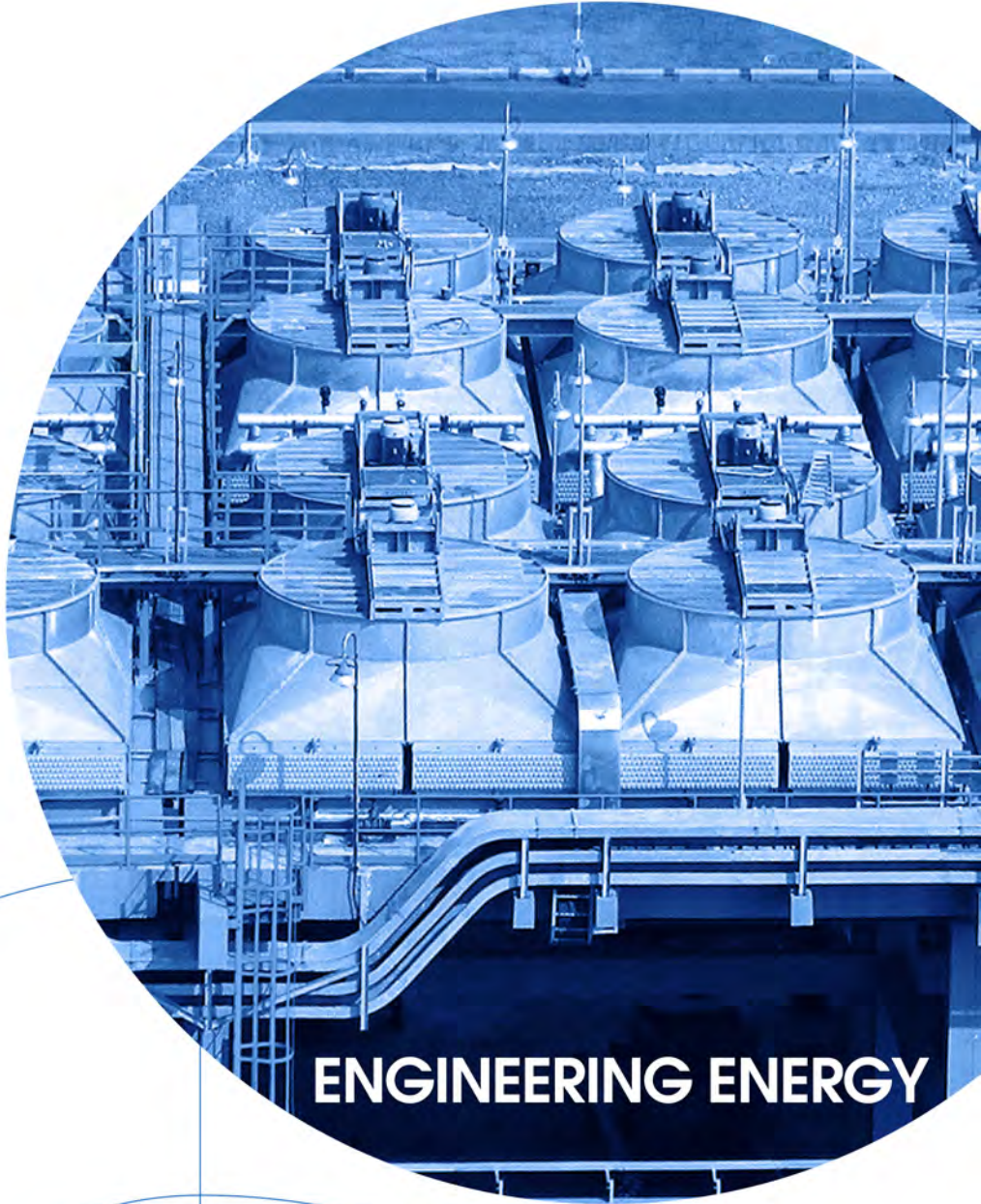




# BGR ENERGY SYSTEMS LIMITED

AIR COOLED HEAT EXCHANGER

Cooling the World's Operations



ENGINEERING ENERGY





# FIN TUBES

For Air Cooled Heat Exchangers (ACHE)



Fin Tubes - Bare Tubes are fitted with Aluminium Fins / Muff Tubes by sophisticated machines as required. We have capacity to manufacture the following types of Fin Tubes.

## G Embedded Fin Tubes



Fin consists of an aluminium strip whose foot edge is tension wrapped and embedded into the primary tube wall.

Maximum working temperature : 400 °C/750 °F  
Atmospheric corrosion resistance : Poor  
Mechanical resistance : Acceptable  
Capacity : 11,23,200 R.Mtrs/Year

## Knurled L Fin Tubes



An aluminum strip is folded to form an L shape and then wound around the base tube. The feet of the fins are joined together and covers the whole of the tube surface. The root of the fin is simultaneously knurled with the inner tube ensuring tight contact between fins and tube.

Maximum working temperature : 250 °C/480 °F  
Atmospheric corrosion resistance : Acceptable  
Mechanical resistance : Acceptable  
Capacity : 5,61,600 R.Mtrs/Year

## L Wrap on Fin Tubes



The aluminium strip foot section is first formed into an L shape and then tension wrapped on to the base tube. Wound fin base sections are close to each other so as ensure a continuous cover over the primary tube surface. Finally, the fin strip is fastened at ends to prevent loosening.

Maximum working temperature : 120 °C/250 °F  
Atmospheric corrosion resistance : Acceptable  
Mechanical resistance : Poor  
Capacity : 5,61,600 R.Mtrs/Year

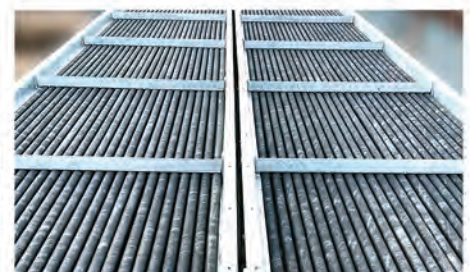
## Extruded Fin Tubes



A core tube, or liner is fitted into an aluminium primary tube. This tube-in-tube assembly is then fed into the finning machine quipped with three spindles. The gang discs which are stepped in profile and diameter will first extrude and shape the fin properly and then shrink fit the primary tube on its liner.

Maximum working temperature : 300 °C/570 °F  
Atmospheric corrosion resistance : Excellent  
Mechanical resistance : Excellent  
Capacity : 18,72,000 R.Mtrs/Year

MOC: CS, LAS, SS, DSS, STSS, Incoloy 625, Incoloy 825, 6 Molybdenum, Titanium. We also provide finned tubes with speciality metals like Copper, Admiralty Bronze in our facility. We produce Fin Tubes from OD 16mm (5/8") to 50mm (2") max OD.







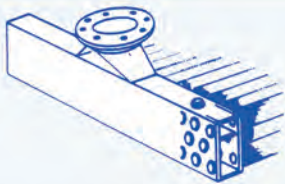
# HEADER BOX

For Air Cooled Heat Exchangers (ACHE)



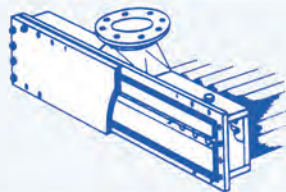
**A critical pressure-retaining component that distributes and collects the process fluid as it enters and exits the finned tubes.**

## Plug Header



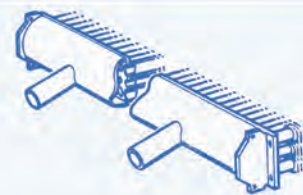
Plug header is the most commonly used up to 350 bar working pressure. The plug holes opposite each tube allows expansion of the tube in the tube sheet, mechanical cleaning and plugging in case of leakage. Seal welding or strength welding can be provided for high partial hydrogen pressure resulting in a less expensive solution than pipe header, generally used for over 200 bar pressure.

## Cover Plate Header



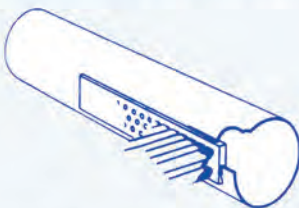
Cover plate is used for fluids with high fouling factors and upto 40 bar maximum when frequent mechanical cleaning is needed. It is also used for very corrosive process fluids so as to periodically check corrosion allowance. Special cover plate headers using welded gaskets are provided for hydrogen service in hydro-cracking plants.

## Welded Box Header



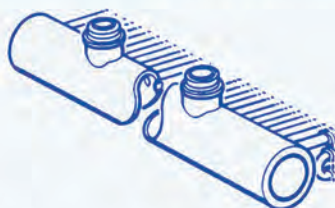
Welded bonnet type is used in some special services such as Ammonia condensers, Freon condensers and Vacuum Steam condensers. One advantage of this design is the fully welded construction which provides perfect sealing required for such applications.

## Manifold Header



A large circular manifold is used in some cases where the allowable pressure drop is very low. This large manifold ensures an equal distribution of fluid flow in the tubes. The tube sheets are directly welded to the manifold. This type is used for vacuum steam condensers and refrigeration units.

## Pipe Header



Pipe headers are used for working pressure over 200 bar. The U bend tubes are welded to weldolets on the pipe. The welds are heat treated and X-ray tested.



**MOC:** CS, LAS, SS, DSS, SDSS, Incoloy 825, Incoloy 625, 6 MO etc.

**Max Design Pressure:** 450 bar

**Max Design Temperature:** 550° C







# TUBE BUNDLES

For Air Cooled Heat Exchangers (ACHE)



Tube bundles, the core component of Air Cooled Heat Exchangers, where the actual process of heat transfer takes place. Each bundle is designed as a complete, self-contained assembly for easy handling, installation, and maintenance.

## Key Features & Construction

- **Integrated Assembly:** Comprises inlet & outlet/return header boxes connected through finned tubes, firmly supported by side frames and interconnecting beams.
- **Robust Design:** Supplied as a single entity, ensuring rigidity and reliability under demanding process conditions.
- **Cooling Mechanism:** Process fluid flows inside the tubes, while ambient air—forced across the finned surface by fans—provides efficient cooling.

## Engineering Excellence

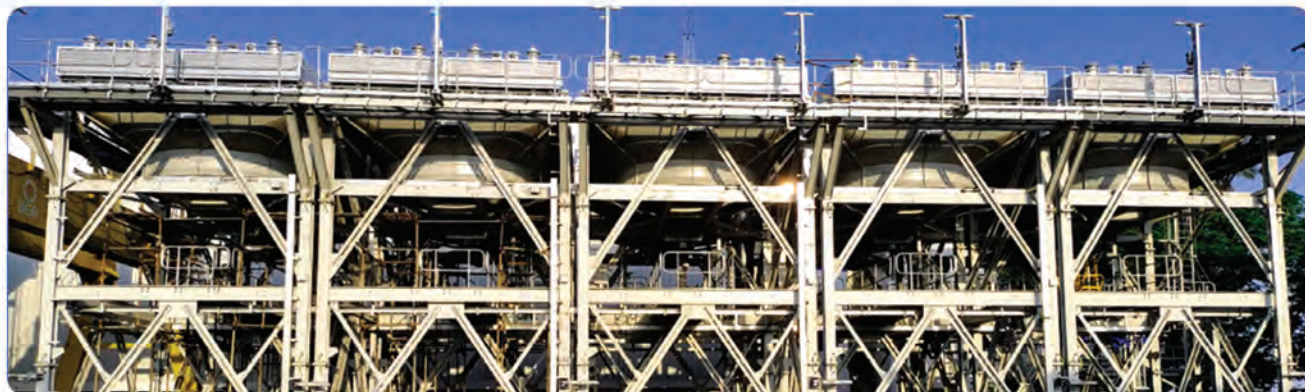
- **Critical Component:** As the most vital part of the air cooler, utmost care is taken in Design, Material Selection, and Manufacturing.
- **Custom Engineering:** Tube bundles are tailored to customer and Consultant Specifications, Addressing Special Design, Metallurgical, and Performance Requirements.
- **Thermal Design:** Performed using **HTRI** software, ensuring optimized performance for diverse process applications.
- **Mechanical Design:** Developed in-house using programs based on **ASME Sec. VIII Div. 1 & 2, API 661 standards, and specific customer needs.**

## Why Choose Our Tube Bundles?

- ✓ Precision Engineered for Performance & Reliability
- ✓ Backed by International Codes & Standards
- ✓ Designed with Global Software & In-House Expertise
- ✓ Fully Customizable to Meet Unique Process Requirements

## Customization Options

- **Header Boxes:** Available in multiple types, selected based on process fluid properties and operating conditions.
- **Finned Tubes:** Type and tube-to-tube sheet joints are carefully chosen to match the operating temperature, pressure, and fluid characteristics.



MOC: CS including LAS, SS, DSS, SDSS, Incoloy 825, Incoloy 625, 6 MO etc. | Max Hydro Test Pressure: 696 Kg/CM<sup>2</sup>





# ACHE

Air Cooled Heat Exchangers



**14,000+ Installations Across 29 Countries In 5 Continents**  
**Industries Served:** Refineries, Petrochemicals, Fertilizer, Steel, Process Industries

## HEADER BOX

The Header Box forms the pressure-retaining chamber of the Air Cooled Heat Exchanger, located at the tube ends to distribute and collect process fluid.

- Designed and fabricated as per ASME Sec. VIII Div.1/2 and API 661 standards.
- Available in plug-type, cover plate, bonnet, and manifold configurations based on process duty. Provides easy access for tube cleaning, inspection, and maintenance.
- MOC include Carbon Steel, Stainless Steel, Duplex, Incoloy 825, 625, 6Mo
- Engineered for uniform flow distribution, minimizing pressure drop and ensuring thermal efficiency.



## FIN TUBES

The fin tube is the core heat transfer element of the ACHE, Combining mechanical strength with enhanced surface area. We manufacture the following in-house for tube OD 16 to 50mm:

- Fin Types: G, L, KL & Extruded Fins.
- Tube MOC: CS, LAS, SS, DSS, SDSS, Incoloy 825, 6 Mo, Ti, CU, Admiralty bronze, etc.
- Provides maximum heat transfer efficiency with reduced footprint.
- Designed for long service life, resisting corrosion and fouling.



Knurled L Fin Tubes   G Embedded Fin Tubes   L Wrap on Fin Tubes   Extruded Fin Tubes

## TUBE BUNDLE

The tube bundle is a modular assembly of finned tubes, headers and supporting structures.

- Engineered for easy removal and replacement.
- Optimized to handle high thermal loads and varying process conditions.
- Ensures uniform airflow and efficient heat dissipation.
- Configurations: Single bay, Multi-bay, V-type, or A-frame layouts.



## TRIAL ASSEMBLY

Air Cooled Heat Exchanger is Completely Assembled at our Factory to Validate the performance parameters and the Dimensional Accuracy.

Complete Structural Frame, Plenum, MSA, Fans, Motors, and Tube Bundles are assembled and Ensures Precise Alignment as per contract requirements.

Performance Checks Include Vibration, Noise level, Motor / fan absorbed power, Airflow and Tip Clearance are all verified against approved specifications.

Results are fully documented and jointly witnessed by the client or their approved TPIA.



## DESPATCH

We ensure every component is meticulously packed for safe dispatch. For exports, sea-worthy packing is provided in compliance with client-approved standards.

Modular Dispatch, Which Reduce Site Erection Time And Cost, Can Be Done Based On Customer Requirement.

Our Manufacturing Plant is Located on the National Highway - Uninterrupted Connectivity For Heavy Equipment And Over -Dimensional Consignments (ODCs). Proximity to Chennai Airport & Close To Chennai & Krishnapatnam Seaports.



**Header Box:** Max Design Pr: 450 Bar | Max Design Temp : 550 C

**Tube Bundle:** Max Hydro Test Pr: 998 Kg/Cm<sup>2</sup>

We also provide Erection / Commissioning Supervision/ Operator Training / Supply All Type of Spares/ Inspection & Upgrade Services

Installed in 29+ Countries | Annual Finning Capacity - 4118 KM | Annual Header Box Capacity - 1,070 | Annual Tube Bundle Capacity - 750





**For Air Cooled Heat Exchangers (ACHE)  
For Water Products and Deaerator**



**We Supply Critical & Genuine Spares To Our Valuable Customers Globally**



**Fin Tubes**

G / KL / L / Extruded Aluminium FinTubes  
Tube MOC: CS, LAS, SS, DSS, STSS, Incoloy 625,  
Incoloy 825, 6 Molybdenum, Titanium.



**Fan / Fan Blades / Hub**

Fan Provides The Required Air Flow  
For Cooling the process fluid.



**Tube Access Plugs**

Facilitates Cleaning And Plugging Of  
Individual Tubes For Routine Maintenance.



**Pulley**

Pulleys Transmit Rotational Motion From  
One Shaft To Another Shaft.



**Belt**

Transmit Power Between Rotating Shafts.



**Plug Gasket**

Gaskets Act As Mechanical Seal, Filling  
The Space Between The Mating Surfaces,  
Preventing Leakage Of Fluids Or Gases.



**Bearing**

Bearing Block / Motor Bearing To Support  
The Rotating Shaft and Minimize Friction.



**Bearing Block / Shaft**

Bearing Block (Fan Shaft) connects the Fan to  
the Drive.



**Nozzle Gaskets**

Play Critical Roles in Sealing and Maintenance.  
Eg.: Spiral Wound, RTJ Gasket



## Field Engineering Services

We have supplied more than 14,000 Tube Bundles over the past 2 ½ decades. Our installations are globally present in more than 29 Countries. With our rich knowledge we provide our expertise in Field Engineering Services.



## Beyond Products End-to-End Service Excellence:

We deliver comprehensive service and support solutions designed to keep your cooling systems operating at optimal efficiency throughout their entire lifecycle.

- ✓ Pre Commissioning and Operator Training
- ✓ Regular Inspections to Improve the Performance
- ✓ Spare Part Management
- ✓ Erection / Commissioning supervision
- ✓ Upgrades
- ✓ Long-Term Maintenance

Our skilled team delivers customized solutions that enhance system availability, extend asset lifespan and minimize operational disruptions. Whether your installation is brand new or has been in service for years, our global service infrastructure ensures your systems remain Future-Ready, Energy-Efficient and Aligned with the Latest Industry Standards — Empowering you to navigate the evolving energy landscape with confidence.





# BGR ENERGY SYSTEMS LTD

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