Kay Bouvet Engineering Ltd.

"People make technology work"

U & R Stamp

CERTIFIED ISO 9001:2008 COMPANY

AS 9100C

Our Company

Kay Bouvet Engineering is a heavy engineering company focused on providing turnkey solutions for the sugar industry. We create holistic **sugar development projects,** from sugar cane plantation to final sugar mill erection and commissioning. Co-Generation power plants, alcohol distilleries, and waste management systems are also part of the services we provide.

Moreover, we cater to the **nuclear, defence and space industries**, commissioning projects for renowned government organizations such as Nuclear Power Corporation of India Limited (NPCIL), Defence Research & Development Organization (DRDO), and Indian Space Research Organization (ISRO).

With **more than 40 years of experience**, many international customers have already witnessed our capabilities to **design, manufacture & operate large scale sugar projects.**

We believe our competitive advantage is based on our **state of the art infrastructure, highly skilled and versatile manpower, and certified high quality management.**

Even though technology has enabled us to improve our efficiency during the last decades, we still maintain the core belief on which our company was founded: **"People make technology work"**

Sugar Division

- More than 40 years of experience in the sugar industry
- Accredited by NCDC for execution of sugar plants on EPC basis in 1995
- Over 30 EPC projects commissioned over the last decade

Special Products Division

- 20 years of experience in the nuclear industry
- Long-term collaborations with the Indian defence and space research organizations
- Dedicated design, manufacturing and erection teams to achieve highest quality standards

Sugar Division

Worldwide there is a clear need for a holistic approach to industrial sugar development, from sugar cane plantations, to sugar plant design, manufacture and operation.

That is why during the last 20 years we have developed a team with wide experience in all the fields necessary to **successfully develop sugar cane plantations and sugar mills anywhere in the world.**

Sugar Cane Plantation Development

Preparation of land

- **Preliminary study of land & region** – feasibility analysis
- **Selection of appropriate site** for sugar cane plantations, based on social, economical & natural reasons
- Development of **land preparation report**
- Selection & development of **irrigation facilities**

Sugar cane development

- **Selection of most appropriate seeds** based on area reports
- **Laboratory setup for development of seeds** by using advanced techniques, such as Tissue Culture Method
- Use of efficient **crop cultivation techniques** to increase crop yield
- **Development of facilities for production of bio fertilizers, bio compost & pesticides**
- Recommendation on most efficient **harvesting & transportation methods**

Collaborations for Sugar Cane Plantations

- Alliances with leading seed laboratories and bio-chemical institutes
- Personal assistance by experts in sugar plantation:
  - PhD's in agriculture
  - Experts in irrigation facilities
  - Scientists specialized in agrochemicals

Vijay Sugars 2500TCD & 12.5MW Co-Gen Power Plant

Turnkey Sugar Plant Project Development

Design

- Development of technical drawings
- Material and bought-out selection
- Design of equipment based on required output
- Design of structures
- Integration of C&I systems

Procurement

- Purchase of needed raw material & bought-outs
- Performance of quality tests on all purchases

Manufacturing

- Fabrication & machining of all components of the turnkey project
- Testing, finishing and painting to ensure high-quality finish

Erection & Commissioning

- Transportation to site
- Supervision of site to ensure proper installation of components
- Performance tests to check the appropriate operation of the facilities

Sugar Plant Operation & Maintenance

Capabilities building

- Development of manpower capabilities (training and supply of experienced manpower)
- Establishment of an organization structure for the entire sugar project

Operation planning

- Development of clear goals and procedures for the operation of the sugar plant
- Organization of process consumables for the period of operation
- Assurance of appropriate handing over to the management at end of contract
- Definition of performance parameters to control efficient operation

600 KLPD Distillery in Brazil

Co-Generation Power Plants

A Co-Generation power plant is fueled by the **by-products of the sugar manufacturing process** and generates electricity both for the sugar plant and the region around it. These plants can convert any sugar project into an efficient and economical way to generate energy.

Characteristics

- Up to 50MW of total electricity output
- High pressure steam generators of up to 105 kg/cm^2 (200 tonne/hr steam)
- Fueled entirely with bagasse, the main by-product of the sugar manufacturing process
- Environmentally friendly, with reutilization of by-products for bio-compost
- Provided with evacuation arrangement for power

Bio-Ethanol Distilleries

Bio-fuels are already a big part of total fuel consumption worldwide and their demand keeps increasing, with some reports stating that they will represent **27% of world transportation fuel by 2050.**

The leading country in Bio-Ethanol technology is Brazil, where companies like Reunion Engineering have many decades of experience in this technology, providing the latest advancements to their global partners.

Kay Bouvet Engineering has been allied for the last decade with Reunion Engg. Brazil to **develop the highest quality distilleries tailored to our clients requirements.**

Project Experience

Kay Bouvet Engineering has executed numerous turnkey sugar projects across India over the last 20 years, including co-generation power plants and ethanol distilleries:

- Sugar Plants up to 10,000 TCD for Bajaj Hindustan Ltd.
- 6250 TCD Sugar plant with 34 MW co-generation power plant for Rana Sugars
- 2500 TCD sugar plant for GM Sugar along with 12 MW Co-generation power plant
- 2500 TCD Sugar Plant for GMR Industries Ltd.
- 2500 TCD Sugar Plant for Shivratna Udyog with 12.5 MW Co-generation power plant
- 2500 TCD Sugar Plant for Markandeya Co-op Sugar Mills
- 3500 TCD Sugar plant for Shree Basaweshwar Sugars Ltd.
- 8400 TCD sugar mill with 44 MW co-gen power plant under execution for Mashkour Sugar, Sudan

International experience

We are constantly looking for opportunities to expand our operations internationally by enabling holistic sugar development projects in countries that can benefit from our expertise in the sugar industry

We have executed projects in Africa, South East Asia & the Indian Subcontinent, and we are currently pursuing new projects in these markets and many other countries worldwide

Some of our clients

bajaj hindusthan ltd.

GMR INDUSTRIES LIMITED

GM SUGARS AND ENERGY LTD.

SHIVRATNA
CONSTRUCTION & EARTHMOVERS

75 TPH Boiler at Vijay Sugar

EPC Projects for Sugar Plants

In addition to complete turnkey sugar plants, Kay Bouvet has executed several expansion and modernization projects on an EPC basis across India. We have also commissioned various co-generation power plants, mill houses and boiling houses on EPC basis.

Summary of recent EPC projects

- >5 Co-Gen Power plants
- >15 Milling plants
- >20 Boiling houses
- >30 Falling film evaporator units
- >15 Fluidized bed dryer units
- >50 Continuous vacuum pans units

We are constantly innovating to make the sugar manufacturing process more efficient, introducing several pioneering technologies in the Indian market during the last decades.

Nowadays, all our sugar plants and EPC projects are **designed with the latest technology**, including automation and control systems to ensure the highest performance efficiencies.

Pioneering technologies introduced in India

Continuous vacuum pan:
- Reduces energy consumption by 2-3% by eliminating the need to load and unload sugar after each iteration

Falling film evaporators:
- Achieves evaporation with lower loss in sucrose, less energy usage and lower maintenance requirements

Static fluidised bed dryer:
- Reduces losses in sugar content and enhances the quality of final sugar in an energy efficient operation

Bagasse dryer:
- Reduces the moisture of bagasse sent to boiler for steam generation, increasing steam output per unit bagasse

Underwater Trolley for PFBR

Nuclear Division

The nuclear industry in India has been expanding rapidly during the last 20 years. Continuous support from the government, and the persistent drive to power the nation using clean, emission free nuclear power has allowed this industry to thrive in the last decades.

In 1999, Kay Bouvet began its collaboration with the Department of Atomic Energy (DAE) and we have progressively expanded our operations as demand increased.

Our experience spans various **reactor components, fuel handling systems, shielding equipment for reactor building, air locks, and coolant and moderator storage vessels**. We have also collaborated with the Bhabha Atomic Research Centre to manufacture equipment for fuel fabrication, sampling and recovery.

Having **contributed to 2 of the 3 stages in the Indian Nuclear Power Program**, we are fully committed to realizing the Indian government's goal of achieving 63,000MW of installed capacity by 2032.

Highlights

- **Qualified for manufacturing the "Calandria",** one of the most critical components of a nuclear reactor
- **More than 20 projects** completed in different parts of the nuclear island
- **Active collaborators in the development of the Prototype Fast Breeder Reactor**, the stepping stone to the 2nd stage of the Indian Nuclear Power programme

Metallic canisters for R&DE

Defence Division

The Indian Government's thrust on indigenization of manufacturing, impactful reforms in the defence sector, and increasing competitiveness in the international market have positioned **India as a key player in the global defence industry.**

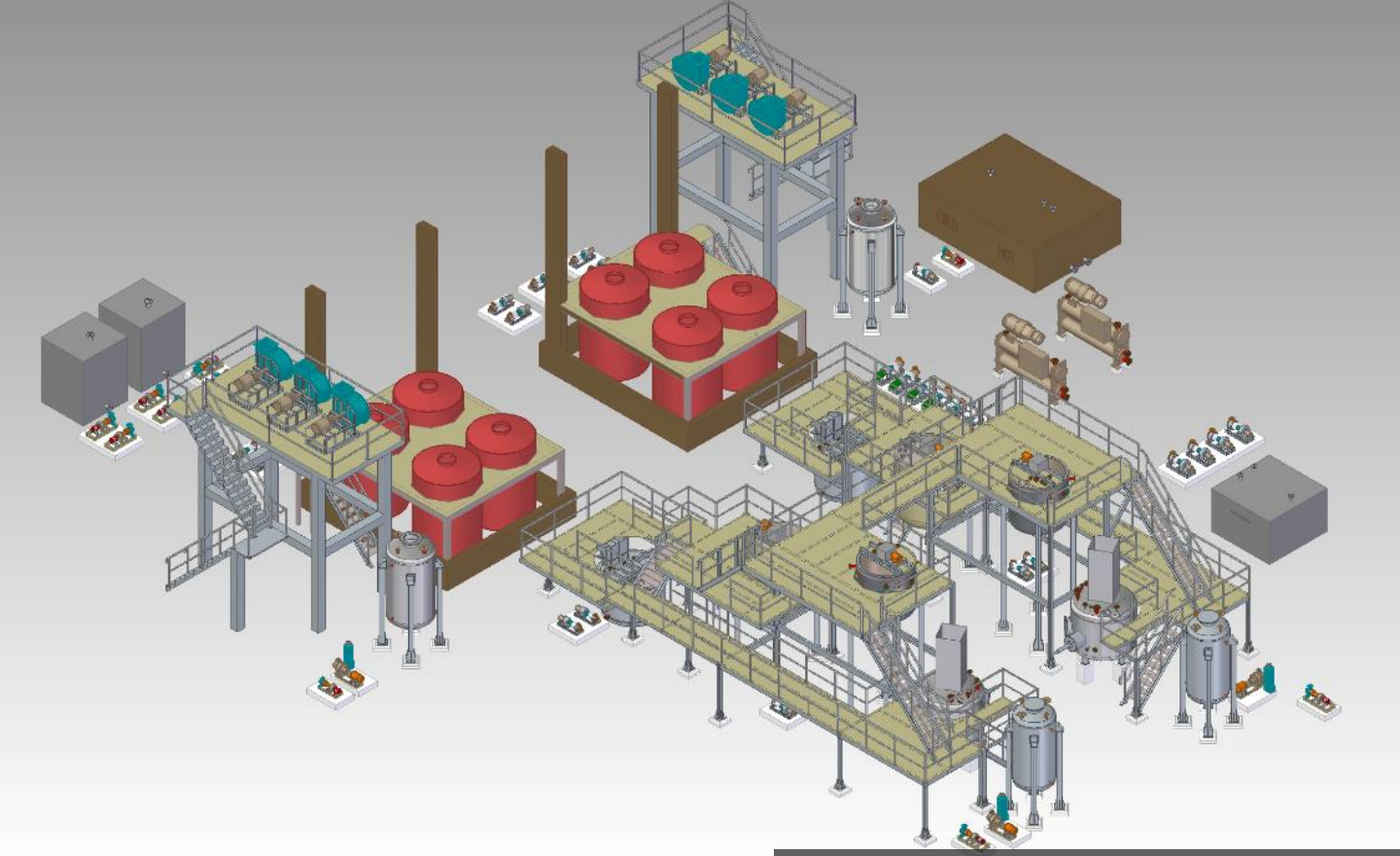
Kay Bouvet has been a **strategic partner for the Indian Defence Research and Development Organisation for the last five years**. Our large scale manufacturing facilities, qualified design department, strict quality standards and project management capabilities have enabled us to serve the requirements of DRDO with the highest quality and precision.

Our project experience spans canisters for **storage, handling and transportation of missiles, loading and handling systems for missiles, radar systems and test rigs for launchers.**

Our aim for the next years is **to be at the forefront of the domestic defence industry** and supply companies worldwide with high quality technology at competitive prices.

Highlights

- **Specialized team for mechanical, structural and thermal design & analysis** for various R&D projects
- **Integration of military grade control & instrumentation systems** with mechanical components
- **Close collaboration with DRDO and defence laboratories** to enhance the capabilities of Indian defence department



Ammonium Perchlorate Processing Facility

Space Division

After years of Research & Development the Indian Space Research Organization (ISRO) has established itself as a key player in the international market due to its **efficiency, reliability and timeliness.**

During the last years Kay Bouvet has become **a key partner of ISRO**, providing critical components for their space launch vehicles and support facilities.

Kay Bouvet has manufactured several projects for ISRO, including:

- **Second vehicle assembly building** at SHAR, which will allow assembly of GSLV MK II and MK III vehicles.
- **Ammonium perchlorate fuel processing facilities** as an EPC project for the Vikram Sarabhai Space Centre
- Various types of **rocket motor casings** for space vehicles

This collaboration was established based on our high precision infrastructure, experience in handling specialized materials, welding qualifications and strict quality management standards.

Kay Bouvet believes in the vision of **India becoming a leader in the global space industry**, and we plan to work with ISRO to make this vision come true during the next decades

Highlights

- **EPC project** under commissioning for setting up **solid propellant processing facility**
- **Dedicated facilities** for precision manufacturing of motor casings
- **Enabling the expansion of ISRO's launch capabilities** by manufacturing a second vehicle assembly building

Our Team

Design

Our team has **several years of experience in designing high quality systems** using the latest design & analysis tools:

- 3D CAD modelling
- Finite element analysis (static structural, seismic, thermal & fatigue)
- Piping design & analysis

Planning

Kay Bouvet has a proven track record of **completing all our projects to the satisfaction of our customers**

- MS Project for detailed planning and scheduling
- Centralized ERP system for resource planning & management

Manufac-turing

Our manufacturing team is composed of a **highly qualified and versatile workforce**

- More than 80 highly qualified welders (as per ASME Section IX)
- 3 manufacturing facilities with state of the art CNC machinery

Quality Assurance

We have **well established QA systems with experience in highly critical jobs** for the nuclear, defence and space departments

- Level III NDE qualified personnel
- In-house NDE facilities (including ultrasonic, helium leak and radiographic testing)

Kay Bouvet Engineering Ltd. has more than 800 employees distributed across its network of offices and manufacturing facilities in India

Unit III - Manufacturing Workshop

Our Capabilities

Quality

- ISO 9001: 2008 certified company
- AS 9100 C (aerospace manufacturing)
- ASME U & R Stamp

Precision

- Accredited to manufacture some of the most critical components in a nuclear power plant
- Leica Absolute Tracker with accuracy of +/- 10µm

Scale

- Material handling capacity of up to 200 MT & more than 800 employees

Facility	Specifications	Maximum Weight
CNC VTL	Table Swing -10400 mm Max Height -3500 mm	90 Tons
CNC Horizontal Boring Machine (BFT 180)	X-34000 mm / Y-4000 mm Z-1800 mm	200 Tons
CNC Horizontal Boring Machine (FB 180)	X-13000 mm / Y-6000 mm Z- 1850 mm	200 Tons
VMC (B02DSL)	X- 1250 mm / Y- 630 mm Z- 700 mm	4.5 Tons
CNC Lathe (SR 2000)	Center Dist – 6000 mm Swing Over Bed- 2000mm	70 Tons
Plate Bending with DRO	Width-2500 mm Thickness-90mm	---
CNC Cutting	15000 mm x 2500 mm	---
Heat Treatment Furnace	13 m x 8.5 m X 7.5 m	150 Tons
Hydraulic Press with Manipulators	Dia-5500 mm	1000 Tons

Unit III - CNC Machine Shop

Manufacturing Facilities

Plano Miller


CNC Horizontal Boring Machine


CNC Cutting Machine


Vertical Turning Lathe


CNC Lathe


CNC Vertical Turning Lathe


Hydraulic Press


Stress Relieving Furnace


Clean Room – 100,000 ppm

Our office network

Satara – Headquarters & Manufacturing

- Marketing, Finance, Design, Purchase & Production departments
- Manufacturing Units I & III

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Yamuna Nagar – Branch Office & Manufacturing

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At Kay Bouvet we have a main belief: ***innovation is key to all our processes.***

In the last decade we have established collaborations with countries around the world to create holistic sugar development projects and worked with leading organizations in Nuclear, Defence & Space engineering by providing unrivalled service and quality.

We have also developed a team of talented professionals eager to redefine how heavy manufacturing is done today.

One thing is clear: ***we will not stop moving forward***

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