

# DIN EN 14750:2025-02 (E)

## Railway applications - Air conditioning for urban, suburban and regional rolling stock - Comfort parameters and type tests

---

Contents		Page
European foreword .....		5
1	Scope.....	6
2	Normative references.....	6
3	Terms and definitions.....	6
4	Parameter selection.....	13
5	Vehicle categories.....	13
6	Comfort parameters.....	15
7	Exterior conditions.....	16
7.1	Generalities.....	16
7.2	Mean exterior temperature range with comfort criteria.....	16
7.3	Mean exterior temperature range with functional criteria .....	17
8	Performance of the heating and cooling installations.....	17
8.1	Design passenger load .....	17
8.2	Heating.....	17
8.3	Pre-heating.....	17
8.4	Cooling.....	18
8.5	Pre-cooling.....	18
8.6	Stand by operation .....	18
9	Control .....	19
9.1	General.....	19
9.2	Interior temperature setpoint ( $T_{ic}$ ).....	19
9.3	Interior temperature setpoint ( $T_{ic}$ ) for vehicles without cooling .....	19
10	Comfort condition requirements .....	19
10.1	Requirements for comfort zone.....	19
10.2	Requirements for local annexes ( $T_{Loc}$ ) .....	29
10.3	Air quantities and quality .....	30
11	Complementary requirements .....	30
11.1	Heat transfer coefficient ( $k$ ).....	30
11.2	Condensation.....	31
11.3	Solar factor ( $g$ ) of the windows.....	31
11.4	Sealing against water and snow .....	31
12	Validation .....	31
12.1	General.....	31
12.2	Test levels .....	31
12.3	Selection of tested vehicles .....	32
12.4	Assessment of comfort criteria based on simulation .....	32
13	Preliminary verifications.....	34
14	Air movement tests .....	34
14.1	General remarks .....	34
14.2	Air flow rates .....	34
14.3	Visualization of the air flow direction.....	34

14.4	Air speed test.....	35
15	Climatic tests .....	35
15.1	General remarks .....	35
15.2	Pre-heating test.....	36
15.3	Pre-cooling test.....	36
15.4	Regulation test.....	36
15.5	Steady-state tests.....	37
15.6	Tests at extreme exterior operating conditions.....	38
15.7	Complementary tests .....	38
16	Methods of measurement – Measuring instruments.....	41
16.1	General remarks .....	41
16.2	Temperatures .....	41
16.3	Relative humidity .....	41
16.4	Air speed .....	42
16.5	Air flow rate.....	42
16.6	Simulated speed of the vehicle .....	42
16.7	Equivalent solar energy .....	42
16.8	Energy consumption and power rating.....	42
17	Characteristics of the test equipment .....	42
17.1	General remarks .....	42
17.2	Occupation .....	42
17.3	Temperature and uniformity of the climatic chamber and climatic wind tunnel .....	43
17.4	Relative exterior humidity.....	43
17.5	Simulation of exterior air speed .....	43
17.6	Equivalent solar energy .....	43
18	Distribution of measuring points .....	46
18.1	General .....	46
18.2	Comfort envelope temperature measuring points.....	46
	Annex A (normative) Form for parameters selection .....	47
	Annex B (normative) Regulation curves for the interior temperature setpoint.....	51
	Annex C (normative) Acceptable air speed .....	53
	Annex D (normative) Maximum Relative interior humidity in the comfort envelope .....	55
	Annex E (normative) Heat emitted by a person.....	57
	Annex F (normative) Exterior conditions for climatic zones.....	60
	Annex G (normative) Fresh air flow.....	62
	Annex H (normative) Test programme for TL1 .....	64
	Annex I (normative) Test programme for TL2 and TL3 .....	66
	Annex J (normative) Equivalent solar energy (Simulation of solar exposure) .....	75
	Annex K (normative) Location of the measuring points used for the determination of the mean interior temperature in the comfort envelope ( $T_{im}$ ), horizontal ( $\Delta T_H$ ) and vertical ( $\Delta T_V$ ) range of the extreme interior air temperatures, floor surface temperature ( $T_{S\_FI}$ ), relative interior humidity ( $RH_{im}$ ), interior CO <sub>2</sub> concentration ( $C_{im}$ ) in the comfort envelopes and local annexes.....	76
	Annex L (normative) Location of the measuring points used for the determination of surface temperatures .....	81
	Annex M (normative) Location of other sensors.....	84
	Annex N (informative) Coefficient k .....	88
	Annex O (normative) Calculation method of the comfort level CL.....	89

**Annex P (informative) Simulation ..... 102**  
**Annex Q (normative) Set-up of the simulation..... 108**  
**Annex R (informative) Abbreviations ..... 114**  
**Bibliography ..... 117**