Temes - for people's safety
The tightness of Temet’s gas-tight valve series, originally developed for civil defense shelters, has been upgraded to meet the strict requirements set by military applications and process industry. The valves are available for many uses and equipped with suitable electrical or pneumatic functions. The selection includes, for example, devices, which make it possible to use the valves in explosion-proof spaces, and in such applications where the valve must either open or close automatically in the event of a power failure.

Professionally designed safety

Modern society is extremely vulnerable faced with sudden and unexpected changes. Wars, environmental catastrophes caused by industry, and even natural upheavals can happen anywhere in the world.

Our environment is predisposed to dangers; a military threat might seem distant today, but other events upset the balance of everyday life; fires, toxic emissions, and nuclear power accidents are an everyday reality.

That is why we must be prepared for all eventualities. We must be able to protect ourselves in all dangerous situations. Professionally planned and executed civil defense is the only way to guarantee citizens’ safety under all circumstances.

Civil defense should cover the whole population in all situations. It must be all-inclusive, objective and thoroughly designed even from the perspective of future needs.
Leisure-time applications

The foundations of an all-inclusive, thoroughly designed civil defense are the modern civil defense shelters that impartially offer all citizens a reliable refuge in all crisis situations.

The construction of civil defense shelters is an investment in the future. However, society has the opportunity to recover a significant amount of this investment. Civil defense shelters properly designed and equipped with the latest technology, in addition to their real function, have practical applications in everyday life as parking halls, sports and cultural facilities, indoor swimming pools, research laboratories, and even amusement parks. In this way, they reimburse the builder for the costs invested and give people opportunities for new versatile activities.
Temet has invested heavily in the design of special protective doors. The newest door type is a sturdy blast-resistant door, optimized by allowing controlled elasto-plastic deformations in various parts of the structure. These doors are installed in facilities having high risk of accidental detonation and the need to confine the explosion effects to a certain area. The operation of the new door type can easily be automated by equipping the door with electrical or pneumatic actuators.

Temet is a Finnish industrial enterprise, founded in 1953, that knows protective structures. The cornerstone of Temet's activities is thorough research and product development related to civil defense shelter and fortification technology. Close cooperation with both domestic and foreign civil and military authorities is an integral part of the product development program, which has made Temet the world's leading supplier of all the specialist equipment and systems needed in shelter technology.

Temet is a full service company that, in addition to equipment technology, has a profound knowledge of fortification and civil defense, as well as responsibility for people's safety. The starting-point is to bring the latest information and know-how in the field within reach of the whole customer chain. That is why Temet's operations cover not only the complete supply of equipment, but also consultation services regarding shelter design, complete equipment installation, and overseeing the commissioning and maintenance, as well as training the technical personnel in the use of the shelters.
A series of Temet’s sturdy special blast doors bound for the Far East. The doors are loaded on to a special flat-track transport pallet and shipped as wide-load transport because of their great width. Temet, with the assurance of its expertise, is responsible for everything connected with the shipment and schedules.

Developer of detection and identification technology

Temet’s challenge has always been to sustain the requirements of life in exceptional circumstances. Staying in the forefront of the international development of civil defense shelter and fortification technology requires a thorough knowledge of special equipment and systems as well as understanding all requirements set for protective structures against blast and the other mechanical effects of weapons. It also demands continuous investment in the detection and identification technologies of poisonous and harmful substances, as well as the development of methods associated with air filtration. Temet develops equipment and systems also for industrial applications, according to the wishes of its customers. Typical industrial users of Temet’s products are petrochemical and nuclear power industries, as well as various research laboratories handling dangerous substances.
The PSV-series blast valves have been re-tested and are in production again. The valves function well with a high peaked short-duration pressure load, and have much greater air flow capacity than any other blast valve on the market today.

Massive and tight structures protect

The protection offered by a modern shelter is based on massive structures and the equipment installed in them to give structural protection against the mechanical effects of weapons. These are primarily blast wave, shock load, and fragments. In addition, a sealed shelter needs to be overpressurized with filtrated clean air to prevent toxic and harmful substances from intruding into the shelter.

Special equipment is needed to achieve the structural mechanical protection: blast-resistant doors to close the passageway openings, blast valves to protect the ventilation openings from the effect of the explosion pressure, as well as various blast resistant wall sleeves to carry the pipes and cables through the blast-resistant structures.

The overpressurization of the shelter with clean air requires that the building be sealed tight, but also high-quality equipment technology is needed. Sealing the passageways is achieved with the help of gas-tight doors, regulating the overpressure of the shelter with the help of gas-tight valves or overpressure valves, and pipes and cables taken through the gas walls with the help of sealed wall sleeves. With the outside air being contaminated, air taken inside is cleaned with NBC filters, which remove all harmful solid particles, aerosols, as well as gas-like substances.
Temet has recently developed a large NBC filter. Its capacity of 1250 m³/h cleaned air is more than twice the capacity of a standard NBC filter. The indisputable advantage of the large NBC filter is that it saves space: the filter takes up the same amount of floor space as a standard filter.

**Blast-resistant and gas-tight doors and hatches**

Temet designs and manufactures special protective doors and hatches for civil defense shelters, fortification structures, and tailor-made for various industrial purposes. The doors protect people and technical equipment from blast waves, fragments, and toxic gases. The doors and hatches of all sizes are made of steel and concrete and for all applications.

**Blast valves**

A wide selection of blast valves makes it possible to protect the ventilation systems of shelters from the effects of the blast wave and dust caused by explosions.

**Overpressure valves**

The exhaust air of small shelters is directed out of the shelter through the overpressure valves, which protect the ventilation system from the pressure shock like blast valves, but also regulate the overpressure in the shelter. Temet also manufactures non-blast rated overpressure valves just to regulate the pressure difference between adjacent rooms.

**Wall sleeves in pressure and gas-tight structures**

The special protective wall sleeves of the shelter walls guarantee that plumbing and piping, ventilation ducts and electricity cables will remain gas-tight and protected against blast.
A field-capable NBC protective tent has been developed together with a Finnish company Suojasauma Oy. The inside fabric of the tent is a new material preventing penetration of chemical warfare agents. The tent's overpressurization and ventilation take place according to the client's design specifications with the help of a ventilation unit equipped with NBC filters. To ensure the field-capability, the tent has also been equipped to heat and cool the inside air.

Gas-tight closing valves

Closing the ventilation channels of the shelter, as well as separating the clean and contaminated areas, can be done safely with the aid of Temet's gas-tight valves. The valves are manufactured to be manually operated, and also come equipped with various electrical and pneumatic power operators.

NBC filters and ventilation units

Temet manufactures its NBC filters, which remove toxic substances from the air, to various civil defense shelter standards and international NBC filter specifications. The emergency ventilation units include, in addition to the NBC filters, the blower units needed to purify the air, the ducts, gas-tight closing valves, as well as all air flow measuring and control systems.

Sound attenuation system

The VAV sound attenuation system developed by Temet can be used in all applications requiring suppression of noise generated by ventilation system machinery. The system is especially designed to dampen the low and medium audio frequencies created by blower units.

Shock isolation system

The equipment and systems installed in a shelter must be protected from the mechanical shock loads propagating in the structures. The VTV shock isolation system, developed by Temet, effectively attenuates the shock loads as well as prevents the machines' motion vibration from transferring to the mounting base.
**Gas detection systems**

Temet delivers the gas detection systems for toxic gases developed by Environics Oy, a member of the Temet Group. The systems control the use of the emergency ventilation units reliably and safely in crisis situations.

**Miscellaneous shelter equipment**

Temet's product schedule includes all the protective accessories required for shelters, such as lock tents and toilets, water and waste containers, air diffusers, overpressure meters, as well as various tools and equipment needed in the shelter.

**Technically first-rate services**

**Consultation and design**

Consultation services are an essential part of the construction, use and maintenance of civil defense shelters and other protective structures. Temet assists its clients in all necessary questions connected with HVAC and structural technology. Temet's fundamental idea is to always guarantee its clients the optimum total solution of the highest quality.

**Inspection and installation services**

Temet carries out equipment inspections at various phases of the shelter construction, thus, ensuring the construction progresses according to schedule from start-up to commissioning. Temet also offers an installation service for its own equipment, which makes their commissioning easier and creates the basis for their undisturbed use.
Both effective analysis tools and testing of the selected door construction are needed in developing a new protective door. Testing normal sized doors to about 2.0 bar reflected pressure load can be performed with the VTT Building and Transport blast wave simulator. Testing large doors with high pressure is extremely difficult and expensive. The behavior of these door types can be studied, for example, with the help of carefully built scale models.

**Broad international research cooperation**

The research carried out at Temet is applied research. It is used to improve the performance of current products, as well as to develop completely new products. Research must closely follow the markets. The trends in protection based on the changing threats at home and abroad must be followed so that the resources in use can be correctly applied.

In addition to the research and development resources connected with its own laboratory, Temet makes good use of the research services of the various departments of the Technical Research Centre of Finland and the Finnish Defence Forces Technical Research Centre. Outside Finland research cooperation is mostly carried out with the Swedish Defence Research Agency (FOI), the Dutch TNO, as well as many Federal research laboratories in the United States.

Typical research targets are various forms of new air filtration technology, as well as dynamic structural analysis methods. Research is also directed to the properties of activated carbon and the chemical resistance of the materials used in the equipment. One must also continuously search for completely new materials and components to be used in the structural elements of blast and shock resistant products.

**Thorough research as a basis**

TemetOy
Before even the first prototype of the product is made, the structural properties are researched both analytically and with the help of structural models. The FEA calculation program, connected to the design and product development used in the 3D design software, calculates the stresses and displacement of the structure modeled. These must match sufficiently closely the results reached analytically. The successful performance of the prototypes in the tests finally ensures the structure will function correctly.

Market-oriented product development

Product development is market-driven. The client’s needs dictate new aspects of development. Product development exploits research and uses progressive 3D design software, which can effectively simulate the load conditions of the product under development and how it would function under various circumstances. Precise initial data for modern production systems can be obtained with the aid of information technology.

The changing threats direct the criteria for building shelters and, thus, also the development of protective shelter equipment and systems.

When developing products, one is often faced with cross-disciplinary problems. Outside development resources used include the Technical Research Centre of Finland/VTT Building and Transport research unit, the Finnish Defence Forces Technical Research Centre, as well as domestic and foreign specialists in the field.
The background of Temet Oy

Two young men who wanted to be entrepreneurs, Launo Laakkonen and Erkki Nykvist, founded a company in 1953 called Teräs- ja Metallityöt Oy manufacturing school gymnastics equipment and various kinds of transport devices. However, the superfluous letters were soon dropped from the name and Temet Oy was born.

Pressure on the Finnish government to modernize civil defense lead to a new civil defense law being passed in Parliament in October 1958. This was the start of the building of civil defense shelters in Finland. Temet participated as a shelter equipment supplier from the very beginning. As the demand for the other product groups fell, the success of civil defense shelter equipment grew strongly. By 1963, the share of these products in Temet’s production was already 85%, and the company had become the market leader in Finland.

Strong product development opened the way for Temet to international markets in the beginning of the 1970’s. Exports began with the Swedish market and widened to the Middle East through the sister company Temet USA established in the United States.

Since the end of the 1980’s, Temet has actively sought new technologies to complete its shelter business. Today, Temet Oy belongs to a group of companies owned by Finntemet Oy. Temet’s sister companies with the group are: Environics Oy which specializes in gas detection and detection systems, Temet Instruments Oy which develops and manufactures multi-component gas analyzers, as well as TVI Vision Oy, an expert in line scan cameras used in industrial machine vision applications.