

Division Shipbuilding



KAEFER

Welcome

The world's shipping lanes are like giant arterial roads, carrying freight of all kinds and sizes over the ocean to its destination. This presents the shipbuilding industry with a constant challenge, as ever more advanced technology is needed to meet the demands presented by deadlines, forces of nature and the variety of different ship designs.

KAEFER's long tradition in the shipbuilding industry and close relationships with shipyards and ship owners enables the company to offer customers innovative technology and specially developed systems and products. The range and versatility of KAEFER's products and services for shipbuilders is evidenced by the increasingly complex commissions it is receiving. Be it a merchant or naval vessel, a ferry or luxury liner, KAEFER knows the ropes.

Nowhere is the interdependence of tradition and technology more apparent than on seagoing vessels. Today, safety on board is an absolute given, and this requires state-of-the-art insulation systems and sophisticated interior outfitting.

Besides newbuilding, KAEFER offers turnkey refurbishment and maintenance services on cruise ships and yachts. Its subsidiaries deliver effective solutions from the Caribbean to the Mediterranean, from the Baltic to the North Sea, and from the Indian to the Pacific Ocean.



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Four divisions, countless skills

■ Industry

Manufacturing industry demands the highest standards of expertise, technical know-how, quality and prompt delivery. The diversity and expertise present in KAEFER's Industry division are showcased in major projects carried out around the world, including demanding newbuild projects and maintenance work, such as that performed during large-scale shutdowns.

All manufacturing and pre-manufacturing takes place in our own workshops, which means we can guarantee consistent quality, in compliance with both our own internal standards and EN ISO 9001. We are also able to develop customized solutions for maximum cost-effectiveness and minimum environmental footprint.

■ Offshore

The Offshore division makes living and working on drilling platforms comfortable and safe. KAEFER can act as lead contractor for

construction, servicing and refurbishment work in all areas of insulation, surface and fire protection, scaffolding, HVAC, interior outfitting and maintenance. With over 30 years of experience in the oil and gas industry, our zero-tolerance approach to accidents reflects the importance of safety to challenging projects in harsh environments.

■ Shipbuilding

KAEFER has a long shipbuilding tradition dating back more than 90 years, and our close partnerships with shipyards and ship owners enable us to provide innovative technology and specially developed systems and products. Alongside our traditional insulation business, interior outfitting is a core focus. The Shipbuilding division offers turnkey solutions for newbuilds and refits of anything from cruise liners and yachts to naval and special-purpose vessels, ensuring safety and onboard comfort.

■ Construction

Urban spaces contain a mixture of historical and contemporary buildings, bold architectural structures and modern, functional constructions. All of these can be enhanced, inside and out, with KAEFER solutions, making the spaces in which we live and work both safer and more attractive.

The Construction division's service offering is as complex as it is diverse. It ranges from the outfitting of manufacturing and office buildings in the automotive, aerospace, chemical and pharmaceutical industries to refurbishment and newbuild projects at airports.

KAEFER offers innovative fire and noise protection systems that make it possible to create new architectural solutions. It can also handle the design and construction of cold storage and tunnels. It provides fire protection solutions to hospitals, and even fitted out two Antarctic research stations, Germany's Neumayer III and India's Bharati.

More than 90 years of quality and expertise

In 1918, Carl Kaefer founded a company specializing in the provision of insulation materials and services to the shipbuilding industry. His idea was to use peat to insulate the walls of the cold stores, and so the vision of efficient energy usage was born. The company's rapid growth proved that Carl Kaefer was in tune with the spirit of the times. New markets were quickly developed and offices established all over the world.

Today, KAEFER is the world's largest independent provider of complete insulation solutions. Headquartered in Bremen, Germany, it has operations in over 50 countries and a current workforce of over 17,000. The company's business is divided into Industry, Offshore, Shipbuilding and Construction divisions.

Carl Kaefer's big idea remains as relevant today as it ever was, and continues to guide the company on its path to success.



“ Safety and comfort
on the high seas ”



■ The Shipbuilding division

The Shipbuilding division is a natural choice for any shipbuilder seeking a reliable partner. We are part of a financially sound group, and can draw on more than 90 years' experience of delivering successful projects. We have sites in several European and Asian countries and combine strong local knowledge and regional supplier networks with the economies of scale of a multinational organization.

Our range of services is focused on turnkey interior outfitting, including insulation, piping, electrical and HVAC installation and the furnishing of accommodation areas, public spaces and catering facilities. KAEFER also has expertise in the technical fitting-out of functional spaces such as galleys and cold stores.

Whether it is a cruise liner, a naval vessel, an offshore supply boat or a yacht, KAEFER is an integrated service provider, offering complete interior solutions that meet the highest standards of quality in design and implementation.

KAEFER covers the full life cycle of a vessel, covering both newbuild and refurbishment and maintenance projects. Our proven turnkey construction solutions have helped us to win a number of “steel-to-steel” contracts. One glance at our extensive list of customers shows the range of projects we have worked on around the world over many decades. Taken together with our current order book, this is the best evidence of our technical capabilities.



■ Services

KAEFER supports its customers at every stage of a project, from preliminary consultations through to design, supply of materials and installation. Thanks to our many years of experience and expertise, we are equipped to carry out all aspects of newbuilding and ship refurbishment, from conception to final approval.

Pre-contractual consulting and services

At the beginning of a project, we can assist yards, owners and architects with pre-contractual advice on layout, weight and budget estimates. When the project begins, we develop custom solutions that meet the highest standards in terms of project management, quality, and environmental health and safety.

Design

KAEFER typically provides the designs itself for the projects it works on, from the general layouts and insulation plans right down to the detailed installation manuals and shop and

coordination drawings. However, we are also very happy to work from our customers' plans.

In order to ensure that the installation runs smoothly, we provide customers with all the necessary documentation. This eliminates the risk of miscommunication and ensures a seamless process from design to installation.

Engineering

KAEFER's expertise is built on a strong engineering background. Our in-house teams can provide specific acoustic, thermal and fire insulation packages, all designed for minimum weight and maximum cost-efficiency. The outfitter's job is to first understand the interior designer's vision, and then make this a reality while complying with all applicable regulations. This is seldom an easy task, but it is one that we have carried out successfully on a large number of projects for many different shipyards. We always find intelligent

compromises that balance factors such as weight, size, cost of installation and total life-cycle costs.

Material supply and logistics

To construct a public space like a theatre, hundreds of different products, from small parts to special constructions, have to be procured from suppliers. Materials must also be certified for compliance with specific safety requirements and weight limits.

Providing the right materials on time and to the right quality standards is a demanding task. KAEFER's purchasing teams are backed by specialists who can prepare all the necessary documentation, such as bills of materials and technical specifications. Whether a customer needs to source a lightweight neoclassical lightweight column for a dining room, or the insulation materials for a submarine, KAEFER can help.

Project management and supervision

Carrying out installation work on board a ship is a demanding undertaking and many factors have to be taken into account: coordinating the different subcontractors, tight schedules, logistical challenges, compliance with health and safety regulations and adherence to budgets.

KAEFER has substantial experience of managing complex assignments. We provide reliable project management that ensures that your projects are completed smoothly and successfully.

Assembly and installation

KAEFER can provide everything from individual interior services, such as minor cabin alterations, to complete turnkey interior outfitting of whole areas, such as the installation of a dining room.

A large turnkey contract begins with an unfinished steel deck, and ends with the handover to the owner of the completed sections, ready for use. These sections may include floors, walls, ceilings, furnishings, insulation, piping, air ducts and electrical equipment.

Maintenance

KAEFER offers maintenance and repair services for both operational and dry-docked vessels. Whether it is simply fitting a replacement part or carrying out more extensive maintenance works to ensure the safety and comfort of passengers and crew, KAEFER is always able to provide a fast, reliable solution.





Working areas

KAEFER's complete interior solutions cover the entire life cycle of a ship. For newbuilds, repairs or conversions, KAEFER can either carry out specific phases of the work or provide turnkey outfitting solutions for whole public areas, both above and below decks.

TECHNICAL

Insulation

KAEFER is able to meet all the complex and varied requirements of the shipbuilding industry. By carefully analysing the requirements for thermal insulation and noise and fire protection, we can tailor solutions that improve the safety and effectiveness of technical systems while reducing their impact on crews and passengers in terms of noise and temperature.

KAEFER has extensive expertise of designing acoustic insulation for ships' structures, flooring, doors and air ducts. Using structural dra-

wings, information on engine characteristics and other data, we can design and manufacture all the necessary noise protection, such as silencers and sound-absorbing systems.

HVAC installation

Shipyards often ask KAEFER to take responsibility for all the work within a given area, including HVAC. In such cases, we will design and install the necessary pipes, ducts, diffusers and dampers in accordance with the yard's specifications. This can be done entirely in-house, or together with a partner. All the parts we supply will, of course, be fully compatible with the ship's HVAC system.

Piping

KAEFER can do anything from simply connecting up washroom fittings to installing all piping passing through a given area (including hot and cold water, grey and black water, and coolant water).

Electrical installation

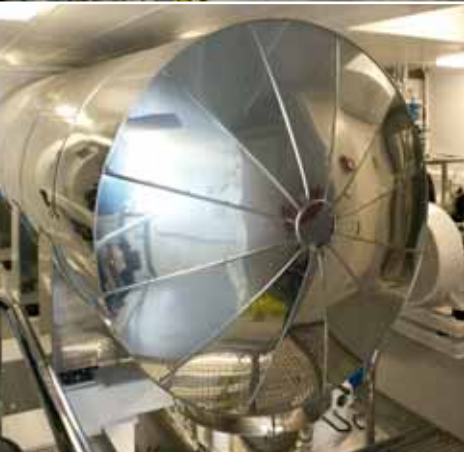
Again, KAEFER can simply connect up lighting and plugs, or take full responsibility for all cabling and electrics in a given area of the vessel. In the case of full turnkey contracts, we design, supply and install normal and emergency lighting, sound, data networks and any other systems which require a power supply.

DECORATIVE

Customers in the shipbuilding industry demand the highest standards of quality – and as such, outfitting is very much a job for specialists. Whether the ship in question is a cruise liner, a supply vessel or a naval frigate, creating a pleasant, comfortable environment for crew and passengers is a highly complex task. Weight, space, acoustics, fire regulations and cost are just some of the factors that KAEFER has to consider when designing its complete interior solutions.

Accommodation

The seamless installation of large numbers of cabin units within short timeframes is a considerable logistical and technical challenge. To date, KAEFER has installed around 20,000 cabins, including modular and traditionally built crew and passenger cabins and luxury suites.





Public spaces

Public spaces are always the centre of attention. By definition, they experience heavy use, and as such they are complex to design and build. With our turnkey approach, we offer a complete integrated solution that includes provision of engineers and designers. In cooperation with a number of different architects, we have delivered solutions for all types of public spaces, including:

- > Restaurants, bars and lounges.
- > Shopping areas.
- > Reception areas and galleries.
- > Corridors and staircases.
- > Cinemas, theatres and casinos.
- > Gyms and spas.
- > Solariums and pools.

Catering

KAEFER has extensive expertise of designing, delivering and installing catering facilities that meet the highest standards. These include:

- > Galley, bar and pantry equipment.
- > Floors, walls and ceilings for catering areas.
- > Cold stores.

Every process step, from design and delivery to installation, is completed in accordance with the strictest USPH regulations. We use our own products, including stainless steel lightweight wall and ceiling systems (USPH) and cold store fire doors (A60 class). To save installation time, we have developed a pre-fabricated cabin pantry which can be installed at the same time as cabins.



■ Products and systems

Customers tell us what they need, and together we will find the optimum solution. Proprietary KAEFER products and systems offer considerable advantages over other comparable systems, incorporating state-of-the-art technology and fully complying with all safety requirements. We produce and install:

Wall, ceiling and floor systems

- > Shockproof, light and demountable panel systems for naval vessels.
- > USPH-compliant wall and ceiling panelling for kitchens and pantries.
- > Elastic and floating A60 floor systems for fire and noise protection.

Exterior ceiling systems

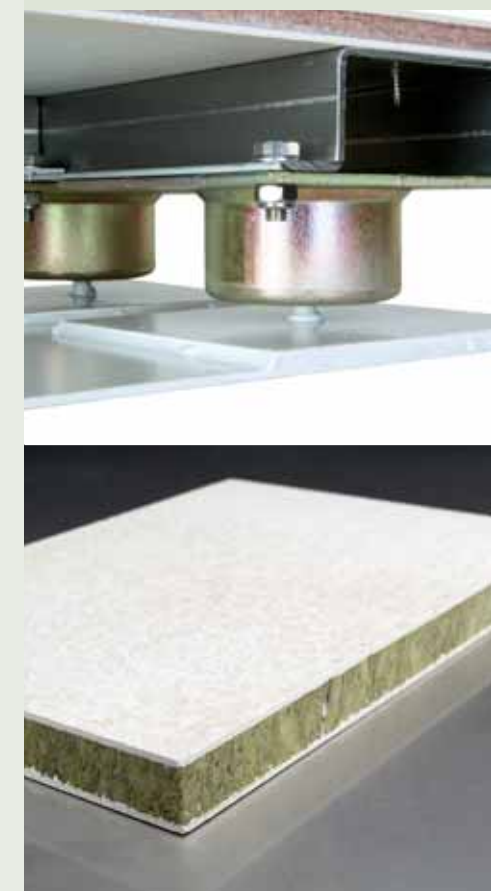
KAEFER is excellently positioned to meet the demands of building high-end yachts. Our KYC exterior ceiling system is a lightweight,

corrosion-resistant solution which offers ease of installation and stylish design. It sets a new technological benchmark for luxury yacht ceilings, delivering the ultimate in comfort, looks and performance.

LOLAMAT panel system

The LOLAMAT panel is a sandwich construction for walls and ceilings. It is made from inorganic and non-combustible materials, and comprises two layers of glass fibre-reinforced magnesite compound either side of a mineral wool core.

LOLAMAT represents an excellent solution for applications in ship interiors where conventional materials are not really suitable. In particular, its low weight and excellent fire resistance make it ideal for sliding fire doors and gates.





Fire safety products

In the event of a fire, passive protection serves two purposes: firstly, to give people time to escape, and secondly, to give the emergency services time to respond. To achieve this, KAEFER deploys an array of unbeatable solutions which meet the highest quality and safety standards for fire protection.

> Fire sliding doors and roller shutters

KAEFER's powered A0 – A60 fire sliding doors make up an integrated system consisting of a sliding door and an electric motor. Since 1980, this system has undergone a continuous process of development. The company's sliding single and double-leaf safety doors come in all standard dimensions, and are installed on more than 100 cruise ships and 200 mega yachts.

KAEFER also provides fire roller shutters up to a maximum size of 15 x 8.75 metres. As doorways and open deck areas on ships are getting larger all the time, this is a significant competitive advantage. Single-surface A0 roller shutters are used in locations such as grill bars and galley areas, whilst A60 roller shutters are suitable for use in high fire-risk areas.

> Fire curtains and folding doors

To meet the increasing demand for low-weight, space-saving, cost-effective fire protection on board ships in recent years, KAEFER and its partner EFFERTZ have developed a new range of fire roller curtains and fire folding doors. The roller curtains are suitable for all A0 fire protection boundaries and the folding doors for all A60 fire protection boundaries.

AmbiMar

AmbiMar simplifies electrical installations on board ships by significantly reducing the amount of wiring and using standardised components. In addition to saving on materials and weight, one of the major advantages for shipyards is the speed of installation.

AmbiMar also offers a very high level of user comfort which could otherwise only be achieved using much more expensive automation technology. Passengers benefit from mood lighting, with an intuitive control system for activating the various lighting areas based on standard light switches. As well as lighting, other electrically controlled systems, such as air conditioning and security detectors, can be integrated into an AmbiMar system.



A60 cold room doors

By using a sophisticated combination of vacuum panels, mineral wool and stainless steel cladding, KAEFER has developed a cold room door which meets all the necessary insulation specifications yet weighs 40% less than conventional doors. A60 cold room doors are available in hinged and sliding variants, in a wide choice of sizes. USPH-compliant versions are also available.

Cryogenic insulation

The transport of liquefied gas places strenuous demands on insulation systems, because of the extremely low temperatures involved (-163°C) and the problems such as metal contraction associated with this.

KAEFER has developed proprietary systems for transporting and storing LPG, LEG and LNG economically and safely that guarantee stable temperatures and low evaporation rates over long distances. Its range of KAEFER tank systems and deck cargo pipes provide cryogenic insulation solutions for every stage of the gas handling chain, including exploration, pipe line transportation, export terminals, tank ships, receiving terminals and the plants of the receiving party.

KAEFER has been working in the LNG industry since 1971. Today, the company is also actively involved in the development of new cargo containment systems for liquid gases and floating LNG (FLNG), as well as an ice-going LNG carrier.

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