

A SKY IN THE CLASSROOM

Light for learning

FAGERHULT



Natural light – our norm

We have walked this Earth for almost two million years, and we have evolved in natural light. We have used electric lights for just over 100 years. Nature is our real habitat, and it is natural light which drives us, makes us more alert and happier, and makes us perform better. Natural light is our reference. Do we have to leave our offices and schools to feel good? No, it's all about creating a good lighting solution. We call it ambient lighting.

Ambient lighting – our sky

Ambient lighting is our indoor sky. It stretches from the horizon, i.e. the floor, across the walls and up to the ceiling. This is how we are programmed to absorb light. By using a lot of indirect light, we can create an “indoor sky”. Light, illuminated walls and ceilings give us our indoor sky.

Research is clear

Since the early 2000 s, Fagerhult has collaborated with various universities to find the perfect light conditions. In five different studies we have been able to determine the significance of ambient light for well-being, alertness and performance.

In most cases we did not just interview the participants, but also measured their levels of sleep hormone melatonin and stress hormone cortisol. The results are clear: in rooms lit with more ambient light, we perform better and are more alert. So it has been scientifically proved – pupils working in classrooms with a lot of ambient light feel better. In our school study in London, they also received better grades!

LED is the future

We have also discovered that LED light seems brighter

than fluorescent lamp light. And that got us thinking. Is it possible to create more and better light in a classroom and also save energy? The answer was a resounding YES!

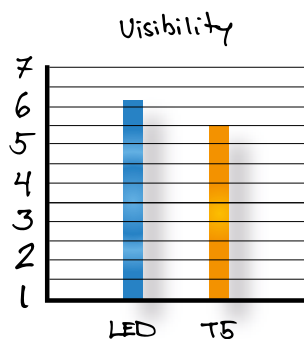
The school lighting of the future is an educational tool – which also saves energy. And we have created a completely new lighting concept for schools.

Indoor sky

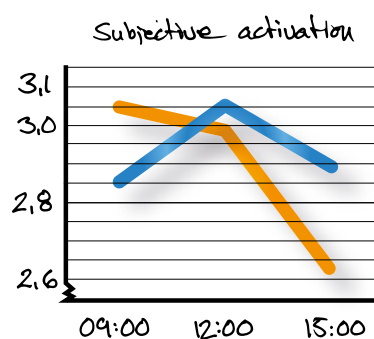
The lighting solution we call Indira is the result of our most recent research project carried out at a secondary school in Helsingborg. By lighting walls and ceilings using only indirect light, we created an environment where the pupils felt more alert and achieved better grades. We created a sky for the classroom. We also saved energy. The sky is just around the corner!



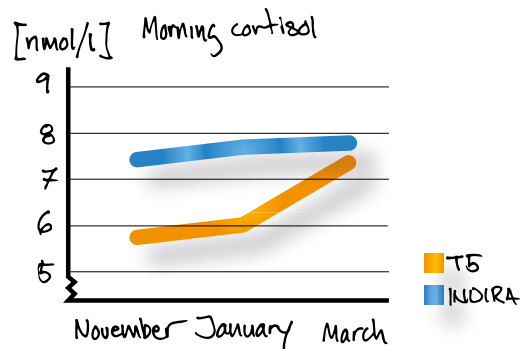
Visual



Emotional



Biological



**The study “Energy efficiency and study-conducive light at secondary schools” was carried out in collaboration with the Faculty of Engineering at Lund University in 2012. The study was carried out during the winter and included*

77 pupils aged from 17–18. We compared Indira and a T5 solution equivalent to the best school lighting systems on the market: nine T5 luminaires with direct/indirect light mounted in three rows. Read more about our research at our website.



Indira – a sky in the room

Indira is school lighting at the forefront of research. Based on the significance of ambient light for pupils' well-being and performance, Indira is solely based on direct light. Energy-efficient LED light sources provide a brighter and more pleasant classroom environment – with a much lower energy consumption.

Indira was developed to create a wholesome and stimulating environment in the classroom. Using indirect LED luminaires, we have created lighting which gives a brighter

room. This solution is completely glare-free and provides the pleasant shadowing necessary for the room to feel naturally lit.

The Indira series comprises three different luminaires mounted on Fagerhult's iTrack rails. The system provides a lot of flexibility over time. The superior energy efficiency makes Indira an obvious investment in our children's future. A sustainable solution from a human, environmental and economic perspective.



Flexible to install and change

Indira is mounted on Fagerhult's iTrack. This makes for very quick installation, and then all you need is a connection point for electricity. The solution is also aesthetically appealing as the ceiling stays cleaner and is less easily damaged. The luminaires are mounted on a rail, which makes it easy to move them around and supplement them if the need arises later.

More light for a lower energy cost

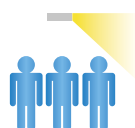
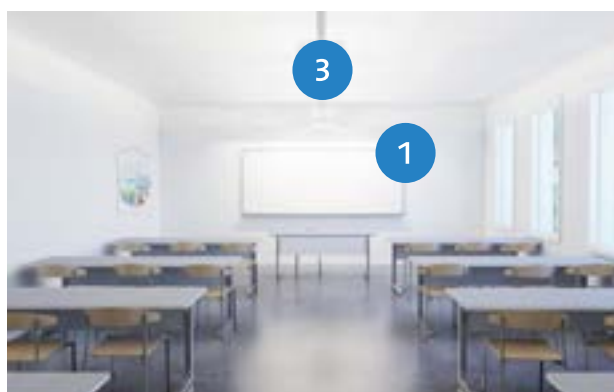
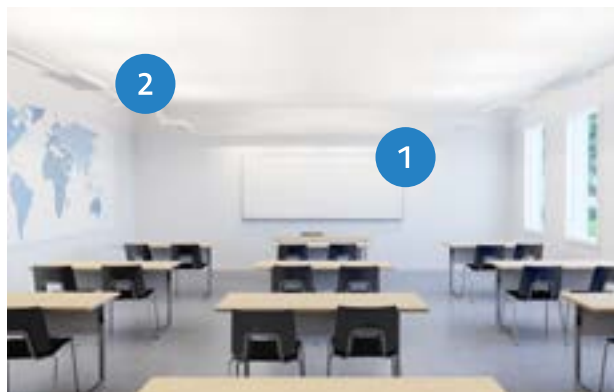
Research shows that a lot of ambient light is stimulating, but to achieve these levels using a traditional lighting solution requires energy.

In our study, we compared Indira with an excellent T5 solution (our own). Indira provides 34 % more ambient light with 13 % less energy consumption, compared to a T5 solution.

Indira is wholly beneficial – with an energy consumption of only 8 W/m². The pupils get the best possible light combined with low energy consumption.

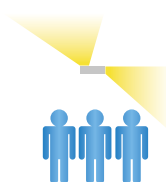
Simple and intuitive control

A teacher has to be able to give pupils their undivided attention, and not worry about light management. Indira has an intuitive and easy-to-manage management system with different light scenarios and sensors for optimal energy efficiency.



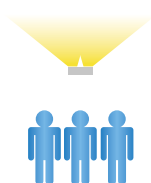
1. Indira Wallwasher

A luminaire where the light is directed at the wall. Mounted in connection with the classroom's front and back walls.



2. Indira Indirect/Wallwasher

A luminaire with combined wallwasher and uplight function. Mounted in connection with the classroom's side walls.



3. Indira Indirect

A luminaire with an uplight function where the light is directed at the ceiling. Used as a supplement or mounted in a T solution for smaller classrooms.

Lighting solutions with Indira



Indira in a U or square formation

This lighting solution was used in our study in Helsingborg, and is the one that our research results are based on. The luminaires Indira Wallwasher and Indira Indirect Wallwasher were mounted on an iTrack system which ran along the room's four walls.

Indira Wallwasher provides vertical light directed at the front wall. Indira Indirect/Wallwasher is used along the room's long sides where the luminaires distribute both vertical light on the walls and light up on the ceiling. If the furniture in the room is changed around regularly or it is used for practical-oriented teaching involving photography or handicrafts, Indira Wallwasher can also be mounted along the back wall to make the room "directionally independent".



Indira in T formation

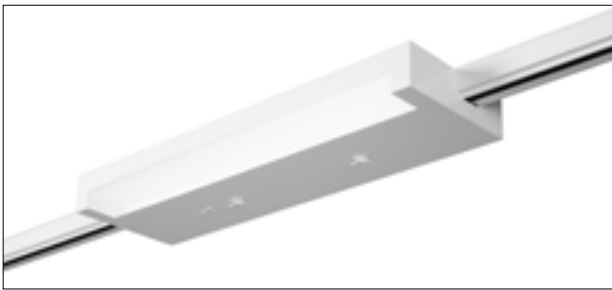
Smaller classrooms up to six metres wide can be illuminated using Indira in a T solution. The iTrack rail mounted in a T formation using Indira Wallwasher directed at the front wall and Indira Indirect in the middle. Indira Wallwasher provides vertical light on the front wall while Indira Indirect lights the ceiling.

Indira mounted on iTrack rails only provides indirect light directed at the walls and ceiling. The result is a classroom which seems a lot brighter than it does with a traditional T5 solution in place. Top Indira in U formation and bottom Indira in T formation.



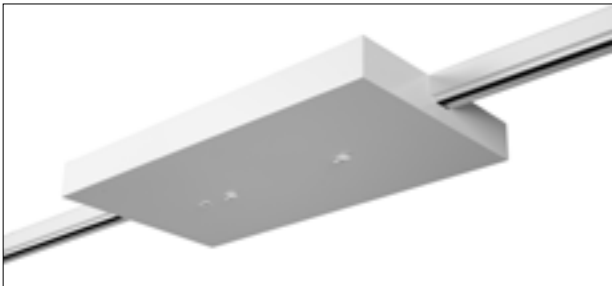


Indira Wallwasher

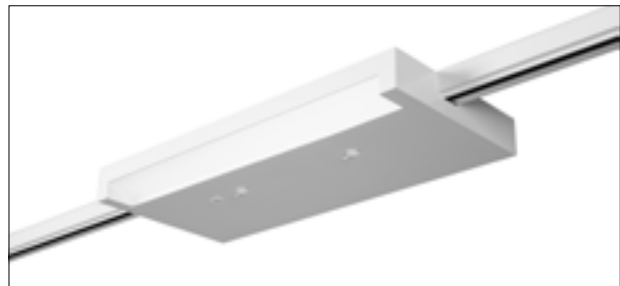


With Indira, the walls and ceiling act as reflectors for increased, indirect LED light. The luminaires are installed on our flexible iTrack tracks throughout the premises and the lighting can be adjusted as required using different light levels and light regulation. Using indirect light distribution, the whole room can be lit with no glare.

Indira Indirect



Indira Indirect/Wallwasher



iTrack



The ability to accommodate and compliment the design of a space is one of the most desirable features in a lighting system and iTrack boasts an unrivalled level of versatility. The track itself is available in four different lengths, with a host of connection options, offering the scope to create dynamic systems free from traditional limitations.

Lighting solutions with T5



This pendant solution with DTI and Lento is among the best on the market and gives the room a well-balanced combination of direct and indirect light.

Pendant solution with DTI and Lento

This T5-solution for classrooms is among the best on the market – and is still an excellent choice. The room has a well-balanced combination of direct light towards the work surface and indirect light towards the ceiling and walls. The pendant luminaires distribute effective light without any glare.

For the light levels in the classroom to be sufficient, it is recommended that several luminaires are installed. By having several daylight control sensors, we can ensure that all pupils in the room receive sufficient light while energy consumption is reduced. To facilitate the teacher's work, the board is equipped with its own lighting and the room can be provided with pre-programmed lighting scenarios.





DTI



With its three combinations of direct and indirect light distributions, DTI is well suited to a range of classroom and public environments. From installation to ongoing ergonomics and energy efficiency, DTI delivers value throughout a projects lifecycle. Available in either surface mounted or pendant variants this luminaire's subtle design is shaped by the rounded sides. The distinctive end caps visibly reduce the size of the fitting, adding aesthetics to its flexibility.

Lento



Lento is a whiteboard lighting solution developed specifically for this purpose. The light distribution is via lined diffuser, which reduces indirect reflections on the board. This approach also minimises the risk of glare for pupils or teachers when turning their attention towards the board.

Lighting solutions with T5



This pendant solution with Closs and Gondol is a given choice in rooms where simplicity in design combined with indirect/direct light distribution is coveted.

Pendant solution with Closs and Gondol

This T5-lighting solutions with Closs is the given choice in classrooms where you aim for simplicity in design. Closs is a decorative luminaire, boasting exceptional efficiency. Available in indirect/direct light distribution providing direct light towards the work surface and indirect light towards the ceiling and walls.

For the light levels in the classroom to be sufficient, it is recommended that several luminaires are installed. By having several daylight control sensors, we can ensure that all pupils in the room receive sufficient light while energy consumption is reduced. To facilitate the teacher's work, the board is equipped with its own lighting and the room can be provided with pre-programmed lighting scenarios.





Closs



Closs is a compact decorative luminaire, and the slender measurements and square angles reflect a neat minimalist style. The luminaire is available in a white or alu grey structured enamelled finish with two different louvres, single parabolic Terazza and double parabolic Beta, and a direct or indirect/direct light distribution.

Gondol



The lighting of vertical surfaces is an important aspect in creating the right atmosphere in any room or space. In particular it is vital in ensuring products receive the correct exposure. The reflectors in the Gondol range are developed to create a balanced lighting level from ceiling to floor.



Fagerhult develops, manufactures and markets professional lighting systems for public environments such as offices, schools, industries and hospitals. Our operations are run with a constant focus on design, function, flexibility and energy saving solutions.

Fagerhult is part of the Fagerhult Group, one of Europe's leading lighting groups with operations in more than 15 different countries. AB Fagerhult is listed on the NASDAQ OMX Nordic Exchange in Stockholm.

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