

DIN EN 13848-4:2025-11 (E)

Railway applications - Track - Track geometry quality - Part 4: Measuring systems - Manual and lightweight devices

| Contents | | Page |
|-------------------------|--|-------------|
| European foreword | | 4 |
| 1 | Scope | 5 |
| 2 | Normative references | 5 |
| 3 | Terms and definitions | 5 |
| 4 | Symbols and abbreviations | 8 |
| 5 | Track geometry measuring system fitted on TGRs or TGIs | 8 |
| 5.1 | General | 8 |
| 5.2 | Measurement system description | 9 |
| 5.3 | Environmental conditions | 9 |
| 5.3.1 | General | 9 |
| 5.3.2 | Climatic conditions | 10 |
| 5.3.3 | Operating conditions | 10 |
| 5.4 | Track features input | 10 |
| 5.5 | Data localization | 11 |
| 5.6 | Measuring device | 11 |
| 5.6.1 | General | 11 |
| 5.6.2 | Sensors | 11 |
| 5.6.3 | Signal transmission | 11 |
| 5.7 | Resolution | 12 |
| 5.8 | Signal processing | 12 |
| 5.8.1 | General | 12 |
| 5.8.2 | Sampling | 12 |
| 5.8.3 | Filtering | 12 |
| 5.9 | Data processing and analysis | 12 |
| 5.9.1 | Data processing | 12 |
| 5.9.2 | Data merging | 13 |
| 5.9.3 | Parameter generation | 13 |
| 5.9.4 | Parameter analysis | 13 |
| 5.10 | Data output | 13 |
| 5.10.1 | Visualization | 13 |
| 5.10.2 | Data transfer | 13 |
| 5.11 | Data storage | 13 |
| 5.11.1 | Data storage: TGR | 13 |
| 5.11.2 | Data storage: TGI | 14 |
| 6 | Testing of track geometry measuring system | 14 |
| 6.1 | General | 14 |
| 6.2 | Calibration | 14 |
| 6.3 | Validation tests: TGR | 15 |
| 6.3.1 | Overview | 15 |
| 6.3.2 | Measurement conditions for validation | 15 |
| 6.3.3 | Track conditions for validation | 15 |
| 6.3.4 | Comparison between different runs | 16 |
| 6.3.5 | Routine validation | 18 |
| 6.4 | Validation tests: TGI | 18 |
| 6.4.1 | Validation of a new or modified measuring system | 18 |

| | | |
|---|---|-----------|
| 6.4.2 | Routine validation | 18 |
| Annex A (normative) Parameters measured by track geometry recorders (TGRs) and track geometry instruments (TGIs) | | |
| | | 19 |
| A.1 | General | 19 |
| A.2 | Track gauge | 19 |
| A.3 | Longitudinal level | 20 |
| A.4 | Cross level | 20 |
| A.5 | Alignment | 21 |
| A.6 | Twist | 21 |
| Annex B (informative) Principles of measurement | | |
| | | 22 |
| B.1 | General description | 22 |
| B.2 | Longitudinal level and alignment (TGR only) | 22 |
| B.2.1 | Chord measuring system | 22 |
| B.2.2 | Inertial measuring system | 24 |
| B.3 | Track gauge | 24 |
| B.4 | Cross level | 24 |
| B.5 | Twist | 24 |
| Annex C (normative) Validation criteria | | |
| | | 25 |
| C.1 | Repeatability - Statistical analysis of parameter data | 25 |
| C.2 | Reproducibility - Statistical analysis of parameter data | 26 |
| Annex D (informative) Track geometry measurement uncertainty | | |
| | | 27 |
| D.1 | General | 27 |
| D.2 | Evaluating uncertainty for manually operated track geometry measuring systems | 28 |
| D.3 | Measurement uncertainty: limit values | 29 |
| Bibliography | | |
| | | 31 |