



LIGHTING FOR SPORTS

World-class LED solutions

FAGERHULT



Eye on the ball with good light

Tennis, table tennis, basketball, handball...fast balls in the air or no ball at all. From participation to adjudication and appreciation, whichever sport is being undertaken the right lit environment makes the activity easier for everyone to enjoy.

The solution itself doesn't need to be complex, just well thought out. All halls have different perspectives, both in terms of design and size, from the simple school gymnasium to the hockey arena with television broadcasts. In many cases the space might be used late in the evening by different clubs and not exclusively for sports- housing ex-

hibitions, theatrical performances or concerts, all activities with different requirements and they can often. Whatever the scenario the basic premise remains the same, you need a lighting solution that is flexible and, crucially, also easy to understand.

The new Excis LED luminaire has been developed specifically for sports and multi-purpose areas. With several different light distributions, several different outputs, if you are choosing to up-grade your existing installation you can easily find the right solution for the needs of the space.

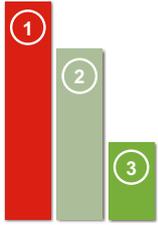


LEDs and controls in sports halls

The properties of the LED light source lends itself perfectly to a wide range of different sports halls. Often characterised by high ceilings, the high output and exceptional longevity offered by LED not only light the space as intended but also significantly reduces the often tricky maintenance involved. Even more so than in your average application, glare control must take centre stage so the choice of luminaire has to be carefully considered.

When optimised with lighting controls, the right LED solution will deliver not only exceptional energy savings compared to a traditional system but also regulate the

light levels to the sport or activity being undertaken. By factoring this in at the planning stage, you can allocate different scenes for different activities or more specific requirements. For instance, if the space is also used at an elite level it is usual for television broadcasts to require more light than might be needed solely for the sport in question.

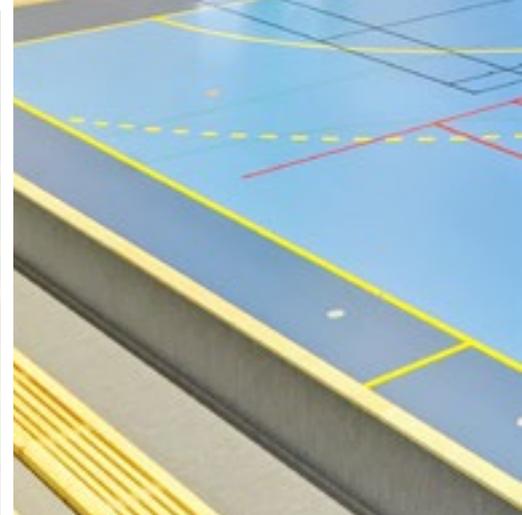


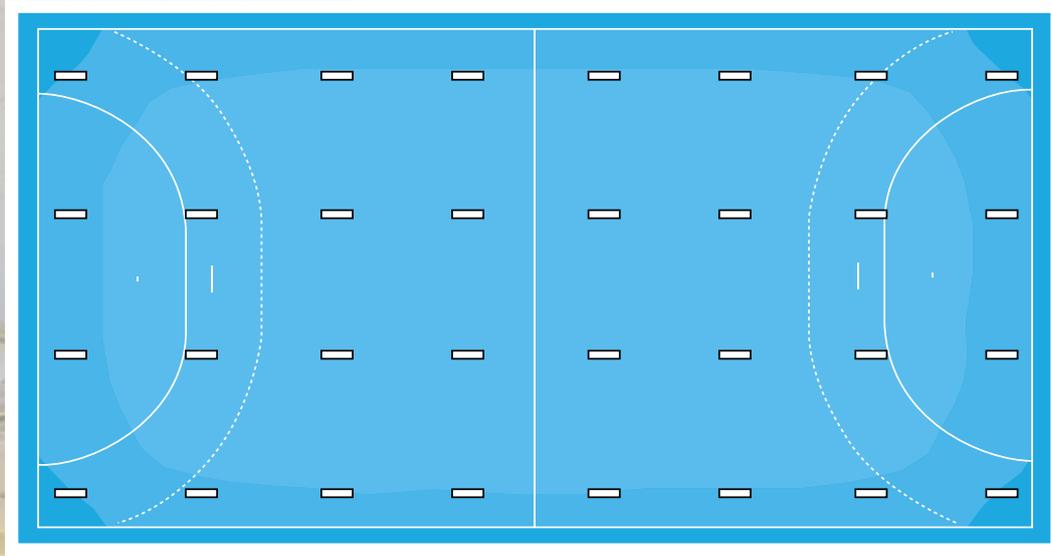
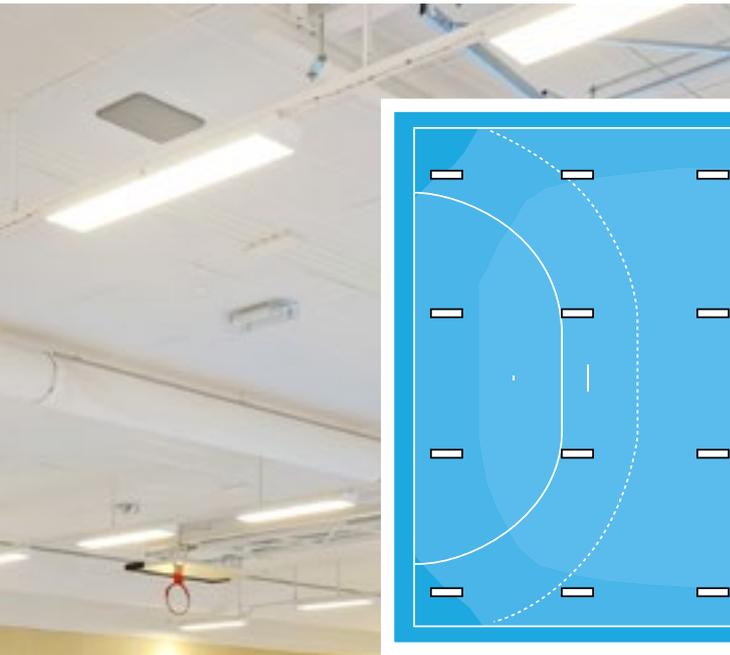
Potential for saving energy in multi-purpose hall
 1. T8 with conventional ballast, 68 Disal T8 3x58 W.
 2. T5, 56 Excis T5 4x49 W – saving 20 %.
 3. LED, 32 Excis LED 20 000 lm – saving 65 %.

The multi-purpose hall

A hall with a game or activity area of 40 x 20 metres for handball, bandy, volleyball, basketball, pretty much anything. Regardless of the sport, you have to have enough light in the playing area. For competitions and matches the normal light level is set at 750lx on the floor, with lower levels during exercise or school physical education. Vertical illumination is equally as important so the participants can see both the movement of the ball and the opponent. The positioning of the luminaires is important to avoid the players being effected by glare and their concentration disturbed.

The basketball court occupies a smaller area in the hall, and it's possible to add a theatrical element and create a sense of occasion. The actual basketball court should be much lighter than the surrounding area, with the markings of the court clearly visible. The very nature of the multipurpose hall encourages the inclusion of lighting controls for maximum flexibility.





*A recommended solution for large halls for handball, bandy etc.
32 pcs Excis LED medium beam with a flow of 20,000 lm.
Mounting height 7 m
Average illumination 530 lux*

The solution meets the uniformity requirement and the glare index in accordance with the sports hall standard EN 12193: 2007 and with Class II for training and competing in lower divisions.

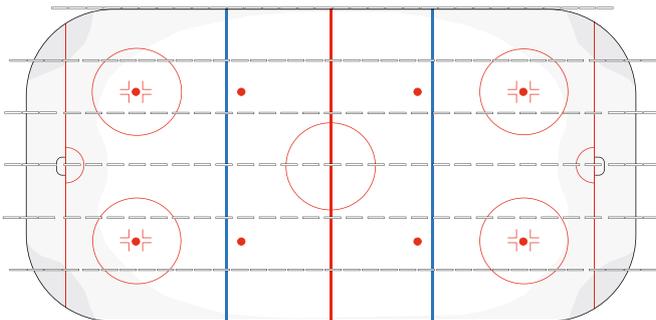
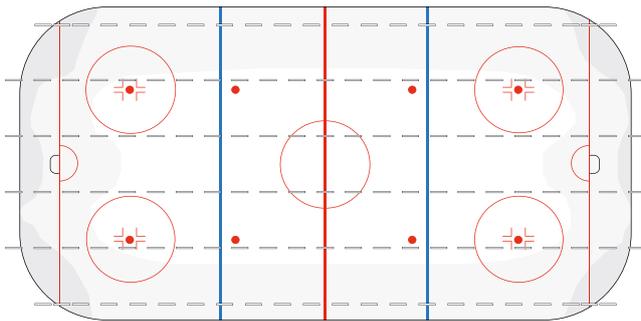
Control of the multi-purpose hall

There are many different varieties of sports hall but whatever its construction factoring in DALI lighting control at the planning stage is advisable.

Sometimes there is a folding partition wall in the centre enabling physical education lessons to be split over two areas or the hall is twice the size with a partition wall in the middle to make two full-sized playing areas. Some halls divide the surface into smaller sections, these divisions with partition walls should also divide occupancy detection in the premises.

The Hockey hall

Hockey is one of the fastest team sports and requires a lot of light, for players, referees and spectators. The lighting needs to contribute towards the contrasts between the puck and the ice with excellent uniformity so everyone involved can clearly see what is happening. In a non-televised context 600lx on the ice is sufficient but when broadcasting this has to be at least 1000lx often more. When planning the light it is important to ensure that the spectator area is lit to at least 30% of the playing surface to avoid tiring visual contrast. During the initial line-ups and breaks lower levels are commonplace with spotlights following the players as they move around the rink, assuming the system is optimised with lighting control.

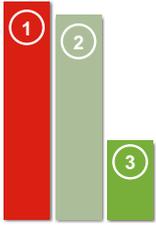


- Potential for saving energy in hockey halls (Class II)**
1. T8 with conventional ballast, 210 Indulux 2x58 W.
 2. T5, 148 Inducon T5 2x80 W – saving 20 %.
 3. LED, 136 InduLED 12 000 lm – saving 60 %.

136 pcs InduLED medium beam 12,000 lm (with puck protection).
Mounting height 7 m
Average illumination 600 lux on the ice.

The solution meets the uniformity requirement and the glare index in accordance with the sports hall standard EN 12193: 2007 and with Class II for training and competing in lower divisions.

249 pcs InduLED medium beam 12,000 lm (with puck protection).
Mounting height 11 m
Average illumination 1014 lux on the ice.



Potential for saving energy in tennis hall

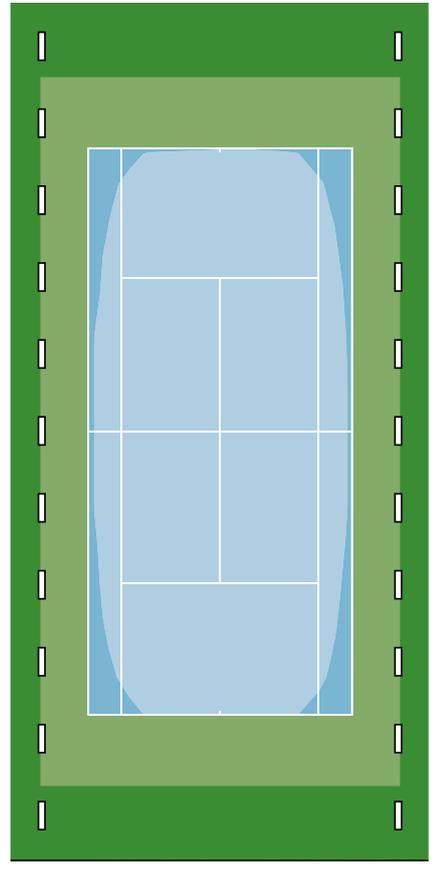
1. T8 with conventional ballast, 44 Disal Sport 3x58 W.
2. T5, 26 Excis T5 4x80 W – saving 6 %.
3. LED, 22 Excis LED 20 000 lm – saving 60 %.

Tennis

Halls for tennis are designed slightly differently and have different lighting requirements than conventional multi-purpose halls. Normally they are lit with 500 lux on the playing surface with the addition of an area of 2 metres beyond the side line and 3 metres behind the baseline.

To avoid glare at serve and smash when the gaze is directed upwards, the luminaires are fitted along the sides of the surface.

Tennis places high demands on the vertical light with a small ball, moving fast against a changing background. The vertical lighting is important because you need to see the ball at different heights and be able to figure out where the ball is going and react quickly.



20 pcs Excis LED Asymmetric 20,000 lm
 Mounting height 7 m (the luminaires are angled 15° towards the centre)
 Average illumination 501 lx on the playing area including the surrounding area.

The solution meets the uniformity requirement and the glare index in accordance with the sports hall standard EN 12193: 2007 and Class II for training and competing in lower divisions.



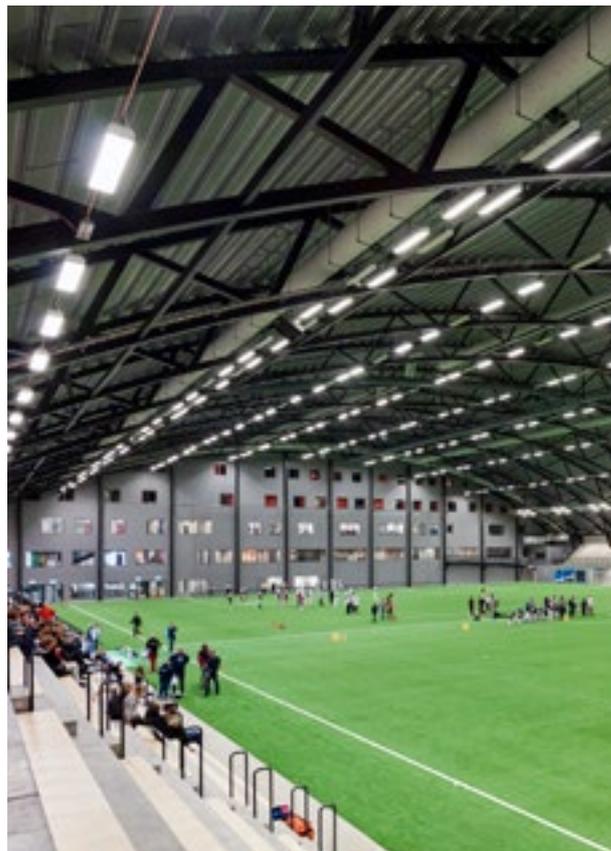
Excis LED



Excis LED offers an ideal solution in sports halls in terms of lighting comfort, energy efficiency, durability and freedom from maintenance. Three different light distributions (wide, medium and asymmetric) and three different flows allow for a tailored lighting solution for different halls and various sports.

The glare control in Excis LED consists of an optical disc that controls the light longitudinally with exception anti-glare properties, all variants pass the UGR requirement for sports halls.

Optimised light outputs, an efficiency of up to 130 lm/w without glare - Excis LED provides all the light you need without consuming a large amount of energy.



Excis LED

IP 20

3000/4000 K

46 W, 6 000 lm, 130 lm/W

92 W, 11 484 lm, 130 lm/W

159 W, 20 300 lm, 130 lm/W

(The values relate to medium beam, 4000 K)

L₇₀ B₅₀ 80 000 h

Service life ballast 100 000 h

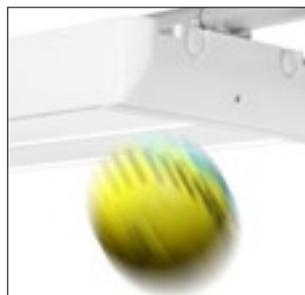
Light control: DALI/phase pulse control



Easier installation

Compared with other similar luminaires Excis LED is relatively hassle-free, installed on a wire, pipe or directly onto the ceiling. The connection is made via the

headboard and concealed by a plastic cover, safeguarding against making marks on the floor should the cover fall down during installation. The luminaire is equipped with through-wiring for simple further connection. With DALI there is still the possibility to connect the fixtures in the hall on three different phases.



Bulletproof

Instead of a traditional grill, the light opening is covered by a clear PMMA disc (acrylic) that does not steal any light. This, together with the frame of extruded aluminium, provides a mechanically robust luminaire and ensures resistance against hard shots. Excis LED meets the tough requirements of the standard ball test, VDE 0710, which requires that the luminaire must withstand 36 handball shots with the maximum speed of 60 km/h from three different directions.

InduLED



A real light machine with superior efficiency and service life further optimised by a simplistic installation process; helping to reduce the time and cost of putting the fixtures in place.

The luminaire's light output ratio is a brilliant 145 lm/W which provides superior energy efficiency. Our calculations shows that a sample installation of InduLED saves up to 103 kWh each day, compared with a traditional industrial luminaire (T8).

The secret? An advanced construction with effective side reflectors that disperse the light from the luminaire opening without compromising on comfort.



InduLED

IP 23
3000/4000 K

800 – 52 W, 6374 lm, 123 lm/W
1300 – 65 W, 9137 lm, 143 lm/W
1300 – 89 W, 12026 lm, 133 lm/W

$L_{70} B_{50}$ 100 000 h
Service life ballast 100 000 h

Light control: DALI/phase pulse control



Installed in half the time

InduLED can be installed in half the time it takes traditional industrial luminaires. So you can start to recoup the investment even at this stage!

InduLED has been equipped with a pivot function; open the luminaire by pressing on the inner end caps, insert the cable, connect the terminal block and close again. The cable suspension is integrated for systematic wire installation. InduLED is IP 23 classified and is also available in a snap-in connection model.



Works in three-shifts

With a service life of 100.000 hours, you get a reliable, maintenance free light for many years. You never need to waste time or energy replacing

the light source, once the luminaires are installed, you can confidently leave them up to their own devices.

Lighting in sports halls

The standard EN 12193: 2007 Light and lighting - Sports lighting, defines the requirements for the lighting of sports facilities for various sports divided into three classes where one can find light levels for school sport, training and competitions at various levels.

The standards determines the minimum illuminance and uniformity for each classification. In essence the higher the standard of play, ranging from international down to recreational use, and the further away the spectators viewing distance, the higher the classification.

Class I: Games in an international context and at elite level

The standard states > 750 lux of horizontal average illumination with a uniformity ≥ 0.70 and recommends vertical values of 30% of the horizontal values 1 metre above the floor.

Class II: Games in the lower divisions

The standard states > 500 lux of horizontal average illumination with a uniformity ≥ 0.70 and recommends vertical values of 30% of the horizontal values 1 metre above the floor.

Class III: Training

The standard states > 300 lux of horizontal average illumination with a uniformity ≥ 0.70 and recommends vertical values of 30% of the horizontal values 1 metre above the floor.

Light when TV broadcasting

Standard EN 12193: 2007 Light and lighting - Sports lighting, defines the requirements for the lighting in sports facilities. It is expected that there will be a revision of the standard in 2017, when especially the requirements for TV broadcasting will be updated.

With the advance of HDTV and slow-motion, there are many completely different requirements for facilities in terms of the levels of light, colour and flicker. In halls for elite sport the lighting is often adapted to the requirement for Television Broadcasting with significantly higher levels than specified in the current standard.

Even colour reproduction is becoming increasingly important and there many TV companies require CRI 90. HDTV also places completely different demands on freedom from flicker. By connecting the lighting over



three phases and using luminaires with amplitude dimming the problem is minimised. Excis LED has amplitude dimming and is also available with CRI 90.

Lighting control and energy saving in sports halls



In sports halls including lighting controls at the planning stage is the best possible way of ensuring the installed solution provides the flexibility to adapt to the evolving needs of the space. Using a DALI system it is easy to define individual settings for standard applications or something less frequent, such as an end-of-term nativity play.

Different light scenes

A system in a modern sports hall should be able to offer complete lighting scenes with different lighting levels for different activities such as school sports, training, matches and other activities outside of sports, all of which require different amounts of light.

In halls with up to 60 luminaires, a simple router with 64 outputs can be chosen. With this approach you can control timing so that school sports during the day gets lower light levels while training in the evenings gets more light.

Simplicity is key; scene selection and programming should be done in consultation with the end user to ensure the usability of the final system.

Presence detection for turning on or off

Switching on and off is normally done with a push button at the exit from the changing room but, from an energy saving perspective, the switching off should take place automatically.

A number of presence detectors cover the required

area and the switching off function can be delayed by up to one hour. In some premises it is also necessary to block the use of facilities by preventing the lighting from being switched on. A time channel can be used to block switching on with occupancy detection, but also for automatic down-regulation to indicate imminent switching off.

Folding partition wall/sliding wall

In halls that are also used for school sports it is common that folding partition walls divide up the hall. A folding partition wall requires a router with two DALI outputs. When the partition wall is in place, the lighting should automatically divide the room's functions for control, scenes and detection, ensuring you will not accidentally turn off the lights on the other side of the wall. Some halls are also able to divide the surface into smaller sections and this should obviously be included in the planning phase. Division with partition walls should also divide occupancy detection in the premises.

Grouping the folding partition walls

Regarding the placement and installation of luminaires they usually follow the length of the premises. The natural way to divide the lighting into groups for control and light regulation follows a transverse arrangement where the lighting is suitably divided transversely across the premises.



Fagerhult develops, manufactures and markets professional lighting systems for public environments. 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.

HEAD OFFICE SWEDEN
FAGERHULTS BELYSNING AB
SE-566 80 HABO, SWEDEN
TEL +46 36 10 85 00
FAX +46 36 10 86 99
WWW.FAGERHULT.COM
WWW.FAGERHULT.CO.UK
WWW.FAGERHULT.IE

FAGERHULT BV
Lichtschip 19
3991 CP Houten
Tel 030 688 99 00
Fax 030 688 99 44
lighting@fagerhult.nl

BELGIË
Axioma n.v.
Vijverdam, zone 2
Mannebeekstraat 31
B-8790 Waregem
Tel 056 62 21 30
Fax 056 62 21 40
info@axioma.be

www.fagerhult.nl

FAGERHULT