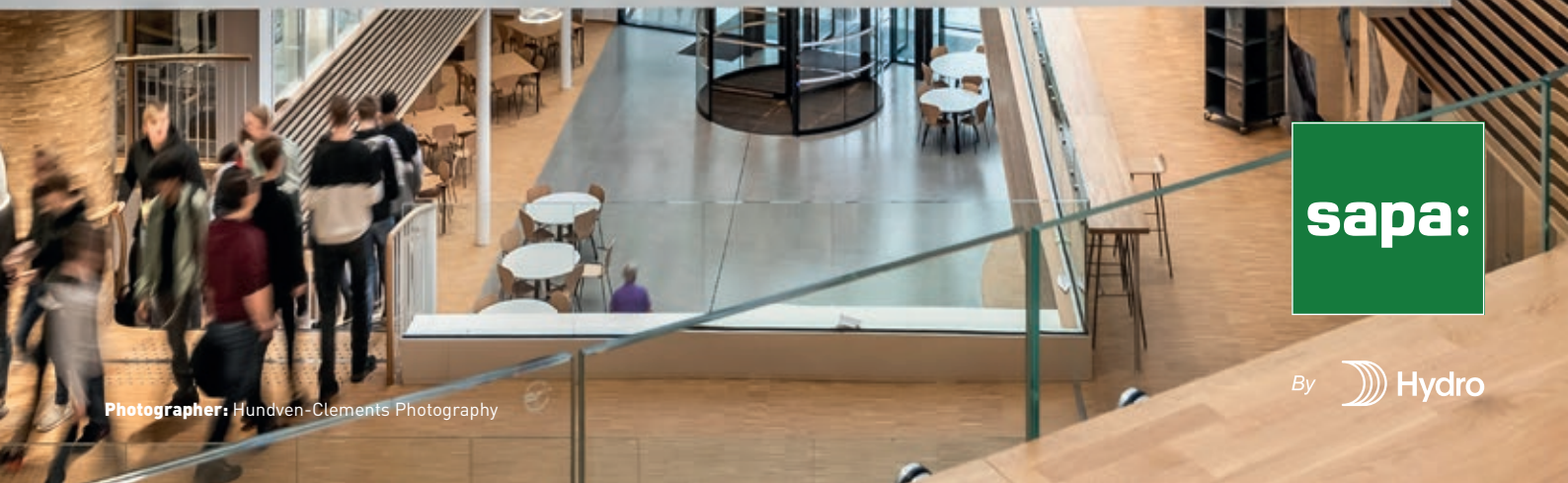



# EDUCATIONAL BUILDINGS



sapa:

By  Hydro



*“Education  
is the most  
powerful weapon  
which you can  
use to change  
the world.”*

/ NELSON MANDELA



# EDITORIAL

/ BY ISABELLE FABBRIO,  
Technical and Product  
Management Director,  
Hydro Building Systems

“We spend most of our lives inside buildings – offices, homes, restaurants... and schools. Educational buildings have a huge impact on the health, thinking and performance of students. They influence their creativity, learning and problem-solving abilities.

Education design of the future must have the needs of the student at its heart. In the campus of the future, the environment adapts to how students want to learn, libraries are the most popular social learning hubs on campus, and grassy lawns host impromptu study sessions. Students have everything they need to learn, study, relax and play – but most importantly, they feel they belong there. Designing spaces that are flexible and community-focused requires a multidisciplinary approach that considers teaching and learning models, the physical campus, future technology, and the students’ entire experience.

From an environmental perspective, concerns for the health and well-being of students—particularly young students—are increasing interest in the improved performance and fabric of school structures. Consequently, more investors, municipalities and states are opting for climate-friendly schools. These are cost-effective constructions that boast low greenhouse gas emissions throughout the entire life cycle.

We offer a wide variety of solutions to meet the requirements of educational buildings in terms of comfort, safety and design. Our products establish a dialogue between the interior and exterior of educational buildings, and our facades revolve around large glass surfaces. Curtain walls, windows and doors, which come in multiple versions, provide adequate answers to the different needs expressed by professionals.

As part of Hydro group, we carry the commitment to sustainable development. As a global supplier of aluminium with activities spanning the entire value chain, Hydro aims to reduce its overall CO<sub>2</sub> emissions by 30% by 2030.”



Lettlest voksen  
A - A

Skjønnlitteratur  
A - Ca



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# HOW ARCHITECTURE CAN INFLUENCE ACADEMIC SUCCESS

Educational architecture is a powerful tool for stimulating creativity, as well enhancing concentration, motivation, and understanding. whether it's a kindergarten, high school, or university, the environment in which we study directly influences how knowledge is absorbed.

More than other building types, educational facilities have a profound impact on their occupants and the functions of the building, namely teaching and learning. Students in various stages of development are stimulated by light, color, the scale of their surroundings, even the navigational aspects of their school. Students can also react negatively to adverse conditions.

## Four main factors come into play:

- Student and teacher's comfort in terms of light, noise, temperature and air quality
- The aesthetics and design of the premises (harmony of colors, layout of the classroom...)
- Flexibility and modularity of the interior space to allow differentiated activities and the use of digital technology.
- Safety and health of occupants in compliance with a range of regulations and requirements such as emergency lights, building capacity, exit signage, fire safety, escape door, corridor widths, disabled access.

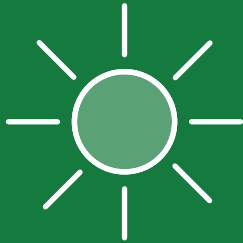




# 16%

## / CLASSROOM DESIGN IMPACT LEARNING PROGRESS

Differences in the physical characteristics of classrooms explain 16% of the variation in learning progress over a year. *(source: HEAD Project study, 2015)*



# 26%

## / NATURAL LIGHT HAVE A POSITIVE EFFECT ON TEST SCORES

Students with natural lighting in their classrooms score up to 26% higher on tests than their cohorts with little or no natural lighting. *(source: Hale study, 2002)*



# 93%

## / TEMPERATURE AFFECTS THE ATTENTION SPAN AND MEMORY

Test scores average 72% when the classroom is too cold or too hot, and 93% when temperature is controlled. *(source: Science Research Club study)*

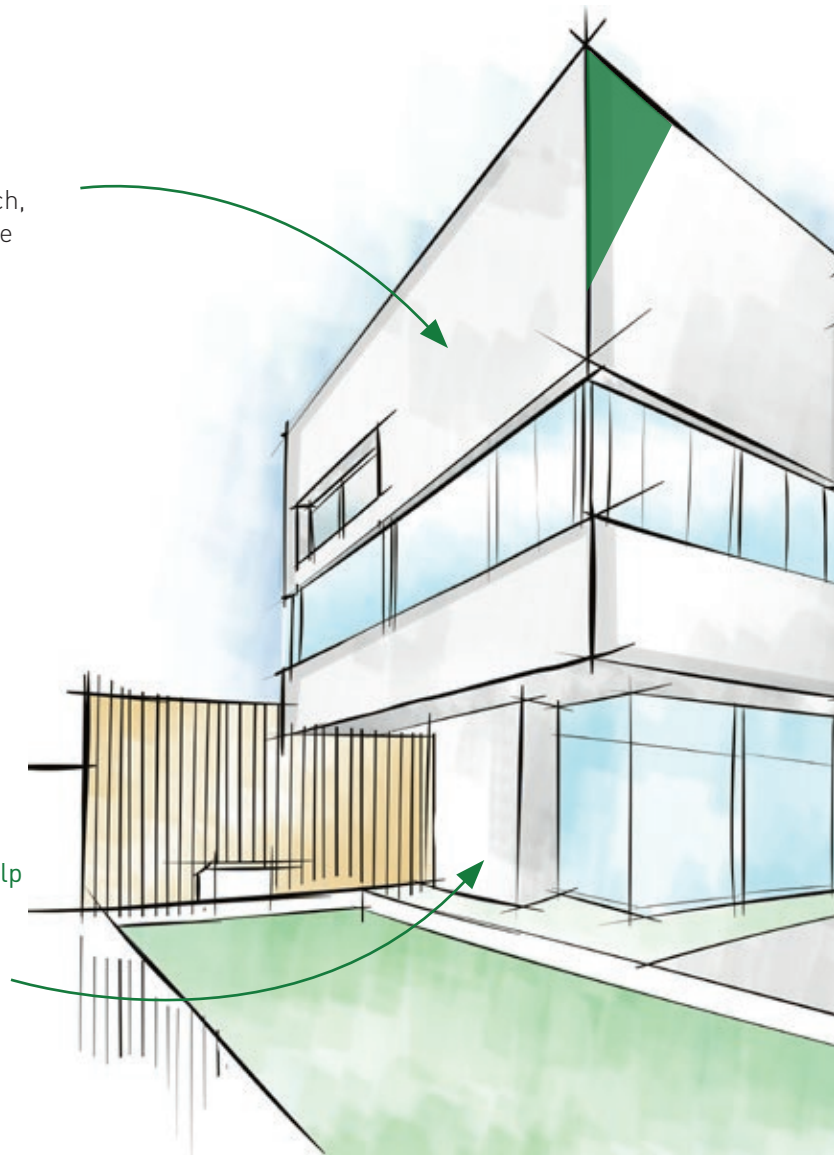
# REQUIREMENTS FOR EFFECTIVE EDUCATIONAL PREMISES

## / FLEXIBILITY OF SPACES

Educational buildings should be able to meet the challenge of evolving teaching styles and emerging technologies. At some facilities, programs and schedules vary frequently. Furthermore, instructors have different and evolving training methods. As such, flexibility within the building's design is critical to the success of an enduring teaching program.

## / THERMAL COMFORT

Temperature impacts student's learning ability and also affects numerous other mental and physical activities. Subconsciously, the brain keeps having to adjust to different temperatures to make sure the body is cooperative. Thermal conditions also have an impact on attention span, fatigue and memory. Architects and stakeholders can't ignore it when designing an educational building. **Our solutions are entirely designed with thermal break. They can accommodate very high performance insulation glazing. These features reduce thermal loss and help maintain a comfortable temperature in all seasons.**



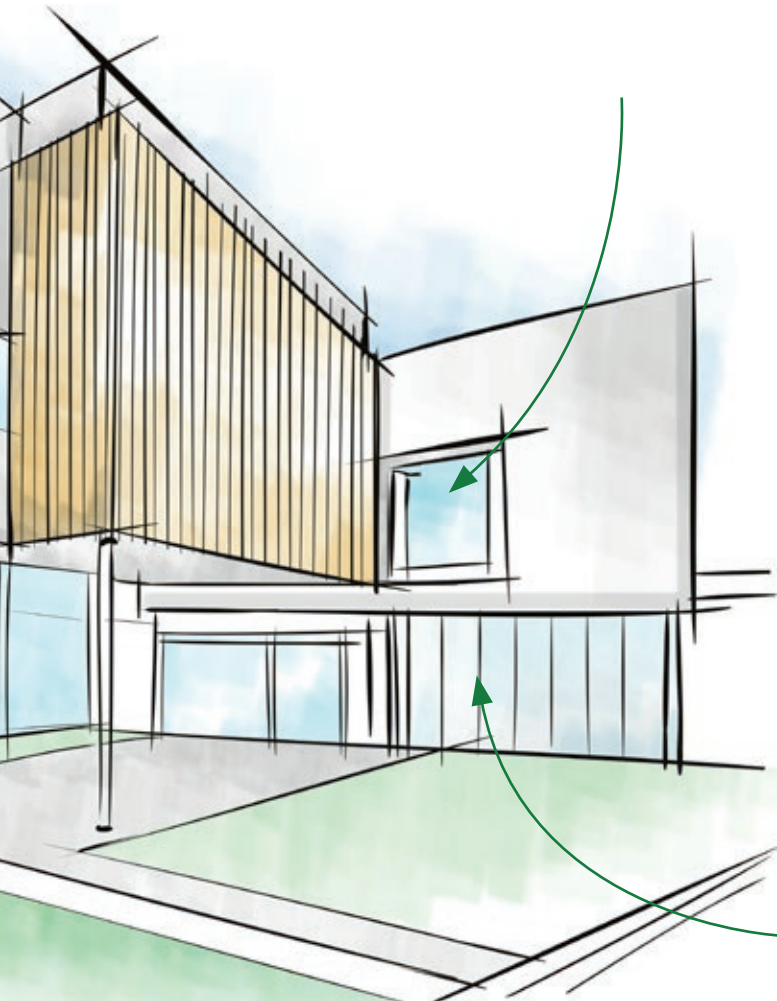
## / AESTHETIC AND DESIGN

The importance of the physical appearance of an educational building should not be minimized. An educational building that is attractive and consistent with the design and context of the neighborhood, builds a sense of pride and ownership among students, teachers, and the community. The exterior should complement the neighborhood and reflect the community's values. The interior should enhance the learning process. **Design is our constant concern and part of our DNA. Particular attention is paid to the treatment of color and the offer of various finishes. Finally, the wide variety of handles and accessories offers the possibility to adapt to different styles of architecture.**



## / ACCESSIBILITY & SAFETY

Educational buildings have to comply with accessibility requirements for the disabled, and the design and construction of secure and safe buildings are essential for owners, architects, engineers, project managers, and other stakeholders. In most cases the minimum design criteria for accessibility, as well as fire protection, occupational and natural hazard safety are prescribed within the building codes and standards. **Our threshold for people with disabilities respond to regulations while maintaining waterproofing performance. The height of our handles is adaptable to accessibility needs and easy to maneuver. And our offering includes solutions like PYROAL, a fire protection door which can compartmentalize the spread of flames and fumes, and strengthen heat resistance.**



## / ACOUSTIC INSULATION

Classroom acoustics are an important, often neglected, aspect of the learning environment. Up to 60% of classroom activities involve speech between teachers and students or between students, indicating the importance of environments that support clear communication. Good classroom acoustics are a basic classroom need, not an accessory, to give all students access to spoken instruction and discussion. **Thanks to their performance, our solutions can significantly reduce noise pollution. Even in a highly exposed situation, they guarantee unprecedented acoustic comfort.**

## / NATURAL LIGHT AND SUN SHADING

Good natural light helps to create a sense of physical and mental comfort, and its benefits seem to be more far-reaching than merely being an aid to sight. This owes in part to the soft and diffused quality of natural light, its subtle changing value and colour, which electric lighting does not have. With natural light and sun shading solutions, spendings on electricity are reduced, another strong benefit for the building owner. **LUMEAL innovative design favours natural light (nearly 14% more) and solar inputs.**

## / SUSTAINABILITY and COST SAVINGS

These days, sustainability is an expectation on higher education. A green education building changes the way students, and the surrounding community think about sustainability. Another true benefit of a green building is cost savings as reducing water and energy consumption is not only environmentally friendly, it will also considerably reduce operating expenses. **Many of our products such as GEODE curtain wall and SOLEAL profile sections are made of Hydro CIRCAL®, a premium quality aluminum range comprising at least 75% of recycled aluminum sourced from post-consumption waste, i.e. end-of-life joinery. Hydro CIRCAL® has one of the lowest carbon footprints in the world: 2.3 kg of CO<sub>2</sub>/kg of aluminum.**

# A NEW BENCHMARK FOR FUTURE SCHOOLS

/ TORVBRÅTEN SCHOOL Asker, Norway

**Universally designed to accommodate everyone – Torvbråten Skole is a place both for learning, and to learn from. There's sometimes a narrow sliver on cognitive development, traditional subjects such as math and reading are often thought of when it comes to children's education. Learning is not only academic, it's also social and emotional.**

The school set high environmental standards, both regarding the environmental architecture and social sustainability. Torvbråten Skole is Norway's second school building to achieve the "Svanenmerkede Skolebygg"

Children's brain capacity develops in a safe and inspiring environment. Thoroughly planned – the building focuses on energy, CO2 emissions and the 470 students that would fit in the building.

The school is created to facilitate diversity, and tolerance is a key word. To achieve this, a sharp focus is put on the architecture to favor this endeavor.

Different classrooms are created for the purpose of giving the students that extra attention that they might need, that could for example be singing lessons.

- Torvbråten Skole is a pioneer project for future school buildings, and the main goal is to create great life quality and sustainable development. The school shall be a great place for both students, employees and the locals – and it should be as sustainable as possible, says Lene Conradi in Asker municipality from a Nohrco pressrelease.

The undulating shapes of the 6700 m<sup>2</sup> building blends beautifully into the environment. The look and feel





**Architect:** LINK Architektur  
**Photographer:** Hundven-Clements Photography

of the building create a pleasant view for the eye, and the interior parallels that vibe with its soft forms and exposed solid wood. From inside there's a great view over the forest and land, the nature surrounding the building almost works as an extension of the school yard, and the Norwegian nature is available for students both during breaks and school lessons.

– Thanks to a great cooperation with Veidekke and participant consultants we've created a building with several innovative and future solutions never been thought of in similar buildings from the past. This has resulted in synergy effects through creation of a high quality learning environment with more knowledge of sustainability, says Jon-Erling Johanessen from LINK Arkitektur.

### / PROJECT

**Architect:** LINK Arkitektur AS  
**Metal Builder:** H-fasader GlassTeam AS

### / PRODUCTS

- SAPA Window 1086 SX
- SAPA Door 2086 SX
- SAPA Fire door 2086 EI 30
- SAPA Glazed elements 3086 EI 30
- SAPA Facade 4150

*Photography: Hundven-Clements Photography*







**Architect:** Liljewall Arkitekter  
**Photo:** Jonas Anhedé

# BAGGEBOSKOLAN IN TIBRO IS THIS YEAR'S BEST COMMUNITY PROPERTY IN SWEDEN

/ BAGGEBOSKOLAN Tibro, Sweden

Great architecture does not solely come from creative ideas, but also from a collaboration with everyone involved in the project. Metal builders, entrepreneurs and those who'll use the space. Baggeboskolan is an example of collaborative architecture and has received the prestigious construction award "Construction of the Year" 2021 in Sweden.



Baggeboskolan is a F-9-school and the focus of this eminent project was, of course, sustainability. The choice of material has carefully been thought through, and every choice has been preceded by life cycle analysis in order to establish if its according to the high sustainable standards that been set out for the project. Not only materials have been carefully selected, but also the interior. The furniture is all mostly high-quality vintage that has been recycled from its earlier life in previous other schools. There has not been a trade off between functionality and design, both the exterior and the interior are expressions of the city's craft traditions.

– Learning, safety and joy” is Tibro’s vision for Baggeboskolan. That was the basis of our work. The vision for us as architects was to create a school where you can feel safe in your own unit - dormitory, but at the same time have a strong participation in the common. And it was also to create a school that

is characterized by light and overview, it provides security and togetherness, says Anette Wallin, architect SAR / MSA, Liljewall Architects.

The design is also a collaboration between architects, educators, teachers, students and other companies involved in the project. They’ve all contributed to create a school with the best prerequisites for its students.

– If there is a trade-off between design and sustainability? Both yes and no. In that context, I spontaneously think of recycling, which we also worked on at Baggebo, especially on the interior design side. There, as architects and interior designers, we have an exciting challenge to learn to ask the question “can we recycle?” instead of believing that we always need to design something new, continues Anette.



Can you say something about the design of the future, what will we be characterized by?

- I think the design of the future will be more eclectic, precisely because I think it will contain more recycling than we see today. It will feel natural to reuse, which will also place demands on the design of what is new. In order to be reusable, what we create must maintain a high quality, which can withstand being used for a long time and being reused.

The construction of Baggeboskolan is the largest new construction project carried out in Tibro in 40 years and the bar was set at a high level for both the educational environment and the school's design. The construction was carried out as a collaborative project between Tibro municipality and NCC with GlasLindberg as subcontractor of both interior and exterior glass and metal sections.

- Baggebo was in many ways a dream project to work with, we had a fantastic client with a strong desire to create the best educational environments based on the business they wanted to build. Working in Tibro, with ancient craft traditions, was also a unique opportunity. Nothing was impossible. If specially built cabinets were proposed, they arranged it. Or bent wood and designed fixtures, or carved handles for the doors. The challenge as an architect was, of course, to respond to it and take advantage of the opportunities that exist. Anette Wallin, architect SAR / MSA, Liljewall architects.

With a total surface of 9 300 square meters, with a variety of classrooms, for both school and leisure, the facilities are designed as a ring around an atrium.







– I believe that varied learning environments have come to stay. Different room types and room sizes. It opens up so many opportunities in everyday life both to gather in the large group and to meet the individual student. Another thing that I experience that many long for, of those who today work in an older school, is a natural center in the school, a place where you meet in everyday life without it being planned. It provides togetherness and context. I also believe that the schools of the future will be even better from a sustainability perspective. Light, sound, energy and materials will be even more important than they are today.

Sustainability, I hope, will also mean that we prioritize school construction in the way it was done at the turn of the last century. Then the schools were important buildings in the city, lavish and with solid material choices. Over time, it is always a good idea to invest in materials that stand the test of time, even if they are not always the cheapest in the construction phase, it pays off in the long run. Schools are being torn down incredibly hard and I think that is sometimes forgotten

when planning, especially in the early stages when political decisions are made and the budget is set, where I hope for change and awareness, concludes Anette Wallin.

The school achieved the certification Miljöbyggnad Silver.

### / PROJECT

**Architect:** Liljewall arkitekter  
**Metal Builder:** GlasLindberg Fasad AB

### / PRODUCTS

- SAPA Door 2086
- SAPA Door 2050
- SAPA Facade 4150

*Photographer: Jonas Anhed*





# VOLDA MEDIA BUILDING – SUSTAINABLE CONSTRUCTION WITH A VISION TOWARDS THE FUTURE

/ MEDIEBYGGET Volda, Norway

**The media building was designed by LINK Arkitektur and completed in 2021. Volda University College has around 500 media students, split between six different bachelor programmes. This represents a real boost for education and the future, as media plays an increasingly important role in society. The building's clear environmental focus is reflected in the choice of material for the exterior cladding – recycled Hydro CIRCAL aluminium – which has one of the lowest carbon footprints on the market.**



**Architect:** LINK Arkitektur AS  
**Photographer:** Marius Beck Dahle

Most of us would agree that it is important to have good teaching facilities that promote motivation and well-being. Schools are continuously being built and renovated. Understanding the importance of materials selection is increasingly important. This is a critical factor in efforts to reduce carbon emissions for every construction project. It is also a responsibility that is shared by everyone in the construction industry.

One important fact to remember is that there is a difference in carbon emissions between recycled aluminium from process scrap and recycled aluminium from older buildings, and this has a key impact on the total carbon footprint of a project.

The media building in Volda has high ceilings and large areas of glazing that create an open impression with lots of light and open views through the building. The building has a clear message: It is designed to be

a space where students find the perfect environment for learning and well-being. In addition to this goal of the architect and developer, the choice of materials is also an important factor for an environmentally friendly building that considers the future of the next generation by re-using resources.

The glazed walls of the new media building are constructed from Sapa Facade 4150 made from Hydro CIRCAL aluminium alloy. Hydro CIRCAL is a range of prime quality aluminium made with a minimum of 75 percent recycled aluminium from post-consumer scrap, such as facades and windows that have been removed from buildings and fully recycled. One of the goals for Mediehuset at Volda was to achieve at least a 30 percent reduction in greenhouse gas emissions in comparison with a reference building that complies with current TEK requirements.



– The more projects that are built using sustainable aluminium solutions, the more we can continually improve the environmental balance between materials and construction. By using environmental product declarations and the like, our partners can always feel confident in their choices, says Johan Strand, Sales Manager for Sapa at Hydro Building Systems.

Alloys based on recycled aluminium are now the standard solution for Sapa facades, and from 2022 they will also be the standard for selected windows and doors.

### **A college for the future**

The media building makes an important statement in a region that puts great value on teaching and learning. Students are welcomed by an impressive and flexible 3,900-square-metre building that offers the highest standards of comfort in sound, lighting and air quality.

– The media professions are undergoing rapid change. The new building gives us opportunities for future-oriented teaching and research in vocational media subjects, commented dean Audhild Gregorisdatter Rotevatn in an earlier press release.

### **/ PROJECT**

**Architect: LINK Arkitektur AS**  
**Metal Builder: H-fasader AS**

### **/ PRODUCTS**

- SAPA Doors 2086
- SAPA Windows 1086
- SAPA Facades 4150.
- SAPA Roof Glazing 5050

*Photographer: Marius Beck Dahle*





# A FACELIFT FOR HALMSTAD UNIVERSITY, SWEDEN

/ S-HUSET, HALMSTAD HÖGSKOLA Halmstad, Sweden

**Do you remember your math teacher? Or do you remember the actual classroom? According to modern studies, the environment is just as important as the teacher when it comes to education. Health, concentration and results are all factors with major improvement thanks to a modern environment containing lots of natural light. A successful example of this is the S-house in Halmstad University, and the building achieved the certification Miljöbyggnad Silver.**





**Architect:** Fredblad Arkitekter  
**Photographer:** Per Kåhréd Photography

A mix of old and new, that would be a pretty accurate description of Fredblad Arkitekter's latest design, S-huset at Högskolan i Halmstad. The old 40's industrial building got both a facelift and a new extension. Modern facilities, with advanced laboratories, auditoriums and offices now fills the old premises, and the old industrial vibe blends in beautifully with the modern establishment.

– The vision was to create, and to recreate the origin of the building. Glass sections played an important role of recreating the character. The integrated sun protection and screen-printed glass give the building a nice character, says Leif Jönsson, Architect SAR / MSA.

S-huset has a ceiling height of 18 meters, and the glass roof generously lets in tons of natural light. The environment is light and airy and creates comfortable

meeting spots for both students and teachers. The cultural value of the building was certainly an important aspect of the project, and this has carefully been in consideration while restoring parts of the project. New windows, a new roof and a crescent roof has been added in order to improve the quality of the in- and outdoor climate.

– It is important when we design school environments to handle daylight in a careful way. It's about ensuring the right access to daylight, creating sun-protected indoor environments and also providing the inner parts of the building with glare-free light. The large glass lanterns give a pleasant light to all parts of the building," says Leif Jönsson, Architect SAR / MSA.





### / PROJECT

Architect: Fredblad Arkitekter  
Metal Builder: Preconal Fasad AB

The building achieved the certification as Miljöbyggnad Silver.

### / PRODUCTS

- SAPA Facade 4150
- SAPA Door 2086
- SAPA Glazed Roof 5050

*Photographer: Per Kåhred Photography*





# A SCHOOL WHERE RENOVATION MEETS NEW CONSTRUCTION

/ MIDTUN SCHOOL Bergen, Norway

**There are many reasons why we should always think of restoration when it comes to “new” projects. One is the historical value of a building, we can learn a lot from old buildings in terms of history, architecture, design and the old way of living. Another reason is sustainability. We must be considerate to the resources we already have, and make sure we contribute to a circular economy.**



**Architect:** ARCTEC AS

**Photographer:** Hundven-Clements Photography



Midtun Skole was in need both of a renovation and a new school building. 4100 square meters was restored, and 2500 square meter surface was added. The school is a primary school, and with the new building the school can accommodate up to 500 students.

The classrooms are specially designed depending on the subjects, there are special rooms for science, music, arts and crafts etc.

– Schools are complex buildings; all different phases have their own challenges. The schools educational is in constant change and demands that the school has some sort of flexibility. The building should last long, be enduring and the choice of material must be robust and sustainable. Necessary elements for a school are quality indoor climate, day light and great acoustic, says Liv Marit Haraldsrud, architect at ARTEC.

When standing in between renovation and new construction, there are several factors to take into consideration. In this specific case, both alternatives were used. However, renovation is not entirely straightforward either, as one must be aware of the buildings antiquarian value and make sure the old character only gets a face lift, and not be modified into something new.

In parallel with the renovation challenge, the new building faced its own challenge – to harmonize with the old building at the same time as it had to clearly differ from the existing building.

The municipality had a desire that the facade should match the exterior of the existing building, the rhythm of the façade is matching each building, but they still have a different geometry etc. The transition from the old to the new is clearly marked thanks to the dark profiles.



– The biggest challenge was the link between an old and a new school, both organizationally and architecturally. Antiquarian authorities did not want an extension. Finding a shape and clothing that could be accepted was difficult. The extension is between 2 existing buildings with different ages and quality. New building had to be lower than what is required of work buildings today. Now that everything is there, I personally wish there was a greater contrast between new and existing, but that was not the wish of the city architect and antiquarian, says Liv Marit Haraldsrud, architect at ARTEC.

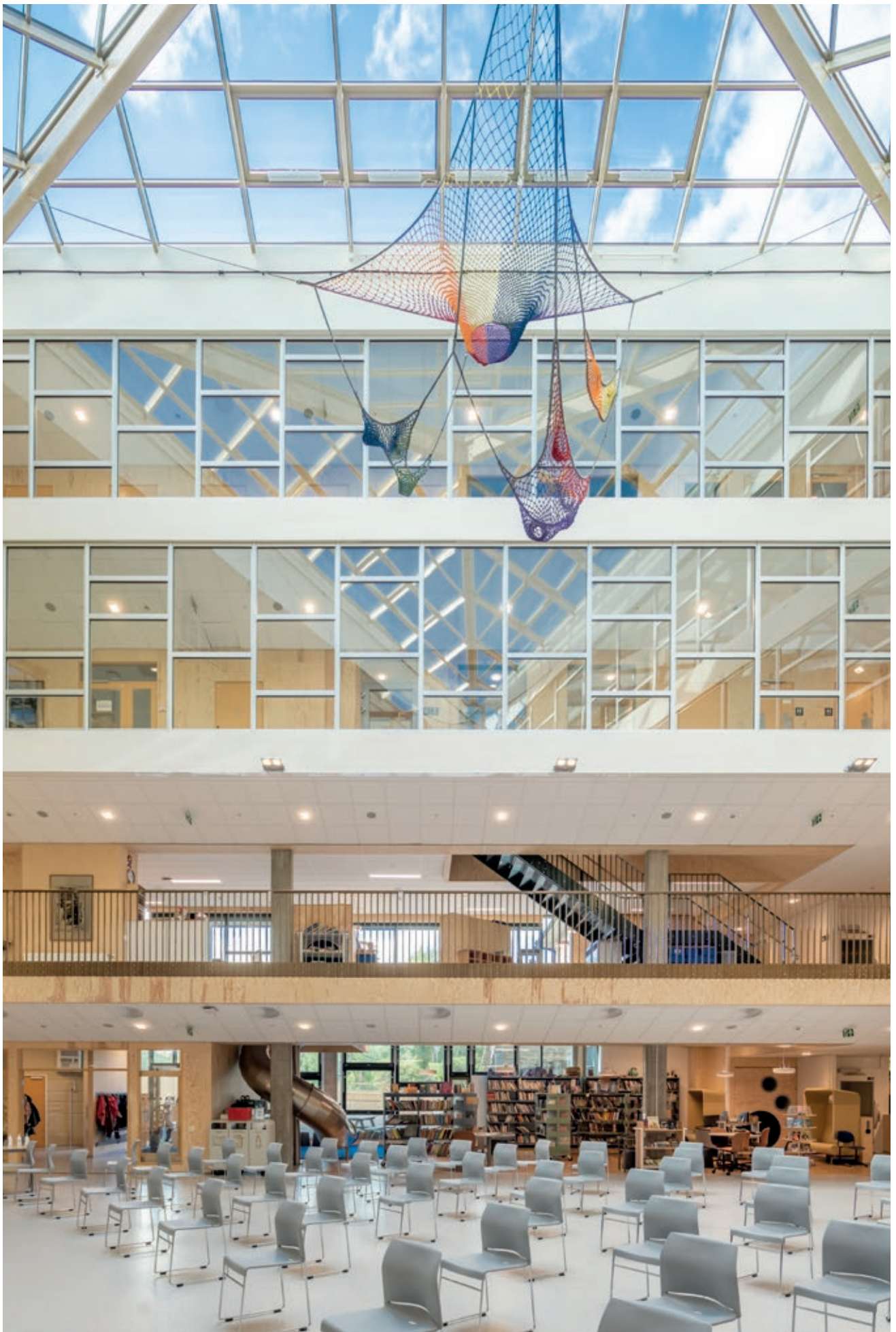
#### / PROJECT

**Architect:** ARTEC AS  
**Metal Builder:** H-fasader Bue Aluminium AS

#### / PRODUCTS

- SAPA Window 1086
- SAPA Door 2086, SAPA Fire Door 2086
- SAPA Facade 4150
- SAPA Roof Glazing 5050

*Photography: Hundven-Clements Photography*



# AN EDUCATIONAL EXAMPLE OF SUSTAINABLE DESIGN

/ HORTEN SCHOOL Horten, Norway

Large areas of glass, plenty of daylight and open views are the foundations of the greenest school in Norway. Thanks to the use of natural materials and bold environmental choices the award-winning building that houses the Horten high school sets the standard for the future.







Architect: LINK Arkitektur  
Photographer: Hundven-Clements Photography

The building has four floors, a basement, and a rooftop utility room – an arrangement that meets many of the requirements for logistics, layout and access. It was also important to preserve a feeling of closeness to the park outside.

There was a desire to draw the neighboring park into the building and create a strong sense of connection with the natural surroundings of the school. This was achieved by linking up with paths from the historic area of the park so that they continue right through the building. The school opens into the park in a way that makes the building feel inclusive and open. "The street winds through the building and connects us to the rest of the park," says Brox-Nilsen from LINK Arkitektur.

Horten High School meets both passive-house and energy-positive building standards. The building has 3,700 square meters of solar panels, 13 geothermal wells, water-based heating and impressive levels of insulation in the walls and ceilings. Strict requirements for toxin levels, transport emissions, recycling efficiency and draught-proofing meant that all materials had to be evaluated carefully.

"We thought a lot about how we could achieve this. There were only a few other buildings we could use for reference, and this one had to meet considerably higher demands than any technical standard. One such

question was what material should we use if we can't use concrete? We ended up with solid wood," says Brox-Nilsen.

The palette of materials is based on environmentally friendly choices, starting with the exterior walls, floors and main staircase – all of which are built of wood. Inside, oak and oak parquet are used. Outside, the architect has chosen untreated ore-pine. The wood makes a striking contrast with the large areas of glass supported by recyclable aluminium profiles. The result is a compact and warm building with wonderful light

**"The glass façades provide lots of daylight and open views. You can orient yourself in relation to your surroundings at any time and feel in touch with the landscape around the school." says architect Grethe Brox-Nilsen from LINK Arkitektur.**

"It was a challenge to make full use of daylight and the views in such a compact building, especially for classrooms and other utility spaces that face the atrium," Brox-Nilsen admits.

The answer was to create balconies on the upper floors





on one side of the atrium. The idea is that every part of the building should lead to the atrium, which is also the main common space in the school. Each department in the school is just steps from this space, which makes it easy to orient oneself and helps create a sense of community.

### Using BIM to design the school

Building Information Modeling (BIM) was used during the design of the school. BIM creates digital 3D models of buildings and makes it possible to visualize, plan, do calculations and coordinate the building process. It also improves and simplifies collaboration between multidisciplinary teams.

“With BIM, we used a composite model to check for clashes between the different structures, and the model was also used to get a visual overview in 3D,” says Brox-Nilsen. “We then set up workstations at the construction site so the model could be examined in detail.”

At the school, the atrium is known as the “heart room.” It is a large, open space designed to welcome students and teachers – everyone. It also serves as the building’s main artery.

“One of the key visions for the school was to create this space where students would feel comfortable

### / PROJECT

Achitect: LINK Arkitektur  
Metal Builder: Umbra Produkter AS

### / PRODUCTS

- SAPA Window 1086
- SAPA Door 2086, SAPA Fire Door 2086
- SAPA Facade 4150

*Photography: Hundven-Clements Photography*

and which would discourage exclusion,” says Runar Bekkhus, who represents the developer, Vestfold Municipality.

The atrium has dedicated zones for socializing and working. The large glass façades that form the entrances from the East and West give the entire school a transparent and inviting impression. A large oak staircase provides vertical communication within the atrium.

At the same time, using such large expanses of glass as well as a glazed roof presented a challenge in keeping CO<sub>2</sub> emissions low. One consequence was that an extra five centimeters of insulation had to be added to the outer walls. It would have been difficult to create the large glass façades without the insulating properties of the aluminium profiles.

### World-class sustainability

Horten High School was designed with sustainability as a fundamental priority. This guided everything from the choice of materials and energy solutions, to recycling

waste during construction. The overall result was a reduction in greenhouse gas emissions of at least 40% compared to a reference building.

Bekkhus says that a lot of effort was put into recycling waste during construction. “We even cut open vacuum bags and sorted the contents,” he says.

Horten High School won a 2019 BREEAM Award for public sector projects. BREEAM is the world’s leading environmental classification system for construction. The award confirms that the new school is the greenest in Norway.

“It’s important to understand how architecture affects the environment. We were totally committed to sustainability on this project. It also means we created something that will last for generations,” says Brox-Nilsen.







**Architect:** SWECO Architects AB and PE Teknik & Arkitektur AB  
**Photograph:** Hanna Bouveng

# WITH LIGHT AND WELLBEING AS A FOCUS

/ LINDBACKASKOLAN Lindesberg, Sweden

**Education is undeniably important for our future. A child's learning shapes people of tomorrow. Scientific studies show that the environment of a school has a positive impact on the student (and teachers) wellbeing - it reduces stress, school absence and some even say environment is a key factor when it comes to student's performance. Lindesberg municipality made their largest investment in history, making sure Lindbackaskolan will have the best conditions for the students and their future.**



Lindabackaskolan opens their doors in august 2021. It's an impressive building with a total area of 17 700 m<sup>2</sup> and will act as a school centrum in Lindesberg. The entire centrum will house 1100 students, and besides classroom there'll also be two sports halls, connection to the hockey hall, and an outdoor arena available also for associations outside the school world.

The construction work has not only been ongoing indoors, a new outdoor environment was also created for school activities, meeting locations, sport facility, playgrounds etc.

"Lindabackaskolan is the biggest project Rockpart ever had, we've worked with this for over 2 years and it's been an exciting project with many challenges" says Anders, CEO at Rockpart.

The school is designed not just for the benefit of learning, but also for the eye. The school contains 4 big atriums which you can enter from inside the building, with the sky acting as a roof.

"The greatest challenge was to mount all glass facades inside these 4 big light courtyards. One glass section broke, so we had to be creative with solutions since we couldn't use cranes or other big machines, but it worked out perfectly and the school can now use 4 incredible atriums" continues Anders at Rockpart.

Lindabackaskolan will be a building with large and bright surfaces, making sure students will have the best conditions for their time in school.



#### / PROJECT

Architect: SWECO Architects AB  
and PE Teknik & Arkitektur AB  
Metal Builder: Rockpart AB

#### / PRODUCTS

- SAPA Fire Door 2086
- SAPA Facade 4150

*Photo: Hanna Bouveng*







Architect: SWECO  
Photograph: Erik Wik

# STOCKHOLM'S FIRST NORDIC SWAN ECOLABELLED SCHOOL

/ BAGARTORPSSKOLAN Solna, Sweden

**The new Bagartorp School in Solna opened in August 2021. The school now teaches 360 students in fresh new premises that provide an ideal foundation for learning and development. It is also the first Nordic Swan ecolabelled school in Stockholm, proving that it has one of the lowest environmental impacts in the sector. The project uses glass facades and windows from Sapa.**

The former Bagartorp School was demolished to make way for a new school with a larger catchment area, to bring children together from different parts of the city and thus counteract segregation. The school, which has an area of 5,200 square metres, promotes sports, and this is reflected in all daily activities, including increased time for sports, close cooperation with sports associations and active competition activities. The school comprises two buildings, one of which contains classrooms, special halls and a dining hall, and the other a large sports hall.

There is no doubt that Bagartorp School places a clear emphasis on well-being and pleasant environments. In fact, the school is the first in Stockholm to be awarded the Swan Nordic ecolabel.

The ecolabel entails a certification process that is managed by Miljömärkning Sverige (Ecolabelling Sweden). A Nordic Swan ecolabelled building is certified on a wide range of criteria: low energy use, inspection of the construction process, good ventilation and daylight, as well as tough requirements for building materials. Eco-labelled building materials have among the lowest environmental impacts on the market and must meet strict criteria for substances that harm health and the environment.

– We are proud that our school has received the Nordic Swan ecolabel; it's a proof of our long-term efforts to create sustainable environments in our properties. It is important for us that students are able to spend their time in buildings that are healthy and eco-friendly, says Anna Sundbaum, Environmental Specialist at Hemsö.

## Life cycle analysis shows reduced climate impact

During the construction process a Life Cycle Analysis was also conducted using the project's building information model (BIM). Just over 134 tonnes of construction materials were renewable materials with biogenic carbon storage, which contributes to a reduced climate impact of 245 tonnes of CO<sub>2</sub>.

## Aluminium facades and windows

The Sapa aluminium facades and windows for the school were supplied by Abax. SAPA facade 4150 is now manufactured from Hydro CIRCAL, an aluminium alloy made from recycled aluminium from salvaged construction products. Sapa's windows will also be produced from this aluminium alloy from 2022. Sapa, which is owned by Hydro, has a clear environmental commitment to sustainability throughout the construction process.

– As one of the leading players in the market, we have a responsibility to constantly make improvements and ensure that the products we develop and deliver contribute to a lower climate impact, says Mattias Jansson, Sales Manager at Sapa.

### / PROJECT

Architect: SWECO

Metal Builder: Abax Dörrsystem AB

### / PRODUKTER

- SAPA Window 1086
- SAPA Facade 4150

*Photo: Erik Wik*





**Architect:** Friis & Moltke  
**Photograph:** Thomas Illemann

# DESIGNED TO BE COMPATIBLE TO THE “21ST CENTURY LEARNING SKILLS”

/ SKÆRBÆK SKOLE Skærbæk, Denmark

**As we're education students in this era called “the Information Age”, we need to be considerate to the lightning-pace of modern markets. We need to armor our students with the right tools in order to simply keep up. The theory of the 21st century learning skills are divided into 12 skills, with all one quality in common – internet. Skærbæk Skole in Denmark is designed in consideration of these different skills, divided into the three categories; 1) Learning skills, 2) Literacy skills and 3) Life skills.**

Skærbæk Skole is a 6000 square meter big school, designed with focus on a healthy student life. The school will house around 575 students from 6 to 15 years old. It's a 2-story building with an observatory available for the public. There'll be two buildings connected with a square creating a natural meeting spot for everyone.

The school is beautifully located between the sea Vadehavet and the urban city, and besides the modern bright classrooms, the school also has learning spaces outdoors. A modern education is connected to exercise, and also to nature. Skærbæk Skole is designed to give students the best prerequisites for modern learning.





– At SAPA and Hydro Building Systems, we have sustainability as our top priority. We are therefore pleased to say that we can offer profile systems with at least 75% recycled aluminum from previously used products. The circular economy must be at the center when we build the bright and user-friendly homes and commercial buildings of the future, says Jan Møller Madsen, Sales Manager at SAPA.

**/ PROJECT**

Architect: Friis & Moltke  
Metal Builder: Ejnar Christiansen Sølsted A/S

**/ PRODUCTS**

- SAPA Window 1086
- SAPA Facade 4150
- SAPA Door 2086

*Photographer Thomas Illemann.*





**Architect:** Stadion Arkitekter  
**Photo:** Erik Wik

# SECURITY AND GREATER OPPORTUNITIES FOR VARIETY

/ JOHAN SKYTTE SKOLA Älvsjö, Sweden

**“All our students are everyone’s students”, is the guiding motto of Johan Skytte School in Älvsjö. We respect differences here and work proactively with basic values. Security and the ability to study without disturbance are essential, and our premises play a large part in this. A new school building for students from pre-school class up to year 9 was opened in autumn 2019 at Johan Skytte School. What makes this building special is that it is divided into small communities. In other words, small schools within the larger school. The central aim is to provide creative and secure learning environments for children. .**

There is a growing need for schools and preschools in Sweden at present, and almost 10 percent of the new schools in Sweden are being built in Stockholm. Johan Skytte School is located in southern Älvsjö. The school serves around 1,200 students from pre-school class up to year 9. It has two separate but adjacent buildings, one for years 7–9 and a relatively newly built school for students from pre-school class up to year 6.

The newer school building is divided into school communities for each year group. Each community has an area of about 400 square metres. The community consists of two base rooms, as large as standard classrooms, plus a study area measuring around 175 square metres. Each community also

has a group study room, studio and toilets. Teaching can take different forms in each of the communities, in different learning environments and in different group sizes, to meet the needs of every student. The school is also shoe-free, which means that everyone takes off their shoes before they enter their respective communities.

There is no doubt that creativity is a recurring theme in the architecture of the school. Working alongside the architect, Stadion Arkitekter, artist Jesper Nyrén provided valuable creative input for the project. In particular, his interior artwork was influenced by acoustic requirements. This began with the need for an acoustic wall that would dampen sound levels



considerably. But this element also had to blend in and become a natural part of the room. Many people notice that the school is unusually quiet, which also contributes to a good learning environment where students can study in peace.

The choice of light-coloured exterior tiles for the exterior of the school harmonizes with the existing yellow bricks. Outside in the school yard, a large acoustic fence has also been erected to create a calmer atmosphere in the yard, which also allows the outdoor space to be used as a study area. Another feature of the school yard is the planted areas, which are exclusively used to grow edible plants such as herbs, strawberries, redcurrants and apples.

Johan Skytte School is an example of how education and the art of building schools can be improved by working together to create imaginative and varied spaces for learning and well-being.

The Sapa aluminium systems for the school were supplied by Abax.

### / PROJECT

Architect: Stadion Arkitekter  
Metal Builder: Abax Dörrsystem AB

### / PRODUCTS

- SAPA Window 1086
- SAPA Facade 4150

*Photo: Erik Wik*





**Architect:** LLP Arkitektkontor  
**Photo:** Erik Wik

# A CREATIVE ENVIRONMENT FOR LEARNING

/ OXELÖSKOLAN Oxelösund, Sweden

**Oxelöskolan in the middle of Sweden is a place filled with creativity. The school’s focus is on artsy activities, and as soon as you step inside the building you can feel the air of originality. Theatre, dance, music, vocals, art and form are all subjects practiced in this building of creativity. Students can definitely expect a both intense and rewarding education.**

Oxelöskolan is an F9 school and with its 7,400 square meters can accommodate about 600 students. When the school was designed, not only were today’s learning environments taken into consideration, but there was also room and space for the “school of the future”. This means that flexibility has been a major focus in the process - the school will last a long time to come, regardless of how the development of learning is.

The school places great emphasis on sustainable material choices, acoustics for a comfortable sound level, energy (including through solar cells on the roof) and having a good climate in general. The school’s external environment is also colorful in its architecture. Studies show that the human eye and brain transform light into color. Color is undoubtedly

a major factor that affects people’s state of mind, some researchers even say that color can affect our blood pressure. Regardless, Oxelöskolan is beautifully located in a creative and colorful outdoor environment where children can use all their senses.

Oxelöskolan is certified according to Miljöbyggnad Silver - it is a clear indication that the construction company and the property owner are involved in environmental issues and think about those who will be staying in the building.

Here, more is required of the building than just complying with legal requirements - among other things, the sun protection, sound environment and ventilation must be much better, something that Oxelöskolan is really proof of.



### / PROJECT

Architect: LLP Arkitektkontor  
Metal Builder: GlasLindberg Fasad AB

### / PRODUCTS

- SAPA Facade 4150
- SAPA Door 2086
- SAPA Window 1086

*Photographer: Erik Wik*





Architect: Jan Izikowits, Tengbom  
Photographer: Åke E:son Lindman

# MUSIKHÖGSKOLAN IN ÖREBRO - WHERE ARCHITECTURE TRANSFORMS INTO MUSIC

/ ÖREBRO MUSIKHÖGSKOLA Örebro, Sweden

**Architecture and music have a lot in common, let's take patterns as an example. Architecture it's a lot about shapes and forms, and music about rhythm and notes. The notion of pattern is the same. Another notion that also goes hand in hand with patterns is consonance, that's how you'd like to look at architecture, but also when listening to music.**



Musikhögskolan i Örebro is not only a beautiful building, it's also a place for creativity and future. Teachers, musicians, scientists, ceramicists and artists are gathered all under the same roof. The academy includes a marvelous concert hall, library and studios for music, painting and ceramics. There are in total 48 individual classrooms that gives students the best prerequisites to be dedicated to their artform.

To design such a public building as a music academy, the main architect Jan Itzikowits wants to create a debate. A public building must be visible, although it is important that it harmonizes with its surroundings.

– We added the building to its area, even though it is a little more majestic than the environment. You have to look at the surroundings, for example, it is important to get to the building in a natural way, Jan continues.

Regardless of whether the building is private or public, according to Jan, it's still about the room experience, there it is equivalent.

– When I start my creative process, I always start with the analysis, with the understanding. Is the building necessary? What's function? The best way to start a design is to question, says Jan.





The outline of the building is quite spectacular, a lot of big glass surfaces that lets in tons of light, and they also lead you towards the forest located behind the premises. The sense of being outside is a constant vibe throughout the entire building. The terms setting the relationship between in and outside, is also a notion that emboss the research happening in the building between people and music.

– The most important thing when designing a place for creativity is the meeting between people. In this project, we have created a house without corridors, making people moving along light corridors and the glazed streets. In this way, you create more contact between people, you get contact from all sides and that is how the structure is designed. Architecture affects us humans unconsciously, says Jan Izikowits, architect and studio manager at Tengbom.

What has been most rewarding about the project?  
 - That it turned out so well! Laughs Jan.

### / PROJECT

**Architect:** Jan Izikowits, Tengbom  
**Metal Builder:** GlasLindberg Fasad AB

### / PRODUKTER

- SAPA Facade 4150
- SAPA Roof Glazing 5050

*Photographer: Åke E:son Lindman*









# WORKING TOWARDS CREATING GREENER BUILDINGS

**In 2018, the industry accounted for 39% of the world's energy and process-related carbon dioxide emissions. Legislation is forcing the building and construction industry to bring down its greenhouse gas emissions, and quickly. Consequently, building systems suppliers are being asked to adjust and accept a new role. Because not only do they need to develop technically advanced systems that are built to last, they need to manufacture such systems with the lowest-possible carbon footprint. And they need to be able to prove that they themselves are sustainable suppliers.**



In a sustainable future, our continued success will depend on our ability to offer systems that combine top performance with a low carbon footprint. It will also depend on its ability to become a sustainable supplier. In this work, collaboration will be key, both with customers as well as with suppliers.

As a fully integrated aluminium company, Hydro has been attacking this challenge from all parts of the value chain, and for several years now. It has addressed the mining of bauxite and refining of alumina, the production of primary aluminium, the high-tech sorting of post-consumer scrap and development of low-carbon aluminium alloys, and the commercialization of sustainable building systems.

Acknowledging that change needs first to occur internally, so we have imposed sustainability targets and have identified several inside-out actions divided into:

- **Greener metal sourcing.**  
Hydro CIRCAL®, Hydro REDUXA®, low-carbon remelted aluminium
- **Greener components sourcing.**  
Recyclable, bio-sourced, low-carbon accessories
- **Greener production and sites.**  
Energy used, water, waste and fumes treatment
- **Greener transport and packaging.**  
Less packaging, transport route optimization
- **Greener workplace.**  
Commuting and travel, IT and data

### **Aluminium is key to zero-energy buildings**

Lightweight and infinitely recyclable, aluminium is increasingly the material of choice. It accommodates growth while constraining carbon emissions.

### **Among the greenest aluminium in the world**

Producing some of the aluminium with the lowest carbon footprint in the world, Hydro wants to make sure that this attractive metal is made available to consumers who care about the sustainability of the products they use.

Hydro CIRCAL® is the most attractive alloy available to the building market, in terms of carbon footprint. Its footprint of 2.3 kg CO<sub>2</sub> per kg of aluminium is more than three times lower than the primary aluminium average in Europe and more than six times lower than the global average.

This alloy contains no less than 75% post-consumer scrap, taken from dismantled windows and facades. Hydro CIRCAL® is verified by DNV GL and confirmed by an Environmental Product Declaration (EPD).

Meanwhile, Hydro REDUXA® – a primary aluminium product – offers a carbon footprint of maximum 4.0 kg CO<sub>2</sub> per kg of aluminium. This alloy, too, has been verified by DNV GL and confirmed by an EPD.

Hydro has achieved this low footprint for Hydro REDUXA® by using the same source of bauxite and alumina and by utilizing improved-efficiency smelters based on hydroelectric power. Other contributing factors are the improved sourcing of anodes and full control on the steps where it sources the cold metal.



### Certified aluminium makes a difference

More and more consumers, companies and public procurers are making purchase decisions using sustainability criteria. For this, objective labels, standards or certificates are a useful aid because they indicate under which environmental and social standards the products were produced.

We work continuously to lower our own emissions, increase recycling and help our customers develop products that enable CO2 savings – among others. In order to do so we have obtained the following certifications for parts of our production, and continuously work to roll this out across our business.



*The leading multi-attribute, multi-industry science-based standard for verifying products for the circular economy with integration of beneficial Environment, Social and Governance features.*



*Independent certification scheme covering the entire value chain of aluminium to address sustainability challenges from a Environment, Social and Governance issues perspective.*

# OUR OFFERING

/ A wide range of products and solutions suited to your needs ...



SAPA 4150  
SAPA 4150 SSG  
SAPA 5050 SG



SAPA 1086  
SAPA 1086 BLOCK WINDOW  
SAPA 1086 VINTAGE  
SAPA 1086 SCREEN  
SAPA 1050



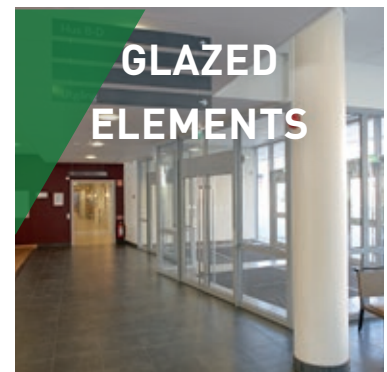
ARTLINE  
AMBIAL  
SAPA 1086  
SAPA 2160  
SAPA 2115



SAPA 2086  
SAPA 2060  
SAPA 2050  
SAPA E-FRAME



SAPA 5050



SAPA 3086  
SAPA 3050



SAPA 4550



EI 60  
EI 30  
E 30  
A 30



RC2  
RC3

... featuring assets complying with the requirements of educational buildings



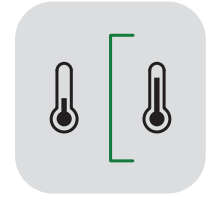
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AIR  
PERMEABILITY



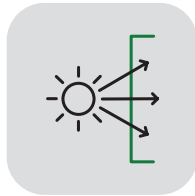
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TIGHTNESS



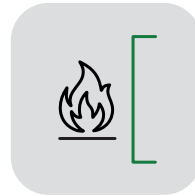
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ISOLATION



WIND  
RESISTANCE



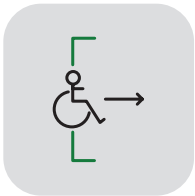
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CONTROL



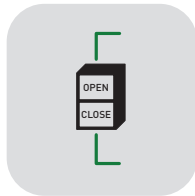
FIRE  
RESISTANCE



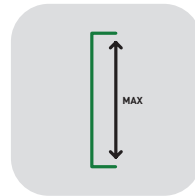
SECURITY



DISABLED  
ACCESS



MOTORIZATION



LARGE  
DIMENSIONS





## ABOUT SAPA

Imagination makes the world go round. At SAPA, it's our driving force and way of doing things. It allows us to move forward, innovate and inspire. Where others just see a window, we see cutting-edge technology that benefits both the users and the environment. We see the future.

The SAPA brand from Hydro was created over 60 years ago and is a pioneering international specialist in architectural aluminium systems. We have established an unrivalled reputation for innovative and inspiring design solutions, building up a portfolio of impressive award-winning projects.

Our aluminium building solutions have been used to create purpose-designed facades, windows and doors for diverse sectors of commercial and residential buildings. We have a clear understanding of the requirements of architects, contractors, developers, fabricators and occupiers which enables us to develop a innovative, technically advanced and flexible product portfolio.

**sapa:**

By  **Hydro**

## Hydro Building Systems, Region Nordic, Baltic & Poland

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