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**Edward H. Canon founds Standard Dry Wall Crafts in the USA**

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1912</td>
<td>Edward H. Canon founds Standard Dry Wall Crafts in the USA</td>
</tr>
<tr>
<td>1931</td>
<td>Introduction of first waterproof pointing mortar</td>
</tr>
<tr>
<td>1940</td>
<td>First Thoro repair mortar was introduced</td>
</tr>
<tr>
<td>1960</td>
<td>Introduction of polymer additive for cement-based mortars</td>
</tr>
</tbody>
</table>

Thoroseal  
Thoro Quickseal  
Waterplug

Thoro Dryjoint  
Thoro Thorite

Thoro Acryl 60
In 1912, construction engineer Edward H. Canon had no idea his Thoro product line would help to generate a major player in the global specialty construction product market. His company, Standard Dry Wall Crafts, had a simple goal: 

**to solve problems for the construction industry**

by providing the best products for the job.

Standard Dry Wall Crafts was renamed into Thoro System Products, a company that obtained a global reputation for quality and reliability where it counts – jobsite after jobsite.

With almost 100 years of experience in concrete repair and waterproofing, Thoro has the know-how to provide the right solution, whatever the problem. The goal of Thoro has never changed – **offer innovative and job specific solutions for the construction industry.** Its unrivalled track record is backed by a product range renowned for quality and durability.

Thoro products are universally approved by internationally recognized test institutes in countries like Germany, UK, Norway, Finland, Spain, Belgium, USA, Italy and many others.

All Thoro products are produced according the most strict procedures and norms, while being backed by research & development facilities.

The Thoro production unit in Ham, Belgium is certified under EN ISO9001 and EN ISO14001.

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<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>Thoro opens European headquarters and production facility in Mol, Belgium</td>
</tr>
<tr>
<td>1986</td>
<td>First polymer modified repair mortar was launched</td>
</tr>
<tr>
<td>1990</td>
<td>Launch of flexible, crack bridging cementitious waterproofing slurry</td>
</tr>
<tr>
<td>1999</td>
<td>Acquisition of Thoro by SKW.MBT nowadays BASF Construction Chemicals</td>
</tr>
<tr>
<td>2009</td>
<td>Launch of a new range of waterproofing and repair products</td>
</tr>
</tbody>
</table>

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![ISO 9001 and ISO 14001 certification](image)
Concrete Repair – Current Situation

With an estimated over 50% of the annual European construction budget spent on the repair and refurbishment of existing structures, buildings and facilities, proper maintenance of these structures and the correct repair of deteriorating reinforced concrete should a vital part of any repair or refurbishment strategy.

As the structure ages, and budget and resource restrictions on new build become ever tighter, this figure can only increase further.

Many causes of concrete deterioration require that a proper maintenance of that concrete is essential in order to guarantee the designed lifetime. Concrete repair is a specialist activity requiring fully trained and competent personnel at all stages of the process.

Nevertheless simple “patch and paint” strategies have been used as short term repairs. As such strategy often does not address the real cause of the problem, failures are almost programmed and the clients’ expectations are not met.

“25% of the structure owners are unhappy with the performance of the repair and protection materials within 5 years after the rehabilitation; 75% are dissatisfied within 10 years!!!”

CONREPNET, November 2004
EN 1504: The Documents

<table>
<thead>
<tr>
<th>EN 1504</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 1504-1</td>
<td>Terms and definitions within the standard</td>
</tr>
<tr>
<td>EN 1504-2</td>
<td>Specifications for surface protection products/systems for concrete</td>
</tr>
<tr>
<td>EN 1504-3</td>
<td>Specifications for the structural and non-structural repair</td>
</tr>
<tr>
<td>EN 1504-4</td>
<td>Specifications for structural bonding</td>
</tr>
<tr>
<td>EN 1504-5</td>
<td>Specifications for concrete injection</td>
</tr>
<tr>
<td>EN 1504-6</td>
<td>Specifications for anchoring of reinforcing bars</td>
</tr>
<tr>
<td>EN 1504-7</td>
<td>Specifications for reinforcement corrosion protection</td>
</tr>
<tr>
<td>EN 1504-8</td>
<td>Quality control and evaluation of conformity for the manufacturing companies</td>
</tr>
<tr>
<td>EN 1504-9</td>
<td>General principles for the use of products and systems, for the repair and protection of concrete</td>
</tr>
<tr>
<td>EN 1504-10</td>
<td>Site application of products and quality control of the works</td>
</tr>
</tbody>
</table>

The new European norm EN 1504

Poor understanding of the causes for concrete deterioration, incorrect diagnosis, incorrect repair specifications and rehabilitation techniques, and the wrong choice of repair products have lead to dissatisfaction from building owners.

The aim of the new European norm EN 1504 is to standardize all aspects of the repair process and provide an improved framework for achieving successful, durable repairs, and, satisfied clients.

EN1504 deals with:

- definitions and repair principles
- the need for accurate diagnosis of causes before specification of the repair method
- detailed understanding of the needs of the client
- product performance requirements, test methods, material production control and evaluation of conformity
- site application methods and quality control of works

Performance characteristics and acceptance criteria for the different type of materials are defined in EN1504, parts 2 to 7. An initial type testing (ITT) has to prove the quality of the products. To warrant that the products fulfill all the criteria as defined in the norm, this ITT plus, a factory production control and regular quality control supervisions are carried out by an external notified body. This notified body issues the relevant EC-certificate and remains responsible for the regular certifications.
Thoro® Structurite R4

Thoro Structurite R4 is a one-component fast-setting, polymer-modified structural repair mortar. It contains a specially incorporated corrosion inhibitor that prevents the offset of corrosion of any embedded reinforcement. The product is ideally suited for the repair of concrete, where application times are limited. Typical applications involve the structural repair of damage caused by reinforcement corrosion, mechanical damage, alkali-aggregate reaction, etc.

The product can be used in all possible exposure conditions as it fulfils all testing requirements of EN 1504 part 3, more specific the harshest durability tests.

Product benefits:
- Thoro Structurite R4 meets the requirements of a class R4 mortar according EN 1504-3
- Excellent bond strength
- Low capillary water absorption, but vapour permeable
- Freeze/Thaw resistant
- Polymer modified
- Long pot life that helps application, but fast setting
- No formwork required
- No separate primer required
- Carbonation resistant
- Corrosion inhibitor inside: Excellent protection of reinforcement, even with low cover
- Can be used in vertical and overhead applications

Technical data:
- Pot-Life: ca. 20 minutes at 20 °C
- Final setting time: ca. 30 minutes at 20 °C
- Compressive strength: ≥ 45 MPa after 28 days
- Adhesion strength: ≥ 2.3 MPa
- Modulus of elasticity: 25 GPa
- For layer thickness: 5 – 50 mm
Thoro® Structurite 100

Thoro Structurite 100 is a shrinkage compensated repair mortar for hand or spray application. Large areas are easily repaired in thicknesses of 5 to 40 mm.

A rough surface profile prior to the application of this repair mortar ensures a durable bond and a successful repair of the concrete structure.

Product benefits:
- Thoro Structurite 100 meets the requirements of a class R4 mortar according EN 1504-3
- Can be trowel and spray applied
- Shrinkage compensation ensures full positive contact with host concrete and load transfer in structural repair situations
- Reduced risk of cracking due to plastic and post cure shrinkage compensation
- No separate primer required
- Can be spray-applied; rapid application of large quantities
- Low rebound when spray applied. Savings in material cost
- Low permeability; gives excellent resistance to attack by aggressive elements
- Carbonation resistant
- Excellent freeze-thaw resistance
- Sulphate resistant

Technical data:
- Pot-Life: 60 minutes at 20 °C
- Compressive strength: ≥ 50 MPa after 28 days
- Adhesion strength: ≥ 2.0 MPa
- Modulus of elasticity: 28 GPa
- For layer thickness: 5 – 40 mm
  (if > 20 mm in areas > 1 m², secondary reinforcement is advised)
Thoro® Structurite FR

Thoro Structurite FR is a single-component, pourable self-compacting cementitious repair mortar. It is particularly suitable for applications where structural reinstatement is involved. It is appropriate for locations involving congested reinforcement and does not require the use of vibration equipment to achieve compaction.

Typical applications include the repair of concrete beams, columns and concrete floors.

Product benefits:
• Thoro Structurite FR meets the requirements of a class R4 mortar according EN 1504-3
• Free flowing, self-compacting, without segregation and bleed
• Rapid early strength gain
• High ultimate strength
• Can be poured and pumped
• Sulphate resistant
• Carbonation resistant
• Resists the actions of de-icing salts and freezing and thawing cycles

Technical data:
• Pot-Life: > 30 minutes at 20 °C
• Compressive strength: approx. ≥ 50 MPa after 28 days
• Adhesion strength: ≥ 3.5 MPa
• Modulus of elasticity: 28 GPa
• For layer thickness: 5 – 100 mm
• Skid resistance: Class III (under wet conditions tested)
Thoro® Structurite Light

Thoro Structurite Light is a one component, polymer modified cement-based lightweight concrete repair mortar specially suited for overhead and vertical concrete repairs and deep repair areas where lightweight properties give particular application advantages.

Suitable for repairing both reinforced and un-reinforced concrete. A specially incorporated corrosion inhibitor prevents the offset of corrosion of any embedded reinforcement and adjacent areas.

Product benefits:
- Thoro Structurite Light meets the requirements of a class R3 mortar according EN 1504-3
- Low density: high-build application, low consumption
- Corrosion inhibitor inside: Excellent protection of reinforcement, even with low cover
- Can be spray or trowel applied
- Fast and easy finishing and shaping
- No formwork required
- Excellent workability
- No separate primer required, only a slurry coat of the material is used
- Over-coatable: after just 1 day

Technical data:
- Density (mixed): approx. 1.6 g/cm³
- Pot-Life: ca. 30 minutes at 20 ºC
- Final setting time: ca. 60 – 90 minutes at 20 ºC
- Compressive strength: ≥ 30 MPa after 28 days
- Adhesion strength: > 1,5 MPa
- For layer thickness: 5 – 75 mm (overhead up to 50 mm)
Thoro® Structurite Primer

Thoro Structurite Primer is a one-component, polymer modified reinforcement primer with excellent active rust inhibiting properties. Mixed with water, Thoro Structurite Primer forms a slurry for application by brush to clean exposed reinforcement and cures to form a light grey coating.

As an anti-corrosion primer for steel reinforcement before concrete repair, Thoro Structurite Primer is recommended for use where the reinforcement is within 10 mm of the finish surface or where chlorides are present. The product can also be ideally used to prevent rusting of the reinforcement, shortly after cleaning to bright steel and where the final repair work can not immediately be finished.

**Product benefits:**
- Excellent rust inhibiting properties
- Chloride and water resistant
- One component, only to be mixed with water
- Cures in damp enclosed areas
- Long pot life and short re-coating time: Two coats can be applied with same mix (no wastage)
- Can be applied on steel reinforcement cleaned to SA 2
- Light grey colour for ease of application

**Technical data:**
- Pot Life: approx. 60 minutes at 20 ºC
- Re-coating interval: approx. 30 minutes at 20 ºC
- Shear adhesion: >95 % bond strength as determined for uncoated bars
- Active protection by:
  - High alkalinity of cement
  - Polymer modification
  - Active inhibitor

<table>
<thead>
<tr>
<th>EN 1504-7 1-component reinforcing primer</th>
<th>Coated zones of the steels are free of corrosion and if rust creep at the ground plate edge &lt; 1 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosion protection EN 15163</td>
<td>Coated zones of the steels are free of corrosion and if rust creep at the ground plate edge &lt; 1 mm</td>
</tr>
<tr>
<td>Shear adhesion (coated steel to concrete) EN 15164</td>
<td>Bond stress at a displacement of g &gt; 0.1 mm The bond stress determined with the coated bars is in each case at least 80% of the ref. bond stress determined for the uncoated bars</td>
</tr>
</tbody>
</table>

BASF Belgium Coordination Center Comm. V. – Business Belux - Construction Chemicals
Nijverheidsweg 90, B-3945 Ham

0749
0749 - CPD
BC2-007-0013-0000-001
Thoro® Structurite Level

Thoro Structurite Level is a single component, polymer modified cementitious levelling mortar that produces a fair-face finish to new concrete or as part of a concrete repair system.

Can be applied in 2 – 10 mm layers to fill all surface blowholes, cracks and irregularities whilst providing an ideal surface for protective coatings.

Product benefits:
- Thoro Structurite Level meets the requirements of a class R2 mortar according EN 1504-3
- Can be applied on damp substrates
- For internal and external use
- Excellent workability
- Freeze-thaw resistant
- Can be trowel and spray applied
- Edge repair up to 10 mm
- Self curing: no curing compounds or wet curing needed
- Over-coatable: after 1 day
- Weatherproof
- Very low water absorption, but water vapour permeable

Technical data:
- Pot-Life: ≥ 45 minutes at 20°C
- Compressive strength: ≥ 35 MPa after 28 days
- Adhesion strength: ≥ 0.8 MPa
- Adhesion strength after freeze/thaw: ≥ 0.8 MPa
- For layer thickness: 2 – 10 mm
Thoro® Crete HS

Thoro Crete HS, is a fast setting, high early strength, polymer modified repair mortar for traffic bearing concrete.

Long term volume stability and extremely low drying shrinkage properties allow the product to be applied on large areas and in large thickness (up to 50 mm). Filled with gravel, it can even be applied up to 10 cm thickness. The fast setting and hardening properties allow for the traffic to be re-opened just 2 hours after the application.

Thoro Crete HS is typically used on bridge structures, roads, airport runways and platforms, factory and warehouse floors.

Product benefits:
- Thoro Crete HS meets the requirements of a class R4 mortar according EN 1504-3
- Fast installation
- Excellent bond to concrete and other mineral substrates
- Freeze/Thaw resistant
- Vapour permeable – very low water absorption
- Rapid strength development, allows easy traffic management

Technical data:
- Pot-Life: ca. 20 minutes at 20 ºC
- Final setting time: ca. 45 minutes at 20 ºC
- Compressive strength:
  - After 2 hours: approx. 15 MPa
  - After 28 days: approx. 55 MPa
- Skid resistance: Class III (tested under wet conditions)
- Adhesion strength: ≥ 2.4 MPa
- For layer thickness: 5 – 50 mm

<table>
<thead>
<tr>
<th>EN 1504-3</th>
<th>Fast setting, polymer modified, traffic repair mortar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressive strength</td>
<td>Class R4</td>
</tr>
<tr>
<td>Chloride ion content</td>
<td>≤ 0.05 %</td>
</tr>
<tr>
<td>Adhesion</td>
<td>≥ 2.0 MPa</td>
</tr>
<tr>
<td>Durability - Freeze/Thaw</td>
<td>≥ 2.0 MPa</td>
</tr>
<tr>
<td>Skid resistance</td>
<td>Class III</td>
</tr>
<tr>
<td>Capillary absorption</td>
<td>≤ 0.5 kg/m² x h⁰.⁵</td>
</tr>
<tr>
<td>Fire resistance</td>
<td>F</td>
</tr>
<tr>
<td>Dangerous substances</td>
<td>Complies with 5.4</td>
</tr>
</tbody>
</table>
Thoro® Crete SL

Thoro Crete SL, is a self levelling two-component, repair mortar, for the resurfacing or repair of damaged traffic bearing concrete. This polymer modified, shrinkage compensated mortar can be applied in layer thickness' varying from 5 to 25 mm.

Provides a smooth, wear-resistant surface suitable for a variety of applications as factory and warehouse floors, loading bays car parks, garages and roadways, balconies.

Product benefits:
- Easy and fast to apply: Self-levelling – no trowelling is required
- Tough and durable, non dusting surface
- Can be mixed and placed mechanically
- High adhesion
- To be applied on damp substrates
- Freeze/Thaw resistant according to SS 137244

Technical data:
- Pot-Life: ca. 20 minutes at 20 °C
- Compressive strength:
  – After 1 day: ≥ 10 MPa
  – After 28 days: ≥ 35 MPa
- For layer thickness: 5 – 25 mm
- Adhesion strength: ≥ 2.0 MPa
- Modulus of elasticity: 20 GPa
Thoro® specification guide

Selecting the right product for each application…

With this specification guide you can easily find which product to be used for your needs. Following scheme and tables summarise the main features of the described products to assist the right product selection. Contact your nearest BASF Construction Chemical technical office or your nearest Thoro distributor for further or detailed advice.

<table>
<thead>
<tr>
<th>Product</th>
<th>Type of material</th>
<th>Certified according</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thoro Structurite R4</td>
<td>PCC mortar</td>
<td>EN 1504-3/Class R4</td>
</tr>
<tr>
<td>Thoro Structurite 100</td>
<td>CC mortar</td>
<td>EN 1504-3/Class R4</td>
</tr>
<tr>
<td>Thoro Structurite FR</td>
<td>CC mortar</td>
<td>EN 1504-3/Class R4</td>
</tr>
<tr>
<td>Thoro Structurite Light</td>
<td>PCC mortar</td>
<td>EN 1504-3/Class R3</td>
</tr>
<tr>
<td>Thoro Structurite Level</td>
<td>PCC mortar</td>
<td>EN 1504-3/Class R2</td>
</tr>
<tr>
<td>Thoro Crete HS</td>
<td>PCC mortar</td>
<td>EN 1504-3/Class R4</td>
</tr>
<tr>
<td>Thoro Crete SL</td>
<td>PCC mortar</td>
<td>n.a.</td>
</tr>
<tr>
<td>Thoro Structurite Primer</td>
<td>PCC mortar</td>
<td>EN1504-7/Class AP</td>
</tr>
</tbody>
</table>
Product selection

<table>
<thead>
<tr>
<th>Products</th>
<th>Typical Application</th>
<th>Consistency</th>
<th>Exposure Conditions</th>
<th>Rebar Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>vertical / overhead</td>
<td>horizontal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thoro Structurite R4</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Thoro Structurite FR</td>
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<tr>
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<td>✓</td>
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<tr>
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<tr>
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<tr>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>n.a.</td>
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</table>

n.a. = not applicable

<table>
<thead>
<tr>
<th>Product</th>
<th>Hardening</th>
<th>Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pot Life @ 20 °C</td>
<td>Compressive Strength after 2 Hours (*)</td>
</tr>
<tr>
<td>Thoro Structurite R4</td>
<td>ca. 20 minutes</td>
<td>–</td>
</tr>
<tr>
<td>Thoro Structurite 100</td>
<td>ca. 60 minutes</td>
<td>–</td>
</tr>
<tr>
<td>Thoro Structurite FR</td>
<td>ca. 30 minutes</td>
<td>–</td>
</tr>
<tr>
<td>Thoro Structurite Light</td>
<td>ca. 30 minutes</td>
<td>–</td>
</tr>
<tr>
<td>Thoro Structurite Level</td>
<td>ca. 45 minutes</td>
<td>–</td>
</tr>
<tr>
<td>Thorocrete HS</td>
<td>ca. 20 minutes</td>
<td>15 MPa</td>
</tr>
<tr>
<td>Thorocrete SL</td>
<td>ca. 20 minutes</td>
<td>–</td>
</tr>
</tbody>
</table>

(*) These values are typical values and not warranted minima
Welcome to the world of Thoro®

Thoro offers innovative and job specific solutions for the construction industry. Since 1912, and with almost 100 years of experience in waterproofing and concrete repair, Thoro has the know-how to provide the right solution for your problem. Thoro products are universally approved by internationally recognized test institutes, while the Thoro production unit in Ham, Belgium is certified under EN ISO9001 and EN ISO14001.

Thoro® offers:

Thoroseal® – cementitious waterproofing products
Waterplug® – fast setting cementitious waterstop
Thoro® Swell – hydroswelling gaskets
Thoro® Acryl 60 – acrylic bonding agent
Thoro® Structurite – concrete repair mortars
Thoro® Crete – horizontal concrete repair mortars
Thoro® Lastic – elastomeric protective coatings
Thoro® Enviroseal – water repellents
Thoro® Grout – cementitious precision grouts

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