




NORWEGIAN DEFENCE MATERIEL AGENCY


TECHNICAL REQUIREMENTS

P4015 – Winter mobility (ski-system)

	TECHNICAL REQUIREMENTS	Responsible publisher: NDMA/Land Systems Division/General Materiel Department Soldier Systems	User: The Norwegian Armed Forces	Classification: Unclassified
	P4015, No.100828 – Winter mobility (ski-system)	Date: 29.09.2022	Prev. date: -	Total no. of pages : 19

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1 Introduction

1.1 Scope

These technical requirements describe the following products in the following sub areas:

1.1.1 Patrol- and Multi-Skis with Skins


Product	
Patrol / Multi Skis with steel edges	Pair
Patrol / Multi Skis without steel edges	Pair
Short skins	Pair
Long skins	Pair

1.1.2 Patrol Ski boots

Product	
Ski boots (with liner)	Pair
Replacement liners	Pair
Replacement locking mechanism (such as laces etc.)	Pair

1.1.3 Multi Ski Bindings

Product	
Multi Bindings	Pair
Multi Bindings, spare parts	N/A
Multi Bindings, mounting jig	N/A

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1.1.4 Telescopic Ski Poles

Product	
Telescopic ski poles	Pair
Spare parts	N/A

1.2 Areas of use

Skis are used by all branches of the Norwegian Defense Forces, mainly in the Arctic. Many soldiers do short(er) range patrols using combat boots (normally combined with overboots). The soldiers operate efficient, rapid, silent and in darkness, without artificial light sources. They operate freely across all kinds of terrain regardless of snow-conditions or lack of snow, in temperatures ranging from - 40° Celsius to +10° Celsius. The products will be used all over Norway from the littoral zone through forests and marshlands to mountains 2000 meters high. Life expectancy is minimum four years of use with 40 days of use each year.

2 Terms and definitions

2.1 Shall-requirement


A SHALL-requirement describes the minimum product requirement that SHALL be fulfilled.

2.2 Should-requirement

A SHOULD-requirement is a requirement that SHOULD be fulfilled for the product to be in compliance with the function and quality requirements.

2.3 References to standards in the technical requirements

Requirements referring to specific standards, brands, recommendations and guidelines (for example ISO-standards) can also be documented by using other equivalent standards, brands, recommendations and guidelines. This will then be specified in the requirement. It must then be thoroughly documented by the supplier that the alternative standards, brands, recommendations and guidelines in its entirety corresponds with all chapters related to the reference stated in the requirement.

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3 Technical requirements


This chapter describes the technical requirements for the products and contains SHALL- and SHOULD-requirements.

3.1 General performance requirement


NO	REQUIREMENT TITLE	REQUIREMENT	REQUIREMENT CATEGORY
1.	Performance	Over all the ski system shall enable the soldiers to perform their military tasks in all requested climate zones.	Shall

3.2 Requirements breakdown Sub Area 1: Skis and Skins


NO	REQUIREMENT TITLE	REQUIREMENT	REQUIREMENT CATEGORY
1.	Usability	The skis shall minimum have a score of 5 on each requirement in the user trial.** (Requirement 2, 3, 24, 25)	Shall

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2.	Usability	The skis and skins should be functional according to 1.2 Areas of use	Should (25%)
3.	Usability	The skis and skins should be of a durable and reliable materials that can handle rough military usage over time according to 1.2 Areas of use	Should (20%)
4.	Ski Sizes	The skis with steel edge shall be delivered in minimum three different sizes	Shall
5.	Ski Sizes	The smallest overall length shall be between 160 and 170 centimeters	Shall
6.	Ski Sizes	The longest overall length shall be between 190 and 210 centimeters	Shall
7.	Properties	The skis' waist shall minimum be 61 millimeters wide	Shall
8.	Properties	The skis' waist shall maximum be 68 millimeters wide	Shall
9.	Dimensions	A pair of skis, without ski binding and skins, shall not weigh more than 2,650 kilogram, for a ski of length of 200 centimeters, ± 10 cm	Shall

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		Weight for other sizes is consistent according to this pattern	
10.	Properties	The skis shall have a white surface***	Shall
11.	Properties	The skis gliding surface shall be sintered	Shall
12.	Properties	The required color of the skis gliding surface will follow in the ITT.	
13.	Tip	The skis shall have a hole in the tip (This facilitates building an improvised sledge)	Shall
14.	Tip	The tip shall be curved not pointy (for safety reasons)	Shall
15.	Tail	The tail of the ski shall be reinforced	Shall
16.	Compatible	The ski shall be compatible and functional with the binding system Rottfella BC Magnum	Shall

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17.	Properties	The ski shall have reinforcement in binding mounting area	Shall
18.	Properties	The skis should have early rise	Should (6%)
19.	Properties	The base material shall have anti-static properties	Shall
20.	Properties	The ski tips should be tapered	Should (4%)
21.	Edge	The skis shall have edges made of steel	Shall
22.	Edge	The skis shall also be available as a variant without steel edges (to protect the dogs)	Shall
23.	Size	The variant without steel edges shall be delivered in at least two sizes	Shall
24.	Usability	The skis and skins should provide good energy efficiency	Should (30%)

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25.	Usability	The skis and skins should provide control during descent as according to 1.2 Areas of use	Should (15%)
26.	Skins	The skis shall be supplied with a solution for application and removal of short skins	Shall
27.	Skins	The skis shall be supplied with a solution for application and removal of long skins	Shall
28.	Skins	All skins (long and short) shall be delivered pre-fitted for all ski sizes (No cutting/adapting by user shall be necessary)	Shall
29.	Skins	The long and short skins shall have a life expectancy of + 40 days of use according to scenario description	Shall
30.	Skins	The skins shall have a high degree of water repellency during minimum the first 40 days of use according to scenario description	Shall
31.	Skins	All skins shall be synthetic	Shall
32.	Skins	The skins gliding surface shall be white***	Shall

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33.	Skins	The skins glue side shall be white***	Shall
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3.3 Requirements Breakdown Sub Area 2 Ski Boots


NO	REQUIREMENT TITLE	REQUIREMENT	REQUIREMENT CATEGORY
1.	Usability	The ski boots shall minimum have a score of 5 on every single should requirement in the user test** (Requirement 2, 3, 4, 8)	Shall
2.	Usability	The ski boots should be functional according to 1.2 Areas of use	Should (40%)
3.	Usability	The ski boots should be comfortable according to 1.2 Areas of use	Should (20%)

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4.	Properties	The ski boots should be of a durable and reliable material that can handle rough military usage over time according to 1.2 Areas of use	Should (20%)
5.	Properties	The ski boots shall be compatible with Rottefella BC Magnum bindings	Shall
6.	Properties	One complete ski boot shall not weigh more than 1250 grams in size 42 (EUR) Weight for other sizes is consistent according to this pattern	Shall
7.	Properties	The ski boots shall have removable liners	Shall
8.	Usability	The ski boots including liners should have a flex suitable for long distance travel	Should (10%)
9.	Size	The ski boot shall be delivered in all whole sizes EUR: 39 – 47	Shall
10.	Size	The ski boots should be delivered in all whole sizes EUR: 37– 50	Should (5%)
11.	Properties	The ski boots shall have integrated gaiters	Shall


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12.	Properties	The gaiter shall have a zipper in front	Shall
13.	Properties	The gaiter shall have a backup closing solution, overlapping the zipper, example: Velcro	Shall
14.	Properties	The top section of the gaiter shall have a flexible closing mechanism that prevents snow and moisture from entering the boot and heat from escaping the boot	Shall
15.	Properties	The gaiter shall be minimum 40 centimeters high measured from the top of the gaiter to the bottom of the outer sole in size EUR 42. (The gaiter for other sizes shall be consistent according to this pattern)	Shall
16.	Properties	The required color of the ski boot with gaiter will follow in the ITT	
17.	Properties	The ski boot with gaiter should be white***	Should (5%)
18.	Chemical substances	The ski boots shall be REACH compliant, regarding substances and chemicals. See list of substances of very high concern (SVHCs) also known as the Reach Candidate list*	Shall


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3.4 Requirements Breakdown Sub Area 3 Multi Bindings

NO	REQUIREMENT TITLE	REQUIREMENT	REQUIREMENT CATEGORY
1.	Usability	The bindings shall minimum have a score of 5 on each requirement in the user test** (requirement 2, 3, 14, 15)	Shall
2.	Usability	The bindings should be functional according to 1.2 Areas of use	Should (25%)
3.	Properties	The bindings should be of a durable and reliable material that can handle rough military usage over time according to 1.2 Areas of use	Should (15%)
4.	Environmental conditions	The binding should have anti-corrosion properties	Should (5 %)

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5.	Color	The required color of the binding will follow in the ITT.	
6.	Color	The binding should be white***	Should (5%)
7.	Installation	The binding shall fit skis with a waist between 61 and 68 millimeters	Shall
8.	Installation	The binding should be fast and easy to mount to skis	Should (10 %)
9.	Mounting screws	Pozidrive 3 mounting screws shall be delivered with the bindings for mounting	Shall
10.	Mounting screws	The mounting screws shall have an anti-corrosion properties	Shall
11.	Sizes	The binding shall fit M/77 combat boot sizes 36 with overboots to 46 with overboots	Shall
12.	Sizes	The binding should fit M/77 combat boot size 47 with standard issued overboot to M/77 combat boot size 52 with standard issued overboot	Should (5 %)

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13	Sizes	Maximum two (2) identical bindings with different size-range shall be delivered to meet requirement 12 and 13	Shall
14	Usability	The binding should facilitate ease of movement on various snow conditions in hilly terrain up to 20 degrees	Should (10 %)
15	Usability	The binding should facilitate ease of movement on various snow conditions in flat terrain	Should (25 %)
16	Usability	The binding shall allow the user to lean so far forward that the knee touches the ski	Shall

3.5 Requirements Breakdown Sub Area 4 Telescopic Ski Poles


NO	REQUIREMENT TITLE	REQUIREMENT	REQUIREMENT CATEGORY
1.	Usability	The poles shall minimum have a score of 5 on every single requirement in the user test (requirement 2, 7, 11)	Shall
2.	Usability	The poles should be functional according to 1.2 Areas of use	Should (40%)

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3.	Properties	The poles should meet the following ISO 7331:2020 requirement 6.8.4, piercing resistance*	Should (4%)
4.	Properties	The poles, should meet the following ISO 7331:2020 requirement 6.8.5, pulling-off force*	Should (4%)
5.	Properties	The poles, should meet the following ISO 7331:2020 requirement 6.9.2, straps, minimum strain in support direction.*	Should (4%)
6.	Properties	The poles, should meet the following ISO 7331:2020 requirement 6.10, shaft, minimum compressive force.*	Should (4%)
7.	Properties	The ski pole should be of a durable and reliable material that can handle rough military usage over time according to 1.2 Areas of use	Should (16%)
8.	Properties	The poles shall have grips with straps	Shall
9.	Properties	The grips shall be made of a material that is non-absorbent	Shall
10	Functionality	The ski pole shall have a locking mechanism that allows telescopic capability	Shall

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11	Functionality	The ski pole should have a locking mechanism, where chosen height, won't adjust unintentionally during use	Should (14%)
12	Dimensions	The poles shall compress to 112 centimeters or shorter during storage (Measured from end to end)	Shall
13	Dimensions	The full length of the poles shall be minimum 150 centimeters (Measured from tip to the straps rear exit point on grip)	Shall
14	Usability	The poles shall be labeled to differentiate between different lengths	Shall
15	Dimensions	The poles shall have a maximum weight of 650 grams per. pair	Shall
16	Dimensions	The poles should be lighter than 650 grams per. pair	Should (8%)
17	Properties	The color of the ski pole's shaft shall be white***	Shall
18	Properties	Requirement regarding non-white colors follows in the ITT	

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19	Properties	The color of the ski pole's strap should be white***	Should (1%)
20	Properties	The color of the ski pole's grip should be white***	Should (1%)
21	Properties	The color of the ski pole's locking mechanism should be white***	Should (2%)
22	Properties	The color of the ski pole's basket should be white***	Should (2%)
23	Properties	The ski poles shall be ambidextrous (no difference between right and left pole)	Shall
24	Functionality	The poles' straps shall be adjustable without tools and while wearing mittens	Shall
25	Functionality	The poles' locking mechanism shall be adjustable without tools and while wearing mittens	Shall
26	Baskets	The baskets shall minimum have a diameter of 10 centimeters	Shall

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27	Baskets	The baskets shall be suitable for long distance travel	Shall
28	Maintenance	The baskets shall be replaceable by hand or multitool by the end user	Shall
29	Maintenance	Spare parts shall be available, minimum baskets and locking mechanism	Shall

* [ISO - ISO 7331:2020 - Ski-poles for alpine and touring skiing — Requirements and test methods](#)

** In user testing material will be scored on a scale from 0-10. A score of 5 represents an “Acceptable” score

*** Information regarding the specific type of white will be given in the ITT