



ISO 29821

Condition monitoring and diagnostics of machine systems — Ultrasound — General requirements, guidelines, procedures and validation

*Surveillance des conditions et diagnostic d'état des machines —
Ultrasons — Exigences générales, lignes directrices, procédures et
validation*

**Second edition
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This document was prepared by Technical Committee ISO/TC 108, *Mechanical vibration, shock and condition monitoring*, Subcommittee SC 5, *Condition monitoring and diagnostics of machine systems*.

This second edition of ISO 29821 cancels and replaces the first edition (ISO 29821:2018) which has been technically revised.

The main changes are as follows:

- [Clause 5](#) has been revised to include [Formula \(1\)](#) describing the decibel level;
- [Clause 5](#) has been revised to include MEMS sensors and a reference to ISO 1683;
- [Subclause 5.3](#) has an additional note describing parabolic reflectors;
- [Figures B.1](#) to [B.4](#) have been improved;
- Minor editorial changes have been made.

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This document provides specific guidance on the interpretation of ultrasonic readings and wave files or frequency and time domain printouts (sometimes called sound characteristics) as part of a programme for condition monitoring (CM) and diagnostics of machines.

Airborne (AB) and structure-borne (SB) ultrasound can be used to detect abnormal performance or machine anomalies. The anomalies are detected as high frequency acoustic events caused by turbulent flow, ionization events, impacts and friction which are caused by incorrect machinery operation, leaks, improper lubrication, worn components, and/or electrical discharges.

Airborne and structure-borne ultrasound is based on measuring the high frequency sound that is generated by either turbulent flow, friction, impacts or ionization created from the anomalies. Personnel carrying out ultrasonic inspections or measurements therefore require an understanding of ultrasound and how it propagates through the atmosphere and through structures as a prerequisite to the creation of an airborne and/or structure-borne ultrasound programme.

Ultrasonic energy is present with the operation of all machines. It can be in the form of friction, turbulent flow, impacts and/or ionization as a property of the process or produced by the process itself. As a result, ultrasonic emissions are created which are a useful parameter for monitoring machine condition and detecting anomalies.