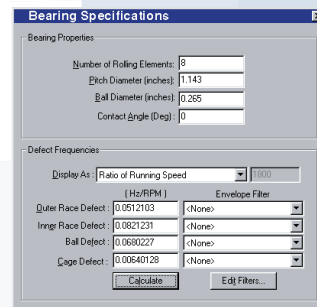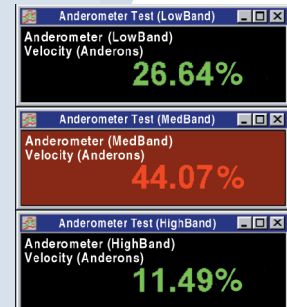# Bearing Test System

When it's bearings that make your world go 'round...
you need IQC to keep it from turning upside down.

The IQC Bearing Test System is designed to test 100% of all bearings you manufacture daily. The advanced algorithms incorporated in IQC are designed specifically to detect defects in roller element bearings. The pass/fail analysis once left to antiquated machinery and an operator's subjective interpretation is now being accomplished using a precise, quantitative process. Using IQC, defective bearings will be rejected, leading to reduced customer complaints and warranty claims.


Bearing Defect Calculator

Digital Anderometer Display

How the Bearing Test System Works

The IQC system starts by using a laser vibrometer to acquire vibration data on the bearing outer race. Standard measurements such as Anderon levels, FTF, BPFO, BPFI, and BDF are calculated. The calculated results are then submitted to SigQC for evaluation. SigQC compares the measurements against tolerance limits customized to identify bearings that are acceptable to you and your customers. A pass/fail or go/nogo signal is then dispatched to your production line in order to sort the bearing into the proper bin.
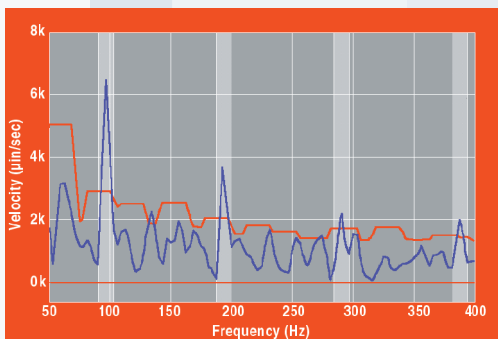
Typical Ball Pass Frequency Outer Race (BPFO) failure mode.
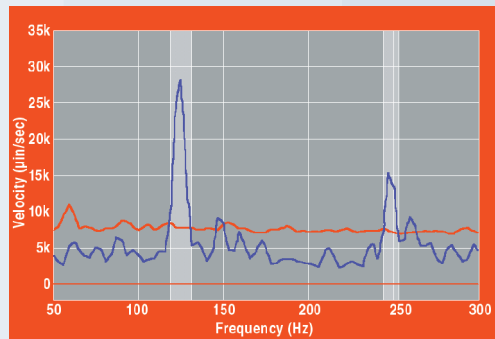
Typical Ball Defect Frequency (BDF) failure mode.

Bearing Test System

IQC is rugged and ready for end-of-line testing 100% of your rolling element bearings. The system is fully integrated, delivered, and supported by Signalysis including training on-site or at our Cincinnati facility. Signalysis recognizes that in the production environment, cycle time and product quality are equally important. All IQC systems are configured for maximum performance.

Bearing Tests Performed

- Anderon Levels (Low, Med, High Bands)
- Overall Vibration
- Time & Filtered Time
- Envelope Spectrum
- Auto Spectrum
- Statistical Waveform Analysis
- Crest Factor
- Kurtosis
- Skewness
- Peak Counting
- Probability Density

Failure Modes Detected

- Inner & Outer Raceway Nick Defects
- Ball & Roller Nick Defects
- Roller Lobing
- Cage Defects
- Brinelled Bearing
- Missing Ball/Roller
- Ball/Roller Sizing
- Inverted Tapered Rollers
- Grease Contaminants
- Dry Bearing

Components of the Bearing Test System
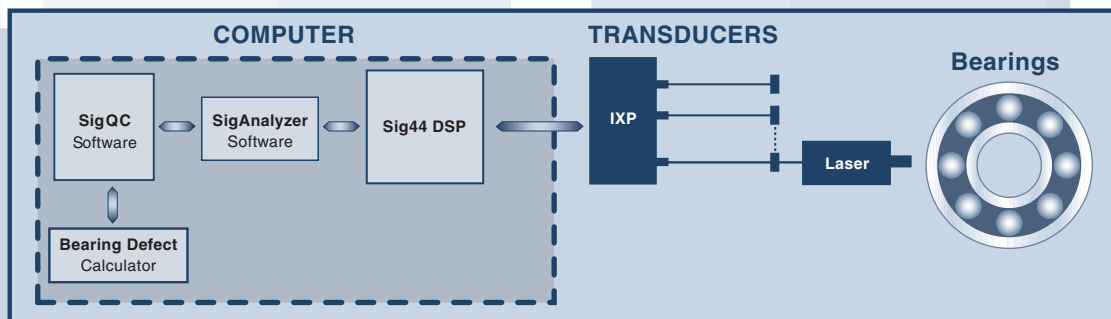
SigQC: Application software at the heart of IQC. Provides the tools to identify product quality based on data sources, acceptance tests, test cases and rejection limits. Supports in-depth statistical analysis features to indicate pass/fail status and generate production reports based on failure modes. Interfaces to test stand devices to control motors, relays, PLCs and indicator lights.

The Bearing Defect Calculator
The bearing defect calculator uses a bearing's dimensional data to calculate bearing defect frequencies. The defect frequencies can be used to create acceptance tests and reject criteria in SigQC that will identify the actual defect.

SigAnalyzer: Software front end for the Sig44. Provides setup, control and transfer capabilities for the DSP card. Additionally adds post-processing capabilities such as RMS, domain cuts, filters, enveloping and tachometers.

Sig44 Specifications: PC card providing four or eight channels, 24-bit 96 kHz sigma-delta A/D converter with 128k over sampling, 100 dB dynamic range, 128k byte SRAM, 7k ohm input impedance and a Texas Instruments (TMS320C44) 60 MHz DSP.

IXP Signal Conditioner: Nineteen-inch rack-mountable signal conditioning unit providing four or eight low noise channels. Delivers a constant current of 4.7mA at 24 volts as required. Features floating inputs and outputs eliminating cross talk between channels. Allows individual gain selections for each channel of 1, 2, 10, 20, 100, 200, 1000 and 2000. Comes equipped with BNC inputs and a 15-pin D-Sub output or BNC connectors as required.

Transducers: Support for many sensor types including accelerometers, velocity and displacement transducers, tachometers, microphones, pyrometers, load cells, lasers and other voltage or 4-20mA sensors.

IQC Computer Specifications: A rack-mount chassis housing the current main-stream Intel processor, at least 128MB high speed RAM, Microsoft Windows2000®, a CD-RW, an uninterruptible power supply and a digital I/O card.