



TENSAFORM PREQUALIFICATION



ABOUT US

Tensaform Membrane Structures operates in the field of "Tensile membrane structures and constructions" one of the most creative applications of today's architectural approaches.

The most important distinction, making Tensaform Membrane Structures the preferred brand in architectural membrane, is its turnkey solution approach from design to application. Enriching this approach with the experience obtained during applications as well as the academic studies, Tensaform achieves many successful domestic and foreign projects.

Rapid, professional and creative team, technologic infrastructure in strict compliance with today's requirements, 300 thousand m² production capacity, specific machinery park and exciting feedbacks received from customers inspired Tensaform Membrane Structures to change its route in the way to become one of the best companies in our sector not only in Turkey, but all over the world.

Succeeded to become a solution partner for the most prominent companies of the construction sector with its ISO 9001 Certificate and working principles, ensuring the accomplishment of activities at international quality standards, Tensaform also delivers an enormous reputation and economic contribution to our country's economy with its export volume.



HEAD OFFICE

Şerifali Mah. Hendem Cad. No:61 S.Türkmen Plaza
34775 Ümraniye/İSTANBUL/ TURKEY



MEMBRANE FACT

Malkara Org. San. Bölgesi Arda Cad. No:6
Malkara/ TEKİRDAĞ/ TURKEY



You can reach it from Google maps by clicking here.

The most important difference that Tensaform is preferred for architectural membranes is the turnkey solution approach that extends from design to application. Tensaform has enriched this approach with academic work as much as the experience gained during its implementation, and has successfully accomplished many successful projects in 16 different countries at home and abroad.

TURKEY
TURKMENISTAN
AZERBAIJAN
SAUDI ARABIA
IRAQ

GEORGIA
GREECE
RUSSIA
BULGARIA
FRANCE

GUINEA
IRAN
KAZAKHISTAN
KUWAIT
LIBYA

EGYPT
PAPUA NEW GUINEA
ROMANIA
UKRAINE
AUSTRALIA



OUR PRODUCTS

The most important factor that makes Tensaform preferred in textile architecture and membrane shell structures is its turnkey approach from design to implementation. It has earned its place among the biggest companies of its industry not only in Turkey but also around the world in terms of project consulting, planning, manufacturing, assembly, service and maintenance for PCT, PTFE, ETFE membrane structures and steel and aluminum structures thanks to its rapid, creative and professional teams, its advanced machinery that meets today's needs, and a production capacity of 300.000 m² for PVC, 150.000 m² for PTFE and 100.000 m² for ETFE.

1

PVC & PTFE SHADES

Stadiums, amphitheatres, tensile shades, tensile structures, inverse umbrellas, mall shade closures etc.

2

ETFE SYSTEMS

It is among the most-preferred coating types in modern stadiums.

3

TEXTILE MESH FACADE SYSTEMS

Material texture, colors, sunshade feature, distant-close perception, various forms, all for more beautiful structures.

4

TENSILE SYSTEMS

Lightweight, durable and can be assembled/disassembled for multiple times, tensile systems.

5

MODULER SYSTEMS

Many features such as water proofing, flame reterdanty and 1. 100 PVC Dtex yarns and hunderets of dfferent solutions.

6

RENTAL ALUMINIUM MODULAR SYSTEMS

In modern architecture, there are many places Aluminum Systems can be sed. Such as fairs, events, organisations, concerts and many other places on our everyday life.

OUR SERVICES

1 Project Consulting

Designing 3d setup modeling, draft project analysis, detail development, mock up preparing, material selection, technical specifications preparing, process and assembly methodology, creating a budget are our services given by our expert team.

2 Project Design

We believe that creation dreams of architects, spatial designers and investors should never be prevented by any means. We are trying to assist our customers in how they can make their wishes come true, rather than telling them what not to do. We are trying to provide the most ideal concept solution by collaborating in order to find the best solution with our customers or solution partners wishing to have more information.

3 Fabrication

Our factory located in Tekirdağ/ Malkara is the world's biggest textile membrane processing facility with a 6.000m² indoor and 4.000m² outdoor areas, and provides solution for textile architecture projects both in Turkey and around the world with its most advanced machinery (5m and 3 m width cnc cutting counters, special production etfe welding machines, modern High Frequency (HF) machines, Teflon ironing and pressing machines in all sizes), its experienced engineers

and trained personnel, and with an annual 300.000 m² PVC, 150.000 m² PTFE, 100.000 m² ETFE processing capacity.

4 Assembly

We are carrying out our reinforced concrete anchorage, steel construction and membrane cover assembly within our company in a controlled manner and by keeping our health and safety inspections on highest levels. We are providing all kinds of opportunities for our experienced, trained teams and technicians to produce a high-quality field product in compliance with the assembly diagrams provided to them, and by following the construction site rules in suitable processes and with necessary equipment and tools.

5 Service and Maintenance

We generally provide a two-year warranty for the manufacturing and assembly errors of steel construction and membrane cover for works manufactured and assembled by us. Then, if requested (particularly in ETFE applications, we carry out semiannual maintenance, repair and part renewal processes in order to render the steel+membrane and ETFE cover systems to be much more durable by our special maintenance and service agreement.

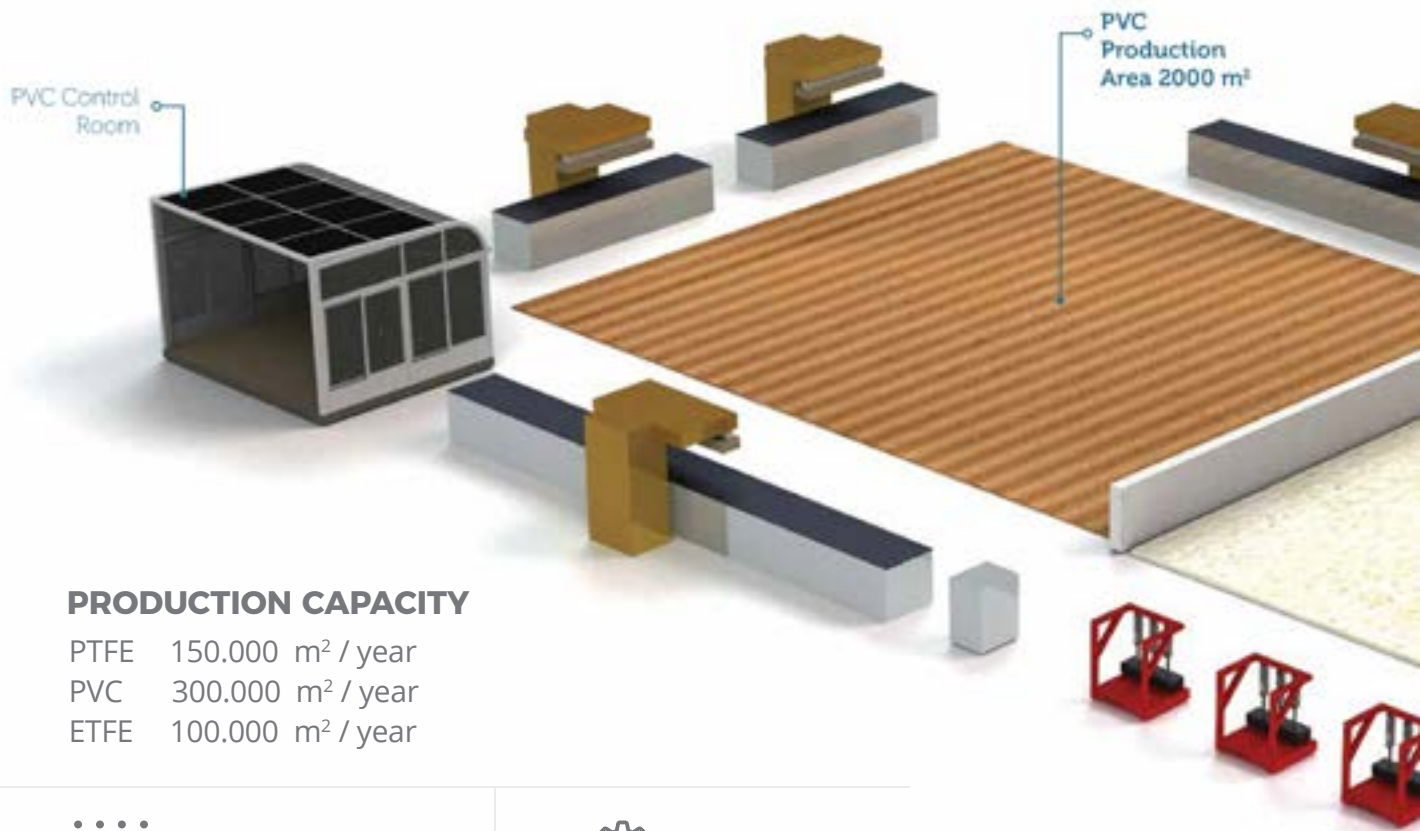
MEMBRANE FABRICATION

As Tensaform, our main purpose is to build environmentfriendly, long-lasting and aesthetic membrane structures. In this rapidly emerging sector, we apply the state-of-art production methods with a creative approach in the production of textile membrane structures. In 2013 year to increase the manufacturing capacity of teflon covered fibre glass weaved (PTFE) membrane and PVC covered polyester yarn weaved membrane and to give a better service to our customers by modernizing the machinery; our new factory is pressed into service which is in Malkara organized industrial site that has a total area of 10.000 m² and 5.000 m² closed membrane cover manufacturing area. Management, technical office, administrative divisions, manufacturing plant, open and closed stock area are giving service inside our new facility that has 5.000 m² closed and 5.000 m² open area.





FACTORY PRODUCTION PROCESS



PRODUCTION CAPACITY

PTFE	150.000 m ² / year
PVC	300.000 m ² / year
ETFE	100.000 m ² / year



ETFE PRODUCTION NUMBER OF EMPLOYEES

Production Chief	01
Technicians	06
Employees	08
Quality Control	01



ETFE MACHINE PARK

Etfe Adhesion Machine	: 1 Adet
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PVC PRODUCTION NUMBER OF EMPLOYEES

Production Chief	01
Technicians	04
Employees	16
Quality Control	01



PVC MACHINE PARK

Hf Machine	: 4 Pieces Fostrom 22 m Table Length
Hf Machine	: 1 Pieces Uhf Machine 3 m Table Length
Cutting Machine	: 24 m Table Length 3 m Width Gerber
Wick Weiding Machine	: 1 Pieces
Ferrari Grinding Machine	: 1 Pieces
Digital Welding Machine	: 9 Pieces
Sewing Machine	: 3 Pieces

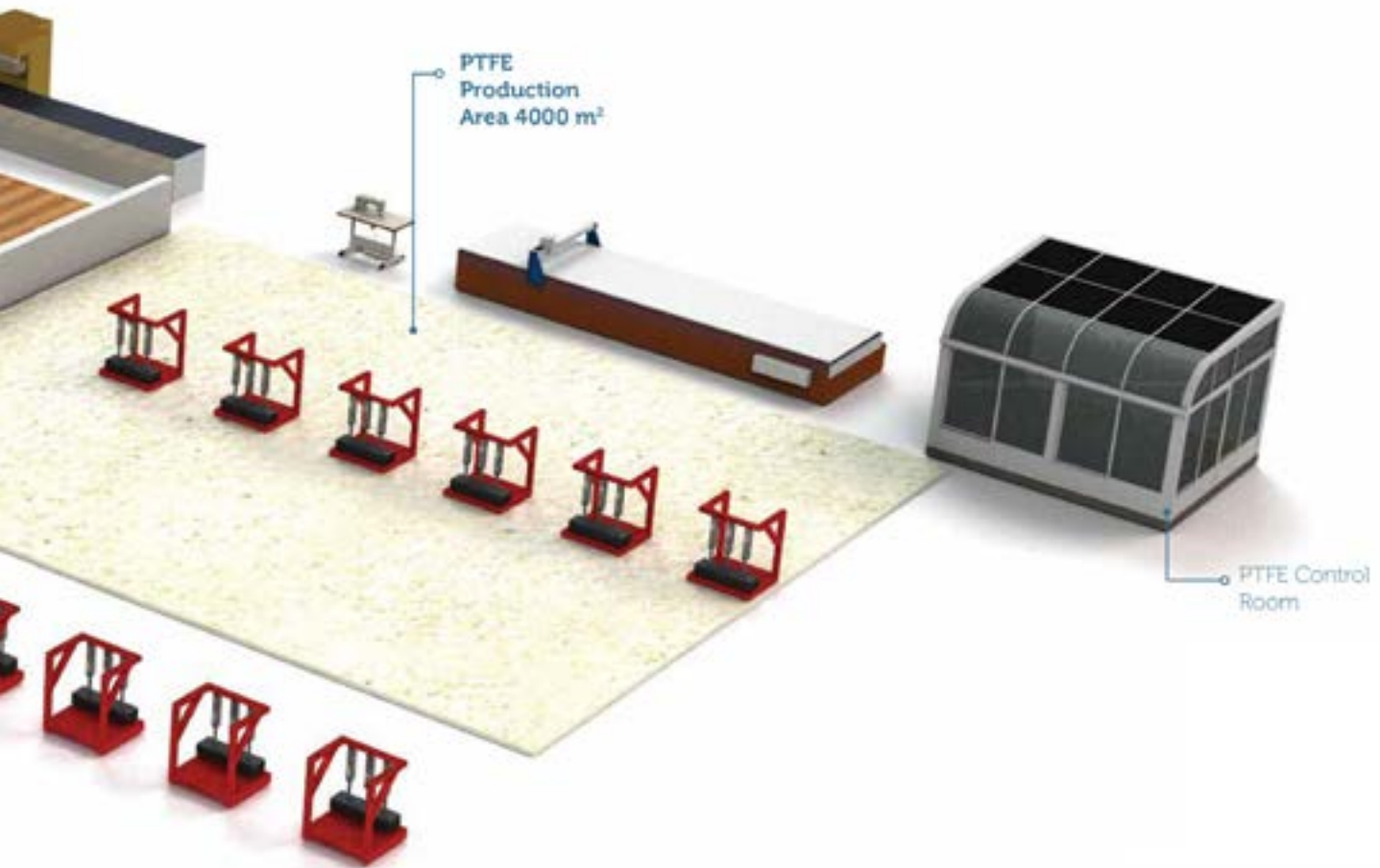
UNICERT
ISO 14001



UNICERT
OHSAS 18001



UNICERT
ISO 9001:2000



PTFE PRODUCTION NUMBER OF EMPLOYEES

Production Chief	01
Technicians	06
Employees	23
Quality Control	01



PTFE MACHINE PARK

Big Iron	: 22 Pieces
Small Iron	: 21 Pieces
Hot Cutter	: 15 Pieces
Controller	: 23 Pieces
Big Press	: 8 Pieces
Small Press	: 2 Pieces
Special Iron	: 1 Pieces
Cutting Machine	: 22 m Table Lenght 5 m width

LOCATION

Tensaform is in a central position because of that it is located between Europe and Asia. The transportation times on the basis of some countries are added on the below:



U.A.E.	2	15-20 Days	28 Days
Italy	2	5-6 Days	6 Days
France	2	5-6 Days	9 Days
Germany	2	4 - 5 Days	12 Days
Spain	2	6-7 Days	7 Days
Russia	2	3-4 Days	22 Days
Georgia	2	2-3 Days	4 Days
Ukraine	2	2-3 Days	3 Days
Libya	2	-	10 Days
Lebanon	2	9-10 Days	5 Days
Egypt	2	9-10 Days	5 Days
Algeria	2	10-11 Days	8 Days
Bahrain	2	10-12 Days	23 Days
Qatar	2	10-12 Days	25 Days
Yemen	2	10-12 Days	20 Days
Kuwait	2	10-12 Days	20 Days
Iraq	2	5-6 Days	23 Days

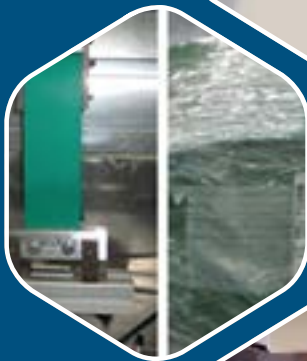


PTFE PRODUCTION PROCESS





02



03



04



05



06

01

Quality assessment supplied by the manufacturer

Generally the following quality and inspection certificates are available by the fabric supplier:

- Raw material – Certificate of conformity 3.1.B EN 10204
- Coated fabric – Certificate of conformity 3.1.B EN 10204
- Inspection certificates as a result of material inspection

The following information is requested:

- Closeness of yarn (DIN 53830)
- Picks (DIN 53853)
- Weave (DIN 61101)
- Grey cloth weight (DIN 53854)
- Character of coating
- Total weight of coated cloth (DIN EN ISO 2286-2)
- Breaking strength (DIN 53354)
- Tear resistance (DIN 53363)
- Adhesive strength (DIN 53357)

Material inspection at the light table takes place at the supplier together with the representative of Tensaform. The complete surface is checked in reflected and back light and an inspection report is made, exactly documenting position, size and kind of the fault.

02

Level inspection of incoming goods

As a last step the fabric is inspected visually during the cutting process. Here the fabric is led over an illuminated surface in order to detect superficial faults as well as faults in the transmitted light, such as weaving faults, damages and variations which do not correspond to the specifications. Here the fabric is inspected against the inspection certificate of the supplier and the fabric faults listed and marked. Pictures of variations are made, the picture is filed with roll number and continuous fault number in the file name and listed either in the inspection certificate of the supplier or in the internal inspection certificate. All this information is also needed for later evaluation of the waste factor.

03

3rd Party external tests

Project specific requirements regarding tests by independent, adequate laboratories can be incorporated into the fabrication process. The tests are based on the project related test plan, agreed between the client and the test laboratory.

- Breaking strength of coated cloth (DIN 53354) at 23°C
- Breaking strength of coated cloth with welded seam (DIN 53354) at 23°C

04

Cutting of the fabric

The file name of the CAD file for the cutter as well as for the templates shows the following information:

- Project number
- Type of fabric
- Membrane number
- Segment number
- Compensation values
- Date
- Manufacturer

Cutting can also be executed on the basis of a cutting order. It must be secured that according to the cutting file / template set, the suitable fabric is used. When using the cutting machine it has to be paid attention that the fabric is absolutely plane and that no marked defects are within the cutting area. The cutting machines must write all information and system points onto the fabric, project number, membrane number, segment number and layer number.

When templates are used for cutting, the templates have to lie plane on the fabric and be fixed by weights. The templates have to be exactly aligned corresponding to warp/weft marking (+/- 3°. No marked defects must be in the cutting area. The marking on the fabric is done with an appropriate marker / pen, according to the type of fabric. As for the cutting machine, all information and system points of the template have to be transferred to the fabric. Only then cutting with scissors may start.

The total material waste is gathered, stored in rolls, weighed and documented in the wastage report. All fabric layers cut are rolled and clearly marked with layer, membrane and segment number, if they are not immediately further processed. They are stored in a special, project related area.

05

Assembling of the fabric

PTFE/glass fabric has to be treated very cautiously. The glass filaments of the basic fabric are most sensitive. Each irregular treatment such as bending, folding, touching with sharp edges has to be imperatively excluded by appropriate measures when assembling the fabric. For start of fabrication, the following documents have to be available:

- General plan – shows all membrane layers with location and kind of seams and details, corner details etc.
- Seam overlapping plan – defines the overlapping direction of the different seams
- Fabrication drawings – of all seams and membrane details
- Dimensions and measurement specifications – Specifications for manufacture and quality control

PTFE/glass fabrics are welded with a thin welding film FEP lying in the seam. Welding is carried out by the combination of pressure and temperature (320 – 410°C) Two steps are necessary:

1. Marking of the seam width on the fabric, fixing of the FEP welding film with welding bar, overlapping of the fabric layers and fixing with smaller hand welding tools. Fixing has to be sufficiently strong so that the fabric layers do not slip apart during moving and welding.
2. Final welding is executed with special welding machines for PTFE/glass fabric, the surface seams with long welding bars, the details and curved seams with short welding bars. Works have to be executed by experienced personnel. All welding steps are documented.

Before welding starts, the machine parameters such as pressure, time and temperature have to be precisely set. To this end peel samples are produced and tested. Only after repeated peel tests have been passed, welding may start.

Directly after complete welding, the seam has to be checked for completeness of welding. After completion, the whole membrane field is cleaned and all details, seams and the complete surface are checked on both sides

06

Packing of the membrane

Packing of the completed membrane may only be executed after presentation of the following documents:

- Project specific packing instructions – describes the general type of packaging, packing material, marking, handling and storage of the packed membrane.
- Folding plan – Folding instructions / Dimensions for folding of the membrane to reach transport size.
- Quality documents – have to be filled in and complete.

PVC PRODUCTION PROCESS



01



01

Level inspection of incoming goods

As a last step the fabric is inspected visually during the cutting process. Here the fabric is led over an illuminated surface in order to detect superficial faults as well as faults in the transmitted light, such as weaving faults, damages and variations which do not correspond to the specifications. Here the fabric is inspected against the inspection certificate of the supplier and the fabric faults listed and marked. Pictures of variations are made, the picture is filed with roll number and continuous fault number in the file name and listed either in the inspection certificate of the supplier or in the internal inspection certificate. All this information is also needed for later evaluation of the waste factor.

02



02

Cutting of the fabric

The file name of the CAD file for the cutter as well as for the templates shows the following information:

- Project number
- Type of fabric
- Membrane number
- Segment number
- Compensation values
- Date
- Manufacturer

03



Cutting can also be executed on the basis of a cutting order. It must be secured that according to the cutting file / template set, the suitable fabric is used. When using the cutting machine it has to be paid attention that the fabric is absolutely plane and that no marked defects are within the cutting area. The cutting machines must write all information and system points onto the fabric, project number, membrane number, segment number and layer number.

04



When templates are used for cutting, the templates have to lie plane on the fabric and be fixed by weights.

The templates have to be exactly aligned corresponding to warp/weft marking (+/- 3°). No marked defects must be in the cutting area. The marking on the fabric is done with an appropriate marker / pen, according to the type of fabric. As for the cutting machine, all information and system points of the template have to be transferred to the fabric. Only then cutting with scissors may start.

The total material waste is gathered, stored in rolls, weighed and documented in the wastage report. All fabric layers cut are rolled and clearly marked with layer, membrane and segment number, if they are not immediately further processed. They are stored in a special, project related area.

03

Assembling of the fabric

PVC fabric has to be treated very cautiously. The glass filaments of the basic fabric are most sensitive. Each irregular treatment such as bending, folding, touching with sharp edges has to be imperatively excluded by appropriate measures when assembling the fabric.

For start of fabrication, the following documents have to be available:

- General plan – shows all membrane layers with location and kind of seams and details, corner details etc.
- Seam overlapping plan – defines the overlapping direction of the different seams
- Fabrication drawings – of all seams and membrane details
- Dimensions and measurement specifications – Specifications for manufacture and quality control

PVC fabrics are welded with a thin welding film FEP lying in the seam. Welding is carried out by the combination of pressure and temperature

(320 – 410°C) Two steps are necessary:

1. Marking of the seam width on the fabric, fixing of the FEP welding film with welding bar, overlapping of the fabric layers and fixing with smaller hand welding tools. Fixing has to be sufficiently strong so that the fabric layers do not slip apart during moving and welding.
2. Final welding is executed with special welding machines for PVC fabric, the surface seams with long welding bars, the details and curved seams with short welding bars. Works have to be executed by experienced personnel. All welding steps are documented.

Before welding starts, the machine parameters such as pressure, time and temperature have to be precisely set. To this end peel samples are produced and tested. Only after repeated peel tests have been passed, welding may start.

Directly after complete welding, the seam has to be checked for completeness of welding. After completion, the whole membrane field is cleaned and all details, seams and the complete surface are checked on both sides

04

Packing of the membrane

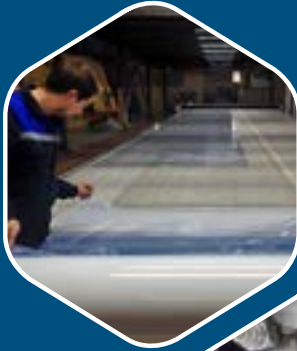
Packing of the completed membrane may only be executed after presentation of the following documents:

- Project specific packing instructions – describes the general type of packaging, packing material, marking, handling and storage of the packed membrane.
- Folding plan – Folding instructions / Dimensions for folding of the membrane to reach transport size.
- Quality documents – have to be filled in and complete.

ETFE PRODUCTION PROCESS



01



02



03



01

Cutting of the fabric

The file name of the CAD file for the cutter as well as for the templates shows the following information:

- Project number
- Type of fabric
- Membrane number
- Segment number
- Compensation values
- Date
- Manufacturer

Cutting can also be executed on the basis of a cutting order. It must be secured that according to the cutting file / template set, the suitable fabric is used. When using the cutting machine it has to be paid attention that the fabric is absolutely plane and that no marked defects are within the cutting area. The cutting machines must write all information and system points onto the fabric, project number, membrane number, segment number and layer number.

When templates are used for cutting, the templates have to lie plane on the fabric and be fixed by weights. The templates have to be exactly aligned corresponding to warp/weft marking ($\pm 3^\circ$). No marked defects must be in the cutting area. The marking on the fabric is done with an appropriate marker / pen, according to the type of fabric. As for the cutting machine, all information and system points of the template have to be transferred to the fabric. Only then cutting with scissors may start.

The total material waste is gathered, stored in rolls, weighed and documented in the wastage report. All fabric layers cut are rolled and clearly marked with **layer**,

membrane and segment number, if they are not immediately further processed. They are stored in a special, project related area.

02

Assembling of the fabric

ETFE fabric has to be treated very cautiously. The glass filaments of the basic fabric are most sensitive. Each irregular treatment such as bending, folding, touching with sharp edges has to be imperatively excluded by appropriate measures when assembling the fabric. For start of fabrication, the following documents have to be available:

- General plan – shows all membrane layers with location and kind of seams and details, corner details etc.
- Seam overlapping plan – defines the overlapping direction of the different seams
- Fabrication drawings – of all seams and membrane details
- Dimensions and measurement specifications – Specifications for manufacture and quality control

ETFE fabrics are welded with a thin welding film FEP lying in the seam. Welding is carried out by the combination of pressure and temperature (320 – 410°C) Two steps are necessary:

1. Marking of the seam width on the fabric, fixing of the FEP welding film with welding bar, overlapping of the fabric layers and fixing with smaller hand welding tools. Fixing has to be

sufficiently strong so that the fabric layers do not slip apart during moving and welding.

2. Final welding is executed with special welding machines for ETFE fabric, the surface seams with long welding bars, the details and curved seams with short welding bars. Works have to be executed by experienced personnel. All welding steps are documented.

Before welding starts, the machine parameters such as pressure, time and temperature have to be precisely set. To this end peel samples are produced and tested. Only after repeated peel tests have been passed, welding may start.

Directly after complete welding, the seam has to be checked for completeness of welding. After completion, the whole membrane field is cleaned and all details, seams and the complete surface are checked on both sides

03

Packing of the ETFE

Packing of the completed membrane may only be executed after presentation of the following documents:

- Project specific packing instructions – describes the general type of packaging, packing material, marking, handling and storage of the packed membrane.
- Folding plan – Folding instructions / Dimensions for folding of the membrane to reach transport size.
- Quality documents – have to be filled in and complete.

OUR TEAM

This innovative partnership spirit takes its strength from being supported by an expert team and high technology also, gathering architectural and engineering disciplines together.

Project department

6 Civil Engineers, 4 Architects,
4 Technicians



Project department
14 Staff

Marketing, Administrative affairs & PR department: 10 Staff



Marketing Administrative Affairs and PR Department: 10 Staff

Membrane Manufacturing Department:

3 Civil Engineer, 4 Technician,
60 Manufacturing Staff



Membrane Manufacturing Department: 67 Staff

Quality Control Department:

2 Staff



Quality Control Department: 2 Staff

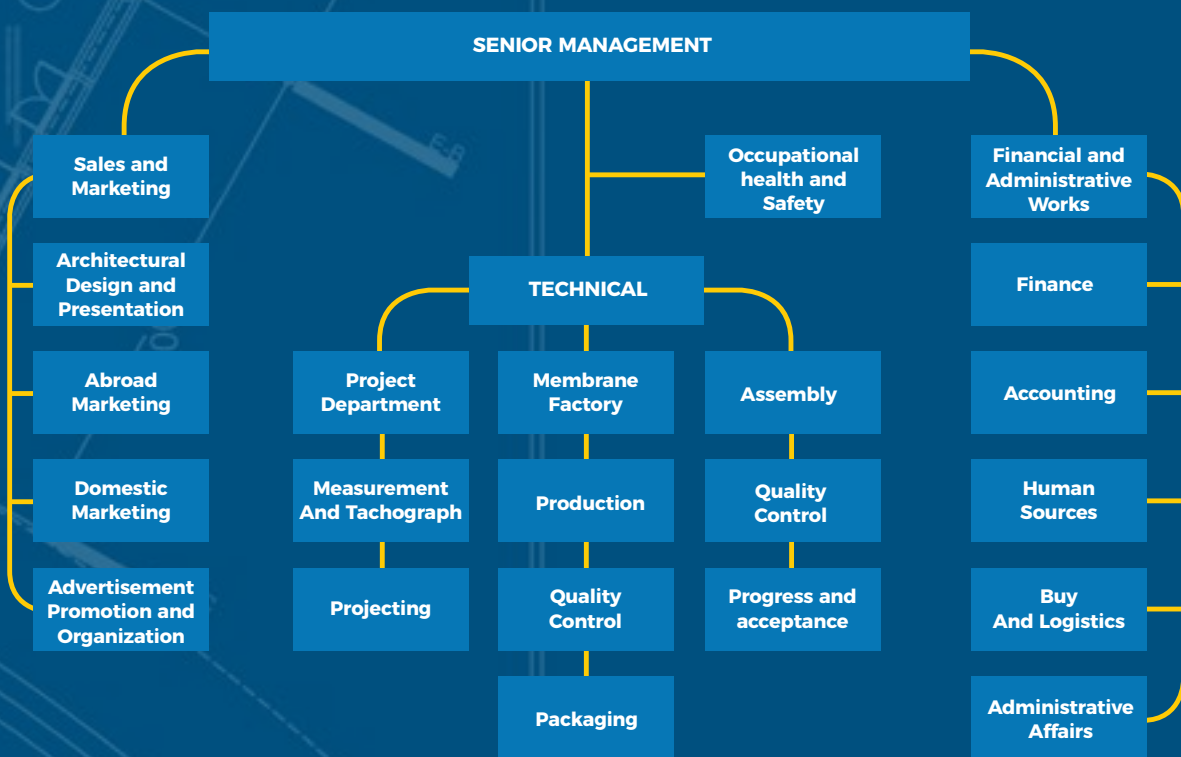
Assembly Department:

2 Civil Engineer, 4 Technician,
15 Supervisors and 20 Installation Personnel

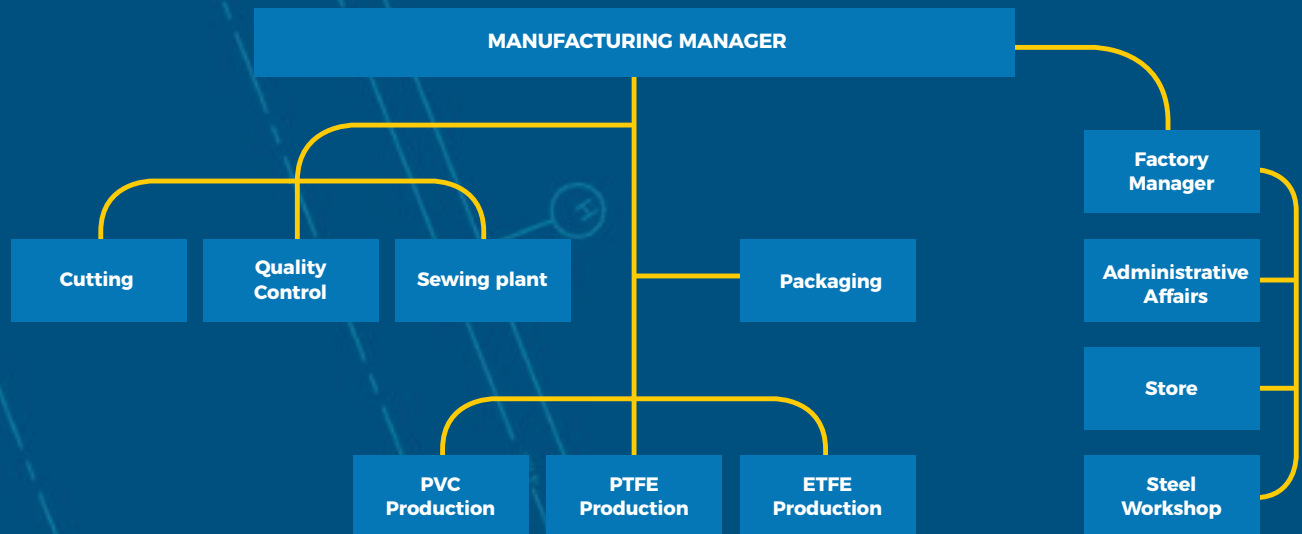


Assembly Department: 41 Staff

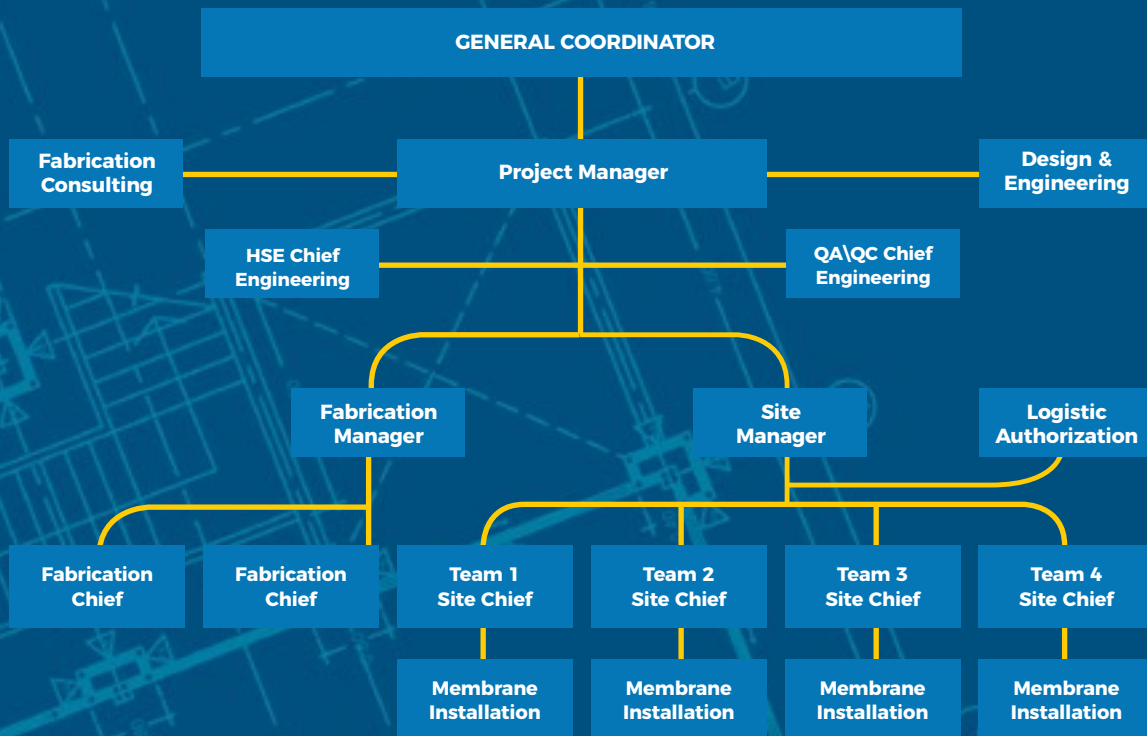
TENSAFORM ORGANIZATION CHART



FACTORY ORGANIZATION CHART



STADIUM ORGANIZATION CHART





METHOD STATEMENT

SITE ORGANIZATION

STOK YARD

Good organization and a clean working place is a part of good progress!
In the stock yard at least two men should be placed. At least one of them must have a forklift operation license and crane rigger license (crane signaler).

People assigned to stockyard will be responsible for:

- Accounting of amount of tools and materials in stock (stock list).
- Proper stock list should be kept on all times and should be available for PM and IM's .
- Receiving shipments (updating stock list)
- Accounting daily material usage (for future reference of the company).
- Issuing tools and equipment to workers.
- When a tool or material leaves the stockyard, it should be noted on a proper stock list. When tools are issued to the worker, a paper with complete list of items received by the worker should be signed by him.
- Preparing and transporting installation material for the teams on daily basis
- Most important task of the stockyard team will be preparing material for installation team. All the installation material (like aluminum profiles, bolts, corner details



etc.) for a single bay needs to be sorted, prepared (Klüber paste needs to be put on bolts, position marks need to be placed on corners etc.) and placed on pallets. Then the pallets with materials should be transported to “lift up area” and lifted to rain gutter corresponding to the bay the materials were prepared for.

All required documents and forms will be prepared prior to the start of the project and handed to the company and people responsible.

WORK FORCE

To work efficiently every worker needs to know his position and his responsibilities.

Daily toolbox talk:

- All the work force should be divided into small teams. The amount of people in each team should be adequate to the task that the team performs. Each team should have an appointed team leader. Please note that the size, composition and the team leader positions can and probably will change during the project. According to current needs.
It is one of the main responsibilities of IM's to form proper teams. IM's will appoint group leaders from among the workers.
- Every team leader should report to the office (or other indicated meeting point), at least 15' (unless otherwise noted) before work starts every day for short briefing with IM's.
- During the briefing each team leader is assigned with tasks for the current day and has opportunity to discuss with IM's.
- Every day after work a team leader must report to IM's and report the work done during the day (debriefing) and also discuss any problems from the day if not discussed earlier. Then IM's report to PM and Project Responsible.
- Work day starts at the indicated meeting point where all teams gather and leave the meeting point with their team leader.
IM's are all time available for workers and team leader to ask questions and solve problems that may occur during installation. All such problems should be reported immediately.
- All workers should be issued with complete set of the tools needed for their working position and they will have to sign for each item received. In case of damage to or loss of tools that are signed for, that occurs from the fault of the worker, the tool cost should be deducted from the next monthly salary. This mechanism should result in better taking care of working equipment.

OFFICE

- Office authorities; Project managers, assembly managers, project managers and extra appointed competent persons.
- Office officials report their processes and current site conditions to the company managers on a daily basis.
- The office should keep track of daily progress, all project plans, safety documents and worker lists.
- The office should provide a list of installation tools that will be needed in each scene and supply it to the stock area.
- The project manager, in cooperation with the field manager and the main contractor, must answer all questions and coordinate their needs with other subcontractors.

INSTALLATION METHOD STATEMENT

Method Statement summary

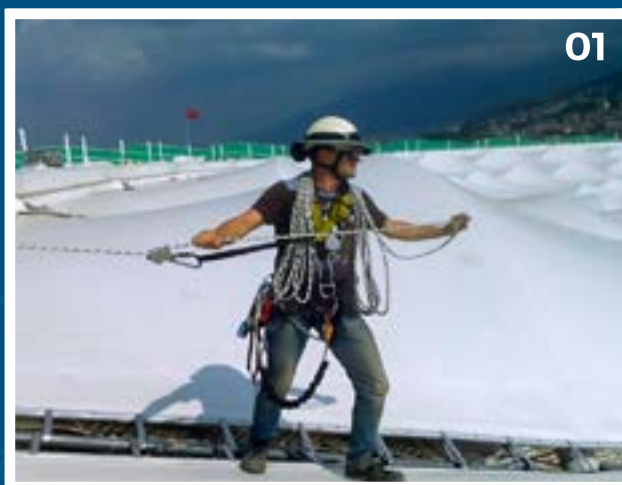
1. Rope access workers install the safety lines around the perimeter current of the working area.
2. Lift all material needed for the bay to the rain gutter and secure.
3. Netting team installs the fall protection net.
4. Installation of membrane liner.
5. Lift membrane into the liner and spread with winches.
6. Install pulling plates and attach to the "Arch Crawler".
7. Place one webbing belt between each arch (wind securing).
8. Pull the membrane over the arch and secure the membrane.
9. Slide in the extrusion and slide in the right amount of screw connectors into the extrusion.
10. Dismantle the membrane liner and pull over the arches from the next bay axis and install.
11. Install the corners and clamp extrusions.
12. Install pulling hooks and span sets, and tension around the perimeter.
13. When the membrane reaches its final tensioning, the screw connectors are locked with a second nut (lock nut).
14. Final check by IM,s, sign off and hand over to PM.
15. Flap installation and welding.
16. All remaining safety lines are dismantled by rope access workers.
17. Final check by IM's, sign off and hand over to PM.
18. After all works on axis are finished, the axis is closed.

METHOD STATEMENT EXPLANATION

01

Rope access workers install the safety lines around the perimeter current of the working area.

Before any other works start on the bay that should be installed, a qualified rope access team enters the axes to mount special “arch clamps” and attach the safety lines that will be used by all other workers during the installation. It is essential that this person uses appropriate fall arrest equipment. Safety line needs to be installed in the manner that meets the safety standard and main contractor requirements.



02

Lift all material needed for the bay to the outer rain gutter and secure.

All installation material needed to install a membrane in bay is assembled on pallets in stockyard and accounted for. The pallets are transported to the right crane (that can reach the bay to be installed). Safe transport routes should be agreed with main contractor by the office. Material is lifted by crane to the rain gutter. Pallets should be secured in a manner to avoid the paint job damage and to avoid material falling from the roof. On the roof a receiving person(s) needs to be present to take the transported pallets and secure them in a proper way



03

Netting team installs the fall protection net.

The netting team can enter perimeter only after proper safety lines are installed! The netting team spreads the net through the axis length. After spreading the net, the net side line (or attachment points) is connected to the "arch clamp". On the axis neighboring the already installed membrane, only one net is installed on the side opposite to the membrane. On the other axis of the bay, two nets are installed (on both sides of the axis). Nets and/or membrane should form a V shaped corridor.

04

Installation of membrane liner.

Membrane liner lifted by a crane (first membrane) or moved from the other bay is spread by a preparation team through the axis length. After spreading it is connected to the

"arch clamp". Please note that due to the total length (and also different lengthd) of the axes, the liner should be composed from sections that can be connected/disconnected together depending on the needs. Also the sections sizes should be small/large enough to be easily and safely moved over the arches to the next bay.

05

Lift membrane in to the liner and spread with winches.

Membrane is lifted by the crane in place in the beginning, end or center of the axis depending on the crane reach for current bay. Please note that the membrane should be properly folded by the factory to allow the installation and spreading according to this method statement. Also the factory MUST properly mark both the membrane packet and the membrane inside the packet. After unpacking the membrane packet, a proper end of the membrane is connected to the pulling plate



and a winch steel cable. The membrane is slowly spread through the whole axis length. A person responsible should accompany the membrane during spreading to avoid the membrane being stacked and/or damaged.

06

Install pulling plates and attach to the "Arch Crawler".

After the membrane has been spread, the special "Arch Crawler" clamps are mounted to the arches. Pulling plates and pulling ropes are installed on the membrane.

07

Place one webbing belt between each arch (wind securing).

To avoid membrane damage during and after installation, webbing belts are placed in between the arches to offer wind securing (in addition to the wind securing offered by the "Arch Crawler").



08

Pull the membrane over the arch and secure the membrane.

The membrane is pulled from the second axis. For this the pulling team uses the rope connected to the membrane pulling plates and "Arch Crawlers". At least two persons should pull on each arch. For pulling special pulling rolls (or tirfor, all depends on total membrane weight) with one way move only mechanism are used. IM's coordinate all pulling people that the membrane is spread evenly over the arches and to avoid the situation that the membrane is pulled too much on one arch and thus blocking the pulling of the whole membrane.

09

Slide in the extrusion and slide in the right amount of screw connectors into the extrusion.

After the membrane is spread, the installation team starts to slide in the extrusions over the whole radial length of the membrane



(as much as possible). Same time the correct amount of screw connectors is also slid into the extrusions.

10

Dismantle the membrane liner and pull over the arches from the next bay axis and install.

The same time the other installation tasks are performed, the liner is disconnected from the arch clamps, separated to single sections and moved over the arches to the next axis. Then it is assembled and mounted as stated in point 4.

11

Install the corners and clamp extrusions.

After extrusions have been slid in, the corners are installed. After the corners are installed, the proper tension is given to the membrane. The corners are then installed to the steel work. After the membrane is tensioned, the special clamp extrusions are cut to size and installed on membrane radial length between the corners and the extrusions.

12

Install pulling hooks and span sets, and tension around the perimeter.

To get the membrane to final position, temporary pulling hooks are installed on the extrusion. Then the ratchet belts are installed between the pulling hooks and steel structure and with it the membrane is tensioned to the final position.

13

When the membrane reaches its final tensioning, the screw connectors are locked with a second nut (lock nut).

After that the tension of the screw connectors is adjusted in a manner that the extrusion is straight. Then the connectors are locked with a second nut (lock nut) to stay on the final position.



14

Final check by IM's, sign off and hand over to PM.

After all the previous works are finished and the axis is cleared, the IM's perform a "final check". During final check the IM's check the correctness of installation and the tensioned membrane for any potential damage. If any additional works are required, the IM's send a team ASAP or note what needs to be done in near future. If everything is correct, the IM's sign off the completion form and hand it to PM.

15

Flap installation and welding.

When the axis is finished, the membrane flap is pulled and welded by trained welded team.
Flap installation
Flap welding

16

All remaining safety lines are dismantled by rope access workers.

It is essential that this person uses appropriate fall arrest equipment.

17

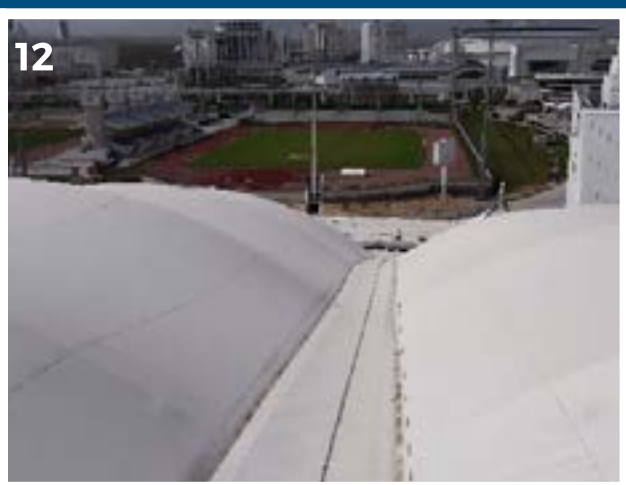
Final check by IM's, sign off and hand over to PM.

After the membrane flap is welded, the welding quality is checked by the IM's. When some corrections are required, the place of it is marked and the welding team has to do it. If everything is correct, the IM's sign off the completion form and hand it to PM.

18

After all works on axis are finished, the axis is closed.

After welding is finished and signed off, the axis is marked with a barricade tape and should not be entered by workers any more. If everything is correct, the IM's sign off the completion form and hand it to PM.



CERTIFICATES

Certificate

A'ND

International Certification Registrar

TENSAFORM MEMBRAN YAP. SAN. TIC. A.S.

SERIFALI MAH. HENDEM CAD. NO: 61 K:2-3 S.TURKMEN PLAZA UMRANIYE / ISTANBUL

**A'ND certify that the system and processes of the above
Organization have been assessed and found in accordance
With the requirements of the Environmental Management Systems detailed below**

ISO 14001:2004

Scope

**DESING, CONSTRUCTION AND UNDERTAKING
OF THE SUSPENDED-TENSILE MEMBRANE STRUCTURES**

Certificate No. : Ç14001/477/2015

Date of Initial Registration : 06 February 2015

Expiry Date : 05 February 2018

This document is valid between 06.02.2017-05.02.2018



TÜRKAK BDS NO
YS-D957-7071

[Handwritten Signature]
General Manager



This certificate is intellectual property of A'ND Uluslararası Den. ve Göz. Hizmetleri Tic. Ltd. Sti. and can be maintained through at least once a year surveillance, period of this certificate is totally 3 years. If you can not maintain the certification, this certificate shall be returned to A'ND. The validity status of the certificate can be checked from the Türkak Document Validation System with your QR code on the certificate
Revision Information: Certificate date is extended, because of the 02 th surveillance. Revision Date: 03.03.2017

A'ND Uluslararası Denetim ve Gözetim Hizmetleri Ticaret Limited Şirketi Yenısahra Mah. Atalay Cad. No:19 Alayşehir / İstanbul Tel: 0216 550 20 80 Faks: 0216 550 20 82 www.andbelgelendirme.com info@andbelgelendirme.com

Certificate

A'ND

International Certification Registrar

TENSAFORM MEMBRAN YAP. SAN. TIC. A.S.

SERIFALI MAH. HENDEM CAD. NO: 61 K:2-3 S.TURKMEN PLAZA UMRANIYE / ISTANBUL

**A'ND certify that the system and processes of the above
Organization have been assessed and found in accordance
With the requirements of the Quality Management Systems detailed below**

ISO 9001:2008

Scope

**DESING, CONSTRUCTION AND UNDERTAKING
OF THE SUSPENDED-TENSILE MEMBRANE STRUCTURES**

Certificate No. : T9/1760/2015

Date of Initial Registration : 06 February 2015

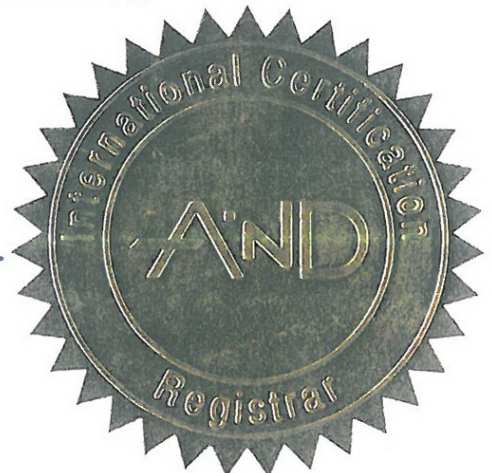
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This document is valid between 06.02.2017-05.02.2018



TÜRKAK BDS NO
YS-9AA2-208B

[Handwritten Signature]
General Manager



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TENSAFORM MEMBRAN YAP. SAN. TIC. A.S.

SERIFALI MAH. HENDEM CAD. NO: 61 K:2-3 S.TURKMEN PLAZA UMRANIYE / ISTANBUL

A'nd has been evaluated and approved that the convenience to standard requirements of the establishment which is mentioned above regarding Occupational Health And Safety Management Systems which is detailed below.

OHSAS 18001:2007

Scope

**DESING, CONSTRUCTION AND UNDERTAKING
OF THE SUSPENDED-TENSILE MEMBRANE STRUCTURES**

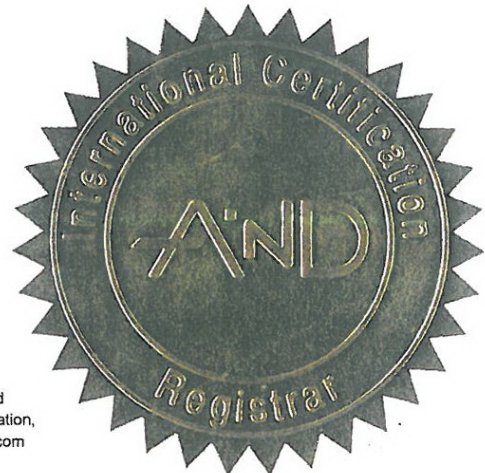
Certificate No. : ISAS/213 /2015

Date of Initial Registration : 06 February 2015

Expiry Date : 05 February 2018

This document is valid between 06.02.2017-05.02.2018


General Manager



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A'ND Uluslararası Den. ve Goz. Hizmetleri Tic. Ltd. Sti. Yenisahra Mah. Atalay Cad. No:19 Ataşehir -Istanbul
Tel : 0216 550 20 80 Faks : 0216 550 20 82 www.andbelgelendirme.com info@andbelgelendirme.com
Revision Information: Certificate date is extended ,because of the 02 th surveillance .Revision Date: 03.03.2017



REFERENCES

TRABZON CITY ŞENOL GÜNEŞ STADIUM



PROJECT INFORMATION

Shopper :	STY İnş. A.Ş.
Market Sector:	Sports Facilities
Fabric Type :	PTFE
Location :	Turkey
Project Size:	51.000 m ²
Completion Date :	2016



TURKMENISTAN OLYMPICS STADIUM

PROJECT INFORMATION

Shopper :	Polimeks
Market Sector:	Sports Facilities
Fabric Type :	PTFE
Location :	Asia
Project Size:	56.000 m ²
Completion Date :	2016





BURSA CITY CROCODILE ARENA STADIUM



PROJECT INFORMATION

Shopper :	Kazova A.Ş.
Market Sector:	Sports Facilities
Fabric Type :	PTFE
Location :	Turkey
Project Size:	80.000 m ²
Completion Date :	2016





KONYA CITY STADIUM



PROJECT INFORMATION

Shopper :	Bir Yapı A.Ş.
Market Sector:	Sports Facilities
Fabric Type :	PVC
Location :	Turkey
Project Size:	50.000 m ²
Completion Date :	2013



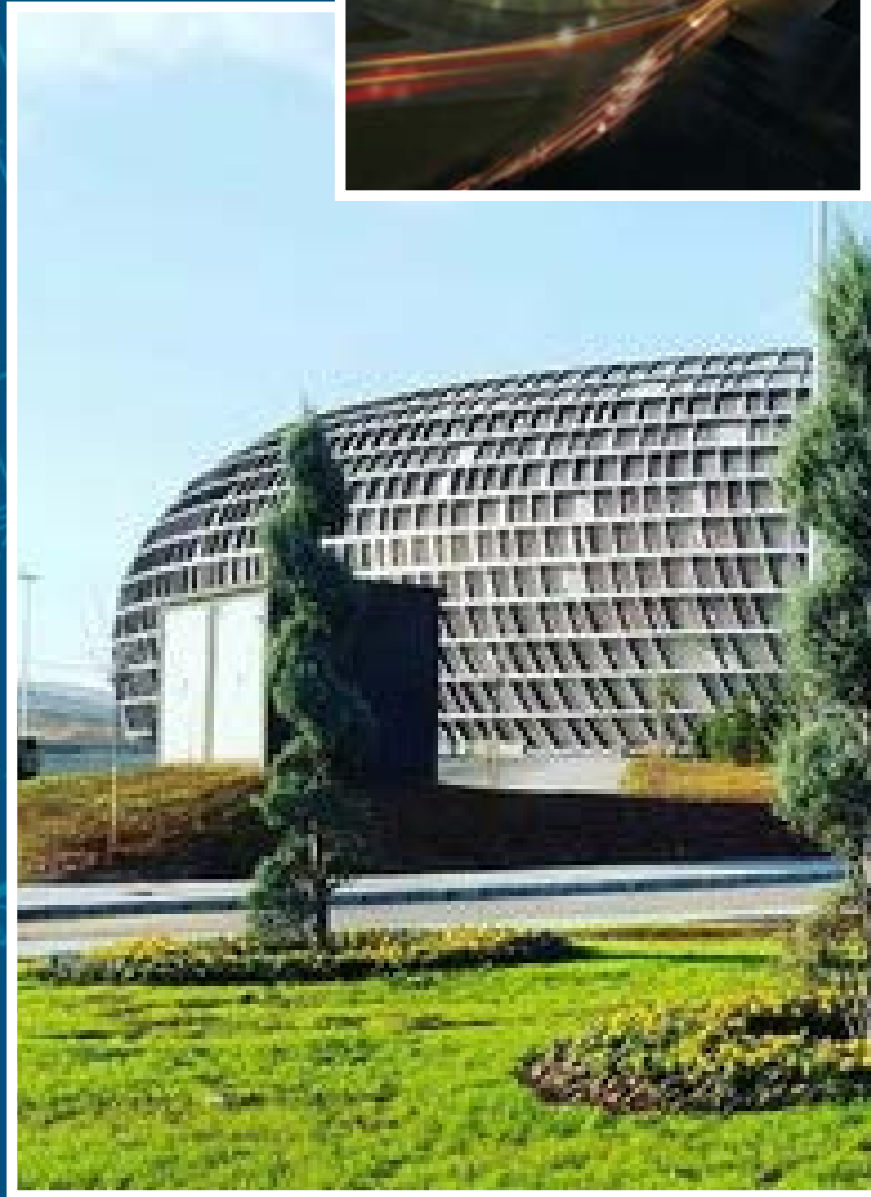


GAZIANTEP CITY STADIUM



PROJECT INFORMATION

Shopper :	MAY İnş.A.Ş.
Market Sector:	Sports Facilities
Fabric Type :	PTFE
Location :	Turkey
Project Size:	53.000 m ²
Completion Date :	2016





ASHGABAT STADIUM TURKMENISTAN

PROJECT INFORMATIONS

Shopper :

Market Sector: Sports Facilities

Fabric Type : PVC

Location : Asia

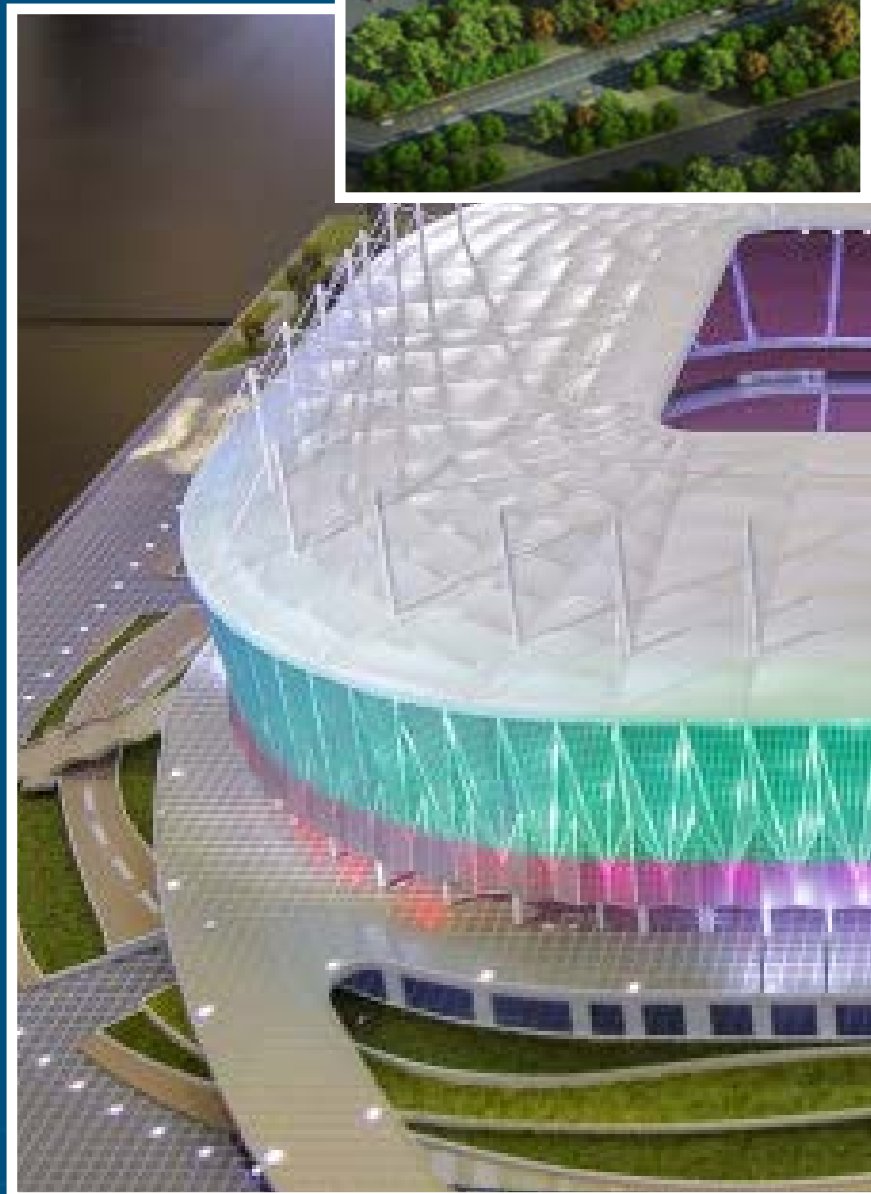
Project Size: 18.500 m²

Completion Date : 2010





ROSTOV STADIUM



PROJECT INFORMATION

Shopper :	2 Construck
Market Sector:	Sports Facilities
Fabric Type :	PVC
Location :	-
Project Size:	50.000 m ²
Completion Date :	-



KARABAG STADIUM AZERBAIJAN



PROJECT INFORMATION

Shopper :	-
Market Sector:	Sports Facilities
Fabric Type :	PVC
Location :	Asia
Project Size:	7.200 m ²
Completion Date :	2015





MERSIN CITY STADIUM



PROJECT INFORMATION

Shopper :	Bir Yapı A.Ş.
Market Sector:	Sports Facilities
Fabric Type :	PVC
Location :	Turkey
Project Size:	50.000 m ²
Completion Date :	2013





ANKARA CITY OSMANLISPOR STADIUM



PROJECT INFORMATION

Shopper :	Anfaş
Market Sector:	Sports Facilities
Fabric Type :	PVC
Location :	Turkey
Project Size:	32.000 m ²
Completion Date :	2013



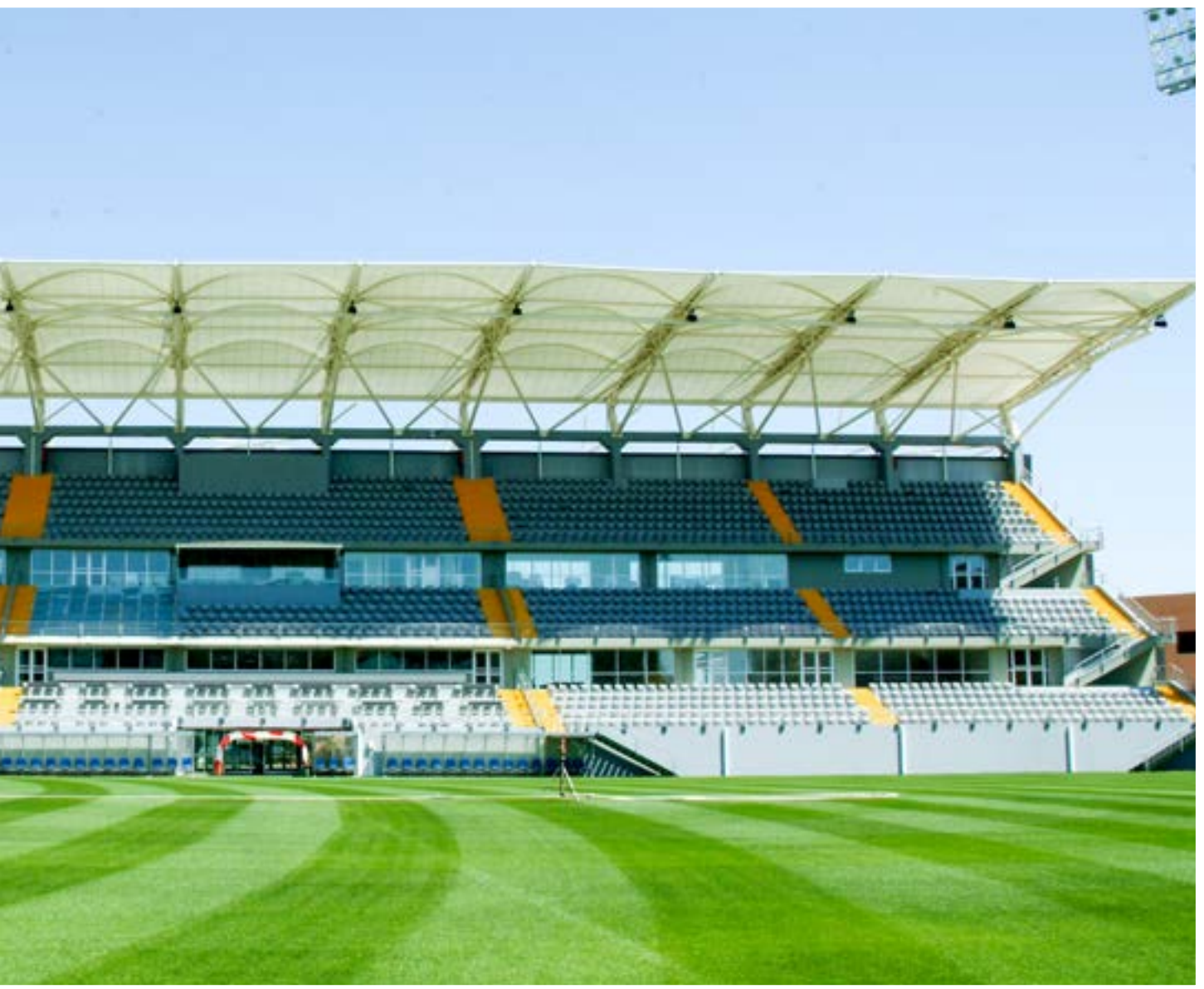
MARDAN SPORE COMPLEX



PROJECT INFORMATION

Shopper :	Mardan Hotels
Market Sector:	Sports Facilities
Fabric Type :	PVC
Location :	Turkey
Project Size:	1.800 m ²
Completion Date :	2008





ISTANBUL FIRUZKÖY STADIUM



PROJECT INFORMATION

Shopper :	Istanbul Munc.
Market Sector:	Sports Facilities
Fabric Type :	PVC
Location :	Turkey
Project Size:	2.200 m ²
Completion Date :	2009

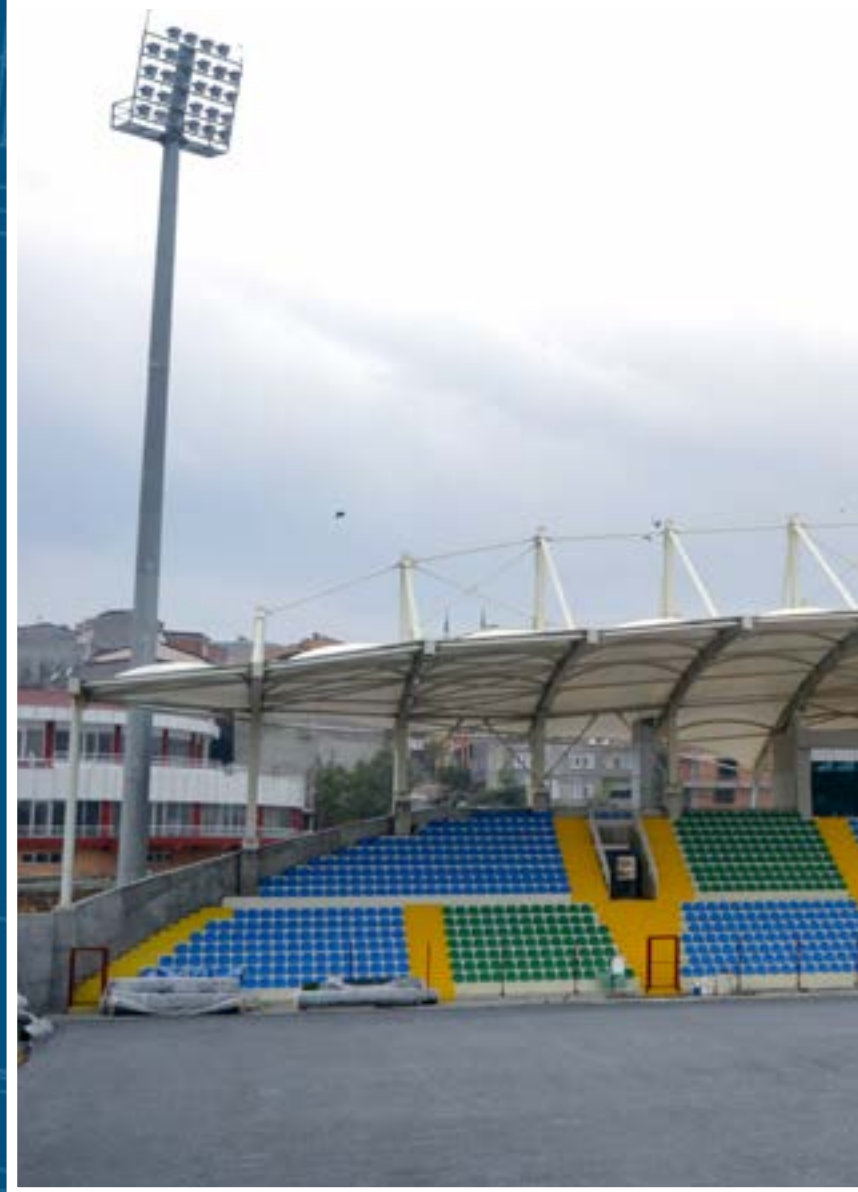




ISTANBUL ESENYURT STADIUM

PROJECT INFORMATION

Shopper :	-
Market Sector:	Sports Facilities
Fabric Type :	PTFE
Location :	Turkey
Project Size:	7.000 m ²
Completion Date :	2011





MEDINA KING ABDULAZIZ AIRPORT



PROJECT INFORMATION

Shopper :	TAV Construction
Market Sector:	Commercial
Fabric Type :	PTFE
Location :	Middle East
Project Size:	25.000 m ²
Completion Date :	2015



KING HALID AIRPORT CAR PARK



PROJECT INFORMATION

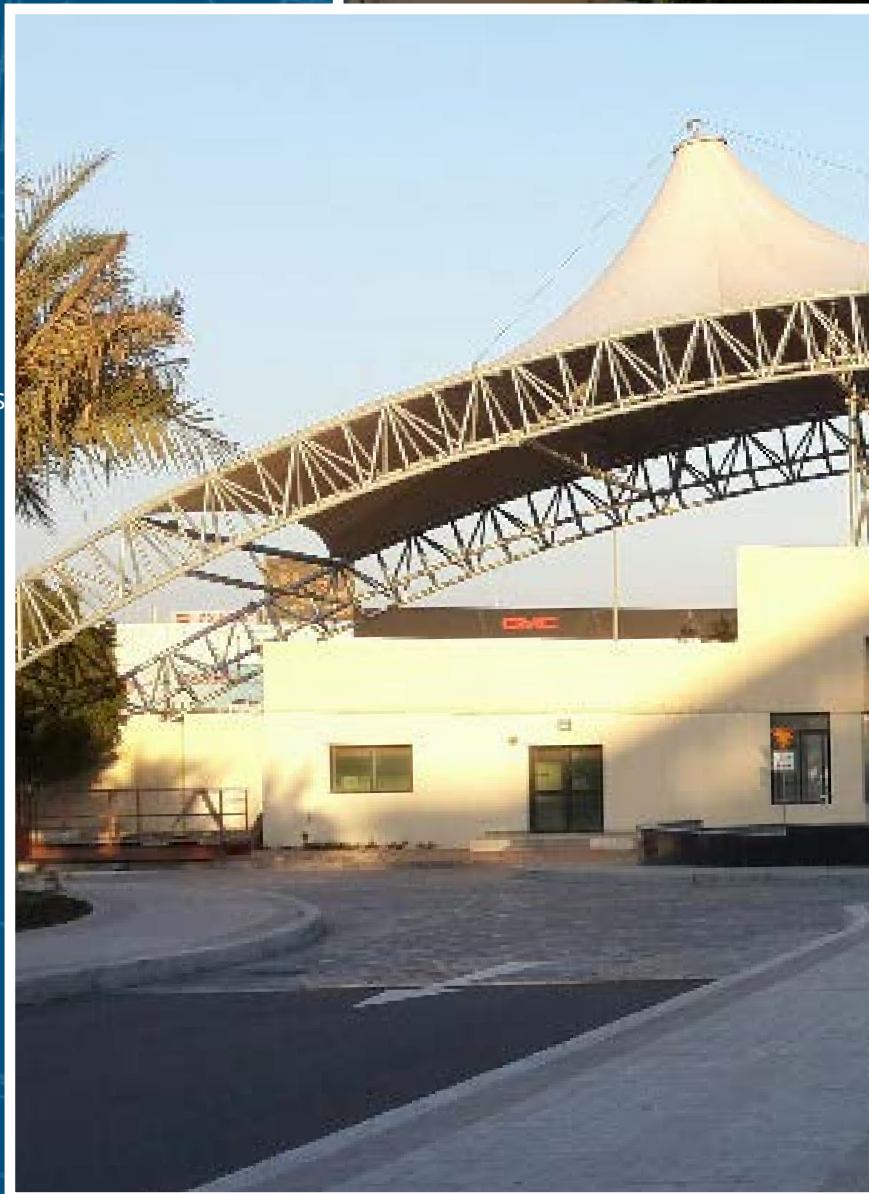
Shopper :	TAV Construction
Market Sector:	Carparks
Fabric Type :	PVC
Location :	Middle East
Project Size:	20.000 m ²
Completion Date :	2016



KUWAIT HEAD QUARTERS

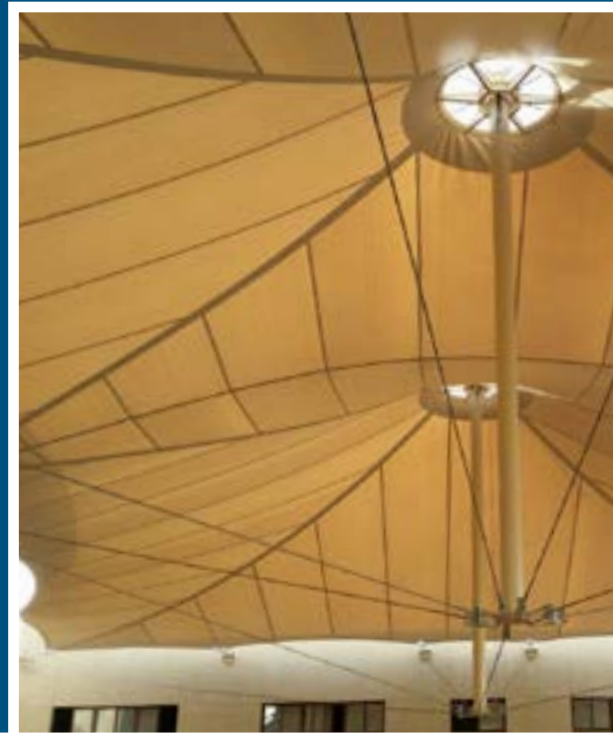
PROJECT INFORMATION

Shopper :	Ahmedinah Corp.
Market Sector:	Entrance Canopies
Fabric Type :	PTFE
Location :	Middle East
Project Size:	780 m ²
Completion Date :	2016



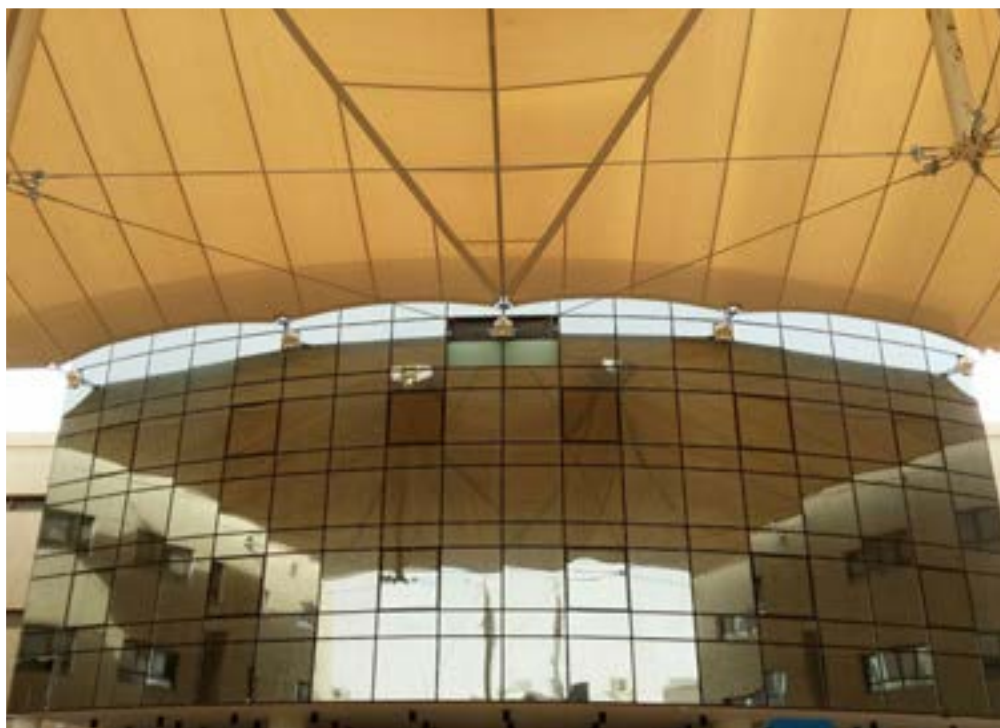


KUWAIT SECONDARY SCHOOL



PROJECT INFORMATION

Shopper :	China Railway
Market Sector:	Commercial
Fabric Type :	PTFE
Location :	Middle East
Project Size:	1.200 m ²
Completion Date :	2016



VAKIFBANK SPORT PALACE

PROJECT INFORMATION

Shopper :	Vakıfbank
Market Sector:	Sports Facilities
Fabric Type :	PVC Mesh
Location :	Turkey
Project Size:	2.700 m ²
Completion Date :	2016





PSH MARNEULI

PROJECT INFORMATION

Shopper :	PSH
Market Sector:	Textile Facades
Fabric Type :	PTFE Mesh
Location :	Asia
Project Size:	1.744 m ²
Completion Date :	2012





PSH KVARELI

PROJECT INFORMATION

Shopper :	PSH
Market Sector:	Textile Facades
Fabric Type :	PTFE Mesh
Location :	Asia
Project Size:	1.100 m ²
Completion Date :	2012





ETIMESGUT CEZERI



PROJECT INFORMATION

Shopper :	Şimşekler A. Ş.
Market Sector:	Commercial
Fabric Type :	ETFE
Location :	Turkey
Project Size:	800 m ²
Completion Date :	2016



HAVELSAN

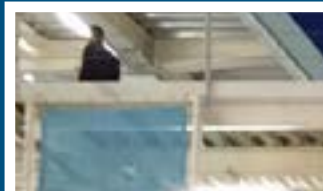
PROJECT INFORMATION

Shopper :	Havelsan
Market Sector:	Commercial
Fabric Type :	ETFE
Location :	Turkey
Project Size:	800 m ²
Completion Date :	2016





BAKU 2015 EUROPEAN GAMES



PROJECT INFORMATION

Shopper :	DDLAR
Market Sector:	Sports Facilities
Fabric Type :	PVC Mesh
Location :	Asia
Project Size:	32.000 m ²
Completion Date :	2015





EXPO 2016 ANTALYA

PROJECT INFORMATION

Shopper :	İlbay İnş.
Market Sector:	Parks
Fabric Type :	PVC Mesh
Location :	Turkey
Project Size:	28.000 m ²
Completion Date :	2016





PRESIDENT OF TURKMENISTAN YACHT



PROJECT INFORMATIONS

Shopper :	Polimeks A.Ş.
Market Sector:	Tourism
Fabric Type :	PVC
Location :	Asia
Project Size:	4.800 m ²
Completion Date :	2012





ANKARA CITY HAYDAR ALIYEV AMPHITHEATRE



PROJECT INFORMATION

Shopper :	Socar
Market Sector:	Amphitheatres
Fabric Type :	PVC
Location :	Turkey
Project Size:	2.100 m ²
Completion Date :	2013





AZERBAIJAN SILK ROAD RALLY



PROJECT INFORMATION

Shopper :	Polimeks A. Ş.
Market Sector:	Tourism
Fabric Type :	PVC
Location :	Asia
Project Size:	960 m ²
Completion Date :	2009





PALLADIUM

PROJECT INFORMATION

Shopper :	Tahinciođlu
Market Sector:	Terrace Canopy
Fabric Type :	PVC
Location :	Turkey
Project Size:	680 m ²
Completion Date :	2009





SUTLUCE CONGRESS CENTER

PROJECT INFORMATIONS

Shopper :	-
Market Sector:	Tourism
Fabric Type :	PVC
Location :	Turkey
Project Size:	3.000 m ²
Completion Date :	2008





KONYA CITY SEYH SAMIL BAZAAR CANOPIES



PROJECT INFORMATION

Shopper :	-
Market Sector:	Bazaar Canopies
Fabric Type :	PVC
Location :	Turkey
Project Size:	5.600 m ²
Completion Date :	2012





PREQUALIFICATION



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Arda Cad. No:6 Malkara / TEKİRDAĞ

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