

ISO 18318:2026-02 (E)

Railway applications - Wheel-rail contact geometry parameters - Definitions and methods for evaluation

Contents

Page

Foreword.....	v
Introduction.....	vi
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
4 Symbols.....	2
5 Overview of the process for determining contact parameters.....	4
6 Description of wheel and rail profiles.....	4
6.1 General.....	4
6.2 Uncertainty of the measuring systems.....	6
7 Plausibility check and processing of measured wheel and rail profiles.....	6
8 Determining the wheel-rail contact positions and contact functions.....	7
8.1 General.....	7
8.2 Determining the rolling radius difference function.....	8
8.3 Other wheel-rail contact geometry functions.....	8
9 Determining the equivalent conicity and the related nonlinearity parameter.....	9
9.1 Background to equivalent conicity.....	9
9.1.1 Mathematical description of the kinematic lateral wheelset motion.....	9
9.1.2 Determining the wavelength of a coned wheelset.....	10
9.2 Determining the equivalent conicity.....	10
9.3 Determining the nonlinearity parameter.....	11
10 Determining the rolling radii coefficient.....	12
10.1 Background and definition.....	12
10.2 Determining point E for the calculation of the rolling radii coefficient.....	13
11 Other wheel-rail contact parameters.....	14
12 Testing of calculation software for contact geometry parameters.....	14
12.1 Overview.....	14
12.2 Validation of the calculation algorithms.....	15
12.3 Assessment of the smoothing process.....	15
13 Assessment of the complete process for the determination of wheel-rail contact parameters.....	17
13.1 General.....	17
13.2 Reproducibility of contact parameter determination based on rail profile measurement.....	18
13.2.1 Manual rail profile measuring devices.....	18
13.2.2 Vehicle based rail profile measuring systems.....	18
13.3 Reproducibility of contact parameter determination based on wheel profile measurement.....	19
13.3.1 Manual wheel profile measuring devices.....	19
13.3.2 Ground based wheel profile measuring systems.....	20
Annex A (informative) Example of presentation of contact geometry functions.....	21
Annex B (informative) Derivation of the kinematic equation of wheelset motion.....	22
Annex C (informative) Determination of the lateral peak displacements.....	24

Annex D (informative) Method for determining the wavelength of the wheelset motion by two-step integration of the nonlinear differential equation	26
Annex E (informative) Method for determining the wavelength of the wheelset motion by direct integration of the nonlinear differential equation	28
Annex F (informative) Method for determining the equivalent conicity by linear regression of the Δr function	29
Annex G (informative) Method for determining linearization parameters by harmonic linearization	31
Annex H (informative) Handling of special cases of the Δr function	33
Annex I (normative) Reference profiles for testing	36
Annex J (normative) Calculation results with reference profiles	49
Annex K (normative) Tolerances on equivalent conicity for testing calculations	83
Annex L (informative) Guidance on wheelset and track geometry parameters	104
Bibliography	107