

fondital

**Anti-corrosion
treatment
for radiators**

(System patented by **Fondital**)



| GB |

Aleternum®: Anti-corrosion

Introduction



Aleternum® internal coating by Fondital

Corrosion is the primary cause of malfunctions in heating systems. Not only does it deteriorate the components of the system, but over the years corrosion significantly reduces efficiency, increasing consumption and, as a result, operating costs.

For example, corrosion in a heating system containing cast iron or steel radiators produces a sludge that accumulates at the bottom of the radiators, obstructing the radiators themselves and the pipes, resulting in a partial or total loss in thermal performance and uneven heat distribution.

In conventional aluminium radiators, corrosion produces gas pockets which prevent the radiator from heating evenly and may limit thermal performance.

To stop corrosion even before it starts, **Fondital** has developed **Aleternum®**, an exclusive resin-based internal coating to protect the radiator water chamber.

Aleternum® by **Fondital** brings the heating system into a new era, in which total protection is a guarantee of safety and high efficiency.

Your heating system will always be as good as new!

Treatment for Radiators

What is corrosion?

✓ It is the chemical and physical interaction between a metal and a water-based medium, which causes changes in the properties of the metal and which often leads to a loss in the functionality of the metal itself, of the medium or of the system consisting of these two elements.



Metal + Water

+ Oxidant = Corrosion

Depending on the part of the metal affected, corrosion is classified as follows:

- ✓ **diffused corrosion (or generalised corrosion):** if the entire surface of the metal is affected by corrosion;
- ✓ **uniform corrosion:** if the entire surface of the metal is affected by corrosion and the effects of corrosion are equal over the entire surface;
- ✓ **localised corrosion:** where only certain areas of the metal are affected by corrosion. There are numerous different patterns of localised corrosion, among which: ulcers, craters, cavities, pin holes and cracks.

plan view		profile view	
	Uniform Corrosion – generalised attack		
	Uniform Corrosion – uniform attack		
	Localised Corrosion		
	Pitting	craters	
		pin holes	
		cavities	
	Stress corrosion cracking (SCC)	Simple cracks	
		Ramified cracks	
	Corrosion - erosion		

*A guarantee
of quality and
durability*



Advantages of Aleternum® S4

1) THE COMPLETE ANTI-CORROSION TREATMENT

2) IDEAL FOR A BROAD pH SPECTRUM

Conventional aluminium radiators require pH levels between 7 and 8.

The new coating eliminates this limitation, allowing aluminium radiators with the Aleternum coating to operate at a wider pH range than both untreated aluminium and steel (which is subject to corrosive attack at pH levels below 8).

Aleternum® radiators by **Fondital** may be used in heating systems with high or potentially high pH levels.

Conventional aluminium radiator



Radiator with Aleternum coating



3) NO GAS POCKET FORMATION (NO GAS)

4) BURST PRESSION UP TO 60 BAR - IDEAL FOR MULTI-STOREY BUILDINGS

5) WILL NOT BECOME OBSTRUCTED - NO COLD SPOTS

6) LIGHT AND EASY TO INSTALL

7) MAY BE INSTALLED IN MIXED HEATING SYSTEMS

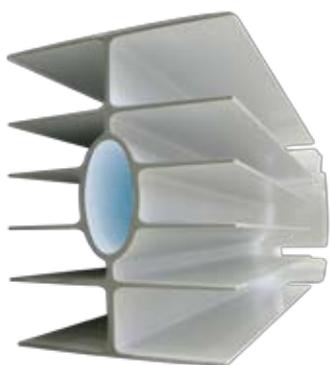
8) EXTENDED WARRANTY UP TO 20 YEARS

9) BETTER EURO/WATT RATIO THAN STEEL AND BIMETAL RADIATORS

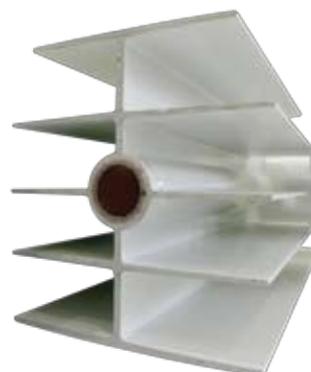
10) PATENTED SYSTEM

Comparison 1

**Aleternum®:
FONDITAL S4 RADIATOR**



**SINGLE-CHANNEL
BIMETAL RADIATOR**



	Aleternum®: FONDITAL S4 RADIATOR		SINGLE-CHANNEL BIMETAL RADIATOR
			

✓ CORROSION COMPARISON

ALLOWED pH VALUES	Can operate in a wide pH range: between 5 and 10		 Cannot be used at water pH levels below 7, as the iron (steel) of the inner channel surface corrodes in acidic pH water conditions
USAGE WITH CHLORINATED WATER	Yes, Aleternum prevents chlorine compounds from attacking the metal		 No, as all unprotected metals are subject to the corrosive effects of chlorine compounds
HOLE FORMATION DUE TO CORROSION	No		 Yes, as a possible result of galvanic corrosion of the internal iron (steel)

✓ PERFORMANCE COMPARISON

THERMAL PERFORMANCE	Aleternum is approximately 12% more efficient than a bimetal radiator with aluminium hub		 A single-channel bimetal radiator with three fins has a heat output of 13 – 14 W less per section than an Aleternum S4
BURST PRESSURE RESISTANCE	Over 50 Bar		 Over 50 Bar
POSSIBILITY OF INSTALLATION IN MIXED HEATING SYSTEMS (STEEL RADIATORS AND ALUMINIUM RADIATORS)	Yes		 Yes
WEIGHT	Light, easy to transport and install, with low thermal inertia and high efficiency		 Heavy, higher transport and installation costs. 500 g more per section than a radiator with Aleternum coating

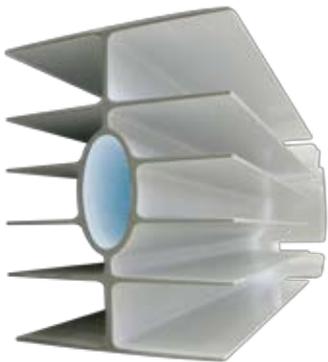
✓ COST COMPARISON

OPERATING COSTS	Lower operating costs and lower fuel consumption		 More expensive than radiators with Fondital Aleternum coating, as the greater volume and weight translates into higher transport and installation costs
€/WATT			

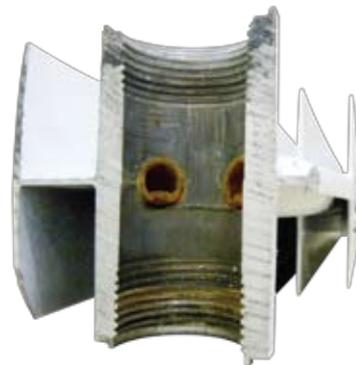
KEY:	 Aleternum performance is Better than that of a single-channel bimetal radiator with aluminium hub	 Aleternum performance is Equal to that of a single-channel bimetal radiator with aluminium hub	 Aleternum performance is Worse than that of a single-channel bimetal radiator with aluminium hub
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Comparison 2

**Aleternum®:
FONDITAL S4 RADIATOR**



**TWO-CHANNEL
BIMETAL RADIATOR
WITH ALUMINIUM HUB**



	Aleternum®: FONDITAL S4 RADIATOR		TWO-CHANNEL BIMETAL RADIATOR WITH ALUMINIUM HUB
			

✓ CORROSION COMPARISON

ALLOWED pH VALUES	Can operate in a wide pH range: between 5 and 10		 Cannot be used at water pH levels below 7, as the iron (steel) of the inner channel surface corrodes in acidic pH water conditions
USAGE WITH CHLORINATED WATER	Yes, Aleternum prevents chlorine compounds from attacking the metal		 No, as all unprotected metals are subject to the corrosive effects of chlorine compounds
HOLE FORMATION DUE TO CORROSION	No		 Yes, as a possible result of galvanic corrosion of the internal iron (steel)

✓ PERFORMANCE COMPARISON

THERMAL PERFORMANCE	Aleternum is approximately 2% more efficient than a bimetal radiator with steel hub		 A two-channel bimetal radiator has a heat output of approximately 3 W less per section than an Aleternum S4 radiator
BURST PRESSURE RESISTANCE	Over 50 Bar		 Over 50 Bar
POSSIBILITY OF INSTALLATION IN MIXED HEATING SYSTEMS (STEEL RADIATORS AND ALUMINIUM RADIATORS)	Yes		 Yes
WEIGHT	Light, easy to transport and install, with low thermal inertia and high efficiency		 Heavy, higher transport and installation costs. 500 g more per section than a radiator with Aleternum coating

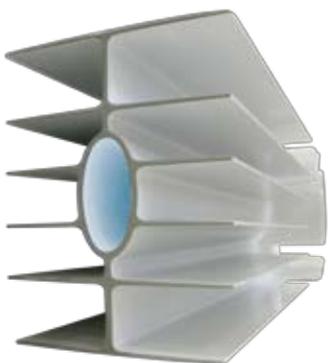
✓ COST COMPARISON

OPERATING COSTS	Lower operating costs and lower fuel consumption		 More expensive than radiators with Fondital Aleternum coating, as the greater volume and weight translates into higher transport and installation costs
€/WATT			

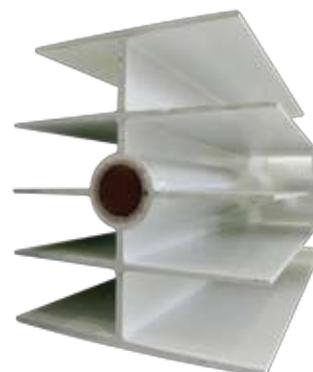
KEY:	 Aleternum performance is Better than that of a two-channel bimetal radiator with aluminium hub	 Aleternum performance is Equal to that of a two-channel bimetal radiator with aluminium hub	 Aleternum performance is Worse than that of a two-channel bimetal radiator with aluminium hub
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Comparison 3

**Aleternum®:
FONDITAL S4 RADIATOR**



**SINGLE-CHANNEL
BIMETAL RADIATOR
WITH STEEL HUB**



	Aleternum®: FONDITAL S4 RADIATOR		SINGLE-CHANNEL BIMETAL RADIATOR WITH STEEL HUB
			

✓ CORROSION COMPARISON

ALLOWED pH VALUES	Can operate in a wide pH range: between 5 and 10		 Cannot be used at water pH levels below 7, as the iron (steel) of the inner channel surface corrodes in acidic pH water conditions
USAGE WITH CHLORINATED WATER	Yes, Aleternum prevents chlorine compounds from attacking the metal		 Yes
HOLE FORMATION DUE TO CORROSION	No		 Yes, as a possible result of galvanic corrosion of the internal iron (steel)

✓ PERFORMANCE COMPARISON

THERMAL PERFORMANCE	Aleternum is approximately 16% more efficient than a bimetal radiator with aluminium hub		 A single-channel bimetal radiator with three fins has a heat output of 13 – 14 W less per section than an Aleternum S4
BURST PRESSURE RESISTANCE	Over 50 Bar		 Over 50 Bar
POSSIBILITY OF INSTALLATION IN MIXED HEATING SYSTEMS (STEEL RADIATORS AND ALUMINIUM RADIATORS)	Yes		 Yes
RADIATOR OBSTRUCTION	Not possible		 Yes - probable in the event of corrosion, resulting in lost thermal performance and efficiency of both the heating system and the boiler
WEIGHT	Light, easy to transport and install, with low thermal inertia and high efficiency		 Heavy, higher transport and installation costs. 500 g more per section than a radiator with Aleternum coating

✓ COST COMPARISON

OPERATING COSTS	Lower operating costs and lower fuel consumption		 More expensive than radiators with Fondital Aleternum coating, as the greater volume and weight translates into higher transport and installation costs
€/WATT			

KEY:



Aleternum performance is Better than that of a single-channel bimetal radiator with steel hub



Aleternum performance is Equal to that of a single-channel bimetal radiator with steel hub



Aleternum performance is Worse than that of a single-channel bimetal radiator with steel hub

Summary

		BROAD ALLOWED pH RANGE FROM 5 TO 10	PROTECTION AGAINST WATER WITH HIGH CHLORINE CONTENT	NO HOLE FORMATION DUE TO CORROSION	HIGH HEAT OUTPUT
		✓ CORROSION COMPARISON			
	ALETERNUM FONDITAL	✓	✓	✓	✓
	SINGLE-CHANNEL BIMETAL RADIATOR				
	TWO-CHANNEL BIMETAL RADIATOR				✓
	SINGLE-CHANNEL BIMETAL RADIATOR (TOTAL INNER COATING)		✓	✓	

BURST PRESSURE RESISTANCE	POSSIBILITY OF INSTALLATION IN MIXED HEATING SYSTEMS	NO RADIATOR OBSTRUCTION	NO COLD SPOTS	LIGHT WEIGHT	REDUCED OPERATING COSTS	BEST €/WATT RATIO
✓ PERFORMANCE COMPARISON					✓ COST COMPARISON	
✓	✓	✓	✓	✓	✓	✓
✓	✓					
✓	✓					
✓	✓					

FAQ (Frequently asked questions) on Aleternum

1	<p>Why was the Aleternum anti-corrosion treatment created? What specific needs does it address?</p>	<p>Aleternum was created to cater for the needs of a constantly evolving market. It is the only patented treatment that eliminates the risk of corrosion phenomena and maximises the already impressive advantages of conventional aluminium radiators.</p>
2	<p>Are radiators treated with Aleternum coating visually the same as previous radiators without the treatment?</p>	<p>From a purely visual standpoint, radiators with the interior coating are identical to Fondital conventional aluminium radiators. This means that Aleternum radiators boast the same superlative qualities that distinguish the brand's products from its rivals, such as anaphoretic paint and powder coat finishes. These fundamental processes in the manufacturing cycle set Fondital products apart in the sanitary plumbing and heating market with unparalleled levels of perfection and quality evident not only in their technical content, but also in their style.</p>
3	<p>How can you tell the difference between a radiator without this anti-corrosion treatment and an Aleternum radiator?</p>	<p>The difference is in the heart of the radiator itself. The water chamber is completely coated in a resin that seals the metal, preventing contact between the material and the aggressive substances in the heating system water and inhibiting all corrosive phenomena.</p>
4	<p>What is the Aleternum internal coating made of?</p>	<p>The coating consists of a specifically developed and tested resin.</p>
5	<p>Do radiators with the Aleternum coating have better thermal performance than the competitors? And compared with earlier Fondital models?</p>	<p>Aleternum radiators have a higher Euro/watt ratio than steel and bimetal radiators produced by rival manufacturers. Aleternum guarantees the same power as equivalent Fondital models without the treatment, therefore ensuring the same demonstrated superior performance relative to rival radiators. As demonstrated by the following comparisons, these radiators offer higher thermal performance than bimetal radiators for analogous applications:</p> <ul style="list-style-type: none"> • Aleternum radiators are on average 12% more efficient than single-channel bimetal radiators with an aluminium hub. • Aleternum radiators are on average 2% more efficient than two-channel bimetal radiators with an aluminium hub. • Aleternum radiators are on average 16% more efficient than single-channel bimetal radiators with a steel hub.
6	<p>Which academic institutes have tested the patented Aleternum system?</p>	<p>The Aleternum treatment is the product of a partnership with one of the most prestigious Italian universities. For years, Fondital's internal R&D department has worked in collaboration with the Milan Research Consortium to develop the innovative and extraordinary patented Aleternum system. Fondital is currently also collaborating with research institutes outside Italy.</p>

7	<p>Why is Aleternum ideal for multi-storey buildings?</p>	<p>All Aleternum models are capable of withstanding very high pressures (burst pressure resistance up to 60 Bar), and can therefore be used without any problems in multi-storey applications.</p> <p>Aleternum has not only maintained the superlative thermal and aesthetic qualities of the brand's aluminium radiators without the Aleternum coating but it also represents the state of the art in terms of technical content.</p> <p>This is why these radiators are ideal for installation in multistorey buildings - even over 100 floors tall - as they have been tested to pressures of up to 60 Bar.</p>
8	<p>Why are they also ideal for mixed heating systems?</p> <p>a. Were previous radiators unsuitable for these applications?</p>	<p>Aleternum radiators ensure protection against contact with any corrosion by-products of other metals in the system, and can therefore be installed in heating systems that include or previously included different types of radiators - such as units in steel or cast iron.</p> <p>Radiators without the Aleternum coating are exposed to the risk of corrosion if installed in such a system.</p>
9	<p>Questions about the new S5 and Super models. Aluminium radiators in general and, as a result, Aleternum radiators are lighter than those manufactured by competitors. Does this mean that they are also weaker?</p>	<p>Lightness has nothing to do with performance.</p> <p>There are countless cases in the automotive industry that illustrate this concept very clearly - carmakers are now producing engines that are significantly lighter than they were in the past, but with no compromises in terms of performance.</p>
10	<p>Can Aleternum only be used therefore in cases with particularly corrosive water conditions?</p>	<p>Aleternum was conceived to respond to the needs of markets where the water is at or may reach extreme pH levels, but its class-beating characteristics have now made it an all-round product.</p>
11	<p>Can Aleternum be used with pH values above 10?</p>	<p>While pH levels will never exceed 10 in a residential heating system, Aleternum still guarantees protection up to a pH of 11.</p>
12	<p>What does having the best €/Watt ratio mean?</p>	<p>It means that less money is spent for purchasing the radiator in order to heat a given space, as cost is determined in relation to thermal performance, not in relation to dimensions. Similarly sized radiators may vary significantly in terms of heat output.</p>

13	How does Aleternum prevent the formation of cold spots?	Aleternum protects against corrosion. Without corrosion, no gas pockets are formed in the heating system and there are no obstacles to the heat exchange between the hot water and the radiator. As a result, the radiators are always uniformly warm.
14	So previous radiator types could not withstand particularly corrosive water conditions?	No, since water quality has a major influence on the durability of a radiator.
15	Exactly why is an Aleternum aluminium radiator more ecological than a competitor product?	Like all aluminium radiators, Aleternum is an ecological heating system for a number of different reasons: 1. Aluminium is 100% recyclable 2. The processes involved in the production of aluminium radiators use less energy than the processes used by competitors to produce bimetal or steel radiators. 3. Lighter weight means less expensive transport and handling costs and, as a result, lower fuel consumption and carbon dioxide emissions.
16	Is the internal water chamber the same as before?	The shape of the water chamber is the same as in former models, and the resin coating has no influence whatsoever on the dimensions of the channel and, as a result, on the flow of CH water.
17	Is thermal performance the same as before?	Aleternum maintains the same high thermal performance of previous models; the internal coating has not reduced thermal efficiency in any way.
18	Has the bottom cap been modified?	By its very nature, the process to weld a cap onto the radiator leaves welding burrs on both the interior and exterior of the radiator itself. While the external burrs are machined off, the internal ones cannot be removed, and their irregular surface is practically impossible to coat with resin. As a result, a new cap system has been adopted, which does not require welding and uses an O-ring to ensure seal tightness. This patented cap is also coated to ensure the same corrosion protection as the rest of the Aleternum radiator. This solution also means that there is no siphon at the bottom of the element, in which harmful corrosion-inducing substances could accumulate.

19	<p>Do Aleternum radiators come in the same packaging as the S3 and S4 models?</p>	<p>Distinctive new graphics have been created for the packaging for Aleternum radiators to differentiate them significantly from other products; the design, however, is still coherent with the image of the Fondital brand - a brand that stands for 100% Italian quality and is the world's leading manufacturer of die-cast radiators.</p> <p>The characteristics of the packaging itself have also been substantially improved: in addition to the inner film protecting the radiator against moisture, the box is sealed in heat-shrink plastic film, which keeps the cardboard in excellent condition and makes the product more visually appealing for sale in large scale retail outlets.</p>
20	<p>What tools is Fondital providing its clients to facilitate the launch of this new product on the market?</p>	<p>Specific POP display units and high visual impact informative material have been created to facilitate our clients and their sales networks to fully communicate the advantages of the product with the Aleternum coating.</p> <p>Seminars and technical training events will also be organised to provide instruction and build loyalty among local operators.</p>
21	<p>Why is Aleternum only applied in the S4 products and not in the S3?</p>	<p>This is a commercial choice, to add yet another advantage to the technologically more advanced product.</p>
22	<p>How long is the guarantee offered for this product?</p>	<p>Aleternum is the first and only aluminium radiator on the international market with guarantee extended up to 20 years as proof of the eternal quality of Aleternum radiators.</p>
23	<p>What about Aleternum production process?</p>	<p>This is a patented additional treatment, applied between the two painting stages.</p>

The manufacturer reserves the right to make any modifications deemed necessary without prior notification.



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