low fine content
TABLE 9		
Product classification	Commercial name and description	Application technology
Expansive admixtures Powdered admixtures that compensate for concrete drying shrinkage. Expancrete admixtures are part of the Mapecrete System reducing the need for control and construction joints in concrete.	Expancrete Powdered expansive agent for shrinkage-compensating concrete	 Shrinkage-compensating concrete Concrete for renovation work Concrete for industrial flooring without joints made using Mapecrete System technology
Admixtures for permeable concrete Admixtures to improve adhesion between cement paste and	Mapecrete Drain L Liquid admixture for making pervious concrete	Concrete for footpaths Concrete for cycle tracks and lanes
aggregates	Mapecrete Drain P Powdered admixture for making pervious concrete	Concrete for sub-layers for roadsConcrete for permeable blocks
Polymeric fibres Synthetic micro and macro fibres as substitute for steel reinforcement in certain applications.	Mapefibre NS12 Anti-shrinkage polypropylene fibres to reduce cracking	 Fibre-reinforced concrete Concrete at risk of cracking due to plastic shrinkage
сентант аррисатіонь.	Mapefibre NS18 Anti-shrinkage polypropylene fibres to reduce cracking	
	Macro Synthetic Fibres: Designed to replace structural reinforcement in specific applications	 Precast concrete Industrial flooring Shotcrete applications such as tunneling, mining and embankment stabilization

Products for sustainable concrete

A line of admixtures specific for reusing leftover concrete returned from sites and the production of sustainable concrete by using recycled aggregates

Re-Con Zero Evo

Two-component powdered component for recovering all leftover concrete from mixer trucks

Recovering returned concrete from jobsites

• Concrete with recycled aggregates

• Recovering water used to wash mixer trucks

Concrete with clay aggregates

Mapeclean Recycler

Admixture to recover water from the mixer truck cleaning process

Re-Con Zero Booster

Granulation aid for returned concrete

Re-Con Agg 100

Absorption-inhibiting plasticising admixture for sustainable concrete containing recycled aggregates

Re-Con Agg 200

High water reducing and absorptioninhibiting plasticising admixture for sustainable concrete containing recycled aggregates

Curing products

Curing compound for concrete in the hardened state to prevent moisture loss from the concrete's surface.

Mapecure WG

Water-based film-forming curing agent for mortar and concrete

- Concrete with a highly exposed area
- Industrial flooring
- Foundations
- Road surfaces
- Road surfaces in airports

Surface finishing products

Film-forming admixture to improve surface finishing operations during hot and windy weather.

Mapecrete Film

Evaporation retarding agent and surface finishing aid

- Concrete applications subject to plastic-shrinkage cracking due to high evaporative conditions
- Industrial flooring
- Road surfaces
- Road surfaces in airports

Form-release agents for concrete

Products designed for enhancing off-form finish and ease of stripping formwork,

Mapeform 1500

Multi-purpose low-viscosity chemicalphysical action form-release agent

Mapeform Eco 31

Chemical-action vegetable oil-based formrelease solution in water emulsion to improve the finish of fair-faced concrete

- Precast concrete industry
- Concrete elements requiring high quality offform finish

Shotcrete products

Products designed for shotcrete applications including tunneling, mining and embankment stabilization

Mapetard SD180

Set retarding admixture inhibiting cement hydration

- Concrete requiring long haul applications
- Concrete requiring slump retention
- Extended working time for concrete

Mapequick AF701D

Shotcrete accelerator for mining, tunneling and underground construction applications

• Shotcrete for tunneling, mining and embankment stabilization

Mapequick AF701S

in specific applications

Macro Synthetic Fibres

Shotcrete accelerator for mining, tunneling and underground construction applications

Designed to replace structural reinforcement

Shotcrete applications such as tunneling, mining and embankment stabilization

Products for concrete repair and maintenence

Mapei's extensive range of concrete repair and maintenance products for all types of concreting applications

Repair and restoration mortar products

Planitop Smooth and Repair R4

Cementitious, Rapid setting, shrinkage compensated, fibre reinforced, thixotropic mortar for 3-40mm single layer concrete repair applications

Concrete surface repair

Concrete defects

<u>Mapegrout T40, T60</u> and <u>Mapefer</u> 1K

Cementitious shrinkage compensated, fibre reinforced mortar for single layer concrete repair applications including reinforcement protection

• Concrete defect repairs where reinforcement protection is required

Mapefast Fast-Set

Cementitious shrinkage compensated, fibre reinforced for concrete repair where fast setting and hardening is required

 Defects where early set and strength are required

Anchoring mortar products: Product: Mapefill GP

Mapefill GP

General purpose, single phase shrinkage compensated grout

Medium to high flow grout for anchoring elements such as base plates

<u>Mapefill SP</u>

Shrinkage compensated dual phase precision grout

Mapefill MC06

Shrinkage compensated dual phase micro concrete grout

Epoxy resin-based adhesives

Adesilex PG1

Two-component, rapid-setting thixotropic adhesive for structural bonds

• Bond between precast elements

• Concrete crack repair

Adesilex PG4

Two-component, thrixotropic epoxy adhesive with modified rheology

Concrete carbonation protection

Protective coatings

Elastocolor Paint

Elastomeric, anti-crack, permanently elastic protective paint with high resistance to chemicals

• Sulphate attack resistance

Sealant products

Mapeflex PU45FT

Rapid-hardening paintable polyurethane sealant and adhesive with high modulus of elasticity for movements up to 20%

Where strong bond coupled with a high degree of flexibility is required

Mapeflex PU40

Paintable polyurethane sealant with low modulus of elasticity for movements up to 25%

Waterproofing systems

Mapelastic Smart

A two component, high-elasticity cementitious waterproofing mortar with crack bridging capacity greater than 2 mm, roller or trowel applied.

- Waterproofing concrete surfaces
- Concrete crack bridging

Purtop 1000N

Two-component, solvent-free pure polyurea membrane applied by spray with a high-pressure, bi-mixer type pump.

Waterproofing hydraulic works, roofs and bridge decks

Mapeplan TM

Synthetic waterproofing membrane in flexible TPO/FPO polyolefin reinforced with polyester mesh.

• Waterproofing concrete surfaces



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