

Eric Clapton interview Decked out

Berth days

SPRING 19

Properly paid



# YOUR GREATEST FAN

EVEN IF YOU ARE NO FAN OF ON BOARD CLIMATE CONTROL THERE IS A NEED FOR EVERYONE ON BOARD TO HAVE A BASIC UNDERSTANDING OF HVAC. **FRANCES AND MICHAEL HOWORTH** EXPLAIN WHY

f you work with electricity then it is likely that the initials HVAC stand for, to you at least: high-voltage alternating current. Work in superyachts however, and the same four letters mean; heating, ventilation, and air conditioning. And before your eyes glaze over and before you skip the page in favour of something more captivating, allow us to suggest that you hang on in there and read on, because HVAC is an all important element in the successful running of a superyacht. Stews need to have grasped a basic understanding of how HVAC affects on board life because it appertains to guest comfort.

HVAC is the tech behind interior and in some cases, exterior environmental comfort. The yacht's engineers use and maintain the onboard HVAC machinery and equipment to provide environmental temperature control and a level of acceptable air quality inside the yacht for the crew, owners and guests.

Deckies need to know where the outside vents are, so that they are never blocked. Stews need to know where inside air handling units are located so that they are never compromised by over stowage. Ventilation vents inside the yacht have to be kept clear inside as well. Where heated or cooled air discharges into a cabin space, this affects a great many things including the freshly prepared flower arrangements. So it does pay to know a little more of the HVAC workings on board the yacht you serve on. Ventilation (the V in HVAC) is the process in which air is exchanged or replaced inside guest cabins and saloons to provide high indoor air quality.

Good ventilation involves air temperature control, oxygen replenishment, and the removal of moisture, dust, airborne bacteria, carbon dioxide, and other gases from the yacht's interior. In the galley and store rooms, ventilation removes unpleasant smells and excessive moisture. HVAC kit introduces outside air to keep the interior air circulating, and prevents air stagnation which is the major cause of bad smells lurking inside a yacht.

Certain spaces on board are kept at different pressures so as to prevent air from these spaces escaping into the yacht's accommodation. The galley, store rooms, larders and walk in fridges being good examples to quote. That same system of pressurisation is often the reason why it is difficult to open the door into the engine room or control room and why doors into the beach club aft are sometimes heavy to operate.

Ventilation includes both the exchange of air to the outside as well as circulation of air within the yacht. It is one of the most important factors for maintaining acceptable indoor air quality on board. Machinery used for ventilating a yacht may be incorporated into the air conditioning system and on many yachts the same



equipment that is used to chill air can when reversed be used to warm the inside air temperature.

Many equipment manufacturers recognise that supplying air conditioning solutions for the luxury superyacht market requires industry leading technology, continual innovation and the highest performing climate control systems because the expectations of the clients, designers and boat builders are so high. The focus continues to be on answering the demands from builders and consumers for reliable, quiet systems and less energy consumption in the smallest possible package.

THE FOCUS CONTINUES TO BE ON ANSWERING THE DEMANDS FROM BUILDERS AND CONSUMERS FOR RELIABLE, QUIET SYSTEMS AND LESS **ENERGY CONSUMPTION** 

There has been a trend in recent years towards greater HVAC reliability on supervachts. A reliable air conditioning system is essential to provide a comfortable cabin climate for crew and passengers, and also to maintain the required temperature range for the operation of critical electronic equipment.

Each system needs to be engineered for the unique layout and use characteristics of each vessel. Designers are constantly being challenged to fit a performing product into different applications.

For superyachts above 30m, chilled water circulating through local fan coil units is the preferred option. In general terms that consists of an insulated water loop running around the whole vessel, usually starting and finishing in the machinery space. The fan coil, or 'tempered water' system is extremely efficient in reverse cycle mode when heating is required. These fan coil units, also called air handlers, need to be designed so they are unobtrusive, yet accessible for cleaning. They need to be equipped using quietest fans available and they must be easy to fit with supplementary heating elements for when the yacht is in less temperate climates. This requirement is unique to the superyacht market and is something not found in HVAC installations ashore."

Things have changed dramatically over the last 20 years. Paul Hickinbotham, Product Director, Marine EMEA at Dometic recalls, "When I first started in the sector, HVAC was still considered to be an option onboard. Back then systems were perceived by boat builders to be too complicated to fit. Today, in contrast,

# DOMETIC

Dometic has the ability to air condition boats from 8m to 80m+ and works alongside partners on even larger projects. With decades of experience in the sector, Dometic recognises that supplying air conditioning solutions for the luxury superyacht market requires industry leading technology, continual innovation and the highest performing climate control systems because the expectations of the clients, designers and boat builders are so high. The focus continues to be on answering the demands from builders and consumers for reliable, quiet systems and less energy consumption in the smallest possible package.

For more details visit www.dometic.com

HVAC is expected on boats of a certain size as an integral part of their design, with climate control simply part of usual life onboard for captain, crew and guests. In the same way that air conditioning is now the norm in the automotive sector and no longer highlighted in brochures anymore, this is now true for larger boats."

Hickinbotham adds, "We work with the majority of boatbuilders, often collaborating with them on concept designs directly to engineer specific spaces for the equipment. Behind the scenes, our teams are supplying the complete systems for boat builders as a standard service, installing everything including complete seawater circuits, copper refrigeration circuits, ducting, 'drains n all'."

Synergy is a newly formed HVAC systems and energy management company. Headed up by Patrick Voorn, an HVAC consultant with over 15 years in the maritime and offshore industry, he is backed by a team with more than 25 years of cumulative experience and expert technical knowledge behind them. Voorn believes that when it comes to HVAC the main talking points revolve around energy savings and air quality. He says, "The yacht's HVAC system is the biggest energy and space consuming system onboard." With over 50% - 60% energy reservations on the total E load balance in every situation, whether it is in port, at anchor, crossing an ocean or cruising from one anchorage to another HVAC is always the largest energy consumer."

Currently the reduction of greenhouse gas emissions is a topic in all sectors of the industry and the yachting industry is no different. This was the reason the IMO came up with an action plan calling for a 50% emission reduction in 2050. Reduction of CO2 emissions in ships can often be achieved by reducing propulsion power, but the average superyacht propulsion unit is only employed between 17% and 25% of the time while HVAC is used 100% of the time.

Voorn says, "This means we must seriously take a look at the reduction of auxiliary power consumption." He adds, "It is a logical step from air cooling towards air treatment keeping control of air quality. Cooling outside air can run up to 75% more cooling energy compared to cooling recirculation air. By cleaning and treating your recirculation air you will be able to save energy without losing the high level of air quality. Creating awareness among the onboard engineers and crew needs be the first step in this process."



# BY CLEANING AND TREATING YOUR RECIRCULATION AIR YOU WILL BE ABLE TO SAVE ENERGY WITHOUT LOSING THE HIGH LEVEL OF AIR QUALITY NEEDED

#### What's new?

Earlier this year Dometic announced that it had extended its titanium condensers to its line of Variable Capacity or VARC chillers, combining the use of industrial-grade titanium with variable speed technology. This means that the new titanium VARCX offers all the efficiency benefits associated with the VARC chiller line, plus the condenser coils made of titanium make the units virtually immune to erosion and corrosion, significantly extending the life of cooling systems.

Hickinbotham said, "The use of titanium is a ground-breaking development for chiller longevity in the marine industry, providing boaters, captains and boat builders with a vastly more corrosionresistant material. Titanium is a very strong material that does not erode easily and therefore makes robust and long-lasting condenser tubes for vessel chillers."

System efficiency is now very high on every Chief Engineer's radar as it leads to less load on the engines, more reliability and easier fault diagnosis. The advancements in system performance analysis are showing great rewards. Stuart Ginbey the Managing Director of Tradewinds Engineering Ltd says, "Our computer based



Whether you are having difficulties with your air conditioning, ventilation or provision cooling system, or you simply have a question about some aspect of your system, Heinen & Hopman has the answer. With subsidiaries in La Ciotat, Antibes, Barcelona and La Spezia, Heinen & Hopman can be at your disposal anywhere on the Mediterranean coastline. Part of MY TECH TEAM Antibes, a co-operation between Heinen & Hopman, De Keizer Marine Engineering and Zenoro, they can offer you a complete package to refit your yacht. Specialising in HVAC Service & Sales, Electrical Support & Sales and Generator Set Service & Sales. For more details Tel: +33(0)4 42 04 86 85

monitoring equipment can measure the exact performance of a chiller and verify data such as kW of cooling, COP, SEI, Compressor Isentropic Efficiency, sub cooling, superheat, stabilised control strategies and a whole lot more. And the best part is, the data doesn't lie! The numbers are witnessed in real time which makes this an ideal verification tool."

## Trending

At Synergy Consulting Patrick Voorn is seeing the use of independent HVAC consultants become more common in projects involved during the design up till delivery. He says, "The benefits of using an independent consultant is that they take care of the client's wishes and that they are not solely looking at the HVAC system but at the total integration. Consultants are also aware of the expectations in way of how clients use their yacht, specific areas on this yacht, what he/she is expecting from a technical point of view like comfort, noise and energy use. He adds, "The products that we see are the monitoring systems, smart controls in the accommodation, air filtration systems, waste heat recovery systems, but also crew training as a product. The proper functioning of a system starts with understanding how it works."

When it comes down to it there is much more about buying an HVAC system than is at first realised. Voorn suggests, "Most yards rely on the knowledge of their suppliers to get the job done properly. Engineering companies design almost every system there

# **REGULATION CHANGE**

Stuart Ginbey the Managing Director of Tradewinds Engineering Ltd warns that with the increased pressure of the FGas Regulations and the phasedown of Hydrofluorocarbon (HFC) Refrigerants, the industry is under more pressure than ever before to reduce its use of high Global Warming Potential (GWP) refrigerants with immediate effect. He said, "The Regulations state that as of the 1st January 2020, a service ban will come into force, where any system containing more than 40T of C02equivalent of a refrigerant with a GWP higher than 2500 will be effected."

Many marine refrigeration systems use refrigerant R404A (GWP3922), but it is also relevant to plants using refrigerants such as R-507, R-434A and R-422D. For equipment that is affected by the service ban plans based on one of these three options need to be taken.

1 Retrofit the existing plant with a lower GWP refrigerant (it must have a GWP below 2500). For example, R-404A systems can be retrofitted with R-407F, R-448A or R-449A. This usually requires very few modifications to the existing plant and there is good evidence that energy efficiency will improve after a well-executed refrigerant retrofit.

2 Service the existing plant using reclaimed refrigerant. However, due to the cuts in manufacturing high GWP refrigerants, there is no guarantee that reclaimed refrigerants will continue to be available. Experience has shown, that refrigerant prices become very expensive and it becomes harder to get, so we don't advise this as a long term solution.

3 Replace the plant with a new plant that uses a lower GWP refrigerant. It is important to recognise that this is happening now and simply ignoring the regulations is not an option. Everyone must start to plan their low GWP refrigerant strategy.

HVAC



# VARIABLE SPEED AND TITANIUM CONDENSER COILS ARE AMONG THE HVAC PRODUCTS AND SERVICES THAT ARE TRENDING CURRENTLY

is on board themselves. These include: grey water, black water and propulsion. Yet frequently the HVAC system is a turnkey bought off the shelf system engineered by the supplier. Every yacht owner should instead insist that this system should be customised and tailored to their precise needs, especially given what they are being asked to pay for them. Someone like us needs to ask the right questions for them so that they do not just get given what is available. There are much more adjustments possible than you would imagine."

Clearly variable speed and titanium condenser coils are among the HVAC products and services that are trending currently. Paul Hickinbotham, at Dometic says, "The majority of 30m-plus boats in EMEA now use VARCs, so these original units will be replaced by the new titanium versions. Our capability to use titanium represents a fundamental shift that will have a huge impact on the way future chillers are designed and manufactured, which is why we are progressing the transfer of all our products to titanium condensers following a period of evaluations and feedback. To ensure our air conditioning systems feature the same longevity to last for the next half century, we have taken the opportunity to completely re-engineer this aspect of our on board systems."

# SYNERGY CONSULTANCY

Synergy Consultancy's team has more than 15 years of experience in technical knowledge and has to date been involved in over 50 new build and refit yacht projects. They work with owners' teams, designers and shipyards. Their independent position means they are not tied to any one particular supplier, enabling them to take care of your specific needs and demands and guide you through the whole process without prejudice. Building a bespoke yacht needs an HVAC system tailored to your needs. Synergy Consultancy can write your technical and functional specifications, take care of the tender review process and manage the build. Synergy is part of the Bond TM Group.

For more details Tel: +31 (0)6 54 75 09 78 or visit www.svnergv-consultancv.com

> Designed to meet the stringent requirements for superyacht vessels, the durable titanium VARCX is much easier to maintain as it can resist marine corrosion and also withstand the cleaning methods which are often used to keep invasive marine life out of the chiller's plumbing.

> Stuart Ginbey at Tradewinds Engineering believes, "Independent surveys are really trending right now as clients want proof that their equipment has been commissioned correctly. Our performance analysis tool does exactly that. Our bespoke Marine Refrigeration training course is also very popular at the moment as students learn how to repair refrigeration systems and also gain the City

& Guilds 2079 qualification in the process. During this course we focus on systems such as the provisions refrigeration plant and running multiple cool-rooms and freezers off a duty/standby condenser set. We also look at the AC Chilled Water plant and other equipment that can be found on superyachts and larger merchant vessels."

## **Environmental awareness**

Stuart Ginbey at Tradewinds Engineering says, "What is of concern is that people's awareness of our impact on global warming has changed significantly over the last 10 years. Most people now realise that refrigerants are bad for the environment and the introduction of stricter regulations has forced technicians to become better trained and educated. Whilst there is a cost element to training, this is far outweighed by the benefits of having a skilled workforce."

## The future of HVAC

At Synergy Consultancy Patrick Voorn believes that in the future there will be a greater use of smarter automation systems than there is now. "The focus," he says, "will be on energy consumption and air quality. Viruses, bacteria and mould are a major influence when it comes to the health of owners, guests and crew and we have to take care of that as well. In the future we will be able to monitor the air quality from a distance."

With customers looking for more efficient systems using minimal power consumption the HVAC industry is constantly changing and evolving. What is often seen as a background problem of little importance is in fact hugely important to the wellbeing of a well run superyacht.