REVOLUTIONARY ENERGY SAVINGS FOR THE BUILT ENVIRONMENT

The world-proven range of high efficiency oil-free centrifugal chillers from Smardt

SMARDT

Global Leader in Oil-Free High Efficiency Cooling

Smardt manufactures and distributes the widest range of innovative, energy efficient and oil-free chillers. As the first manufacturer in the world to utilize this compressor technology, Smardt now offers the most comprehensive range of Water Cooled, Air Cooled, Evaporatively Cooled and unique Split Chillers delivering high efficiency cooling solutions to customers world-wide.

Smardt remains the globally trusted leader in high efficiency oil-free cooling, since it delivered the world's first oil-free chillers in 2002.

Smardt, known originally as PowerPax, was founded in Melbourne, Australia in 2000, by a team of HVAC industry veterans to specialise in high-efficiency shell-and-tube heat exchangers and their optimisation for oil-free centrifugal chillers. In 2005, Smardt established a factory in Montreal, Canada, with a team of Turbocor veterans to produce high efficiency chillers for the North American market. Since 2005, Smardt has continued to grow rapidly, adding manufacturing facilities in Europe in 2010, Asia in 2012, and South America in 2015.

With more than 5000 oil-free chillers now installed worldwide, Smardt has won recognition for providing the lowest lifecycle cost cooling solutions across many industries, including commercial applications such as hotels, offices, data centres, hospitals, government buildings, and industrial applications, such as pharmaceuticals and F&B manufacturing.

Smardt has strategically established an extensive global sales and support network, with regional offices working in conjunction with Smardt's manufacturing facilities in Australia, Canada, USA, Germany, China and Brazil, to ensure it can deliver these high efficiency cooling solutions to customers world-wide.

All of Smardt's chillers are designed and manufactured to the highest standards, and Smardt is the only OEM that is 100% focused on oil-free chillers, exclusively manufacturing an extensive range of water cooled, air cooled, evaporatively cooled high efficiency oil-free chillers, optimized for Danfoss Turbocor Magnetic Bearing Oil-free Compressor Technology.

The Smardt chiller range delivers high reliability, outstanding quality, industry leading efficiencies, and the overall lowest cost of ownership to building owners. Achieving these goals as consistently and simply as possible remains Smardt's core purpose, and clearly differentiates it from other chiller manufacturers.

Chiller Advancements

Oil-free design optimizes heat transfer

The well-known ASHRAE study (research project 361) concluded that typical lubricated chillers show reductions in design heat transfer efficiency of 15 - 25%, as lubricant accumulates on heat transfer surfaces, denatures, and blocks normal thermodynamic transfer processes. Logically, no oil in your chiller means no oil contamination over time, so design efficiency is maintained effortlessly.

Extraordinary soft-start efficiency

The compressor's power electronics, further enhanced by Smardt's chiller controller, require only 2 amps for start-up, compared with 500-600 amps in conventional capacity machines. This provides further savings for owners, who can reduce maximum power loads and reduce backup generator size, cost and capacity, and maintain customer power tariff profiles.

Rugged and built-in defence against power failure

Each compressor has a bank of capacitors used for energy storage and filtering DC voltage fluctuations. In the case of a power failure, the capacitors continue to provide power to the bearings to keep the shaft levitated, allowing the motor to turn into a generator and to power itself down to a stop. Extended real world testing has confirmed the system's remarkable durability.

Oil-Free Technology

All Smardt chillers, are designed to optimize the performance of the oil-free centrifugal compressors from Danfoss Turbocor Inc. These compressors use oil-free magnetic bearings and variable-speed drives to deliver superior efficiencies than conventional oil-lubricated centrifugal, reciprocating, scroll and screw compressors. Delivering high speed impeller performance - up to 45,000 rpm, whilst also being extremely compact, very quiet, rugged and reliable.

Proprietary magnetic bearings replace conventional oil-lubricated bearings, eliminating high friction losses, mechanical wear and high-maintenance oil management systems. This contributes to the delivery of chiller energy savings of 35 percent and more over conventional chillers whilst ensuring long-term reliability.
The compressor's one main moving part (rotor shaft and impellers) is levitated during rotation by a digitally-controlled magnetic bearing system. Position sensors at each magnetic bearing provide real-time feedback to the bearing control system, at the incredible rate of 100,000 times every second, ensuring constantly centered rotation.

Chiller Advancements

HFC–134a Refrigerant

R134a has no Ozone Depletion Potential and no phase–out schedule under the Montreal Protocol.
It has an A1 rating under ASHRAE standard 34 (no flame propagation, lower toxicity). Positive pressure chiller designs (compared with negative pressure designs using R123, for example) enhances sustainable performance, as neither air nor moisture can leak into the chiller. No purge unit is required – a further saving. Liquid R134a refrigerant is used in Smardt chillers to cool critical electronic and electromechanical components to ensure maximum efficiency and safe operation.

Energy cost savings can be spectacular

Compared with a new screw chiller, Smardt's IPLV efficiency is routinely more than 32% better. Compared with older lubricated reciprocating, screw, scroll or centrifugal chillers, year round savings with Smardt chillers can be spectacular, with over 50% savings. Under AHRI conditions, Smardt's IPLV performance can be as low as .31 kW/TR, higher than 11.5COP, while part load efficiency can be under .27 kW/TR, higher than 13.0 COP.

Very Quiet

Smardt chillers have very low sound and vibration levels, due to the absence of physical contact between moving metal parts. This eliminates the need for expensive sound attenuation. Smardt chillers are typically so quiet that a novice cannot tell whether they are actually operating. Testing of Smardt water–cooled chillers with reference to AHRI standard 575 yields readings as low as 75 dBA at 1 meter.

Extremely Fast Restart

Mission critical cooling plants such as data centres, hospitals, and industrial facilities require continuity of chilled water supply for air–conditioning and equipment cooling. It can be disastrous and costly to an operation if a power failure occurs and the cooling system is interrupted. In such an instance, the amount of time to restart a conventional chiller could be detrimental to operations. The new Smardt Restart™ feature can start up the compressors in as little as 20 seconds. This built–in feature helps you to reduce the risk of cooling disruption, saving you from risking millions of dollars in equipment failure and operational downtime.

Lowest lifetime operating costs

Smardt maintains simplicity in chiller design and operation - reflected by quality workmanship, unit operational reliability and low operating costs. This is remarkably simple - with no oil, flooded shell-and-tube evaporators, soft start, low power consumption, low maintenance costs and high reliability with only one main moving part. Smardt field reliability has been outstanding - not surprising when you consider that an estimated 80% of all chiller problems in the field are due to issues with oil return to the compressor, which Smardt has eliminated through removing the need for oil. The growing fraternity of Danfoss Turbocor trained engineers and technicians often suggest that total maintenance costs for oil-free chillers are well under half the costs of traditional lubricated chillers. These estimates are conservative at best.

Servicing

Ease of serviceability is always important in minimizing operating costs, and Smardt have ensured that service access is swift and simple. Today's technologies are also employed to offer access to the chiller through remote monitoring, allowing compressor and chiller set points to be accessed remotely by trained and authorized service personnel.

Simple BAS integration

Integration with Modbus and BACnet building management systems are standard options, as is connectivity with most other industry-standard protocols.

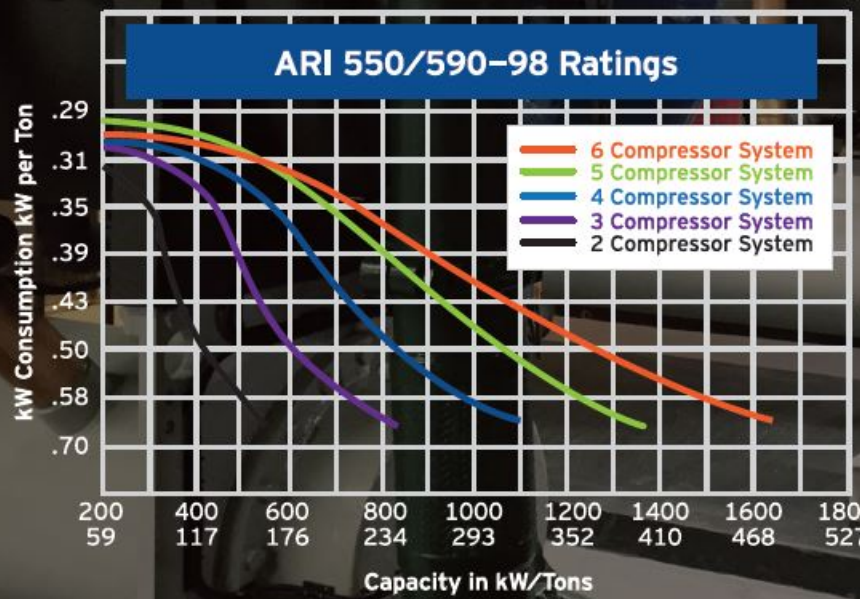
Redundancy

Smardt, through their innovative use of multiple compressors provides exceptional built in redundancy, and greater flexibility in system design. Using up to eight compressors on a single chiller, offering multiple circuits when necessary, Smardt can provide a single chiller capable of satisfying both the full load and the low load requirements of a system. This enables system designers to eliminate the necessity for costly multiplication of chillers, pumps and controls as redundancy is available by simply selecting an additional compressor on the chiller. Multiple compressors also allow system designers to save on low-load chillers, because with a VFD integrated into each compressor, a chiller which uses multiple compressors can be efficiently driven right down below 10% of its full capacity.

Custom design and problem solving

The group's design engineers are happy to resolve special equipment design challenges for you. For example, dimensional and clearance constraints can be allowed for, as can non-standard water temperatures. Corrosion protection, stainless steel tube sheets, Integrated Automatic Condenser Tube Cleaning system, Fast Restart functionality, Free Cooling, and many other options are available to be built-in and can be quoted on request.

Chiller Advancements



This test data, from a 480 TR water-cooled chiller using 2-6 TT300 compressors on a single pair of shell and tube vessels, shows clearly how best-in-class energy efficiencies are routinely delivered.

SMARDT Solutions Product Range

Water Cooled

60TR / 200kWR to > 2500TR / 8800kWR

The Smardt water-cooled range offers the highest efficiencies, lowest sound levels, and smallest footprints available. The water-cooled range is configured with up to eight compressors, depending on the capacity required. This redundancy DOES NOT come at the cost of efficiency, as is often the case with conventional chillers.
The chillers can be configured with a vast array of options including stainless steel tubesheets and waterboxes, accessible sacrificial anodes, marine water boxes, various water pass arrangements, and various insulation types clad in either aluminium or stainless steel. Due to the Smardt chillers being oil-free, the vessels can be easily rearranged from the standard configuration to a horizontal or side by side configuration, to suit particular plant space requirements. Additional options such as alternate low-GWP refrigerants, the use of seawater or other cooling fluids, and other special applications can also be accomodated.

Split Chillers

Smardt's unique split chiller range makes light work of previously impossible access situations. Water cooled chillers normally consist of two long vessels – an evaporator and a condenser. Many manufacturers can offer to separate these, along with compressors and other components, in order to transport the chiller into plantrooms with tight access considerations. However, even then the task is sometimes impossible or very expensive.
Smardt can take the dismantling process even further by splitting the long vessels in half, removing each of the compact and lightweight compressors (approximately 130kgs or 280lbs), allowing a large chiller to be easily transported to the plantroom in pieces via goods lifts and narrow corridors, saving expensive cranage and rigging cost.
Chillers can be supplied from our factory prepared for disassembly to ensure the process of installation is as simple as possible. Also, a representative from our Smardt service partner network can be employed to supervise the disassembly and rebuild process to ensure relevant guidelines are followed.
Inefficient, modular style chillers are no longer the only option for space and weight challenged installations. This unique solution from Smardt sets a new benchmark.

Product Range SMARDT Solutions

Evaporatively Cooled

60TR / 200kWR to > 375TR / 1320kWR

The Smardt evaporatively cooled range offers a unique packaged chiller that operates at close to water cooled system efficiencies, without the concerns of condenser water systems and cooling towers. Water usage is only 20% of that used by an open cooling tower system. Condenser pumps, piping, cooling towers, expensive water treatments, and the risk of legionella infections are totally eliminated. The evaporative condenser is purpose built by Smardt and completely integrated as part of the chiller and the wet media panel maintenance is extremely simple. These chillers are designed for warm, dry climates such as those found in south parts of Australia and the south west United States, where demand for improved energy efficiency, reduced maintenance costs, and lower water usage are answered with this innovative chiller. In these climates, Smardt evaporative chiller efficiencies are approximately 30% more efficient than Smardt air-cooled chillers.

Air Cooled

60TR / 200kWR to > 440TR / 1550kWR

The Smardt air-cooled range offers a small footprint, the quietest operation and the highest air-cooled operating efficiencies on the market. Condenser coils use a "V" configuration, providing excellent air distribution and offering increased protection from fin damage, and are designed with a dedicated subcooling section to optimise heat rejection. Coils are baked and double-coated with epoxy and have sealed edges as standard, to extend the coil's physical protection from environmental corrosion. Additional corrosion protection and fin materials are also available. All mechanical components, except for the fans, are completely enclosed in a weather proof enclosure, preventing exposure to the elements and prolonging their life and further reducing maintenance costs. EC fans are used as standard, providing the best efficiencies and the lowest sound levels on the market. Smardt Free Cooling packages are also available, which can drive air-cooled chiller efficiencies to spectacular levels when operating at appropriately low ambient temperatures.

SMARDT Solutions Product Range

SMARDT Chiller Range

Smardt has the world's largest range of oil-free chillers, ranging from 60RT / 200kWR up to 2500RT / 8800kWR ensuring there is a solution to meet your needs.
Smardt utilises its unparalleled experience in oil free chiller technology, to fine tune each chiller selection, on a project by project basis, allowing Smardt to exactly meet its customers capacity, efficiency and redundancy requirements. Along with the ability to meet its customer's performance criteria, Smardt also can select chillers to best meet the customer's space and plant room configuration requirements, with chillers that can be adjusted in height, width, and length.
The tables of Smardt Water Cooled and Air Cooled chillers provided here demonstrate only a small selection of the possible chiller configurations within the Smardt chiller range. There are many more capacities, chiller sizes, and customised chiller configurations available. Please contact Smardt with your specific requirements, to find the best solution possible.

Water Cooled Chillers

60TR / 200kWR to > 2500TR / 8800kWR

Model Number	Nominal Capacity		No. of Compressors	Lp at 1m		Evaporator		Condenser		Power		Dimensions			Weight (kg)
	TONS	kW		dB	db (A)	PASSES	CONNECTION SIZE – VITAULIC	PASSES	CONNECTION SIZE – VITAULIC	FLA	LRA	L (mm)	W (mm)	H (mm)	Operating
T-CLASS															
WA031.1B.44N	80	280	1	77	74	4	4"	4	4"	100	110	2525	1265	2049	2685
WA040.1H.44N	125	400	1	78	77	4	5"	4	5"	135	145	2535	1401	2369	3535
WA044.2B.22N	130	440	2	79	76	2	5"	2	5"	200	210	3856	1265	2049	3615
WA062.2B.22N	163	573	2	80	77	2	6"	2	6"	200	210	3769	1265	2049	3990
WA080.2E.22N	200	703	2	80	79	2	6"	2	6"	270	280	4180	1399	2386	4635
WA088.2H.44N	250	880	2	81	80	4	8"	4	8"	270	280	3035	1399	2419	5410
WA095.2H.22N	270	950	2	82	80	2	8"	2	6"	300	315	3735	1399	2386	5070
WA096.2H.22N	273	960	2	82	80	2	8"	2	6"	300	315	4180	1399	2386	5075
WA125.3H.22N	300	1055	3	82	81	2	8"	2	6"	405	425	4535	1399	2394	5965
WA140.3H.22N	391	1375	3	83	82	2	8"	2	6"	405	425	5035	1399	2419	7245
WA190.4H.22S	500	1758	4	85	84	2	8"	2	8"	540	560	5045	2106	1851	8935
WA240.5H.22S	650	2286	5	85	84	2	8"	2	8"	675	695	5530	2141	1852	10585
WA260.6H.22S	796	2800	6	86	85	2	10"	2	8"	810	830	6530	2141	1852	12655
V-CLASS															
WV240.2U.22S	700	2462	2	84	83	2	10"	2	8"	756	794	5168	1845	3075	10060
WV400.3U.22S	1000	3517	3	85	84	2	12"	2	10"	1134	1210	5781	2635	2502	15535
WV500.4U.22S	1500	5276	4	86	85	2	14"	2	12"	1512	1588	5707	2768	2741	19465
WV600.5U.22S	1800	6331	5	87	86	2	14"	2	12"	1890	1966	5870	2980	2610	25010
WV740.6U.22S	2250	7914	6	88	87	2	14"	2	14"	2268	2344	6933	3223	2711	30555

Chiller Performance Testing

Smardt is commited to providing extremely precise chiller performance data to its customers, allowing accurate modelling and detailed predictions of future energy usage. In addition to certifying their chillers in the AHRI chiller certification program (AHRI550/590), Smardt has also invested in building AHRI certified test facilities. These test facilities allow Smardt to offer chiller performance testing for their customers, where they can see their chiller in operation prior to installation, and using NATA certified instrumentation, accurately measure and record the performance of the chiller under a wide variety of load conditions. These test facilities not only allows customers to verify for themselves the extraordinary efficiency Smardt chillers provide, it also ensures Smardt remains the leading oil–free chiller supplier in the world through Smardt's ongoing investment into further development and expansion of Smardt's existing product range.

Air Cooled Chillers

60TR / 200kWR to > 440TR / 1550kWR

Model Number	Nominal Capacity		No. of Compressors	Lp at 1m	Evaporator		Condenser		Power		Dimensions			Weight (kg)
	TONS	kW		db (A)	PASSES	CONNECTION SIZE – VITAULIC	FANS	AIRFLOW m3/s	FLA	LRA	L (mm)	W (mm)	H (mm)	Operating
AD028.1B.4A.04A	70	246	1	74.5	4	6"	4	26.7	148	158	2400	2330	2515	3300
AD040.1E.4A.06A	114	400	1	77.3	4	6"	6	40.2	199	217	3600	2330	2515	4510
AD054.2B.2A.08A	150	528	2	77.8	2	6"	8	53.6	296	306	4800	2330	2515	5545
AD065.2E.2A.10A	185	650	2	79.4	2	6"	10	67.0	332	347	6000	2330	2515	6735
AD080.2E.2A.12A	226	795	2	80.3	2	6"	12	80.4	398	416	7200	2330	2515	7370
AD086.3B.2A.12A	240	844	3	79.7	2	6"	12	80.4	370	397	7200	2330	2515	7865
AD120.3E.2A.16A	300	1055	3	81.5	2	6"	16	107.2	501	531	9600	2330	2515	9965
AD150.4E.1A.20A	350	1230	4	82.2	1	8"	20	134.0	604	624	12000	2330	2515	12940
AD160.4E.1A.24A	400	1406	4	82.9	1	8"	24	160.8	677	707	14400	2330	2515	14400

SMARDT Solutions Clever Cooling Solutions

Hospitals

Reliable and Uninterrupted with Integrated Redundancy

In a hospital environment reliable air conditioning is critical, not only for patient comfort but also for equipment and laboratories. Utilising multiple compressors is a form of integrated redundancy that ensures continuous availability of chilled water in the event of a component failure. This approach will give you the ability to perform maintenance on the faulted component without disrupting service to the building. Such design increases operational availability and that reduces total ownership cost.

Hotels

Fluctuating load capabilities to match seasonal occupancy levels.

Due to the seasonal nature experienced in hospitality industry, Smardt chillers can provide outstanding solutions. With phenomenal low-load capabilities, a single chiller can easily match the wide variation in capacity requirements due to changing occupancy levels. The chillers also operate extremely quietly ensuring that the chillers operation is not heard outside the plantroom. The reduced maintenance requirements of Smardt chillers and proven reliability allows the maintenance staff to focus on other needs.

Education

Quiet chillers deliver a constant, comfortable learning environment.

In educational facilities the load varies significantly throughout the day as student timetables vary. Smardt chillers have the ability to very precising match the load requirement, ensuring that the air conditioned spaces can be kept at a constant, comfortable temperature. Reduced power consumption allows a significant reduction in operating costs. The low operating sound level of these chillers ensures that there is no disturbance to class rooms.

Clever Cooling Solutions

SMARDT Solutions

Commercial

Reduced power consumption and reduced maintenance costs.

Smardt chillers offer outstanding efficiencies and reliability, with maintenance reduction around 50% over conventional technology. This reliability ensures continual comfort year-round. The unparalleled ability of Smardt's oil-free variable speed driven chillers to meet a wide variety of load conditions allows for the optimal control of room temperatures to be maintained with ease. The reduced power consumption and reduced maintenance partner to offer a significantly reduced operating cost, and the lowest total cost of ownership.

Process

No wear to compressors, regardless of hours of operations.

With oil–free operation and virtually no friction, the Smardt chillers ensure that there is no wear to the compressors, regardless of hours of operation. This significantly reduced the maintenance cost despite 24/7 operation. Compared with conventional technology, Smardt chillers offer rapid chiller restart at low amp draw after a power failure so as to minimise the down time, especially in a critical environment. In addition, the multiple compressor chiller design offers built–in redundancy ensuring constant and precise chilled water supply.

Data Centres

Increase uptime while decreasing costs.

Data centres require extremely high reliability and availability. It can be disastrous and costly to an operation if a power failure occurs and the cooling system is interrupted. In the event of a power failure, the ability to start up a chiller on back–up generators due to the extremely low starting current of the chillers, ensures that the chiller can continue to operate despite power interruptions. Smardt Restart™ can restart the chiller in as little as 20 seconds, on less than 2 amps draw. The chiller is able to re–establish chilled water supply temperature with approximately 2 minutes, decreasing the thermal storage and spatial requirements. This technology also reduces the requirement for manual intervention by operating personnel.

SMARDT

Outstanding Performance Values

The energy efficient performance of Smardt chillers is rated according to AHRI standard 550/590

The IPLV performance of its chiller always exceeds the minimum levels set out by ASHRAE standard 90.1, CSA 743, Eurovent, MEPS, and others, typically by a considerable margin. Together with the leading engineers in the HVACR industry, Smardt considers the use of IPLV to predict a chiller's actual year-round energy efficiency to be the most accurate approach.

Strong Green Building Certification Contribution

Smardt Technology is instrumental in achieving LEED, NABERS, Greenstar, & Greenmark certifications

Smardt technology can be very useful in achieving LEED certification for your building, whether in existing buildings, core and shell or new construction, because it can help win critical points in the Energy & Atmosphere category. Market research by the US Green Building Council finds that the streamlined LEED process is second only to rising energy costs as a driver for stronger adoption of green building practices and the transformation of the built environment to sustainability. Smardt is a member of the USGBC & the SGBC.

AHRI CERTIFIED™
www.ahridirectory.org

EPA's Responsible Use Vision

Smardt strongly supports the EPA's Responsible Use Vision.

The EPA's Responsible Use vision encourages manufacturers, system designers and owners to invest in products and technologies which document sustainability of the highest efficiencies in tandem with lowest emissions. Smardt is a strong supporter of the vision and the EPA.

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