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Wooden Facades

compiled by

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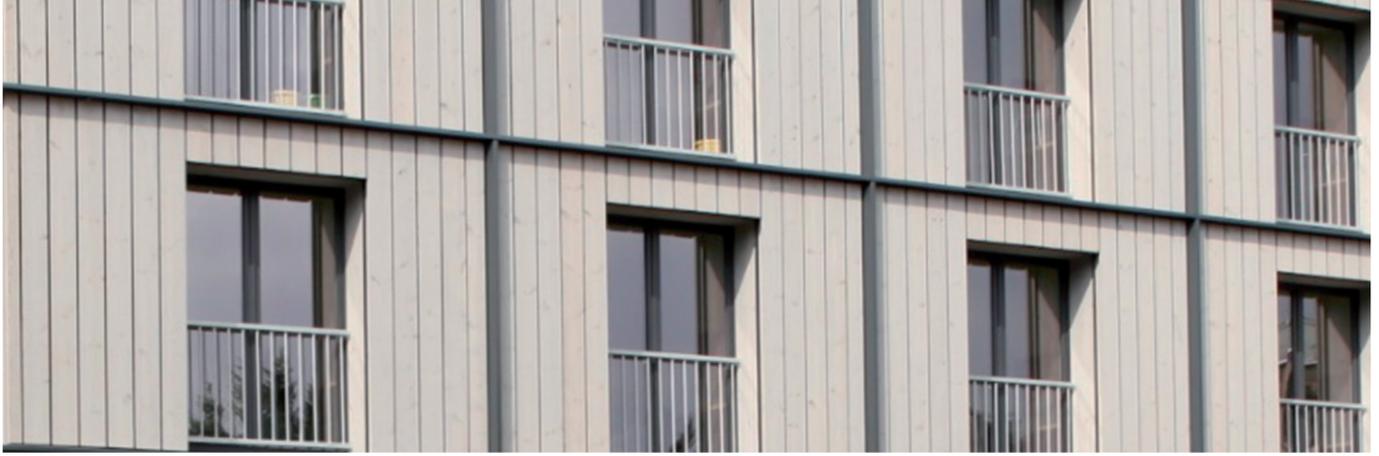
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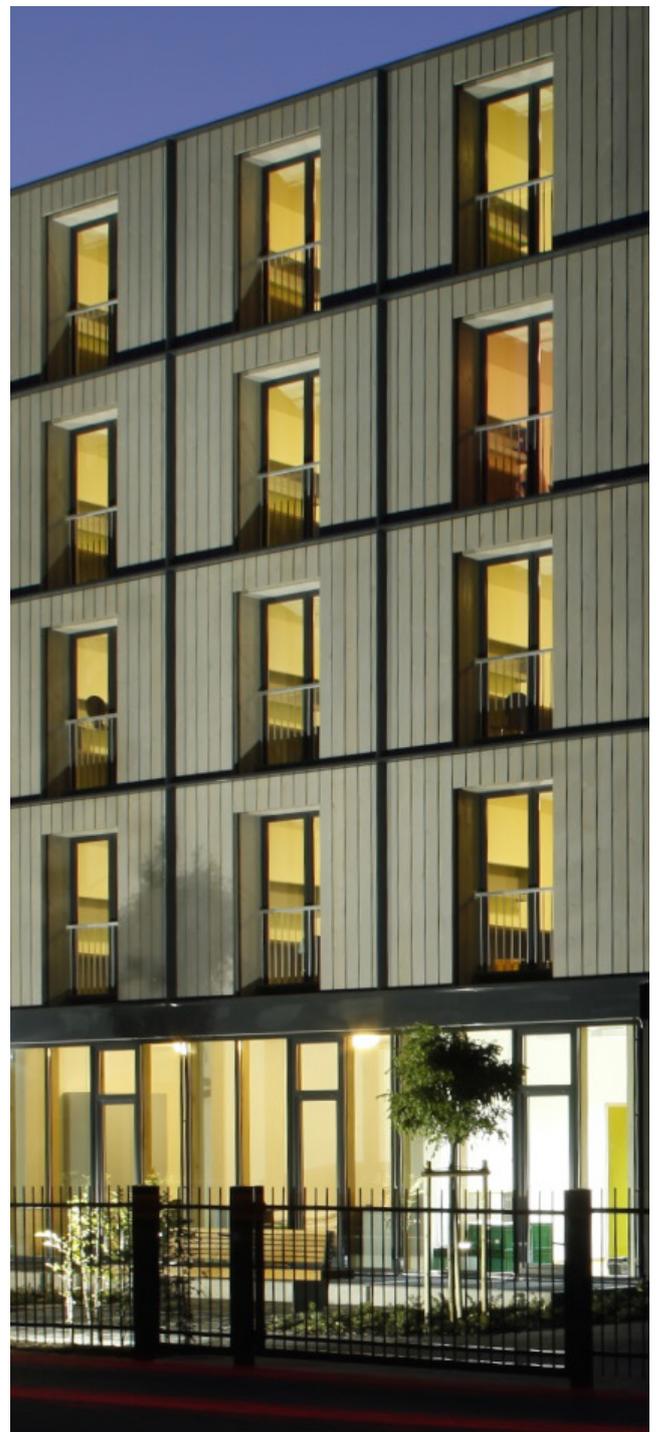
1 / Introduction

Wooden facades have a long tradition. They have been used to protect and beautify buildings since wood has been used as building material. Different regional architectural styles have created different forms of facades, either the outside of the wooden structure itself, as in log cabins, or the shuttering with overlapping boards or the cladding with wooden shingles. Facades made of wood are not only used today in wooden houses but also for design reasons in conventional construction. Today there is a large number of modern, technically mature products and forms of cladding.

Wooden facades made of various types of wood last for a long time, as many old wooden houses impressively demonstrate. Decisive for this is on the one hand sufficient constructive wood protection and on the other hand also the use of certain types of wood (see chapter 2). Constructively, there are a wealth of designs, from:

a) Solid wood with slotted formwork of overlapping boards, open or closed board formwork with fold, facades made of moldings, facades with vertical battens, shingle facades and others.

b) wood materials made of solid wood panels such as e.g. coated OSB boards to wood fiber cement boards.





For comparison: other facade materials

Aluminum facades. Aluminum facades are lightweight and at the same time relatively impact-resistant, they are easily deformable and can be obtained today in a variety of colors and shapes. Aluminum itself is very easy to recycle. However, aluminum is easily deformable, so e.g. gullies may bend due to snow pressure, so snow protection is required. Under joint installation of aluminum together with copper, it comes to electrocorrosion. Aluminum sheets are not solderable and damage must be sealed by gluing or sealing with liquid plastics. When producing 1 kg of raw aluminum, about 10 kg of CO₂ are released.

Steel facades. Steel facades are well malleable and today in various colors and shapes available. However, they are weather-resistant only with corrosion protection, but such facades are always provided with corrosion protection ex works. Like aluminum, steel is very easy to recycle. In the primary production of crude steel, in Europe with very good furnaces, only about 1.5 kg CO₂ / kg of steel are emitted. This is not comparable with other countries in the world where steel is produced with completely different conditions (not comparable environmental regulations). Since the recycling of steel does not consume too little energy, at least 0.8 kg of CO₂ / kg of steel are emitted. The CO₂ balance depends on the electricity mix used.

Fiber cement facade panels, Eternit plasterboard, glass fiber concrete facade panels. Fiber cement is a composite of cement and fibers, which is sold mainly under the trade mark 'Eternit'. The fibers improve the bending, tensile and breaking strength of the material. Cement-based facade panels come in many shapes and colors, even patterns. In many cases, they are now used in multi-storey commercial and office buildings. Like any facade material, the panels can be individually cut to size. Fiber cement facades, like all other facades, are weather-resistant and easy to assemble. In the past, up to 10% of asbestos fibers were used in fiber cement. Asbestos is classified in the EU today as extremely hazardous to health and therefore underlaid in European production limits and is banned in Germany. Although bans are also valid for other countries outside the EU, but not for all. For health reasons, care should therefore be taken to ensure German or European production, since imports may still contain asbestos fibers. Asbestos fibers are today largely replaced by glass, carbon or plastic fibers. Eternit plasterboard panels consist of fiber cement panels with an applied external plaster. Fiberglass concrete facade panels are a composite material made of concrete and glass fibers. „Due to the undirected distribution of the short fibers in the fine concrete, only a small proportion of the fibers have a strengthening effect“ (website RWTH Aachen). Therefore, the scope of fiber concrete and fiberglass concrete is essentially limited to mechanically lightly loaded components. Advantages of fiber concrete or glass fiber reinforced concrete products, compared to reinforced concrete, they are corrosion-free and do not require strong concrete cover to protect the reinforcement against corrosion. The stability is obviously improved by textile fiber concrete, but this is still a rather low marketable product.

ETICS. External thermal insulation composite systems are usually installed on older buildings made of stone or concrete in order to comply with the new insulation regulations. ETICS can be based on different material groups, from wood fiber insulation materials to mineral and synthetic insulating materials. For the problem of ETICS with regard to sustainability, see product group profile „Insulating materials“.



2 / Prechains

Basic raw materials in wood facades (material)

The basic raw material for wooden facades is roundwood from which either rough or planed and profiled sawn timber is produced, which directly represent the facade products or veneer, sawn timber or wood fibers which is further processed into board materials.

For facades, different types of wood come into question.

- **Spruce.** Spruce has good strength properties and dimensional stability. It is easy to work with, but only moderately weather-resistant. Therefore, the use of spruce boards usually requires a surface treatment. Spruce wood is ubiquitous and regional available.
- **Pine.** Pine is in principle similar usable as spruce, but has a higher resin content and is (as heartwood!) more weather resistant. The pine is also available almost ubiquitously. But a focus should be set on native origin, since different types of pine can come from far away.
- **Larch.** Larch represents the classic facade wood. Larch can also be used untreated outdoors and has a long lifespan. Here special attention should be paid to the origin. Larch is not widely distributed and therefore may have traveled very far distances. This explicitly applies of course for siberian larch, which has grown more finely than the Central European and therefore is often requested and therefore still appears in many architectural tenders. Narrow annual rings, however, also have its price or its cause: It may take centuries before new trees have grown on the harvested land (if forest ever grows back). Therefore, for reasons of protection of climate and biodiversity, Siberian larch should be avoided.
- **Douglas fir.** Douglas fir is a more recently used facade wood, which has many advantages. In addition to the fast-growing and high yields in our middle latitudes, the durability of Douglas fir and their resistance to fungi and pests is at least as of larch. In Germany, Douglas fir is increasingly in use and has a comparatively good availability and thus represents a sensible and ecological alternative to larch.
- **Western Red Cedar.** This wood species is also untreated largely resistant to fungal infestation and pests. However, this tree species, as the name implies, does not grow in Central Europe but comes from the USA. A usage therefore requires very long transports with a devastating climate footprint as well as a high risk of overexploitation. A use is therefore not recommended.
- **Oak.** Oak as wood with natural high durability in any case would be appropriate as facade wood. However, the use is little more common today. In simpler qualities, oak is also very common and can therefore be used as a still favorable regionally available facade material.
- **Robinia.** The Robinia naturally has the highest durability class among all native European wood species, which surpasses even most tropical wood species. However, their availability is very limited, since the wood (although very common in Germany) mostly originates from Eastern Europe.



In addition to the mentioned types of wood are of course also still modified woods come into question. In addition to the boiler pressure impregnation (which is mainly used in spruce and pine), the thermal modification is particularly important here.

„Thermowood“ has an extremely high durability (durability class 1 for most woods) due to the process of changing the chemical structure. Especially the local wood species beech, ash, oak, poplar or pine are used here. Thermowood represents an excellent alternative to tropical wood species for outdoor use.

For comparison: other facade materials

Aluminum. Aluminum cladding contains 97% aluminum, 3% adhesive and <1% plastic protective film.

Steel. Profiled steel panels are made of steel with a metallic coating (often made of zinc and other metals or / and partially an organic coating with polyester).

Fiber cement, Eternit facade panels. Cement-based panels consist essentially of cement and additives. Cement consists mainly of cement clinker (72 to 79%) and gypsum (17%). Gypsum in cement in German production (!) is essentially natural gypsum (75%) and less FGD gypsum from industry (25%). Cement clinker consists mainly of limestone / chalk (83%), sand (8%), bauxite (1-2) and fly ash 6-7%. Ingredients for fiber cement facade panels are according to EPD: 35-40% Portland cement, 50-55% quartz sand, 5-10% pulp and 3-7% aluminum hydroxide.

Glass fiber reinforced concrete panels. Fiberglass concrete facade panels consist essentially of cement and additives. Cement consists mainly of cement clinker (72 to 79%) and gypsum (17%). Gypsum in cement in German (!) Production is essentially natural gypsum (75%) and less FGD gypsum from industry (25%). Cement clinker consists mainly of limestone / chalk (83%), sand (8%), bauxite (1-2) and fly ash 6-7%. Ingredients for glass fiber reinforced concrete slabs are (according to EPD): 82% Portland cement, 6% trass, 2.5% pulp, 3.5 polyvinyl alcohol fibers, 6.5% paint.

ETICS (External Thermal Insulation Composite Systems). ETICS consist of several layers. Mostly: (1) an insulating layer, often polystyrene or mineral fiber boards or stone and glass wool, calcium silicate / sulphate foam / boards, EPS, XPS, rigid polyurethane foam, vacuum insulation boards, wood fiber boards, etc. (2) A reinforcing layer in plaster or cement in which mostly a glass mesh is embedded. (3) The finish is a textured plaster, usually synthetic resin, silicate or silicone resin, but also mineral plasters or lime-cement-based lightweight bricks. (4) A final coat on the plaster. Here, dispersion silicate or silicone resin paints are usually used with biocides. (5) Alternatively or additionally glued-on metal ceilings made of steel and aluminum with plastic coatings are used. From data in current EPD to ETICS it is not deductable, which ingredients these products contain.



Raw material extraction (A1)

The raw material wood comes from forests that are either commercial forests (the rule in Central Europe) or primeval forests (in other parts of the world). German forests have been sustainably managed for centuries, sustainable forestry is enshrined in the German Forest Act. Almost all of our managed forest areas are additionally certified with sustainability labels for the forest (FSC and PEFC). This is not the case everywhere in the world, for example in Asia, Latin America and Africa only about 1-5% of the forest area is certified with such sustainability labels. For imports without such a forest label, depending on the count-

ry of origin, the risk of poaching and depletion is high. The proof of origin of the climate and environmental label HOLZ VON HIER is at the same time a proof for the origin of sustainable forestry. Wood is a renewable raw material and thus is available in principle permanently, provided it comes from sustainable forestry, because then no more wood is taken, than grows back. Timber from poaching should not be used for climate and environmental reasons (the „outreach“ depends on the occurrence in primary forest countries, especially in the tropics such as Asia, Latin America, Africa and boreal forest areas such as Siberia, Canada etc.).

For comparison: extraction and outreach of raw materials from other facades

Aluminum. Aluminum sheets are made from aluminum precursors as frames, rods or granules. Aluminum precursors are made from aluminum raffinate and aluminum raffinate from bauxite. BAUXITE is only found in 26 countries worldwide, the three main deposits are in Australia (30%), China (18%) and Brazil (13%). Germany has no own deposits. ALUMINIUM PRECURSORS are produced in 44 countries around the world, the three biggest producers are China (44%), Russia (8%) and Canada (6%). ALUMINUM is produced in 25 countries around the world, including v.a. China (46%), Japan (7%) and the USA (6%). The mining of bauxite is one of the biggest environmental impacts of raw material extraction. In addition, the estimated outreach of bauxite (USGS) with 26 years is very short.

Steel. Steel sheets are made of structural steel, those of crude steel, of iron granules / iron blocks, and iron ore. IRON ORE: Iron ore is mined in 42 countries in the world, with the three largest incidences being China (45%), Australia (18%) and Brazil (14%), the German resources are very low (0.1%). RAW STEEL is produced in 86 countries around the world, with the main producers being China (46%), Japan (7%) and the USA (6%). In Germany, 2.8% of world production of crude steel is produced. The outreach of iron ore is estimated with 30 years.

Fiber cement, Eternit plates, glass fiber concrete facade panels. Important basic raw materials for fiber cement are gypsum, lime, bauxite. However, GIPS is gained in 80 countries around the world, with the three leading countries being China (55%), the USA (7%) and Iran (6%). The main mining area for LIMESTONE is China (63%), USA (5%) and India (4%). Germany holds 2% of the world's limestone production. The reach of the basic raw materials of cement such as gypsum and lime is >> 100 years. BAUXITE only exists in 26 countries, the three main countries being Australia (30%), China (18%) and Brazil (13%). Germany does not have own bauxite deposits.

ETICS. The composition of ETICS depends on the insulating material (see the comments above) and usually still has GYPSUM or CEMENT as well as metal or plastic coatings. Therefore also applies to ETICS, which has already been described for cement board and metal facades.



Transports „cradle to gate“ (A2) and Transports „gate to customer“ (A4)

Transports in the processing chain (A2)

Standard data sets from life cycle assessments (EPD) expect product independent 50 to 350 km for the upstream chains. In the case of wood products, already more than 20 years ago, scientific studies calculated transport distances of 100 to > 900 km (roundwood: 150 -> 900 km, glued wood: 300 -> 800 km, lumber: 104 to 700 km, sawn timber: 150 - 830 km). However, the tendency of the transport distances is increasing, so that on average today still longer transports can be assumed. Even 500 to 600 km in Germany should not overestimate real transports today. If one also considers the imports of intermediates, it becomes clear that the transport with such modelled transport figures is severely underestimated in their climate and environmental impact: sawn timber or planed timber imported into Germany for instance has an average transport load of 2.300 km and an average CO₂ footprint of 143 kg CO₂/t, which is more than the CO₂ emissions through the entire production.

Transport to the place of use (A4)

As a rule, there is no information about the transports to the place of work or the construction site. Without material flow certificates, products used in construction can have covered thousands of kilometers of transport. The same applies here for the intermediate sawn timber, as facade timbers are not reported separately in the foreign trade statistics. Although the raw material itself would be very regional in nature and even if the last processing step takes place in Germany, without proof of origin such as the label „HOLZ VON HIER“ in timber construction products, it can not automatically be assumed that they are derived from climate and environmentally friendly „short distances“, because the market for raw materials and precursors is now also international for wood products. It is possible that wood of unknown origin even comes from exploitation.





For comparison: evidences of material flows for other facade materials

Aluminum facade. (1) Example BAUXIT. Germany consumes about 2 to 2.4 million tons of bauxite annually and as Germany does not have its own deposits of this rare metal this amount is imported e.g. from Australia, China and Brazil. (2) Example PRIMARY ALUMINIUM. In addition to bauxite, Germany imports about 50% of ALUMINIUM produced in Germany as primary aluminum or aluminum (for example, from China, Russia, Canada). (3) Example ALU FACADES. Aluminum facades are also produced and traded worldwide in Germany.

Steel facade. (1) Example IRON ORE. Germany imports 99% of its iron ore (BGR, 2012), 39 million tonnes annually, 61% from Brazil, 13% from Sweden and 11% from Canada. (2) Example RAW STEEL. Germany produces approx. 43 million tons of crude steel, consumes approx. 38 million tons and imports approx. 31 million tons (BGR, 2012), a material flow that is burdened with enormous transports, since on average at least half of imports come from high transport loads (eg from China, Japan, USA). (3) Example CONSTRUCTION STEEL PRODUCTS. The various structural steel products that are used in construction in Germany will be both produced in and imported to Germany. Therefore, it can not automatically be assumed that steel products in Germany were made from german crude steel.

Fiber cement facade panels, Eternit plasterboard, fiberglass concrete panels. Cement consists of cement clinker and gypsum. Cement clinker again from limestone / chalk, sand, bauxite and fly ash. (1) Example GYPSUM: Germany produces 2 million tonnes of gypsum per year (about 1% of the world's gypsum production) and could currently meet its own needs. Nonetheless, gypsum is also imported every year at 0.12 million tons and also gypsum products (for example, 0.14 million tons of gypsum plasterboard). (2) Example LIME: Germany produces 6.7 million t of lime per year and imports about 2 million t, v.a. from Austria, Belgium, Poland and France. (3) Example BAUXITE. Germany does not have its own deposits and imports its needs from 2 to 2.4 million tonnes of bauxite per year worldwide (for example, from Australia, China, Brazil). (4) Example CONCRETE PRODUCTS themselves. Germany annually produces large quantities of Portland cement (32 million tonnes), ready-mixed concrete (34 million tonnes) and aerated concrete (31 million tonnes) and 0.7 million tonnes of lightweight concrete, concrete slabs and concrete blocks. Germany imports as well as 1.6 million tonnes of concrete products such as lightweight concrete slabs and lightweight concrete blocks.

ETICS. The material mix in ETICS is so extensive that it is not possible to describe individual substances here, but for most of these substances the material flows are global (eg aluminum, plastics, mineral wool).

Production (A3)

Wood facades consume significantly less energy (70 MJ/m² dry planed lumber) than other types of facade (121 - 533 MJ/m²) and are highly ecological (see Chapter 5). The CO₂ emission of facade wood produced in Germany is 51 kg/m³.



3 / Use-phase and After-use-phase

Use phase (B)

Inertness of the building material. Wooden facades and other facades are ‚inert‘ in the use phase and do not consume energy, water or raw materials. Their climate and environmental parameters (GWP, AP, EP, ODO, POCP, PERE, PENRE, water) are set to zero at this stage. Resources and energy are consumed only in the form of any care and treatment. However, this depends less on the product, but more on the taste and behavior of users. In addition, other facade types must be maintained as well.

After use phase (D)

The reuse of wood facades is simple and variable. Screwed wooden facades can be used again for the same purpose. When nailed wooden facades there are certain losses at demolition. In general, wood can be recycled very well. The waste wood does not have to be disposed but can be reused both materially and energetically, as a substitute for oil and gas. In Germany, the handling of waste wood is regulated by the so-called waste wood regulation. Waste wood has become a coveted secondary raw material today.





For comparison: other facade types in the after use

Aluminum. If aluminum were sorted and recycled according to layers and alloys, the alloys could be recycled without loss of quality. Since various alloys are mixed today when collecting and melting, it usually comes only to downcycling. For aluminum facades, 50% secondary materials are used in production. About 1% of the metal is lost in the recovery. Nevertheless, open questions remain. Metals such as aluminum and steel are so rare that the market will continue to look for ways to increase recycling rates wherever possible. The recycling rate of aluminum is only about 40% worldwide (UNEP Report „Recycling Rates of Metals“, 2011, USGS database). In environmental balances, it is not considered that the recycling of metal products today does not occur automatically in Germany, but over long transport distances such as in Asia (for example China) with lower wages and environmental regulations.

Steel. Steel is very good recyclable. Steel scrap is melted and processed into steel again, this process succeeds several times. Alloy elements may but need not be removed during recycling. High-alloyed steels are usually specially recorded and tempered (exception: recycling of tin scrap takes place only as downcycling). Today, steel is the world's most recycled material with recycling rates of 70-90%. It is not taken into account in environmental balances that the recycling of metal products is not automatically carried out in Germany today, but also over long transport distances, for example in Asia (eg China), or countries with suitable infrastructure (large ports) and lower wages or environmental regulations.

Fiber cement boards, Etenrit, fiberglass concrete. The main route for the disposal of cement-based panels is the building rubble dump. Depending on the fastening system (adhesive, screws, nail systems), the plates could theoretically also be removed non-destructively. Pure and undamaged, the products could theoretically be recycled (which is certainly rarely the case in practice). Cement-based slabs could theoretically also be used as aggregate and building rubble for road construction (only if no asbestos fibers are contained). Aluminum hydroxide is used in some fiber cement boards. Rare and valuable metals such as aluminum in non-recyclable „spread-out form“ (as irreversibly dispersed in other materials) must necessarily be evaluated as unsustainable.

ETICS. The disposal of many ETICS is a problem. More extensive experience is missing so far, since the systems have not been used for a long time. ETICS can be glued, doweled, or both or mounted with a rail system. In most cases, the ETICS system is simply fixed in the form of slabs or slats by gluing and / or dowelling (dowel plate) on the wall surface of brick, sand-lime brick or concrete. This makes it clear that in most cases a damage-free removal of the ETICS is not possible. The demolition of ETICS can only theoretically be reused if the systems are not damaged. Even in the analyzed EPD, it is stated that there is currently no proven method for doing so. The ETICS waste must therefore be disposed together with the construction waste. Due to the high proportion of plastic in the elements, this is actually not possible today in Germany (only here) on the building rubble landfill, but only in waste incineration plants. But because of the high mix of materials and the composite system itself is also difficult. As the only ETICS systems, wood-based systems are somewhat less problematic in terms of reuse and can be used partly for energy purposes or incinerated in the incinerator. If the material ends up with landfill on the landfill no information is given about how the long-term behavior of the material is and which or in which amount eluates are washed out into the groundwater.



4 / Product features

Health aspects

Sawn timber for facades contains no harmful substances.

For comparison - health

Aluminum and steel sheets for facades. Metal facades made in Germany comply with the legal requirements (... „comply with the AgBB Scheme“). However, there were no readings in the analyzed EPD stating that the product is only applied outdoors.

Fiber cement, Eternit, fiberglass concrete facades. German fiber cement products comply with the legal requirements according to the EPD. Measured values for formaldehydes and carcinogens are not available (note: „the product is only applied outdoors“). VOC values in eternit plates: TVOC-28 days: 24 µg / m³, VOC o. NIK-28 days: <5 µg / m³; TSVOC 28 days: <5 µg / m³. Eluate analyzes are available in some EPDs. Substances above the limit value of the drinking water ordinance are: chromate <0.01 mg / l (GW: 0), aluminum: 0.8 mg / l (GW: 0.2 mg / l), KMnO₄ 60 mg / l (GW : 0.5), COD 49 mg / L (GW: 0), TOC 15 mg / L (GW: 0), phenol index <0.01 mg / L (GW: 0), AOX <0.01 mg / L (GW: 0). In the use phase, this is less relevant, but in the post-use landfill, eluates could be hazardous to the environment.

ETICS. ETICS made in Germany comply with the legal requirements. Measured values are not available and are „not required“ according to EPD, as the materials are used outdoors. The note „constructive measures can prevent“ may indicate the danger of leaching out of the façade.

REACH-RISK in wooden facades. There is no risk of harmful substances in wooden facades in German and European production.

For comparison - REACH Risk (risk for dangerous substances according to REACH)

Aluminum / steel sheets for facades. Metal facades could contain REACH relevant substances. In the metal sector, there are potentially 2 substances of the REACH regulation and 13 of the candidate list, plus possibly substances from adhesives and plastic coatings.

Fiber cement, Eternit, glass fiber concrete facades. In the Cement material sector there are potentially 5 substances on the REACH candidate list, plus possibly substances from the adhesives, adhesion promoters or paints.

ETICS. The enormously high material mixture in ETICS may contain numerous REACH relevant substances, e.g. only the use of biocides is questionable, because these are highly human and ecotoxic substances that are washed out in the rain and land in the adjacent subsoil. It depends very much on which main materials are used, ie whether ETICS is based on wood or plastic and whether the product was produced in Europe or comes from imports. In Germany, the approval of ETICS is also subject to the general building inspectorate approval. Here, products are tested for their structural safety as well as their fire protection properties; a check for health and ecological effects is not included however.



Safety aspects

The safety and the behavior in case of fire of wooden facades is optimal. Wood burns, but with solid wood, the burning speed is greatly reduced by the charring around the fire. According to the project database wecobis of the German Federal Ministry of Transport, Building and Urban Development, natural materials such as wood and stone are optimally compatible with health, both during use and in case of fire. In case of fire, however, the usual combustion gases are produced without highly toxic substances, such as e.g. in plastic fires.

For comparison: safety / behavior in case of fire

Aluminum and steel sheets. Pure metal facades are not flammable.

Fiber cement, Eternit and fiberglass concrete panels. Also fiber cement, Eternit and glass fiber cement plates are classified as non-flammable.

ETICS. It can be assumed that in the event of a fire, ETICS in particular emits enormous amounts of toxic and harmful substances. However, measurements on this are not mentioned in EPD. Also due to the high amounts of plastics in many ETICS, this may possibly raise the problem of increasing the fire load as with plastic insulating materials.

Lifetime - durability

The durability of wooden facades and almost all facades is given by the Federal Ministry of Building (BBSR table) with > 50 years. This is the highest durability level specified here. However, wooden facades definitely last longer, as many old wooden houses impressively prove.

For comparison: durability

Aluminum and steel sheets. The service life of cladding made of aluminum or steel depends on the duration of protection of the corrosion layer. This is stated in manufacturer EPD for aluminum plates at the age of 15 years. The BBSR database specifies a useful life of 50 years for all metal facades.

Fiber cement and fiberglass façade panels and Eternit plasterboard. The BBSR specifies the durability of fiber cement and fiberglass concrete facades at the age of 50, and Eternit plasterboard at the age of 40.

ETICS. The durability of ETICS systems is given by the BBSR at the age of 20 years.

Maintenance

Depending on the type of wood (larch, thermowood, etc.) or taste (for example, if graying does not bother), the care of wooden facades is minimal. And you should keep in mind that absolutely every facade needs care to optimally fulfill its technical functions.

For comparison: care of other facades

Aluminum and steel sheets. According to the manufacturer, the plastic layer on aluminum facades is weathered after about 15 years. This or the facade must then be renewed. Even alloyed steel facades must be maintained.

Fiber cement, glass fiber reinforced concrete, Eternit plaster base plates. According to the manufacturer, demands on maintenance and care are low. In internet chats, water repellents that can be painted are recommended. The care tips range from „treat with high-pressure cleaner“ to „applying acrylic paint every 5 years“.

Prejudice 1) the maintenance of fiber cement facades is simple, the costly of wood facades?

First, the following should be noted: with absolutely every facade care is necessary over the years, if you want to keep them visually and technically in good condition, that's what every client should be prepared for. It's more about the question, what can you do yourself or why and when do you need specialist knowledge or a specialist?

Fiber cement facades have their significance especially in multi-storey commercial construction. On many portals to fiber cement panels, however, it is called e.g. also for private construction: „Wooden facades are trendy. They stand for coziness and tradition, but also for economy and modernity. But who chooses a wood façade for his house, has to adjust to a high maintenance effort. Colored façade panels made of fiber cement with embossed wood grain offer a convincing alternative without having to put up with the disadvantages of wood“. This shows just how little actually known about the advantages of wood. Why not, wherever possible, choose the same wooden facades, if you just like the wood look?

The fact is that other facades, including fiber cement facades, need care. This is illustrated by the following excerpts from an publication by the University of Hannover with the title: „Hydrophobing: to keep water out of mineral building materials“. Quotes from the article: „The key function of a hydrophobing is the prevention of capillary water transport. Mineral building materials such as natural stone, bricks, plasters and concrete are known to absorb water. This water brings with it a lot of problems. The infiltrated water can cause frost damage. In addition, the water brings salts or noxious gases into the building material. The presence of water promotes biological growth, for example by algae, lichens and fungi. Last but not least, water worsens the thermal insulation of exterior walls“. It continues: „Modern hydrophobing agents are, for example, silanes. These are so-called hermaphroditic molecules, which have a hydrophobic, so water-repellent, and a hydrophilic, so water-attracting part“. And further: „Last but not least, hydrophobing is not a panacea. Design-related defects in the water supply must be eliminated before a hydrophobization can be used meaningfully. In addition, there is no universal hydrophobing for all substrates“.

The article goes on to say: „In spite of these good properties, in practice hydrophobing enjoys an at least dubious reputation. Several causes are responsible for this: incorrect applications and the lack of success of water repellency have led to misjudgements of effectiveness in recent years. Completed hydrophobations are invisible. The success of such a measure is therefore not easy to assess by visual inspection. Difficult boundary conditions are often underestimated. For example, a building material that is largely water-saturated due to bad weather means that the hydrophobization can not penetrate“.

The amount of applied hydrophobing agent is usually not determined at all and often very inaccurate. Too much active substance leads to gloss or white spots on the building material surface, too little material is not permanently effective. A still to be developed, effective tight control is therefore of central importance. Systematic studies on durability are missing so far. ... In particular, the decrease in the hydrophobizing effect of various materials under the influence of weathering on different substrates has been little or not considered. In further research, standardized specimens should be applied in a controlled manner, taking into account the depth of penetration, and exposed to various loads. The results should contribute to targeted use of hydrophobing and to avoid misuse“ „Another problem is to train construction site personnel so that a later difficult-to-control action can still be performed correctly.“



Prejudice 2) Metal facades do not need to be maintained.

„Stainless steel facades can be affected by industrial emissions, traffic exhaust gases, dew salt spray, but also by fine iron dust, such as is caused by brake wear in areas subject to heavy traffic.“ Leaflets (for example Leaflet 965 of the Stainless Steel Information Center) recommend regular cleaning at the same rhythm as used for glass surfaces. „In my 25 years as a consultant, I have seen hundreds of metal facades damaged by care mistakes,“ reports Hans Pfeifer, Managing Director of the Institute of Surface Technology in Schwäbisch Gmünd (article by Klaus Vollrath, http://grm-online.de/fileadmin/user_upload/pdf/2006-03-13_Metallfassaden.pdf). „In principle, there is no really care-free facade,“ affirms Pfeifer in the article. Every façade construction requires a certain minimum of care or maintenance. This applies even for concrete and granite as well as for stainless steel ...

It goes on to say in the article: „In some cases he even had to notice total economic losses, d. h., the costs of the renovation were on a par with the original value of the facade. At a price per square meter of between € 700 and € 1,500, the metal façade on a medium-sized commercial property represents a million-dollar asset. Obtaining this value requires proper care. In practice, according to Pfeifer, he repeatedly notes that the building managers make mistakes. Cause is often misunderstood economy. Unsuitable care products that attack the material and cause surface changes or corrosion, as well as improper action by insufficiently qualified low-cost suppliers with personnel, the z. B. causes unrecoverable scratch damage to sensitive visible surfaces and surface coatings.

Painted aluminum. „Paints are available in almost every imaginable color. Of course, the architect likes to use these degrees of freedom for individual façade design „...“ Lacquered facades are durable, but by no means maintenance-free, because lacquers are organic substances that are subject to slowly progressive weathering. This „Verkreidung“ leads to color changes and to decrease the gloss level. If this Verkreidungsschicht not removed for long periods, then finally sets in a state where care procedures can hardly help. A coating layer that has not been maintained for more than ten years can then quickly become a total renovation case. In this case, a re-coating is required, the cost of which can quickly reach a magnitude of 200 euros per square meter or more“, the article states. A special case today is the metallic paints that are often used in the building sector. „As unlike car paints, they have no additional protective layer of clear lacquer, the tiny metal particles in the lacquer are located directly on the surface and can easily be damaged if handled incorrectly. The consequences are then immediately visible. The care of such facades therefore requires very special expertise and care“, so the article.

Anodized aluminum. „Unlike paints, anodized coatings are largely resistant to weathering,“ so the article. The advantage of this coating is ... „a very stable, insensitive surface with strong color tones, but the available color palette is relatively limited. The color pigments in these surfaces often lie in tiny, deep pores, which are closed by a transparent ‚lid‘. Despite their extensive resistance, however, these layers can also be damaged by incorrect treatment (through the use of unsuitable cleaning agents). The insidious thing here is that it is often not visible immediately, but only after a few years, when the slow destruction of the color pigments has progressed far enough through the damaged covers“.



Reparability

Wooden facades are either screwed or nailed. Wood facades are virtually never glued, in contrast to other facade systems. A further advantage of wooden facades is therefore their easy and simple reparability. If a facade board is damaged, it may be simply exchanged over a small area. This is even easier with bolted facades than with nailed facades. Pay attention to this when building a house. The screwing costs a little more time, but is worthwhile in the case of possible additions, installations (for example, new windows, doors conservatory, etc.) or renovation work in any case.



For comparison: ease of repair of other facades

Aluminum and steel facade panels. For aluminum facades, the plastic layer is weathered according to the manufacturer in EPD after about 15 years. This must then be renewed if possible, in the worst case, the facade must be renewed. The replacement of damaged larger facade panels can only be done by professionals. Damaged plates can only be replaced as a whole.

Fiber cement, fiberglass concrete and Eternit plasterboard. The replacement of damaged larger facade panels can only be done by professionals. Damaged plates (e.g., frost cracks) can only be replaced as a whole. In older renovation buildings with fiber cement facades, it must be ensured that no asbestos-containing fiber cement is present.

ETICS. The main cause of damage to ETICS is the loss of condensation between insulation and exterior plaster. If the condensation does not completely evaporate due to the high water vapor resistance of the external plaster and paint, it may cause chipping due to freezing water and gradual moisture penetration of the insulation. The consequences are a decrease in thermal insulation and stability problems. This may also require a rebuild of the ETICS, as a renovation of ETICS, including the exterior plaster on the system, is difficult and requires expertise.



5 / Environmental label

Environmental / quality labels

HOLZ VON HIER (LOW CARBON TIMBER)

The HOLZ VON HIER label particularly distinguishes climate-friendly and environmentally friendly wood products with wood from short distance transports originating from sustainable forest management, with proof of origin and life cycle assessment data. In addition, products manufactured in their entire material flow in Germany or Europe comply with the strict environmental and health regulations. HOLZ VON HIER is a climate and environmental label and therefore has not developed its own criteria for sustainable forestry, but requires evidence such as FM certificates to FSC or PEFC or similar.

FSC

FSC-FM certification certifies sustainable forest management worldwide according to the criteria of FSC. The wood in products with an FSC-CoC certificate can exhibit long transports.

PEFC

PEFC-FM certification certifies sustainable forest management worldwide according to the criteria of PEFC. The wood in products with a PEFC-CoC certificate can exhibit long transports.

Nature Plus

Natureplus features formaldehyde-free and low-emission products that go well beyond European limit values and also verify that the product contains no REACH-relevant substances (including substances from the REACH candidate list). Currently not awarded for facade products.

Blauer Engel (Blue Angel)

The Blue Angel designates formaldehyde-free and low-emission products that go far beyond European threshold specifications. So far not assigned to facades.

EU flower

Not yet awarded for wood products.

EPD

EPD are not environmental or quality labels and can not be used and evaluated as such. In addition to methodological problems such as comparability and system-immanent neglect of transports, an EPD without a comparative framework says nothing about the environmental friendliness of a product.