UPGRADE YOUR LIVING SPACE

Modernization with PVC Windows

Topics

#SUSTAINABILITY
#ENERGY-SAVING
#DESIGN

QUALITÄTSVERBAND KUNSTSTOFFERZEUGNISSE E.V.
FÜR LANGLEBIGE KUNSTSTOFFPRODUKTE

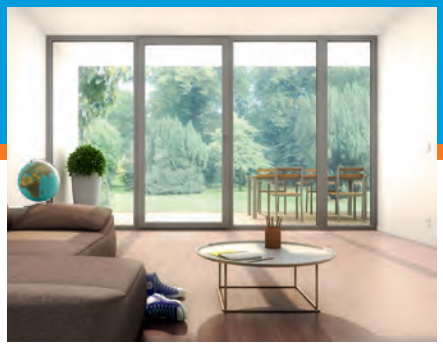
KUNSTSTOFF FENSTERPROFILSYSTEME | RAL Simply Excellent

EPPA The European Trade Association of PVC Window System Suppliers

vinyl plus COMMITTED TO SUSTAINABLE DEVELOPMENT

#YOUR ADDED VALUES

by Modernization with PVC Windows



Images f. l.: GKFP, Schüco, Deceuninck

DEAR READER,

At the end of 2019, EU Commission President Ursula von der Leyen announced the European Green Deal, a climate policy concept, with the goal of the EU becoming climate neutral latest by 2050; and to reduce net emissions of greenhouse gases to zero. An important component thereof is the modernization of private houses and flats as well as public buildings. Aging heating systems, poorly insulated facades and, last but not least, old windows contribute to high CO_2 emissions. This applies to almost 75% of existing buildings in the EU.*[3]

With the Renovation Wave, the EU Commission wants to pave the way for climate protection and growth. Incentives are to be created to double the renovation rate to around 2% by 2030, which corresponds to approximately 35 million building units.*[2] A considerable undertaking that can succeed if everyone, private builder, window manufacturer, architect, planner, public procurer, industry and the housing sector, invest in renovation solidly.

Pushing the renovation wave with window replacement

If you are considering modernization or are already planning it, window replacement can be a beneficial, complementary measure.

PVC windows in particular offer a wide variety of designs for modernization projects. New windows also ensure comfort: noise stays outside, no more draught but a pleasant indoor climate. Furthermore, with new windows you save energy, which is not only good for the environment, but in the end is also noticeable in your wallet. Europe-wide funding opportunities for modernization measures make window replacement even more attractive.

And did you know that new PVC windows are made of recycled PVC? For this purpose, discarded PVC windows are collected and processed. In 2020 over 350,000 tonnes of PVC from windows were recycled. This ensures that the valuable raw material remains in the cycle, resources are conserved and fewer environmental impacts are generated.

We have developed this brochure to introduce you to the many possibilities that PVC windows offer, especially for renovation projects. It provides information about window technology and current design trends, an inspiration for all those who want to preserve the old and implement the new.

Charlotte Röber | Managing Director
European PVC Window Profiles and related Building Products Association | EPPA ivzw

CONTENT

* The figures used in the brochure are based on the following papers: 1. EPPA: Position paper on the "Renovation Wave" and the revision of the Construction Products Regulation (2020) | 2. European Commission: A Renovation Wave for Europe – greening our buildings, creating jobs, improving lives (2020) | 3. European Commission: JRC report "Achieving the cost-effective energy transformation of Europe's buildings" (2019) | 4. VinylPlus® Progress Report 2021 (2021)

MODERNIZATION – **GOOD FOR HUMANS, ECONOMY AND ENVIRONMENT**

Image: Deceuninck | deceuninck.de/en-gb

WHAT'S IN IT FOR YOU?

Modernization of buildings is not only of interest to individuals, but is of central importance for society, the economy and the environment.

ADDED VALUES AT A GLANCE

#01_Sustainability
#02_Energy Savings
#03_Modern Design
#04_Funding Opportunities
#05_Products and Services

BUILDING OWNER

In addition to increasing the value of the building, improved thermal insulation, whether via the facade or new windows, leads to noticeably more living comfort: it stays pleasantly cool in the house in summer and rooms get warm faster in winter and stay that way. Conversely, this saves costs for air conditioning and heating. At the same time, it reduces the emission of greenhouse gases. Replacing old windows with modern PVC windows is thus a relatively inexpensive and simple measure to save energy and thus heating costs. The latter allows for a rapid to amortization of the expenditure.

Public subsidies, increase this speed, because as a building owner planning to renovate your house, you can take advantage of numerous funding opportunities that are offered especially for energy-efficient renovation. You can read more about this on page 16.

TENANT / CONSUMER

In the long term, energy prices must be expected to rise continuously. Energy-efficiently refurbished houses and flats are now much appreciated by their inhabitants. The energy certificate shows how much electricity and heat a flat requires. ***You can recognize a modernized flat by the fact that the annual heat demand is usually well below 100kWh/m².*** It is worthwhile to approach your landlord about modernization, as energy and heating costs can also be saved with simple, individual measures.

WINDOW MANUFACTURER / RETAILER

When the renovation wave takes grip, demand increases, and it is important to be prepared for this. In times of a shortage of skilled workers, companies will therefore have to invest in more automation to be able to meet the demand. This in turn not only advances the performance of the industry, but also creates the prerequisites for innovation.

PLANNER

Modernization in particular gives planners scope to realize modern architecture in addition to energy-efficient renovation. Large window areas, for example, enhance the overall appearance and provide more daylight and a feeling of space.

SOCIETY, ENVIRONMENT AND (CIRCULAR) ECONOMY

Around 353,000 tonnes profiles in 2020 (profiles from old and new windows as well as other building profiles) were recycled. ***With the expected higher renovation rate of 2%, millions of old PVC windows will be available for recycling***. This means that more recycled PVC can be used as a raw material for the production of new PVC profiles, so that less virgin material has to be produced, thus reducing the primary energy demand in manufacturing.

The first system house successfully launched controlled loop recycling of PVC windows in 1995. This best practice example has become a blueprint for the circular economy. Accordingly, an increased renovation and recycling rate would save more valuable raw materials and energy. Thereby climate-damaging greenhouse gases are reduced.

One tonne of recycled PVC saves about 2.2 tonnes of CO_2 compared to the use of virgin material.*

Moreover, the use of new PVC windows at least halves energy consumption, assuming that a 30-year-old window is replaced leading the house to comply with passive house standards.

* QKE/EPPA Environmental Product Declaration (EPD) (2017)

CIRCULAR PVC WINDOWS ...
FACTS AND FIGURES*

In 2020 over **350,000 tonnes of PVC** from windows were **recycled** and partly used to produce new window profiles.

There are currently around **650 million PVC windows** in the stock.

VinylPlus®
commits to recycle **1 million tonnes of PVC per year** from 2030. European profile manufacturers contribute 45%.

vinyl plus® COMMITTED TO SUSTAINABLE DEVELOPMENT

Since 2000, around **2 million tonnes of PVC** profiles have been recycled. This saved more than **4 million t of CO_2**.

... AND RENOVATION IN EUROPE

The EU demands:
The **renovation rate** of buildings should **increase to 2%** per year by 2030. This corresponds to **35 million building units**.

Buildings account for about **40% of total energy consumption** in the EU and **36% of energy-related greenhouse gas emissions**.

Window replacement can save **70–75% of energy**. (Compared to windows from the 1980s, $U_w = 3{,}0\ W/(m^2K)$)

* The figures used in the brochure are based on the following papers: 1. EPPA: Position paper on the "Renovation Wave" and the revision of the Construction Products Regulation (2020) | 2. European Commission: A Renovation Wave for Europe – greening our buildings, creating jobs, improving lives (2020) | 3. European Commission: JRC report "Achieving the cost-effective energy transformation of Europe's buildings" (2019) | 4. VinylPlus® Progress Report 2021 (2021)

ADDED VALUES_#01+#02

SUSTAINABILITY IN EVERYDAY LIFE AND ENERGY SAVING

The term sustainability is on everyone's lips. But what is meant by sustainable construction products?

Construction products are characterized in particular by a long usage phase. ***In the case of windows and doors, this is an average of 30–40 years.*** In addition, the raw material and energy balance in production, quality, energy efficiency in the use phase, as well as the possibility of repair and ultimately the disposal options, also characterize the concept of sustainability. Established concepts exist since many years. These are interlinked and constantly being further developed:

> ***The energy demand in the production of profiles has decreased by 10% from 2007–2017.***

VinylPlus® Product Label: European sustainability mark for PVC windows

VinylPlus®, the European PVC industry's commitment to sustainable development, has been in existence for more than 20 years. For the next ten years, the European PVC industry committed itself to establishing a circular economy and advancing towards carbon neutrality as targets in addition to PVC recycling. Furthermore, the commitment includes the responsible use of additives, future-oriented recycling technologies and design-for-recycling, to name but a few. By the way: The replacement of lead-based stabilisers was completed on schedule by the end of 2015.

System suppliers who consistently implement the VinylPlus® programme can demonstrate this with the VinylPlus® Product Label for PVC window systems*, which is awarded after an elaborate auditing process. Almost all European profile manufacturers have acquired the VinylPlus® Product Label.

Quality assurance for durability

For more than 40 years, PVC window profile systems have been quality assured throughout Europe. Quality assurance is carried out according to national quality assurance systems such as KOMO (NL), NF or QB (F), ATG (B) and RAL (D). Numerous quality-determining characteristics must be fulfilled and are regularly monitored by accredited testing bodies. The requirements relate to material and mechanical properties in order to determine the suitability for long-term durability. In addition to profile systems, insulating glass, fittings, windows and installation are also quality assured. With the quality assurance, the requirements for durable PVC windows were created at an early stage.

The RAL quality mark for PVC window profile systems is awarded to manufacturers who fulfil defined requirements for long-term usability, healthy living and environmental compatibility. This ensures that no harmful substances enter the interior from quality-assured PVC windows** and that attention is paid to environmental compatibility throughout the entire life cycle. The results are published in standardized life cycle assessments, the so-called Environmental Product Declarations (EPD), in accordance with EN 15804.

Recycling or: Where to put the old windows?

After an old PVC window is replaced with a new one, the PVC frame can be recycled without any loss of quality. To this end, the PVC is separated from the other frame materials such as rubber gaskets and metal fittings. Subsequently, it is shredded. Pure PVC recycling material remains, the so-called recyclate.

* The concept is based on BES 6001, a programme of the Building Research Establishment (BRE) for sustainable procurement, which has been extended here to include PVC-specific requirements. VinylPlus® is also supported by the non-profit, non-governmental organization The Natural Step (TNS).

Image: SKFP/Sarah Heiser (With kind support of Haas Fertigbau GmbH)

VINYLPLUS® – COMMITMENT TO SUSTAINABLE DEVELOPMENT

More information: vinylplus.eu

This material is used in the new PVC profile. Modernization saves twice: energy is saved via the use of efficient windows and raw materials are saved due to the use of recycled old profiles.

Recycling old PVC windows is always worthwhile: For window manufacturers and building owners who are planning to replace old PVC windows, there are recycling companies or collection points in the vicinity that take back old windows. Recycling initiatives such as Rewindo (D) and SnEP (F) offer a search function for collection points on their website.

Resource-efficiency

Through resource-efficient manufacturing processes, the use of renewable energy, energy-saving plans and material-optimized product solutions, European profile manufacturers have reduced their energy requirements and thus lowered the emission of greenhouse gases such as CO_2. ***A study has shown that primary energy demand has been reduced by around 10% in the period 2007–2017.*** Individual companies were even able to save up to 20% energy.

CRITERIA THAT COMPANIES HAVE TO FULFIL IN ORDER TO OBTAIN THE VINYLPLUS® PRODUCT LABEL:

- Be a VinylPlus® partner
- Have established management systems
- Meet special logistics requirements
- Consistently use recycled PVC (Controlled Loop)
- Procure PVC from sustainable production
- Use additives responsibly
- Reduce energy and resource consumption
- Create awareness for sustainability, among employees, customers and consumers

** For so-called volatile organic compounds (VOC), the German Institute for Building Technology (DIBt) prescribes that the evaluation scheme of the Committee for Health-related Evaluation of Building Products (AgBB) should be applied. Quality-assured PVC windows comply with these requirements, which can be seen in the QKE/EPPA Environmental Product Declaration (2017) on page 9.

ADDED VALUE_#03
DESIGN TRENDS

There is a trend in favour of large glass surfaces for maximum light incidence, slim profile elevations, colour statements and surface finishes in wood, concrete or metal looks. Ultimately, it is a question of personal taste and suitability in the given building context of renovation or modernization.

Large glass fronts for more light in the room

Daylight boosts the production of the happiness hormone serotonin, which makes us awake and has an influence on our sense of well-being. Daylight in living areas is becoming increasingly important, which is why there is a trend towards large formats for windows and doors. Wall-high window fronts or large sliding elements open up new architectural design possibilities: therefore the question arises as to whether, when modernizing, one should simply replace old windows with new ones or opt for larger elements right away, thereby giving the house facade a new and modern style.

New PVC windows open up new architectural design opportunities.

Angular profiles and slender elevations

It is usually the simplicity of things that convinces us – be it straight lines, 90° angles or unadorned shapes. In the case of PVC windows, angular profiles and slim frames with shallow basic depths of around 74mm are used. For refurbishment depths from 70mm and for higher energy savings 80mm and more are the order of the day. Regardless of whether you look at the windows from the outside or the inside, the modern frame design focuses on minimalism and restraint, so that the entire facade of the house appears open and calm.

Angular profiles support exceptional design | Image: profine | profine-group.com

Image: aluplast | aluplast.net

Classic white windows are always in vogue, here as a sliding door | Image: Veka | veka.de/en

Variety of colours and surfaces

Colours have a significant influence on perception and individuality. That is why there is a wide range of colours available for PVC window profiles: Choose between coloured film decors, natural wood decors and elegant aluminium shells or simply classic white. At the top of the current popularity scale are shades of grey and black. Alternatively, you can opt for surface finishes such as concrete or leather look, which some system suppliers offer. Your ultimate choice is a matter of taste or related to the building type. Rest assured: All surfaces are weatherproof, impact and scratch resistant and easy to clean.

Coloured profiles are popular for modernizations, here anthracite | Image: Rehau | rehau.com

Sustainable product design

It is not only the outer values that count, but also the inner values. Following this idea, the use of recycled material is also playing an increasingly important role in the product design of new PVC windows. A modern PVC window profile consists of approx. 50% recycled material, which is usually found in the core of the profile. Visually and in terms of quality, the new windows with recycled cores play in the same league as windows made from virgin material.

Image: Gealan | gealan.de/en

Large window front in wood look also on the inside | Image: profine

MODERN PVC WINDOWS – **BEST PRACTICE AND INSPIRATIONS**

Image: Schüco | schueco.com

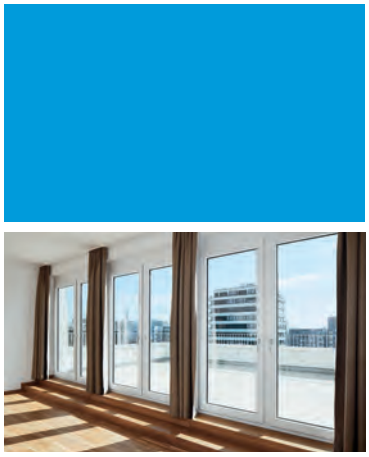
Images: profine

BEST PRACTICE
School Building

Location: Lutzerath, Germany

Measures: Complete renovation of a building in a school complex. This included the comprehensive energetic modernization of the facade, including architecturally and physically customized new windows.

Windows: Sliding windows were used in the classrooms, tilt and turn windows in other rooms. The sliding windows allow easy opening for push and cross ventilation. All elements have excellent thermal and sound insulation as well as high functionality.



Images: Schüco | Top large image and bottom left: after modernization; below right: before

BEFORE-AFTER EXAMPLE
Multi-Family House

Location: Frankfurt, Germany

Measures: Renovation of multi-family house with new windows and facade insulation.

Windows: Double-glazed PVC windows with wood optic lamination on the outside and white on the inside.

Images: Deceuninck | Top large image and bottom left: after modernization; below right: before

BEFORE-AFTER EXAMPLE

Private Home

Location: Kortrijk, Belgium

Measures: This urban row house was renovated including the replacement of old wood windows and doors to meet current energy standards, to improve insulation and to save heating costs.

Windows: PVC windows with integrated fibreglass technology have been used. With this technology it's possible to produce extremely stable windows without steel reinforcement what lead to increased insulating values. The offset design and the frame depth of 76mm is suitable for many applications thanks to the combination of straight lines and timeless design. The colour graphite black matt in the inside and outside of the windows fits very well to the new facade and enhances the property.

Images: Rehau

BEST PRACTICE
Privat Home

Location: Münster, Germany

Measures: We witness the renovation and extension of a family home. A glass cube with a total area of about 90m² is the new home for the children and the centre of family life.

Windows: Large PVC window walls set the scene and provide light and quality of life inside. The house complies with the German KfW 40 EE.

Images: Salamander | salamander-windows.com

BEST PRACTICE
Working Space

Measures: The mission for this building consisted of completing the interior and facade with clear, minimalist window profiles. The slimline design allows the construction of large glass areas for maximum light incidence.

Windows: The natural texture with a concrete look transforms the windows into a tangible design building. The texture provides the office with a stunning frame with a timeless, minimalist style.

ADDED VALUE_#04

FUNDING OPPORTUNITIES FOR WINDOW MODERNIZATION

Image: Gealan

Throughout Europe, there are numerous funding opportunities for home and flat owners who want to have their home or property renovated to make it more energy efficient. You can find an overview of the programmes here (this is continuously updated online).

BELGIUM

The Flemish government offers interest-free renovation credits/ energy credits+ up to €60,000 and a label premium of €2,500 to €5,000 for improving the energy efficiency of flats and houses.

> **mijnBENOvatie.be**

CROATIA

The Environmental Protection and Energy Efficiency Fund and the Croatian Bank for Reconstruction and Development provide funding for projects for energy efficiency. They offer financing programmes and special loan conditions.

> **www.fzoeu.hr/hr/o-fondu/10 | > www.hbor.hr**

DENMARK

The Danish Energy Agency (ENS) offers the possibility to apply for grants for energy-efficient refurbishments, including the replacement of facade windows, through the funding programme "Building Pool" (Bygningspuljen).

> **ens.dk/service/tilskuds-stoetteordninger/bygningspuljen**

FRANCE

The best-known financing option is „MaPrimeRenov" from the Ministry of Economy, Finance and Industry. This applies to comprehensive renovations, including window replacement.

> **ecologie.gouv.fr/evolutions-maprimerenov**

GERMANY

The Federal Promotion for Efficient Buildings (BEG) applies to all residential buildings. The BEG grants a subsidy or low-interest loan plus repayment subsidy.

> **bafa.de**

The Kreditanstalt für Wiederaufbau (KfW) offers various programmes for „energy-efficient renovation" (261/262 and 461).

> **kfw.de**

Numerous banks at the federal states level also offer loans for energy modernization, for example of the Investitions- und Strukturbank Rheinland-Pfalz.

> **isb.rlp.de**

At foerderdata.de a database is available listing all available programmes which are displayed in order of zipcode and type of modernization.

> **foerderdata.de/foerdermittel-suche**

GREECE

The Hellenistic Ministry of Environment and Energy in Greece offers the "New Savings" programme (NEO ΕΞΟΙΚΟΝΟΜΩ) providing incentives for energy saving measures in residential buildings, i.e. single and multi-family houses and flats.

> **ypen.gov.gr**

Image: GKFP/Sarah Heuser
(With kind support of Haas Fertigbau GmbH)

FOR EUROPE

ITALY

Different renovation premiums exist under certain conditions of up to 110%. All of them are administered by the Finance Authority and the Italian National Agency for New Technologies, Energy and Sustainable Economic Development.

> **enea.it/it** | > **agenziaentrate.gov.it/portale**

NETHERLANDS

The National Warmth Fund (Nationaal Warmtefonds) offers loans to private homeowners, homeowners' associations and schools up to a maximum of € 65,000 for the sustainable design of houses and buildings.

> **energiebespaarlening.nl**

POLAND

The government Program "Clean Air" (Czyste Powietrze) aims to improve energy efficiency from existing family homes. The BOŚ Environmental Protection Bank (Bank Ochrony Środowiska) grants credits for ecological investments.

> **czystepowietrze.gov.pl/czyste-powietrze**
> **bosbank.pl/klient-indywidualny**

ROMANIA

A European fund exists for the specific thermal refurbishment of residential.

> **bankwatch.org/blog/taking-the-chill-off-romania-s-residential-buildings**

SPAIN

There are different national renovation funds: The funds are managed by the Public Institute for Diversification and Energy Saving. The Planes PREE are tailored for a complete thermal improvement of the building envelope. Private energy saving companies (ESEs) also financially support the modernization of the entire building envelope.

> **idae.ea**

Image: Schüco

DETAILED INFORMATION

Please visit: eppa-profiles.eu/renovation

ADDED VALUE_#05
PRODUCT SOLUTIONS AND SERVICES

Find windows that fit your home | Image: Deceuninck

If renovation and modernization measures are imminent, PVC windows offer a wide range of product features from modern security and ventilation systems to barrier-free solutions. PVC windows are not only suitable for installation in post-modern buildings. The spectrum also includes solutions for historical buildings. For better planning of modernization projects, profile suppliers also offer numerous tools that make the search for the right window easier.

Security technology

Security is a basic requirement: Modern PVC windows have the resistance classes RC1 and RC2, whereby RC2 is recommended for security reasons. Of course, windows can be equipped or retrofitted with additional security technology. Special glazing techniques exist, e.g. bonding, burglar-resistant PVC frames, fittings with mushroom pins and additional locks or grilles. These investments can be particularly useful for patio doors or windows on the ground floor.

PVC windows support solutions for every renovation.

Barrier-free access to the terrace | Image: Veka

Ventilation and sound insulation

On the one hand, we want to let fresh air into the house, on the other hand we want to keep the noise outside: Fresh air with a closed window is not a contradiction, because both increase our sense of well-being within our home. For example, there are modern PVC windows with clever rebate ventilation systems integrated into the frame, allowing for ventilation without opening the window. The air from outside is filtered. If you live next to a major road and still want to enjoy peace and quiet, PVC windows with higher sound insulation values are an option.

Passive house standard

We want cosy warmth: The state of the art are PVC windows with frame insulation values (Uf) of less than 1.0W/m²K. Accordingly, a passive house standard can be realized simply and effectively. This keeps the warmth where we want it.

Barrier-free access

We like to take precautions: To ensure barrier-free access to balconies and terraces, PVC system suppliers offer comfortable and age-appropriate threshold systems for house and balcony doors.

Perfectly fitting designs

We want windows that fit our homes: The spectrum ranges from timelessly straight lines to round arches and triangles to trapezoidal or circular. Today a suitable PVC window for every style of facade from the Wilhelminian period to Bauhaus and the post-war and post-modern period to the efficiency building style of the 1990s and early 2000s exists. Various frame and sash heights or sash depths, forend and transom constructions, all-glass or glazing bars characterize the appearance of both modern and historical facades.

For houses from the 1960s, for example, there are special pivoting window profiles that were very popular at that time. For the Bauhaus style, the functional style of the 1950s to the 1970s and for post-modern period, there are systems in which the window sash disappears completely behind the outer frame. Especially when it comes to monument protection, it is decisive that a window is designed as closely as possible to the original.

Simply leave the city noise outside | Image: Gealan

DETAILED INFORMATION

Please visit: eppa-profiles.eu/renovation

Image: Rehau

Online tools and apps

The following tools help in the decision-making process when buying windows:

- **Energy saving calculator:** calculates the costs and CO_2 savings for replacing old windows with new PVC windows.
- **Winspirator tool / Window configurator:** selects a house style, climatic conditions and your requirements and configure the appropriate window and door profiles.
- **Colour and surface app:** supports getting to know the almost infinite spectrum of colours and surface finishes.
- **Specialist company search:** helps you find the right window manufacturer in your area.

Links to all tools can be found on eppa-profiles.eu/renovation

DO YOU HAVE ANY QUESTIONS?

Visit us at **eppa-profiles.eu/renovation** or write an e-mail: **info@eppa-profiles.eu**

CONTACT PERSON EPPA

Karina Grucka
Phone: **+32 27 39 63 81**
e-mail: **info@eppa-profiles.eu**

PUBLISHED BY

Qualitätsverband Kunststofferzeugnisse e.V. (QKE)
RAL Gütegemeinschaft Kunststoff-Fensterprofilsysteme e.V. (GKFP)
Am Hofgarten 1–2 | 53113 Bonn (GERMANY) | +49 228 766 76 54 | info@gkfp.de | gkfp.de/en | qke-bonn.de

European PVC Window Profile and related Building Products Association (EPPA ivzw)
Avenue de Cortenbergh 71 | 1000 Brussels (BELGIUM)
+32 27 39 63 81 | info@eppa-profiles.eu | eppa-profiles.eu

Cover: Sarah Larissa Heuser Fotografie | tonlosekunst.de
(With kind support of Haas Fertigbau GmbH)

This brochure is made of 100% recycled paper and is respectful of the environment.