



# **International Specification for Ski Orienteering Maps ISSkiOM**

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# International Specification for Ski Orienteering Maps

## 1 General

Maps for ski orienteering are based on the IOF international specifications for orienteering maps (ISOM). However, in order to meet the specific requirements of the discipline, certain deviations and additions to the orienteering map specifications are needed. These special rules and symbols are described in this booklet.

For international events, deviations from the specifications are only allowed with permission from the IOF Ski Orienteering Commission.

Ordinary orienteering maps may be used in ski orienteering competitions at all levels, if the dark green (symbol 410) is replaced by light green (symbol 406). For international events, permission from the IOF Ski Orienteering Commission is required.

## 2 Content

Ski orienteering is a sport in which the ski orienteer uses the map to navigate a track and route network in order to visit a number of control points. In ski orienteering, the competitor's skiing and navigation skills shall be tested in such way that the navigation skill becomes the decisive element.

Ski orienteering takes place on a track network, and involves as a basic element complex route choice problems, including estimating height differences. It is obvious that the map must concentrate on clearly depicting these features. The map must also be legible when skiing at high speed and in adverse weather conditions (snowfall, fog, rain, frost). This means that the map should omit a large part of details in "free" terrain in order to highlight the visibility of the track network and to simplify the presentation of the shape of the ground. Only details that impact a) route choice and b) navigation and positioning, need to be shown on the map.

In order to accomplish fairness in route choice, additional symbols need to be introduced. These symbols describe the quality and width of the tracks.

## 3 Scale

The official map scales in official IOF ski orienteering events are:

- 1:15000 in long distance events
- 1:10000 in middle distance and relay events; and
- 1:5000 in sprint and sprint relay events;

In addition to the official map scales, supporting map scales are available:

- 1:12500 and 1:10000 in long distance events; and
- 1:7500 in middle distance and relay events.

For international events supporting scales can be used only with the permission of the IOF event adviser, and one or more of the following conditions must be met:

- When sprint, middle and long distance events are organized completely or partially in the same terrain, the very dense track system, used in sprint and middle distance, may make the same terrain severely illegible for the long distance competition in 1:15000 scale.

- When the ski orienteering events are organized at cross-country skiing and biathlon stadiums or centres (where the complex track system is packed in very narrow and tight areas with bridges, tunnels, walls, fences, earth walls, etc), it might not be possible to depict the complex track system legibly with the official map scales, and therefore, to maintain the legibility of the maps, supporting map scales are needed. This condition may apply even when major part of the terrain and track system is not dense, if some areas, located in the centre of the event, can not be depicted legibly and justly in the official map scales.

In ski orienteering, the map reading takes place at very high speed (especially in downhill sections) and often in weather conditions (frost and snow fall) that limit the readability of the map. That in combination with the above conditions, contain a risk that the competition will be won not on the merits of the sport, but on the legibility of the map. Therefore, legibility and fairness must be kept in mind when deciding the map scale for an event.

The magnification in scale has made it possible to build a more dense and easily legible track network. Furthermore, the error probability has decreased, as the shapes of the junctions and the departure angles of the tracks can be drawn correctly on the map.

The map handed out to the competitors should not be larger than is necessary for the ski orienteering competition. For practical reasons (size of map holders, avoiding folding and ease of handling in general), the map size for ski orienteering competition maps should not exceed A4 (210 mm by 297 mm).

#### **4 Contour interval**

Contour interval should be 5 m, but two other alternatives (2.5 m or 10 m) can be used, when justified.

#### **5 Colours**

Ski orienteering maps add a new colour (PMS 354) for tracks, prepared areas and public snow mobile routes. The spot colour printing order for ski orienteering maps is as specified in the ISOM, but with an “upper green” (PMS 354) added: Grey is not used for ski orienteering maps.

1. Yellow (PMS 136)
2. green (PMS 361): all green symbols except tracks, prepared areas and public snow mobile route
3. blue (PMS 299)
4. brown (PMS 471)
5. upper green (PMS 354): tracks
6. black (Process black)
7. purple (PMS Purple)

Overprint effect, as described in ISOM, is to be used also for ski orienteering maps. The overprint effect ensures that important detail is not masked out by symbols in other colours, and helps improve the readability of the map.

Colour deficient orienteers are very sensitive to variations in colours. The colours used in the IOF map specifications have been chosen with colour deficient orienteers in mind. It is therefore very important to make sure that the colours on the printed orienteering maps are as close as possible to the colours specified in the IOF map specifications.

## 6 Printing and reproduction

Ski orienteering maps must be printed on good, preferably water-resistant paper (weight 100-120g/m<sup>2</sup>). The paper must not be laminated. Colours must be water proof.

Ski orienteering maps are often updated very close to the competition. The track network may be revised only hours before the event. Therefore, the shorter printing times of digital printing (digital colour press, laser printers, colour copiers, etc.) are often required for ski orienteering maps. All competitions may be organised using non-offset printed maps, but the print quality needs to be excellent, both with respect to colour fidelity and resolution.

## 7 Course overprint

It is very important that the course overprint does not hide or interfere with the track symbols. Control circles and connecting lines must be cut to make the track system and other important map detail readable. Control numbers and codes must be placed carefully to avoid hiding map features and tracks that are important for the competitor.

## 8 Recommended symbols

### 8.1 Use of symbols from the orienteering map specification

The following symbols from the orienteering map specification are recommended for ski orienteering maps.

#### Land forms

The shape of land is shown by means of contours. In order to maintain legibility of the map when skiing at high speed the contour lines should be more generalised compared to orienteering maps. Form lines shall be omitted, if they are not essential.

101 Contour, 102 Index contour, 103 Form line, 104 Slope line, 105 Contour value, 106 Earth bank, 107 Earth wall, 109 Erosion gully, 111 Knoll, 114 Depression.

#### Rock and boulders

Rocks and boulders may be prominent and can therefore serve as valuable objects for navigation and positioning. They may also constitute a danger to the competitor. The map may show these features when they are visible also when covered with snow.

201 Impassable cliff, 202 Rock pillars/cliffs, 203 Passable rock face, 206 Boulder, 207 Large boulder, 208 Boulder field, 209 Boulder cluster.

#### Water and marsh

Besides navigation and positioning, this group is important to the competitor as it facilitates the interpretation of height (what is "up" and what is "down") in maps with complex contouring.

305 Crossable watercourse, 306 Crossable small watercourse

In addition there are special versions of 301 Lake and 310 Marsh for ski orienteering.

#### Open land and vegetation

The representation of vegetation is of importance to the competitor mainly for navigational purposes, but could be used for route choices in cases where the competitor chooses to try shortcuts in free terrain. In order not to destroy legibility of the green tracks, all vegetation screens must be drawn with the symbol 406 Forest: Slow running.

401 Open land, 402 Open land with scattered trees, 403 Rough open land, 404 Rough open land with scattered trees, 405 Forest: easy running, 406 Forest: slow running, 412

Orchard, 413 Vineyard, 414 Distinct cultivation boundary, 416 Distinct vegetation boundary, 417 Indistinct vegetation boundary, 418 (green x) Special vegetation feature.

### Man-made features

Man-made features may be important features for navigation.

501 Motorway, 502 Major road, 503 Minor road, 504 Road, 509 Narrow ride, 513 Crossing point with bridge, 515 Railway, 516 Power line, 517 Major power line, 518 Tunnel, 519 Stone wall, 521 High stone wall, 522 Fence, 524 High fence, 525 Crossing point, 526 Building, 527 Settlement, 528 Permanently out of bounds, 529 Paved area, 531 Firing range, 534 Uncrossable pipeline, 535 High tower, 536 Small tower, 539, 540 Special man-made features.

509 Narrow ride is used for unploughed paths if well visible in the terrain.

## 8.2 The sizes of symbols in different scales

Scale	Track symbols	Other symbols
1:15 000	As specified in this publication	As specified in this publication
1:12 500 (Supporting Scale)	As specified in this publication (same as 1:15 000)	Enlargement (1.2x) from 1:15 000 map
1:10 000	As specified in this publication (same as 1:15 000)	Enlargement (1.5x) from 1:15 000 map
1:7 500 (Supporting Scale)	Enlargement (1.33x) from 1:15 000/1:10 000 map	Enlargement (1.5x) from 1:15 000 map (same as 1:10 000)
1:5 000	Enlargement (1.5x) from 1:15 000/1:10 000 map	Enlargement (1.5x) from 1:15 000 map (same as 1:10 000)

The width of the contour lines can be narrower (0.11 mm), so that the track symbols will be shown more clearly.

The official map scales for all IOF ski orienteering events are 1:15000, 1:10000 and 1:5000. For international events, the IOF event adviser may, based on specific reasons described earlier in this document, allow the use of supporting map scales 1:12500 and 1:7500.

## 8.3 Discipline-specific symbols

The following symbols are introduced for ski orienteering maps.

### Track symbols

The track network is indicated by a variety of green line symbols. The symbols are drawn with a compact and clearly visible green colour (PMS 354 is recommended). When a track follows a path, the path is not shown (i.e. black is not used).

Contrary to all other skiable routes (marked in green), opened skiable roads are shown with a black line symbol because roads need to be distinguished from ski tracks. The skiing conditions on a road are different from those on a ski track made for skiing only. The conditions on a road can also change more rapidly (e.g. rain, snow fall, sunshine).

All junctions and crossings must be drawn solid in order to clarify the exact position of the junction or crossing. This is valid also for dotted tracks.



#### 801 Very wide track > 3 m

Colour: upper green (PMS 354)

Width 0.85 mm

Very fast, wide ski tracks in ski centres, made with a ski trail groomer or a track leveller.



#### 802 Wide track 1.5-3.0 m

Colour: upper green (PMS 354)

Width 0.60 mm

A fast, skateable track made by a snow mobile, width usually 2-3 m. Skateable tracks rougher and softer than the wide skateable tracks in the area.



#### 803 Track 0.8-1.2 m

Colour: upper green (PMS 354)

Width: 0.5 mm

Length of a line 3 mm and distance between lines 0.5 mm

A good track made by a snow mobile, usually 1-1.2 m wide. In steep slopes, tracks may be made wider to reduce widening during competition.



#### 804 Track, slow 0.8-1 m

Colour: upper green (PMS 354)

Diameter of dots 0.7 mm and distance between dots 1.3 mm

A rough, slow track with little snow or some brushwood. This symbol is not used in steep slopes, if the width of the track allows using herringbone steps for uphill, or snow plowing technique for slowing and stopping.

In order to clarify a junction, the beginning of a slow track is drawn with a short line.



### 805 Road covered with snow

Colour: black

Width of line 0.7 mm

Snowploughed, skiable roads are drawn with a normal road symbol but wider.

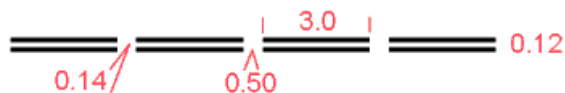


### 806 Sanded or snowless road

Colour: purple

Height 3.0 mm

A road on the map which is sanded or snowless during the competition. A chain of V-marks across the road symbol show that the road is not skiable. Snowless roads and heavily sanded roads should normally be marked as forbidden routes.



### 807 Unploughed road

Colour: black

A road which is not opened for traffic, no skiable track.



### 808 Prepared area

Colour: upper green (PMS 354)

Width of line 0.2 mm, distance between lines 0.8 mm, angle 45°

Slalom slopes (alpine skiing slopes) and other areas which are wide, skiable and hard. The boundaries of prepared areas are shown with a narrow green line (0.13 mm) so every edge can be read clearly.



### 809 Forbidden route, crossable

Colour: purple

Two purple lines across each other. Width of line: 0.35 mm. Length of line 3.5 mm.

Linear features marked with the forbidden route symbol can be crossed but not followed. At least two symbols must be used to mark a forbidden route.

The symbol 711 Forbidden route is drawn in a bigger size in a ski orienteering map so that it is more clearly visible in the track network.



### 813 Public snow mobile route

Colour: upper green (PMS 354)

A public and marked route for snow mobiles that may be in use during the ski orienteering competition. These routes are often uneven and of varying width and quality. The organizers must inform competitors in the competition instructions about the quality of such routes (e.g. with photographs) and ensure the safety of the competitors by temporarily closing the route, manning the route or by other means informing any snow mobile drivers about the possibility of encountering ski orienteers on the route. If the safety of the competitors can not be guaranteed, the route must be marked as forbidden and safe passages must be ensured.



### 814 Forbidden route, forbidden to cross

Colour: purple

Width of line 0.5 mm. Minimum total width of symbol 2 mm. Angle relative to the route (for straight sections) 45°.

A route which is out-of-bounds and forbidden to cross is shown with a zigzag. The zigzag line should be as continuous as possible. If there is a crossing point over the forbidden route, it shall be presented like a gate by two perpendicular lines over the forbidden route. Also a longer crossing section shall be presented clearly on the map by using the perpendicular lines at the end of the zigzag lines.

### Other symbols



### 810 Control point and focus point

Colours: purple

Diameter of control circles 5.5 – 6.0 mm (same in all scales), width of line 0.5 mm, diameter of focus point 0.65 mm

The focus point (i.e. the point in the centre of a control circle) can be used when it is necessary to clarify the exact position of a control for instance in a dense track network. In ski orienteering, a control is preferably placed in one track only, not in crossings or junctions. A focus point helps specify the exact track where a control is situated. For non-spot colour printing, the focus point can mask out all underlying print colours.



# 1-31

## 811 Control number and control code

Colour: purple

In ski orienteering, control descriptions are not used. Code numbers for controls are placed either next to control numbers on the terrain area of a map or on a separate control code list. The map size and the shape of the course are important factors in determining which alternative is better. If the track network is dense and/or the shape of the course is complicated, the column should be chosen. There is a hyphen between a control number and a code number.

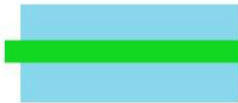


## 812 Equipment deposit

Colour: purple

Height: approx. 10 mm

A deposit for spare equipment in the terrain.



## 301.1 Crossable waterbody

Colour: 50 % blue

When a body of water can be safely crossed, the colour shall be blue 50 %, so that the track symbols drawn can be read more clearly.

The bank line of the crossable waterbody is not presented in ski orienteering map.



## 301.2 Uncrossable waterbody (forbidden to cross)

Colour: 100 % blue

Outline: Width of line 0.3 mm, black

When a body of water is not covered with ice or is otherwise dangerous to cross, the colour of the area shall be blue 100 %. That means also that the area is forbidden to cross.

A black bank line indicates that the feature cannot be crossed.



### **310.1 Marsh (in ski orienteering map)**

Colour: 50 % blue

The marshes shall be shown with the same symbol as indistinct marsh (311) in the orienteering map specification, so that the track symbols drawn can be read more clearly.

The colour yellow 50 % shall be used with the symbol, if there are no trees or bushes.