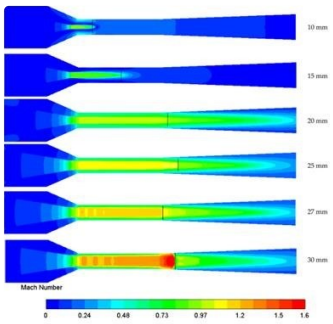
# THERMAL – Vapor Recompressor (TVR)

Manufacturing Thermal Vapor Recompressors (TVR) is where T2E began. Our mission is to deliver the highest-performing ejectors and thermocompressors by combining classical theory, CFD validation, and real-world fabrication expertise.

High-pressure motive steam accelerates through the motive nozzle, converting pressure into kinetic energy. The resulting vacuum entrains low-pressure suction vapor into the mixing chamber, where both streams merge and are recompressed through the diffuser. When the flow reaches sonic velocity at the throat, the ejector is sonic (critical); otherwise, it is subsonic (subcritical). As we say at T2E: ejector theory is elegant — but you have to know how to build it in practice!






## Advantages of Thermocompression:

- No moving parts — minimal maintenance and long service life;
- Simple, reliable, compact, and lightweight operation;
- 100% oil-free and suitable for hazardous areas;
- Low CAPEX and OPEX, adaptable to changing process conditions.

## Construction Standards (Food & Sanitary Duty):

| | |
|---|---|
| **Material of construction:** | 100% AISI 304L Stainless Steel (AISI 316L optional) |
| **Surface finish:** | Polished internal (Ra ≤ 0.8 µm) / pickled external (external polish optional) |
| **Drainage & CIP:** | Vertical drain and integrated CIP nozzle positioned per EHEDG guidelines without affecting performance |
| **Connections & gaskets:** | Butt-weld ends (motive steam with ASME B16.5 SS flange); food-grade silicone gaskets |
| **Design limits:** | Body: 0 to 1.5 bar(abs) \| Motive nozzle: 150# flange (up to 12 bar g) or 300# (up to 30 bar g) |
| **Standards & origin:** | Designed per ASME VIII Div. 1 (non-code / no ASME stamp); 100% locally manufactured |
| **Insulation:** | Supplied without thermal/acoustic insulation (optional upon request) |

## Engineering, CFD & Quality Control:

- Preliminary sizing using classical 1D/2D flow equations (±5% accuracy vs. actual field performance);
- Full CFD (Computational Fluid Dynamics) validation prior to fabrication to verify shock waves, recirculation zones, and diffuser geometry, eliminating field adjustments;
- Liquid Penetrant Testing (PT) performed on 100% of welds prior to shipment.

> **Historical Note:** Classical ejector theory was established by pioneers such as DuPerow Bossart (1927), Mellanby (1928), Watson (1933), Keenan & Neumann (1942), and Langhaar (1946). At T2E, we combine this foundation with modern CFD and precision fabrication.

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## Reference Models & Dimensions — TVR Series:

| Model | S (mm) | D (mm) | C (*) (mm) | Weight (*) (kg) |
|---|---|---|---|---|
| **100** | 100 | 100 | 900 | 45 |
| **125** | 125 | 125 | 1,100 | 53 |
| **150** | 150 | 150 | 1,400 | 79 |
| **175** | 175 | 175 | 2,200 | 81 |
| **200** | 200 | 200 | 2,500 | 102 |
| **225** | 225 | 225 | 2,750 | 115 |
| **250** | 250 | 250 | 3,200 | 125 |
| **275** | 275 | 275 | 3,800 | 157 |
| **300** | 300 | 300 | 4,200 | 190 |
| **350** | 350 | 350 | 4,600 | 211 |
| **400** | 400 | 400 | 4,900 | 272 |
| **450** | 450 | 450 | 5,200 | 300 |
| **500** | 500 | 500 | 5,750 | 400 |
| **600** | 600 | 600 | 6,850 | 650 |

*(*) Approximate overall length (C) and weights, subject to variation depending on operating pressures, temperatures, and process duty.*

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