CHART
Cooler By Design

Howden
A Chart Industries Company

# Jetstream AX

## Flexible design and high performance fans for mining and tunnelling operations


chartindustries.com/mining

# A **flexible** and **modular** design approach while achieving **high-efficiency performance** across the fan curve.

**For more than a century, Howden, a Chart Industries company, has supplied ventilation equipment to every major mining company in the world, from frozen sites in the Arctic and the hottest nations in Africa to some of the deepest mines on the planet.**


Drawing on Howden's extensive mining and tunnelling experience, the Jetstream AX range of fans has been specifically developed to meet the requirements of auxiliary fan applications in demanding environments with a particular focus on performance, durability and flexibility.

Our vast experience in mine and tunnel ventilation applications and our global footprint positions Howden to optimally serve the mining and tunnelling markets.

### TMVS integration

The Jetstream AX fan range aligns with Howden's Total Mine Ventilation Solutions (TMVS) offering by complementing our product suite for mine ventilation applications.

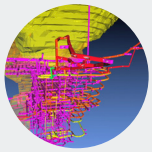
TMVS is a fully customizable, integrated suite of expertize, products and services. Providing efficiency and safety across operations globally.

Heating systems

Cooling solutions

Ventilation studies

Ventsim DESIGN



Ventsim CONTROL

# Jetstream AX

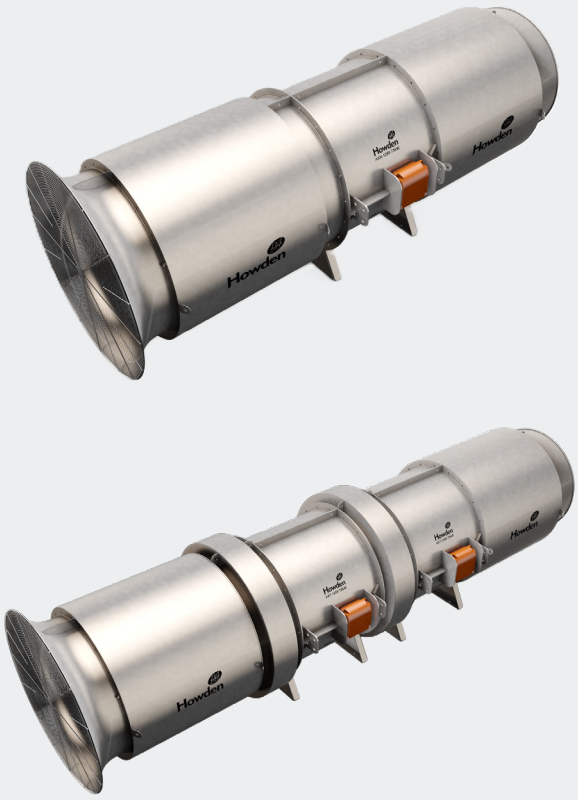
## The Jetstream AX improves personnel working conditions underground, and also expands available working places with improved airflow management.

Howden's Jetstream AX auxiliary mine ventilation fans are designed to give the highest fan output at low power consumption, providing high efficiencies across a broad operating range.  Efficiencies of over 85% are achievable.

The range of fans varies from 710mm to 1600mm in diameter and are available in either single-stage or twin stage configurations. The range of sizes aligns with standard ventilation duct sizes employed in underground mines around the world.

Nonstandard fan sizes are available on request. Numerous duty combinations are available, with the ability for multi-stage configurations to achieve higher pressures. The impeller design allows for varying number of blades and blade angles. The impellers are dynamically balanced and fit directly onto the motor shafts.

Downstream guide vanes with full inner fairing tube and tail cone are incorporated in each fan to ensure maximum static pressure regain.




| Features | High efficiency benefits |
|---|---|
| Fan design | The aerofoil blade design gives optimum fan performance. Providing higher fan performance with lower power consumption. |
| Full inner fairing and tail cone | A full inner fairing and tail cone in the fan casing reduces shock losses after passing through impeller and stator vanes, thus maximizing efficiency and reducing noise. For multi-stage operation, an inner fairing spacer is fitted between the stages that allows high-efficiency operation. |
| Large performance envelope | Adjustable pitch aerofoil blades maximize operational envelope and give reliable high-efficiency aerodynamic performance across a wide range. Blade angles are adjustable at standstill. |
| Flexible modular design | Modular design for each fan size gives commonality of parts and flexibility on the arrangement, components, number of stages, thus allowing customization if needed. |
| Anti-stall chamber add-on option | The anti-stall chamber allows for continued safe operation during transient high-pressure events, offering a risk-free process in parallel fan arrangements. This creates a continuously rising pressure characteristic that provides high-pressure capability with a significantly increased operational range. |

## Performance and dimensions


L1

H

H1

D

W


L2

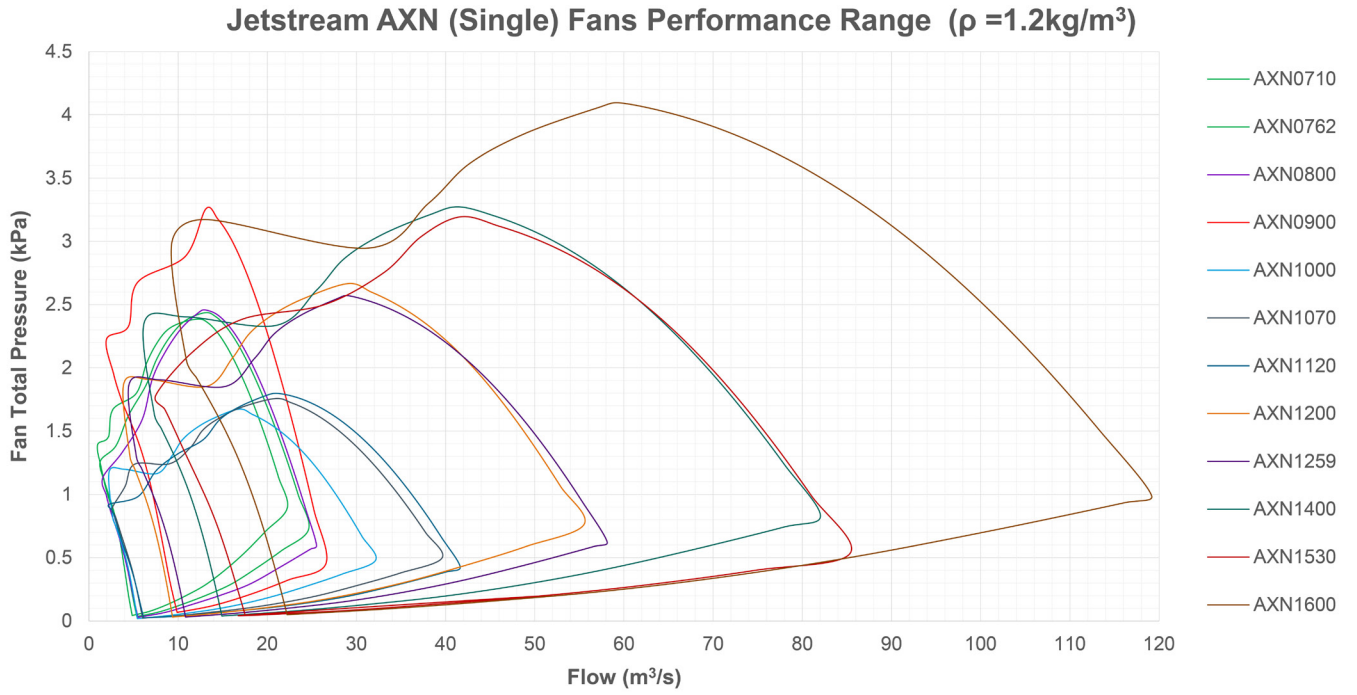
| Label | Dimensions and Weights | Unit | 710 | 762 | 800 | 900 | 1000 | 1070 | 1120 | 1200 | 1259 | 1400 | 1530 | 1600 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L1 | Single stage (AXN) length (inc. silencers) | mm | 2819 | 2933 | 3016 | 3291 | 3612 | 3804 | 3877 | 4297 | 4454 | 4940 | 5190 | 5597 |
| L2 | Twin stage (AXT) length (inc. silencers) | mm | 3841 | 3955 | 4038 | 4413 | 4734 | 4926 | 4999 | 5731 | 5888 | 6544 | 6794 | 7401 |
| D | Fan diameter | mm | 710 | 762 | 800 | 900 | 1000 | 1070 | 1120 | 1200 | 1259 | 1400 | 1530 | 1600 |
| W | Width | mm | 1068 | 1056 | 1106 | 1244 | 1335 | 1406 | 1477 | 1624 | 1636 | 1836 | 1950 | 2121 |
| H | Height | mm | 943 | 1005 | 1120 | 1206 | 1341 | 1403 | 1499 | 1590 | 1659 | 1851 | 2001 | 2101 |
| H1 | Fan centreline height | mm | 550 | 570 | 590 | 620 | 680 | 720 | 760 | 800 | 840 | 940 | 1020 | 1060 |
| | Single stage fan (inc. inlet bell & duct adaptor) | kg | 545 | 550 | 565 | 1100 | 850 | 870 | 890 | 1390 | 1490 | 1930 | 2180 | 2670 |
| | Twin stage fan (inc. inlet bell & duct adaptor) | kg | 1055 | 1070 | 1095 | 2160 | 1625 | 1660 | 1700 | 2680 | 2880 | 3760 | 4240 | 5210 |
| | Inlet and outlet silencers (x2) | kg | 124 | 140 | 150 | 184 | 218 | 246 | 264 | 300 | 325 | 392 | 458 | 495 |

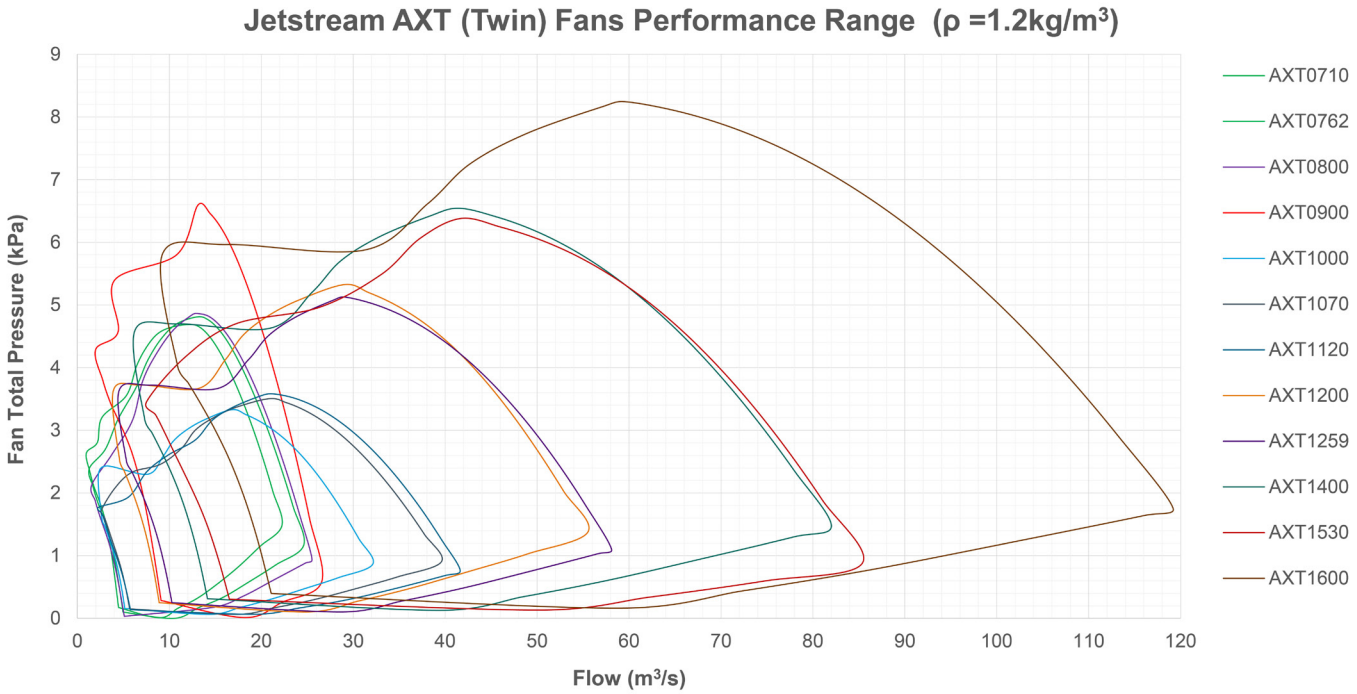
| Performance | Unit | 710 | 762 | 800 | 900 | 1000 | 1070 | 1120 | 1200 | 1259 | 1400 | 1530 | 1600 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow rate | $m^3/s$ | 5.5 - 22 | 6.5 - 24 | 6 - 25.5 | 13 - 23 | 10.3 - 32 | 14 - 39.7 | 14 - 41.5 | 17.5 - 55.5 | 20 - 60 | 24 - 80 | 26 - 85 | 26 - 118 |
| Single stage max. fan total pressure * | kPa | 2.40 | 2.40 | 2.45 | 3.25 | 1.67 | 1.76 | 1.80 | 2.65 | 2.55 | 3.21 | 3.15 | 4.10 |
| Twin stage max. fan total pressure * | kPa | 4.80 | 4.80 | 4.90 | 6.50 | 3.34 | 3.52 | 3.60 | 5.30 | 5.10 | 6.42 | 6.30 | 8.21 |
| Motor power (50Hz) ** | kW | 15 - 45 | 15 - 45 | 15 - 45 | 30 - 55 | 15 - 45 | 30 -45 | 30 - 55 | 55 - 110 | 55 - 110 | 75 - 200 | 90 - 200 | 110 - 355 |

* based on air density of 1.2 $kg/m^3$ ** fans with 60Hz supply motors are also available

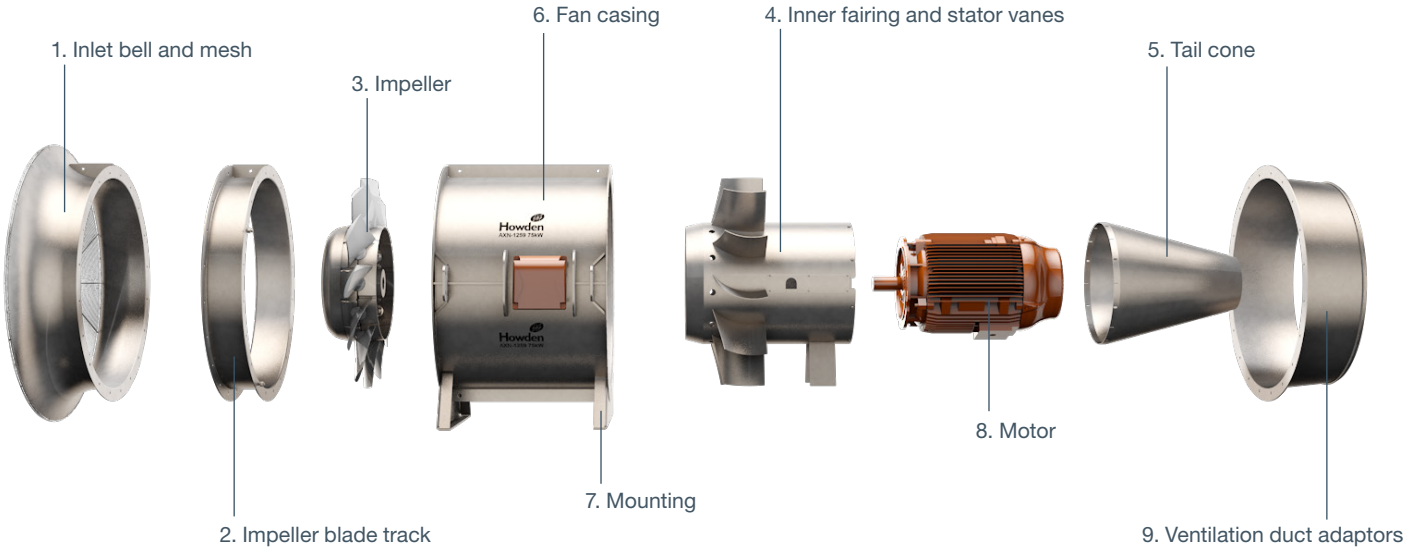
## Performance curves

Fan total pressure based on fan discharge annulus area, carnot loss and accessory losses not included.



## Product design and features




### Product design

**Jetstream AX auxiliary mine fans have robustly constructed steel casings with heavy gauge flanges at both ends of the casing.**

The motor is rigidly mounted within the casing to minimize vibration. The electric motors are flange mounted and can be supplied suitable for differing regional requirements. This gives flexibility with voltages, rating and class combinations.

### Options and accessories

- Silencers (inlet and/or outlet)
- Anti-stall chambers
- Self-closing doors/dampers
- Outlet diffusers
- Electrical starters (VSD/DOL/ Soft Starter)
- Fan controllers and monitoring (Ventsim CONTROL ready)
- Dual speed motors (1259/1400 sizes)
- Ducting

### 1. Inlet bell and mesh

Inlet bell is used to maximize performance with durable steel mesh.

### 2. Impeller blade track

Precision is manufactured, giving low tip clearances to optimize aerodynamic performance.

### 3. Impeller

Variable pitch impeller design across the full range, pitch angle adjustable at rest.

### 4. Inner fairing and stator vanes

Aerodynamically optimized to give high performance.

### 5. Tail cone

Optimize performance by reducing discharge shock losses.

### 6. Fan casing

Robust construction for mining environments. Houses the motor and straightener vanes.

### 7. Mounting

Supplied removable mounting feet and multiple lifting and suspension points.

### 8. Motor

Flange mount motors for ease of assembly. Various motor options available for each fan size. Externally mounted terminal box incorporating bump guards.

### 9. Ventilation duct adaptors

Allows connection to standard ventilation duct sizes (inlet or outlet).

### Coating protection

All static components are hot-dipped galvanized for durable protection.

# Delivering production efficiency through integration with Ventsim

## By reducing blast clearing downtime, Howden can improve production rates by up to 70%.

The Jetstream AX can be configured with fan controllers and monitoring ready for operation through Ventsim CONTROL. The combination offers impressive production efficiencies for your mine operation. Ventsim CONTROL is fully integrated with the Ventsim DESIGN model.  It utilizes intelligent software connected to hardware devices to monitor remotely, control, and automate airflow, heating, and cooling. In that way, it delivers safer, more productive, and lower-cost ventilation for your mine.

### Increase production

Clear blast gases faster, decreasing downtime up to 3 hours per production blast.

### Health and safety operation

No personnel are required to control fans manually. Auto-matically increase airflow to active levels.

### Energy savings

Strategic deployment of variable frequency drives reduces power usage by more than 50-60%.


## Global support

We offer the technical expertize and responsive approach you depend on to keep your system running.

- Authentic replacement parts
- Performance testing
- Vibration analysis
- Field supervision
- Maintenance contracts
- System analysis
- Turnkey services

**With a global reach we are ready to support mining operations in every region.**

**Howden**

Make an enquiry through our website.
**www.chartindustries.com/mining**

Or contact us via email:
**global.mining@chartindustries.com**



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