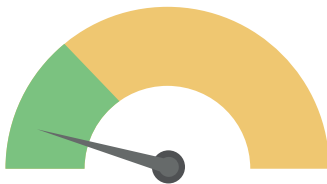


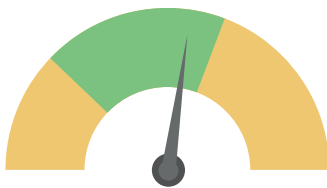
**Howden Uptime is a suite of products and services, powered by our physics-based Digital Twin;** a virtual replica based on our equipment design knowledge, that enables owners and operators to extend fan life, improve performance, and avoid unplanned events leading to reduced maintenance costs and improved site safety.

## Fan life optimization

Lube oil viscosity ratio



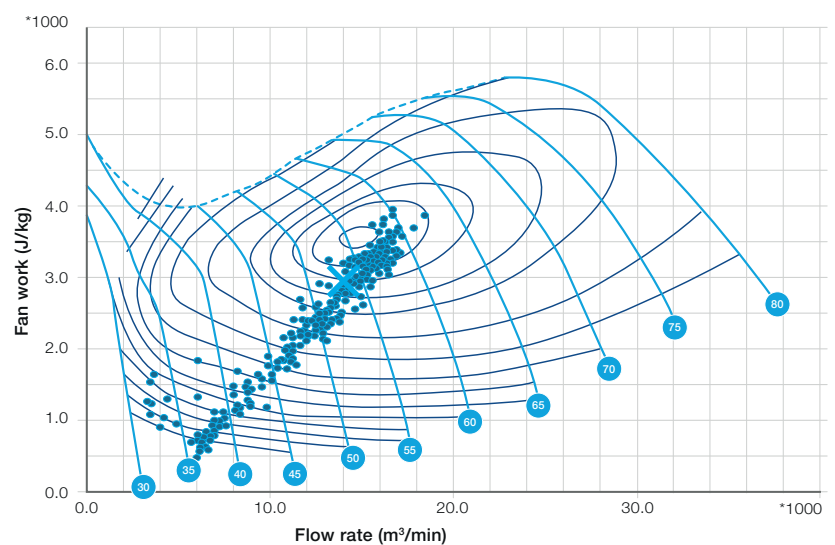
Rate of blade pitch angle change



**Features include:**

- Hydraulic oil pressure monitoring
- Lube oil viscosity monitoring
- Blade pitch monitoring

## Fan performance



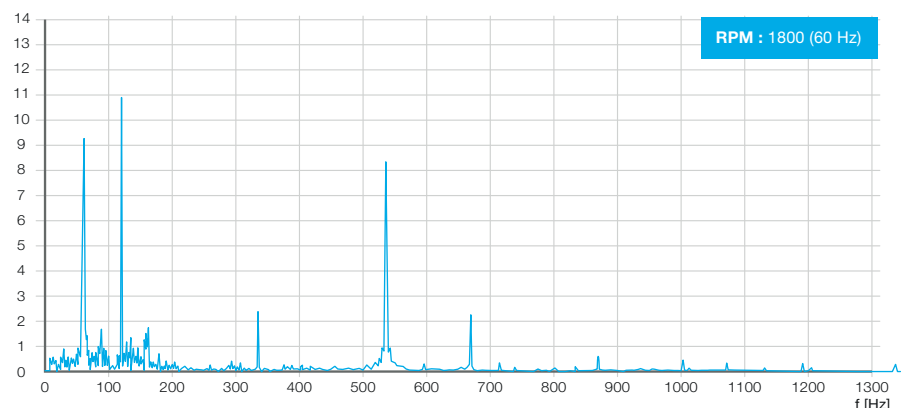
**Features include:**

- Stall warning
- Energy usage analysis
- Blade wear monitoring
- Stall probe health monitoring

## Vibration analysis

**Features include:**

- RMS trending analysis
- Online spectral analysis



**Howden Uptime is a cloud-based solution delivered via a web-based user interface, enabling secure access virtually anywhere and immediate software upgrades for one low annual subscription price.**

Additional analytics and maintenance services are available to enable a comprehensive predictive maintenance program tailored to individual site needs.

Required sensors (provided by Howden or via existing instrumentation)				
	Fan life optimization	Fan performance	Vibration (RMS)	Vibration (online FFT)
Uptime edge gateway	●	●	●	●
Shaft speed	●	●	●	●
Inlet temperature	●	●		
Main bearing temperatures	●			
Blade pitch control actuator position		●		
Inlet pressure		●		
Outlet pressure		●		
Main bearing vibration	●		●	●

For further information on Howden Uptime, please get in touch with your designated Howden contact.

