

InsightPak Analytics

Over 60 years of proven Bently Nevada machine and process problem-solving is now embedded in powerful new software plug-ins which continuously perform analytics and diagnostics covering an extensive range of equipment.

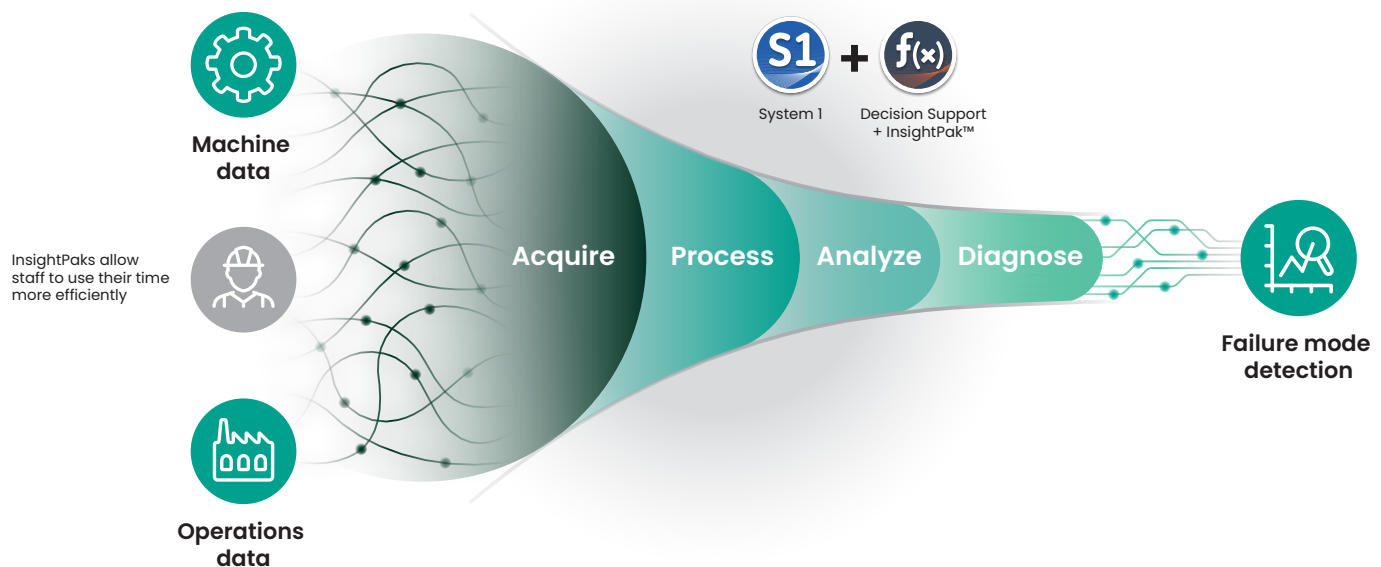
Modern industrial operations have an overwhelming quantity of data, and it's impossible for staff to continuously monitor and analyze machinery conditions. Unfortunately, generic analytics tools often provide insufficient diagnostics for specialized machines, and many analytic offerings do not allow experts to access and alter the algorithms to meet specific requirements. In addition, it is difficult to correlate diagnostic results with data in disparate historian platforms lacking high-resolution, time-synchronized data.

InsightPak™ Analytics changes all that.

Each InsightPak can be applied to specific machines within the System 1 platform to perform continuous real-time data analysis to detect early changes in machine behavior and identify targeted failure modes. It doesn't just raise red flags. InsightPaks diagnose malfunctions by using machine configuration information, real-time data, and asset operating states.

Results can be visualized, trended, and annunciated within System 1. Alarm notifications are available via email and may be shared via open protocols such as OPC UA. InsightPak Analytics can aid root-cause diagnostics by correlating its results with high-resolution data within the System 1 database.

InsightPak Analytics cover a wide range of assets including rotating machines with fluid-film bearings, reciprocating machines, auxiliary systems, and common processes.





InsightPak for rotating assets with fluid-film bearings

- Centrifugal compressors
- Axial compressors
- Speed increasing/ decreasing gearboxes
- Electric motors
- Integral gear compressors
- Pumps
- Industrial gas turbines
- Blowers
- Aeroderivative gas turbines
- Fans
- Power turbines
- Generators
- Steam turbines

With appropriate instrumentation, diagnostics include:

- Radial preload
- Stall
- Fluid-induced instability
- Gear mesh
- High synchronous vibration
- Blade pass
- Rotor runout
- Combustor rumble
- Sub and Super synchronous rubs
- High exhaust/high differential exhaust temperatures
- Misalignment
- Electric motor non-uniform airgap
- Rotor bow
- Pump cavitation
- Surge



InsightPak for reciprocating assets

This InsightPak covers API type compressors in the services of hydrogen, flare gas, LDPE, or natural gas. With appropriate instrumentation, diagnostics include:

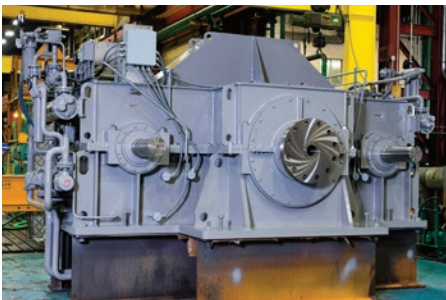
- Crosshead pin loading
- Suction/discharge valve leaks
- Frame loading
- Leak—cylinder to low pressure
- Pressure packing leaks
- Leak—high pressure to cylinder



Rules for auxiliary systems

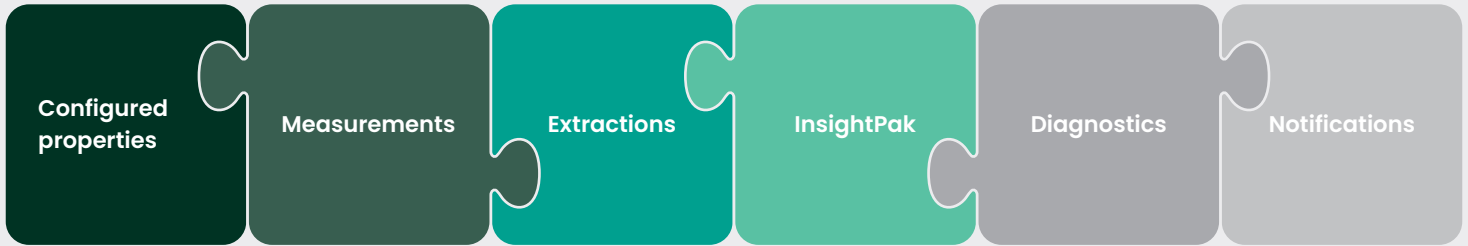
InsightPak rules cover analytics and diagnostics for two types of dry gas seals used in centrifugal compressors: tandem, and tandem with intermediate labyrinth. Diagnostics include:

- Bearing oil migration
- Secondary seal failure
- Low seal gas DP
- Secondary seal gas flow problem
- Low seal gas temperature
- Separation seal gas flow problem
- Low secondary seal gas temperature
- Seal gas booster fouled filter
- Low separation seal gas DP
- Seal gas fouled filter
- Primary seal failure
- Secondary seal gas fouled filter
- Seal gas flow problem
- Separation seal gas fouled filter
- Secondary or separation seal failure



Stay tuned for more InsightPak diagnostics

InsightPak methodology



Configured properties examples:

- Design speed/ lower and upper speed limits
- First balance resonance
- Rotor rotation direction
- Bearing clearance
- Maximum and nominal bearing temperature

Measurement examples:

- Speed
- Temperature
- Vibration: direct values, 1x and 2x amplitude and phase, gap, nx bands
- Pressure

Extracted asset values for model-based analytics examples:

- Bearing level
 - Bearing temperature ratio
 - Maximum direct amplitude ratio
- Rotor level
 - Slow-roll threshold ratio
 - Slow-roll amp ratio
 - Relative phase
- Asset level
 - Inlet volume ratio
 - Design pressure ratio
 - Measured pressure ratio

Bently Nevada deep machine domain knowledge and applied physics

Diagnostic results examples:

- Radial preload
- Fluid induced instability
- High synchronous vibration
- Rotor runout
- Sub and super synchronous rubs
- Misalignment
- Rotor bow
- Primary seal failure

Notifications

Diagnostic results are identified via System 1 Event Manager, email notifications, or OPC UA alarm events

Benefits

- Automatically detect failure modes
- Maximize your plant availability
- Support existing maintenance strategies
- Mitigate your operational risks
- Extend the life of your assets
- Reduce time spent for root-cause analysis
- Utilize existing sensor data
- Gain new insight into equipment and process behavior
- Leverage System 1's core capabilities such as notifications and plotting

Support

In addition to installation, we provide a full range of support services to ensure you get the most value from your InsightPak Analytics:

- Installation and configuration
- Training
- Optimization
- Customization to meet corporate best practices
- Supporting service agreements