

# ISO 16750-4:2023-07 (E)

## Road vehicles - Environmental conditions and testing for electrical and electronic equipment - Part 4: Climatic loads

---

Contents		Page
Foreword .....		v
1	Scope .....	1
2	Normative references .....	1
3	Terms and definitions .....	2
4	Operating temperature ranges .....	2
5	Tests and requirements .....	4
5.1	Tests at constant temperature .....	4
5.1.1	Low-temperature tests .....	4
5.1.2	High-temperature tests .....	4
5.2	Temperature step test .....	5
5.2.1	Purpose .....	5
5.2.2	Test method .....	5
5.2.3	Requirement .....	6
5.3	Temperature cycling tests .....	6
5.3.1	Temperature cycle with specified change rate .....	6
5.3.2	Rapid change of temperature with specified transition duration .....	13
5.4	Cold water shock tests .....	15
5.4.1	Purpose .....	15
5.4.2	Splash water test .....	15
5.4.3	Submersion test .....	19
5.5	Salt spray tests .....	20
5.5.1	General .....	20
5.5.2	Corrosion test .....	21
5.5.3	Leakage and function test .....	21
5.5.4	Salt spray active test for rotating machines with open housing .....	22
5.5.5	Salt spray combined cycle test .....	24
5.5.6	Cyclic corrosion test .....	26
5.6	Humid heat, cyclic tests .....	27
5.6.1	Purpose .....	27
5.6.2	Test method .....	27
5.6.3	Requirements .....	30
5.7	Damp heat, steady state test .....	30
5.7.1	Purpose .....	30
5.7.2	Test method .....	30
5.7.3	Requirements .....	30
5.8	Condensation test .....	31
5.8.1	Purpose .....	31
5.8.2	Test method .....	31
5.8.3	Requirement .....	35
5.9	Corrosion test with flow of mixed gas .....	35
5.9.1	Purpose .....	35
5.9.2	Test method .....	35
5.9.3	Requirement .....	35
5.10	Solar radiation test .....	35
5.10.1	Purpose .....	35
5.10.2	Test method .....	35

5.10.3	Requirements .....	36
5.11	Dust test .....	36
5.11.1	Purpose .....	36
5.11.2	Test method .....	36
5.11.3	Requirements .....	38
5.12	Atmospheric pressure test .....	38
5.12.1	Purpose .....	38
5.12.2	Test method .....	38
5.12.3	Requirements .....	39
6	Code for climatic loads .....	39
7	Protection against water and foreign objects .....	41
8	Documentation .....	41
Annex A (informative) Usual tests and requirements for equipment depending on the mounting location .....		42
Annex B (informative) Background information to determine the number of cycles of the salt spray combined cycle test .....		47
Annex C (informative) Insulation tests .....		52
Annex D (informative) The necessity of testing atmospheric pressure .....		55
Bibliography .....		59