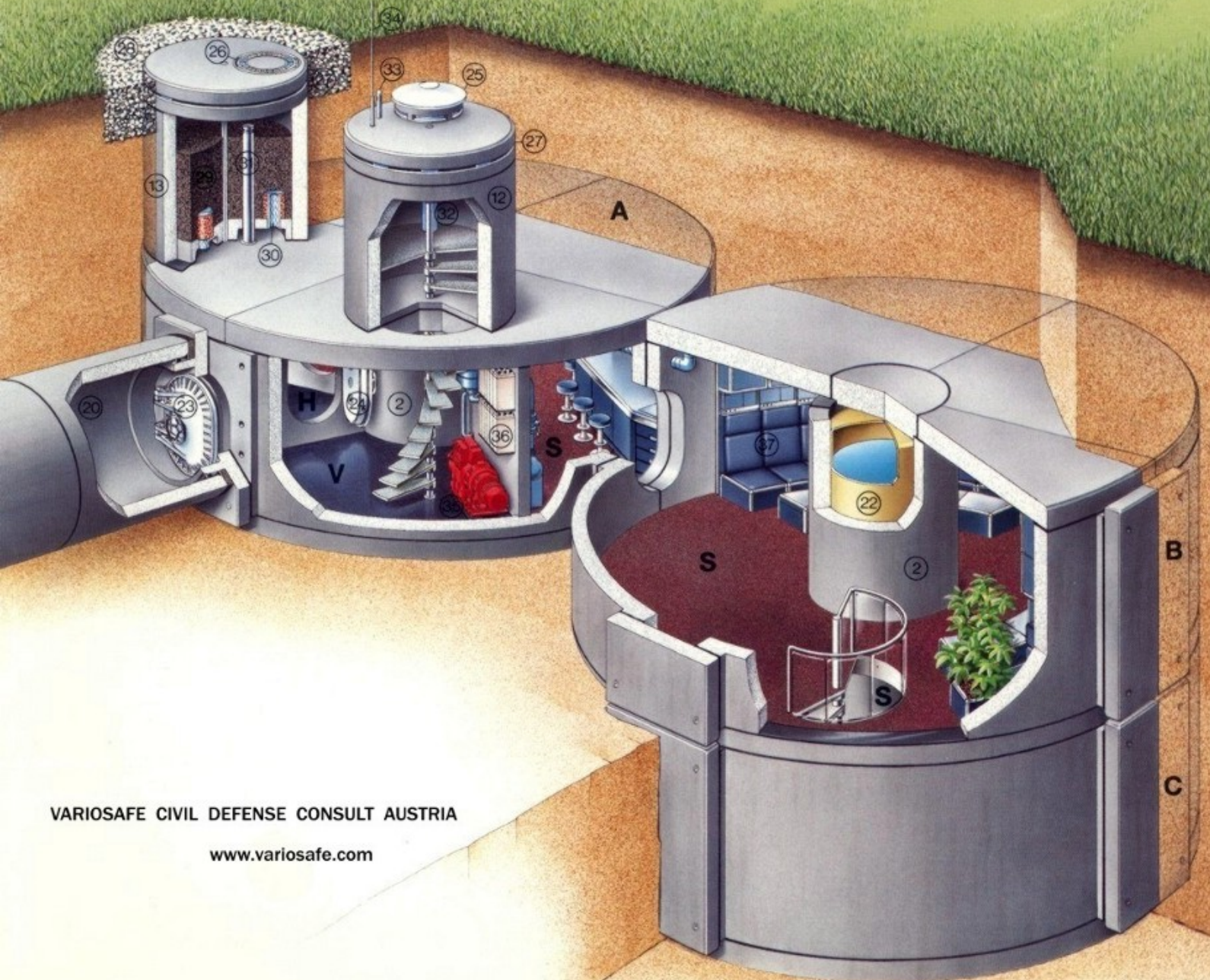




**VARIOSAFE<sup>®</sup>**  
**Security & Rescue System**

— The New Shelter Technology —



VARIOSAFE CIVIL DEFENSE CONSULT AUSTRIA

[www.variosafe.com](http://www.variosafe.com)

## VARIOSAFE®

Active over the world, VARIOSAFE is a renowned specialist in innovative shelter technology. The company's products are designed on the basis of up-to-date scientific research into shelter and survival requirements for civilian and military emergency situations, and are protected by international patents.

### Program

Variable shelter installations of all classes, designed to provide protection for extended periods, ranging from 48 days to 280 days. Turnkey delivery of private and public shelter installations in both monocylinder and multicylinder layouts, customized to the client's precise size and equipment specifications. Large-scale shelter installations comprising networks of individual units connected in grid layouts for schools, hospitals and residential institutions. Shelter installations for production monitoring units in the chemical industry. Mobile shelters for both civilian and military command applications.

### Products

VARIOSAFE V6      Diameter 6 m / Space 26 m<sup>2</sup>  
 VARIOSAFE V8      Diameter 8 m / Space 48 m<sup>2</sup>  
 VARIOSAFE V9      Diameter 9 m / Space 63 m<sup>2</sup>  
 Structural optimization pursuant to DISMAS-ELC specifications. High-strength, up to 10 bar blast-proof outside doors and hatches made of AISi12 with a radioactive half-life of only 0,38 hours, fitted with an adjustable centrally-controlled locking system, external ceramic heat radiation coating, shrapnel- and bullet-proof 360° sight device, and a hydraulic lifting system capable of pushing the exit hatch up to through a rubble load of up to 3 tons. Preliminary filter units and emergency exit moduls installed externally, can also be used for upgrading conventional shelters. Standard equipment configurations and optional extras available to cover all possible requirements as regards utilities, waste and sewage disposal, chemical analysis, radiation analysis, energy supply, air regeneration, air conditioning and water recycling systems.

### Scope of Protection

Shielding of 6–9 tenth-value-thicknesses provides comprehensive protection against radiation of all types, thermal radiation, initial radiation Alpha/Beta/Gamma, neutron-induced radiation, residual radiation and radioactive fallout – even at ground zero of nuclear device detonations at standard altitude. Automatic blast valves against reflected shockwaves with pressures up to 10 bar. Active filters against volatile industrial and military chemical agents.

The servicing of the filters and the replacement and disposal of the contaminated filter elements are to handle in the security of the airlock area. Double airlock system with decontamination chamber, shower, toilet and sewage ejecting gear. Unrestricted but shielded view of the outside area allows monitoring of the outer installation and surroundings even in case of an actual emergency, when the installation is sealed off from the outside. Shockproof connection of the protective passageway to the residual building – flexible joint design prevents the transmission of mechanical shock waves. Automatic service tanks for continually renewed drinking water in each shelter cylinder. Tank capacity 2000 or 7000 liters, depending on the shelter series.

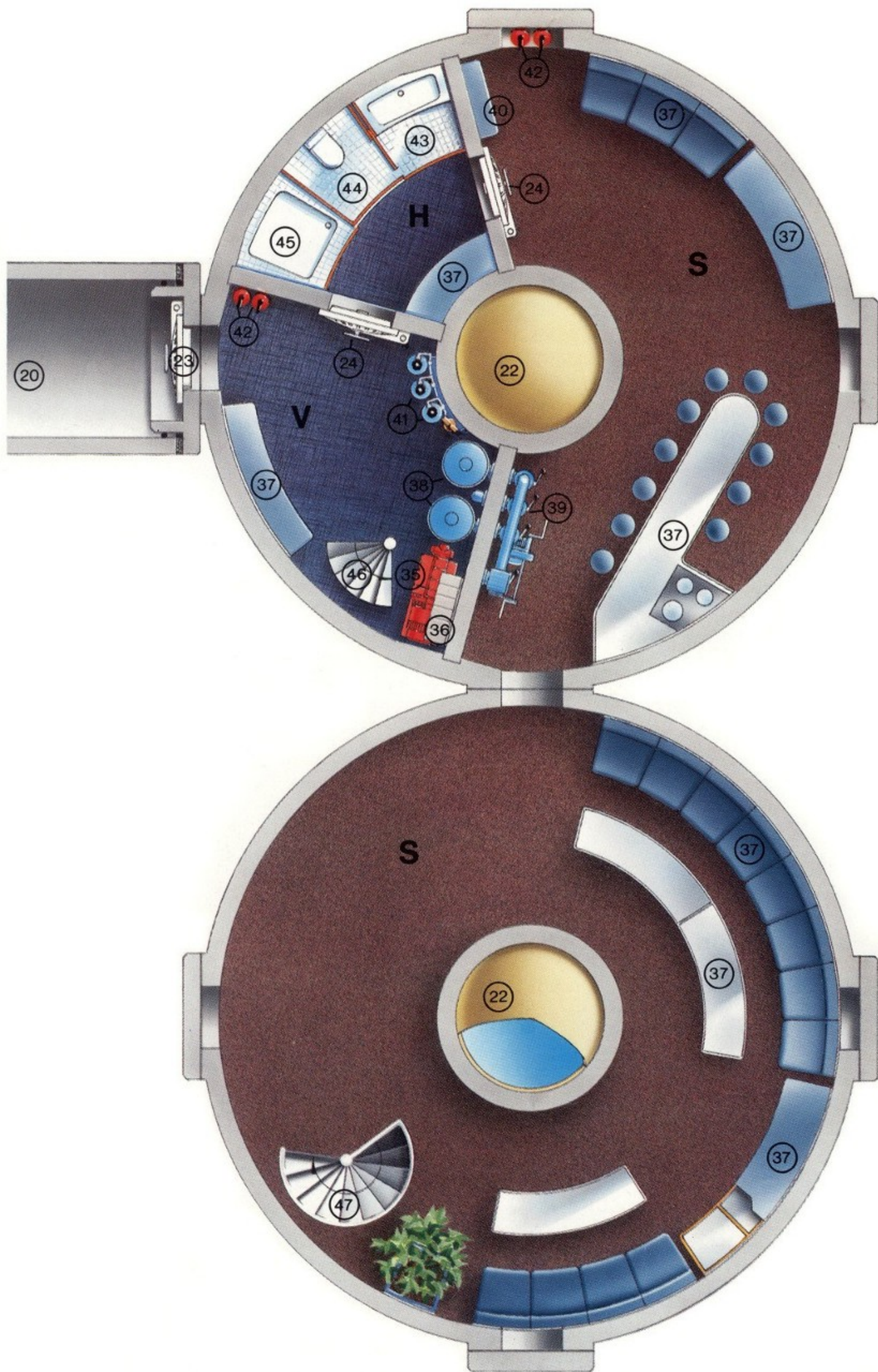
### Advantages

Drastically improved drinking water storage facilities. Innovative airlock and filter technology. Unrestricted view of the surrounding area, even when shelter is closed and sealed off from the outside hazard. Significantly longer duration of protected occupancy periods. Flexible extension options horizontal and/or vertical. All modules of the V6 / V8 / V9 series are fully compatible and can be installed in a wide variety of combinations. Additional moduls can also be added at a later date if required.

### Description Picture 1

- A Primary Cylinder
- B Horizontal Extension
- C Vertical Extension
- V Preliminary Airlock
- H Main Airlock
- S Security Area
  
- 2 Vertical Stabilizer
- 12 Observation Turret
- 13 Mechanical Filter Unit
- 20 Protected Passageway
- 22 Tank 2000 or 7000 liters
- 23 AT 10 Armored Door
- 24 AT 3 Airlock Door
- 25 AL 10 Armored Hatch
- 26 Inspection Cover
- 27 Air Outlet Slot
- 28 Ring-shaped Barite Shield
- 29 Filter Sand
- 30 Air Separator
- 31 Bypass Pipe for Unfiltered Air
- 32 Hatch Hydraulics
- 33 Environmental Analysis Probe
- 34 Antenna
- 35 Generator 220/380 V
- 36 Emergency Power Supply 24 V
- 37 Modular Furnishing System





## Objectives

Satisfaction of contemporary shelter and survival requirements was made necessary by the drastic changes in military technology and by the new hazards presented by technological developments in the chemical/industrial sector. The provision of affordable shelter which provides effective protection all the way up to ground zero of nuclear device detonations at standard altitude. Extension of the protected occupancy periods. Effective protection against fires in the surrounding area caused by fire storms, and against resulting O<sub>2</sub> deficiency in the interior atmosphere. Protection against radioactive and chemical contamination of both military and civilian/industrial origin has to provide shelter which can serve both as an initial refuge and also, later on, as a reusable base in accordance with the recommendations of current scientific research, so as to help provide a satisfactory solution to the serious logistical problems involved in evacuation.

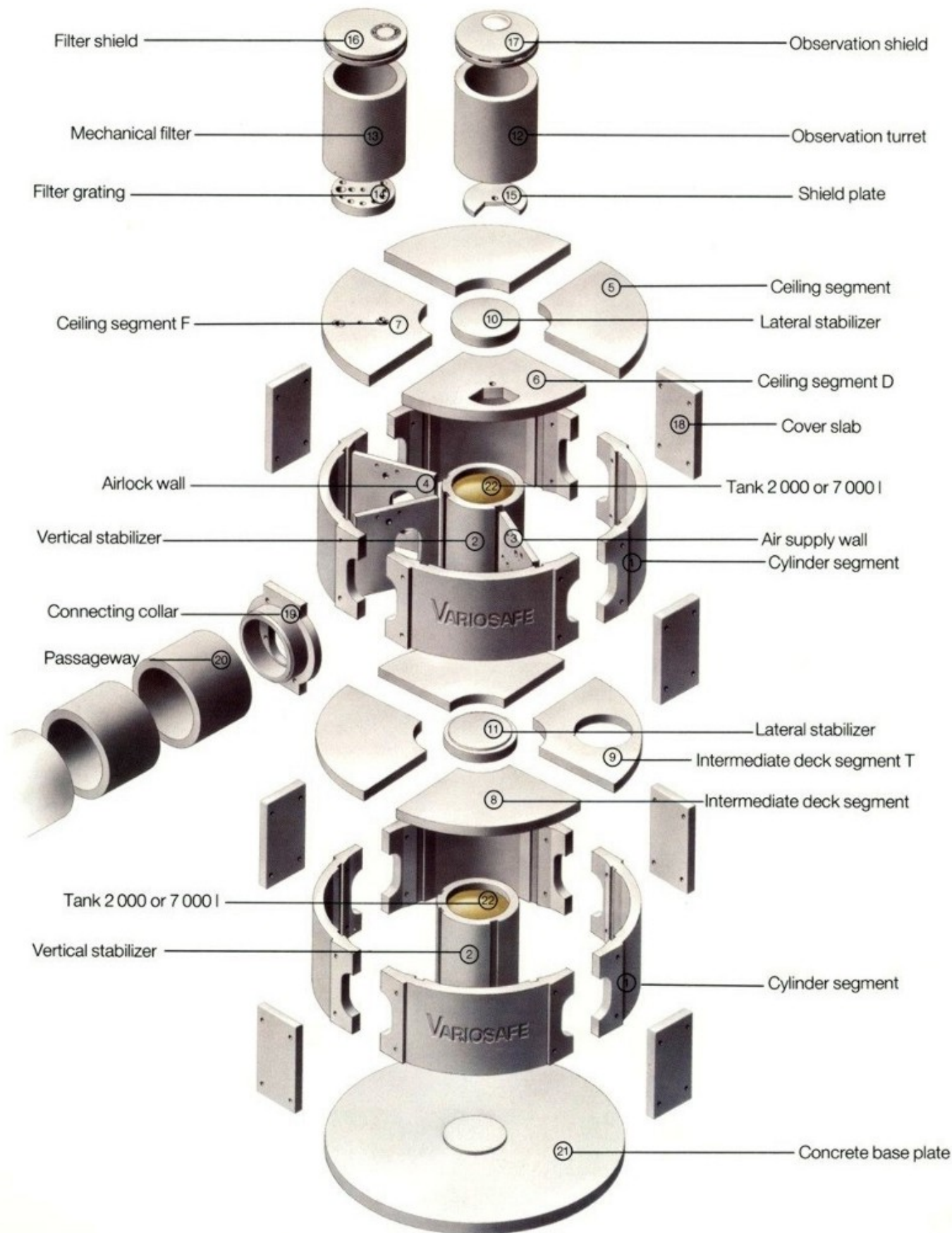
## Requirements

The increasing use of complex technology in modern industry and the hazards associated with that technology make viable shelter and survival concepts and the provision of effective shelter for those who desire it absolutely imperative. The shelters currently available are completely inadequate because their antiquated design has been fixed to World-War-II-Standard. Nevertheless civil defence of today provides only space for less than 4% of the population. Austria, one of the countries most severely affected by the fallout from the nuclear reactor accident at Chernobyl, has already passed legislation requiring the construction of adequate shelter facilities. Even Denmark is considering the introduction of similar legislation, and in Germany the same objectives are to be pursued by a planned amendment to the German Civil Defence Act. Ever since the Chernobyl accident, people have finally begun to understand that the provision of adequate shelter facilities is not a preparation of war, but rather a long overdue precautionary measure for the protection of the citizens of peaceful industrial nations.

## Description Picture 2

- V Main Airlock
- H Decontamination & Sanitary Unit
- S Security Area
  
- 20 Passageway Residential Building
- 22 Tank for Water / Fuel
- 23 AT 10 Armored Door
- 24 AT 3 Airlock Door
- 35 Generator 220/380 V
- 36 Emergency Power Supply 24 V
- 37 Modular Furnishing System
- 38 R3-Active Filter/K3-CO<sub>2</sub>- Absorbtion
- 39 Ventilation Equipment System
- 40 Control Systems Terminal
- 41 Air Regeneration System
- 42 Fire Extinguishers
- 43 Washroom
- 44 Toilet – Sewage Ejecting Gear
- 45 Shower
- 46 Stairway to Observation Turret
- 47 Stairway to Module below





### **New Shelter Technology VARIOSAFE®**

Modular design, using prefabricated components made of high-quality reinforced concrete. Shelter can be extended vertically, horizontally or in steps (e.g. on slopes) as required by adding extra cylinder modules, allowing optimum accommodation of the installation to the terrain. Vertical pressure cylinder design with central structural pressure shaft, minimalizing unsupported spans and thus maximalizing resistance to pressure. All the individual concrete components are separated by polymer supports to absorb mechanical shocks as well as to provide tightness after. Flexible joint connection of the protective passageway to the residual building prevents the transmission of mechanical shocks to the shelter installation. Weight of all individual components less than 10 tons, allowing normal road delivery and easy erection.

### **Radiation Shielding**

The shielding bandwidth of 6-9 tenth-value-thicknesses provides absolute protection against all types and intensities of radiation of an order which was previously unattainable. The shelter area is 100% shielded against any residual radiation from the external preliminary filter unit. The contaminated condensate which accumulates in this outer prefilter unit is to drain off safely in the main airlock area and finally to dispose outside via sewage ejecting gear.

### **Filters**

Single or double mechanical air filter unit (Preliminary Filter) installed outside the shelter, fitted with innovative exchangeable air separators for efficient flow of filtered air. Protected air inlet. Twin active filter unit (Main Filter) installed inside the main airlock area, where filter servicing and replacement of contaminated filter elements can be handled safely and without interrupting the supply of filtered air.

### **Airlocks**

Twin airlock system incorporating a comprehensive decontamination chamber. Both entrance to and exit from the shelter is only possible via this airlock and decontamination area. Innovative airlock door design, made of high-strength AISi12, with an integrated air exhaust valve and a centrally-controlled locking system with locks which can be adjusted manually.

### **Duration of Protected Occupancy**

Even in the basic version VARIOSAFE installations provide effective shelter for up to 48 days under maximum occupancy conditions,

thanks to the high capacity of the tanks installed in each cylinder module. Up to 280 days are possible under adapted occupancy conditions.

### **Ventilation Equipment**

In the event of fires accompanied by an O<sub>2</sub> deficit in the outside atmosphere (Fire Storm), a new air recirculation system makes it possible to provide for the reabsorption of CO<sub>2</sub> from the air within the closed system without the need for additional equipment or fittings. The only alteration required is the replacement of the standard main filter element R3 with a CO<sub>2</sub> reabsorption element K3 of just the same dimensions.

### **Hatches and Doors**

New, blast-proof armoured outside hatches and doors specifically designed to withstand reflected shockwaves with pressures of up to 10 bar, made of AISi12 with a radioactive half-life of only 0,38 hours, fitted with a centrally-controlled locking system and external ceramic heat coating.

**AT 10 Armored Door**, fitted with a locking mechanism which can be readjusted manually, door cavity filled with barite granules to shield against nuclear radiation. **AL 10 Armored Hatch** with 3 different opening positions, lateral swivelling mechanism and hydraulic lifting gear capable of lifting the hatch through rubble loads of up to 3 tons. Bullet-proof military panoramic prisms for a protected view of 360 degree to the outside environment.

### **Emergency Exit**

Instead of the usual miserable "emergency exits", VARIOSAFE shelters are fitted with a shielded observation turret which doubles as a fully functional airlock. Exactly this enables safe aggress from and return to the shelter for servicing work on the outside, or for the admission of additional persons seeking shelter.

### **Surveillance**

Unobstructed view allows surveillance of the outside shelter installations and the surrounding area even when the shelter is closed and sealed off. All air inlets and outlets are fully protected and are laid out on a multiple basis. They are thus protected against damage and intentional blockage from the outside. The turret is fitted with special sealable lead-through tubes for extending an antenna and/or an environmental probe for monitoring the state of the outside contamination. This innovative design makes it possible for these instruments to remain retracted inside the shelter, where they are protected against EMP damage, until the time comes for them to be deployed.

## VARIOSAFE Security & Rescue System

**Innovative Design:** Variable shelter installations of all classes, designed to provide protection for extended periods, ranging from 48 days to 280 days. Preliminary filter units and emergency exit modules installed externally, can also be used for upgrading conventional shelters. Turnkey delivery of private and public shelter installations in both monocylinder and multicylinder layouts, customized to the client's precise size and equipment specifications. Mobile shelters for both civilian and military command applications.

**Radiation Shielding:** Absolute shielding of 6–9 tenth-value-thicknesses provides comprehensive protection against radiation of all types, Thermal radiation, Initial Gamma-radiation Alpha/Beta radiation, Neutron-induced radiation, Residual radiation and radioactive Fallout – even at ground zero of nuclear device detonations at standard altitude.

**Structural Optimization:** Pursuant to DISMAS-ELC specifications. High-strength, up to over 10 bar blast-proof outside doors and hatches made of AISi12 with a radioactive half-life of only 0,38 hours, fitted with an adjustable centrally-controlled locking system, external ceramic heat radiation coating, shrapnel- and bullet-proof 360° sight device, and a hydraulic lifting system capable of pushing the exit hatch up to through a rubble load of up to 3 tons.

**Air Supply:** Automatic blast valves provide a secure protection of the air supply against reflected shockwaves with pressures up to over 10 bar. Exchangeable active filters against volatile industrial and military chemical agents. The servicing of the filters and their replacement as well as the disposal of contaminated filter elements are to handle in the security of the main airlock area.

**Entrance – Exit - Surveillance:** Double airlock system with separate decontamination chamber, shower, toilet and sewage ejecting gear. Unrestricted but shielded view of the outside area allows monitoring of the outer installation and surroundings even in case of an actual emergency, when the installation is sealed off from the outside.

**Emergency Exit:** The emergency exit is a special part of an appropriate combination of a main airlock chamber (location of the active filters) and a real decontamination chamber with toilet, shower and sewage ejecting gear.

**Connection to the Residential Building:** Shockproof connection of the protective passageway to the residential building – flexible joint design prevents the transmission of mechanical shock waves.

**Water Supply:** Automatic service tanks for continually renewed drinking water in each shelter cylinder. Tank capacity 2000 or 7000 liters, depending on the shelter series. All tanks are connected to the normal drinking water system of the residential building, but disconnected only in case of real emergency manually or automatically by a special blast valve.

## Traditional Shelters – Comparative Data

**Traditional Design:** Traditional Shelters built as various monolithic cast-in-place concrete structures, or structures built from prefabricated, cub-shaped reinforced concrete components, only in some versions blast-proof to a maximum of 3 bar. When these structures are exposed to dynamic stresses imposed by blasts, uncontrolled crack formations are inevitable, leading to leaks in the structure during the critical high-contamination period which follows.

**Radiation Shielding:** Insufficient shielding with only 2–3 tenth-value-thicknesses. Adding to this the shielding against residual radiation from the sand filter unit installed inside the shelter is also insufficient. Danger of contamination from the filter condensate, which is drained off within the shelter area. Entrance and exit hatches made of steel with unacceptable radioactive half-life of real 41 days.

**Active Filters:** Active filters are directly coupled with the ventilation equipment located within the shelter area. With this design, changing the contaminated and used-up filter elements exposes the shelter occupants to extreme hazard.

**Ventilation Equipment:** No air recirculation system. This makes it impossible to connect a CO<sub>2</sub> absorption filter instead of the active filter element, which is essential in the event of fires in the surrounding area (fire storm), when the air supply to the shelter must be temporarily turned off.

**Airlock:** The only airlock is the entrance passage between the residential building and the shelter. In this location, however, the airlock becomes non-functional when the residential building is destroyed – all it takes is a only 0,3 bar shockwave.

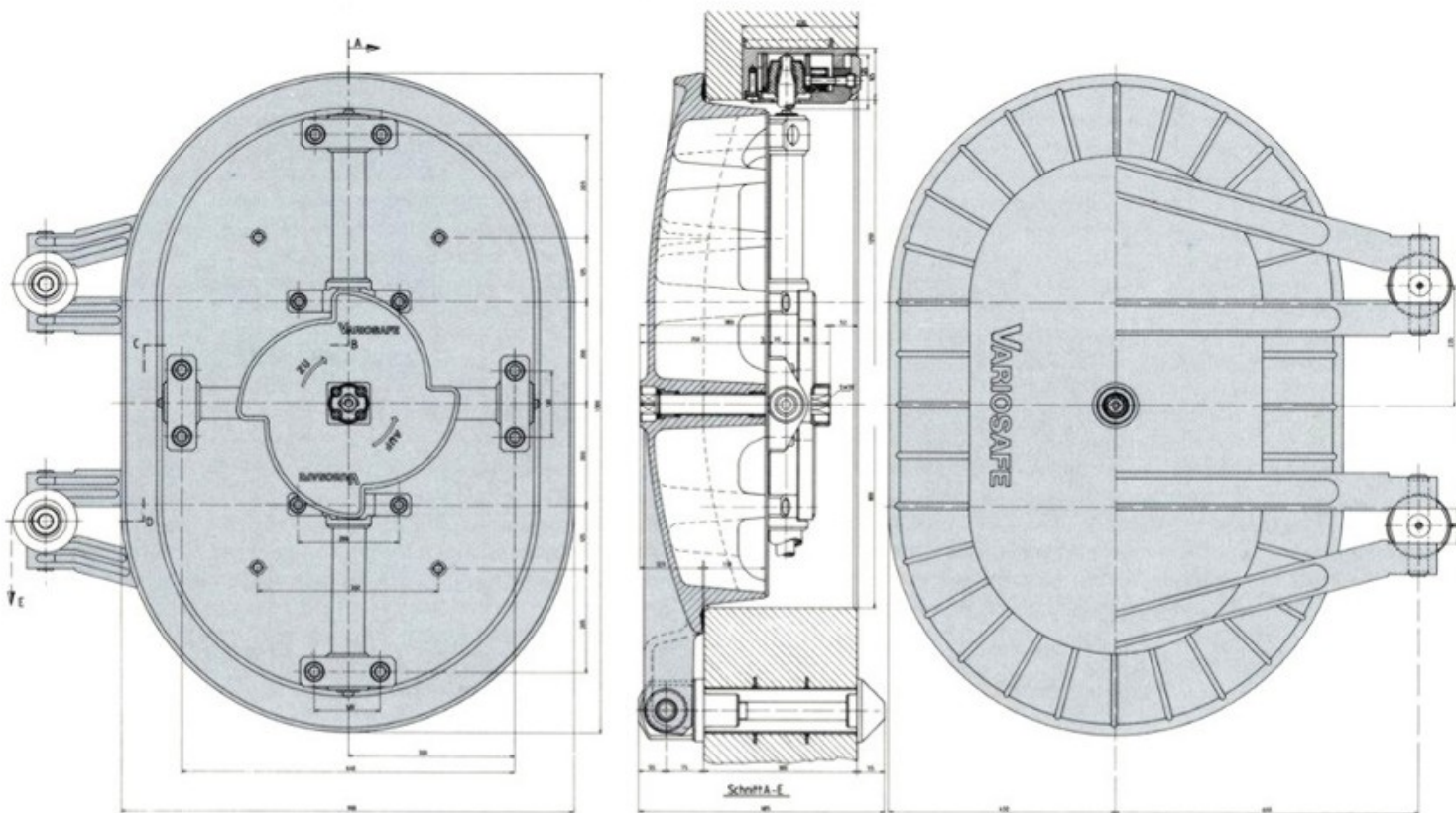
**Emergency Exit:** Not fitted with an airlock. In some designs the emergency exit hatch opens inwards, which means that contaminated rubble and dust at least enters the shelter making worthless all the protective measures taken before.

**Surveillance:** No way of monitoring the surrounding area or the air intake passages. Air intake and exhaust openings are not protected against damage or wilful blockage from the outside.

**Occupancy Periods:** Provided for a maximum of 14 days, with insufficient drinking water supply, no waste disposal facilities, and no visual contact to the outside environment. Dry toilet facilities, water in cans and insufficient protection against radiation and chemical contamination are typical features of the traditional shelter technology, making occupancy for periods of more than 14 days unacceptable.

**Disadvantages:** All of the traditional shelter concepts have not been adapted to meet the requirements imposed by modern-day-hazards, their structural design has basically not changed since World War II. Modern customers are well-informed, and they increasingly tend to regard these designs as technical lacking and as inappropriate for longer occupancy periods. In a free market, these products thus have lost their significance.





### Specification Competenced

The standard version of the VARIOSAFE® System comply with all of the official shelter specifications for both standard and increased levels of protection. In addition to this, however, VARIOSAFE® also offers a comprehensive program of optional extras and special equipment over and above the official specifications, and many of these features are already included in the standard versions. This program makes it possible to satisfy clients's differing individual requirements as regards shelter equipment and desirable occupancy periods.

All VARIOSAFE® models are designed so that they can be upgraded with any of the listed equipment at any time. Additional features can thus be added later, quickly and easily, as desired.

### Protection for up to 280 Days

In contrast to the usual 14-day occupancy period propagated by an outdated doctrine, even the standard version of the VARIOSAFE® shelter modules provide convenient protection for a full 48 days, with a safe, effective water supply and waste water resp. sewage ejecting system, and providing an unrestricted view of the surroundings, even when the installation is closed and sealed off from the outside hazard.

Scientists who have conducted research into possible maximum contamination periods and the practical problems of evacuation recommend that shelters should provide protection for up to 280 days. With our program of special equipment, VARIOSAFE® installations can also be configured for this maximum occupancy period.



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