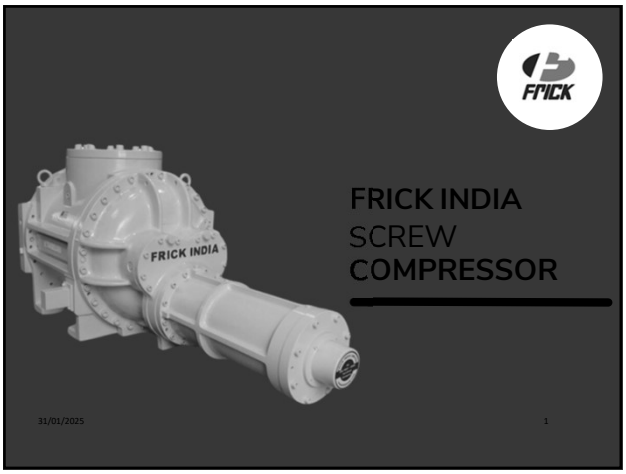
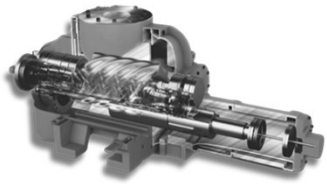


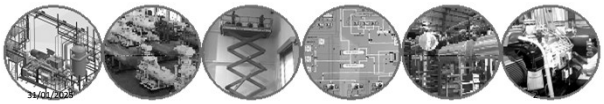

1

## About us

**A Leader in Industrial Refrigeration Equipment Manufacturer and Turnkey Solution Provider, Since 1962.**



**ALL INDUSTRIAL REFRIGERATION SOLUTIONS UNDER ONE ROOF**

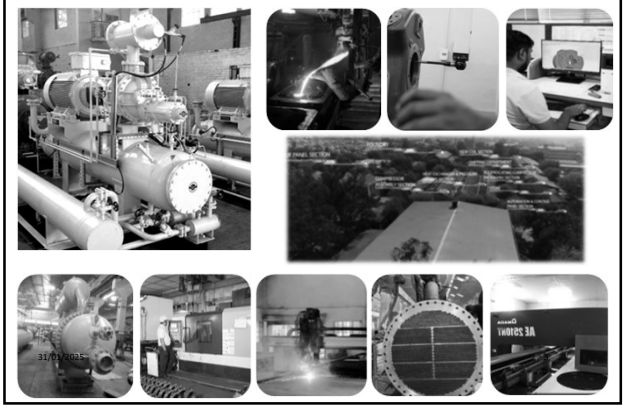


DESIGNING | MANUFACTURING | INSTALLATIONS | AUTOMATION | COMMISSIONING | SERVICING

31/01/2025

2

## Integrated Production Facility



31/01/2025

3

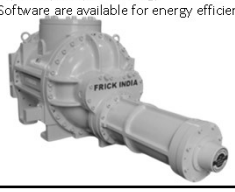
## Certification


31/01/2025 4

4

## Why Frick India Screw Compressor

- Indigenous compressor designed and manufactured as per API-619 Standard
- Energy saving 5 to 7% over other compressors available in market due to
- Automatic 'Vi' system
- Pre-lube system
- Pump less method
- Greater flow area, stronger gate rotor lobes, reduced leakage and lower internal friction than alternate profile
- Readily available spares with FIL being indigenous production and manufacturing
- Easy to service and maintenance with FIL trained and expert service team
- Service 24/7 and Spare parts are available with "Frick Service Network System" throughout India.
- FIS compressors are CE marked & EAC (GOST) certified
- Frick India Microtech System (FIMS) save energy
- FISCom Compressor Software are available for energy efficient selection.



31/01/2025 5

5

## Screw Block Models (2950 RPM)

| MBM 255 | MBM 305 | MBM 384 | MBM 517 | MBM 689 |
|---|---|---|---|---|
| 433 CMH @ -5°C SST & 40°C SDT; 50 Hz. | 518 CMH @ -5°C SST & 40°C SDT; 50 Hz. | 652 CMH @ -5°C SST & 40°C SDT; 50 Hz. | 878 CMH @ -5°C SST & 40°C SDT; 50 Hz. | 1171 CMH @ -5°C SST & 40°C SDT; 50 Hz. |

| MBM 890 | MBM 1120 | MBM 1384 | MBM 1600 | MBM 2000 |
|---|---|---|---|---|
| 1512 CMH @ -5°C SST & 40°C SDT; 50 Hz. | 1903 CMH @ -5°C SST & 40°C SDT; 50 Hz. | 2351 CMH @ -5°C SST & 40°C SDT; 50 Hz. | 2718 CMH @ -5°C SST & 40°C SDT; 50 Hz. | 3398 CMH @ -5°C SST & 40°C SDT; 50 Hz. |

31/01/2025 6

6

## Compressor Nomenclature

10 Models: FIS-255, FIS-305, FIS-384, FIS-517, FIS-689, FIS-890, FIS-1120, FIS-1384, FIS-1600 & FIS-2000

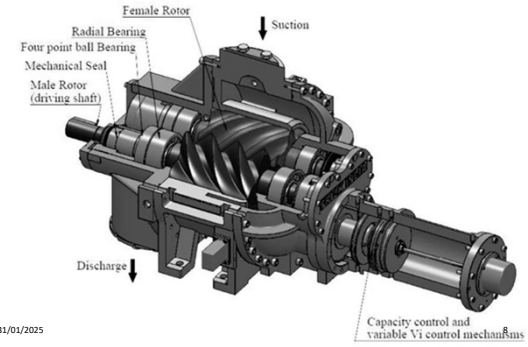
FIS-305
- Swept Volume of Compressor in CFM @2950RPM
- Frick India Screw Compressor

FIS-305B
- Booster (Low stage Application).
- Swept Volume of Compressor in CFM@2950RPM.
- Frick India Screw Compressor



7

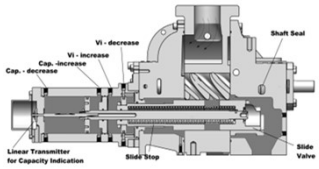
## Structure of the Compressor

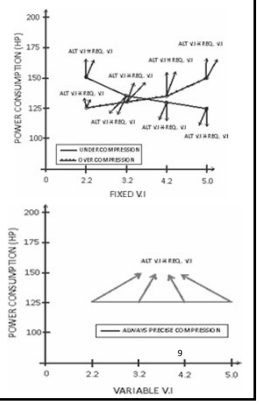





8

## "Volumizer" variable volume ratio control




Automatically infinitely controlled saving test recorded power (5-25 HP), i.e., (5-15%) of overall power consumption of package w.r.t. a standard fixed Vi Screw Package. Capacity control is achieved by using a movable slide valve
- Highest COP at all suction and discharge parameters
- Automatic Adjustment for V.I. 2.2 to 5.0
- Highest Power Saving (up to 10%) over equivalent Screw without Fully



9

## Casting compliance API-619

In house NABL Certified Lab to check quality of casting.

Grey C.I Castings are Close Grain meets ASTM A278 CL-40/ASTM A 48

Assured Structural Integrity, Mechanical and thermal stability under all operating conditions.

Monthly production capacity 50,000 kg (50 MT).

Optionally Ductile iron (ASTM A795 60-40-18) and Cast steel (ASTM A352 LCB) for high pressure rating up to 40 bar.

Energy Efficient Induction Furnaces (750 kg-1 No, 1000 kg -1 No & 1000 kg-1 No)

Computer Controlled Chemical Analyzer "V-smart" to control Chemical, tensile and Hardness



10

## ROTORS

The rotors are made from low-carbon steel forgings AISI 1040/080M40 BS 970 to the exacting tolerance of the latest "N" profile.

Manufactured by renowned U.K. company M/s Holroyd by using the latest technology under the technical know-how of "City University, London."

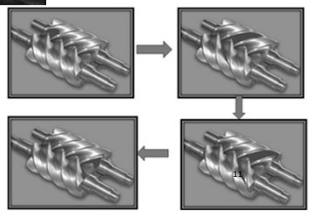
The four-lobed male rotors are directly connected to the drivers.

The six-lobe female rotor is driven by the male rotor on a thin oil film.

### Compression

**Female Rotor : Space between two lobes acts as Cylinder**

**Male Rotor : Male lobs acts as Piston**





11

## Bearings

**Thrust Bearing**

**Roller Bearing**

**Anti-Friction Bearings are used to reduce frictional horsepower and superior rotor positioning, resulting in reduced power consumption.**

**Rigid anti-frictional roller bearings have an ISO B10 bearing life of 1,00000 hours.**



12

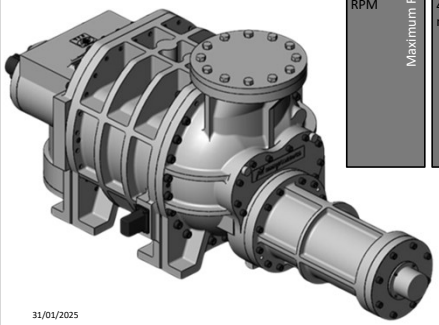
## Shaft Seal

The compressor shaft seal is a single-face type with a spring-loaded carbon rotating surface riding against a cast iron stationary seat. The seal is capable of sealing up to 350 psig but is vented to low pressure to provide extended seal life.



13

## Screw Block Models (2950 RPM)



3600 RPM — Maximum RPM

4300 m3/hr — Maximum Displacement

Upto 26:1 — Pressure Ratio



14

## HOUSING

Monthly Production Capacity : 50,000 Kgs.

Single Casting Weighing : 1000 Kgs.

Acid Cured Sand Process for Mold & Core Making.

All screw compressor castings are designed and tested to meet the requirements of ASHRAE 15-78 safety codes for 350 psig maximum discharge pressure.

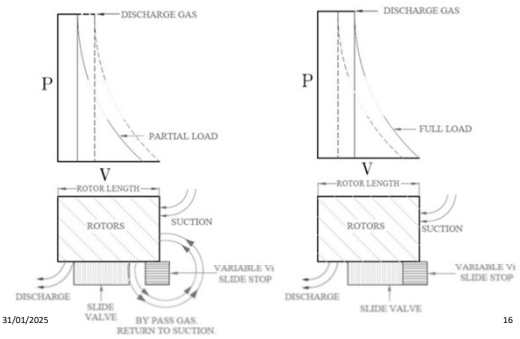
Fine grey and alloy cast iron casting as per ASME SA 278 CL 35 and CL 40 and steel casting as per ASME SA 352 LCB/LCC to ensure structural integrity.



15

## Capacity Control

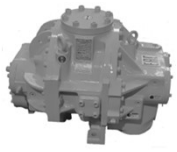
Slide Valve Capacity Control Structure and Capacity Control Characteristics






16

## New Models



Model: 193 S (Fixed Volume)
Swept Volume: 517 CFM

Model: 233 XL (Steel Casing)
Swept Volume: 1384 CFM
Heating Temp: 75°C

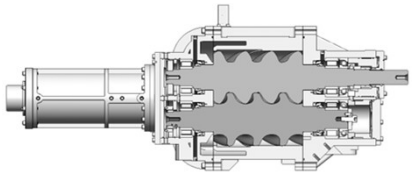
Model: FIHP 220 S
Swept Volume: 400 CFM
Water Heating Temp.: 90°C

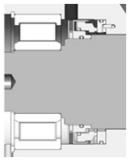
Model: FIHP 220 L
Swept Volume: 525 CFM
Water Heating Temp.: 90°C

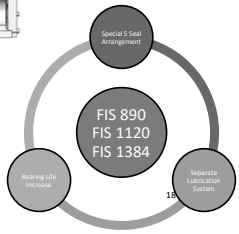


17

## NEW DEVELOPED FIS MODELS WITH FIVE SEAL (API-11) (OIL & GAS APPLICATIONS)



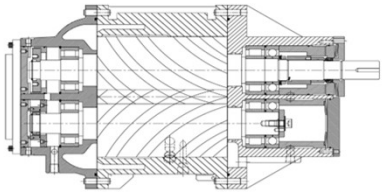







18

## Fixed Vi and 100% capacity Frick India screw compressor



| | | | |
|---|---|---|---|
| Fixed VI from 2.2 to 5 at application requirement with 100% capacity | Cylinder less and not need of oil pump for oil rejection | Compact design | Longer bearing life due to fixed load |

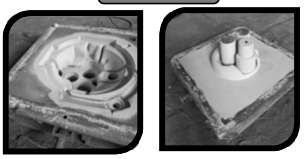


19

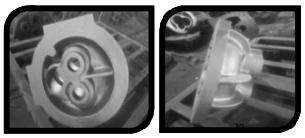
## Steel Casting

**Melting and Pouring**
Tapping temperature: 1644 °C
Used Bottom Pouring

MOULDING



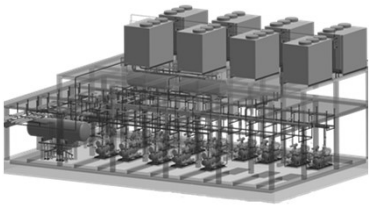
INLET CASING

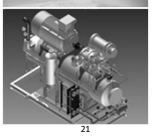




20

## R&D AND DESIGN DIVISION





Cost effective designing of all equipment as per the industry.

Engineers & designers are using PV-elite, Unilab, Solid Works and Inventor, PDMS, AutoCAD and HTRI design Software.

An in-house Research & Development team having equipment and test rigs work together for the highest quality of equipment at the lowest power costs.

A wide range of applications in the refrigeration including "U' stamping vessels are covered by this division.





21

## HIGH Precision Machining Centre

State-of-the-art manufacturing facilities in Faridabad, near New Delhi including CNC machines.

Stringent quality control process to ensure excellence of performance in the production under event the most adverse circumstances.

Frick India has in-house NABL approved testing lab to ensure the highest standard of accuracy.

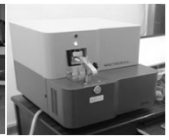


22

## Precise Measuring Machines

We at Frick India Limited are committed to the total satisfaction of our customers and their end users by delivering products and services of high standards with post-delivery care.

We are committed to complying with the requirements of ISO 9001:2015 and continuously improving the effectiveness of our system.





23

## Performance Test Bed As Per IS-10431 / ISO-1217

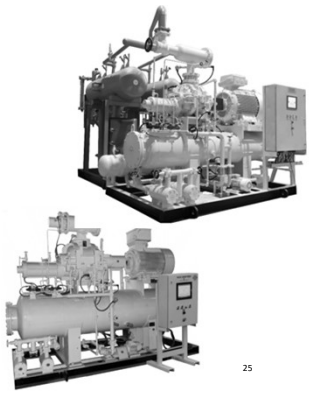
- Performance test conducted by highly experienced production team and witnessed by quality personnel
- Noise level, vibration and volumetric efficiency checked on each compressors.
- Mechanical Running test conducted 2hrs in house test rig.



24

## CUSTOM BUILT FRICK INDIA ROTARY TWIN SCREW COMPRESSOR PACKAGE

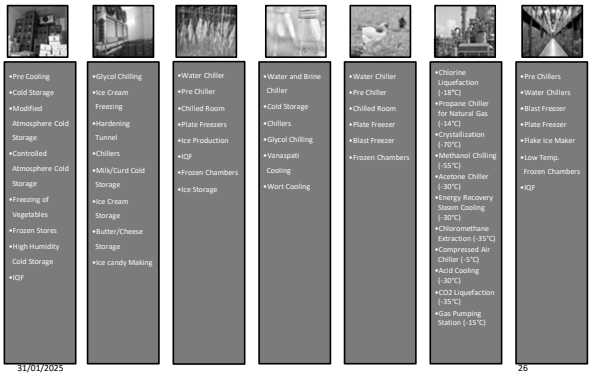
- Pre-lube pump technology
- Dual safety valve and Frick oil filter
- VFD controlled
- Standard horizontal oil separator
- Vertical oil separator
- Compact design
- PLC- controlled system
- PHE- type heat exchangers
- Shell and tube-type condensers





25

## Industries We Serve



- Pre Cooling
- Cold Storage
- Modified Atmosphere Cold Storage
- Controlled Atmosphere Cold Storage
- Freezing of Vegetables
- Frozen Stores
- High Humidity Cold Storage
- IQF

- Glycol Chilling
- Ice Cream Freezing
- Hardening Tunnel
- Chillers
- Milk/Curd Cold Storage
- Ice Cream Storage
- Butter/Cheese Storage
- Ice candy Making

- Water Chiller
- Pre Chiller
- Chilled Room
- Plate Freezers
- Ice Production
- IQF
- Frozen Chambers
- Ice Storage

- Water and Brine Chiller
- Cold Storage
- Chillers
- Glycol Chilling
- Vanaspati Cooling
- Wort Cooling

- Water Chiller
- Pre Chiller
- Chilled Room
- Plate Freezer
- Blast Freezer
- Frozen Chambers

- Chlorine Liquefaction (-18°C)
- Propane Chiller for Natural Gas (-14°C)
- Crystallization (-70°C)
- Methanol Chilling (-55°C)
- Acetone Chiller (-30°C)
- Energy Recovery Steam Cooling (-30°C)
- Chloromethane Extraction (-35°C)
- Compressed Air Chiller (-5°C)
- Acid Cooling (-30°C)
- CO2 Liquefaction (-35°C)
- Gas Pumping Station (-15°C)

- Pre Chillers
- Water Chillers
- Blast Freezer
- Plate Freezer
- Flake Ice Maker
- Low Temp. Frozen Chambers
- IQF



26

## APPLICATIONS (+5 DEG C TO -60 DEG C)

70 TR of TUNA Freezing plant at -45 Deg C SST with ammonia as Refrigerant

FIS-305
Oil Refinery
-18 Deg C SST

FIS-1384 & FIS 689
Meat Processing
-40 deg C SST & -6 Deg C CST

65 MT/Day Meat processing plant. Plant Capacity : 1000 TR at -40 Deg C SST

7500 MT Multi commodity , Multi temperature
( -25 Deg C to -3 Deg C SST) fully automated cold storage with racking system.

2000 TR (7020 kW) ammonia refrigeration system for chilled water cold rooms (various application -10, -3, and -15 Deg C SST)



27

## Specifications

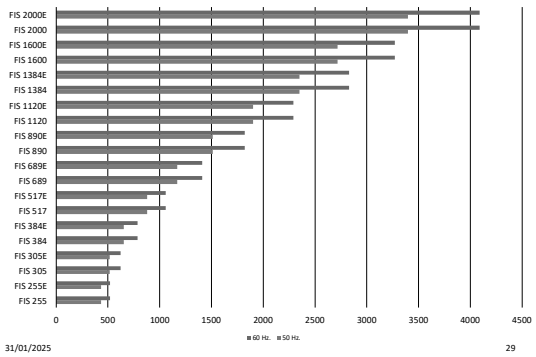
| High Stage (50 Hz.) @ -5°C SST & 40 SDT | | | | | High Stage (60 Hz.) @ -5°C SST & 40 SDT | | | | | Low Stage (Booster) 50 Hz @ -40°C SST & -5 SDT | | | | | Low Stage (Booster) 60 Hz @ -40°C SST & -5 SDT | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Models | CMH | Kw | BKw | BKw/Kw | Models | CMH | Kw | BKw | BKw/Kw | Models | CMH | Kw | BKw | BKw/Kw | Models | CMH | Kw | BKw | BKw/Kw |
| MBM 255 | 433 | 336.2 | 87.4 | 0.91 | MBM 255 | 521 | 404.5 | 105.2 | 0.91 | MBM 255B | 433 | 86 | 23.1 | 0.94 | MBM 255B | 521 | 103.5 | 27.8 | 0.94 |
| MBM 255E | 433 | 373.2 | 90 | 0.86 | MBM 255E | 521 | 449.1 | 109.6 | 0.86 | | | | | | | | | | |
| MBM 305 | 518 | 395.5 | 102.9 | 0.91 | MBM 305 | 624 | 475.9 | 123.8 | 0.91 | MBM 305B | 518 | 101.4 | 27.2 | 0.94 | MBM 305B | 624 | 122.1 | 32.7 | 0.94 |
| MBM 305E | 518 | 439 | 107.1 | 0.86 | MBM 305E | 624 | 528.3 | 129 | 0.86 | | | | | | | | | | |
| MBM 384 | 652 | 497.7 | 129.5 | 0.91 | MBM 384 | 785 | 599.1 | 155.9 | 0.91 | MBM 384B | 652 | 127.7 | 34.3 | 0.94 | MBM 384B | 785 | 153.7 | 41.3 | 0.94 |
| MBM 384E | 652 | 552.4 | 134.9 | 0.86 | MBM 384E | 785 | 664.9 | 162.3 | 0.86 | | | | | | | | | | |
| MBM 517 | 878 | 686.2 | 165.7 | 0.87 | MBM 517 | 1057 | 802.1 | 199.5 | 0.87 | MBM 517B | 878 | 171.3 | 43.6 | 0.89 | MBM 517B | 1057 | 206.7 | 52.5 | 0.89 |
| MBM 517E | 878 | 739.5 | 172.6 | 0.82 | MBM 517E | 1057 | 889.9 | 207.7 | 0.82 | | | | | | | | | | |
| MBM 689 | 1171 | 888.7 | 221 | 0.87 | MBM 689 | 1409 | 1069.4 | 266 | 0.87 | MBM 689B | 1171 | 228.5 | 58.1 | 0.89 | MBM 689B | 1409 | 274.8 | 70 | 0.89 |
| MBM 689E | 1171 | 985.9 | 228.6 | 0.82 | MBM 689E | 1409 | 1186.6 | 276.9 | 0.82 | | | | | | | | | | |
| MBM 890 | 1512 | 1200 | 288.8 | 0.85 | MBM 890 | 1820 | 1444.3 | 347.6 | 0.85 | MBM 890B | 1512 | 304.6 | 75.3 | 0.87 | MBM 890B | 1820 | 366.7 | 90.7 | 0.87 |
| MBM 890E | 1512 | 1331.6 | 300.8 | 0.79 | MBM 890E | 1820 | 1602.7 | 362 | 0.79 | | | | | | | | | | |
| MBM 1120 | 1903 | 1511 | 363.4 | 0.85 | MBM 1120 | 2290 | 1818.7 | 437.8 | 0.85 | MBM 1120B | 1903 | 383.6 | 94.9 | 0.87 | MBM 1120B | 2290 | 461.9 | 114.2 | 0.87 |
| MBM 1120E | 1903 | 1677 | 378.8 | 0.79 | MBM 1120E | 2290 | 2018.3 | 455.9 | 0.79 | | | | | | | | | | |
| MBM 1384 | 2351 | 1867.6 | 449.5 | 0.85 | MBM 1384 | 2830 | 2247.4 | 541 | 0.85 | MBM 1384B | 2351 | 474.3 | 117.3 | 0.87 | MBM 1384B | 2830 | 570.8 | 141.2 | 0.87 |
| MBM 1384E | 2351 | 2072.5 | 468.1 | 0.79 | MBM 1384E | 2830 | 2494.1 | 563.3 | 0.79 | | | | | | | | | | |
| MBM 1600 | 2718 | 2150.6 | 518.1 | 0.85 | MBM 1600 | 3271 | 2588 | 623.4 | 0.85 | MBM 1600B | 2718 | 546.2 | 135.1 | 0.87 | MBM 1600B | 3271 | 657.4 | 162.5 | 0.87 |
| MBM 1600E | 2718 | 2328.3 | 539 | 0.81 | MBM 1600E | 3271 | 2801.8 | 648.7 | 0.81 | | | | | | | | | | |
| MBM 2000 | 3398 | 2708.2 | 652.4 | 0.85 | MBM 2000 | 4089 | 3258.9 | 785.1 | 0.85 | MBM 2000B | 3398 | 687.7 | 170.1 | 0.87 | MBM 2000B | 4089 | 822.6 | 204.7 | 0.87 |
| MBM 2000E | 3398 | 2932 | 678.8 | 0.81 | MBM 2000E | 4089 | 3528.4 | 816.9 | 0.81 | | | | | | | | | | |

Notes
a) Allow 48 inch / 122 cm free space required on motor end to pull out Coalescer element.
b) Dimension and performance data given is for ammonia units only. For other refrigerants please use FISCom Software or contact factory
c) All specifications are subject to change without notice



28

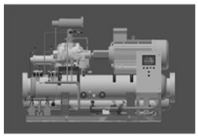
## Displacement CMH



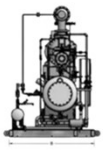


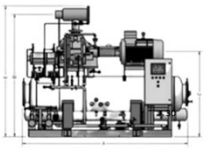

29

## DIMENSIONS



| DIMENSIONS (mm) & Weight (Kgs.) | | | | | | |
|---|---|---|---|---|---|---|
| MODEL | A | B | C | D | E | WT. |
| MBM-255 | 3060 | 1650 | 1465 | 2175 | 2330 | 2208 |
| MBM-305 | 3060 | 1650 | 1465 | 2175 | 2330 | 2219 |
| MBM-384 | 3060 | 1650 | 1465 | 2175 | 2330 | 2350 |
| MBM-517 | 3555 | 1800 | 1610 | 2320 | 2475 | 2716 |
| MBM-689 | 3610 | 1800 | 1610 | 2320 | 2475 | 2850 |
| MBM-890 | 3610 | 1850 | 1850 | 2660 | 2850 | 4900 |
| MBM-1120 | 3610 | 1850 | 1850 | 2660 | 2850 | 5100 |
| MBM-1384 | 3610 | 1850 | 1850 | 2660 | 2850 | 6350 |
| MBM-1600 | 3933 | 1950 | 2070 | 2967 | 3180 | 6700 |
| MBM-2000 | 4272 | 2036 | 2253 | 3160 | 3370 | 6890 |







30

## Customized Design as per Application



31

## Customized Design as per Application

Offshore Oil & Gas Plant (Russia)

Propane Chiller (Nigeria)

Edible Oil Plant

Ethylene / PDH Plant

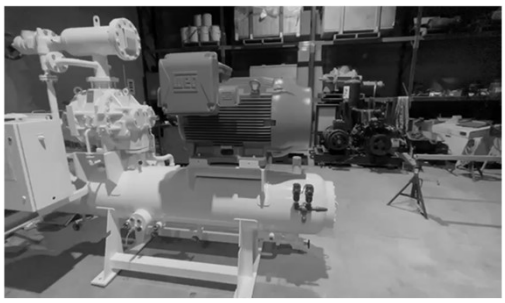
Phosphate Based Fertilizer Plant (BOG)

Chlorine Liquefaction Plant



32

## FIS -384 ARBS Exhibition package in Australia(2024)





33

## Screw Compressor Package in Oat Milk Plant, Australia



34

## Case Studies

## Screw Compressor Performance



35

## Screw Compressor Running Hours (12 years)

Model: MBM 689
Application: Ice Cream
Running Hours: 40,000 +



36

## Screw Compressor Performance (8 years)

Model: MBM 689, 1384
Application: Meat
Running Hours: 40,000 +



37

## Frick Screw MBM 305 vs Other Brand Piston Compressor (Gurdaspur)

Running Hours: 9 hr. (MBM 305), 14 hr. (1 year)
Electricity Consumption: 1500 unit (MBM 305), 4500 unit (per day)



38

## Frick Screw MBM 305 vs Other Brand Piston Compressor (Hoshiarpur)

Running Hours: 18 hr. (MBM 109), 24 hr. (Per Day)
Electricity Consumption: 1700 unit (MBM 305), 2300 unit (per day)
Energy Saving: INR 20-25 Lac (per year)



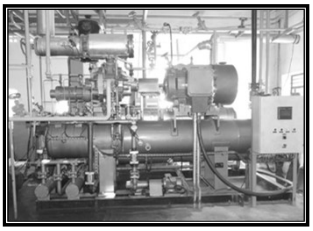
39

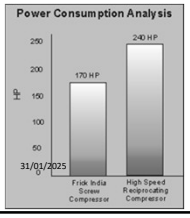
## Frick Screw Compressor vs High Speed Reciprocating Compressor

Model: FIS 305E

Application: Dairy (-10°C SST/40°C condensing temp. and storage of 1.3 Lakh liter per day of milk)

Electricity Saving: 70 HP/ hour








40

## Frick Screw Compressor vs High Speed Reciprocating Compressor

Power consumed by 2 numbers Screw Compressors = 400.74 BHP = 299 KW

Power Consumed by 3 nos. reciprocating compressors = 427.5 BHP = 319 KW

Power saved/Hr = 319=299 = 20 KW
Power saved/day = 20 x 14 = 280 KW
Power saved/year = 280 x 300 = 84000 KW
(assuming 300 working days/year)

Assuming Power rate as Rs.9 per unit

Total Amount saved/year = 84000 x 4.50 = 7,56,000/-



41

## Frick India Screw Compressor: Vibration Report

**Accolade**

- Working fine
- No seal leakage observed
- Vibration found ok
- No abnormal sound

- **FIS 890 Booster, running hours- 10499**

**Vibration Report:-**

| Bearing hsg. M.I. | Bearing hsg. F.I. | Bearing hsg. M.D. | Bearing hsg. F.D. |
|---|---|---|---|
| 1.0/1.19 | 1.0/1.29 | 1.4/1.23 | 1.5/2.29 |

- **FIS 384 high stage, running hours- 2619**

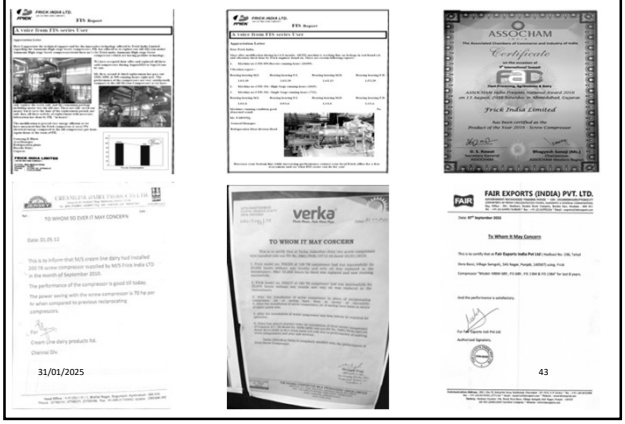
**Vibration Report:-**

| Bearing hsg. M.I. | Bearing hsg. F.I. | Bearing hsg. M.D. | Bearing hsg. F.D. |
|---|---|---|---|
| 1.0/1.6 | 0.9/1.6 | 1.3/1.0 | 2.3/1.4 |



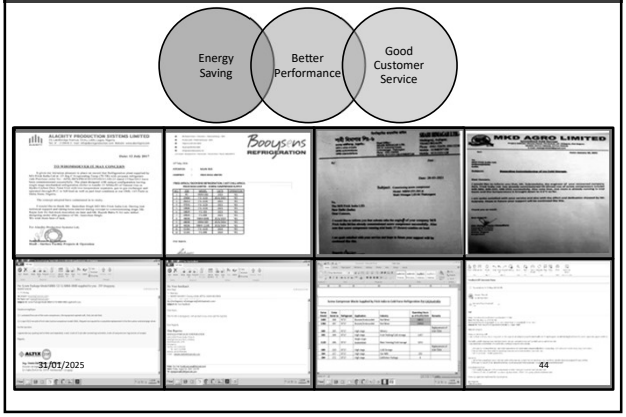
42

## Frick India Screw Compressor Feedback Certificates



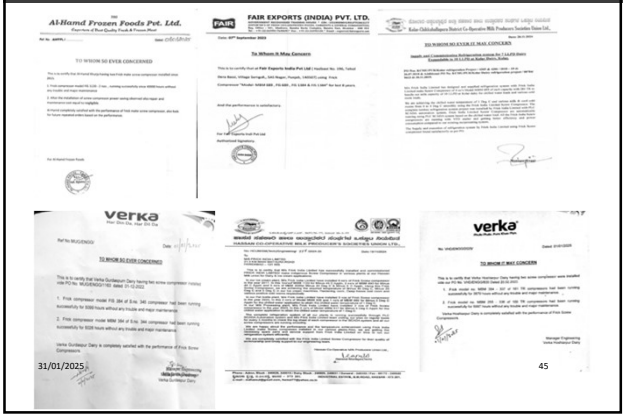

43

## Customer Contentment



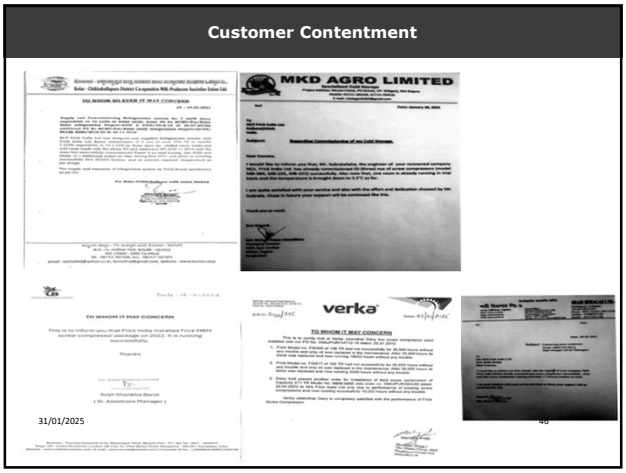

44

## Customer Contentment



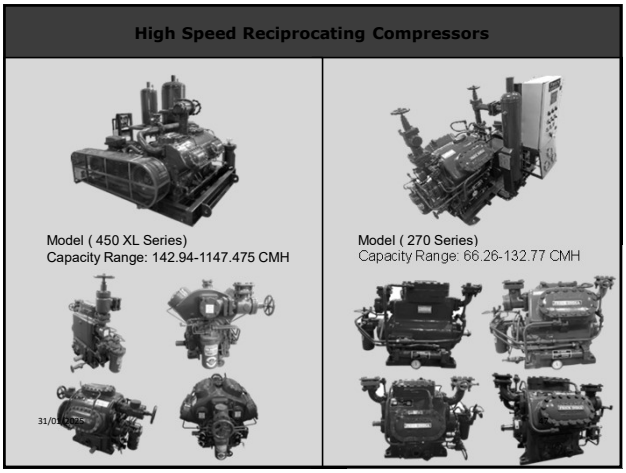

45

## Customer Contentment



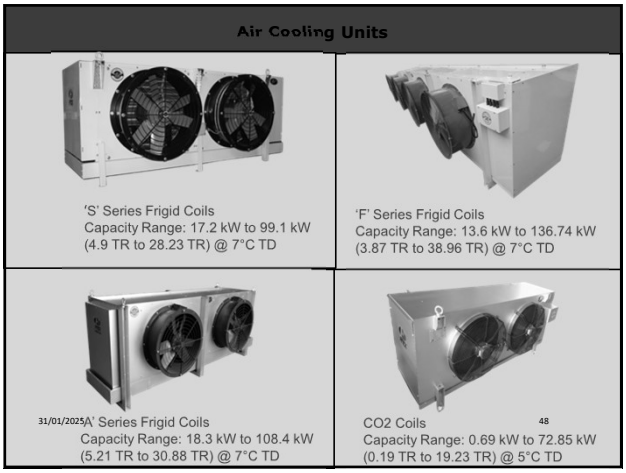

46

## High Speed Reciprocating Compressors




47

## Air Cooling Units




48

## Evaporative Condenser & Liquid Overfeed System

Evaporative Condensers
Capacity Range : 74 kW to 2830 kW
@40 Deg C SDT & 28 Deg C WBT

Ammonia Pumps
Capacity Range
Open Type: 7 to 14.2 CMH @30m Head
Hermetic: 1.5 to 20.1 CMH @30M Head



49

## Low Charge Ammonia System

- It is environment friendly, having zero GWP and zero ODP.
- Its excellent thermodynamic properties ensure good energy efficiency and performance, as well as ammonia's abundance and ease of use at low costs.
- Ammonia, which has traditionally been considered highly toxic and can pose a risk to human health if released, has become safer with low-charge ammonia systems that reduce its charge.
- This is a packaged system that can be assembled quickly and fairly inexpensively.



50

## Automatic Air Purger

Frick India Air Purgering Solution helps in maintaining optimum refrigeration capacity and system efficiency, allowing professionals to achieve maximum system performance. Its design and function have led to savings in energy, time, and money.

**Features & benefits**

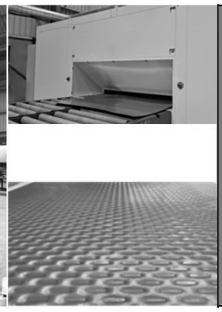
- Fully automatic gas purger for refrigeration plants.
- Automatic purger continually function to scavenge and remove air from System.
- Maintains condensing temperature at nearly optimum operating conditions.
- Reduces the concentration of non-condensable gases to a negligible Percentage.
- No need of separate refrigeration system.
- Eliminates the labour associated with personnel regularly removing air by manual operation.



51

## Pillow Plate Heat Exchangers

Frick India Pillow Plate consists of two stainless steel sheets that are laser welded together by welding a custom circle weld pattern. The outside perimeter of the pillow plate is fully laser welded to create a pressure boundary. Our high-speed laser welding unit is combined with our in-house laser cutting capability up to 1500 x3000 mm. We inflated the pillow plate by using nitrogen, which will guarantee no impurities and no rusting in the long run. Depending on the application, other inflation processes can also be used.



**Applications**

Bulk milk coolers
Air heater steam
Flue-gas-water heat exchanger
Air Heater Oil
Jacketed Tanks
Steam-air heat exchanger
Cooling and heating of beer tanks
Cooling and heating of wine tanks
Cooling and heating process tanks
Cooling and heating of conveyors
Immersion plates
Waste heat recovery
Plate banks
Clamp-on plates
Cooling and heating plates
Heat recovery units
Falling film chillers
Ice machines
Ice banks
Fuel-gas-air heat exchanger
Heat pumps
Steam-water heat exchanger
Column reboilers
Latent heat storage systems



52

## Countries We Exported Frick Screw Compressors



53

## Our Branch Offices

| | | | |
|---|---|---|---|
| Bengaluru Branch bng@frickmail.com | Mumbai Branch mumbai@frickmail.com | Delhi Branch delhi@frick.co.in | Kolkata Branch kolkara@frickmail.com |
| Chennai Branch chennai@frickmail.com | Vizag Branch vizag@frickmail.com | Cochin Branch cochin@frick.co.in | Jalandhar Branch Jalandhar@frickmail.com |
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54


55