



## APPLICATION

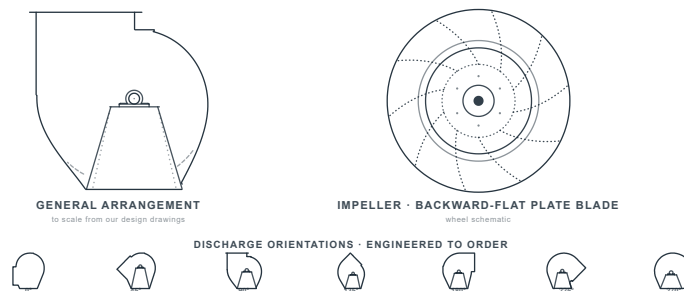
## Cooling tower

A cooling-tower fan moves a large volume of ambient air across the fill against very little resistance — the whole duty is high flow at low static. Most towers use large-diameter axial fans; where a cell is space- or pressure-constrained, or the tower is forced-draught, a centrifugal fan earns its place.

### Capability envelope

cooling-tower service

| PARAMETER           | STANDARD RANGE                                                     | ON APPLICATION                               |
|---------------------|--------------------------------------------------------------------|----------------------------------------------|
| Volume flow         | up to 2,25,000 CMH                                                 | higher on enquiry                            |
| Static pressure     | 25–150 mmWC typical cooling-tower point                            | up to 2,000 mmWC across the envelope         |
| Inlet air condition | ambient to saturated (100% RH), with drift and treatment chemicals | warm return-air recirculation on application |
| Static efficiency   | high static efficiency                                             | higher on high-efficiency builds             |
| Sound level         | <85 dB(A) @ 1 m                                                    | <75 dB(A) with acoustic enclosure            |
| Drive power         | up to 425 HP                                                       | our largest drive delivered to date          |
| Speed               | 600–1,800 RPM typical                                              | per duty + sound limits                      |
| Balance quality     | ISO 21940 G6.3                                                     | G2.5 / G1.0 on application                   |



**FIG. 1** Representative arrangement — a Jitamitra Backward-Flat Plate fan, the family most often applied to this duty. The exact family and wheel are engineered to your operating point.

### Construction & materials

documented on your GA

- **Impeller geometry** — Backward-inclined or backward-curved for the highest static efficiency on the high-flow, low-static cooling-tower point; airfoil-bladed on the highest-efficiency builds where the duty is large and the continuous hours justify the CAPEX. Low tip speed keeps the noise down.
- **Materials for saturated air** — Stainless steel (304 / 316L) or hot-dip galvanising for the wetted path; FRP coating / FRP-rubber-ebonite lining where the treated water is corrosive; epoxy or special coating on carbon-steel builds; shaft seal and cased drain to keep condensate off the bearings.
- **Control — VFD as default** — Cooling demand swings with ambient wet-bulb and plant load; a tower cell rarely runs at design flow. VFD speed control tracks the load and is far more efficient than throttling or cycling — and by fan-affinity the power falls with the cube of speed, so part-load running is where the savings are. Inlet vane dampers remain available for legacy retrofit.
- **Drainage & bearing protection** — Casing drain points so condensate does not pool; a heat slinger / cooling disc where a warm return-air recirculation raises inlet temperature; sealed, regreasable bearings selected for a wet outdoor environment; drive and motor rated for the humidity and the outdoor duty.

### How a Jitamitra Cooling tower fan is specified

AMCA conventions

| SPECIFICATION FIELD   | OPTIONS                                                                                                                                                                                                                                  |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Arrangement (AMCA 99) | Arr. 1 (overhung, fan bearings) / Arr. 4 (direct, motor on base) / Arr. 8 (overhung on common base) / Arr. 9 (overhung, motor side) / Arr. 10 (overhung, motor inside base) — selected by drive, access and the wet outdoor environment. |
| Width / inlet         | SWSI (single width, single inlet) default for a forced-draught cell; DWDI (double width, double inlet) for high flow at low static where the cell geometry allows.                                                                       |
| Wheel type            | Backward-inclined or backward-curved (default, best efficiency at high flow and low static) / airfoil-bladed (highest-efficiency, large continuous-duty builds).                                                                         |

| SPECIFICATION FIELD                     | OPTIONS                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Class (by pressure / outlet velocity)   | Class I typical for the low-static cooling-tower point; Class II / III only where the cell resistance is unusually high — selected from the duty point on the pressure-vs-outlet-velocity limits.                                                                                                           |
| Materials of construction               | Stainless steel (304 / 316L) or hot-dip galvanised for saturated air (default) / carbon steel + epoxy or special coating on milder chemistry / FRP coating or FRP-rubber-ebonite lining where the treated water is corrosive.                                                                               |
| Drive                                   | Direct-coupled / V-belt / VFD (default for load tracking). Drive up to 425 HP across the envelope; speed typically 600–1,800 RPM, kept low for noise where the duty allows.                                                                                                                                 |
| Discharge & rotation (AMCA orientation) | Rotation CW or CCW (viewed from drive side) with discharge angle per AMCA — e.g. TH/BH/UB/DB — set to match the cell air inlet and installed footprint.                                                                                                                                                     |
| Accessories & acoustic scope            | VFD or inlet vane damper control; shaft seal and cased drain for standing condensate; heat slinger / cooling disc on warm-recirculation duty; inlet silencer and casing acoustic lagging; acoustic enclosure / sound hood for <75 dB(A); flexible connection / expansion joint; drain and inspection doors. |

## Where the Cooling tower runs

|                                                                                                            |                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>POWER GENERATION</b><br>Condenser cooling-tower cells, auxiliary-cooling and closed-circuit tower fans. | <b>CHEMICALS &amp; PETROCHEM</b><br>Process cooling-water towers, forced-draught cells on space-constrained plots.                                                                                                |
| <b>DATA CENTRES</b><br>Cooling-tower and closed-circuit cells for chiller and heat-rejection loops.        | <b>OIL &amp; GAS</b><br>Refinery and gas-plant cooling-water towers, often to a tight noise limit.                                                                                                                |
| <b>IRON &amp; STEEL / METALS</b><br>Cooling-tower cells on caster, mill and furnace-cooling water loops.   | <b>HVAC &amp; BUILDINGS</b><br>Condenser-water and closed-circuit cooling towers on large chiller plants.                                                                                                         |
| <b>PHARMACEUTICALS</b><br>Utility and process cooling towers on space- and noise-constrained sites.        | <b>YOUR DUTY POINT</b><br>Send us flow, static pressure and the air / gas condition — we size the wheel to it and quote in <b>3 to 5 working days</b> — <b>5 to 7 working days</b> for ATEX and special projects. |

## Standards & conformity

|                                                                                                                                                  |                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>PERFORMANCE</b><br>Tested to the IS 4894 / ISO 5801 / AMCA 210 method, in-house on our 200 HP VFD rig. Tested-to-method — not AMCA-certified. | <b>QUALITY SYSTEM</b><br>ISO 9001:2015 — third-party certified (our only third-party certification).                               |
| <b>CE CONFORMITY</b><br>Self-declared per 2006/42/EC + 2014/35/EU. Not a notified-body certificate.                                              | <b>ATEX CONFORMITY</b><br>Self-declared, spark-resistant (SR), Zone 2/22 Cat 3 per 2014/34/EU, where area classification requires. |
| <b>BALANCE &amp; VIBRATION</b><br>Balance ISO 21940 (G6.3 std, G2.5 on request); fan vibration acceptance ISO 14694, measurement ISO 14695.      | <b>WELDING &amp; HEAVY DUTY</b><br>ASME Sec IX welders + WPS; API 673 available as project-specific scope for oil & gas.           |

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*Figures indicate family capability; every fan is engineered to the customer's duty point and confirmed on the approved GA drawing.*