

ATX axial turboexpander engineering design basis

Axial-flow expansion platform for preliminary refrigeration and energy-recovery studies.



Illustrative engineering visualization. Final production geometry may differ.

DOCUMENT CODE	AXO-ATX-EDB-R02
REVISION / DATE	R02 / 23 OCTOBER 2026
STATUS	ENGINEERING REVIEW
PUBLICATION CLASS	Uncontrolled public review copy
INTENDED USE	Preliminary technical orientation and enquiry preparation only

**PRE-RELEASE TECHNICAL
INFORMATION**

Do not use this document for procurement, fabrication, installation, operation, maintenance, or safety decisions. Final values require approved project data and controlled engineering release.

01 / GUIDE STATUS

How to use this engineering guide

Use this document to structure an enquiry and a verification plan. Do not use it to select, purchase, fabricate, install, operate, maintain, or certify equipment.

Control	R02 statement
Product scope	4 draft models: ATX-160, ATX-250, ATX-400, ATX-630
Status	ENGINEERING REVIEW
Numerical claims	Model-level evidence and conditions remain approval-pending
Standards	Pathways only; applicability and conformance are not claimed
Image	Illustrative; final production geometry may differ

Decision hierarchy

The approved project specification, datasheet, calculations, drawings, inspection/test records, and final manual take precedence over this public guide.

Reference model map

Axial-flow expansion platform for preliminary refrigeration and energy-recovery studies.

Model	Current R02 role
ATX-160	Small-footprint axial expander reference for pilot, modular, and distributed systems.
ATX-250	Compact axial machine reference for mid-range process refrigeration and energy recovery.
ATX-400	Axial-flow expansion reference platform for engineered refrigeration and power-recovery duty.
ATX-630	Large-frame axial expander reference for high-throughput cryogenic and recovery trains.

What the model code does not prove

The code does not by itself prove capacity, pressure-temperature rating, material, dimension, efficiency, leakage, safety integrity, certification, installed experience, or interchangeability.

03 / DUTY DEFINITION

Minimum enquiry inputs

The selection record should preserve each governing case and identify which case controls each aspect of the configuration.

- 01 Gas composition, molecular weight, phase condition, and contaminants
- 02 Normal, minimum, maximum, start-up, shutdown, trip, and upset cases
- 03 Inlet and outlet pressure and temperature; flow range and turndown
- 04 Control philosophy, load or compressor arrangement, utilities, and hazardous-area basis
- 05 Piping loads, supports, lifting, access, maintenance, inspection, test, and documents

Required case structure

Case	Engineering purpose
Normal / rated	Primary performance and continuous operating point
Minimum / turndown	Stability, control, containment, and operability
Maximum	Continuous limits, loads, temperature, and rating
Start-up / shutdown	Transient, thermal, sequence, and permissive review
Trip / upset	Protection, safe state, relief, and recovery review

04 / CONFIGURATION REVIEW

Translate process intent into equipment scope

The selected boundary must identify included equipment, interfaces, utilities, controls, documentation, testing, spares, and responsibility for adjacent systems.

- 01 Thermodynamic calculation and off-design operating map
- 02 Aerodynamic selection and operating-region review
- 03 Rotor-dynamic, balance, critical-speed, and overspeed review
- 04 Bearings, seals, auxiliaries, controls, vibration, and trip philosophy
- 05 Mechanical-run and performance-test scope where contracted

Interface freeze points

Interface	Record
Process / piping	Ends or nozzles, loads, orientation, drains, vents, insulation, cleanliness
Mechanical	Supports, base, lifting, access, removal, alignment, maintenance envelope
Electrical / controls	Power, signals, instruments, cause-and-effect, trips, communications
Utilities	Lubrication, seal/purge gas, air, cooling, heating, drainage as applicable
Documentation	Datasheets, drawings, calculations, certificates, manuals, final dossier

05 / INSPECTION & TEST

Make acceptance criteria explicit

Inspection and test scope is selected for the actual configuration, code basis, purchaser specification, hazards, and contractual guarantees.

Stage	Typical controlled evidence
Incoming / materials	Certificates, identification, traceability, condition, approved substitutions
Manufacturing	Route cards, procedures, qualifications, NDE, dimensional records
Assembly	Clearances, torque, orientation, cleanliness, functional checks
Testing	Approved procedure, calibrated instruments, witness/hold points, results
Release	Punch closure, preservation, nameplate, packing, final dossier index

No implied test claim

This guide does not state that any listed model has completed a type test, performance test, fire test, cryogenic test, emissions test, mechanical run, or third-party certification.

06 / STANDARDS & RELEASE

Confirm scope before claiming conformity

Reference	R02 use
API 617	Potential machinery scope pathway; applicability, edition, purchaser supplements, and exceptions must be agreed.
ISO 20816 series	Potential vibration measurement/evaluation pathway; select the applicable part and criteria for the actual machine.

Release checklist

- 01 Approve model and variant identity.
- 02 Approve all numerical data with units, conditions, methods, and tolerances.
- 03 Approve materials, dimensions, interfaces, and drawings.
- 04 Approve inspection, test, certification, and document requirements.
- 05 Approve public media rights and claims.
- 06 Record named engineering and document-control authorization.

Source identifiers

CLIENT-DRAFT-001; API-617-SCOPE; ISO-20816-STATUS

Primary references used for this issue

Source ID	Publisher / location	Use
CLIENT-DRAFT-001	Existing Axoventra workspace product and document draft	Client-controlled draft; engineering approval not provided
API-617-SCOPE	American Petroleum Institute - API Standard 617 scope	https://www.api.org/-/media/%20files/publications/whats%20new/617_e8%20pa.pdf
ISO-20816-STATUS	ISO/TC 108/SC 2 catalogue	https://www.iso.org/committee/51472/x/catalogue/

Interpretation

Official standards pages support scope and status statements only. The standards themselves are not reproduced. The client draft remains the only source for Axoventra-specific model identities and therefore requires client approval.

Document close

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