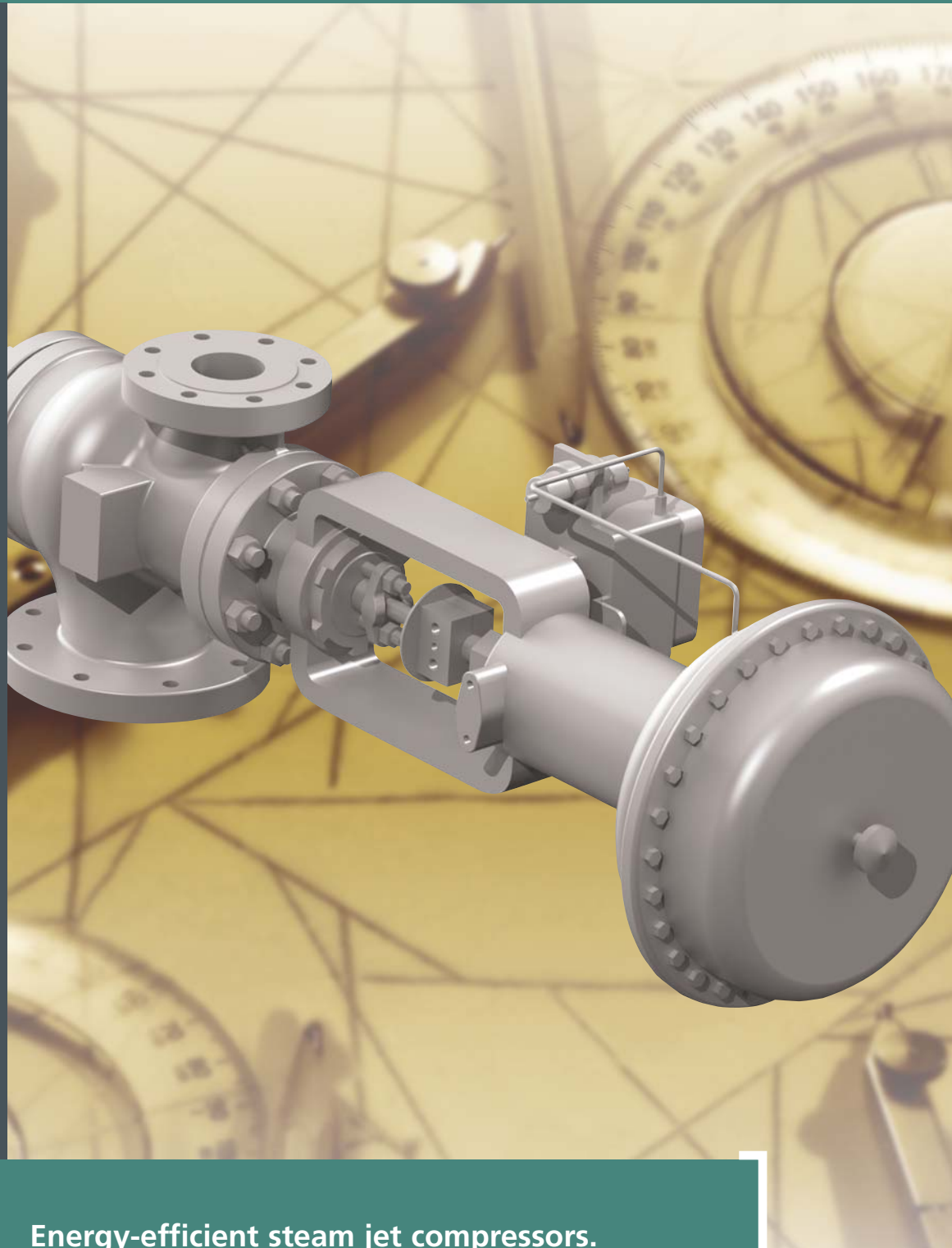


Thermocompressors

Engineered for efficiency

KADANT
AN ACCENT ON INNOVATION

Recirculating and booster
thermocompressor
applications.



Energy-efficient steam jet compressors.

Thermocompressors

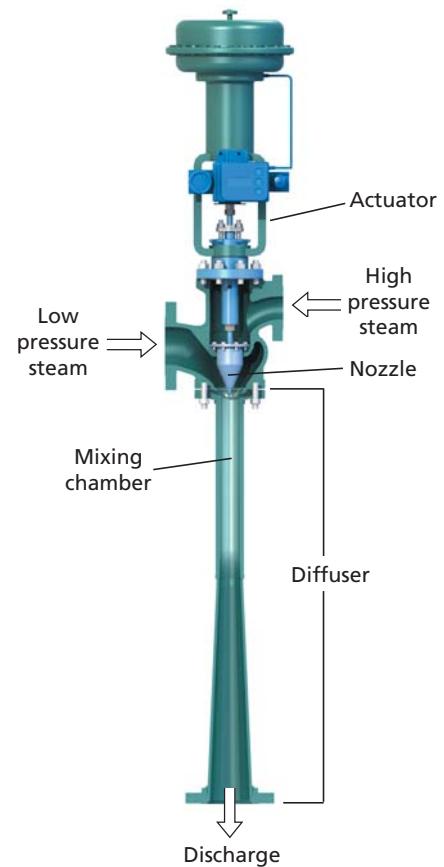
Kadant steam jet thermocompressors are designed to recirculate steam or boost lower-pressure steam for reuse in a variety of process applications in pulp and paper, petrochemical, food processing, desalination, and specialty chemical production.

How thermocompressors work

Thermocompressors are designed to accurately mix lower-pressure steam with higher-pressure steam. The higher-pressure motive steam entrains the lower-pressure steam and increases its pressure.

The motive steam is introduced through the nozzle of the thermocompressor. As the nozzle opens, the high velocity motive steam draws the lower-pressure steam into the thermocompressor body. An exchange of momentum occurs as the steam flows are mixed and the mixed flow is accelerated to high velocity with a uniform profile in the mixing chamber of the thermocompressor.

As the mixed flow enters the diffuser section, the diffuser flow area gradually increases to allow the velocity of the mixed flow to be reduced. As the velocity is reduced, the steam pressure increases. At the end of the diffuser, the discharge steam pressure is higher than the lower-pressure suction flow entering the thermocompressor.

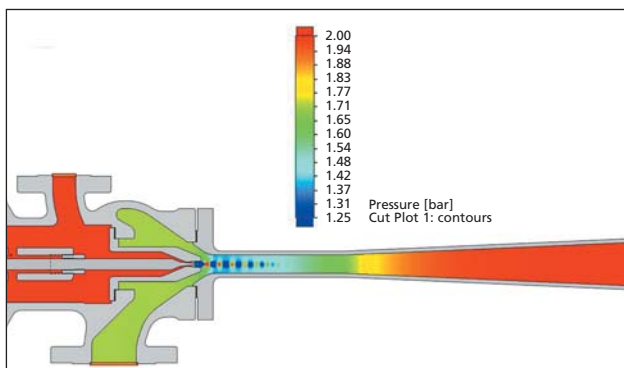


Features

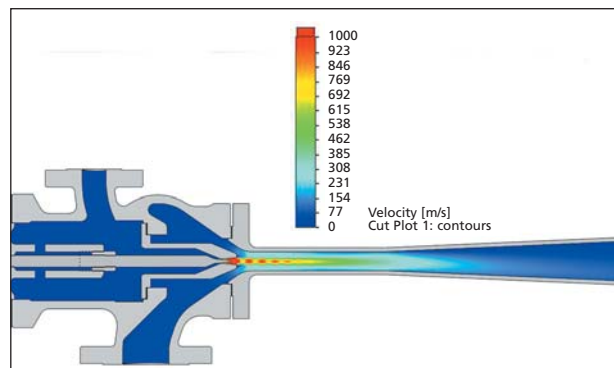
- ▶ Computational fluid dynamics used to model flow characteristics
- ▶ Nozzle and mixing chamber are sized based on specific operating conditions
- ▶ Retrofit existing installations without piping modifications
- ▶ Optimized thermocompressor geometry

Benefits

- ▶ Entrainment efficiency improvements up to 25% compared to conventional designs
- ▶ Minimize high-pressure motive steam use
- ▶ Low-cost upgrade to latest jet compressor technology
- ▶ Wider operating range
- ▶ Increased energy efficiency



As the motive jet accelerates the suction flow, a low pressure region is created at the entrance to the mixing chamber. As the flow moves along the mixing chamber, pressure rises. At the diffuser, velocity decreases and pressure rises.



The motive flow is accelerated at the nozzle and a high velocity jet is created. The jet transfers momentum to the suction flow and accelerates it as the two flows mix.

High-efficiency thermocompressors

In addition to retro-fitting existing steam jet compressors, Kadant also provides high-efficiency thermocompressors for improved energy utilization. Based on extensive product development, modeling, testing, and field applications, Kadant’s high-efficiency thermocompressor offers entrainment ratio improvements of up to 25% over conventional steam jet compressors.

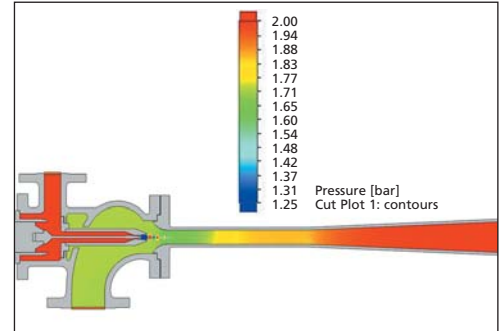
Using advanced computer analysis techniques to model the intricacies of flow dynamics within the thermocompressor, Kadant custom-engineers its high-efficiency thermocompressor to optimize the nozzle position, nozzle shape, and mixing chamber entrance geometry and length. This increases the dynamic head entering the diffuser and allows for more pressure recovery. The result is less motive steam consumption, higher energy efficiency, and a wider operating range.

When applied to paper drying systems, Kadant incorporates its application expertise in paper drying steam systems to properly match the thermocompressor to the syphons, separator tanks, flow orifices, and pipelines to ensure correct thermocompressor design and performance.

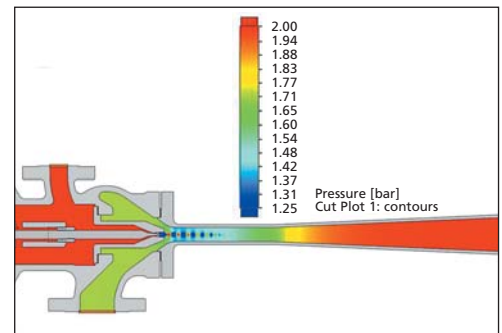
High-efficiency thermocompressors that are properly integrated with the steam system and process equipment can provide significant improvements in energy conservation, including:

- ▶ Increased power generation in combined heat and power plants
- ▶ Eliminated steam venting in steam recirculation systems
- ▶ Increased range of operations for stable and efficient production

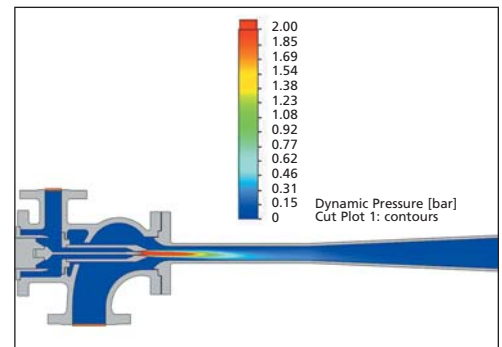
	Standard Unit	High-Efficiency Unit
Booster and recirculating applications	✓	✓
Retrofit existing installations	✓	✓
Match thermocompressor to syphons	✓	✓
Maximize entrainment ratio		✓
Minimize motive steam use		✓
CFD flow analysis		✓
Improve system control		✓
Increase electrical generation		✓



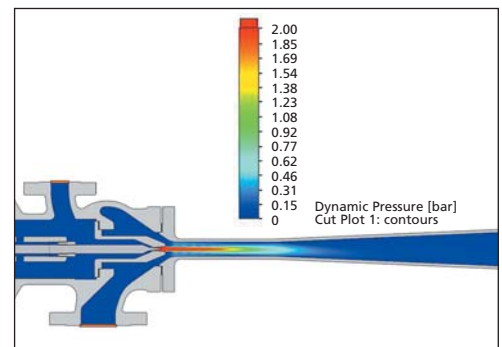
Static pressure distribution with standard geometry.



Static pressure distribution with optimized geometry.



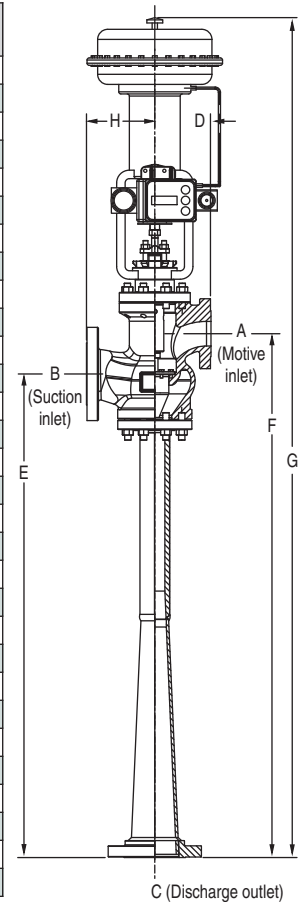
Velocity head in the mixing chamber with standard geometry.



Velocity head in the mixing chamber with optimized geometry.

Steam Jet Thermocompressors

Size	A ANSI 300#	B & C ANSI 300#	D	E	F	G	H	Units	Approximate Weight
2"	1.0"	2.0"	5.21	22.97	25.84	50.58	5.42	inches	140 lbs
			132	583	656	1285	138	mm	64 kg
2.5"	1.0"	2.5"	5.21	26.96	29.83	54.54	5.40	inches	150 lbs
			132	685	758	1385	137	mm	68 kg
3"	1.5"	3.0"	5.75	32.56	35.81	74.61	6.50	inches	240 lbs
			146	827	910	1895	165	mm	109 kg
4"	2.0"	4.0"	6.31	42.56	46.19	85.61	7.50	inches	285 lbs
			160	1081	1173	2174	191	mm	129 kg
5"	3.0"	5.0"	6.68	52.12	56.87	96.79	8.06	inches	340 lbs
			170	1324	1444	2458	205	mm	154 kg
6"	4.0"	6.0"	6.75	61.56	67.37	107.92	8.56	inches	480 lbs
			171	1564	1711	2741	217	mm	218 kg
8"	5.0"	8.0"	7.00	78.44	86.06	126.00	9.19	inches	780 lbs
			178	1992	2186	3200	233	mm	354 kg
10"	6.0"	10.0"	9.56	98.50	110.49	159.35	14.06	inches	1314 lbs
			243	2502	2807	4048	357	mm	596 kg
10"	8.0"	10.0"	11.44	98.50	112.88	166.63	14.06	inches	1414 lbs
			291	2502	2867	4232	357	mm	643 kg
12"	8.0"	12.0"	11.44	119.75	134.75	185.25	16.56	inches	1700 lbs
			291	3042	3423	4705	421	mm	773 kg
14"	8.0"	14.0"	11.44	133.00	147.69	198.19	19.06	inches	1800 lbs
			291	3378	3751	5034	484	mm	818 kg
16"	10.0"	16.0"	12.56	158.14	182.95	243.89	21.06	inches	2420 lbs
			319	4017	4647	6195	535	mm	1100 kg
18"	10.0"	18.0"	12.56	178.63	204.45	265.39	23.56	inches	2626 lbs
			319	4537	5193	6741	598	mm	1194 kg
20"	12.0"	20.0"	14.56	197.80	226.12	288.56	25.74	inches	3281 lbs
			370	5024	5743	7329	654	mm	1491 kg
24"	14.0"	24.0"	16.06	237.14	268.70	332.14	30.06	inches	4492 lbs
			408	6023	6825	8436	764	mm	2042 kg



Dimensions shown are for standard design. High-efficiency thermocompressors are custom-engineered and dimensions provided above are for reference only. Dimensions are subject to change without notice.

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Kadant is a global supplier of high-value, critical components and engineered systems used in process industries worldwide.

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