

# Innovative structure solutions

**DUOL**

[www.duol.eu](http://www.duol.eu)

## A Better Way to Build

Air supported structures

Textile architecture

Prefabricated structures

Modular structures





# DUOL company

DUOL company designs, manufactures and installs some of the most unique and versatile fabric structures in the world. We are **experts** in **AirDomes**, Prefabricated frame (**wooden/metal**) **structures** and **Tent Structures**. DUOL Air domes / Air-supported structures are our most popular and familiar product.

## We are innovation-driven

Innovation fuels us like nothing else. For this reason today DUOL remains **the global AirDome leader**.

DUOL air domes have many unique advantages including **innovative membrane technology, certified quality, officially certified thermal insulation and more**.

## Focus on quality



As a certified company with the **ISO 9001:2015 quality standards**, we apply this standard to every operation within DUOL organization. DUOL follows strict ISO 9001:2015 quality standards in every process to ensure client **safe and on time delivery**.



Solid company organization, worldwide references, innovative solutions: In 2013 DUOL was awarded **"Best managed company in Slovenia"**.



Creditworthiness certificate warrants for the **business excellence**. Our certificate guarantee, that we will be a reliable partner also in the future.



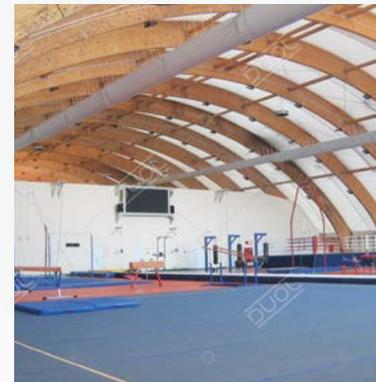
The Slovenian Chamber of Commerce and Industry's Award for **exceptional business and entrepreneurial achievements** of 2018.



Air Domes



Metal structures



Wooden structures



Tension structures

# Our projects speak for themselves

We are the **global leader** in the field of **air-supported structures** and since the company foundation **27 years ago**, DUOL has covered **more than 1500 objects worldwide**.

MORE THAN

**25**

years  
experiences

**1500**

covered  
objects

**40**

different  
countries



*DUOL AirDomes – a legacy of innovation, quality and service.*

From the very beginning, our goal has always been to **provide the best custom-designed air-supported domes** available to meet the **specific needs** of our customers.

# Complete project support

*from the start to the project finalization = **Quality and Liability***

DUOL provides the full service including **initial consultation, design, production, groundworks, dome installation and after sales support.**

The AirDome is handed over to the client after a detailed maintenance course with **complete operation, maintenance and equipment manuals for the AirDome.**

*Complete control over all phases of operations*



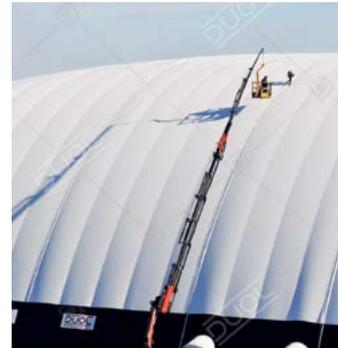
**R&D and Engineering**



**Production**



**Assembling**



**Maintaining**

- *Worldwide service, immediate response, quick actions, and efficiency in fixing problems.*
- *Analysis and resolution of issues are safely solved by phone or e-mail.*
- *Sending parts or immediate fly-in interventions of DUOL technicians.*
- *After-sales service with a first degree of intervention carried out by a local partner.*

*5-20 year manufacturer warranty on the fabric and up to 2 years on equipment.  
Life expectancy more than 40 years.*



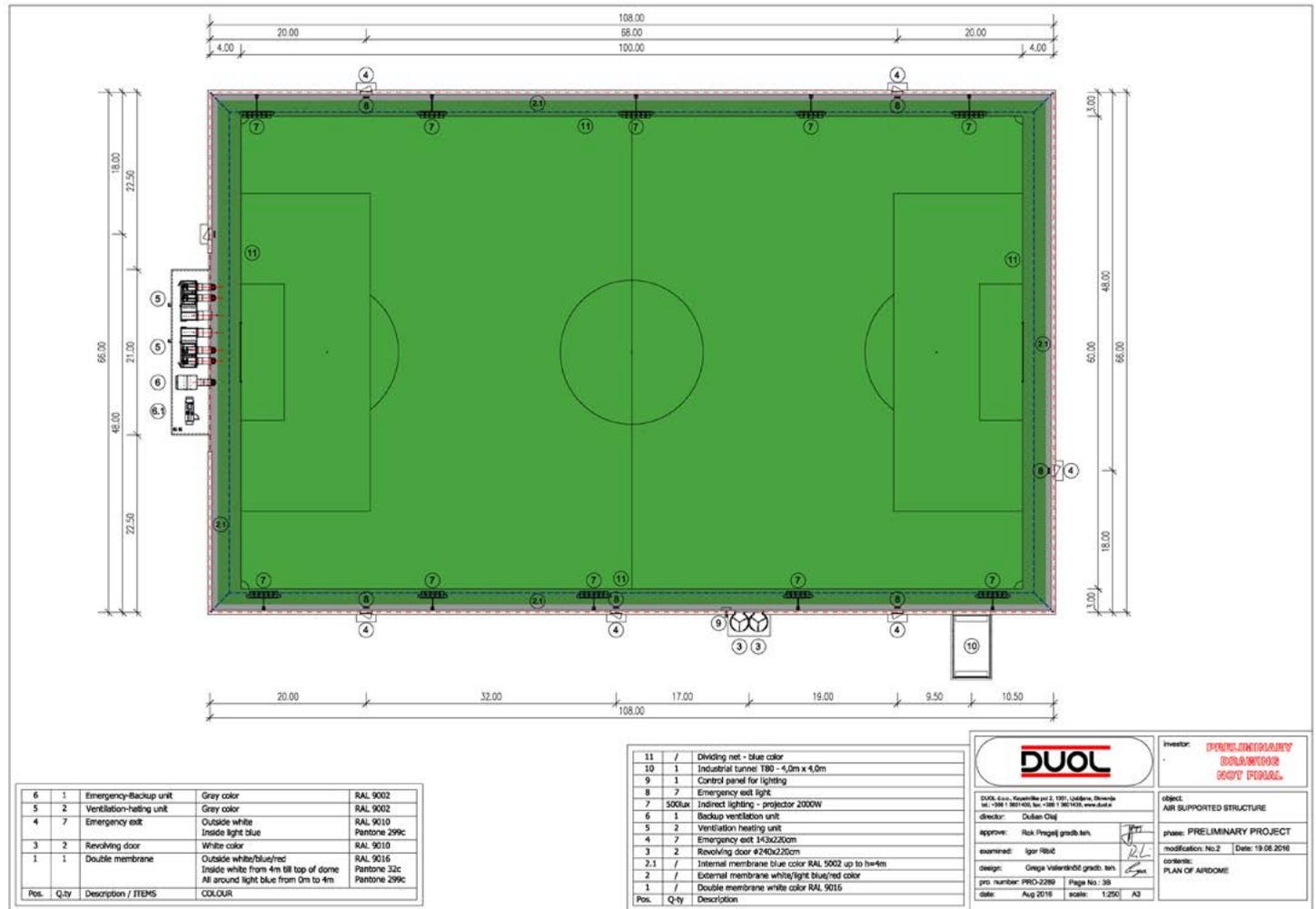
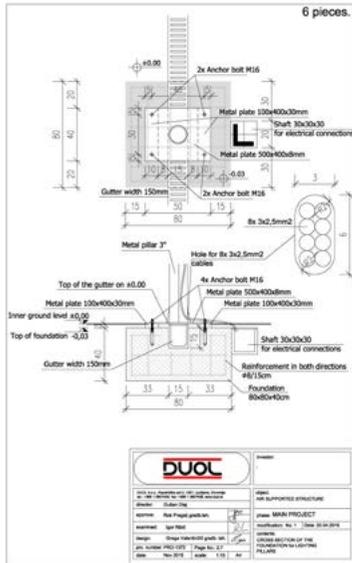
**Service**

*Object handover with complete client support*

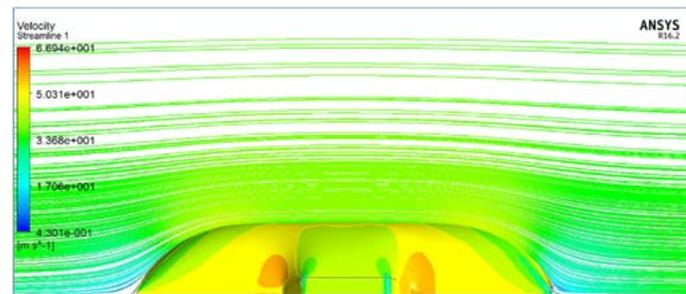
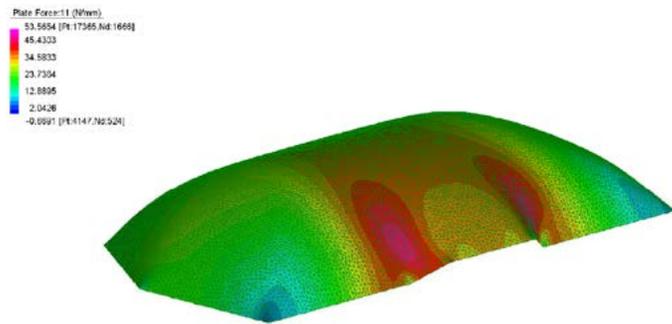
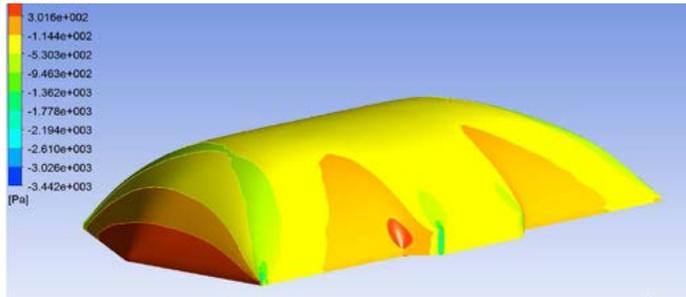
*Efficient and fast after sale service*

# Complete engineering support drawings and static calculations

- Study of standard references
- Determination of loads
- FEM modulation of the structure
- CFD analysis
- Pattern drawings
- 3D visualization



DUOL engineers design fabric structures (air supported structures, tension, steel and wooden structures) upon your request. We can completely **custom design** your fabric structure to meet your **specific needs**.



## Multi-purpose structures

We are specialized in several types of structures. We construct multi-purpose sports facilities, agricultural halls, logistics and industrial structures, temporary buildings (exhibition halls, entertainment venues, temporary warehouses), structures for civil purposes (hospitals, refugee camps, emergency centers) and military purposes.

## No wasted space

One of the important advantages of DUOL domes is the space saving inside the structure as they do not contain traditional buildings frames and pillars which allows several design options without wasting any available space.

## SmartDome

DUOL structures are featured with an intelligent and advanced control and monitoring system that automatically controls the entire dome settings. The airdome can also be managed remotely via internet and smartphones.

## Resistance to extreme weather

Withstands temperatures from -55°C and up to +70°C, strong winds, storms, heavy snow, ice.

## Very short project execution time

Only few weeks from the date of agreement until the structure is completed and ready for use.

## Seasonal flexibility

Only few days to assemble and disassemble the airdome easily and with minimal effort.

## Easy to relocate

DUOL structures can be used as permanent or temporary structures which can be easily relocated.



11 SmartDome

10 DUOL ECO Membrane system



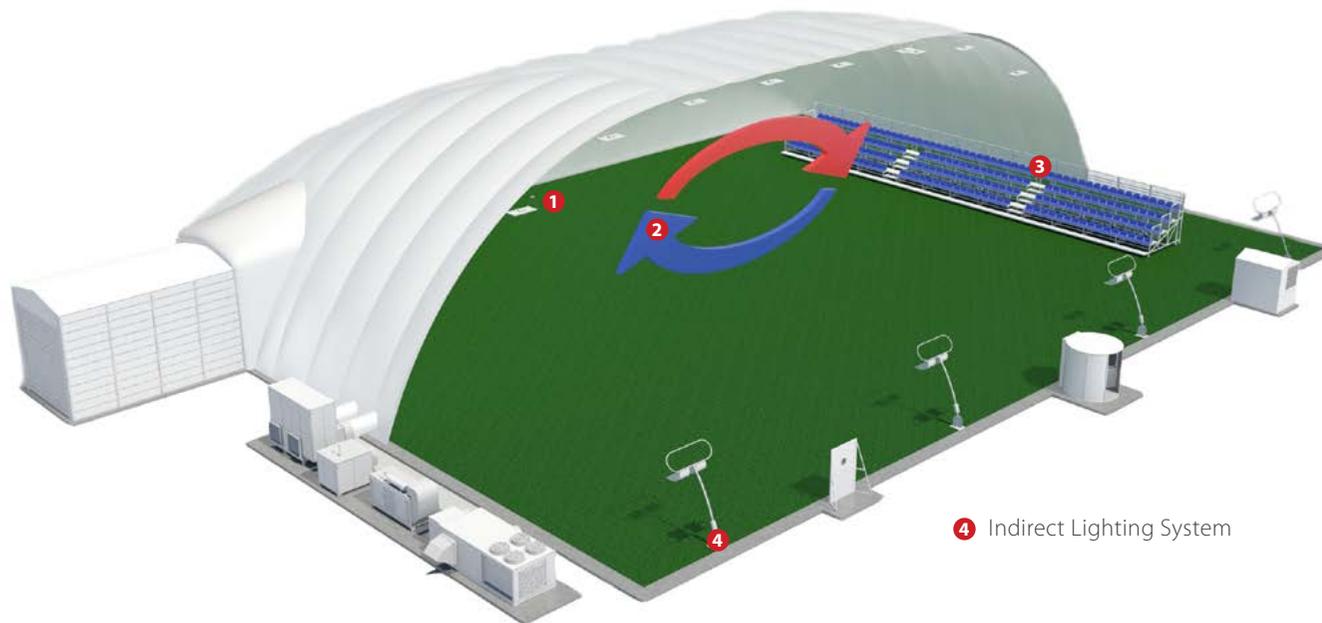
# DUOL innovative technologies

DUOL domes have many unique advantages including **innovative DUOL ECO** membrane system, which provides **highest thermal insulation** with rock-solid weather resistance.

1 Direct Lighting System

2 Destratification system

3 Turnkey projects



4 Indirect Lighting System

## Long lifespan

DUOL AirDomes have a lifespan of more than 40 years.

## Modern customizable design and branding

DUOL air supported structures have a modern design and could be -unlike traditional building- easily branded and customized in terms of colors and logos to fit the marketing and branding plan of the client.

## Energy efficient structures

The combination of the latest materials and technologies used in DUOL AirDomes offers you low operating costs.

## Conforms to all safety standards

All DUOL structures conform to all safety standards and regulations as they are resistant to fire, earthquakes and UV. Structures are made of a double-layered extremely durable membrane which is vandalism-proof. All structures are provided with an emergency backup unit and they are eco-friendly and 100% recyclable.

## Lower costs than conventional buildings

DUOL structures require much less construction cost than traditional structures as it doesn't need sophisticated site preparation such as concrete foundation and framing and other complications that conventional buildings have. Furthermore it does not require a construction permit as it is not considered as a permanent structure.

# Applications

## *Industry*



## *Sports*

## *Agriculture*



## *Military*



## *Others*

- Exhibition halls
- Landfill AirDomes
- Decontamination halls
- Emergency shelters
- Temporary shelter
- Cultural Venue





# Extend your playing season

DUOL AirDomes are a cost-effective and flexible means of **covering outdoor sporting areas permanently** (or during the winter months). The domes can be used for many sports including **football, tennis, swimming pools, indoor hockey, golf ranges, basketball, beach volleyball** and others.

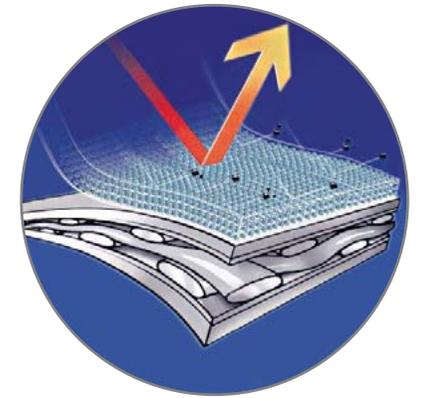


# DUOL **ECO** Membrane system

**DUOL ECO Membrane** is the unique DUOL membrane system which ensures the **structural stability, excellent thermal insulation, the ultimate strength**, and has an **amazing flexibility** at the same time. Thanks to its outstanding properties there is no condensation inside the air dome. **DUOL ECO Membrane** is coated with a **special lacquering finish** like Polyvinylidene fluoride (PVDF-II) or Titanium dioxide (TiO<sub>2</sub>) which increases the material's quality, lifespan, and dirt resistance. **ECO Membrane** is certified by independent European third-party laboratories.

## **DUOL ECO**

The outer skin provides improved protection against UV and dust/pollution, affording a greatly increased overall lifespan.



- Unique system with two independent layers\*
- Rock-solid design with double pressure lock\*
- Super low U-Value. Huge energy savings
- No condensation
- Effective system upgrade (at any time)\*
- Easy installation/dismantling including insulation\*
- Unique glass design option
- Higher side walls
- Simple lights fixation
- Electric cables hidden between membrane\*
- UV, chemical and weather resistant fabrics
- Dirt, fungus and mildew resistance
- Fire retardant
- Very high tensile and tear strength
- Long lifespan
- Environmentally friendly, recyclable

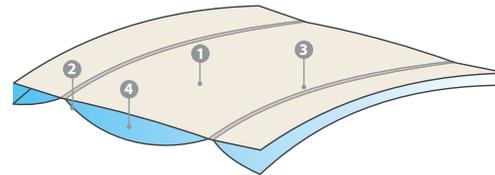
\* for certain ECO Membrane types



# DUOL **ECO** types

## **ECO Basic**

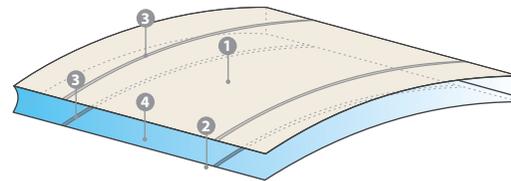
ECO Basic is a DUOL classic membrane system which offers DUOL high quality within your budget.



- 1 Outer membrane
- 2 Inner membrane
- 3 Seam
- 4 Air pocket

## **ECO Advance**

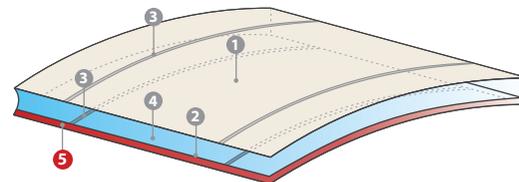
ECO Advance is the new generation of membrane system which completely eliminates thermal losses through thermal bridges. This innovative design offers higher thermal insulation and many other advantages over ECO Basic.



- 1 Outer membrane
- 2 Inner membrane
- 3 Seam
- 4 Air pocket

## **ECO Ultra**

ECO Ultra is the latest DUOL innovation with the most advanced membrane technology. A state-of-the-art insulation system between the membranes ensures the lowest possible U-value.



- 1 Outer membrane
- 2 Inner membrane
- 3 Seam
- 4 Air pocket
- 5 **Special high quality DF insulation**



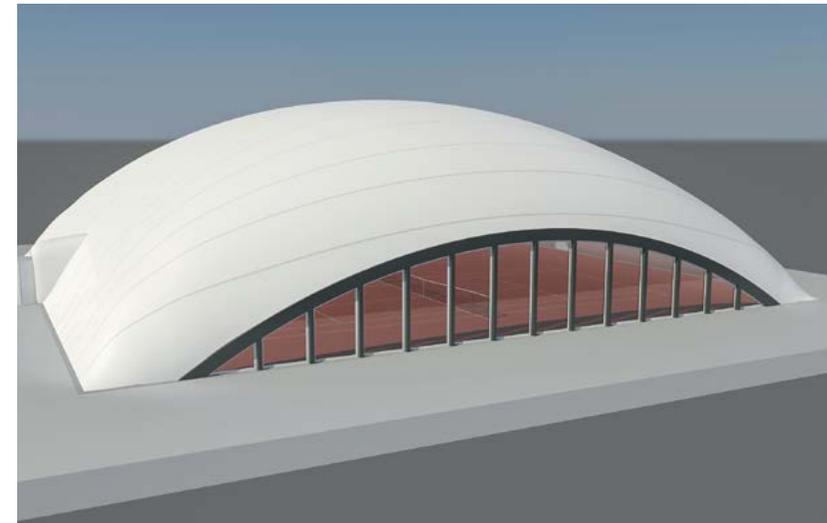
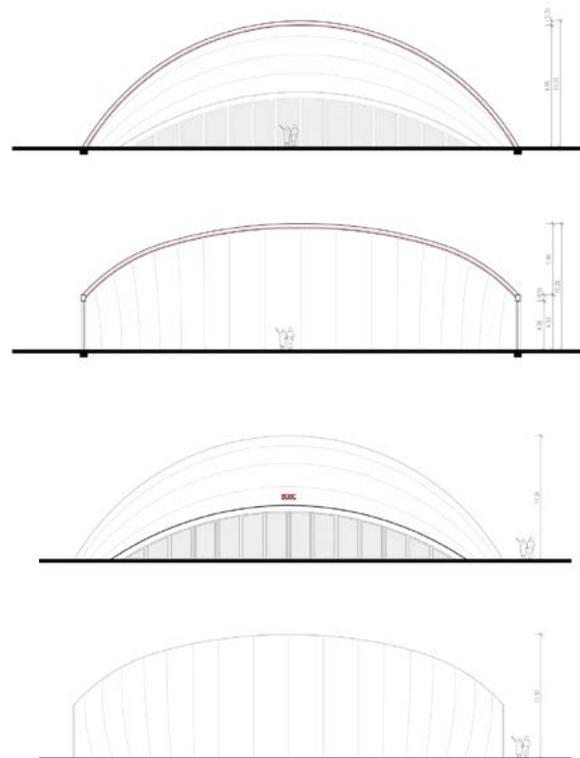


# Design options

**DUOL ECO** allows new design concepts with options of higher side walls and panoramic windows.

Higher side walls provide more indoor space which results in more vertical playable area and overall more pleasant indoor experience.

Panoramic windows are an attractive solution with an awesome view to surroundings.

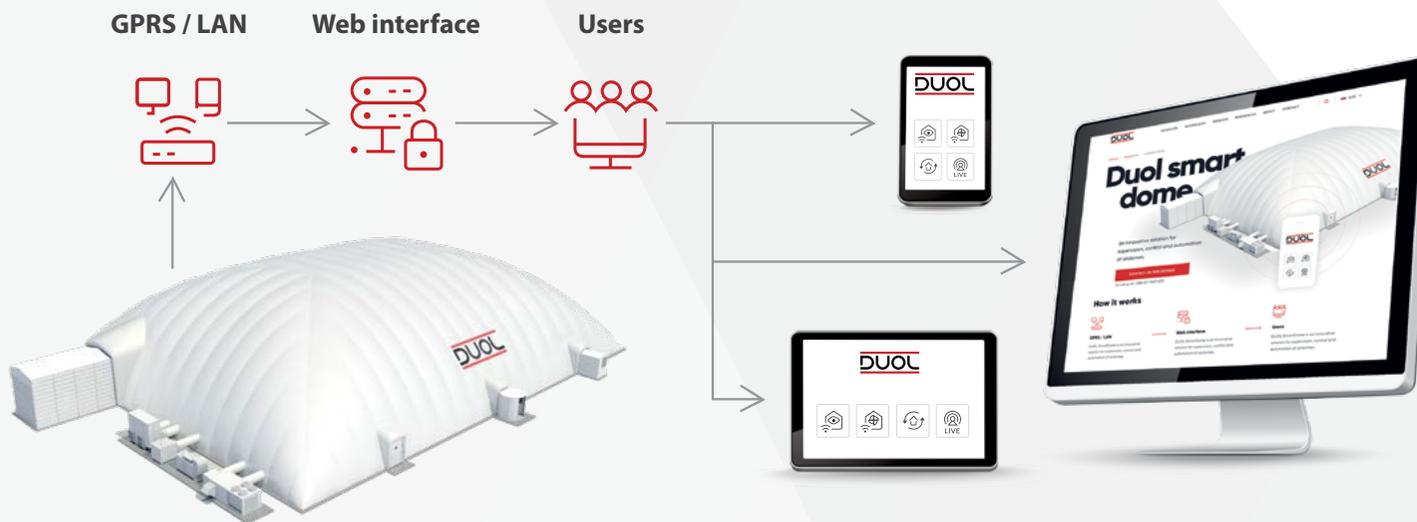




# DUOL SmartDome

DUOL SmartDome is an **innovative solution** for the **airdomes supervision and automation**. Programmable logic controller (PLC) interacts with different airdome settings and is used for monitoring and automatic control. Technical data and alarms are transmitted (via GPRS or LAN) and can be managed remotely. Users have **easy access via a web cloud-based interface** where data is stored and accessible by smartphones as well. Alarms are sent by email or SMS.

- *Monitoring, alarming and automation*
- *Remote data acquisition*
- *Data logging and history*
- *Modular design*
- *Wide range of air dome monitoring/controlling/alarming systems*
- *Energy savings*
- *Time savings*
- *Automatization of daily/repeating tasks 24/7 monitoring & remote control, through smartphone, tablet or computer*
- *User-friendly and customizable interface*



 Live stream	 Wind alarm
 Air dome pressure	 Customized alarming
 Snow alarm	 Temperature
 Real time reports	 Detailed history analysis
 HVAC system	 Cloud data security
 PDF history reports	 Lighting system
 Remote fan speed control	 Other custome systems

# Ventilation / Heating System

DUOL Ventilation/Heating System is **pre-engineered for stability**. Furthermore, it provides the desired climate conditions inside the dome. The system is **completely automatically-controlled**.

- *Automatic pressure regulation- frequency converter reducing overall energy costs and noise*
- *DFS – Double Fan System; modular fan operation, increased reliability*
- *Improved modulating system (saving up to 50%)*
- *High efficiency heat exchanger*
- *High efficiency condensing units (up to 105% efficiency)*
- *Full automation (wind mode, snow mode, heating mode)*
- *Silent operation - radial fan of low noise, silencers*
- *Heating options: natural gas, LPG, oil, hot water or steam, electricity, heat pump, biomass, combined source*

## Pellet burner

Self-cleaning boiler with automatic pellet loader.



# AC system

DUOL have accomplished many projects in the Middle East, Gulf region and other regions with very hot climates. We have installed domes in Saudi Arabia, United Arab Emirates, Egypt and other countries in Asia and South America with extreme climatic conditions. Our AirDome membrane is **uniquely designed** to withstand temperatures up to **70 degrees** Celsius. Our domes are designed AC system ready together with high thermal membrane insulation which reduces the heat entering the dome and maintains the climate inside the dome. A ventilation system ensures the fresh air circulation inside the dome to keep a healthy, fresh and cool environment for the visitors inside the dome. The air conditioning system withstands heat up to 70 degrees Celsius.

## Opaque membrane

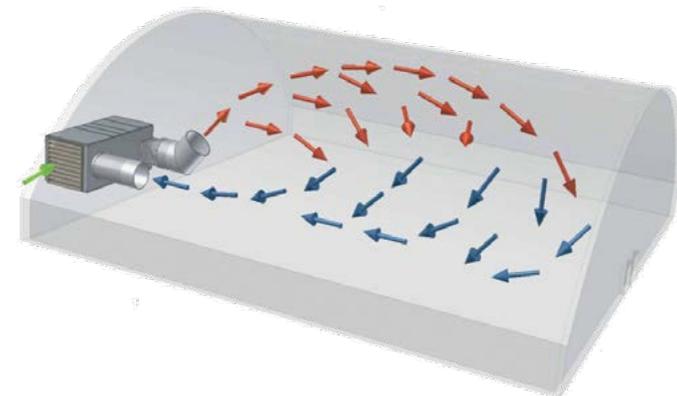
Opaque membrane ensures that AC works with maximum efficiency. It is a type of membrane that is mainly designed for extremely hot regions where sun protection is vital. The membrane withstands heat up to 70 degrees Celsius. The membrane comes with all colors. You choose the color that you like and we make it.

## De-stratification system

De-stratification system is mounted on the top of the dome and improves temperature distribution inside the dome – pushing the warmer air down from top to bottom. The result is lower energy consumption and a pleasant indoor environment.



*Air dome with AC system and Opaque membrane in Khobar, Saudi Arabia.*



# Extreme weather conditions expert

DUOL is an expert in airdomes construction in **extreme weather conditions**. We enhance all elements (membrane, air generators, anchoring system...) to withstand **extremely low or high temperatures** with **strong winds** and **heavy snow**.



## Emergency backup system

**Reliability** and **safety** are the most important DUOL AirDome features.  
**Constant power supply** is a critical item that must not be left to chance.

- *Auto start function and automatic shutdown*
- *12-24 h autonomy, which can be extended up to 100h*
- *Equipped with tested and reliable engines of well-known manufacturers (Iveco, Cummins, Perkins, Volvo ...) and alternators (Mecc Alte ...), which have a service network practically all over the world*



# Anchoring

Every structure needs a solid foundation to keep it anchored and secure. With the **DUOL advanced anchorage system**, air loss around the base perimeter is significantly reduced, providing **savings** on running costs.



Rings with peg crossed by a metal tube



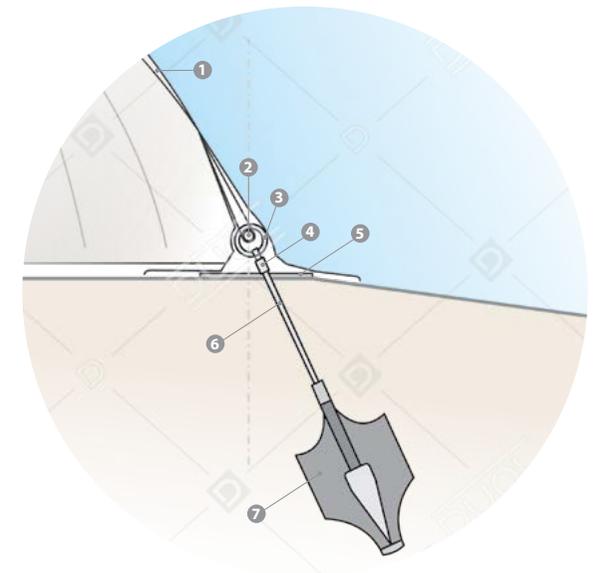
Metal profiles

- Perfect airtightness
- Powerful fixation
- Suitable for extreme weather conditions
- For permanent or seasonal use of the dome
- Durable hot galvanized steel. Maintenance free

## Anchoring without concrete foundation

With a **ground-anchoring system**, there is no need for a concrete foundation around the air dome. By using ground anchors, the air dome is **anchored directly into the ground** with minimal ground disruption.

- 1 Double membrane
- 2 Metal pipe 1"
- 3 Metal ring
- 4 Flange
- 5 Anchor stabilization
- 6 Anchor metal rod
- 7 Anchor plate



# Connection options

Air structures can be fixed to other buildings in a variety of ways. If the need arises for a larger facility, expanding or modifying an air structure is a simple procedure and can be accomplished with minimal disruption. The Air dome can be **shortened, lengthened or relocated at any time**, even doors, tunnels and connections to buildings can be added additionally.



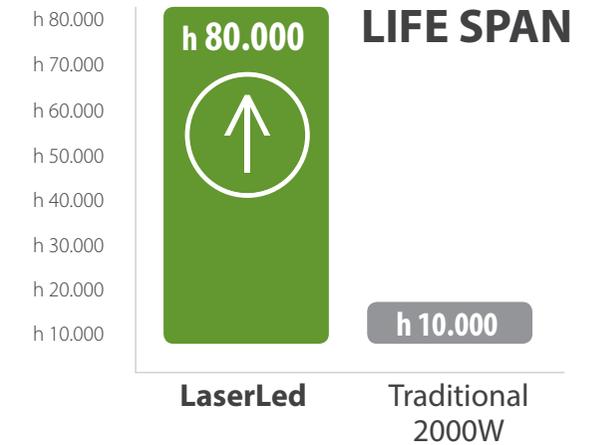
# Air dome on the top of buildings

Air dome has a **flexible design** that can be installed even **on top of existing buildings**.



# Laser LED luminaries

Laser Led luminaries are using LED source for light emission. They are **suitable for operation under most difficult sports applications**. Specially designed technology for precise and high-intensity light source. System efficiency up to 210 lm/W Construction with the optical part is designed for high-intensity light source with a low glare as well as a “no-shadow” effect. The construction is made of steel and aluminum to ensure **best possible heat dissipation and a long lifetime**. One of the great advantages of LaserLed is its **simplicity of construction** where **all parts can be substituted** as well as having standard power supply. LaserLed has the possibility of **remote control for dimming** purposes if needed.



## Laser LED Indirect

- For indirect light applications. Air dome structure height up to 45m
- Power 800W
- Luminaire flux: 110.000lm



1 France, tennis



2 Luxembourg, football

1 France, tennis  
500lux  
Standard: 32kW/h  
NEW LaserLED: 13kW/h

2 Luxembourg, football  
1000lux  
Standard: 204kW/h  
NEW LaserLED: 85kW/h



Excellent performance standards



Lower costs, better efficiency



Protection degree: IP66



Dimmable driver

## Laser LED Direct

- For direct light applications.
- Air dome structure height from 5m-22m height
- Power 200W
- Luminaire flux: 27.000lm



**1 Switzerland, multipurpose**  
500lux  
Standard: **7.5kW/h**  
NEW LaserLED: **3kW/h**

**2 United Kingdom, football**  
350lux  
Standard: **48kW/h**  
NEW LaserLED: **22kW/h**

**3 Germany, tennis**  
500lux  
Standard: **12.7kW/h**  
NEW LaserLED: **3.8kW/h**



**1 Switzerland, multipurpose**



**2 United Kingdom, football**

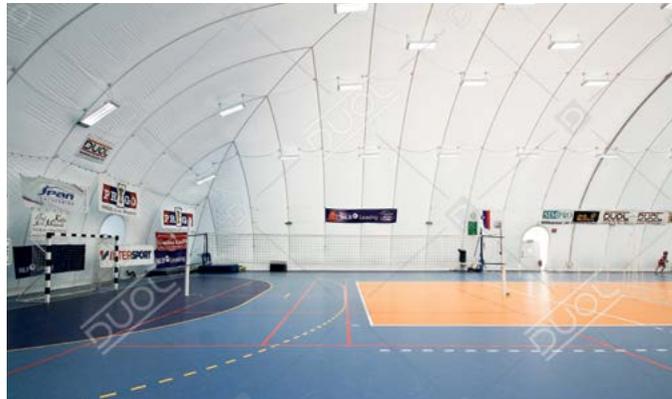


**3 Germany, tennis**



# Turnkey projects

As a company involved in sport industry for **more than 25 years** we have been closely linked to trusted suppliers of air dome interior and we can deliver for you **completely equipped turn-key** sports object, including stands, offices, locker rooms, toilets, sports flooring, sports equipment, dividing nets etc.



# Custom design possibilities

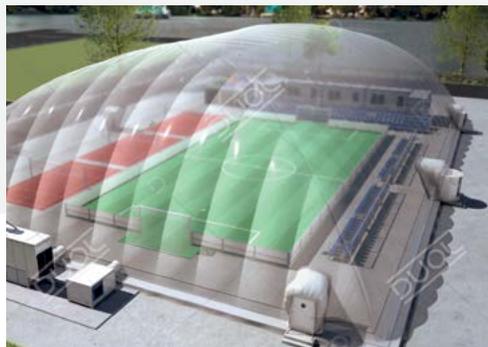
DUOL air domes can be **custom-designed** according to the client's specifications. Different colors, patterns and logos are possible.





## *Transparent membrane*

DUOL Transparent membrane has an impressive **64% light transmittance** and offers a pleasant indoor ambiance.



# Prestigious references all over the world



Ljubljana, Slovenia



Belgrade, Serbia



Bern, Switzerland



Kaunas, Lithuania



Tromsø, Norway



Hveragerði, Iceland



Dubai, UAE



Feldkirchen, Germany



FC Udinese, Italy



Kemi, Finland



Astana, Kazakhstan



Ataköy, Turkey



Brussels, Belgium



Novo Mesto, Slovenia



Astana, Kazakhstan



White Hart Lane, UK



Illertissen, Germany



Copenhagen, Denmark



Abu Dhabi, UAE



Kemerovo, Russia



Meudon, France



Minsk, Belarus



Batingen, Switzerland



Alkhubar, Saudi



North Siberia, Russia



Tallinn, Estonia



Paris, France



Pinsk, Belarus



Donetsk, Ukraine



QPR FC London, UK



Cairo, Egypt



Tbilisi, Georgia



Rijeka, Croatia



Kungsbacka, Sweden



Thessaloniki, Greece



Newcastle, UK



Helsinki, Finland



Karlstad, Sweden



Nanjing, PR China



Granada, Spain



Rüdeseim, Germany



Mondercange, Luxembourg



Volgograd, Russia



Nordberg, Norway



India, Military RaDomes



Boden, Sweden



Riga, Latvia



Moscow, Russia



Amsterdam, The Netherlands



Annaba, Algeria



Čapljina, BiH



Helsinki, Finland



Vienna, Austria



Tallinn, Estonia



Tignes, France



Abu Dhabi, UAE



Batumi, Georgia



Niort, France



Sundsvall, Sweden



Krasnodar, Russia



Istanbul, Turkey



Kamchatka, Russia



Valkenswaard, The Netherlands



Naryn, Kyrgyz



Imatra, Finland



Athens, Greece



Sofia, Bulgaria



Cardiff, UK



Mumbai, India



Graz, Austria



Bunnik, The Netherlands



Moscow, Russia



Khorog, Tajikistan



Ashgabat, Turkmenistan



Copenhagen, Denmark



Hormozgan, Iran



Kőszeg, Hungary



Gmund, Germany



Valparaíso, Chile

# Clients about DUOL

*From order to completion the project has run like clockwork; we formed a great working relationship with DUOL and they were professional and efficient throughout, keeping us up to date with progress and dealing with any issues promptly and professionally. Importantly the project was delivered within the agreed timescale and we would not hesitate in recommending them to others, in fact we are already planning our next project with them.*

**Queens Park Rangers Football Club, United Kingdom, Mark Donnelly, Chief Operating Officer**

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*Nach 20 Jahren hatte die alte Traglufthalle des HTCB ausgedient. Wir suchten deshalb eine neue Halle für die drei Tennisplätze (36m x 54m). Nach einer intensiven Evaluation entschieden wir uns für eine Traglufthalle der Firma DUOL aus Slowenien. Die Vorteile gegenüber der alten Halle waren: Heller, besser isoliert, weniger Energie verbrauchend. Trotz der geografischen Distanz waren die Verhandlungen stets sachlich, fair und zielführend. Der Transport klappte tadellos. Die erste Installation wurde zusammen mit DUOLMitarbeitern und Klubmitgliedern durchgeführt. Die Klubmitglieder sind sehr zufrieden mit der neuen Halle und freuen sich darauf, nächsten Winter wieder in der Halle spielen zu können.*

**Hallentennisclub Bern, Schweiz, Dr. Wolfgang Neugebauer**

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*In 2008 company DUOL supplied and installed football dome dim. 70x110x24m in Seinajoki, Finland. Company DUOL proved itself as a trustful business partner making its business obligations according Agreement. The dome is representative object in our community. From our point of view a decision to purchase an air supported structure was correct and done in right time due to rising needs in investments into sport. Thank to DUOL air supported structure playing football is able in every weather conditions, no matter on a season. We do hope that our community has neared an attractive kind sport such football is to wide population. And finally the most important is that our football team has got own facility for undisturbed trainings.*

**Wallsport Oy, Finland, Raimo Sarajarvi, Chairman**

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*This letter is written to express our satisfaction with the services provided by DUOL in engineering, manufacturing and installation of a football airdome made of double membrane with dimensions of 108x66m. The airdome has been installed in a very professional manner as agreed in the contract. Today we can openly say that we are very pleased with our DUOL airdome. The airdome has perfectly filled our needs for a covered full-sized football pitch that provides the opportunity for quality training and matches during the months when the autumn and winter weather creates problems for training and playing process. We can wholeheartedly recommend DUOL to any institution or club deciding for a new sports airdome.*

**Fédération Luxembourgeoise de Football, Joël Wolff, General Secretary**



# Supreme football selection



## Contact us

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# DUOL

