



Minutes of Meeting

FINA Swimwear Approval Committee Meeting with the Manufacturers

**10th November 2017
Lausanne, Switzerland**

Meeting Notes

FINA Swimwear Approval Committee was represented by:

Prof. Jan-Anders Mansson, FINA SAC Chairman

Mr. Jean-Pierre Morand, FINA Legal Counsel

The meeting was led by Prof. Jan-Anders Mansson, SAC Chairman.

Representatives of swimwear manufacturers attended the meeting:

Adidas	Mrs. Christine Barth-Darkow - Director Swim
Adidas	Mrs. Deborah Yeomans - Director future
Agonswim	Mrs. Henar Alonso-Pimentel - Director of Production
Aqualung	Mrs. Catherine Botalla - Product development manager wetsuits
Aqualung	Mr. Luca Armillotta - Product development manager wetsuits
Arena	Mr. Greg Steyger - Global Category Manager
Asics	Mr. Masanari Fujita - Swimwear Developer
Asics	Mr. Masako Mikanagi - Swimwear Product Merchandiser
Dolphin Swimwear	Mr. Matthew Zimmer - VP Global Development
Fashy GmbH	Mrs. Carmen Reitzner - Design / Product Management
FINIS	Mr. Martin Fahnemann - Director of Sales & Marketing EMEA
Horizon Sport Creation (MAKO)	Mrs. Jessica Harrison - Head of Design
HUUB	Mr. Dean Jackson - Proud Owner
HUUB	Pr. Huub Toussaint - Research Developer
Jaked	Mr. Francois Bertonazzi - Export manager
Jaked	Mrs. Raffaella Magistretti - Production
Keo S.r.l.	Mrs. Gabriele Angel - Production Manager
Keo S.r.l.	Mr. Daniele Cerabino - General manager
Mad Wave	Mr. Maxim Gilde – Marketing
Mares	Mrs. Giorgia Lorenzi - Textile R&D and Project Manager
Mizuno	Mr. Hiroyuki Tanaka - Engineer
Mizuno	Mr. Mito Yozawa - Manager
Speedo	Mr. Ben Hardman - aqualab
TYR	Mr. Franck Horter - President TYR Europe
YAMAMOTO KOGAKU CO., LTD.	Mr. Naoya Matsuo
YAMAMOTO KOGAKU CO., LTD.	Mr. Ayumu Hirota

Agenda:

09:45 – 10:00 Welcome Coffee
10:00 – 12:30 Meeting - part 1

Welcome and introduction

POOLSUITS

- Submission statistics from 2017
- Information and discussion on main issues from the last submissions – year 2017
- Seam count
- Merging seams and relative seam distance
- Fabric consistency: permeability non-stretched - fabric versus suit
- Permeability non-stretched versus stretched
- “Approval” tolerance margin versus “measurement” tolerance margin

12:30 – 13:15 Lunch
13:15 – 17:00 Meeting - part 2

Follow-up on issues from the last meeting

- Caps and goggles: “FINA Approved Label”
- Approval list publication / effective date

Suggestions of additional points to be addressed

- Zipper at the back of female poolsuits
- PFCs - Perfluorinated Chemicals
- Thickness limit increase from 0.8mm to 1.0mm
- Full-body poolsuits for men

Submission procedure during 2018 & pre-avis service

WETSUITS

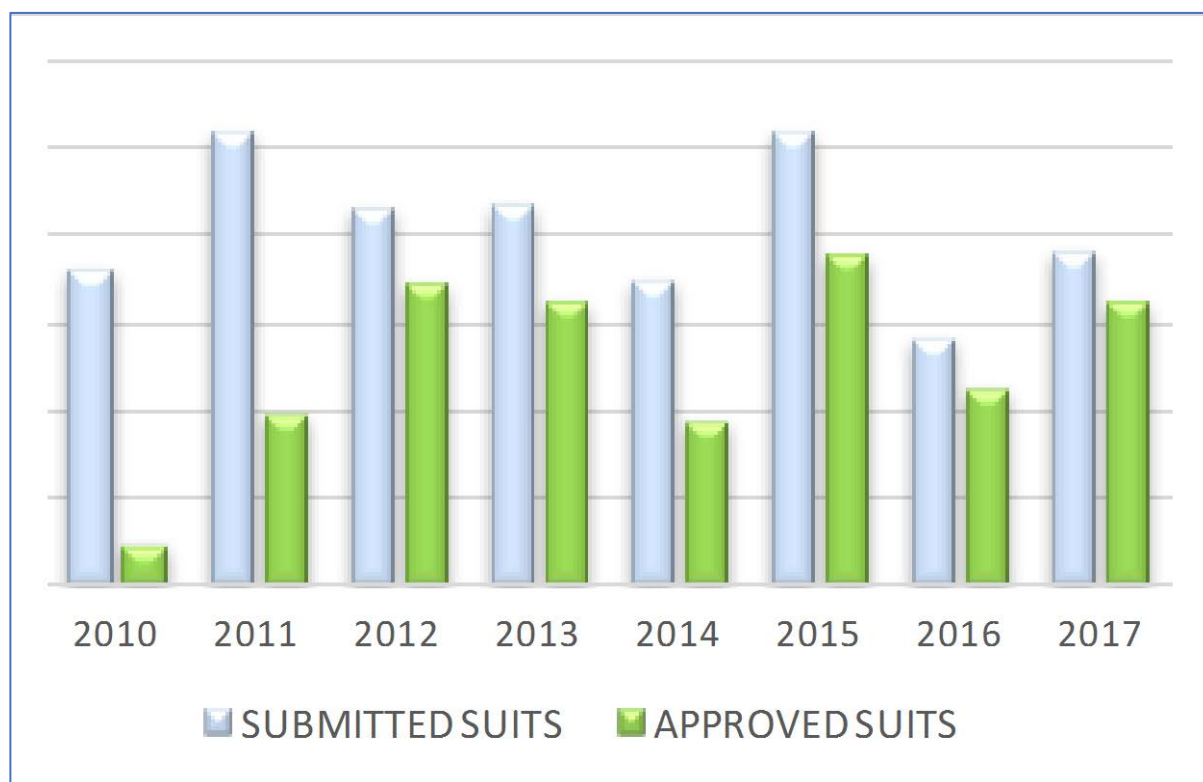
- Information and discussion on main issues from the last submissions – year 2017
- Ruling
 - Coverage and thickness
 - Thickness and tolerances
 - Thickness measurement device
 - “FINA Approved Label” on wetsuits

Q&A
Closing

I. POOLSUITS

1. Submission statistics from 2017

The following chart was shown to illustrate the dynamics in the amount of submitted and approved swimsuits since 2010:



2. Information and discussion on main issues from the last submissions – year 2017

During 2017, the following main issues were observed by the SAC in submissions:

- Excessive number of seams
- Non-functional seams/reinforcement tapes
- Parallel seams with not sufficient distance in-between
- Thickness
- Permeability
- Fabric consistency: permeability non-stretched - fabric versus suit

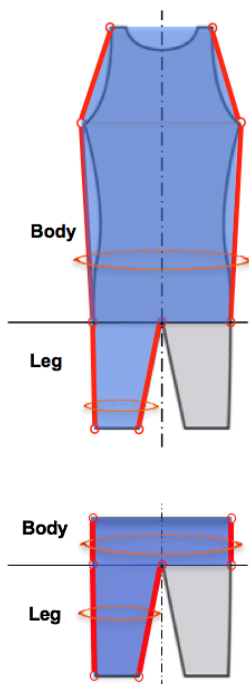
In order to avoid failing the approval due to thickness or permeability of fabrics, the SAC invites manufacturers to use the free pre-avis tests service offered to them twice a year, in April and in November. A communication is sent to all the manufacturers by the FINA Office to announce the forthcoming pre-avis sessions.

3. Seam count

This guideline was first shown at the manufacturers meeting on 11th November 2015.

Seam count

 **Reference line** for vertical seam count



- The “reference line” is always horizontal and can be placed at any position
- The total number of seams is the sum of the full circumflex
- The “edge seams” are not counted
- “Body” and “Leg” are treated separately

FRSA - Number of seams:

Excessive number of seams is prohibited.

Indicative guideline:

For the **upper part** (above the crotch area):

- **9 seams for Men swimsuits**

- **11 seams for Women swimsuits**

For the **lower part** (below the crotch area):

- **4 on each leg for both Men and Women suits**

SAC reserves the possibility to intervene against excessive or non-functional seams.

The seam count approach was presented again to the manufacturers. The SAC also explained how the maximum number of seams was defined initially, i.e. by aligning the number of seams to most of the swimsuit designs submitted during 2015 submissions.

The definition of a seam was reminded to the manufacturers: A seam is considered as functional when it brings two fabrics together. The strip of glue attaching the lining to the shell fabric is considered as an element of the seam, therefore its width is counted in the overall seam count. The edge seams are not counted.

4. Merging seams and relative seam distance

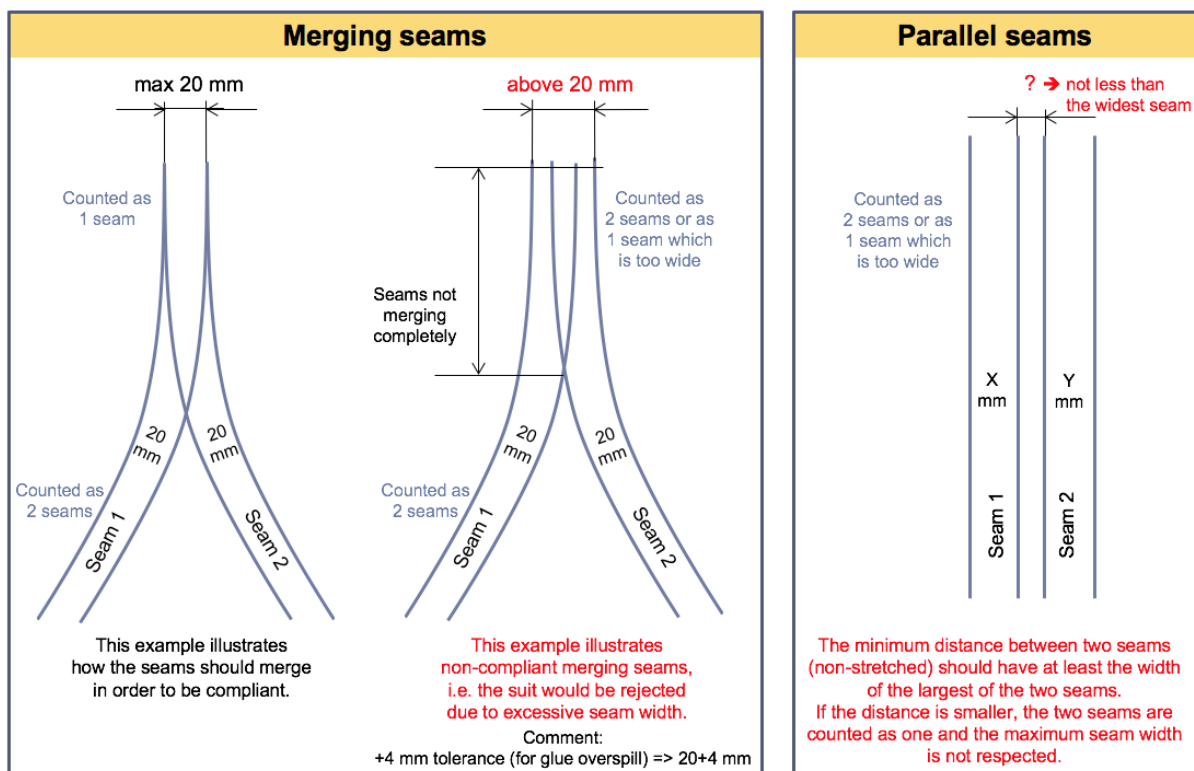
The current rules about merging and combined seams are the following:

FRSA (Regulations valid for swimwear to be approved with effect from January 1, 2017)

Exhibit 5 - Clarification 3: Clarification to clause 4.1.6 “construction”

“(…) When two or more seams are combined or merge, they count as two or more different seams in any area where their combined width is above the maximum width of a seam.”

The illustration below shows how the rules are applied by the SAC:



The principle of both seam types was discussed:

➤ Merging seams -

The merging area should not be excessively extended and the natural curve of merging should be respected. For the seams to be considered as merging, they need to merge completely within a reasonable distance. If two seams do not merge entirely, they are considered as two individual seams.

➤ Parallel seams -

If two seams are running in parallel at a longer surface, the distance between them should be of at least the seam width, e.g. if the seams are 10 mm wide, the distance

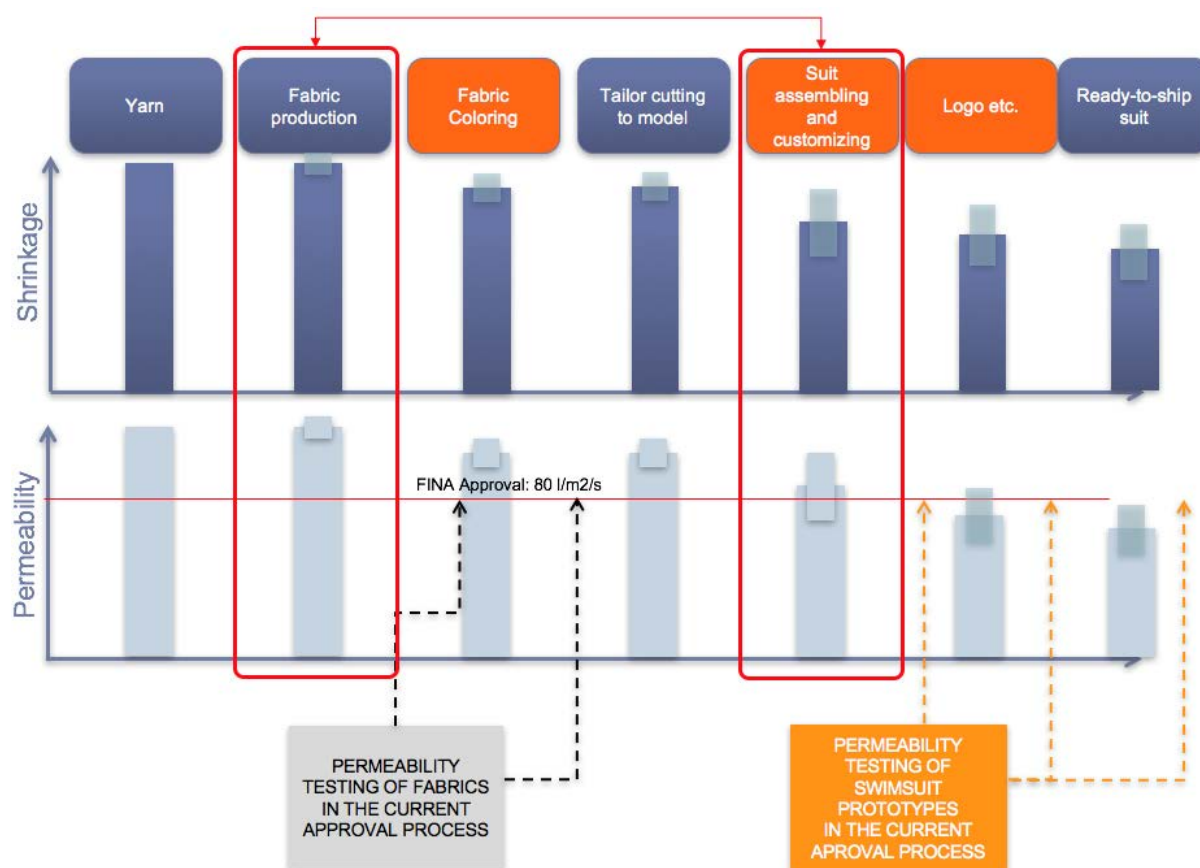
between them should be of at least 10 mm. If the seams do not have the same width, it is the wider seam that serves as reference. Non-stretched width is taken into account.

It was reminded that the control of the seams is made visually by the SAC during the approval process.

5. Fabric consistency: permeability non-stretched - fabric versus suit

During the last submissions, the SAC noticed several cases of swimsuits where the permeability value non-stretched on the swimsuit was significantly lower than the value non-stretched measured on the fabric.

The below schematics give an indication of potential shrinkage of fabrics and a possible reduction of permeability during the manufacturing process.



It was reminded that manufacturers bear the responsibility for the compliance of the finished garments.

As different locations on the suit can get different heat treatments, manufacturers have to make sure that permeability value is respected at any location on the finished suit (except the seams). Furthermore, relevant fabric samples should be sent for approval. The fabrics could, for example, be put through some heat process before being submitted for approval.

6. Permeability non-stretched versus stretched

The matter of measuring permeability on non-stretched fabrics/suits versus stretched was discussed. The current approach is to measure permeability on fabrics both stretched and non-stretched, and to measure permeability non-stretched on the swimsuits. The non-stretched value is used as the screening value (control value) and the stretched value that is used in the approval process (decision value).

However, neither the SAC nor the manufacturers can currently carry out appropriate testing of the finished garments without destroying the samples in order to have a precise control on the actual values.

Clarification: A sample of 160mm x 160mm is required to perform the permeability test. A uniform bidirectional and perpendicular stretch of 25% is applied to the fabric sample, and permeability is measured within a diameter of 25mm in the middle of the stretched sample. If the swimsuits' design does not allow for cutting out a sample of sufficient size to perform the permeability test, i.e. a sample of the combination of materials if the suit is not made of one layer only, the swimsuit cannot be checked in a precise manner.

As the current system is considered as inefficient, a test procedure that creates more level-playing field for all the manufacturers, and that enables a reliable control of the finished garments should be found.

Several solutions were discussed:

- Measuring permeability on non-stretched fabrics –
As there is no correlation in the behaviour of different fabric types (weave types), the absolute non-stretched value does not exist. Consequently, the non-stretched value is not representative and cannot be considered as relevant. However, the non-stretched values are measured and can be used as control/target value.
- Stretching the suit on a manikin –
As there is no control on the size of swimsuits when worn by an athlete, this method is not representative.
- Simulation of the fabric behaviour –
This could be helpful but it would serve as an indication rather than a solution.
- Reducing the stretching area and therefore the sample size required to carry out the permeability test –
This solution was identified as the most promising. Prof. Mansson proposed to have one of his students at Purdue University working on this matter with the objective to identify a new test methodology enabling a reliable permeability test on a smaller fabric sample. The new test methodology should be developed to fit the existing measurement device. Also, various material types' behaviour should be taken into consideration in this study.

Any possible solution will need to have proper study and confirmation, and by no means should affect the concept and parameters of the current approval process.

The progress on this matter shall be discussed again at the next manufacturers meeting.

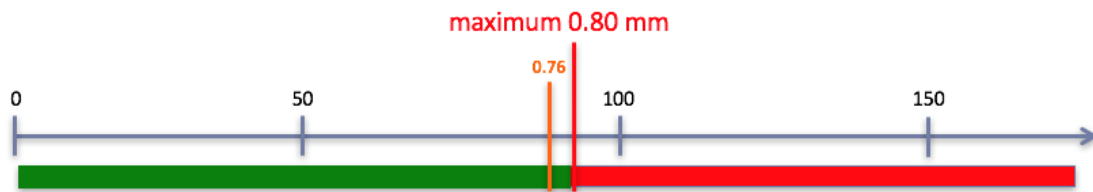
7. “Approval” tolerance margin versus “measurement” tolerance margin

The following illustration of the measurement tolerances was shown as a reminder.

PROPOSITION	REASONING	COMMENTS
Tolerance limit to be adjusted	Clearer understanding of the limit to be respected.	The tolerance margin should not serve to lower the minimum test value but to cover the measurement uncertainty . Tolerances should be maintained for the margin of test checks on effective products.

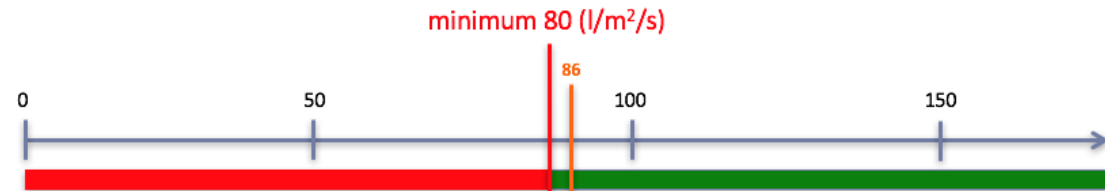
Thickness (below 0.80 mm)

A note is given to manufacturers when the value is close to the limit → within 0.76 - 0.80 mm range



Permeability (above 80 l/m²/s)

A note is given to manufacturers when the value is close to the limit → within 80 - 86 l/m²/s range



II. Follow-up on issues from the last meeting

The following issues from the last meeting were raised:

1. Caps and goggles: “FINA Approved Label”
2. Approval list publication / effective date

1. Caps and goggles: “FINA Approved label”

Two options were considered:

- a) With approval label – the same process as for the swimsuits
- b) Without approval label - caps and goggles being checked in the call room before competition

For now, the current approval remains unchanged.

The following proposals were considered:

- a) Goggles -

Approval could be replaced by specifications (notably dimensions) and requirement of compliance with international standard. An ISO standard is presently under discussion.

A check of maximum dimensions of goggles could be conducted on site. Awaiting the standardization, the current rules for the approval of goggles are maintained.

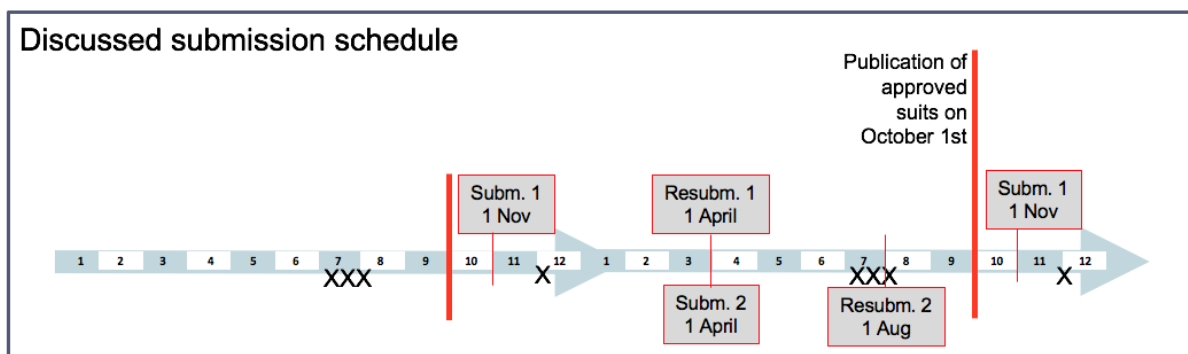
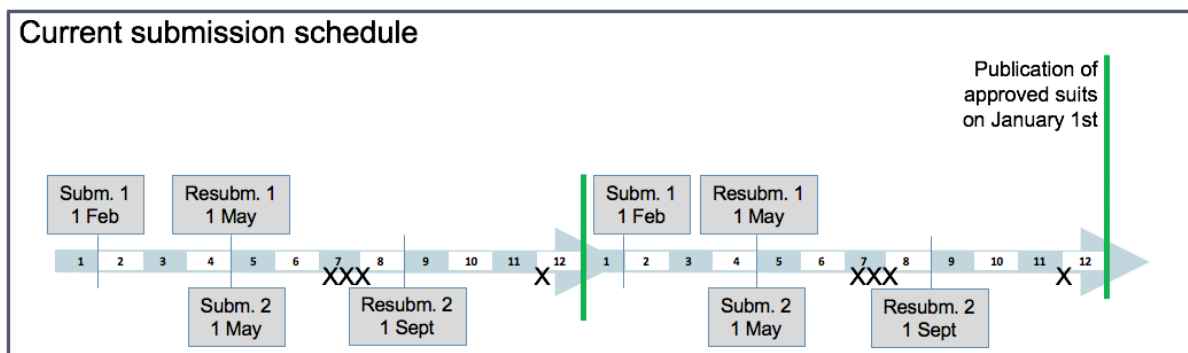
- b) Caps -

It was proposed to introduce a “FINA Approved label” for caps. The mark should be printed on the outside of the cap in a visible colour depending on the colour of the cap. This matter shall be submitted for decision at the next manufacturers meeting.

2. Approval list publication / effective date

A request to change the date of publication of the list of FINA Approved swimwear was brought up by one of the manufacturers. It appears that some athletes would like to be able to use the swimsuits earlier in the season (a few months before January 1st) in order to get accustomed with the new products.

The publication date suggested by the manufacturers is October 1st. The submission dates would have to be modified to fit this change, i.e. November 1st for the first submission period (with resubmission on April 1st) and April 1st for the second submission (with resubmission on August 1st).



X Competition windows

This matter is in any event a change of FRSA and is therefore subject to approval by the FINA Bureau.

A few constraints were discussed:

- As rule changes are put into force according to the effective date (currently January 1st), moving the validity date to another date might affect competitions taking place at the end of the year (which could be an issue, notably in the case of a major change of rules).
- It is important for the manufacturers to have a cut-off date for the new collections. In this respect, the end of the year seems more appropriate.

Given those issues, no consensus on a change was eventually found. For 2018, the submission schedule and the validity date remain unchanged. A proposal shall be submitted to SAC by the manufacturers and discussed again at the next manufacturers meeting.

III. Suggestions of additional points to be addressed

The following additional points were brought up:

1. Zipper at the back of female poolsuits
2. PFCs - Perfluorinated Chemicals
3. Thickness limit increase from 0.8mm to 1.0mm
4. Full-body poolsuits for men

1. Zipper at the back of female poolsuits

This issue was raised to Prof. Mansson by a female athlete. It appears that the female swimsuits are difficult to be put on, therefore a zipper in the back of the suits would greatly improve the comfort.

As major construction changes were being discussed, the discussion was not pursued. It shall be discussed again at the next manufacturers meeting with a proposal from SAC.

2. **PFCs (Perfluorinated Chemicals)** - An issue to come, and an opportunity for our industry to show global responsibility.

PFC is a liquid Teflon widely used to make everyday products more resistant to stains, grease, and water. It is used as a water-repellent treatment in many swimsuits. PFC is a very toxic chemical that breaks down very slowly in the environment. Therefore, it will probably be banned soon.

Some relevant literature:

https://www.niehs.nih.gov/health/materials/perflourinated_chemicals_508.pdf

<https://www.theguardian.com/environment/2016/jan/25/toxic-chemicals-found-in-most-outdoor-gear>

https://www.researchgate.net/publication/278814097_A_Technical_Overview_on_Protective_Clothing_against_Chemical_Hazards

<https://www.wired.com/2016/09/pfc-free-outdoors-gear/>

Conclusion from the meeting:

No decision is needed today. To maintain a proactive open approach, which aims at understanding the issues and correctly acting upon them, when needed is the best way forward.

3. Thickness limit increase from 0.8mm to 1.0mm

A request to increase the thickness limit from 0.8mm to 1.0mm in order to allow knitted fabrics to be approved was made by one of the manufacturers.

As the rules cannot be changed for just one fabric type, the suggestion was not retained.

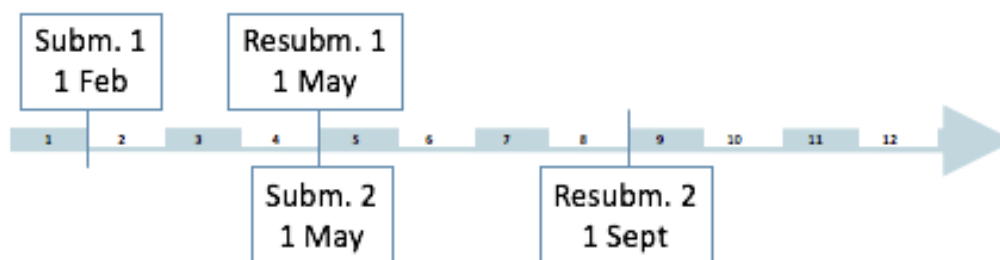
4. Full-body poolsuits for men

This issue is still being discussed but there is no political window open at the moment for such a proposal. This is a political decision and cannot be handled on a technical level, on which the SAC can act.

IV. Submission procedure during 2018 and pre-avis service

Submission schedule during 2018 will remain unchanged.

The submission windows for approval of poolsuits are the following:



Submissions for approval of wetsuits will remain open during the entire year.

It is reminded that manufacturers can use the free pre-avis tests service offered to them twice a year, in April and in November. A communication is sent to all the manufacturers by the FINA Office to announce the forthcoming pre-avis sessions.

V. WETSUITS

1. Information and discussion on main issues from the last submissions – year 2017

During 2017, the following main issues were observed by the SAC in submissions:

- Flatness of material not respected (e.g. ruffles on the forearms)
- Coverage not respected (shoulders not covered)
- Thickness limit not respected (below or above the limit)
- Technical drawing incorrect

Concerning technical drawings, it is reminded that the exact wetsuit design needs to be illustrated on a drawing/sketch submitted during the approval process. A clear indication of the location and the thickness of each panel used in the construction of the wetsuit is required.

It is clarified that the thickness measurements are done on finished garments. Therefore, it is not required to provide material samples.

2. Ruling

- Coverage and thickness

The current rules concerning wetsuits are valid since January 1st, 2017. These rules have been approved at the FINA Bureau meeting in Rio in 2016.

The current rules are:

4.2. Wetsuits for open water swimming competitions with water temperature below 20 °C.

4.2.1. Design (shape)

Wetsuits shall completely cover torso, back, shoulders and knees. They shall not extend beyond the neck, wrists and ankles.

4.2.2. Composition

Wetsuits for both men and women shall be in one piece.

4.2.3. Material (Type)

Material used for wetsuits must have thermal insulation properties (for example foam of polychloroprene (Neoprene) or of polyurethane or other material with similar insulating properties. The material can be multilayered, with non-water permeable layers. The material cannot contain injected gas.

Material without insulating properties cannot be used.

4.2.4. Material (measured values - layers)

Thickness: The thickness of material/s used shall be minimum 3mm and maximum 5mm. Provided the insulating functions are not prejudiced, the Applicant may apply for lowering of the minimum thickness value in limited specific areas, if such is functionally justified to allow free swimmer's movements. A decision in this respect is made at SAC's discretion and cannot be challenged.

Permeability and buoyancy are not measured.

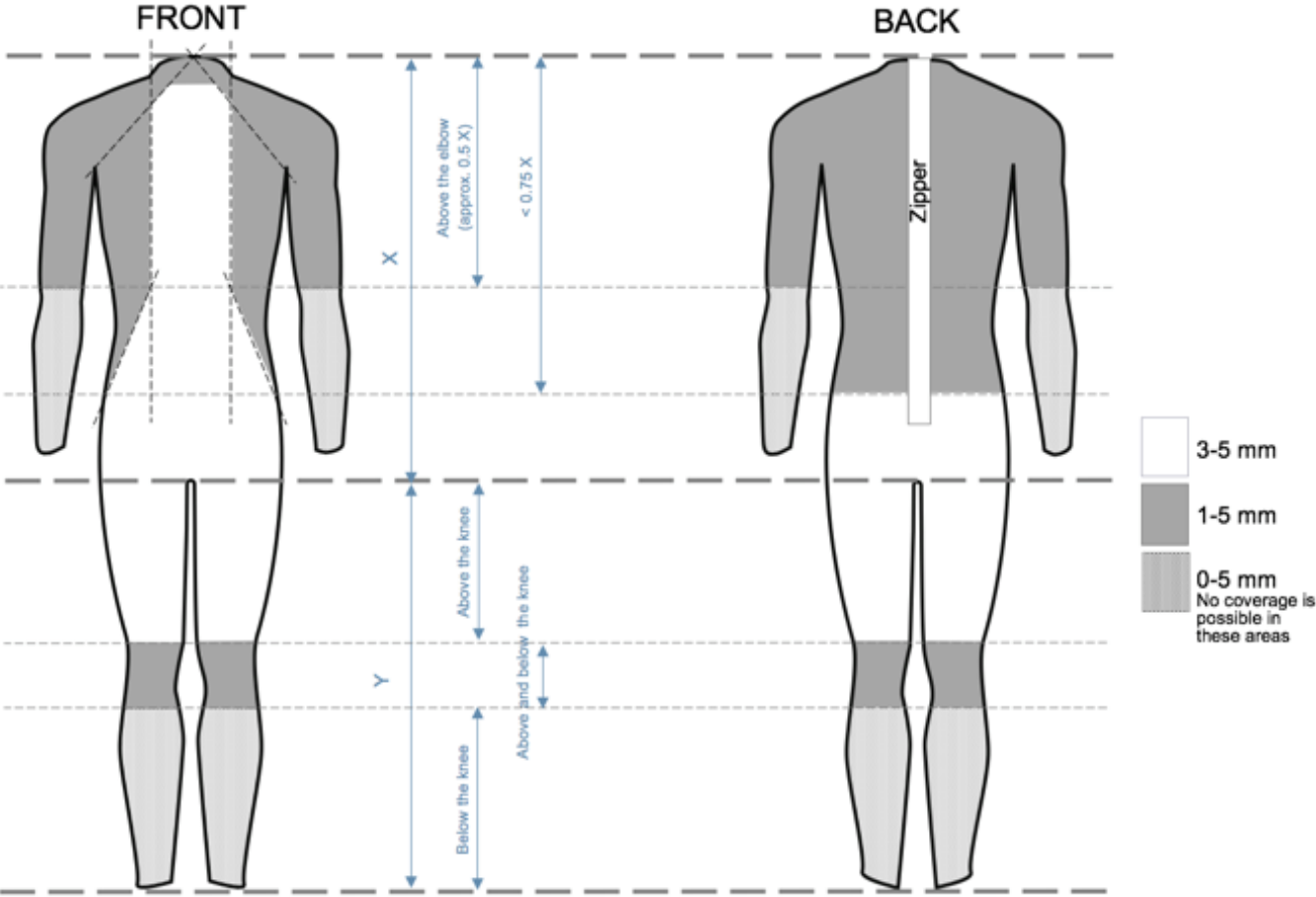
4.2.5. Construction

Zippers or other fastening systems are allowed without specific limitations. They must be functional.

The following suggestions were discussed and received SAC's approval:

- Correction in the text as follows:
4.2.3. Material (Type): The material can be multi-layered, with at least one non-water permeable layer. (pending change of the FRSA will serve a s interpretation)
- Given the additional rigidity due to the zipper in the back of the wetsuit, the material in the back should not be too thick in order to allow free movement of swimmer's arms. It was agreed that thickness of the material in this area can be between 1-5 mm. The zipper area (approximately 6 cm wide) is not subject to the thickness rule – as illustrated below.
- In order to ensure a good thermal insulation, the sleeves have to go down to the elbow – as illustrated below.
- The edges of the wetsuit need to be made of a comfortable well-fitting material.

The following guidelines for coverage and measures were discussed and reached consensus:



➤ Thickness and tolerances

It was explained by the manufacturers that common available wetsuit materials can be purchased by thickness differences of 0.5mm, e.g.: 1.0 / 1.5 / 2.0 / 2.5 / 3.0 / 3.5 / 4.0 / 4.5 / 5.0. There is also a fabrication tolerance of +/-10 % and measurement tolerance of +/- 0.2 mm that should be considered.

The table below gives a guideline to the manufacturers with regards to the purchase of material ensuring that the final thickness on finished garments is compliant:

Chosen Nominal Material thickness (mm)	Fabrication tolerances (+/-%)	Upper / Lower bound (mm)	Measurement tolerances (+/-mm)	Upper-Upper / Lower-Lower bound (mm)	Rounded limit values (mm)	Reached limits
	10		0.2			
For max 5.0mm						
	Upper bound	4.40	Upper/Upper bound	4.60	5.0	Max thickness OK
			Upper/Lower bound	4.20		
4.00						
	Lower bound	3.60	Lower/Upper bound	3.80		
			Lower/Lower bound	3.40		
For min 3.0mm						
	Upper bound	3.85	Upper/Upper bound	4.05		
			Upper/Lower bound	3.65		
3.50						
	Lower bound	3.15	Lower/Upper bound	3.35		
			Lower/Lower bound	2.95	3.0	Min thickness OK
For min 1.0mm						
	Upper bound	1.65	Upper/Upper bound	1.85		
			Upper/Lower bound	1.45		
1.50						
	Lower bound	1.35	Lower/Upper bound	1.55		
			Lower/Lower bound	1.15	1.2	Min thickness OK

The maximum/minimum values used in the approval process of wetsuits remain unchanged.

➤ Thickness measurement device

The following text is suggested for integration in the rules as a clarification related to the thickness measurement for pool and open water suits:

Equipment

The equipment consists of a disk, a reference plate larger to the disk and parallel to it, as well as a test gauge capable of measuring the distance between disk and plate with an accuracy of at least 0.01mm.



General view of the equipment
(value stretched is 116)



Set-up for testing fabrics
(pool swimsuits)
Pressure 1 +/- 0.01 kPa



Set-up for testing insulating
material (wetsuits)
Pressure 10 +/- 2 kPa

THICKNESS MEASUREMENT FOR POOL SWIMSUITS

The total thickness of material(s) is measured. The thickness of layered materials is the total thickness of both layers measured together.

Value

Maximum value: equal or less than 0.8 mm

Minimum value (applicable only when there are different values): equal or superior to 50 % of maximum value

Measurement tolerance*: +/- 0.1mm

Specifications

according to ISO 5084

disk size 100 +/- 1 mm² (diameter 11.3 +/- 0.05 mm)

pressure 1 +/- 0.01 kPa

THICKNESS MEASUREMENT FOR OPEN WATER WETSUITS

Material used for wetsuits must be thermally insulating, for example foam of polychloroprene (Neoprene) or of polyurethane or other material with similar insulating properties.

The total “overall thickness” of material(s) is measured. The “overall thickness” includes all the different layers used in creation of the “material”.

Value

Maximum value: equal or less than 5.00mm

Minimum value: equal or more than the applicable value, depending on the position of the material on the wetsuit.

Measurement tolerance*: +/- 0.5mm

Specifications

according to ASTM D3767 – 03 (2014)

disk diameter: 11.3mm +/- 0.05mm

pressure: 10 +/- 2 kPa

- “FINA Approved Label” on wetsuits

It was agreed that for now competition checks will be done without obligation of having the “FINA Approved Label” on wetsuits.

The next SAC meeting with the manufacturers is planned for November/December 2018. The exact date and place of the meeting will be communicated in due time.

Done by
Jan-Anders Mansson, FINA SAC Chairman,
Marta Klincewicz, AISTS Head of Sport Technology Intelligence