

# ISO 9614-3:2002-11 (E)

## Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 3: Precision method for measurements by scanning

---

| <b>Contents</b>     |   | <b>Page</b> |
|---------------------|---|-------------|
| Foreword .....      |   | v           |
| Introduction .....  |   | vi          |
| 1                   | Scope .....   | 1           |
| 2                   | Normative references .....  | 1           |
| 3                   | Terms and definitions .....   | 2           |
| 4                   | General requirements .....  | 7           |
| 4.1                 | Size of sound source under test .....   | 7           |
| 4.2                 | Character of sound radiated by the source .....   | 7           |
| 4.3                 | Measurement uncertainty .....   | 7           |
| 5                   | Acoustic environment .....  | 9           |
| 5.1                 | Criteria for adequacy of the test environment .....   | 9           |
| 5.2                 | Extraneous intensity .....  | 9           |
| 5.3                 | Wind and gas flows .....  | 9           |
| 5.4                 | Temperature .....   | 9           |
| 5.5                 | Configuration of the surroundings .....   | 9           |
| 5.6                 | Atmospheric conditions .....  | 9           |
| 6                   | Instrumentation .....   | 10          |
| 6.1                 | General .....   | 10          |
| 6.2                 | Calibration and field check .....   | 10          |
| 6.3                 | Time-series of sound intensity and sound pressure .....                                       | 10          |
| 7                   | Installation and operation of the source .....  | 10          |
| 7.1                 | General .....   | 10          |
| 7.2                 | Operating conditions of the source under test .....   | 11          |
| 8                   | Measurement of normal sound intensity component levels .....                                  | 11          |
| 8.1                 | Determination of measurement surface .....  | 11          |
| 8.2                 | Determination of scanning paths and segments .....  | 11          |
| 8.3                 | Measurements .....  | 12          |
| 8.4                 | Further actions .....   | 14          |
| 9                   | Determination of sound power level .....  | 15          |
| 9.1                 | Calculation of partial sound powers for each partial surface of the measurement surface ..... | 15          |
| 9.2                 | Calculation of normalized sound power level .....   | 15          |
| 10                  | Information to be recorded .....  | 15          |
| Annex B (normative) | Calculation of field indicators .....   | 19          |
| B.1                 | General .....   | 19          |
| B.2                 | Definition of field indicators .....  | 19          |
| B.2.1               | Temporal variability indicator, FT .....  | 19          |
| B.2.2               | Unsigned pressure-intensity indicator, np IF .....  | 19          |
| B.2.3               | Signed pressure-intensity indicator, npIF .....   | 20          |

|   |   |    |
|---|---|----|
| B.2.4   | Field non-uniformity indicator, FS .....                                    | 21 |
| Annex C (normative) Procedure for achieving the desired accuracy .....  |   | 22 |
| C.1   | Qualification requirements .....  | 22 |
| C.1.1   | General .....   | 22 |
| C.1.2   | Check for the adequacy of the averaging time .....                          | 22 |
| C.1.3   | Check for the repeatability of the scan on a partial surface .....          | 22 |
| C.1.4   | Check for the adequacy of the measurement equipment .....                   | 22 |
| C.1.5   | Check for the presence of strong extraneous noise .....                     | 23 |
| C.1.6   | Check for the field non-uniformity .....                                    | 23 |
| C.2   | Action to be taken to increase the grade of accuracy of determination ..... | 23 |
| Annex D (informative) Effects of airflow on measurement of sound intensity .....  |   | 26 |
| Annex E (informative) Effect of sound absorption within the measurement surface .....   |   | 27 |
| Annex F (informative) Measurement surface and scanning procedure .....  |   | 28 |
| Annex G (informative) Procedure for obtaining time-averaged intensities and squared pressures<br>from a sequence of short-time averaged intensities and squared pressures ..... |   | 29 |
| Annex H (informative) Normalization of sound power level .....  |   | 30 |
| H.1   | General .....   | 30 |
| H.2   | Calculation of normalized sound power level .....                           | 30 |
| Bibliography .....  |   | 33 |