

Equipment Control FIS Cross-Country World Cup

Date: 30th September 2023

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1 General Information

1.1 Testing method

- Fourier Transform InfraRed (FTIR) Spectroscopy.
- Find more information about the instrument and calibration model [HERE](#)

1.2 Data storage

- All testing data will be collected and stored in the FIS database.
- Data will not be shared with 3rd persons.

1.3 Location of the test

- Pre-start, as close as possible to the start.
- Detailed location and set up will be coordinated with the LOC Chief of Competition.

1.4 Testing scope

- Primary goal is to test all skis of all athletes.
- Due to time constraints in some competition formats and techniques random number of skis will be tested.
- The amount of athletes/skis to be tested will not be communicated by the Jury before the competition.

1.5 Infrastructure for the test

1.5.1 Tent for testing

- Provided by FIS.
- Restricted access (FIS Equipment Controller, Jury, LOC testing personnel).
- Size 6 x 3 m.

1.5.2 Equipment for the tent

Provided by LOC:

- Rubber floor (or any other stable, hard and not slippery floor).
- Furniture:
 - Tables – 4pcs (Size: 2.50 x 0.75 m)
 - Chairs – 4 pcs
- Electric heating (not a blower)
- Reliable electric power source

1.5.3 Tent for Control Area - Provided by FIS

Restricted access (equipment controller, coach/team technician, athlete):

- Size 2 x 2 m min
- Furniture:
 - Table (Size: 2.50 x 0.75 m)
- Reliable electric power source

1.5.4 Ski storage

- 7-8 wooden ski racks – provided by LOC
- Ski racks with bib numbers
- Example/technical specification – in separate document
- Ski storage should be protected against sun, wind, rain and snowing (roof and some side walls, but no heating)

1.6 Testing setup

- Fenced off area
- Restricted access
- Jury + FIS staff
- Team technicians
- Space for ski storage for all athletes in the pre-start
- Depending on the technique and format
- Example for 90 athletes:
 - o Interval Start Free – 90 pairs
 - o Mass Start Classic – 180 pairs
 - o Skiathlon/Mass Start C with Ski exchange – 270 pairs
- Control by FIS officials to check if all skis are in the position before the ski delivery time
- Each ski will be place by the technician/athlete in the correct rack.

2 Testing logistics

2.1 Before Competition

2.1.1 Ski marking

- All competition skis for the race must be marked with a sticker
- Sticker will contain:
 - o Bib number
 - o Number of the pair
 - o Number of the ski
- Stickers will be provided to all athletes before the season.
- Each athlete will get a certain number of stickers, to be used during the season.
- Number of stickers/athlete according to the table:

Athlete's ranking	Amount of sticker
TOP 30 in Sprint, Distance or Overall Standing	25
From top 30 to top 60 in the Overall Standing	15
Over Top 60 in the Overall Standing	10

- If needed, more stickers can be provided.
- Without the sticker, skis cannot be checked in.

2.1.2 Skis delivery

- Skis must be delivered to the test area "**Fluor - Post race ski check-in**" latest at the defined time.

FREE TECHNIC	Interval start Mass start Pursuit Sprint qualification	-1 pair of ski (Athlete's number sticker)	-30 Minutes before the athlete start
	Sprint Heats	-1 pair of ski (Athlete's number sticker)	-15 Minutes before the athlete start
	Long Distance with ski exchange	-1 pair of ski (Athlete's number sticker)	-First Pair 30 minutes before the athlete start
-1 pair exchange (Athlete's number sticker)		-Ski Exchange at the start of the athlete	
Skiathlon	-2 Classic pairs of ski (Athlete's number sticker)	-2 Classic Pairs 30 minutes before the athlete start	
	-1 pair exchange (Athlete's number sticker)	-Ski Exchange 10 minutes before the start of the athlete	
CLASSIC TECHNIC	Interval start Mass start Pursuit Sprint qualification	-2 pairs of ski (Athlete's number sticker)	-30 Minutes before the athlete start
	Sprint Heats	-2 pairs of ski (Athlete's number sticker)	-15 Minutes before the athlete start
	Long Distance with ski exchange	-2 pairs of ski (Athlete's number sticker)	-First Pair 30 minutes before the athlete start
-1 pair exchange (Athlete's number sticker)		-Ski Exchange at the start of the athlete	

- The technician/athlete personally put the skis in the designated rack.
- No interaction with a volunteer.
- Skis are tested in the tent.

2.1.3 Skis pick-up before the start

- After the test skis will be delivered in the “**Fluor - Race ski pick up**” area.
- Skis will be delivered in the “**Fluor - Race ski pick up**” area ASAP.
- Skis should not be delivered in the “**Fluor - Race ski pick up**” area not later than 10 min before the start of the competitor (interval start, sprint qualification) or 10 min before the start of the competition (mass start, skiathlon, pursuit).
- After the test skis cannot be touched by anybody, except the fluor testing personnel (exception – classic technique competitions, see below).

Free technique

- Skis will be deposited in the “**Fluor - Race ski pick up**” zone in the designated rack with athlete number by LOC volunteers
- Athlete will collect the skis directly before the start

Classic technique

- After the test skis will be deposited in the “**Fluor - Kick wax service**” zone
- Skis will be picked up by team staff (no longer than 10 min after the delivery time).
- Only the kick zone can be adjusted by team technician in the “**Fluor - Kick wax service**” zone.
- Only technicians (no coaches, physio, etc.) can access the “**Fluor - Kick wax service**” zone.
- Number of technicians, who will be allowed to adjust the kick zone will not be limited.
- After the kick zone has been adjusted, team technician will deposit skis in the designated rack with athlete number in the “**Fluor - Race ski pick up**” zone.

- Only 1 pair/athlete can be put in the **“Fluor - Race ski pick up”** zone, the unused pair stays in the **“Fluor - Kick wax service”** zone.
- Team staff can only deposit skis and not stay in the **“Fluor - Race ski pick up”** zone.
- Athlete will collect the skis directly before the start in the **“Fluor - Race ski pick up”** zone.
- LOC officials will control the area.

2.1.4 Tools and products allowed in the **“Fluor - Kick wax service”** zone

Tools

- Wax tables
- Ski profiles
- Heats guns (battery) and gas guns
- Corks
- Metal’s Spatula
- Scrapers
- Grooves and Pencil grooves
- Sandpapers
- Dry paper or Fiberlene for cleaning tools.

Products

- Kick-Wax
- Klusters, hard wax
- Tape-Wax
- Tapes

2.1.5 **Not allowed** products in the **“Fluor - kick wax service”** zone

- Sprays
- Liquids
- Glide waxes

2.2 After Competition

- Right after the competition skis must be delivered by the athlete or team member or SRS with special armband to the **“Fluor - Post race ski check-in”** Zone.
- The skis must be placed in the designated rack.
- No interaction with a volunteer.
- Skis are tested in the tent.
- After the skis have been tested, they will be placed in the **“Fluor - Final check out”** Zone in the designated rack with athlete number and can be collected by athlete or team member.
- Exchange skis from the pit boxes must be placed in the **“Fluor - Post race ski check-in”** zone right after the end of the competition. Skis can be collected from the exchange zone after competition by athletes or team members with armband.

3 Red ski

- For the definition of **“red ski”** see further
- When a ski is **“red”** the team staff will be directly informed by the Equipment Controller.

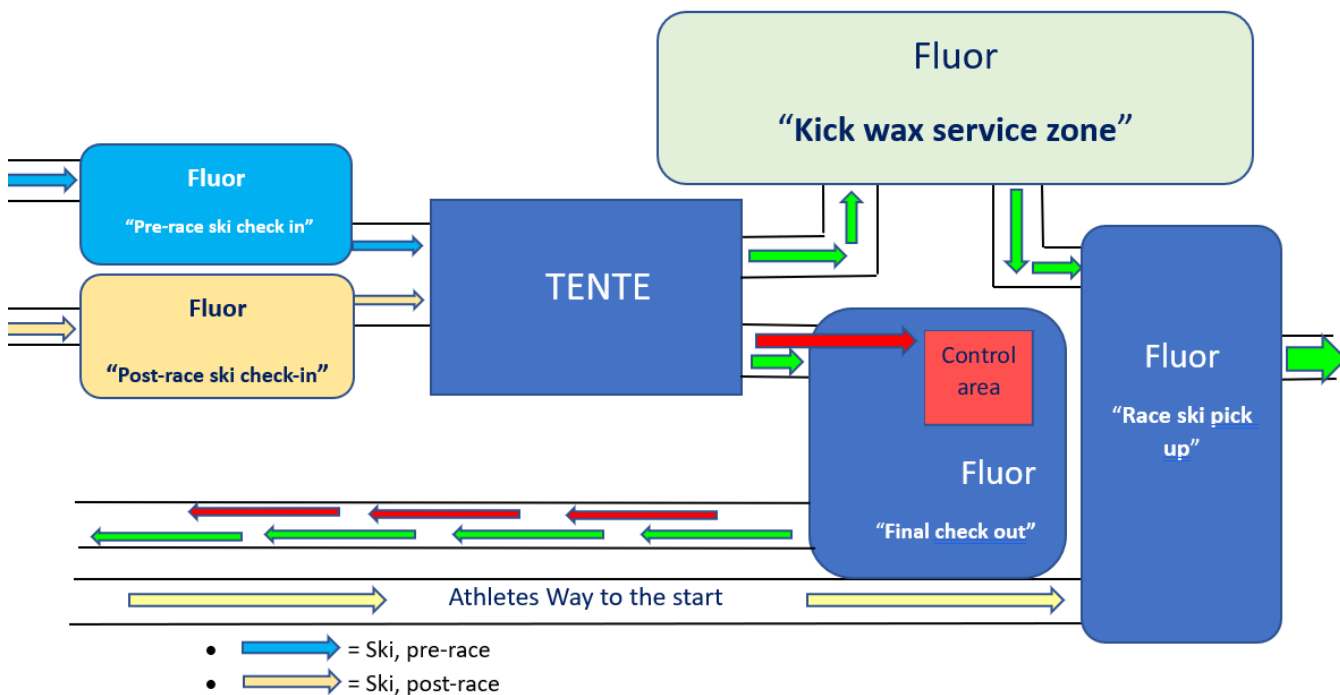
- A maximum amount of three people (athlete include) can come to the “**Fluor - Control area**” to collect the racing ski
- The Equipment Controller will show the different tests measurements from a screen
- No subsequent measurements by team’s testing instrument will be considered when the “red ski” ski leaves “the zone 6”.

4 Testing before the competition – details for each competition format.

4.1 Interval Start

4.1.1 Interval Start Classic

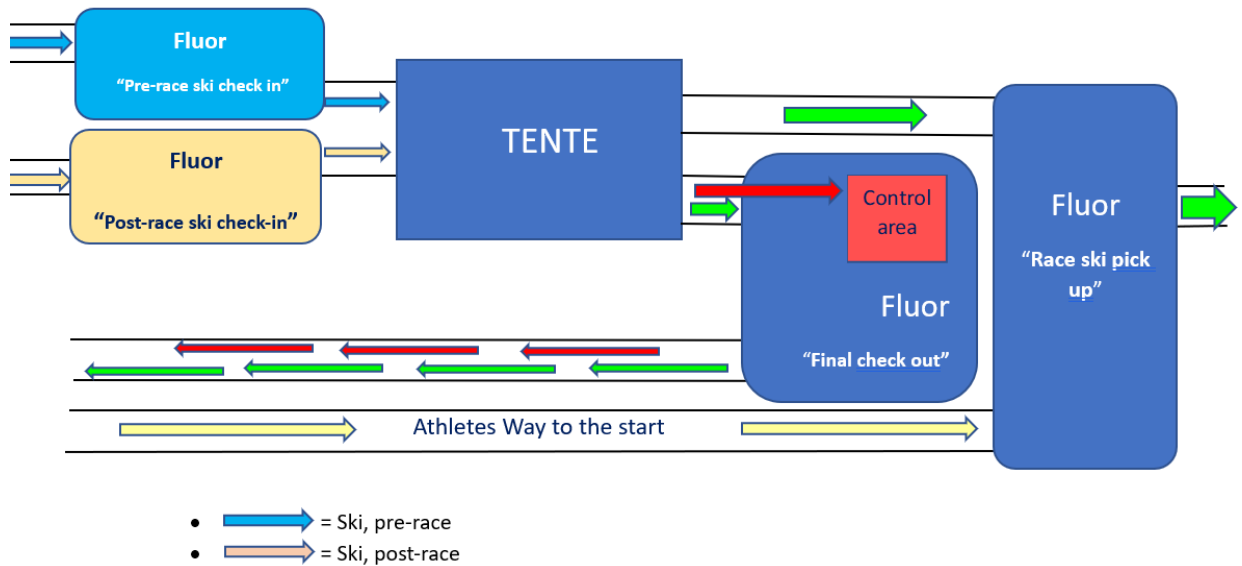
- Test Station will be open from 45 min before the 1st start.
- Each athlete can bring maximum two (2) pairs of skis.
- Only 1 pair/athlete can be put in the “**Fluor - Race ski pick-up**” zone, the unused pair stays in the “**Fluor - kick wax service**” zone.
- Each ski must be marked with the sticker.
- Ski delivery time for each athlete is 30 min before athlete’s start time.
- The skis will be collected and tested after the race.



4.1.2 Interval Start Free

- Test Station will open from 45 min before the 1st start.
- Each athlete can bring maximum one (1) pair of skis.
- Each ski must be marked with the sticker.

- Ski delivery time for each athlete is 30 min before athlete's start time.
- The skis will be collected and tested after the race.



4.2 Individual Sprint

4.2.1 General rules

- Test Station will be open from 45 min before the start.
- Skis will be tested:
 - o before and/or after the qualification
 - o before ¼-finals and after final
- Waxing, scraping, or cleaning of the competitor's skis during the competition (between ¼ Final - Final) is forbidden. **Exception see further.**
- Test Station will be open from 45 min before the 1st start.

Ski delivery

Qualification

- 30 min before athlete's start time.

¼ Finals

- 15 min before the start time of the respective ¼ Final.

4.2.2 Sprint Classic

Qualification

- Number of competition pairs:
 - o Two (2) pairs/athlete
- Each ski must be marked with the sticker.
- Only 1 pair/athlete can be put in the "**Fluor - Race ski pick-up**" zone, the unused pair stays in the "**Fluor - kick wax service**" zone.

- No skis can be stored in the “**Fluor - kick wax service**” zone after the qualification.

¼ Finals

- Number of competition pairs:
 - Two (2) pairs/athlete
 - Each ski must be marked with the sticker
- During the heats of Individual Sprint Classic competitions, adjustments to the kick wax between the rounds is allowed. Adjustment must be made by the competitor or authorized personnel within the “**Fluor - kick wax service**” zone.. Adjustment of glide zones is not allowed.
- Ski exchange between the 2 pairs during the rounds is allowed.
- Only 1 pair/athlete can be put in the “**Fluor - Race ski pick-up**” zone, the unused pair stays in the “**Fluor - kick wax service**” zone.

4.2.3 Sprint Free

- Number of competition pairs:
 - One (1) pair/athlete
- Each ski must be marked and signed with the sticker:
- During the heats of Individual Sprint Free competitions, re-waxing of skis is not allowed.

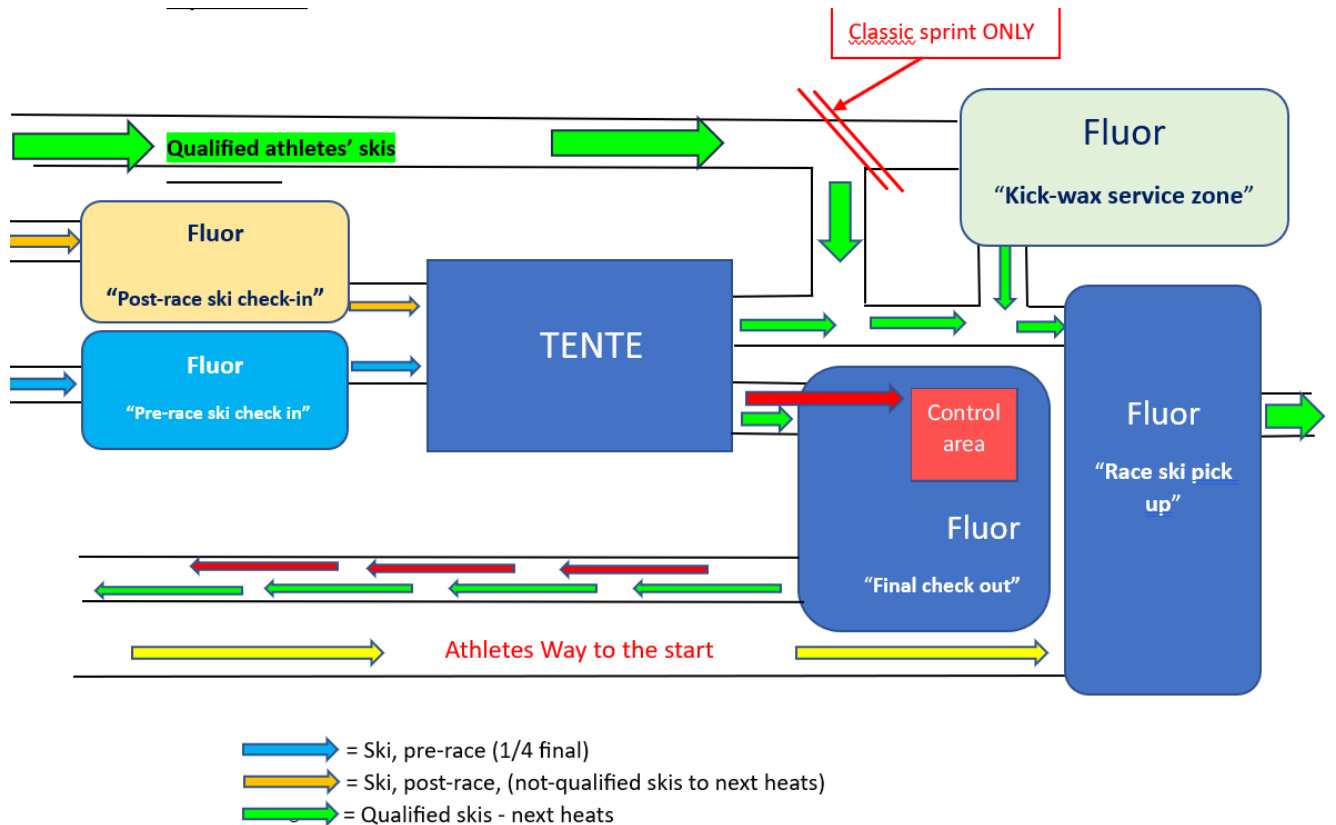
4.2.4 Testing after the race

Qualification

- Skis will be collected and tested after the women’s qualification and after the men’s qualification.
- The skis should be ready for pick up “**Fluor - Final check out**” Zone app. 10 minutes after the end of women’s qualification, after the end of men’s qualification and after the end of the final.

Heats

- Athletes’ skis who have been eliminated will be tested after their last round.
- Athletes’ skis in the final will be tested after the final.



4.3 Team Sprint

4.3.1 General rules

- Test Station will be open from 45 min before the start
- Skis will be tested:
 - o before and/or after the qualification
 - o before and after the finals
- Waxing, scraping, or cleaning of the competitor's skis during the final is forbidden

Ski delivery

- Qualification
 - o 30 min before athlete's start time
- Finals
 - o 15 min before the start time of the respective Final (women's or men's)

Testing after the race

- Skis will be collected and tested after the race in the finish after the Final.
- The skis should be ready for pick up "Fluor - Final check out" zone, app. 10 minutes after the qualification and the finish of the final.
 - Qualification Team Sprint Classic
- Number of competition pairs
 - o Two (2) pairs/athlete
- Each ski must be marked with the sticker.

- Before the qualification, adjustments to the kick wax is allowed. Adjustment must be made by the competitor or authorized personnel within “**Fluor - kick wax service**” zone. Adjustment of glide zones is not allowed.
- Only 1 pair/athlete can be put in the “**Fluor - Race ski pick-up**” zone , the unused pair stays in the “**Fluor - kick wax service**” zone.
- After the end of qualification of team sprint classic no skis can be stored in “**Fluor - kick wax service**” zone.

4.3.2 Qualification Team Sprint Free

- Number of competition pairs:
 - o One (1) pair/athlete
- Each ski must be marked and signed with the sticker.
- During the heats of Individual Sprint Free competitions, re-waxing of skis is not allowed.

4.3.3 Final Team Sprint Classic

- Number of competition pairs:
 - o Two (2) pairs/athlete
- Each ski must be marked and signed with the sticker.
- Before the start of the final, adjustments to the kick wax is allowed. Adjustment must be made by the competitor or authorized personnel within “**Fluor - kick wax service**” zone. Adjustment of glide zones is not allowed.
- Only 1 pair/athlete can be put in the “**Fluor - Race ski pick-up**” zone, the unused pair stays in the “**Fluor - kick wax service**” zone.
- Ski exchange between the 2 pairs during the final is not allowed.

4.3.4 Final Team Sprint Free

- Number of competition pairs:
 - o One (1) pair/athlete
- Each ski must be marked with the sticker.

4.4 Mass Start + Skiathlon

4.4.1 Mass start Classic (without ski exchange)

- Test Station will be open from 45 min before the start.
- Each athlete can bring maximum two (2) pairs of skis.
- Each ski must be marked with the sticker.

Ski delivery

- 2 pairs latest 30 min before the start (kick wax allowed to be adjusted).
- Only 1 pair/athlete can be put in the “**Fluor - Race ski pick-up**” zone, the unused pair stays in the “**Fluor - kick wax service**” zone.

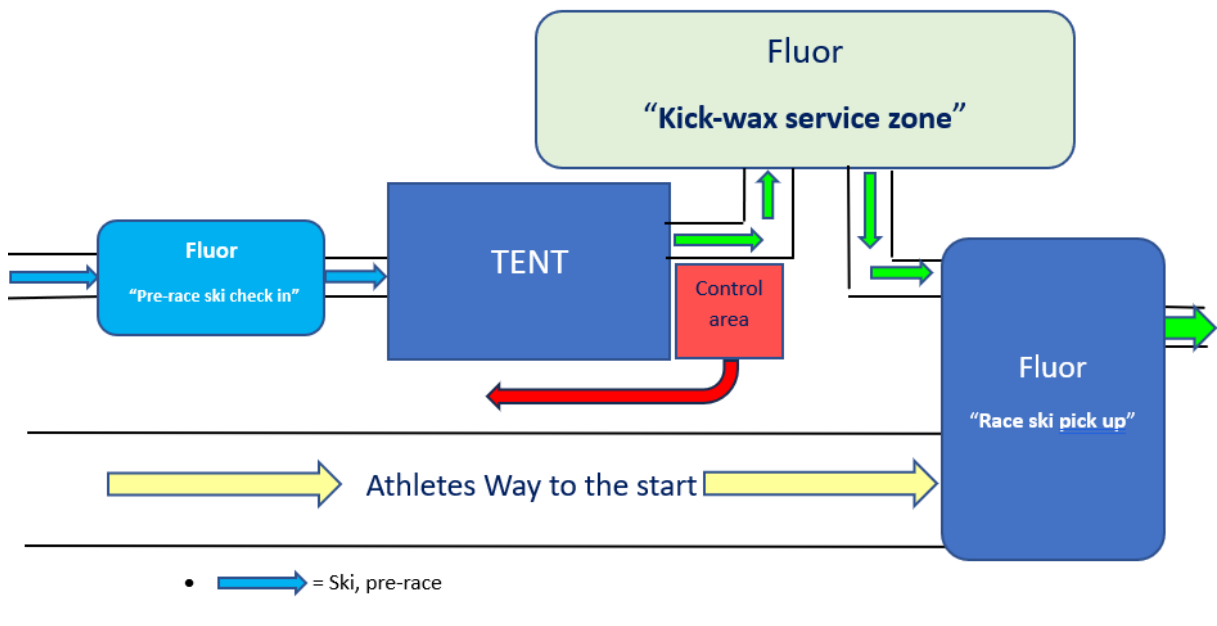
4.4.2 Mass Start Classic (with ski exchange)

- Test Station will be open from 45 min before the start
- Each athlete can bring maximum three (3) pairs of skis.

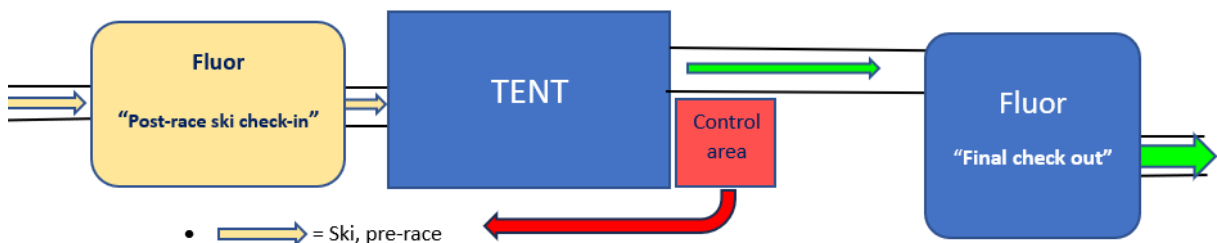
Ski delivery

- Starting ski: 2 pairs latest 30 min before the start (kick wax allowed to be adjusted).
- Only 1 pair/athlete can be put in the “**Fluor - Race ski pick-up**” zone, the unused pair stays in the “**Fluor - kick wax service**” zone.
- Exchange ski: 1 pair latest at the time of the start (kick wax allowed to be adjusted)
- Each ski must be marked and signed with the sticker.
- Team member with armband will be allowed to bring athletes exchange skis in the pit boxes from “**Fluor - kick wax service**” zone.
- The skis will be collected and tested after the race. Athletes and/or team members with armband can collect skis from the exchange zone.
- Skis from ski exchange must be placed in “**Fluor - Post race ski check-in**” zone for testing after the competition.

Mass-Start Classic (BEFORE-RACE):



Mass-Start Classic (AFTER-RACE):



4.4.3 Mass Start Free (without ski exchange)

- Test Station will be open from 45 min before the start.
- Each athlete can bring maximum one (1) pair of skis.

Ski Delivery

- 1 pair latest 30 min before the start.

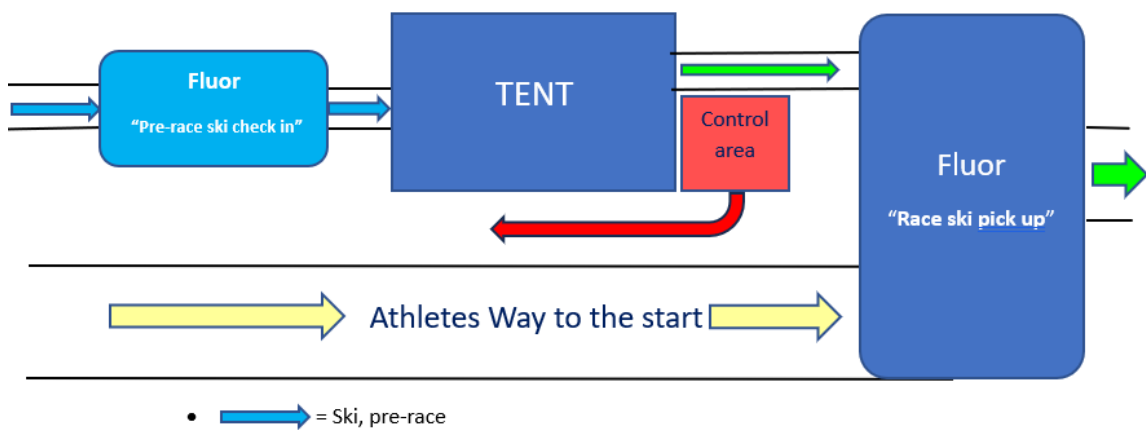
4.4.4 Mass Start Free (with ski exchange)

- Test Station will be open from 45 min before the start.
- Each athlete can bring maximum two (2) pairs of skis.

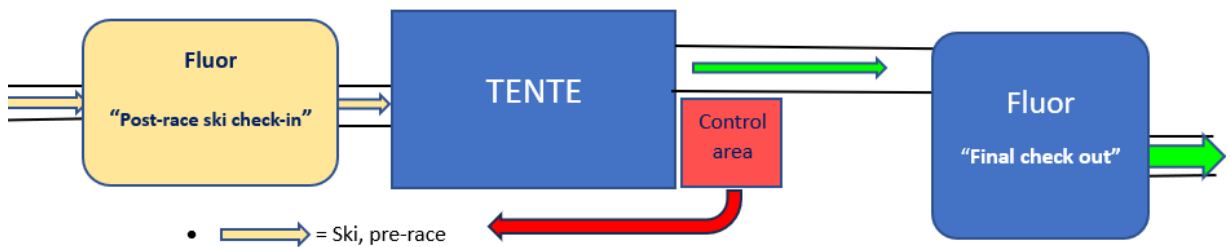
Ski Delivery

- Ski before start: 1 pair latest 30 min before the start.
- Exchange ski: 1 pair latest at the time of the start.
- Each ski must be marked and signed with the sticker.
- During the competition only, team member(s) with armband will be allowed to bring athletes exchange skis from “**Fluor - Race ski pick-up**” zone to in the pit boxes.
- The skis will be collected and tested after the race. Athletes or team member(s) with armband can collect skis from the exchange zone.

Mass-Start Skating (BEFORE-RACE):



Mass-Start Skating (AFTER-RACE):



4.4.5 Skiathlon:

- Test Station will be open from 45 min before the 1st start.
- Each athlete can bring maximum two (2) pairs of classic skis and one (1) pair of skating skis.

Ski Delivery

- Classic ski: 2 pairs latest 30 min before the start (kick wax allowed to be adjusted).
 - o Only 1 pair/athlete can be put in the “**Fluor - Race ski pick-up**” zone, the unused pair stays in the “**Fluor - kick wax service**” zone.
- Skating ski: 1 pair latest at the time of the start.
- Each ski must be marked and signed with the sticker.
- Team member(s) with the armband will be allowed to bring athletes exchange skis from “Zone 2” to the pit boxes.
- The skis will be collected and tested after the race. Athletes and/or team members with armbands can collect skis from the exchange zone.

4.5 Gender Specific Relay/Mixed Relay Competition

- Test Station will be open from 45 min before the start.
- Each ski must be marked and signed with the sticker.

Ski Delivery

- Leg1: 2 pairs latest 20 min before the start (kick wax allowed to be adjusted)
 - o Only 1 pair/athlete can be put in the “**Fluor - Race ski pick-up**” zone, the unused pair stays in the “**Fluor - kick wax service**” zone.
- Leg2: 2 pairs latest 10 min before the start (kick wax allowed to be adjusted)
 - o Only 1 pair/athlete can be put in the “**Fluor - Race ski pick-up**” zone, the unused pair stays in the “**Fluor - kick wax service**” zone.
- Leg3: 1 pair latest at the time of the start.
- Leg4: 1 pair latest 10 min after the start.
- The skis will be collected for testing in the Finish after the last leg.
- The skis will be ready to pick up in the Test Station app. 10 min after finish.

5 Measuring procedure

5.1 Personnel and responsibilities

5.1.1 FIS Equipment Controller

- Directly involved and responsible for the organization of fluor testing before and during the event.
- Responsible for smooth flow of the fluor testing on site.
- Responsible for selecting athletes to be tested in the finish area in accordance with the Jury.
- The only person to communicate with the Jury and FIS Race Director about NPS or DSQ.
- Collects information from teams and SRS about development in ski waxing, to develop the testing models.

5.1.2 Jury

- Receives information from the FIS Equipment Controller.
- Makes final decision about sanctions.

5.1.3 Testing personnel from LOC

Testing station (total number of testing stations is 4)

- 1 testing operator – provided by LOC/NSA.
- 1 assistant – provided by LOC/NSA.

Check-in/after test

- 2 volunteers
- 1 responsible for:
 - o Organisation of ski storage BEFORE the test.
 - o Controlling the ski delivery time of each athlete.
- 1 responsible for:
 - o Organisation of ski storage AFTER the test.

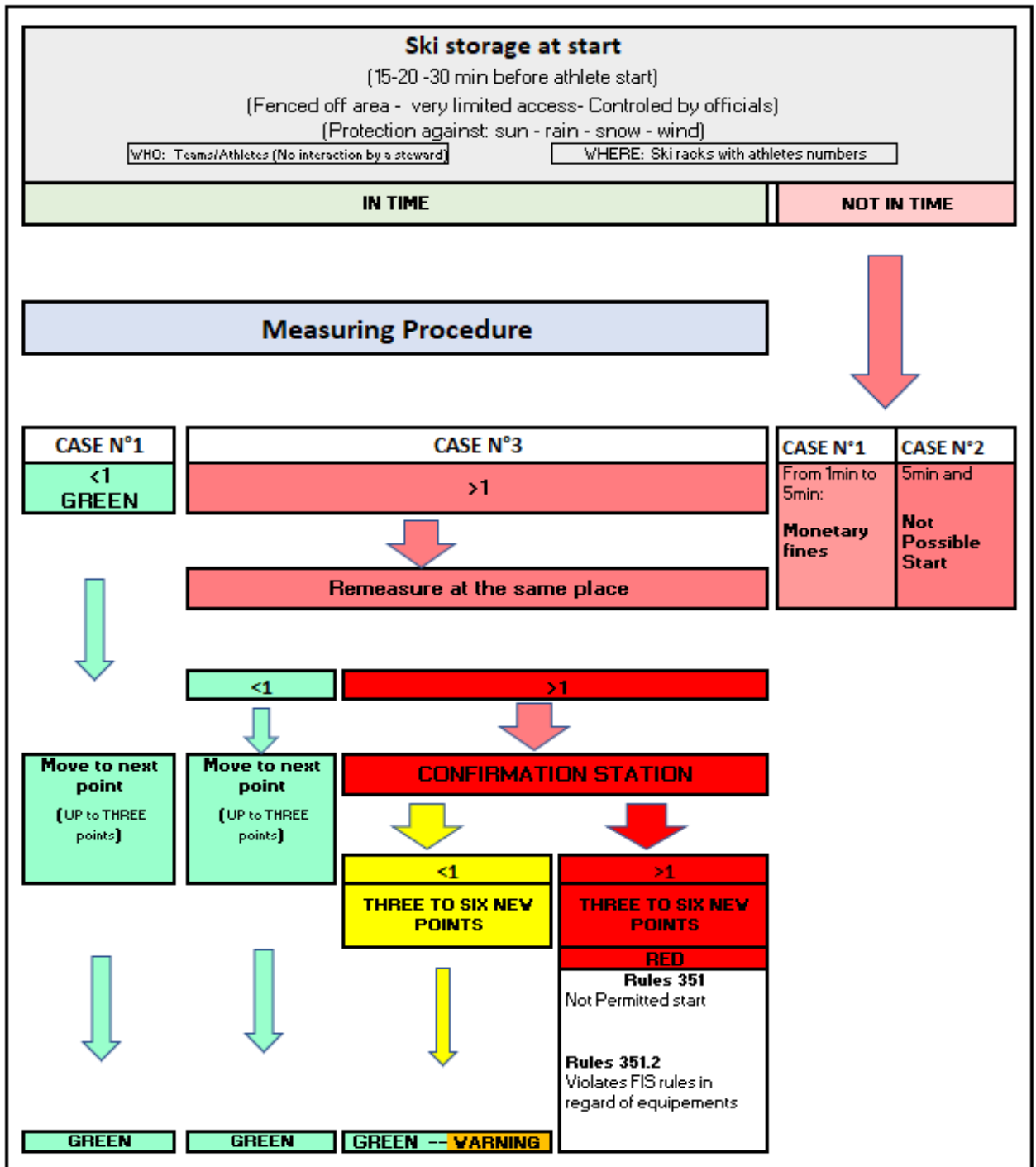
Waxing control

- 4 persons to control that only kick zone is adjusted in the “**Fluor - kick-wax service**” zone.
- Responsible for monitoring no waxing is done after the equipment control has been done.
- Exception – classic technique competitions (see further).

5.2 Number of testing instruments

- Normally, there will be 4 instruments on the FIS Cross-Country World Cup.
- 4 testing instruments will be used for testing.
- 1 testing instrument will be used for confirmation test in case of a positive result.

5.3 Measuring procedure



The model is also set up to instruct the controller to conduct small brushing 2cm² when needed, based on the shape of the full spectrum.

- **Ski will be considered RED when the 3 measured points in the confirmation station are RED.**

5.4 Document library

Cleaning methods guidelines for skis and equipment can be found [HERE](#).

Fluor ban information can be found in the dedicated section in the FIS website [HERE](#).