



BLUE STAR



CONFIGURED
OIL-FREE CHILLERS



THE NEW BENCHMARK
FOR CHILLER EFFICIENCY



CONFIGURED OIL-FREE CHILLERS

Blue Star, India's largest central air conditioning company, has been providing expert cooling solutions for over seven decades now. As a leader in the industry, Blue Star has been manufacturing a wide range of scroll, screw and centrifugal chillers which are used in many applications such as hospitals, airports, green buildings, hotels, and malls, across the country.

The continued thrust on research and product development has now enabled Blue Star to launch a new series of state-of-the-art AHRI-certified water-cooled oil-free magnetic levitation centrifugal chillers.

These new chillers offer you industry-leading energy-efficiency, application versatility, control precision, reliability, ease of installation, and operational cost-effectiveness. The chillers are designed to deliver proven performance plus a host of other benefits required for industrial and commercial applications like hotels, hospitals, office buildings, malls, and industries.

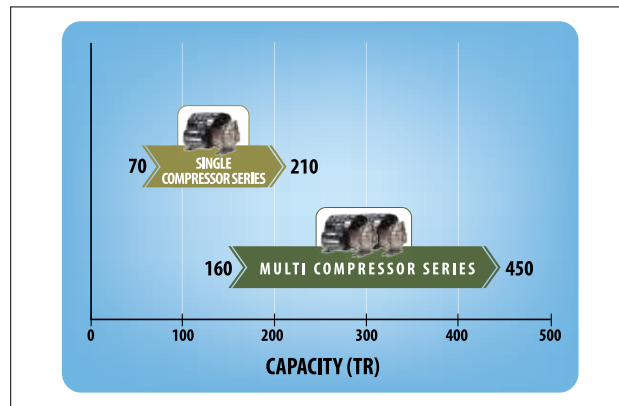
MADE IN INDIA - MADE FOR INDIA

The new-generation oil-free magnetic levitation centrifugal chillers are manufactured at Blue Star's own ISO9001-certified factory equipped with a chiller test bench certified by the Air Conditioning, Heating and Refrigeration Institute (AHRI). These chillers are designed to deliver higher efficiencies even at higher condenser water temperatures and with moderate water quality, a common occurrence in India.

WIDE CAPACITY RANGE

Blue Star's oil-free chillers are offered in a wide range of capacities starting from 70TR to 450TR with single/multiple compressors. Operating power requirements are standard 415V, 50Hz, 3 Phase power supply.

Performance of entire range of chillers is validated by reputed AHRI – Air Conditioning, Heating and Refrigeration Institute.



AHRI CERTIFICATION

Blue Star's new-generation configured series Turbocor chillers are manufactured at Blue Star's sophisticated ISO 9001 certified factory. The entire range of chillers is certified by the international rating body AHRI (Air conditioning, Heating and Refrigeration Institute). Blue Star's factory has India's only precision testing facility certified by AHRI to test and rate all the chillers manufactured by us.



INDUSTRY BEST ENERGY EFFICIENCY

Blue Star's new configured series magnetic levitation chillers are designed for high performance both at full load and part load.

- Exceptional IPLV values up to 11.7 COP unachieved in the industry
- Very high COP up to 6.4 COP shall provide maximum efficiency in full load.



ECONOMIZER

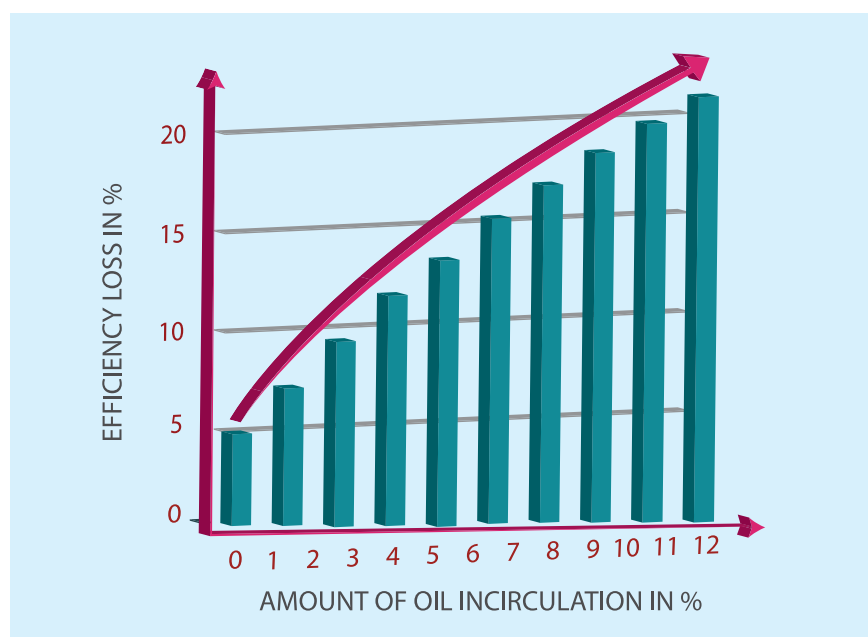
The new Blue Star configured series magnetic levitation centrifugal chillers are equipped with economisers. These plate type heat exchangers help in further sub-cooling of liquid refrigerant. The economiser system enhances the unit's refrigeration effect by providing more kcal/kg of refrigerant circulated. This yields about 5% higher cooling capacity and higher COP as compared to conventional chillers.

OIL-FREE ADVANTAGE

Blue Star's magnetic levitation centrifugal compressors do not need oil for compressor lubrication. Oil used in conventional chillers have the following detrimental effects:

- Forms a coat on heat exchangers
- Reduces heat transfer efficiency
- Excess charge of oil during repair/servicing speeds up performance deterioration

Efficiency drop due to oil is estimated to be around 8% for every 3.5% oil content in the refrigerant as per an ASHRAE (American Society of Heating Refrigeration and Air conditioning Engineers) study.



In the ten (10) chillers tested in the ASHRAE study, the average overcharge of oil in the system was 12.88%, this equated to an average energy loss of about 21%.

In Blue Star's new series of oil-free chillers, the entire oil circuit including oil pump, filter, oil cooler, etc, is eliminated providing following benefits:

- Higher efficiency as oil related performance deterioration is eliminated
- Significant reduction in maintenance

PRECISE MAGNETIC LEVITATION TECHNOLOGY

Blue Star's new configured oil-free series chillers are equipped with two-stage centrifugal compressors with magnetic bearings and in-built VFD with state-of-the-art automatic controls, providing the following benefits:

- The compressor shaft levitates in air while running thereby ensuring no mechanical contact with other parts, completely eliminating wear & tear and frictional losses.
- The VFD precisely controls the compressor speed to match the varying capacity required and operating conditions, thus providing maximum chiller efficiency.
- In the event of power failure, the compressor motor acts as a generator, providing power for the bearing control system ensuring smooth de-levitation of the shaft.
- Two stage compression aids in achieving high full load and part load efficiency.



PROJECT SPECIFIC CHILLER DESIGN

- The new configured series chillers can be selected for most typical applications and project requirements.
- Unlike conventional methods, the new range is not limited to only some of the capacity models.
- The configured magnetic levitation centrifugal chiller is designed exclusively for each project requirement from its exhaustive range of coolers, condensers and compressors to precisely match the capacity and performance requirement of a typical project.



Cooler



Condenser



Compressor





EXCEEDS REGULATORY NORMS

International Standards – ASHRAE 90.1.2016 Energy Efficiency Norms:

CHILLER TYPE	CAPACITY RANGE	PATH A (Kw/TR)		PATH B (Kw/TR)	
		COP	IPLV	COP	IPLV
Water-cooled Screw	> 75TR	0.75	0.6	0.78	0.5
Water-cooled Screw	75 - 150TR	0.72	0.56	0.75	0.49
Water-cooled Screw	150 - 300TR	0.66	0.54	0.68	0.44
Water-cooled Screw	300 - 600TR	0.61	0.52	0.625	0.41

The newly configured oil- free chillers exceed above standards



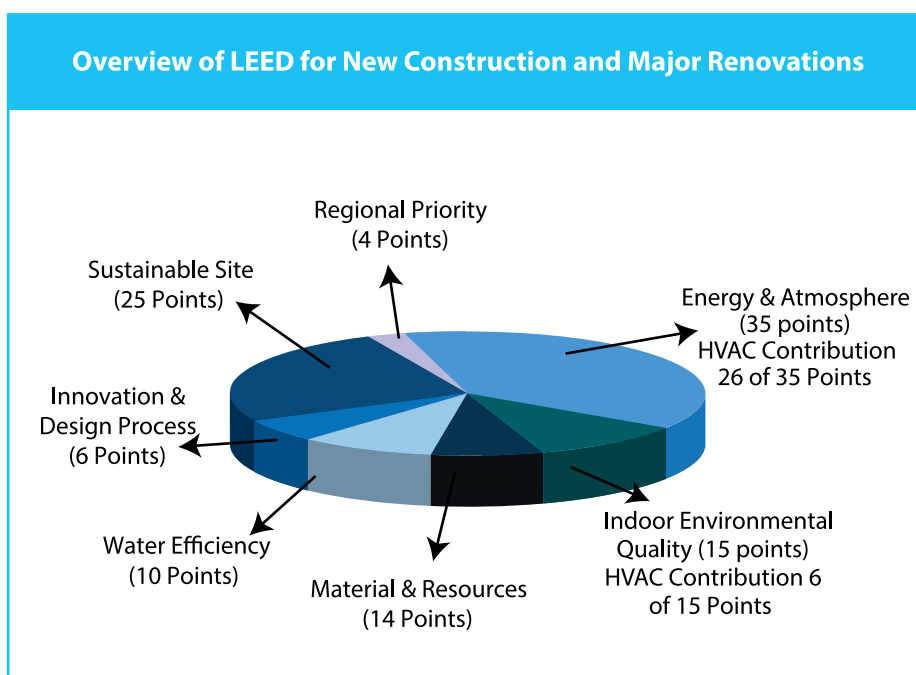
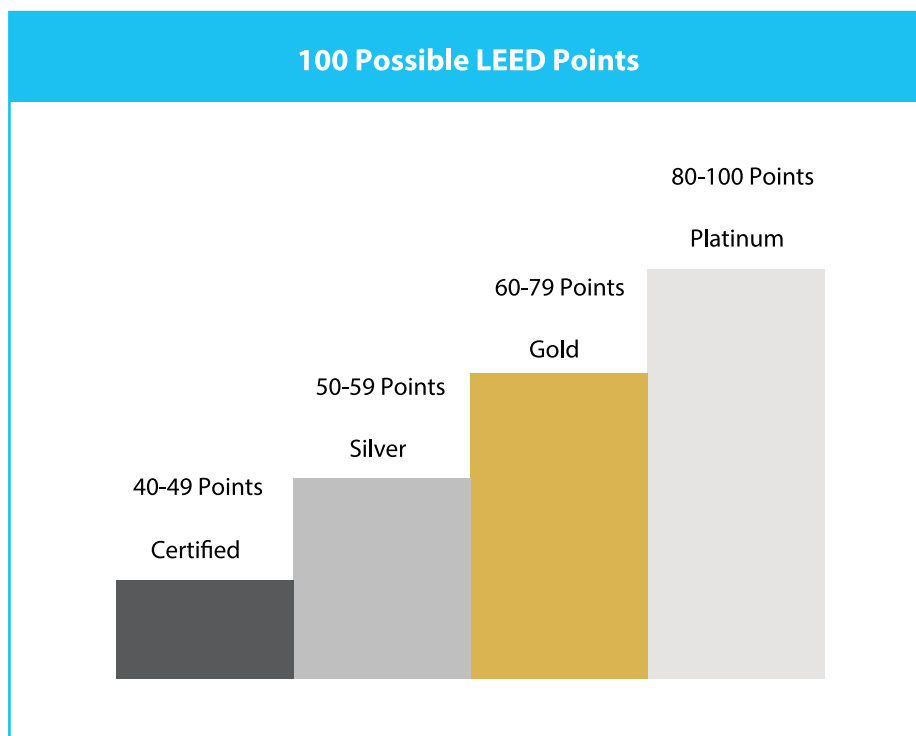
Domestic Standards – ECBC 2017 Energy-Efficiency Norms:

Category		Capacity Band (TR)	ECBC		ECBC+		Super ECBC	
			Full Load kw/TR	IPLV kw/TR	Full Load kw/TR	IPLV kw/TR	Full Load kw/TR	IPLV kw/TR
Air-cooled		74 and less	1.25	1.00	1.17	0.88	NA	NA
Air-cooled		75 and above	1.17	0.95	1.10	0.70	NA	NA
Water-cooled		74 and less	0.75	0.61	0.68	0.51	0.61	0.49
Water-cooled		75 to 149	0.72	0.59	0.61	0.49	0.59	0.44
Water-cooled		150 to 299	0.65	0.54	0.61	0.47	0.56	0.42
Water-cooled		300 to 449	0.61	0.52	0.57	0.43	0.54	0.40
Water-cooled		450 and above	0.56	0.50	0.54	0.39	0.52	0.39

All above efficiencies are at AHRI conditions. The new configured oil-free chillers exceed above standards.

IDEAL FOR GREEN BUILDINGS

- The air conditioning system uses about 40% of the annual building energy consumption. Selection of the right air conditioning system is therefore one of the main aspects to consider when designing a green building.
- A green building is a building that is environmentally sustainable and has been designed, constructed and is operated to minimise impact on the environment.
- The choice of heating, ventilation and air conditioning (HVAC) products in particular can have a significant impact on LEED certification, as the HVAC system directly impacts two categories that together influence 40% of the available points.



EA Prerequisite 2 : Minimum Energy Performance

Blue Star's chillers exceed the energy-efficiency requirements of ASHRAE 90.1.2010, thereby complying with the prerequisite standard.

EA Prerequisite 3 : Fundamental Refrigerant Management

These Chillers does not use chlorofluorocarbon (CFC) refrigerants satisfying the prerequisite statement.



Indian Green Building Council

EA Credit 4: Enhanced Refrigerant Management

LEED awards systems that minimise the Ozone Depletion Potential (ODP) and Global Warming Potential (GWP) of the system. Our chillers are equipped with R-134a and qualify for this credit.

EA Credit 1 : Optimized Energy Performance

The new generation configured oil-free series are designed to exceed the part load performance as per ASHRAE 90.1 and therefore satisfies this LEED credit.





HIGH RELIABILITY – LOW MAINTENANCE

- The new range of oil-free chillers has only one moving part – the Compressor.
- There is no contact between the compressor and other parts when operated
- Virtually no wear and tear
- Advanced control algorithm prevents excessive compressor cycling
- Automatic compressor unloading in case of abnormally high condensing pressure or discharge temperature and abnormally low suction pressure
- Elimination of oil results in reduced maintenance requirements
- Vertical stack design provides easy access to key components



SILENT OPERATION

- Since the compressor – the only moving part – runs in the air, ultra-low noise levels are achieved
- Chiller sound levels are as low as 70dBA @ a 1-metre distance
- No need for any additional acoustic enclosures



Conventional Chiller

Oil-free Chiller



LOW STARTING CURRENT

The new series of Blue Star's magnetic levitation chillers just needs starting currents as low as 2 amp, thereby significantly reducing the size of the associated generator and other electrical components.



Conventional Chiller

Oil-Free Chiller



QUICK RESTART

These chillers can re-start within half a minute of power resumption. This exclusive feature is very useful for critical industrial applications such as data centres.



Conventional Chiller

Oil-Free Chiller



VERSATILE APPLICATION

- Conventional screw chillers cannot deliver high chilled water temperature due to limitation in motor cooling and oil viscosity
- The new series is free from oil making it suitable for achieving higher cooler leaving temperature.
- Chilled water leaving temperature up to 20°C can be achieved which is ideal for applications like data centres.



SIMPLE AND FAST INSTALLATION

Blue Star's new-generation oil-free series is designed with compact dimensions for easy and quick installation

- 1.2m - wide chiller can pass through a standard door opening and requires minimum floor space in plant room
- Simple electrical connections including easily accessible main disconnect switch and 400/24V transformer supply to the integrated control circuit
- Victaulic connections on the evaporator and condenser
- Practical reference marks for entering and leaving water connections
- Possibility to reverse the heat exchanger water inlet and outlet at the factory
- Systematic factory operation test before shipment
- All compressor components are easily accessible on site minimising down-time
- Discharge line shut-off valve and liquid line service valve for easy maintenance

Victaulic connections





ENVIRONMENT FRIENDLY

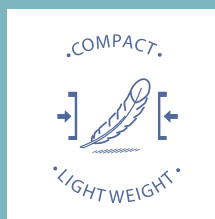
- These chillers use R-134a refrigerant which has zero ozone depletion potential
- R-134a has no expiry date as per the Kyoto Protocol
- Leak-proof refrigerant circuit is ensured as there are no capillary tubes and flare connections



COMPACT AND LIGHTWEIGHT

The critical parts like compressors, coolers, condensers, etc, of these newly configured oil-free chillers are not only efficient but also compact, which enables the chiller to be compact as a whole. These chillers are as much as 30-50% lower in size and weight compared to conventional chillers.

The compact design helps to free up valuable floor space.





ASME STAMPING

Blue Star's newly configured series screw chillers are available with a U Stamp for the pressure vessels in compliance with ASME (American Society of Mechanical Engineers), a renowned third party certifying organization for safety of pressure vessels.



REMOTE MONITORING SYSTEM

The Blue Star configured oil-free chillers are designed to operate through an advanced GPRS-based Remote Monitoring System, which is available as an option to all users.

The RMS has the following advantages:



Close monitoring of the site irrespective of the location

24x7

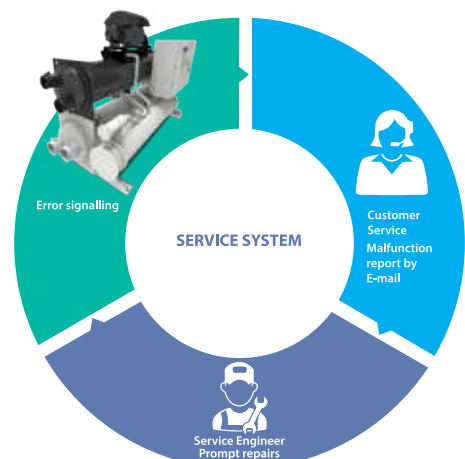
24x7 automatic monitoring



Automatic notification in the form of SMS or e-mail in case of any error



Auto call login for service



The data captured and sent by RMS to the Central Service Team enables analysis by the local service team so as to be equipped with the necessary solutions to resolve any issues speedily. This ensures:



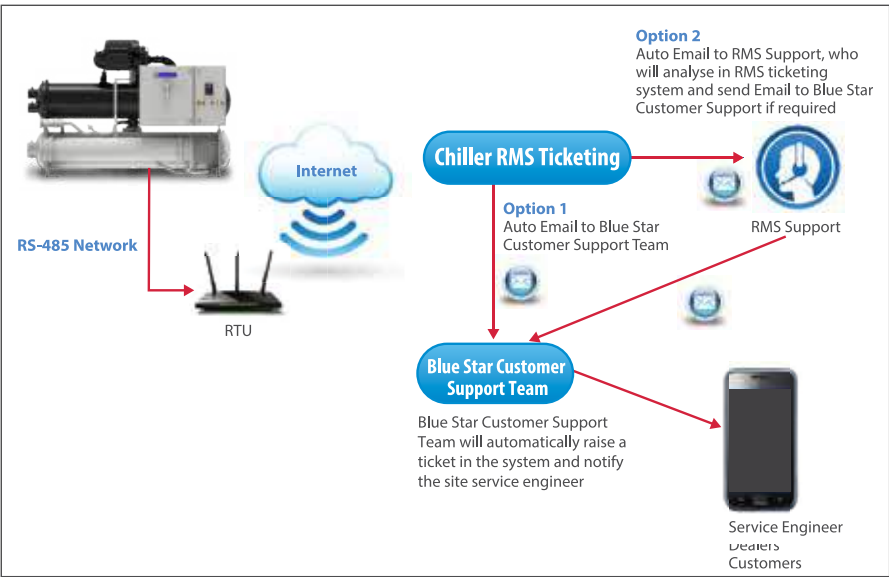
Very quick response time



Faster turnaround time



Lower down time of the system



ADVANCED CONTROLLERS:

The new oil-free series chillers are equipped with internationally reputed and advanced MCS controllers, with the following advanced features:



Precise temperature control
of $\pm 0.5^{\circ}\text{C}$



Overload protection



Anti-freeze and
no-flow protection



Over-current protection



Compressor run-time
balancing



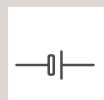
HP / LP protection



Auto backup mode



Compressor run hours



Single phasing / phase
loss protection



Password protection



BMS

BMS compatibility



Self-diagnosis
control system



User-friendly
machine interface



Stored past history
and alarm



Alarm output



Display unit flexibility



Efficient operating
zone algorithm



Demand restriction



Efficient oil separator

DLT

DLT protection



Oil level protection



WIDEST RANGE OF PRODUCTS



VRF V Plus 100% Inverter



VRF Sprint - Pre-piped VRF System



VRF IV S - Side Discharge VRF System



Packaged ACs & Ducted Splits



Inverter Ducted System



Water - Cooled Centrifugal Chillers



Water - Cooled Screw Chillers Configured Series



Water - Cooled Screw Chillers with VFD



Air - Cooled Configured Screw Chiller - High Efficiency Series



Air - Cooled and Water - Cooled Scroll Chillers



Air - Cooled & Water - Cooled Condensing Units



Process Chillers



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To know more about Blue Star, visit
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Blue Star products comply with RoHS regulations as per E-Waste (Management & Handling) Rules, 2016. For disposal of E Waste, kindly visit our website www.bluestarindia.com or call our customer care 1800 209 1177 (Toll Free) or 1860 266 6666.