

# **O.M.A.R.** TECHNOLOGY S.R.L.



Progettazione e Costruzione attrezzature speciali  
Planning and construction special equipments

## **MOBILE SURGICAL HOSPITAL**



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## O.M.A.R. TECHNOLOGY

OFFICES - SAN DONATO MILANESE (MILAN) ITALY

NATO MANUFACTURER'S CODE: A 4883

### INTRODUCTION

In order to briefly describe our company and the equipment it manufactures, we shall focus on some items which we feel are important for understanding our approach to making the offer.

- Company profile,
- Solutions we have suggested
- Manufacturing technology

### COMPANY PROFILE

OMAR was founded in 1975 as a workshop for the modification of industrial vehicles and construction of special body-works.

In 1982 we started working for the Italian Armed Forces, designing and developing trailers for the transport of helicopters.

In 1985, upon specific request of the Health Departments of the Italian Armed Forces, we designed and developed the first heli-transportable Operating Theatre Unit.

Our Company's activities cover 3 main sectors:

- Aeronautics - manufacturing trailers for the transport of helicopters,
- Motorbike Racing - manufacturing workshops for the servicing and transport of racing motorbikes.
- **Military Health Services - this represents our main activity, where we manufacture varying and standard volume Shelters to be fitted out for hospital purposes and to be used for setting up field hospitals.**

Before use, our equipment is tested for NATO approval at relevant army centres; these tests include a Climatic Chamber test.

The Health Departments of the Italian Armed Forces, which have 7 complete units, have used the heli-transportable Operating Theatre Units with Pharmacies and Analysis Labs during NATO/UN missions in:

SOMALIA	from	December	92	to	March	94
MOZAMBIQUE	from	April	93	to	December	94
BOSNIA	from	January	96	to	July	97
ALBANIA	from	February	97	to	August	97
KOSOVO	from	May	99	to	Today	
AFGHANISTAN	from	September	03	to	Today	
IRAQ	from	August	04	to	Today	

and these performed well in hot and dusty zones such as Somalia Iraq, as well as cold areas like Bosnia.

## THE SOLUTION WE PROPOSE

The solution that we propose is based on the experience acquired during the previously mentioned NATO/UN missions and liaison with Italian and other country soldiers who took part in these missions, performing more than 4,000 different type of operations.

The arrangement of the Shelters we are showing you, is for demonstration purposes, and may vary depending on your needs, and on the size of the area available and its configuration.

We propose 4 types of Shelters for this project:

- 31 Sqm. Expandable Shelter – OPERATING THEATRE – INTENSIVE CARE UNIT
- 22 Sqm. Expandable Shelter – RADIOLOGY-
- Standard size Medical Shelter – LABORATORY- PHARMACY- STRILIZATION
- Standard size Shelter – TOILETS, SERVICE GAS SYSTEM, GENERATOR,
- INFLATABLE TENTS (Patient wards, connection etc..)
- Standard size STORAGE CONTAINERS

## CONTAINERS WITH EXTENSIBLE WALLS

Please allow us to present our line of containers with extensible walls designed on the basis of the experience gained over 20 years in the construction of EXPANDABLE SURGICAL UNITS as: OPERATING THEATRE INTENSIVE CARE UNIT, PHARMACIES, ANALYSIS LABORATORIES etc and EXPANDABLE SERVICE UNIT as KITCHEN, WORKSHOP, COMMAND STATION etc , all of which have undergone, and successfully passed, tests at the appointed Military Technical Centres, including the Climatic Chamber test, and are used by the Health Departments of the Italian Armed Forces in the various military and humanitarian missions in TURKEY, SOMALIA, MOZAMBIQUE, BOSNIA, KOSOVO, and now in AFGHANISTAN and IRAQ etc..

We are certain that we can offer a functional and valid product that meet all needs when used as:

OPERATING THEATRE  
INTENSIVE CARE UNIT  
FIRST AID UNIT  
ANALYSIS LABORATORY  
PHARMACY  
RADIOLOGY UNIT  
TOMOGRAPHY UNIT  
DENTAL UNIT  
FIELD KITCHEN  
COMMAND STATIONS  
WORKSHOP etc.

These units are unique in that:

- during transport they have the dimensions of ISO 1C containers (20") while during operations, with the walls extended, they have a surface area of approx. 31 or 22 m<sup>2</sup>.
- The surface or the floor is at the same level
- the walls, when extended, do not require any bottom support.
- the containers can be installed on any morphology of terrain.
- The interior height is never less than 2 mt.
- All the equipments are fixed inside the container and they remain in the same position whether in operation or during transport. In this way the container will be operative in a very short time ( about 10 minutes)
  - vehicle loading and unloading operations **are performed by a single operator using a push button panel without using external means such as cranes, bridge cranes, lift trucks or mechanical lifting equipment.**

## MAIN CHARACTERISTICS

**31 Sqm. Expandable Shelter**

### EXTERNAL DIMENSIONS



**During Transport** Length 6050 mm Width 2450 mm Height 2450 mm.



**During operations** Length 6050 mm Width **5600 mm** Height 2450 mm.



## THEIR APPLICATIONS



**Operating theatre**



**Intensive care unit**



## MAIN CHARACTERISTICS

**22 Sqm. Expandable Shelter**

### EXTERNAL DIMENSIONS



**During Transport:** Length 6050 mm. Width 2450 mm. Height 2450 mm.



**During Operations :**Length 6050 mm. Width 4000 mm. Height 2450 mm.

## THEIR APPLICATIONS



## Radiology



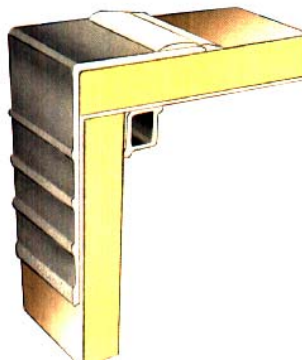


## STRUCTURE OF THE 2 KINDS OF EXPANDABLE CONTAINERS

The base and perimeter structure is made from anticorodal extruded aluminium sections; tubular steel pieces are fitted at the lower and upper ends of the structure to allow the lower and upper corner blocks and the containment C of lifting jacks to be welded onto the structure.



## WALLS AND ROOF



The walls and roof are made from steel/polyurethane/steel bearing type panels with a thickness of between 38 mm. and 45 mm. and feature:

- water hammering resistance
- shock proof characteristics
- resistance to fire and flame (class B2)
- vapour sealing
- protection against magnetic and electrical fields
- sound-proofing
- resistance to corrosion
- resistance to chemical and biological aggression
- heat dispersion coefficient of 0.42 K

## FLOOR

The floor is made from special aluminium strips with a thickness of mm. 40, inserted and electro-welded to the base structure.



## DOORS

The access doors (2) are located in the centre of the end sides. They are built from anticorodal extruded aluminium pipes sealed with closed cell polyurethane and lined with aluminium sheets.



## TENTS CONNECTIONS

The connection between the containers and the tents are easily made by PVC tunnel with a fast lock system which guarantee weather condition proof



## HYDRAULIC SYSTEM

The wall closing, opening operations and extension of the hydraulic jacks are performed by a **single operator** using a push button panel.



The system comprises an electro-hydraulic control panel supplied by 24 Volt batteries in DC or alternatively at 220V 50 Hz.

The hydraulic system with stainless steel pipes has sequential valves, flow dividers and hydro-piloted valves.

The extensibility and closure of the walls operations are performed using the hydraulic jacks fitted onto the base structure. These jacks support the walls when the container is in use and make the use of special supports below the container unnecessary.

In the even of a fault in the system, the walls can be opened and closed using a manual hydraulic pump or external auxiliary pump which is provided.

The container is lifted by 4 hydraulic jacks arranged in special housing at the end of the container, these make it possible for a single operator to load and unload the vehicles without needing external equipment such as cranes, bridge cranes, lift trucks etc..

The operator uses the push button panel to operate the single hydraulic jacks, to move them together, two at a time or individually, allowing for loading and unloading operations of the vehicles and levelling of the container in any morphology of terrain



## MOVEMENT SYSTEM

The strong structure of our containers allows to move them in different way such as.  
Cranes, truck with hook system, Fork lift with spreader , at the CH 47 hook and inside the airplane C 130 or similar.







## **ELECTRICAL SYSTEM**

The electrical circuit complies with EEC standards and current law provisions as regards the category and final use of the container. The electrical circuit is installed in special aluminium raceways fitted inside the containers.



As medical norm required every socket regarding the medical device must be under an UPS system. They are countersigned in red colour.

The UPS system guarantee 2 hours utility of the main medical equipment.



the electric connection between the service container and the OT and ICU is made by electric wire with water proof connections



## AIR-CONDITIONING

Unless expressly requested otherwise, the containers are conditioned using single-block or split wall-mounted air conditioners.

The conditioners are suitably resistant to heating systems.

**Containers used as Operating Theatres or Intensive Care Units** require special conditioning with absolute filters and high air recycling frequency so these conditioners will be installed on the service container with the rest of the support equipment required.

It is made from an air conditioning unit inside to the service container and an stainless steel distribution system complete with absolute filters inside the rooms



It is possible to modified all the thermal parameter as internal temperature and the air flow directly from the remote control inside the rooms

## **GAS SYSTEM**

The gas system is divided in 2 main sections.

The first section is inside the service container and is made by:

- ◆ general gas panel
- ◆ air compressor
- ◆ oxygen production system (molecular sieves)
- ◆ vacuum pump
- ◆ medical air compressor
- ◆ emergency oxygen tanks
- ◆ nitrous dioxide tanks
- ◆ gas connection between the service container and the rooms



The second section is inside the O.T./I.C.U. rooms, and it is made by:

- ◆ UNI/DIN gas connection
- ◆ Visual and acoustic alarms
- ◆ Gas manometers
- ◆ Medical gas evacuation





## INTERNAL LININGS



All the containers used for hospital purposes are internally lined with PVC suitable for each single use. The walls and ceiling are made from anti-static material and the pavement from conductive material. All the joints of the PVC on the walls, ceiling and floor are electro-welded as required by current law provisions.

## SEALS

All seals are silicone.

Sealing against heavy rain or dust is guaranteed by double seals fixed perimetally on the extensible walls and access doors.

**The interior design and equipment supplied are based on the client's needs.**

**On request, we can provide further documentation on the specific type of shelter you may be interested in.**

## STANDARD SIZE MEDICAL SHELTER



The characteristics of the container's structure vary in accordance to the container's purpose.

This container is built in steel/polyurethane/steel with the sandwich technique. The container roofs and walls used for hospital are built with a structure steel/polyurethane/steel with a 40-mm layer of insulation; the aluminium floor is equipped with a special reinforcement structure

The technical characteristics of the steel/polyurethane/steel panels in the containers fitted out for hospital use are the following:

- Resistant to water hammer;
- Resistant to vibration;
- Resistant to fire and class B2 flames;
- Vapour proof;
- Protection against magnetic and electrical fields;
- Sound insulation;
- Resistant to corrosion;
- Resistant to chemical and biological phenomena;
- Heat dispersion coefficient: K 0.38

The roof, wall and floor seams are all electro-welded with suitable material to avoid infiltration and to make cleaning and disinfecting as safe and easy as possible. The system we have chosen makes use of bearing panels and eliminates all conductive points. Furthermore, should any part need to be replaced or repaired, these operations are possible, because the procedure to be followed is the same used for the repair of the chassis of vehicles. The container pieces can be easily replaced. Should a piece be damaged, it does not affect the other pieces.

The external dimensions of the containers for hospital use comply with ISO 20' 1C standard. The upper corner blocks are designed to enable the extension of the walls and are made of special shaped steel profiles, which enable also the lifting and the moving of the containers with bridge cranes or cranes. The corner joints are resistant to deformation during transport.

The container corners are adequately resistant to lifting, moving, suspension and fastening during transport. Their structure enables them to be lifted and moved by means of the corner blocks they are equipped with as long as the proper lifting cables are used with the safety hook.

(Said cables are to be long enough to enable the lifting of the container without damaging the structure). Refer to the tables which will be fixed to each container.

The fastening of the containers to the truck flatbeds is to be carried out by means of the specific Twist-Lock mounted on the flatbeds (ISO regulations) or with belts and belt tensioning devices.

**Each Shelter is equipped with its own hydraulic fluid system which enables a single operator to perform the following operations, using the push-button panel to work the 4 hydraulic lifting jacks, which can be operated synchronously, in pairs or individually.**

**This system makes it possible to position the Shelter in areas where the terrain is rough and unlevelled.**

**The electrohydraulic system which activates the hydraulic jacks is powered by 4 24 volt batteries. This enables the above mentioned operations to be performed autonomously, without the aid of cranes, bridge cranes or fork lift trucks.**

## THEIR APPLICATIONS



**PHARMACY**



**LABORATORY**



**STERILIZATION**

## INFLATABLE TENTS



These pneumatic structures have been designed and produced to face any need and emergency situation in the best possible way.

These high-safety and high-tech structures can be usefully employed both in the civil and military field. They are suitable –with no limitation - to any need, from hospital installations to storage of materials. The limited weight and bulk when deflated, the easy stowing and fast assembling are only some of the features which have conferred to these structures their unique supremacy as far as the field of logistics is concerned.

This material is able to withstand temperatures ranging from -50°C to +66°C and guarantees unique standards of reparability, resistance and wear.

The production technology employed is the high frequency electronic welding (HFW®), which operates without any interposed material and allows a quality control that would be extremely difficult to achieve by means of different assembling systems.

That is why EV has got today's international supremacy in the fields of civil and military inflatable industry.

High frequency electronic welding is employed to assemble materials. This technology guarantees a perfect union of parts by means of controlled molecular fusion. No glue or adhesive is used; therefore, no detachment of material can occur as, once welded, the materials form a single body. The top covering part (roof) is joined to the lower part (basin floor) by means of the same welding procedure, thus assuring:

water - proofness, protection against external polluting agents and a better inner insulation.

It uses electronic high frequency welding (H.F.W.), which allows the joining of two parts without using any glue or adhesives but instead uses a process that we call "controlled fusion". The H.F. welding takes advantage of the material's dielectric properties and does not create dangerous annealing zones.

Recently, to improve our flexibility, we have introduced a "thermo-bonding" process for special production operations, such as prototypes and small batches of specialised products to customer's individual requests. This process uses "contact heat" technology to produce the fusion without the need for unique tooling.

For all of its professional, military as well as leisure products it is used a material called EV Marine Compound (EMC®). This is an extremely abrasion resistant and chemically resistant TREVIRA-fabric coated with a unique compound.

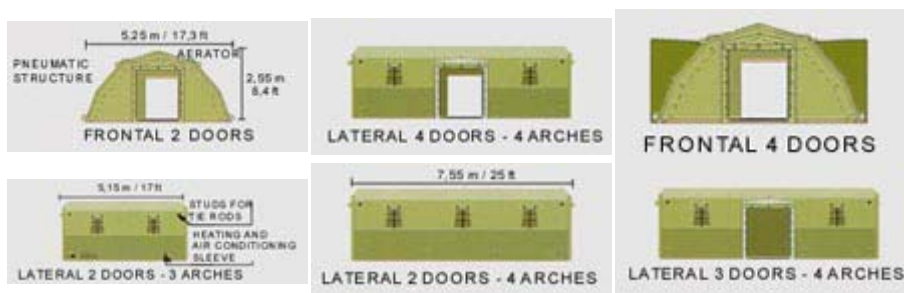
This coated fabric has been specially developed to meet the demanding requirements of land based and marine applications.



It is composed of a high tenacity Trevira base with a 275 to 3.300 decitex count. The particular characteristics of tensile strength, tear resistance and puncture resistance make this material the best of its kind.

EMC has also been proved to be resistant to a wide range of temperatures (from -50°C to + 70°C in accordance to U.N.I. regulations). This enables its use in a wide variety of climates without suffering any damage.

TENT TYPE	SURFACE	VOLUME
4 arches	sqmts ± 39	m <sup>3</sup> ± 75,5



Doors Dim. cm 175 x 156	Zipper closing and perimetrical velcrum; Lateral fixing snap-fasteners; Upper bands keeping the closing sheet up; Perimetrical drip; Upper clutches for connecting side and front corridors.
Windows Dim. cm 60 x 45	Closing sheet with perimetrical velcrum; Lateral fixing snap-fasteners; Removable mosquito-net; Upper bands keeping the closing sheet up
Inflation valves	Two for each arch; Velcrum protecting flap
Sleeves for heater or air-conditioner	Four for each tent
Other tent components	Studs for outer tie-rods; Clutches for the arch distance poles; Inner studs for insulation and dividing sheets; Electric plant preset
Weight	4 arches 4 doors Kg 180 396 (lb).
Standard Accessories	Bag with tent pegs and hammers; bag with distance poles; Repair kit and manual inflator; Manual of use

## Self-erecting pneumatic Tent



New conception pneumatic tent suitable for emergency services and long-term field solutions:

- ✍ Fast and easy assembly
- ✍ Larger internal space
- ✍ Modularity
- ✍ Easy transport
- ✍ Materials

**only 1 person in 4 minutes**

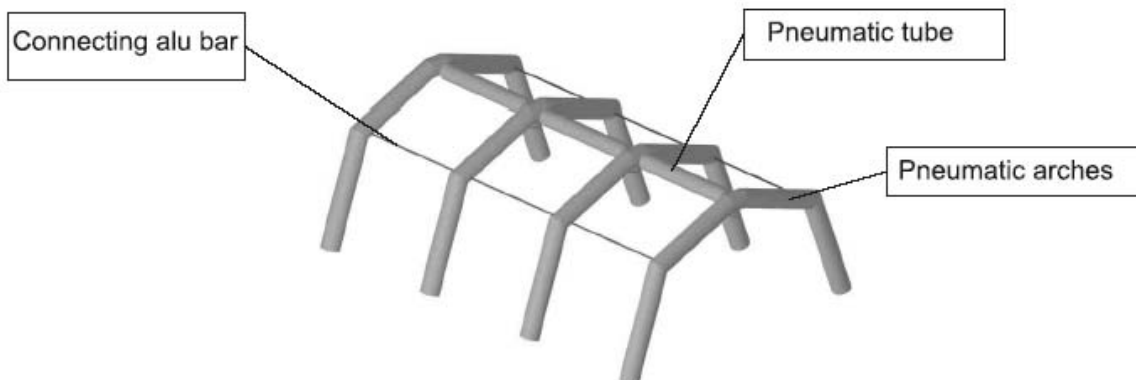
no vertical poles

possibility of connection to other structures in order to offer various logistic solutions

it covers only 1 cubic metre

new conception PVC coated fabric that reduces the sun radiation and offers:

- High mechanical resistance
- Fire resistance
- Mush and mould resistance



**Logistic System  
Division**

# Self-erecting pneumatic Tent

## TECHNICAL CARD

### Use

- ✍ Operative lodging
- ✍ Persons/families shelter
- ✍ Advanced Medical Post
- ✍ Field hospital



### Technical specifications

Outer dimensions	Width 5,40 m	Length 7,55 m	Height 2,80 m
Basic area	41 m <sup>2</sup>		
Weight	165 Kg		
Inflation time	4 min		
Wind resistance	80 Km/h		
Snow load	15 Kg/mq		
Material	PVC Coated Fabric 1100 Dtex		
Standard accessories	Pegs and hammer, manual pump, repair kit, technical manual for use and maintenance		

### Other models available:

**3 arches**  
**5 arches**

**Dimensions**  
5,40 x **5,15** x h 2,80 m  
5,40 x **9,95** x h 2,80 m

**Basic area**  
28 m<sup>2</sup>  
54 m<sup>2</sup>





## FIELD HOSPITALS

