



**Biogas Plants:
New Challenges Need New Solutions**
MasterSeal 7000 CR –
The Certified System to Protect Concrete

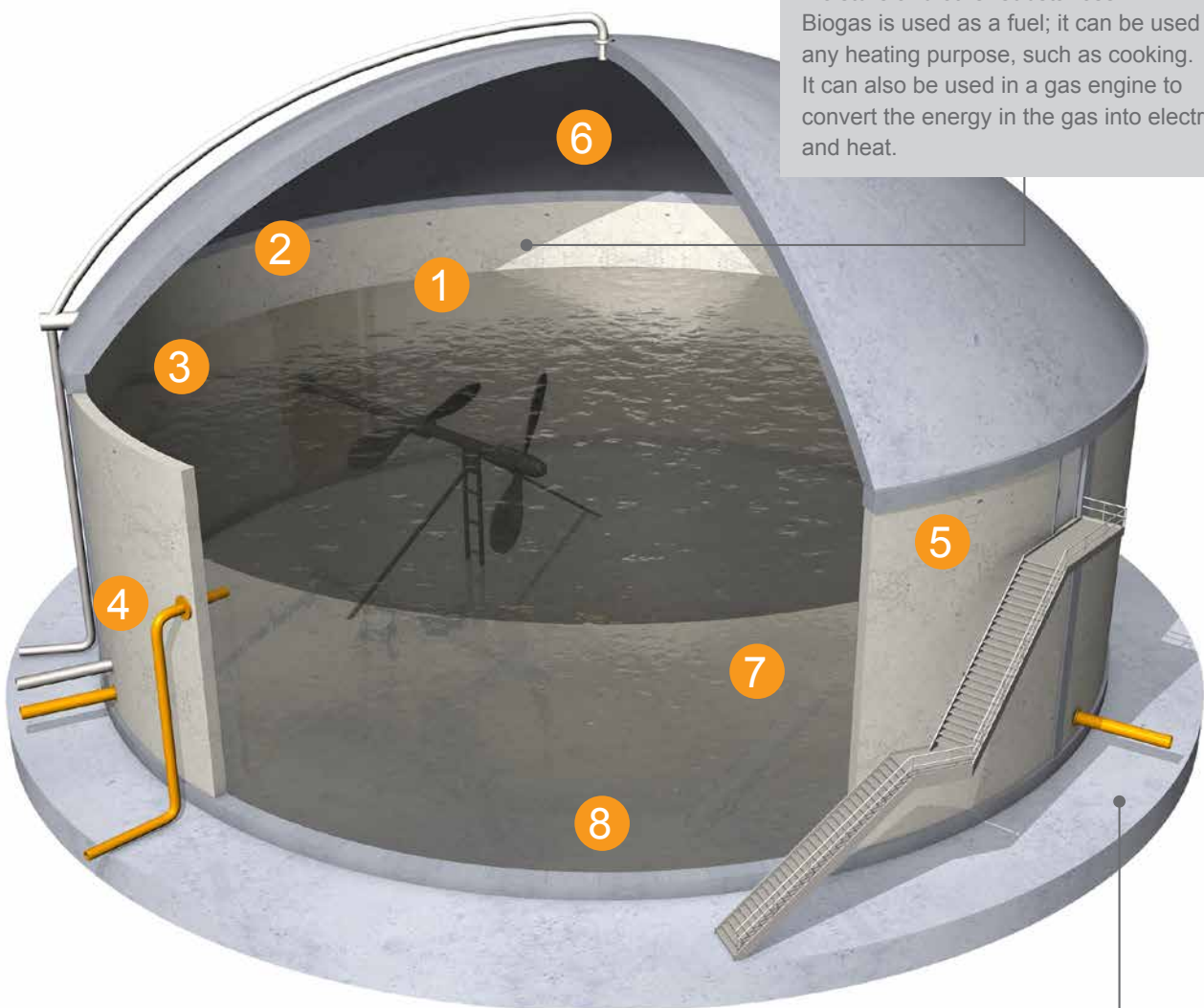




What Happens Inside a Biogas Digester

The most challenging combination of requirements for the concrete structures in a biogas plant can be found inside the biodigester

Biogas is primarily methane (CH_4) and carbon dioxide (CO_2). It may also contain small amounts of hydrogen sulphide (H_2S), moisture and other substances. Biogas is used as a fuel; it can be used for any heating purpose, such as cooking. It can also be used in a gas engine to convert the energy in the gas into electricity and heat.



Digestate is what remains after anaerobic biogas digestion and it is comprised of the solid fibrous material fraction emanating from the bio-reactor (acidogenic digestate), and the liquid portion (methanogenic digestate).



What to Look for Choosing the Solution – 8 Factors to Consider

For the specific case of biogas plants, the following conditions and solution features should be considered when choosing the right solution:

- 1 Chemical resistance:**
Evaluated according EN 13529 where the loss of surface hardness of the protection system is measured after contact with some chemicals. Long term resistance, even under pressure requires a minimal loss of hardness of the membrane.
Selection of chemicals depend on the specific contact in each case, but in the situation of biogas plants, agents like sulphuric acid, organic acids or salts are to be tested. Additionally, chemical resistance to liquid manure & silage, etc will be necessary for applications in storage facilities.
- 2 Elastic or crack bridging characteristics:**
One of the most important characteristics of a protective coating is the capacity to remain continuous on substrates which may be subjected to movement. It can be measured using both static and dynamic methods (EN 1067 part 7 methods A or B) and the results are classified under EN 1504 part 2.
- 3 Adhesion to concrete**
Protection systems must have a complete adhesion to substrate (even if this is humid during application) to ensure durability of intervention.
- 4 Temperature resistance:**
The protection must withstand process temperatures between 37°C (Mesophilic) to 55°C (Thermophilic).
- 5 Impermeability to CO₂:**
The protective membrane must be impermeable to CO₂ to prevent carbonation of concrete and later corrosion of rebars.
- 6 Gas tightness:**
Final membrane must prevent gas leakages, ensuring biogas can be discharged effectively.
- 7 Impermeability (water tightness) against positive and negative pressure:**
The capacity of a coating, when adhered to substrate, to avoid capillary absorption can be evaluated according EN 1062 part 3.
- 8 Mechanical resistance:**
Abrasive wear resistance is measured according EN ISO 5470 part 1 evaluating the loss of mass after being subjected to a revolving abrasive wheel under load.

Additionally, mechanical impact resistance needs to be also evaluated by means of measuring the fall energy procedure EN ISO 6272 where the behavior (e.g. cracking or peeling from a substrate) of the membranes is checked when it is subjected to a deformation caused by a falling weight dropped under standard conditions.

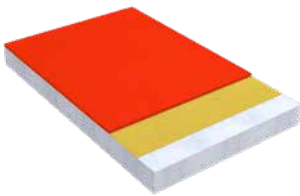
Type of anaerobic digestion processes

	Process Temperature	Residence times
With mesophilic bacteria	Optimal interval between 37 – 41°C	Typically between 15 to 30 days
With thermophilic bacteria	Optimal conditions are between 50 – 52°C, but can be higher than 70°C	Very fast, even allowing continuous production



Our Range of Durable, Proven and Certified Systems and Solutions for Biogas Plants

MasterSeal 7000 CR certified by the “DIBt” (Deutsches Institut für Bautechnik) for the use in biogas facilities, tanks, bunker silos and for containment areas in storage and filling of liquid manure & silage.



MasterSeal 7000 CR

is an elastomeric waterproofing system based on Xolotec - Technology and includes a primer (MasterSeal P 770 or MasterSeal P 385) and a membrane (MasterSeal M 790).



High Chemical Resistance

long-term chemically resistant against biogas, liquid manure and silage media



0,7 mm crack bridging

Crack-bridging for gaps of up to 0.7 mm prevents aggressive chemicals to be in contact with substrate



Moisture tolerance

Including application on humid substrates



5°C to 35°C

Window for manual or spray application



Quick hardening

Return to service only after 24 hours



Resistant to process temperatures

Up to 70°C



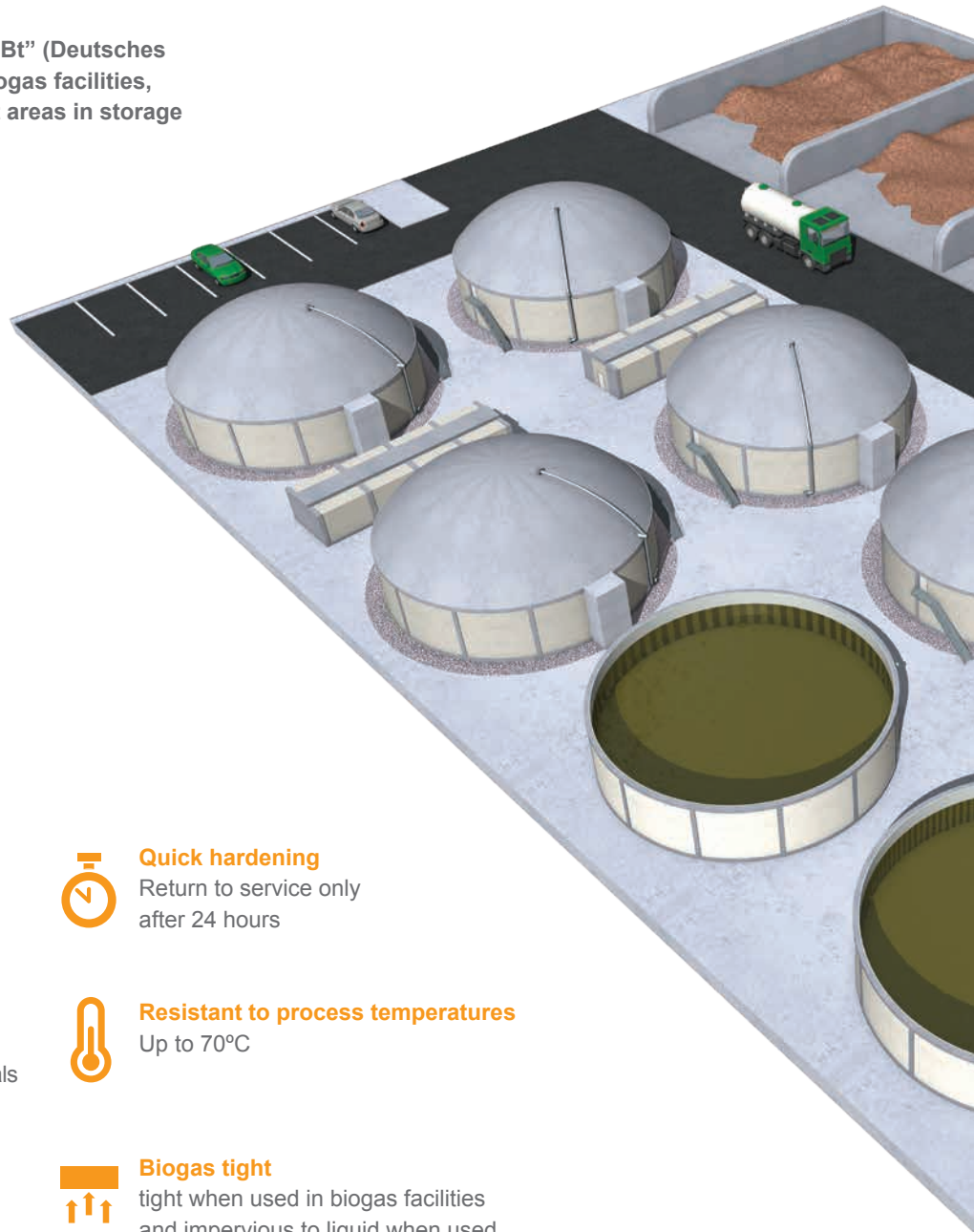
Biogas tight

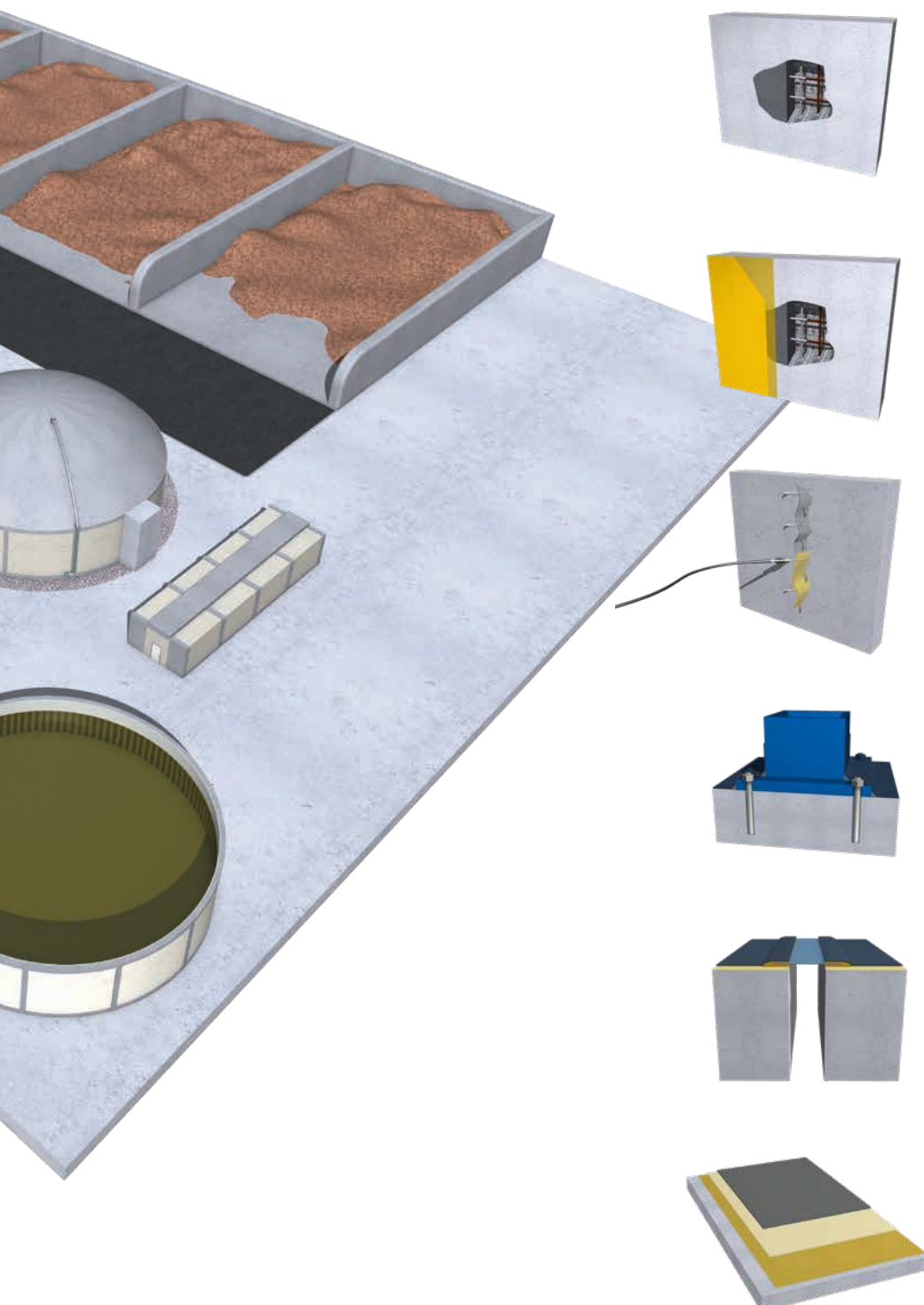
tight when used in biogas facilities and impervious to liquid when used in silo bunkers and storage tanks



Easy to clean

Residues can be removed from the surface





Concrete Repair:

Before installing the protective waterproofing coating, repair damaged concrete structures and create a firm surface with **MasterEmaco S 5440 RS**

External protection:

Protect concrete from carbonation in external side of the tanks with **MasterProtect 330 EL**

Crack Injection:

Structurally rebonding cracked concrete sections with **MasterInject 1380**

Anchoring:

Fix metallic elements and machinery with **MasterFlow 960**

Joint sealing

Movement joints need to be treated with a sealing system, which resists chemically the media to be in contact with **MasterSeal 930/933**

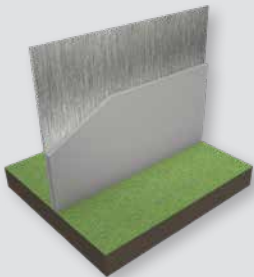
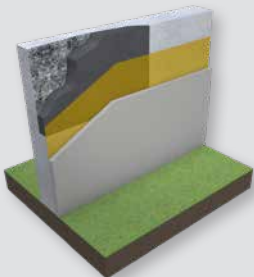
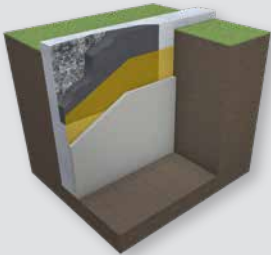
Roof waterproofing:

Avoiding water penetration and structure damage of the tank cover with **MasterSeal Roof 2689**



Our Systems and Solutions in an Overview

The overview shows 3 different systems advising solutions for steel surfaces and concrete structures that need repair and or a waterproofing and protective treatment.

Substrate Preparation	Steel/metal	Concrete structure above ground	Concrete structure below ground
			
Fast repair (if required)		MasterEmaco S 5440 RS	MasterEmaco S 5440 RS
Primer and scratch coat		0,2–0,3 kg/m ² MasterSeal P 770	1,5 kg/m ² MasterSeal P 385
Membrane	0,8 kg/m ² MasterSeal M 790	0,8–1 kg/m ² MasterSeal M 790	0,8–1 kg/m ² MasterSeal M 790
Return to service	24 hours: Sprayed Membrane (ready for service after 24 hours)	53 hours: Repair (recovery after 24 hours) Primer (recoating after 5 hours) + Sprayed Membrane (ready for service after 24 hours)	53 hours: Repair (recovery after 24 hours) Primer (recoating after 5 hours) + Sprayed Membrane (ready for service after 24 hours)



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Find real cases where challenges in biogas plants were solved and much more job references

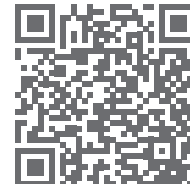
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Solunaut is a tool designed for all professionals in the construction industry. It provides an overview of our solutions by application in the food and beverage, chemical and waste-water industry, including TDS and the possibility of contacting us directly if there are any questions.

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Master Builders Solutions





The Master Builders Solutions brand brings all of our expertise together to create chemical solutions for new construction, maintenance, repair and renovation of structures. Master Builders Solutions is built on the experience gained from more than a century in the construction industry. The know-how and experience of a global community of construction experts form the core of Master Builders Solutions.

We combine the right elements from our portfolio to solve your specific construction challenges. We collaborate across areas of expertise and regions and draw on the experience gained from countless construction projects worldwide. We leverage global technologies, as well as our in-depth knowledge of local building needs, to develop innovations that help make you more successful and drive sustainable construction.

The comprehensive portfolio under the Master Builders Solutions brand encompasses concrete admixtures, cement additives, solutions for underground construction, waterproofing solutions, sealants, concrete repair & protection solutions, performance grouts, performance flooring solutions and solutions for on- and offshore wind energy.

Our comprehensive portfolio

- Concrete admixtures
- Cement additives
- Chemical solutions for underground construction
- Waterproofing solutions
- Sealants
- Concrete repair and protection solutions
- Performance grouts
- Wind turbine grouts
- Performance flooring solutions



Master Builders Solutions for the Construction Industry

MasterAir

Complete solutions for air entrained concrete

MasterBrace

Solutions for concrete strengthening

MasterCast

Solutions for the manufactured concrete product industry

MasterCem

Solutions for cement manufacture

MasterEase

Low viscosity for high performance concrete

MasterEmaco

Solutions for concrete repair

MasterFinish

Solutions for formwork treatment and surface improvement

MasterFlow

Solutions for precision grouting

MasterFiber

Comprehensive solutions for fiber reinforced concrete

MasterGlenium

Solutions for high performance concrete

MasterInject

Solutions for concrete injection

MasterKure

Solutions for concrete curing

MasterLife

Solutions for enhanced durability

MasterMatrix

Advanced rheology control for concrete

MasterPel

Solutions for hydrophobization, anti-efflorescence and surface protection

MasterPolyheed

Solutions for mid-range concrete

MasterPozzolith

Solutions for water-reduced concrete

MasterProtect

Solutions for concrete protection

MasterRheobuild

Solutions for high strength concrete

MasterRoc

Solutions for underground construction

MasterSeal

Solutions for waterproofing and sealing

MasterSet

Solutions for set control

MasterSphere

Solutions for guaranteed freeze-thaw resistance

MasterSuna

Solutions for sand and gravel in concrete

MasterSure

Solutions for extraordinary workability retention

MasterTop

Solutions for industrial and commercial floors

Master X-Seed

Advanced accelerator solutions for concrete

Ucrete

Flooring solutions for harsh environments



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