

# ISO 19202-1:2017-06 (E)

## Summer toboggan runs - Part 1: Safety requirements and test methods

---

<b>Contents</b>		<b>Page</b>
Foreword .....		v
<b>1</b>	<b>Scope .....</b>	<b>1</b>
<b>2</b>	<b>Normative references .....</b>	<b>1</b>
<b>3</b>	<b>Terms and definitions .....</b>	<b>2</b>
<b>4</b>	<b>List of significant hazards .....</b>	<b>3</b>
<b>5</b>	<b>Safety requirements .....</b>	<b>5</b>
5.1	Manufacturing .....	5
5.1.1	Materials .....	5
5.1.2	Safety measures against loosening of connections .....	5
5.1.3	Welded joints .....	5
5.1.4	Corrosion and surface protection, protection against rot .....	5
5.2	Toboggan .....	6
5.2.1	General .....	6
5.2.2	Toboggan for rail-guided summer toboggan runs .....	6
5.2.3	Toboggan for tub-guided summer toboggan runs .....	6
5.2.4	Braking .....	7
5.3	Track .....	7
5.3.1	Structural design of the system on the site .....	7
5.3.2	Rail-guided summer toboggan runs .....	7
5.3.3	Tub-guided summer toboggan runs .....	7
5.3.4	Visibility down the track and braking distances .....	8
5.4	Entrance and exit area .....	8
5.4.1	General .....	8
5.4.2	Entrance areas .....	9
5.4.3	End of downhill track .....	9
5.4.4	Exit areas .....	9
5.5	Uphill transport system .....	9
5.5.1	General .....	9
5.5.2	Technical design .....	9
5.5.3	Means of conveyance and connection to the means of conveyance .....	10
5.5.4	Tensioning devices .....	10
5.5.5	Drives and their components .....	10
5.6	Special safety equipment and precautions .....	11
5.7	Clearance zone .....	11
5.7.1	Downhill travel .....	11
5.7.2	Uphill transport .....	13
5.7.3	Squeezing and shearing points .....	13
5.8	Electrical equipment .....	14
5.8.1	Electrical systems .....	14
5.8.2	Control systems .....	14
<b>6</b>	<b>Calculations .....</b>	<b>15</b>
6.1	General .....	15
6.2	Actions .....	15
6.2.1	General .....	15
6.2.2	Permanent actions .....	15
6.2.3	Variable actions .....	16

6.2.4	Accidental actions .....	17
6.2.5	Impact .....	17
6.2.6	Vibrations occurring in directly passable components .....	18
6.3	Strength verification by calculation .....	18
6.3.1	General .....	18
6.3.2	Toboggan calculation .....	18
6.3.3	Tub calculation .....	19
6.3.4	Rail calculation .....	19
6.3.5	Calculation of supporting structure .....	19
6.3.6	Brake calculation .....	19
6.4	Verification of fatigue .....	20
6.4.1	General .....	20
6.4.2	Fatigue loads .....	20
6.5	Verification of stability .....	20
6.5.1	Safety against overturning, sliding and lifting off .....	20
6.5.2	Ground anchorages .....	22
7	Testing and inspection .....	26
7.1	General .....	26
7.2	Examination of the technical documentation .....	27
7.3	Acceptance test prior to commissioning (initial acceptance test) .....	27
7.3.1	General .....	27
7.3.2	Functional check .....	28
7.4	Periodic inspection .....	29
7.5	Inspection after modification .....	29
7.5.1	Examination of calculations .....	29
7.5.2	On-site inspection .....	29
7.6	Test report .....	30
8	Marking .....	30
8.1	Summer toboggan run .....	30
8.2	Toboggan .....	31
9	Commissioning .....	31
10	Technical documentation .....	31
10.1	General .....	31
10.2	Construction specification .....	31
10.3	Structural drawings and manufacturing drawings .....	31
10.4	Structural calculations .....	32
10.5	Risk assessment .....	32
10.6	Operating manual .....	32
	Annex A (informative) Example of load combinations in accordance with EN 1993 .....	33
	Annex B (normative) Track calculation .....	35
	Bibliography .....	44