



JETOMAT

Variable Nozzle Thermocompressor

ReCompression | TurboHeat | Desuperheating

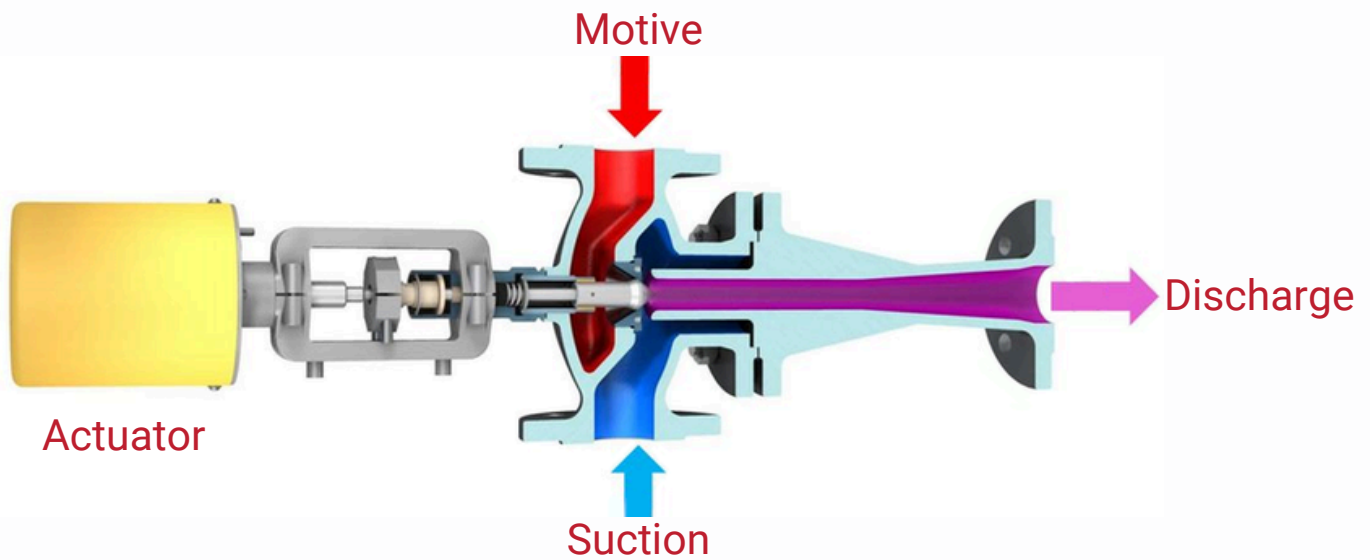


The Baelz thermocompressor, known as **Jetomat**, is a **patented**, German-made device featuring a variable nozzle design, showcasing over **125 years of Baelz's engineering expertise**. This advanced technology efficiently recycles low-pressure steam by compressing it with high-pressure steam, significantly increasing its pressure and temperature for reuse within the system. By optimizing this steam recovery process, the Jetomat **reduces steam consumption by 10-30%**, resulting in significant energy savings and enhanced operational efficiency.

Jetomat thermocompressors are highly versatile and suitable for various process industries, including Chemical, Paper, Plywood, Dairy, and Pharmaceuticals. They are particularly effective in optimizing the reuse of low-pressure steam, reducing process heating cycle times, and eliminating bottlenecks in heating applications. With a simple design featuring few moving parts, Jetomat thermocompressors are low-maintenance and provide long-term reliability. Integrating Jetomat systems into your operations can lead to reduced energy waste, improved performance, lower operational costs, and a significant step toward achieving sustainability goals.

WHAT IS A JETOMAT?

A thermocompressor is a device that recycles low-pressure steam by compressing it using high-pressure steam. This process increases the pressure and temperature of the steam, making it reusable within the system, which leads to significant energy savings and efficiency improvements.



KEY FUNCTIONS

Energy Efficiency through Steam Recycling: Optimizes energy efficiency by recycling low-pressure steam through compression with high-pressure steam, making it reusable within the system. This process reduces the need for fresh steam, lowers fuel consumption, and results in significant cost savings.

Variable Nozzle Control: Utilizes a variable nozzle design that allows for precise control and adjustment of steam flow rates, enabling quick adaptation to changing steam load requirements. This ensures stable operation and maintains efficiency across varying operational conditions.

Optimize Process Efficiency: Enhances Heat Transfer Rate by up to 18% by reducing condensate film thickness and increasing turbulence, which enhances heat transfer efficiency and maximizes output from existing production equipment.

HOW DOES THE JETOMAT WORK?

The thermocompressor operates by utilizing a high-pressure steam jet to entrain low-pressure steam. The mixture is then compressed, resulting in increased pressure and temperature, which allows the steam to be reused in various processes.

SUCTION STAGE: Low-pressure steam is drawn into the thermocompressor by the high-velocity jet of motive steam.

MIXING STAGE: The low-pressure steam mixes with the high-pressure steam within the diffuser, where the kinetic energy is transferred.

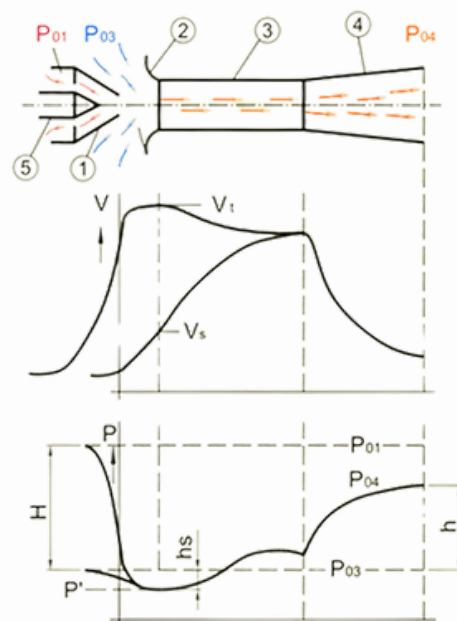
COMPRESSION STAGE: The mixed steam is compressed, resulting in higher pressure and temperature, making it suitable for reuse.

VARIABLE NOZZLE ADJUSTMENT: The variable nozzle design adjusts the steam flow rate and pressure dynamically, ensuring optimal performance and efficiency under varying process conditions.

Pressure-/
Velocity run

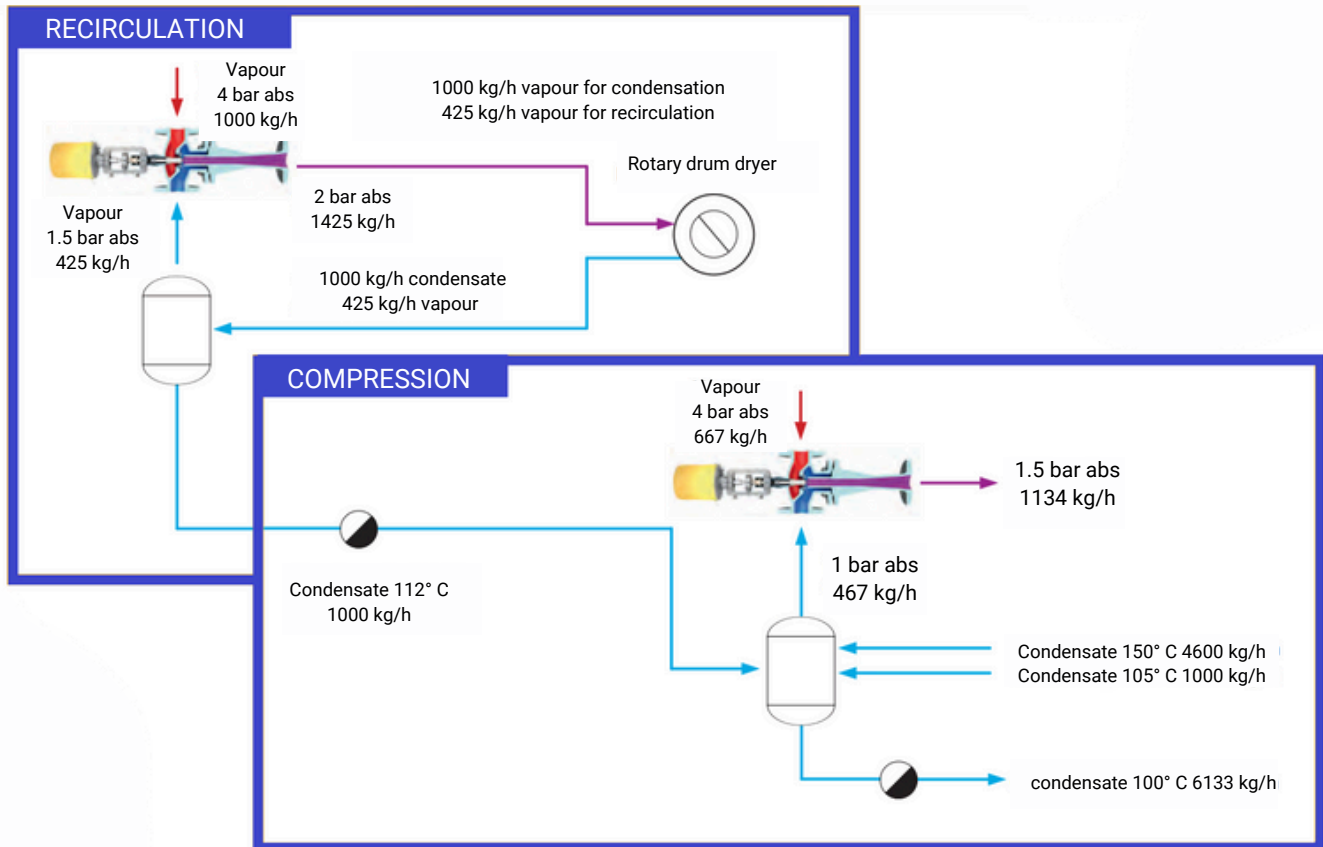
Velocity
Diagram

Pressure
Diagram



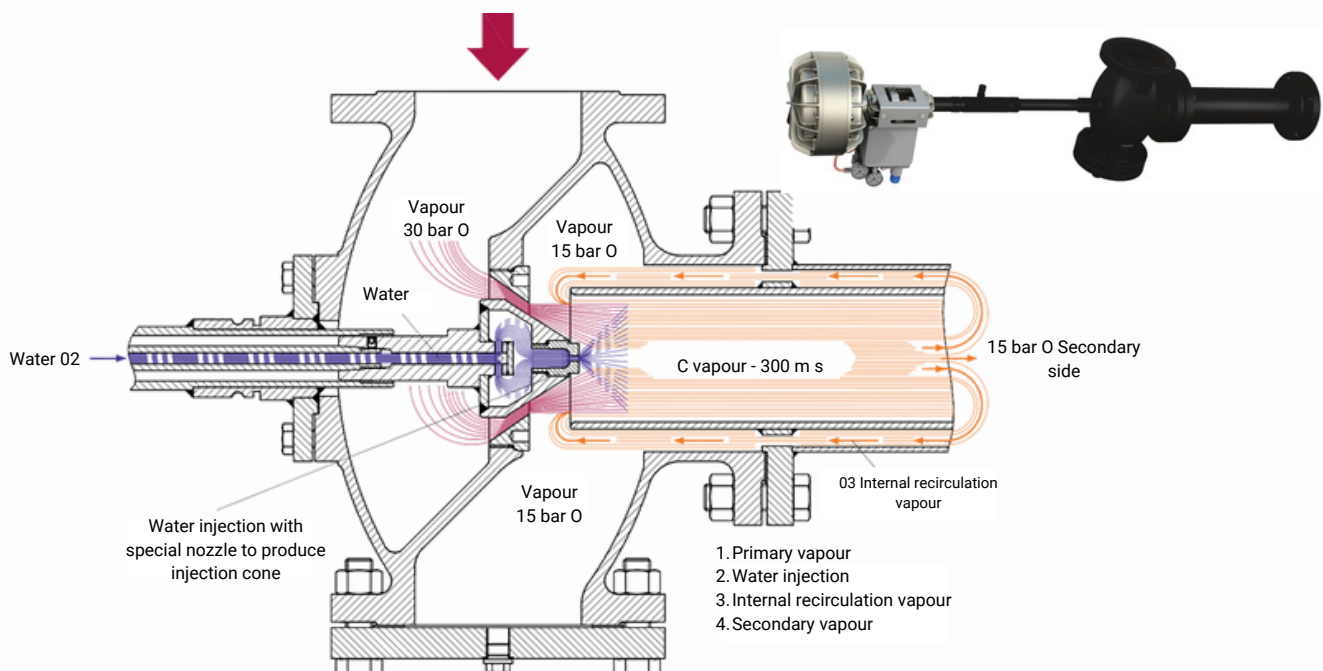
APPLICATIONS OF JETOMAT

Fields of application for baelz 590 controlled jet pump for vapour include **Recirculation, Compression and Desuperheating** in Process Heating by Steam, Hot Water, Thermic fluid etc



Jetomat as a Desuperheater and saturated steam generator.

No overheating and high precision pressure and temperature control.



BAELZ VARIABLE VS FIX NOZZLE

FEATURE	VARIABLE NOZZLE	FIXED NOZZLE
OPERATION PRINCIPLE	Nozzle Area Varies Based on Load During Operation	Nozzle Area Remains Same in Operation
CONTROL & FLEXIBILITY	High controllability Turndown Ratio 10 - 80%	Limited controllability Turndown Ratio 2 - 5%
ENERGY SAVINGS	Higher energy savings due to precise control and adaptability	Lower energy savings as Suction Drops due to Load Variation
APPLICATION SUITABILITY	Can Operate in Process with varying steam loads and pressure requirements	Needs Constant steam loads and pressure requirements in Process
OPERATION EXAMPLE	Design Point • Pressure..... 5 bar • Flow..... max • Speed after the nozzle.. 500 m/s • Suction effect..... max Lower Operating Point • Pressure at lower load... 2 bar • Flow Still..... Max • Speed after the..... 500 m/s • Suction effect Still Max SAME SAVINGS	Design Point • Pressure..... 5 bar • Flow..... max. • Speed after the nozzle.. 500 m/s • Suction effect..... max Lower Operating Point • Pressure at lower load... 2 bar • Flow Still..... Reduced • Speed after the..... 200 m/s • Suction effect Lowered LOWER SAVINGS



TECHNICAL SPECIFICATIONS

Media	Steam, Hot / Cold Water, Thermic fluid
Size	15NB to 300 NB
Pressure Rating	upto 100 Bar
Temperature Rating	-10°C to 350°C
Leakage Class (EN 1349)	Better than class IV (0.004% Kvs)
End Connection	DN Flanged (EN 1092-1)
Housing	Ductile Iron / Carbon Steel
Plug, Stem and Nozzle *	Stainless Steel
Actuator	Pneumatic and Electric

INSTALLATION AND INTEGRATION

Integrating a Jetomat thermocompressor into your existing steam system is straight forward, thanks to its adaptable design. The following steps outline the installation process:

Site Assessment: Evaluate the current steam system to determine the best location for the Jetomat installation.

Piping and Connections: Ensure proper piping configuration for the efficient flow of motive and suction steam into the Jetomat.

Control System Integration: Connect the Jetomat to the Baelz microprocessor controller and pressure transmitter for seamless monitoring and control.

Testing and Calibration: Conduct thorough testing and calibration to ensure the Jetomat operates within the desired parameters.



BENEFITS



ENERGY EFFICIENCY:

Saves upto 30% of Live Steam load, by recompressing and recirculating steam and condensate, significantly reducing the need for fresh steam generation.



RAPID PAYBACK PERIOD:

Typical **Payback Period is 6 to 18 Months**, due to the substantial energy savings, Simple Implementation, Increased Production, depending on the application and energy prices.



IMPROVED MACHINE PERFORMANCE:

Up to **18% Higher Heating output** can be achieved from existing machines due to increased Heat Transfer Rate, Thinner Condensate Films and improved condensate removal.



SIMPLIFIED SYSTEM DESIGN:

Jetomat ejectors eliminate the need for additional circulation pumps and complex hydraulic balancing and Utilising Flash Steam Locally



VERSATILITY ACROSS APPLICATIONS:

Jetomat can be seamlessly integrated into both new and existing systems, providing flexible solutions tailored to different industry needs for Steam, Water, Thermicfluid and Vapours.



RELIABLE AND LONG-LASTING:

100% Built in Germany by Baelz, Jetomat ensure Decades long service life **(15-30 Years)** with minimal maintenance requirements.



CLOSE LOOP STEAM NETWORK:

When combined with flash vessels and pressurized condensate recovery systems, Jetomat technology maximizes energy recovery by efficiently recycling steam and condensate.



ENVIRONMENTAL BENEFITS:

By reducing energy consumption and optimizing steam usage, Jetomat help lower greenhouse gas emissions helping reduce carbon footprint and aligns with sustainability goals and environmental regulations.



CASE STUDIES

CHEMICAL INDUSTRY - UPL, India

UPL Ltd. was honored with the **"Most Innovative Project Implemented"** award in the General Category at the **CII Energy Awards 2019** by the Confederation of Indian Industry (CII) for their pioneering use of a variable nozzle Jetomat thermocompressor.

The project successfully recovered waste flash steam to generate 3.5 bar steam, resulting in a **substantial saving of 422 kg/hr of steam and annual cost savings of Rs. 45 lakh.**

UPL subsequently purchased 12 more thermocompressors to further enhance their operations.



Confederation of Indian Industry

#CIIEnergyAwards2019
General Category

Most Innovative Project implemented

Project: Flash steam recovery using Variable Nozzle thermocompressor

IDEA

Use of variable area thermocompressor to recover flash steam which was letting out to atmosphere.

Before

Using Pressure Powered Pump Package Unit to pump condensate to power plant. The flash from the PPPPU was venting out. As the plant is not having continuous steam load, the amount of flash steam varies. Therefore could not use the fixed nozzle thermocompressor to recover flash.

After

By using Variable Nozzle Thermocompressor we are utilizing waste flash steam to generate 3.5 Bar steam by motive steam at 16.5 Bar. This thermocompressor is used in parallel with 3.5 bar Pressure reducing station.

Benefits

1. Saving in terms of steam 422 kg/hr
2. Cost Saving Rs. 45 LPA , Total investments Rs. 28 LPA




* The Above Case Study was presented by UPL Ltd, Bharuch at CII Energy Awards 2019 and would be helpful for cross sectoral learnings & implementation after suitably fine-tuning to meet the requirements of the plant



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Drop a message to **+91 9989992902** to get the invite link
To avail any of our services write to us at **nitish.kumar@cii.in**



CASE STUDIES

TYRE INDUSTRY - Malaysia

A global tyre manufacturers Deployed, a Jetomat to efficiently **recover 200 kg/hr of flash steam by repressurizing** 1 barg low-pressure vent steam to 3 barg for process use.

PAPER INDUSTRY - Marko Steamjet, India

A steam specialist company, utilized a Jetomat to optimize the performance of a Yankee Dryer. By using a **low motive steam of just 4.5 barg**, to compresses flash steam of 1 barg to deliver steam at 3 barg to the dryer.

This innovative setup **significantly improves condensate removal and enhances heating efficiency in the dryer**, resulting in better drying performance and energy savings in the paper production process.

TEXTILE INDUSTRY - China

The solution led to a **15% reduction in steam consumption, from 2.6 tons to 2.2 tons**, and **eliminated the steam traps** after each drum. By replaced control valves with Jetomat 590 steam ejectors **in a 3-row drying stage of 12 drum dryers for a textile manufacturing process**. This retrofit allowed the plant to use 5.5 bar steam, achieving higher steam velocity and a thinner condensate layer, resulting in uniform heat distribution, **better drying quality, and increased production speed**.

CORRUGATOR INDUSTRY - China

A Corrugator machine's dryer section, originally using **individual drum dryers controlled by valves**, was **retrofitted with Jetomat** steam ejectors. This change resulted in **increased production speed, and reduced steam consumption by approximately 15%**.

INDUSTRIES WE SERVE



BREWERY



CHEMICAL



CORRUGATOR



DAIRY



F & B



OIL & GAS



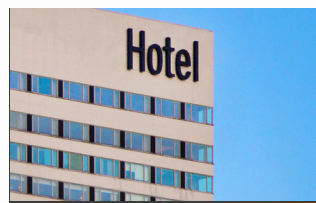
PAPER



PHARMA



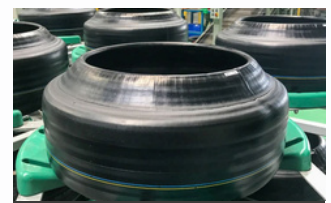
PLYWOOD



HOTEL



TEXTILE



TYRE





Baelz is a **family-owned enterprise** with a long tradition. Based in Heilbronn in south-west Germany, its products, made in Germany, are known for their quality. For **over 125 years** Baelz inventiveness has produced new patents & new developments. Baelz technologies are inspired by the laws of nature & harness the power of innovation to **achieve economical use of energy & resources**.

Due to Baelz's policy of continuous development, the company's **components & products for control, heat & cold engineering** have been installed all over the world.



MORE RESOURCES



CONTACT US

i-Kcal Systems Engineering LLP

Plot No 17, Tiny Indst. Estate,
Punyadham Ashram Road, Kondhwa Budruk,
Pune - 411 048. Maharashtra, INDIA

