香港空調及冷凍商會有限公司
THE HONG KONG AIR CONDITIONING AND REFRIGERATION ASSOCIATION LIMITED

會員通訊
NEWSLETTER
WINTER 2022

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Message from the President

Ir M.T. LAW
President

It is my great pleasure and honour to serve as President of the Hong Kong Air Conditioning and Refrigeration Association (ACRA) for the term of 2022-2024. First of all, I would like to sincerely thank Ir. Franklin Lau and the council members for their efforts to contribute to the ACRA in the last term of 2020-2022. During this term (2022/2024), I will meticulously work with the stakeholders, council members and committee members to create another eminent chapter for the association.

ACRA is incontrovertibly dedicated to contribute to the industry and to actively provide advices on technical issues of HVAC system regarding statutory and regulatory requirements and code of practices. Last year, we formed a taskforce to initiate and prepare the recommendations on the Government General Specification and the review of Part XI of circular letter No. 4/1996. Our recommendations offered an insight into and expertise in helping the launch of Government General Specification 2022 edition in September of 2022 and the Part XI of circular letter No. 4/1996 to be issued by the end of 2022. Besides, we proposed sample drawings showing acceptable standards for supporting frames for suspended horizontal air duct, axial fan, cabinet fan and air handling unit inside a building for BD's consideration. These drawings were accepted by BD which have already been incorporated into <PNAP ADV-33 Essential Information in Plan Submissions> in Dec 2021.

Starting from the '90s, the ACMV industry already introduced the concept of Design for Manufacture and Assembly (DfMA) such as off-site manufacturing pre-insulated air duct in factory, delivery the parts in modules for on-site assembly. In the 2000s, chilled water pipes with insulation and cladding completed in factory and delivered to site for installation have become popular over the past decades. Nowadays, Modular Integrated Construction (MiC) and Multi-trade Integrated Mechanical, Electrical and Plumbing (MiMEP) have become a criterion of government projects led by the Development Bureau (Works Branch). To cope with this trend of development in the construction industry, the capabilities and resources shall be collectively allocated for formulating our operations in this growing pipeline.

The objective for the application of MiC and MiMEP in the industry is to enhance the productivity, shorten the construction programme and minimize the operations on site which in turn could solve the problem of labour shortage due to aging population as well as improving the performance in safety and quality. Nevertheless, in order to adopt these methodologies, the production method for construction needs to be transformed from wholly fabricated on-site into pre-fabricated off-site where applicable for installation and the extent of the off-site fabrication should be determined during the design stage in consideration of the nature of the project, floor layout, site constraint and particular requirements etc.

..... (To be continued on page 3)

MESSAGE FROM THE PRESIDENT

..... *From cover page*

From the transformation of typical production method, the E&M industry shall prepare their own strategy for MiMEP fabrication to integrate into the complete cycle of Building Information Modelling (BIM) workflow, i.e. the reform of factory set up, or the partnering approach among enterprises to enhance supply chain systems for MiMEP production etc. In order to achieve an effective approach in the factory operations for the current development of the built environment industry, the necessity of mechanization, automation and artificial intelligence in factory production including the production line set up to cater BIM application is the key for the success of the air conditioning industry in a new era.

Besides integrating new technologies into the process of fabrication, logistics planning on the sizes and sequence of delivery of the modules, the means of transportation, delivery route and method of hoisting on site shall also be considered. Delivery and lifting arrangements must also have well coordination with the Main Contractor for their committed involvement, which is the key element for the efficacious implementation of the MiMEP approach.

Facing the challenge of this reform of production process in the industry, the talents with knowledge of MiC, MiMEP, BIM are highly demanding and insufficient in the short term. Whilst some key actions to nurture young and energetic individuals on adopting these advanced technologies and enhance overall professionalism at all levels are currently being undertaken by the stakeholders in the construction industry to ascertain the transformation forward. The E&M industry shall familiarize itself with these alterations and develop the capabilities in adopting MiC and MiMEP in business operations. It is a way for tackling a core aspect of the challenge ahead and contributing to the industry for having an even more sustainable, productive and bright future.

Recently, we have also participated in the Working Group for the revision of Standard Method of Measurement (SMM5 – Building Services Sections) to be published by The Hong Kong Institute of Surveyors. Our input mainly focused on presenting the trade's concern about practical criteria to be properly addressed in the method of measurement and the new requirements on the changes of construction method related to our industry. In the Working Group, the measurement method on elements of modules (i.e. module frames, interconnection components etc.) and the payment requirements related to the initial set up and construction cost for the MIC and MiMEP are also discussed. Our addressed elements and proposed method can facilitate the mechanism to introduce the stage payment for MiC and MiMEP during fabrication of MiMEP modules in factory and initial payment for these preliminary costs for the Committee to consider and to examine the way it shall be implemented under the revised method of measurement.

We are at all times pleased to learn feedback and views from all of our members which will greatly support to the advancement of the construction industry. We look forward to meeting you in the ACRA platform or events or any other occasions to share our missions to promote our trade and profession of air conditioning, and move the status forward in the coming years.

Finally, I would like to take this opportunity to express my gratitude for members and supporting participants for their support and contributions. I wish you all the best in your future endeavours.

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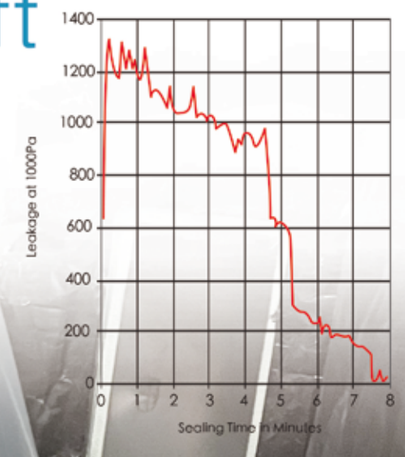

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District Cooling System at M+ Building

To cope with the emerging market standard of environment-friendly construction for one of the largest museums of modern and contemporary visual culture in the world, M+ building, at the West Kowloon Cultural District, energy-efficient system namely the District Cooling System (DCS) has been installed with major equipment located on B2/F of the M+ development serving the premises including M+ Podium, M+ Tower, CSF Building, WKCDA Tower and FREESPACE.

DCS Central Chiller Plant

DCS central chiller plant (total cooling capacity of 4,900TR) consisting of 4 nos. of seawater cooled chillers (1,100TR each) operated by variable speed drive (VSD) and 1 no. of seawater cooled heat recovery chiller (500TR) with centrifugal compressor operated by constant speed drive (CSD) is installed along with 2 nos. of electro-chlorinator with associated pump set (1 duty and 1 standby) for the sea water circuit where the chlorination dosing pipe is connected to suction side of each seawater pump.

DCS Chilled Water System

DCS chilled water system consisting of 7 nos. of constant flow primary chilled water pumps (5 duties and 2 standby), 2 nos. of variable flow primary chilled water pump (duty) and 7 nos. of variable flow secondary chilled water pumps (5 duties and 2 standby). The designed chilled water supply and return temperatures at primary side are 5°C and 13°C respectively, whereas the relevant temperatures at M+ development, WKCDA Tower and future development are 6oC and 14°C respectively. Moreover, a closed loop reverse return chilled water piping system is provided to distribute chilled water to the substation of M+ development, WKCDA Tower and future development. For the distribution of AC hot water to the substation of M+ development, a closed loop hot water piping system is applied.

The chilled water is distributed from the DCS plant under a primary secondary flow principle of which each chiller is provided with a primary chilled water pump that leads its associated chiller when called into operation and cuts out when the associated chiller is turned off. Chilled water of DCS loop is distributed by secondary chilled water pumps to various sub-stations of M+ development (M+ Podium, M+ Tower and CSF Building), WKCDA Tower and future development. DCS substation acts as a physical break that will transfer the cooling/heating energy from the central system to the individual development. Pressure independent control valves are installed for each set of heat exchangers. For each consumer, two PICVs are installed in parallel, only one PICV shall be opened if the flow is equal to or less than 50% of design flow. If the flow is greater than 50% of the designed flow, both PICVs will open at the same percentage of opening to provide the required cooling capacity. The AC hot water distribution from DCS plant operate under a single loop with variable flow principle although the chilled / AC hot water distribution within each of the development is independent.

Other Relevant System

Other system includes the heat rejection system consisting of 4 nos. of VSD seawater pump (3 duties and 1 standby) where the seawater pumps are interlocked with the operation of chillers to ensure adequate flow through the condenser prior to the operation of the compressor.

For filtering the seawater upstream of the condensers, 3 nos. of automatic backwash strainers (3 nos.) are installed. The backwash action is activated by timer during normal operation with a pressure differential switch installed to monitor the pressure drop across each automatic backwash strainer and overrides the timer when the differential pressure is excessive.

Water Leakage Detection System

Water leakage is one of the major issues for every type of buildings especially for this world-recognized art and cultural premises. Due to this matter, linear water leakage detection cable is installed between the pipe jacket and outer surface of the chilled water pipes whereas. sensing cables is installed at the bottom of the annular space of the double wall piping. The system shall operate in the manner that leaks cannot be suppressed or otherwise ignored once they are detected. The water leakage detection system can discern external ingress or moisture or internal water from weld leaks inside PIP pipe. It can also feedback the fault signal if the water leakage detection cable is broken so that the system always remains intact with the support of injection of electrical pulses that enable precise positioning of water leakage spot and cable break location.

Summary

To enhance the overall HVAC performance for one of the Hong Kong's most iconic landmarks, West Kowloon Cultural District, the M+ DCS plant will be integrated with WKCD DCS plant in the near future. The combined system will allow both plants to back up each other offering a more reliable and uninterruptible cooling and heating services to all the premises in the district.

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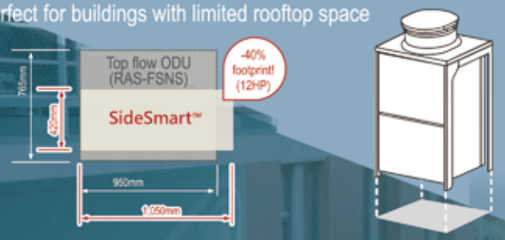

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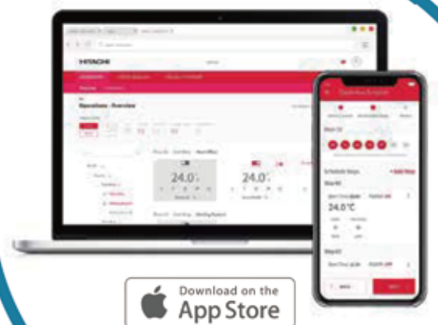

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人物專訪

姚國華先生(Dominic Yiu)

伴隨著市場的迅速發展和科技的不斷進步，冷氣產品推陳出新，有效掌握市場脈搏、了解用戶所需方為營商致勝之道。智能空調工程有限公司創辦人姚國華先生(Dominic Yiu)從事冷氣行業良久，他與時並進，從不與時代脫軌，又敢於創新、適時引進技術，領先於業界開拓市場，更從而提升行業整體水平。今次本會有幸訪問姚先生， 邀請他為大家談論工程生涯的箇中點滴。

甫入職場遇挑戰 逆景求變

姚先生憶述早年在香港理工大學的前身香港工業專門學院修讀電機工程高級文憑。他矢志不斷求進，其後獲取由怡和機器(JEC)與英國電器(English Electric)合辦的獎學金，遠赴英國進修，以半工讀形式，完成英國電機工程學會第三級考試課程及為期兩年的學徒實習訓練。姚先生告別英國返港，加入JEC的電機銷售部展開他的職場生涯。就於此時發生一個重大的轉變，當時作為英國最大電器制造商 English Electric 却被英國通用電器所併購, 而怡和機器與 English Electric 分手後帶來重大損失。因應市場環境變化，姚先生著手研究應對策略，於是他摒棄慣有做法選擇英國廠家並作出變革，由日本引入產品，為市場帶來嶄新選擇，造就機遇。與同事一起並肩開拓，公司成功爭取不少知名日本廠商代理，例如三菱重工，東芝變頻電機，明電社 Maiden 高壓真空開關，騰倉電纜 Fujikara，OKI Denki PABX 電話系統，東芝Micorwave，Kitz Valve，Kobelco Crane 等...。奠定JEC在機電產品市場領導地位。

開拓專業領域 擴闊市場視野

其後姚先生被委任負責管理整個機電貿易部，包括環保及污水處理，機械物流工程，建築機械等部門。從輸配電，中央監控電力系統，發電機，照明，屋宇設備供應等專業工程領域，公司皆能積極參與。姚先生優秀的表現獲得管理層肯定，應邀加入JEC董事局，更間接連系當時代理約克(York)多年的冷氣部，結下和冷氣的緣份。由於仁孚行改組，姚先生之後調職到同為怡和系的上市公司仁孚行任董事，負責管理工業部門，當時仁孚業務除平治汽車外，還有很多其他業務，例如船機及 MTU 柴油機維修部，發電機及建築材料部等。業務方針亦學習以市場為主導，姚先生很快適應過來，做起來發現饒有趣味，亦從中獲益良多，豐富了個人閱歷。及後回歸 JEC。

毅然創業 掌握成功契機

於2000年，姚先生離開JEC並創立了 Chivas Corporation Ltd.（其後改名為智能空調工程限公司 Smartech HVAC & Engineering Ltd）。公司宗旨以推動節能減排，創新理念為基礎，以中央空調為主業，付之配合附助設備，推動最節能制冷機組市場。當年市場仍然盛行價格戰，業界出現惡性競爭。姚先生洞悉到綠色樓宇、節能減排為大勢所趨，引入相關技術產品是唯一打破這個局面的出路，於是落實代理首間來自南美巴西的 WEG 節能電機產品，加拿大 Armstrong sensorless 變頻立式泵組和 Hartman Loop optimum control system，及無化學物UV消毒設備，設備取得應用於渠務及公共游泳池的水處理相關項目。雖在這些產品領域取得成果，姚先生卻念念不忘冷氣業務，認為要突圍於競爭激烈的既有市場，必須跳出四大品牌空調的框框，首先要有創新的技術，成功取得 Smardt Chiller Group 的總代理。Smardt 研發 Turbocor 磁浮壓縮機，齊備當時最先進的技術：永磁馬達(Permanent Magnet Motor)、磁浮軸承(Magnetic Bearing)、數碼控制(Digital Control)、EC(Electronic Commutation) Motor 再加上內置變頻等等，配備這新式壓縮機的無油冷水機(Oil Free Chiller)就成為他發展冷氣業務的夥伴。猶記得 2005 年禮賓府安裝首部無油冷水機的項目，相關部門初接觸新技術難免會考慮良多，姚先生為客戶耐心講解，一一釋疑解惑，最後客戶終於放心落實換機計畫，節能表現日見成效，機電工程署於是亦效法在總部試用。姚先生洞察到節能降耗勢在必行，變頻系統全面投入應用於冷凍機組為政府所倡、市場所需，香港當年率先採用變頻系統無油年代領先於各東南亞國家，帶領綠色建築發展。

創新思維 承先啓後

目前應對氣候變化為世界最大挑戰，香港如何落實碳中和，零碳日子亦甚具挑戰。香港作為個人碳排量極高的城市，香港人有責任更積極推動減排碳中和目標。除使用更潔靜能源，加大節約，畢竟冷氣空調是社會重大耗能裝置，商會更應積極作出貢獻。個人認為在實施(implementation)上：(一)多採用水冷系統、(二)優先採用最優化節能裝置、(三)設備盡可能是低碳足印材料，(四)裝置優先要求永續性能 sustainable performance，(五)定時調較以保性能永續。

近年他更探討採用其他創新的技術或方法，改善沿用以久的技術，例如離地安裝的水泵以節省地方和管道長度、以非金屬的水管減低因生銹而引致高磨擦損耗等。觀察所及，奈何這些創新技術，在香港保守的工程界中，難有人作出嘗試採用，每次產品介紹後得到的回覆都是“Job Reference?”。由於香港工程界，很多人都只跟從 General Specification，比較保守，所以很難去用新的產品，阻礙創新發展。不少工程公司出現青黃不接情況，特別在中層管理層面，未來情況或許會更加嚴峻，故業界亦應好好思考如何留住及增聘人才。年青的工程師輩，雖有良好環保意識，卻未有足夠經驗去決定用新產品的好處。很多公司就為節省金錢和人手，不願冒險而沿用既有方法。

持續更新 永續常新

姚先生認為要成就業界未來，現時工程界應該「勇於創新，敢於用新」，過往實施決定皆奉行過時的價格成效“cost effectiveness”為準則，然而以目前日益昂貴能源價格和碳排放損害，相信採用ESG effectiveness 更有意義。各持份者若能理解到追求最優化節能方案所帶來豐厚回報，而同時履行社會責任，何樂而不為。It makes great sense!

業界裝備自己應對新挑戰之餘，亦帶動市場欣欣發展，吸引後進入行。我們要將新思維帶入業界各方，尤其要讓業主知道創新為他們所帶來的裨益，以助他們長遠發展，實現遠景。靠賴政府的帶領、商會的推動及業界的積極參與，我們定必可以開拓更多領域，成就業界未來。

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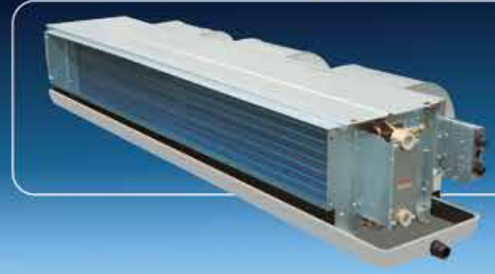

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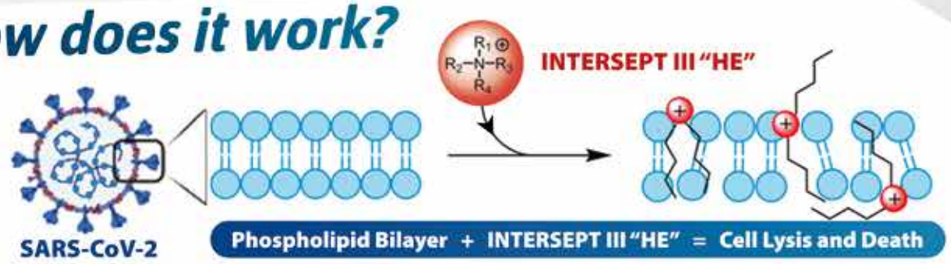
How does it work?



Covid-19 virus, influenza virus and bacteria have membranes with Phospholipid Bilayer. AAF filter works to arrest and destroy COVID-19 by using media combined with the INTERSEPT III "HE" anti-virus agent to disrupt the phospholipid membrane of the virus and make the cell lysis and death. It also eliminates and prevents growth of bacteria, virus, mold and mildew.
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Centrifugal Chiller History and New Development

The first Centrifugal Chiller was appeared in the USA in one century ago May 1922. Technology of centrifugal chiller have been improved by different manufacturers to more efficient and match changes in the world in past ten decades.

A. HISTORY OF FIRST CENTRIFUGAL CHILLER

COMMEMORATING 100 YEARS OF WILLIS CARRIER'S INVENTION OF CENTRIFUGAL CHILLER TECHNOLOGY - MAKING MODERN LIFE POSSIBLE

The impact of centrifugal chiller technology has spanned a century, affecting buildings, industries, and countless aspects of life across the globe. This is the story of how Willis Carrier's invention of the centrifugal chiller fundamentally changed the way we live, work, learn and play.

In June 1920, Willis Haviland Carrier authored "Development Possibilities for Improvement in Refrigeration," a confidential memo he sent to a handful of his colleagues. The document described a novel machine and refrigerant that might significantly advance traditional "process air conditioning" used in factory production. His idea also had the potential to create an enormous new category, "comfort air," meant to cool the occupants of theaters, stores, ships and office buildings.

A Vision of Centrifugal Chilling

Already renowned for his 1911 "Rational Psychrometric Formulae," Carrier had become frustrated over the decade by the slow advance of refrigeration technology. Inspired by the application of centrifugal motors in heating and electrical generation, he envisioned in his 1920 memo "a centrifugal compressor combined with a compact shell-and-tube heat transfer surface."

The refrigerant for this device, he said, must be non-toxic and non-flammable, have a high molecular weight to minimize the cost of the compressor, and have a boiling point around 110°F (43.3°C) to reduce pressures.

Disappointed by the tepid response among manufacturers in the United States, Carrier took his work to engineers in Europe who might help him piece together this puzzle. He was delighted to find that German chemists had developed a dielene (dichloroethylene, C2H2Cl2) for use as a cleaning fluid that met the needs of his refrigerant.

Carrier also found an economical and reliable centrifugal compressor manufactured by the C. H. Jaeger Company of Leipzig. The compressor would require adaptions "entirely foreign to the usual conception of centrifugal machinery," he wrote. These included the perfect sealing between the housing and the shaft without the use of packing whether the machine was in operation or shut down; the successful evaporation of a refrigerant having a low vapor pressure with small temperature head available for efficient operation; the handling of a gas with low pressure difference; the successful operation of an enclosed lubricating system; and the doing away with expansion values and multitudinous joints.

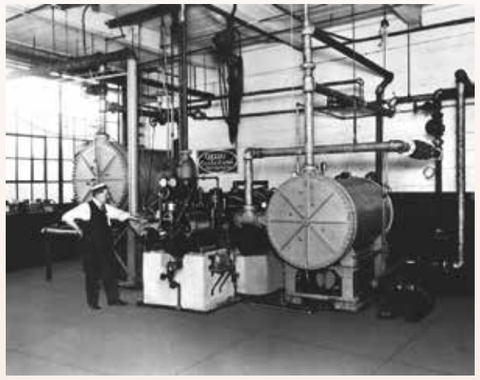
These challenges were matters of mechanical design and invention, work that would result in 20 patents filed between 1921 and 1929. In practical terms, the centrifugal chiller would be more affordable and deliver the same capacity as traditional ammonia systems while requiring about 25% of the footprint. Unlike ammonia, the combination of dielene with centrifugal compression would make safe and reliable air conditioning available wherever people congregated. In retrospect, Carrier's invention of the centrifugal chiller was an inflection point in the history of modern air conditioning, the first significant advance in refrigeration since the original ammonia compressor of 1872. Not only would comfort air sweep the world in the next century, but traditional process air would also be transformed.

"Carrier's idea to combine a centrifugal refrigeration compressor with a shell-and-tube type condenser and chiller in a package on one frame," wrote engineer-historian Bernard Nagengast, "was revolutionary in its time."

Innovations and Dramatic Growth

On the evening of May 22, 1922, some 300 people, primarily members of the New York sections of the American Society of Refrigerating Engineers and American Society of Heating and Ventilating Engineers, witnessed the unveiling of the first centrifugal chiller unit. "After a few brief speeches, the big doors were rolled back and there was the number one machine, perking along under a fair load," engineer and attendee Logan Lewis recalled, "running at the almost unheard of speed of 3500 rpm."

Willis Carrier and members of the New York sections of the American Society of Refrigerating Engineers and American Society of Heating and Ventilating Engineers, witnessed the unveiling of the first centrifugal chiller unit



Shown in the Carrier plant in 1922, the centrifugal chiller prototype that made its debut in Newark would cool the factory of Onondaga Pottery Company in Syracuse, New York, for decades before moving to its permanent home at the Smithsonian.

The first customer installation of centrifugal chilling was in 1923, helping to cool Stephen F. Whitman & Sons' candy plant in Philadelphia. The chiller that had made its debut before a 1922 dinner audience in Newark was placed at Onondaga Pottery Company in Syracuse in 1924. Forty years later, this iconic machine was displayed at the Smithsonian Institution in Washington, D.C., where it resides permanently.

Three 75-ton compressors at the Stephen F. Whitman & Sons' candy plant in Philadelphia, Pennsylvania, became the first installation of Carrier's historic centrifugal chiller.

In movie theaters, the comfort air revolution came on Memorial Day 1925 at the Rivoli Theatre in Manhattan, where a combination of dielene and centrifugal chilling, by-pass and down-draft systems magically cooled a grateful audience. “It has now been demonstrated that the hotter the weather here,” the Rivoli Times reported on July 1, 1925, “the more people attend the Rivoli.” This marquee installation repaid its $100,000 installation cost in three months.

In less than a decade, centrifugal refrigeration had driven process air into more than 200 industries. By 1937, the air-conditioning industry’s gross revenue had climbed to $90 million. The global community embraced centrifugal chilling after WWII. By 1964, the combined capacity of all centrifugal chillers produced since 1922 totaled almost 5 million tons, or enough capacity to air condition 2 million single-family homes. And demand had accelerated, with more than 90% produced since WWII. Meanwhile, the machine installed in the J. L. Hudson Store in Detroit completed its 40th year of reliable service.

The fundamental physics of centrifugal have not changed in a century, the chiller’s major components have been adapted and improved over time by a legion of innovative engineers. And some of the most significant improvements to the centrifugal chiller have been in its refrigerant. From dielene and Carrene (methylene chloride), the industry moved to chlorofluorocarbons (CFCs), all eventually banned by the Montreal Protocol, to hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs), and now to advanced refrigerants such as hydrofluoroolefins (HFOs). This transition has steadily shifted refrigerants away from chlorine and toward materials with lower global warming potential (GWP).

Making Modern Life Possible

In the last century, few venues have been untouched by Willis Carrier’s invention of centrifugal chiller technology, from skyscrapers to apartment buildings, hotels to hospitals, airports and cruise lines to subway stations, and sporting venues to museums. Likewise, centrifugal chillers have made possible countless manufacturing processes that improve all facets of our lives, from medicines, automotive products, plastics, chemicals, textiles and mining applications, to many aspects of our modern digital age, including electronics, semiconductor chips and data centers.

What began as a memo drafted by an engineer frustrated by the pace of change, the centrifugal chiller is today celebrating a century of innovation and evolution. Launched in 1922, the product has grown into a multibillion-dollar industry that supports global health and productivity, making modern life possible.

Bibliography

Carrier Global Corporation, Commemorating 100 Years of Willis Carrier’s Invention of Centrifugal Chiller Technology Making Modern Life Possible,
https://www.shareddocs.com/hvac/docs/1001/Public/05/100-YEARS-CENTRIFUGAL-TECH.pdf

B. NEW DEVELOPMENT OF THE FIRST CENTRIFUGAL CHILLER MANUFACTURER

Taking Chiller Technology Into The Future

Carrier took centrifugal chiller technology to a new level with its AquaEdge® 19DV chiller, introduced in 2018. Utilizing EquiDrive two-stage back-to-back simplified and balanced structure compressor technology which substantially improves efficiency and operating range. Pioneering falling film evaporator designed specifically for low pressure refrigerant and aerodynamic components optimized for new ASHRAE 34 A1 class ultra-low GWP R-1233zd(E) refrigerants. Modern variable frequency drive (VFD) is unit mounted and is a standard component on 19DV that allows the speed to vary, substantially improving efficiency at partial load condition and winter operation. Bearing technology has progressed from traditional oiled roller bearing to ceramic bearing that make use of injected refrigerant as lubricant for peace of mind operation. Controls have evolved to full-color, graphical displays with software that can determine the optimal operating conditions, and to AI that can diagnose potential machine service issues well before a catastrophic event occurs.

AquaEdge® 19DV Centrifugal Chiller

Digital enablement today is having a tremendous impact on the industry and on professionals’ ability to design and maintain their equipment and cooling systems with confidence. Advanced software tools like Carrier’s PLV Pro™ provide consulting engineers with detailed energy analyses that can help them make objective and informed decisions when it comes to chiller selection. And with solutions like the Abound HVAC Performance and the SmartVu™ control panel, facility engineers and building owners can use intuitive, connected technology to improve the way they monitor and interact with the 19DV centrifugal chiller.

Information provided by Carrier Hong Kong Limited

C. NEW TECHNOLOGY IN OTHER CHILLER MANUFACTURERS

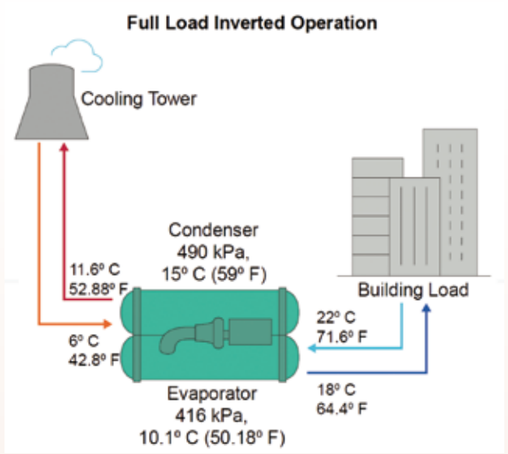
Besides the original centrifugal chiller manufacturer, some technologies were developed by other manufacturers.

1. Free Cooling Design by “Inverted Operation” of Advanced Centrifugal Chiller

To achieve similar low ambient performance with conventional chillers, it is necessary to install an external waterside economizer in order to provide cooling when the chiller cannot operate. This requires additional cost, maintenance and control processes.

The advanced centrifugal chillers can be operated even in very cold climates and do not require additional economizers for free cooling. It adapts to a very wide range of operation and provide extremely high efficiencies due to the optimized, oil free and magnetic bearing design. Conventional chillers, even oil free systems, typically require a much higher minimum condenser temperature and are unable to take advantage of the reduced outdoor temperatures.

During inverted operations the compressor is running, and the pressure differential will always be maintained in one direction. The saturation temps in the condenser must remain higher than the saturation temps in the evaporator. The positive head being forced by the compressor, along with the large evaporator approaches at very low head conditions, result in condenser saturation temperature above evaporator saturation temperature without additional control logic on the system.



When the conditions get more inverted, larger approaches and heat transfer impact the COP. This is the reason why the Minimum Condenser Water Temperature Report shows an efficiency reduction at some specific condenser water temps and load %. In the example above, this can be seen between 9 & 12°C (48.2 & 53.6°F) inlet condenser at 50% load. The report and "tipping" point for COP performance is chiller specific.

Partload Data (Minimum Condenser Water Temperature										
CEFT	% LOAD									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
30°C 86°F	9.036	9.591	10.14	10.65	11.07	11.32	11.21	10.61	8.794	4.061
27°C 80.6°F	10.46	11.21	11.99	12.76	13.44	13.95	14.01	13.41	11.60	6.514
24°C 75.2°F	12.27	13.28	14.39	15.56	16.70	17.65	18.21	18.02	16.19	10.91
21°C 69.8°F	14.54	16.03	17.73	19.55	21.47	23.42	25.09	25.83	24.60	18.48
18°C 64.4°F	16.78	19.08	21.63	24.34	27.87	31.61	35.38	35.55	29.67	18.79
15°C 59°F	19.66	23.29	27.30	32.45	37.15	41.84	45.50	36.55	22.86	12.19
12°C 53.6°F	19.53	22.82	26.41	33.34	39.58	45.94	49.76	34.55	21.04	12.02
9°C 48.2°F	17.93	21.15	24.59	29.73	37.30	43.45	50.29	36.51	21.63	11.87
6°C 42.8°F	16.02	18.59	22.24	26.01	33.37	39.89	46.53	39.42	22.69	11.73
3°C 37.4°F	13.87	15.96	18.80	22.72	27.30	35.75	42.12	44.39	24.48	11.70
*Values are in COP										
	Rated point is 60% or higher efficiency compared to design operation point									
	Rated point is 7-% or higher efficiency compared to design operation point.									
	Rating point is 80% or higher efficiency compared to design operation point									

NOTE: there is an optimum COP for each % load and condenser water combination.
At the lowest temperatures the COP is still very high but may be lower than at warmer water temperatures.
This is normal and explained in the "Conclusions" section.

Information provided by York International (Northern Asia) Limited

2. *Falling Film Technology for Evaporator and Two-stage Permanent Magnet Motor Compressor*

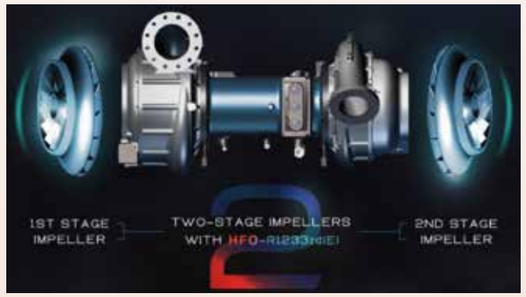
In order to minimize the carbon emissions, there are two directions of environmental approach. One is minimizing refrigerant use; the other is maximizing the chiller efficiency.

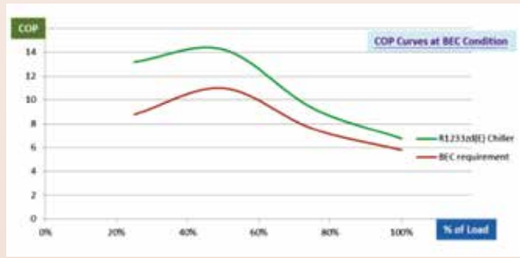
A single component HFO refrigerant R-1233zd(E) offers outstanding environmental compatibility due to the extremely low GWP of 1, zero ODP, lower toxicity, no flame propagation and energy efficiency. R-1233zd(E) is the best choice for large chiller such as centrifugal chiller.

In addition to apply the new HFO refrigerant, minimizing the refrigerant use is also important. The falling film technology for evaporator enhanced the heat exchange. The evaporator shell is not filled with refrigerant to submerge all the tubes. Instead, a thin film of refrigerant only covers the surface of the tubes, resulting in high heat transfer coefficient and less refrigerant required. The falling film design reduces up to 40% refrigerant charge and gives better efficiency compared to flooded design.

Improving the chiller efficiency is the most effective way to save energy. R-1233zd(E) centrifugal chiller makes a big step forward in the Coefficient of Performance and Integrated Part Load Value. The low boiling point of R-1233zd(E) with its low pressure refrigerant characteristic increases the efficiency of centrifugal chiller. New compressor technology with back to back double impeller provides kinetically balance, reducing the thrust and load of the bearing. Two-stage compression by back to back impeller performs less work to achieve higher chiller lift. The flash tank economizer is specially designed for the two-stage compressor to improve efficiency. The refrigerant from the condenser flows to two different paths. The flash gas flows into the second-stage compressor to be re-compressed, while the liquid flows through the float valve to further reduce its temperature and then into the evaporator to cool the chilled water.

The chiller motor is permanent magnet motor which eliminates rotor excitation loss to deliver superior motor efficiency under high-speed operation. Magnetic bearing technology enhances chiller efficiency by minimizing heat transfer loss, gap loss and friction loss. The chiller can run at peak efficiency year after year with a design that wipes out the risk of oil contamination from efficiency-robbing oil buildup on to heat-transfer surfaces. For the part load operation, the compressor is equipped with the dynamic dual IGV and optimally controlled to give most accurate cooling and optimized part load efficiency. Through these technologies and HFO refrigerant, chiller performance can achieve COP7.1 and the part load efficiency IPLV 11.9 based on AHRI condition. In addition, the COP of R1233zd(E) Chiller is 15% to 20% higher than BEC requirement.





Information provided by McQuay Air Conditioning Limited

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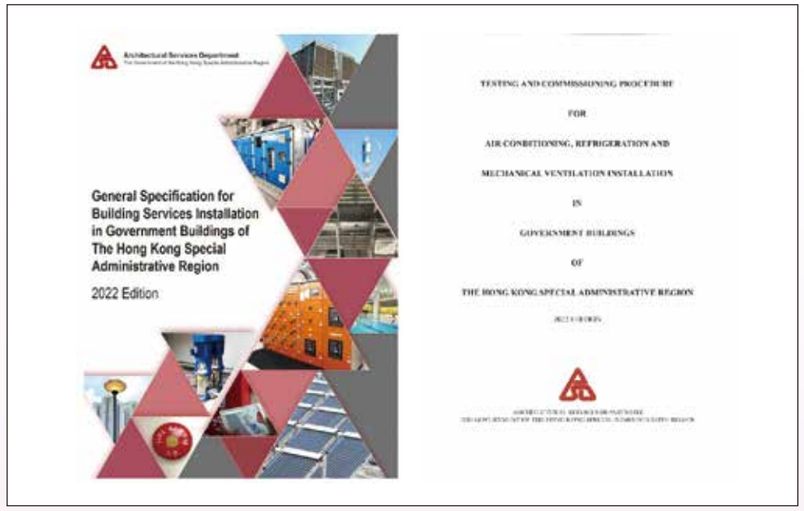
General Specification for Building Services Installation 2022 Edition



The Architectural Services Department (ArchSD) General Specification for Building Services Installation 2022 edition (BSGS 2022) has included below major amendments and additions after reviewing the 2017 edition (incorporating latest corrigenda):

1. Integrated the 11 sets general specifications for various types of building services installation of 2017 edition (incorporating latest corrigenda) into 1 document
2. Added new Parts on Modular Integrated Construction (MiC), Renewable Energy Systems and Internet-of-Things (IoT) Infrastructure
3. Enhanced the green and energy efficiency requirements
4. Included innovation and technologies (I&T) requirements
5. Updated the technical requirements
6. Updated the applicable international standards and statutory requirements

Applicable

For tenders to be invited on or after **1 November 2022**, this BSGS 2022 shall be used; existing contracts (including contracts using previous editions tendered before 1 November 2022) will not be affected.

T&C Procedure Updated

Testing and Commissioning Procedure 2022 edition was developed from the new General Specification that was established by the ArchSD.

Website :

https://www.archsd.gov.hk/media/publications-publicity/general-specification-for-building-serivces/BSGS%202022%20Edition%20(Sep22).pdf

https://www.archsd.gov.hk/en/publications-publicity/t-c-procedure-for-air-conditioning,-refrigeration,-ventilation-and-central-monitoring-control-system-installation.html

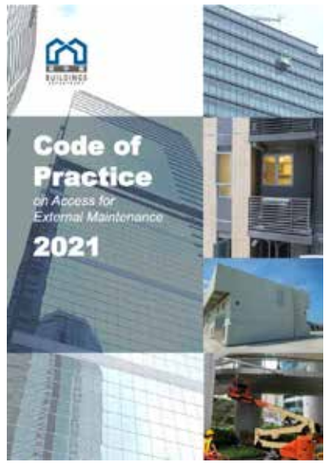
Safety of External Maintenance

To improve external maintenance safety of air conditioners, the Construction Industry Council and the Building Department issued two documents in working safety and design and safety provisions for air-conditioner platform.

These Guidelines provide guidance recommended by the Construction Industry Council on good practice for the erection of truss-out bamboo scaffolds (with heights not exceeding 6 meters) to enhance the works safety of scaffolders in minor renovation and repair works including air conditioning units at external wall of building. The design and erection practices of truss-out bamboo scaffolds are reviewed and safety guidance on the critical items requiring additional attention to enhance work safety is proposed.

Website:

https://www.cic.hk/eng/main/safety-corner/safety-publications/guidelines/



Buildings need regular maintenance and repair (M&R) to prevent them from rapid deterioration. The maintainability concept should therefore be integrated in the building design so as to facilitate M&R. Provision of adequate means of access for maintenance of the external building elements of a building (i.e. maintenance and repair access (M&R access)) in building design is of paramount importance in the maintainability strategy. Requirements of design and safety provisions of the air conditions is redefined to provide sufficient space and accessibility to the outdoor units of air conditioner.

Website:

https://www.bd.gov.hk/doc/en/resources/codes-and-references/code-and-design-manuals/cop_on_access_for_external_maintenance_2021.pdf

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Hong Kong Palace Museum

Project Name

Hong Kong Palace Museum, West Kowloon Cultural District, 8 Museum Drive, Kowloon

Member's Role in the Project

Heating, Ventilation and Air-conditioning Installation, Central Heating and Chilled Water Plants, Solar Hot Water Plant, Smoke Extraction System and Staircase Pressurization System Installation.

Completion Year

2022

Member / Company Name

China State Mechanical and Electrical Engineering Limited

Project Overview

The Hong Kong Palace Museum ("HKPM") is located at the harbour-front of the West Kowloon Cultural District which regularly displays the finest treasures from the Palace Museum and other important cultural institutes, such as painting, calligraphy, decorative arts and rare books to foster Chinese art and culture. It is a 7-storey building with about 7,800 m^2 exhibition area dividing into nine galleries. Precise environmental control is adopted in all galleries and museum storages in order to provide world-class atmosphere for invaluable exhibitions.

Project Highlights

The scope of work includes the supply and installation of HVAC systems for the HKPM. Energy-efficient, sustainable and environmentally friendly features integrated into E&M systems have been installed in which "Gold Class" of BEAM Plus from Hong Kong Green Building Council and "Good Class" of Indoor Air Quality (IAQ) have been achieved. Major E&M systems are included as follows:

- Chilled and Heating Water Distribution Systems
- Solar Hot Water System
- Air-conditioning and Air Distribution Systems
- Free Air-Cooling System
- Humidification
- Mechanical Ventilation System
- BMS System
- Water Treatment System
- Acoustic and Vibration Control
- Ventilation / Air Conditioning (VAC) System
- Staircase Pressurization System
- Smoke Extraction System

Project Characteristics

Precise Environmental Control in Galleries and Museum Storages

There are nine galleries and five museum storages in the HKPM which have adopted precise environmental control. Normally, the design temperature and relative humidity of 20 ± 2°C and 55 ± 5% respectively are maintained at all time. The water-cooled chilled water system (3 nos. of 600 TR & 2 nos. of 300 TR) provides 7°C of chilled water supply for space cooling and dehumidification purpose. The hot water plant (2 nos. of 410 kW and 2 nos. of 525 kW heat pumps) provides 40°C of hot water supply for re-heating purpose. In additional, every single AHU serving the galleries and museum storages is accompanied with a humidifier for humidification control. The wall mounted and high accuracy room temperature sensors, humidity sensors and CO_2 sensors have been installed in all galleries and museum storages which can monitor the room environmental condition precisely and instantly. Apart from this, the warning alarm signal will be generated in the BMS system when the environmental condition is out of the acceptable level.

Life Safety Systems in Smoke Control

There are 3 life safety systems preventing the loss of life during a fire related to smoke control in the HKPM which comprise of Ventilation/Air Conditioning System, Staircase Pressurization System and Smoke Extraction System. Both Method A and Method B of VAC control are adopted in ventilating systems. Class B (for fire-fighting) of the staircase pressurization system is used in 4 different staircases with protected lobbies and fireman's lifts. Smoke extraction systems with natural make-up are adopted in 5 different smoke zones which almost cover all the atrium areas. The hot smoke tests have been performed to demonstrate the desired performance of the systems at those atrium areas with headroom over 12 meters in height.

Energy Saving and Sustainability

Solar hot water system consists of 113 nos. of solar panels installed at the roof level of the HKPM. The vacuum tubes are coated with ALN/SS-ALN/CU which provide absorption coefficient more than 94% and emissivity coefficient less than 7%. The entire solar thermal system can generate minimum 276,000 kWh energy per year and is used to pre-heat the hot water for space heating. Besides, free air-cooling mode is applied for the PAUs and AHUs in the area. When the enthalpy of outdoor is lower than that of indoor, the cooling valve of the PAUs and AHUs will be closed in order to save energy.

Environmentally Friendly

In the HKPM, the main chiller plant consists of 3 nos. of 600 TR & 2 nos. of 300 TR water-cooled chillers utilizing the latest HFO R514A refrigerant technology for year-round cooling and dehumidification control. R514A refrigerants have characteristics with a low Global Warming Potential (GWP) value of 2 and also low Ozone Depletion Potential (ODP). For the chillers, the low-pressure design is applied to the evaporator and condenser which can greatly reduce the chance of refrigerant leakage with the maximum leakage rate of less than 0.5 % per year which is remarkably lower than industry accepted norm at 2% per year. As long as the refrigerant leakage can be minimized, it can enhance the environmental-friendly performance.

Summary

The HKPM presents more than 900 priceless treasures from the Palace Museum in Beijing since the Grand Opening on 1 July 2022. The integrated HVAC system including the precise environmental control has high capability to preserve the valuable exhibits from the regularly held and special exhibitions featuring Chinese art and culture displaying art pieces and treasures from other parts of the world. This definitely assists to position Hong Kong as an influential hub for art and cultural exchanges between Mainland China and the rest of the world.

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1.4 200kW以下精密空調GB/T19413；
1.5 200kW以下風冷熱泵GB/T18430.2；
1.6 全系列風機盤管GB/T19232；
1.7 1000kW風冷和水冷冷水機GB/T18430.1；
1.8 200kW以下水冷柜機GB/T17758；
1.9 10萬立方米每小時以下風量，風量報告；
1.10 風柜強度、漏風率、傳熱系數和熱橋因子。
2.0 冷凍水及熱水盤管換熱能力，風阻和水阻測試GB/T14296。
3.0 AHRI風冷冷水機及水冷冷水機報告，ANSI/AHRI Standards 550/590(T-P)。
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Annual General Meeting (AGM) Dinner

The ACRA Annual General Meeting has been hosted on 8 July 2022 introducing our newly elected office bearers. President Mr. M. T. Law and Chairman Mr. Pachu Leung with other council members are dedicated to continuously lead ACRA in stimulating the development of air conditioing industry by providing a platform to link our members and industry with the government bodies and organizations, providing competent training, implementing corporate social responsibilities and participating in industry events, etc.

AGM Dinner was followed after the meeting where the members could mingle with one another while indulging the authentic delicacies since the COVID-19 social distancing measures were loosen. Last but not least, special thanks was sent to our Immediate Past President, Mr. Franklin Lau for his great leadership from the past two years during the challenging pandemic period.

Experience Sharing by CIC Green Product Certification Owner: E&M Product Series (Webinar)

ACRA is devoted to promote green solutions to all E&M entities in order to align with the objective of increasing energy efficiency through reducing energy demand, optimizing production efficiency, improving environmental compliance, and enhancing corporate sustainability effort. Our Chairman, Dr. Pachu Leung and our valued members delivered an informative presentation and shared insights on green product solutions for E&M industry in Hong Kong at this Webinar organized by HKGBC on 27 September 2022. This webinar received overwhelming response attracted approx. 700 personnel to join.

Electrical & Mechanical Best Practices Ceremony (Online)

Organized by EMSD with the collaboration with E&M Trade, the E&M Best Practices Ceremony was held on 29 September 2022 for the launching of a series of booklets and handbooks as well as an e-platform of the Best Practices for Operations and Maintenance Services of E&M assets for facilitating quality management of the E&M installations. Our ACRA President, Mr. M. T. Law, supported this ceremony by calling upon the industry to comply with the captioned practices to enhance the wellbeing for our community.

空調管道隔熱材料知識，技術理論及實務證書課程

根據政府規定，承判政府工程之隔熱保溫安裝時，承判商必須提供不少於一成（10%）安裝技術人員持有本會或同等認可機構發出合資格証書的技術人員指導施工。有見及此，本會於2022年10月28日舉辦了一個證書課程解說一些有關「發泡橡塑保溫（豬腸膠）及玻璃棉」和「泡沫酚醛及PID直接風管系統」的資訊及經驗分享。

Caring Event – Happy Bags Delivery to Elderly
關懷社區行動 2022 – 開心福袋贈長者

Being the association representing the air conditioning industry, ACRA is perpetually committed in caring activities for sending our regard to the elderlies in our community. On 5 November 2022, ACRA jointly organized the Happy Bags Delivery to Elderly with HKFEMC and Open Door Ministries at Lam Tin. Led by FEMC Honorary Secretary Mr Emil Yu, ACRA President Mr. M.T. Law and Caring Committee Chairman Mr. Raymond Synn, the event was successfully completed with the wholeheartedly support from our respected council members, youth committee members, sponsors and volunteers.

Society of Operations Engineers 19th Anniversary Celebration Dinner 2022

Our council members were pleased to attend SOE's 19th Anniversary Celebration Dinner on 5 August 2022. Congratulations to SOE for the well recognition of the dedication in inspection, maintenance and management of the equipment and machinery ensuring the safety of people and business as well as for the sustainable engineering practice.

中華人民共和國成立七十三周年國慶典禮

一年一度的香港建造界慶祝中華人民共和國成立七十三周年國慶典禮於2022年9月21日假香港龍堡國際舉行。香港空調及冷凍商會很榮幸參與了這個典禮見證過往建造界的輝煌業績。在未來的發展，我們定會不遺餘力為業界一起創造更強大及繁榮的明天。

Building Safety Week

ACRA participated in the Building Safety Week 2022, a major public education and publicity event to promote building safety, organized by the Buildings Department held from 22 to 28 October 2022.

CLP Smart Energy Award 2022

On 26 October 2022, ACRA participated in CLP's Smart Energy Award being one of the judges for candidates competing for the Innovation Award, Event Management Award and Carbon Management Award. Congratulations to all award winners and thanks to CLP for this honourable judging invitation.

Green I&T Day

ACRA visited one of the HKSAR 25th anniversary celebration events namely the Green I&T Day jointly organized by Environment and Ecology Bureau, Electrical & Mechanical Service Department, China Association for Science and Technology Office of Hong Kong, Macao and Taiwan Affairs and Guangdong Provincial Association for Science and Technology on 3 November 2022. This event illustrated the energy efficiency and carbon neutrality achievements from past years, and offered a platform for the professionals to exchange innovative green solutions for our industry and society.

ACRA Youth Committee

On behalf of the ACRA Youth Committee (YC), it is our pleasure to share our devoted participation in the past months.

Let's Welcome Our New Core Members of the Year:

YC President:	Rocky Fung
YC Internal Vice President:	Ronald Kwong
YC External Vice President:	Gianna Kwok
YC Secretary:	Sabina Chung
YC Secretary:	Twinsen Cheng

Youth Committee will sustain our enthusiasm and professionalism to provide support for the stakeholders, council members, fellow members, and events of ACRA as well as the air conditioning industry.

E&M EXPO 2022

On 22 July 2022, the E&M EXPO 2022 with the theme of "Light Up Eco-City, Walk With me" was held at HKCEC. Together with our council members, we introduced the visitors to the scope of works, career prospects, promotion opportunities, training, and continuing education in the respected industry. We believe that young talents are crucial to the E&M sector which with the success of the E&M EXPO this year, we anticipate that more potential young engineers will be joining this trade to achieve some irreplaceable contributions.

Thai Boxing Trial Class

As the COVID-19 social distancing measure relaxes, HKFEMC YC organized a Thai Boxing Trial Class for fellow members on 31 July 2022. ACRA YC members were delighted to join this activity to cheer ourselves up through this exciting experience whilst having the opportunity to connect with others in this challenging period.



E&M Go!

The Hong Kong Electrical and Mechanical (E&M) Trade Promotion Working Group hosted the “E&M Go!” orientation ceremony at KITEC on 6 October 2022, welcoming about 750 young trainees of various E&M training schemes. We are pleased to take part in the ceremony with our ACRA President M. T. Law, Chairman Pachu Leung and council members, witnessing the newcomers entering the industry. There is no doubt that these apprentices will nourish in their training to enhance their future career path.







New Members

1	Associate Member	Nanofil Filtration Technology Limited	May 2022
2	Associate Member	CYH Limited	June 2022
3	Associate Member	CLPe Solutions Limited	August 2022

MEMBERSHIP LIST

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	Company Name		Contact Number	Website / Email	Trade
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	Krueger Engineering (Asia) Limited	高雅機電工程有限公司	2860 7333	www.krueger.com.hk	●
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	Winston Air Conditioning & Engineering (Hong Kong) Company Limited	永通冷氣工程(香港)有限公司	2764 1200	www.winston-hk.com	● ●
	York International (Northern Asia) Limited	約克國際(北亞)有限公司	2590 0012	www.johnsoncontrols.com	● ● ● ●
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	ATAL Building Services Engineering Limited	安樂機電設備工程有限公司	2561 8278	www.atal.com	● ● ●
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	Carewin Engineering Limited	嘉榮行工程有限公司	2898 2183	carewin@on-nets.com	● ●
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	Chun Wo E & M Engineering Limited	俊和機電工程有限公司	3758 8007	www.chunwo.com	●
	Daikin Airconditioning (Hong Kong) Limited	大金冷氣(香港)有限公司	3966 9528	www.daikin.com.hk	●
	Efatar Environmental Protection Equipment Limited	怡輝環保器材有限公司	2606 6922	www.cold-magic.com	● ● ●
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	Gate Way Valve & Fitting Limited	基法水管配件有限公司	2688 2666	www.gatewayv.com.hk	●
	Honeywell Limited	霍尼韋爾(香港)有限公司	2331 9133	www.honeywell.com	● ●
	Hsin Chong Aster Building Services Limited	新昌亞仕達屋宇設備有限公司	2675 3300	www.aster.hk.com	●
	Johnson Controls Hong Kong Limited	江森自控香港有限公司	2590 0012	www.johnsoncontrols.com	● ● ● ●
	K-Thorn Engineering Company Limited	旗鋒工程有限公司	2481 2918	main@k-thorn.com.hk	●
	Lik Kai Engineering Company Limited	力佳工程有限公司	2611 4501	ericyung@likkai.com.hk	●
	Lucky Engineering Company Limited	運通冷氣電業有限公司	2780 5285	general@luckyeng.com.hk	●
	McQuay Air-Conditioning Limited	麥克維爾空調有限公司	2893 6261	www.mcquay.com.hk	● ● ● ●
	MECO Engineering Limited	德寶工程有限公司	2774 8200	meco-engltd@yahoo.com.hk	●
	Midea Electric (Hong Kong) Limited	美的電器(香港)有限公司	3669 4888	www.mideahk.com	● ● ●
	Quad-Tech Engineering (Hong Kong) Company Limited	高得工程有限公司	2573 1832	qt@quadtech.com.hk	●
	Raising Engineering Limited	威信工程有限公司	2395 6081	simonsiu@raising.com.hk	●
	Ryowo (Holding) Limited	菱和(集團)有限公司	2391 8381	www.ryowo.com	●
	Siemens Limited	西門子有限公司	2107 6506	andy.wong@siemens.com	●
	Skyforce Engineering Limited	天科工程有限公司	2885 1620	info@skyforce.com.hk	●
	Southa Technical Limited	南龍機電工程有限公司	2963 7175	www.southa.com	●
	Standard Refrigeration & Engineering Company Limited	立德工 程有限公司	2781 0871	SRE@hklpg.com.hk	● ● ●
	Takasago Thermal Engineering (Hong Kong) Co., Ltd.	高砂熱學工業(香港)有限公司	2520 2403	sales@takasago.com.hk	● ●
	Technicon Engineering Limited	得力確工程有限公司	3193 1300	technic@technicon.com.hk	●
	Welcome Air-Tech Limited	偉基空調有限公司	2806 8316	www.saiver-welaire.com.hk	● ● ●
	Westco Airconditioning Limited	威高冷氣工程有限公司	2426 3123	mandylo@scee.com.hk	●

Contracting · Manufacturing · Servicing · Supplier

	Company Name		Contact Number	Website / Email	Trade
ACRA Associate Members	ABB (Hong Kong) Limited		2929 3800	www.abb.com	●
	Aeroseal (HK) Limited	亞樂斯(香港)有限公司	2511 2118	www.aerosealhk.com	●
	A-Gas Environmental Services HongKong Limited		3188 5078	www.agas.com	●
	A & R Engineering Company Limited	奇業工程有限公司	2408 2960	general@arengco.com.hk	●
	Aires Engineering Company Limited	毅力機電工程有限公司	2658 8856	adrianwong@aires.com.hk	●
	Alpha Appliances Limited	第一電業有限公司	2529 7555	www.alpha-general.com	●
	Anway Engineering Company Limited	正佳工程有限公司	2598 4228	www.anway.com.hk	●
	Armacell Asia Limited	阿樂斯亞洲有限公司	2574 8376	www.armacell.com	●
	Arnhold & Co., Ltd.	安利有限公司	2807 9400	patricklai@arnhold.com.hk	●
	A Shing Engineering Company Limited	亞成冷氣工程有限公司	2537 1818	wilkiengan@ashing.com.hk	● ●
	Associated HVAC Contracting Company Limited	華聯冷氣工程有限公司	2573 1716	aec@aechvachk.com	● ●
	Auto Integrated Limited	奧力科技有限公司	2612 0758	rickie@autoinhk.com	● ●
	BELIMO Actuators Ltd.	搏力謀執行器有限公司	2682 7837	www.belimo.com	●
	Bollfilter Hong Kong Ltd.	波勒過濾系統(香港)有限公司	2715 5000	www.bollfilterchina.com	● ● ●
	Biocline Healthcare Services Ltd.	新康醫療器材工程有限公司	2672 1111	bio@biocline.com	● ●
	Bitzer Refrigeration Asia Limited	比澤爾制冷亞洲區有限公司	2868 0206	www.bitzer.de	●
	Brisky Limited	穿梭科技有限公司	2511 3161	tkwan@briskyltd.com	● ● ●
	Castco Testing Centre Limited	佳力高試驗中心有限公司	2597 8333	www.castco.com.hk	**Laboratory Testing**
	Centalink International Limited	信嘉國際有限公司	2626 1897	andy@centalink.com.hk	● ●
	CDBM Engineering Consultant Company Limited	新雄力工程顧問有限公司	2598 1088	mail@cdbm.asia	●
	Cheung Kee Metal Company Limited	祥記五金有限公司	2393 1448	www.ckmetal.com	●
	Chi Yip Engineering Company	志業工程公司	3078 9984	canny@acmv-cy.com	● ●
	Chin Tat Trading Company	展達貿易公司	3521 1589	www.chintat.com.hk	●
	Chit Tat Electrical Engineering Limited	捷達機電工程有限公司	2529 8888	chittat@yahoo.com.hk	● ● ●
	Chong Kin Air-Condition Trading Engineering Co., Ltd.	創建冷氣貿易工程有限公司	2307 5159	www.chongkinaircon.biz.com.hk	● ●
	C.J. Wishing International Limited	惠生電業有限公司	2799 9797	cjwish@cjwish.com.hk	●
	CLPe Solution Limited	中電源動有限公司	2678 7900	www.clpesolutions.com	● ●
	Clydeman Engineering Limited	佳電工程有限公司	2332 3591	daniel@clydeman.com	● ● ●
	CMA Testing & Certification Laboratories Limited	廠商會檢定中心	2698 8198	www.cmatesting.org	**Laboratory Testing**
	Crowntin Limited	冠殿有限公司	8202 0830	clchoy@crowntingrp.com.hk	● ●
	CYH Limited	仲賢行有限公司	2967 3999	www.cyhltd.com.hk	●
	Delta Pyramax Company Limited	佳澤科技有限公司	2511 2118	www.deltapyramax.hk	●
	Dictson Engineering Ltd.	迪迅工程有限公司	2891 8070	lui@dictson.com.hk	● ●
	Dynalink International Technology Limited	匯能國際科技有限公司	3955 0203	www.di-technology.com	● ● ●
	Eaxon International Company Limited	恩索有限公司	3590 4656	gamescheung@eaxon.hk	● ● ●
	ebm-papst Hong Kong Limited	依必安派特香港有限公司	2145 8678	info@hk.ebmpapst.com	● ●
	Electrodrive Engineering Limited	高宜工程設備有限公司	2573 7211	info@electrodrive-eng.com	●
	Enviro-Tech Engineering Company Limited	鷹達工程有限公司	2827 0688	steveli@envirotech.com.hk	●
	Ever Cool Refrigerating & Air-Conditioning Co., Ltd.	嘉毅冷凍空調設備有限公司	2356 8598	info@evercoolhk.com	● ●
	Evergreen Environmental Technology Company Limited	冬青環保科技有限公司	2562 3331	www.evergreen-environmental.com	●
	Extensive Trading Company Limited	精基貿易有限公司	2889 1681	www.extensive.com.hk	●
	Far East Engineering Services Limited	遠東工程服務有限公司	2898 7331	www.fareast.com.hk	● ●
	Fortune Links Hong Kong Limited	鑫力香港有限公司	2562 9399	info@fortunelinks.com.hk	● ● ●
	GTECH Services (Hong Kong) Limited	英國通用工程(香港)有限公司	2123 0888	www.gtechservices.com.hk	●
	GELEC (HK) Limited	香港通用電器有限公司	2919 8383	hq@gelec.com.hk	●
	Gether-Force Air-Conditioning Engineering Co., Ltd.	群力冷氣工程有限公司	2890 2622	geforce@hknet.com	●
	Getwick Engineers Limited	佳域工程有限公司	2893 3600	getwick@getwick.com	●
	Glory Air-Conditioning Limited	天恩空調有限公司	3487 9092	gloryacltd@gmail.com	● ● ●
	Golden Leaf International (Hong Kong) Limited	金葉國際(香港)有限公司	2648 1000	info@glint.com.hk	● ●
	Goodway Electrical Engineering Limited	佳濤電業有限公司	2405 0888	www.goodwaygrille.com	● ●
	Gotop Engineering (HK) Limited	高陞工程(香港)有限公司	2459 3038	gotopco@yahoo.com.hk	●
	Great Top Engineering Limited	宏鋒工程有限公司	2345 2219	general@greattop.com.hk	●
	Greentech Engineering Limited	堅迪工程有限公司	2776 3128	www.hk-greentech.com	●
	GRUNDFOS Pumps (Hong Kong) Ltd.	高福水泵(香港)有限公司	3540 0300	www.grundfos.com	●
	Hang Ji Industries International Co., Ltd.	恆基工貿國際有限公司	2721 6129	www.hangji.com	●
	Hensen System Engineering Limited	豪信系統工程有限公司	2884 9001	cecil@hensen.com.hk	●

MEMBERSHIP LIST

ACRA Associate Members

Company Name		Contact Number	Website / Email	Contracting	Manufacturing	Servicing	Supplier
Hilti (HK) Limited	喜利得(香港)有限公司	2954 1751	www.hilti.com.hk		●		
Hofmann Construction Material Ltd.	香港好夫曼建材有限公司	3157 1841	www.hofmannhq.com				●
Honest Air Conditioning Limited	明發冷氣有限公司	2396 8108	www.achonest.com	●			●
H.W. International Air-Conditioning Limited	豪華國際空調有限公司	2796 8888	info@hooair.com		●		
IES Engineering (Hong Kong) Limited	恒豐工程(香港)有限公司	2992 0830	www.ieshk.com.hk			●	●
InnoTec Engineering Ltd.	科技工程有限公司	3706 6333	info@innoteceng.com	●			
Intelligent Technologies Limited	毅智科技發展有限公司	2301 4868	info@intelligent-net.com				●
Jade Star Engineering Limited	捷陞工程有限公司	3998 3256	jadestarhk@yahoo.com.hk	●		●	
JC (HK) Engineering Limited	悅峰工程有限公司	2898 9885	jc.hk.eng@gmail.com	●	●	●	●
Jetford Engineering & Trading Company Ltd.	捷科工程有限公司	3101 2323	www.jetford.com.hk	●		●	●
J & J Network Engineering Company Limited	信卓網絡工程有限公司	3579 5263	www.jjnetwork.com.hk				●
Johnson Controls-Hitachi Air Conditioning Trading (Hong Kong) Limited	江森自控日立空調貿易(香港)有限公司	2590 0012	www.jci-hitachi.com		●		●
Joneson Environmental Technologies Limited	忠誠環保科技有限公司	2889 8220	jet@fsenv.com.hk	●	●	●	●
Join Rich Engineering Limited	億聯工程有限公司	3153 2048	www.joinrich.com.hk	●			
Jinchat Engineering (HK) Company Limited	正卓工程(香港)有限公司	2687 1755	jyin@jinchat.com		●	●	●
Jun Feng Company Limited	駿峯有限公司	2707 3088	www.junfeng.com.hk			●	●
Kamui Cold Chain Engineering & Service Limited	淦鎧冷鏈工程服務有限公司	2554 6666	admin@kamui.hk	●		●	
Keio Engineering Company Limited	京王工程有限公司	2695 8872	www.keio.com.hk	●			
Kembla (Hong Kong) Limited	金特霸(香港)有限公司	2528 0999	www.kembla.com.hk				●
Kin Wo A/C Engineering Limited	健和冷氣工程有限公司	2398 0157	kw@kinwo.com.hk	●			
Kinetics Noise Control (Asia) Limited	建力聲震控制(香港)有限公司	2191 2488	www.kineticsnoise.com		●		●
Kingsfield Engineering Ltd.	堅輝工程有限公司	2815 9560	www.kelhk.com			●	
Kings View Airconditioning Engineering Co., Ltd	景匯空調工程維修有限公司	2796 2417	admin@kingsview.com.hk	●			
K-Flex (Hong Kong) Insulation Company Limited	凱門(香港)保温材料有限公司	2668 5202	www.k-flex.com		●		
KSB Limited	凱士比有限公司	2147 1226	philip.chow@ksb.com.hk		●		
K.Y.H. Steel Company Limited	金源行鐵倉有限公司	3473 2332	www.kyh.com.hk				●
Laser Resources (Asia) Company Limited	全美(亞洲)有限公司	2516 7500	laasiahh@netvigator.com		●		●
Lap Kei Engineering Company Limited	立基冷氣工程有限公司	2798 8210	www.lapkeieng.com	●		●	
LeBlanc Water Treatment & Chemicals Limited	利邦化工水處理有限公司	2408 2000	www.leblanc.com.hk			●	
Lee Tack Engineering Company Limited	李德工程有限公司	2305 3111	ltec@leetack.com.hk	●			
Lee Yip Metal Products Compnay Limited	利業金屬有限公司	3651 2698	www.leekeegroup.com				●
Legend Engineering Company Limited	卓越聲控工程有限公司	2815 0928	info@legendjt.com.hk	●	●		●
Lifa Air Limited	麗風空氣有限公司	2511 7076	www.lifa-air.com			●	●
Life Air IAQ Limited	活力空氣品質科技有限公司	3527 0106	winston@lifeairiaq.com		●		●
Link The Best Company Limited	必發(香港)有限公司	2568 4092	www.linkthebest.com.hk		●		●
Luen Fat Air Condition (Holding) Trading & Engineering Co., Ltd.	聯發冷氣(集團)貿易工程有限公司	2345 0280	www.luenfat.com				●
Luen Ming E & M Engineering Ltd.	聯明機電工程有限公司	3619 9186	info@luenmingem.hk	●			
Luen Ming Pengshan Air Conditioning Factory Ltd.	聯明坪山冷氣製品廠有限公司	2797 2168	www.luenming.com				●
Man Tung Air-Conditioning E & M Ltd.	萬通冷氣機電有限公司	3165 8698	www.manshungroup.com.hk	●			
Mason Industries (HK) Limited	梅森實業有限公司	2967 9639	www.mason-hk.com				●
Maxwell Electrical Asia Ltd.	美基電器亞洲有限公司	3583 5088	www.maxwell-asia.com		●	●	
Mesan Fiberglass Engineering (International) Limited	明新玻璃纖維工程(國際)有限公司	2787 5717	www.mesanct.com		●		
Mitsubishi Electric (Hong Kong) Limited	三菱電機(香港)有限公司	2887 4575	www.mitsubishi-ryoden.com.hk				●
NAP Acoustics (Far East) Limited	NAP 聲學工程(遠東)有限公司	2866 2886	www.napacoustics.com.hk	●	●	●	●
Nanofil Filtration Technology Limited		3708 1838	https://nanofil.com.hk		●		
New Way Engineering Company Limited	新法機械有限公司	2325 6892	www.newway.com.hk				●
O-Link Limited	奧聯(國際)有限公司	2619 8888	www.o-link.com.hk		●		
Oxprime (International) Limited	鑫輝(國際)有限公司	2590 8088	info@oxprime.com				●
Pacific Sense Enterprises Limited	栢昇企業有限公司	3749 5272	www.pacificsense.com.hk	●			●
Paul Y. (E&M) Contractors Limited	保華機電工程有限公司	2831 8338	www.pyengineering.com	●			
Pekko Engineers Limited	柏高工程有限公司	3973 0698	www.leightonasia.com	●			
PowerTech IPC Company Limited	科力發展有限公司	3105 3928	www.powertechipc.com			●	●
Powers Technical Services Limited	寶華技術服務有限公司	2770 2110	powers.pts@gmail.com	●			
Practical Engineering (Hong Kong) Company Limited	百利高工程(香港)有限公司	2402 2772	practical@practical.hk	●			●
Pyrofoe Engineers Limited	衛安工程有限公司	2388 8038	www.pyrofoe.com.hk	●			

ACRA Associate Members

Company Name		Contact Number	Website / Email	Contracting	Manufacturing	Servicing	Supplier
Ready Electrical Metal Work Limited	全達電器金屬製品有限公司	2898 8623	kw_leung@ready-group.com	●	●		
REC Green Technologies Company Limited	盈電環保科技有限公司	2619 8817	www.yaulee.com			●	●
Ritech Engineering & Supply Company Limited	偉達工程材料有限公司	2410 1819	www.ritech-hk.com				●
San Yik Air Conditioning Engineering Company Limited	新益冷氣工程有限公司	3565 5812	www.sanyikgroup.com	●		●	●
Sanby Trading Company Limited	聖備貿易有限公司	2573 4219	www.sanby.com				●
Samsung Electronics H.K. Company Limited	三星電子香港有限公司	2862 6300	www.samsung.com.hk		●		
Savills Engineering Limited	第一太平戴維斯設備工程有限公司	3622 3309	chytsang@savills.com.hk	●		●	
Shenling Environmental Systems (Hong Kong) Ltd.	申菱環境系統(香港)有限公司	2603 0002	www.shenling.com				●
Shun Hing E & M Engineering Limited	順興機電工程有限公司	2387 2882	project@shunhingeng.com	●			●
Shun Hing Electric Service Centre Limited	信興電器服務中心有限公司	2406 5333	www.shunhing-service.com			●	
Shun Hing Electronic Trading Co. Ltd.	信興電器貿易有限公司	2733 3888	www.shunhinggroup.com	●			●
Shun Tung Engineering Company Limited	順通冷氣電機工程有限公司	2633 6866	info@shun-tung.com	●			
Sing Kin Limited	陞建有限公司	2333 1518	singkin@gmail.com	●			
Smartech HVAC & Engineering Limited	智能空調工程有限公司	2521 9768	info@smartech-hvac.com.hk				●
Southa Engineering Limited	南龍工程有限公司	2963 7241	www.southa.com	●			
Stars (Hong Kong) A/C & R Company Limited	恒星(香港)冷熱設備有限公司	6116 7832	stanley_yuen@hstars.com.cn		●		
Sun Chun (E & M) Engineering Limited	新駿(機電)工程有限公司	3613 0755	info@sunchuneng.com	●			
Sun First International Limited	昇福國際有限公司	2807 7888	www.sunfirst.com.hk				●
Sun Yu Chau Engineering Company Limited	新宇宙工程有限公司	2345 9355	www.sycengg.com.hk	●			
Sunny Fire Engineering Ltd.	華輝建材有限公司	2395 6766	sunnyfireengltd@gmail.com	●			
Sun Ying Prefab Products Limited	新鷹預製件有限公司	2547 7877	www.sunying.com.hk		●	●	●
Superpower Pumping Engineering Company Limited	力霸水泵機械工程有限公司	2745 3562	www.sppump.com				●
Sustainable Energy Limited	恒澤節能有限公司	2332 3077	www.sustaine.com.hk		●	●	
Target Energy Solutions Limited	達標能源管理有限公司	2345 0298	www.targetensol.com			●	
Teembase Development Limited	天基發展有限公司	2554 6263	www.teembase.com				●
The Hong Kong & China Gas Company Limited	香港中華煤氣有限公司	2963 3368	www.towngas.com				●
Tinwood Pacific Limited	天匯太平洋有限公司	6325 1197	www.sinro.com		●		
Tom's Equipment Company Limited	義隆設備有限公司	2757 5539	tom@toms-equipment.com				●
TICA-SMARDT Hong Kong Limited	天加思茂特香港有限公司	2772 8448	hk.info@smardt.com				●
Tin Sing Chemical Engineers Ltd.	天成化工有限公司	2619 8858	tsc@rec-eng.com			●	●
Trisun Air Conditioning System Limited	三陽系統有限公司	2377 1618	enquiry@trisun.com.hk	●		●	●
TROX Hong Kong Limited	妥思香港有限公司	2861 2261	www.troxapo.com				●
Tung Shing Hardware Company Limited	東成五金有限公司	2626 9983	www.tungshinghardware.com.hk				●
Union (Luen Hop) Refrigeration Co., Ltd.	聯合冷氣工程有限公司	2627 4600	unionlh@bizentvigator.com	●			
United Controls (Hong Kong) Limited	統一儀器(香港)有限公司	2556 1001	www.ucl668.com			●	●
Victaulic Hong Kong Ltd.		6898 6823	www.victaulic.com		●	●	●
Victory Engineering Service Company Limited	維陞工程有限公司	2979 4068	pamela@ves.hk				●
Viewco Building Services & Engineering Co., Ltd.	偉保工程有限公司	2543 0610	engineering@viewco.com.hk	●			
Vircon Limited	雲建有限公司	2617 2770	www.vircon.com.hk	●	●	●	
Wai Luen Air Conditioning Limited	偉聯空調設備有限公司	2890 9321	garychan@wailuenhk.com	●			
Wai Tat E & M Engineering Company Limited	偉達機電工程有限公司	2682 7200	fungscww@netvigator.com	●			
Wardson Engineering Limited	華順工程有限公司	2329 8268	wsengltd@yahoo.com.hk	●			
White Hippo Limited	白河馬企業有限公司	2303 1318	www.kshop310.hk				●
Wilco Engineering Limited	駿陶工程有限公司	2344 7725	info@wilcoenghk.com	●			
Wing Shing Air-Flow Company Limited	永盛風咀製品廠有限公司	2792 6331	accounting@wingshing-hvac.com		●		●
WinTech Century Company Limited	宏達世紀有限公司	2760 4883	www.tanda.info	●			
Wo Lee Steel Company	和利鋼鐵有限公司	2393 0131	www.wolee.com				●
Wolter Asia Limited	華德亞洲有限公司	2456 0198	info@wolter.com.hk		●		●
Wysermann Company Limited	威士文有限公司	2614 2213	wysermann@wysermann.com.hk		●		●
Yin On Trading Limited	賢安建材貿易有限公司	2572 7110	office@yinon.com.hk				●
Yordland Engineering Limited	日島工程有限公司	2362 2186	www.yordland.com	●		●	●
York Choi Industrial Limited	旭彩實業有限公司	2795 8286	www.yorkchoi.com		●		
Yuen Fong Air-Condition Products (HK) Limited	圓方空調設備製品(香港)有限公司	2880 5880	yuenfongaircondition@hotmail.com				●
Zenith International Enterprise Ltd.	盛豐國際企業有限公司	2815 5852	www.ebara.com.hk				●

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Duct & Pipe Support Insulation

Load-Bearing Insulation, fit for Various Insulation material & perfect the Whole Insulation System

VARIOUS colour vapour barrier surface, fit for VARIOUS design environment / purpose
HEAVY DUTY DSF Aluminium Foil Facing : Aluminium bright / Black matt / White antiglare & etc...

Easy & Fast Installation
Apply adhesive + Snap insulation + Seal with Tape

2022 onward...
*Major Job Reference

Hong Kong Palace Museum
West Kowloon Cultural District,
Year of Completion : 2022

M+ Museum
West Kowloon Cultural District,
Year of Completion : 2020

CUHK Medical Centre
Year of Completion : 2020

MTR Express Rail Link,
West Kowloon Terminus
Year of Completion : 2017

Passenger Clearance Building, Hong Kong Boundary Crossing Facilities,
Hong Kong-Zhuhai-Macao Bridge.
Year of Completion : 2018

Liantang / Heung Yuen Wai Boundary Control Point
Year of Completion : 2020

Fire and Ambulance
Services Academy
Year of Completion : 2015

Court of Final Appeal, Central
Year of Completion : 1996

General Cancer Centre,
Prince of Wales Hospital
Year of Completion : 1994

Central Mail Centre
Year of Completion : 2013

Nina Tower
Year of Completion : 2007

International Financial Centre
Phase I (IFC-I)
Year of Completion : 1998

SOLE AGENT/STOCKIST :

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