

ALUMINIUM AS A DURABLE BUILDING MATERIAL [1]

Aluminium can be found in many different products. Think of the many iPhone's and Mac's that Apple brings to the market. It's also found in various laptops, flat screen TVs, protective cases and even in furniture. As well as the technical specifications, there is another good reason for this: aluminium is durable.

Aluminium durable? The fact that many do not associate this with the material is understandable. The high energy demand during production in particular creates a negative image. Yet aluminium is a durable substance. Not just in consumer products; it also forms a durable solution in construction. How is that? In this article we will discuss all aspects, from production to the end of the life cycle.

DURABLE ALUMINIUM EXTRACTION

A report from [The Council for Aluminium in Building \[2\]](#) (CAB) show that aluminium is the most common metal on earth. As a result, it's unlikely that it will become scarce in the future. In the next 1250 years there will still be economically viable resources available. This is in stark contrast to other metals. For example, iron has 155 years of economically viable resources, copper 41 years and lead only 28. The viability of aluminium will further increase as a result of the rise in recycling.

Aluminium is extracted in the form of bauxite ore. 30 km² of new surface area is utilised annually for extraction. The largest part of that surface area is made of forest areas. In order to minimize the impact on the landscape, rehabilitation plans have been drawn up. The area mined will on completion be returned to its original state as much as possible.

According to the CAB, 97% of the mining companies have formal rehabilitation plans in place for this. Thanks to this rehabilitation, approximately the same amount of surface area will be recovered as is being exploited annually, according to the Dutch Aluminium Centre.

POSITIVE DEVELOPMENTS AROUND ENERGY CONSUMPTION

Durability is therefore central to the extraction of aluminium. Why is this type of metal met with such resistance? A big stumbling block for opponents of aluminium is the high energy consumption during production. The production of aluminium is an energy-intensive process. 3.5% of global energy consumption is used in primary aluminium production. Fortunately there are some positive developments taking with regard to this: According to the CAB, the required amount of energy has been driven down by 70% since 1900. More use is also being made of clean energy sources such as hydropower. [Rusal \[3\]](#), the largest aluminium producer in the world, produces 90% of their aluminium using hydroelectricity.

The CAB also provides an interesting perspective on this: Although the energy consumption in production is high, it is important to offset that against its lifespan. If we look at the durability of aluminium, the required energy can be put into perspective. In the construction industry, aluminium lasts for decades. In that sector, the lifespan even has a cut off value of no less 60 years. That is impressive! Spread the initial energy requirement out across all these years, then it's not that bad.

RECYCLING IS ON THE UP; COSTING MUCH LESS

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Aluminium primary production has a high energy requirement, this is much lower when recycling aluminium! Secondary production requires 60% less energy than primary production. No electrolysis is required for recycling. That step is by far the most energy-consuming. The most energy-consuming step, the melting of aluminium, requires very little energy.

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Research points out that secondary production of aluminium is on the increase proportionately. In 2013, 28% of the total production was made up of this recycling process. Such figures are also echoed by the Dutch Aluminium Centre.

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It's not just the low energy requirement that makes recycling attractive, but also that aluminium has a very special property: It can be recycled repeatedly without degradation! The recycling process does not affect the quality of the aluminium. That aspect makes the material even more durable. And that brings us directly to the next point: the life cycle.

Because

LIFECYCLE

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What makes aluminium a durable material is the whole life cycle. As indicated earlier, in the construction industry aluminium has a particularly long lifespan equalling decades. Countless years will pass before the material reaches the end of its life. And what happens at the end of the life cycle? By far the largest part of the aluminium is then reused.

When demolishing construction works, by far the largest proportion is recycled, according to the Aluminium Centre. Only 6% of aluminium used can no longer be utilised or recovered. The CAB also echoes this with a [study carried out by the University of Delft](#) [4]. It shows that between 92% and 98% of the aluminium used can be utilized at the end of the life cycle.

The end of the life span is therefore not really the end for the material. It can lead a new, long life thanks to secondary production. The long life and high level of reuse make aluminium a truly durable product. The evidence of these qualities? 75% of all aluminium produced is still actively used, [according to The International Aluminium Institute](#) [5]. That says a lot about the durability and recyclability of the material!

LOW MAINTENANCE

An additional benefit is the low level of maintenance required by the material. For aluminium frames, for example, simple periodic cleaning is sufficient, says the Aluminium Centre. The environmental impact is low during the period of use. This yields a gain in this phase compared to other building materials that require more maintenance.

DEPLOYABILITY OF ALUMINIUM IN CONSTRUCTION

Thanks to its long life span, high level of recyclability and low maintenance requirements, aluminium is extremely suitable as a durable product in the construction sector. The energy requirements initially seem high, but are quickly put into perspective when considering the life cycle. Moreover, it takes much less energy to recycle without affecting the quality of the aluminium. This makes aluminium an excellent choice for all kinds of applications in construction. For now and in the future.

Want to know more about aluminium? Read about the production process and the properties of aluminium below:

[ALUMINIUM PRODUCTION PROCESS](#)

[6]

VIDEO ABOUT ALUMINUM IN THE CIRCULAR FACADE ECONOMY

[youtube]HRDAC80S7n0[/youtube]

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[2] http://www.c-a-b.org.uk/wp-content/uploads/080707_sustainability_s-locked-version-Justin.Ratcliffe-v1.pdf

[3] https://rusal.ru/en/aluminium/al_and_nature/

[4] <https://www.european-aluminium.eu/media/1628/collection-of-aluminium-from-buildings-in-europe.pdf>

[5] <http://recycling.world-aluminium.org/home/>

[6] <https://www.comhan.com/en/aluminium-production-process>

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