Document WT-60-
Submitted by the experts of JASIC

JASIC revised proposal to the worn tyre wet test precision improvement activities (2024-25 Test campaign) in response to Co-Chair proposal (WT-59-3)

12. July, 2024

JAPAN AUTOMOBILE STANDARDS INTERNATIONALIZATION CENTER

ETRTO and JASIC proposals did not reach to the agreement at IWG WGWT (23. May)

ETRTO / JASIC Test campaign proposals - summary

Preconditions of JASIC proposal	
Target coefficients of calc. formula	**5** **4** (a:μ, temp b:primary, c: secondary, d: MTD) + **1** (water depth)
Theoretically necessary test volume per candidate tyre	**28**
Wet μ test variation (from 2019-21 Test campaign)	**σ = 0.115**
Target Margin of error	**5 %**

	JASIC original proposal	JASIC new proposal	ETRTO new proposal
Number of Candidate tyres	**40** (20 / category)	**40** (20 / category)	**24** (12 / category)
Test volume per candidate tyre	**27 (-1)**	**27 (-1)**	**12 (-16*)**
Target Margin of error	**5 %**	**5 %**	**6.5 %**
Test centers	9	14	12
Test workload (except water depth)	40 tyres / Test center (13 tyres / category)	**26** tyres / Test center (13 tyres / category)	**8** tyres / Test center (4 tyres / category)
	120 tests / Test center (60 tests / category)	**72** tyres (▲48) / Test center (36 tests / category)	**24** tyres / Test center (4 / category)

*** ETRTO new proposal does not meet the JASIC target for necessary test volume per candidate tyre and Margin of error**

JASIC cannot accept ETRTO proposal because test volume is not sufficient for JASIC target.

Therefore JASIC offered to extend the submission timing of Working document (WD) to GRBP

from WD submission to GRBP Feb. 2026 session

to WD submission to GRBP Sep. 2026 session

Hence, a draft coordination (WT-59-3) was submitted by the Co-Chair (EC/France) to IWG WGWT (10. June).

- **Improvements to the initial test method already agreed as of today:**
  - Introduction of the moulded SRTT worn “to remove the buffing variation of the buffed SRTTT worn” (see informal document GRBP 74-42)
  - reduced track friction range and water depth measurement recommendations (see working document for September 2024 GRBP)
- **Further improvements to finalize the wet grip of worn tyres measurement method, prioritizing a more sequential approach:**
  - Establish the objective for the test precision improvement (KPI) in a quantified manner along with the relevant justifications
  - Establish the current test precision following all the recent changes introduced / planned
  - Establish the remaining dispersion sources not solved yet: differences between the water depth seen by the tyre due to the different methods (trailer / vehicle), watering systems (self / external)…
  - If the improvement objective is not reached, which possible alternative approaches could be investigated:
    - Correction formula specific to each test configuration (vehicle + external watering / trailer + self watering / trailer + external watering)
    - Water depth introduction in the correction formula,
    - Restriction of the test watering systems, etc.
- **Work on the safety aspect in parallel: what is the worst acceptable wet grip for worn tyres (based on accidentology) ?**

Summary of Co-Chair draft coordination :

(1) Establish the objective for the test precision improvement (KPI) in a quantified manner along with the relevant justifications.
(2) Establish the current test precision following all the recent changes introduced / planned.
establish the remaining dispersion sources not solved yet:
differences between the water depth seen by the tyre due to the different methods (trailer / vehicle), watering systems (self / external)…
(3) If the improvement objective is not reached, which possible alternative approaches could be investigated:
→ correction formula specific to each test configuration
vehicle + external watering / trailer + self watering / trailer + external watering,
water depth introduction in the correction formula,
(4) The water depth introduction in the correction formula, restriction of the test watering systems, etc.

JASIC took the intention of the Co-Chair proposal is to clarify the targets for improving precision by setting target KPI and to aim for consensus on the stalled test campaign (test volume and schedule) discussion by introducing a step-by-step approach.

The intention of the Co-Chair proposal ：

It is assumed that the intention of the Co-Chair proposal is to

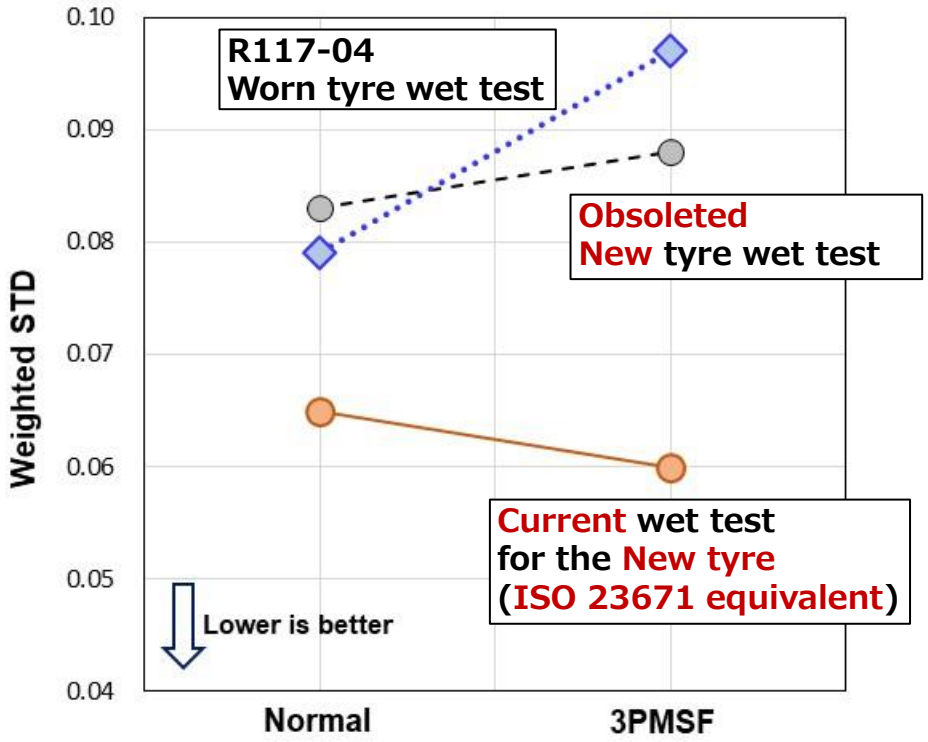
(1) Clarify targets for the precision improvement by setting KPI.
(2) Aim for agreement at the IWG on the stalled test campaign planning (test volume, schedule), by introducing a step-by-step approach.
(3) Maintain the schedule for WD submission to GRBP in Feb. 2026 as written in the ToR.

2. Approaches to the Co-Chair's proposal

<table>
<tr><th></th><th>Co-chair Proposal</th><th>JASIC proposal</th></tr>
<tr><td>(1)</td><td>Establish the objective for the test precision improvement (KPI) in a quantified manner along with the relevant justifications.</td><td>Target is the equivalent precision of new tyre wet grip index assessment (ISO 23671:2021), considering the evolution of the New tyre wet test.</td></tr>
<tr><td>(2)</td><td>Establish the current test precision following all the recent changes introduced / planned. establish the remaining dispersion sources not solved yet.</td><td>Implemented items to data :
<table><tr><td>Molded SRTTworn</td><td>Qualitatively good, however improvement not confirmed from the statistical analysis.</td></tr><tr><td>Test track
Friction range</td><td>Only two test centers out of twelve are out of range
The effectiveness was not verified from the 2019-21 test campaign results</td></tr><tr><td>Water depth measurement method</td><td>No measurement method is rejected</td></tr></table>Essential issue it the insufficient sample size for statistical analysis in 2019-21 test campaign.</td></tr>
<tr><td>(3)</td><td>If the improvement objective is not reached, which possible alternative approaches could be investigated.</td><td>The effect on test precision improvement by item(2) is not sufficient. Therefore, conduct step-by-step evaluation from the high contribution factors on wet performance.
- Water depth and watering method as priority issues.
- Verification by the test water temperature .
Verification with the candidate tyres</td></tr>
<tr><td>(4)</td><td>water depth introduction in the correction formula, restriction of the test watering systems.</td><td>To review the correction formula, the test campaign must be conducted with the proper sample size proposed by JASIC.</td></tr>
</table>

From Contracting Party point of view, another test campaign for improvement of certification test precision is quite important.

Worn tyre wet performance test precision target.



M+S date was omitted due to less data at 2019-21 test campaign.

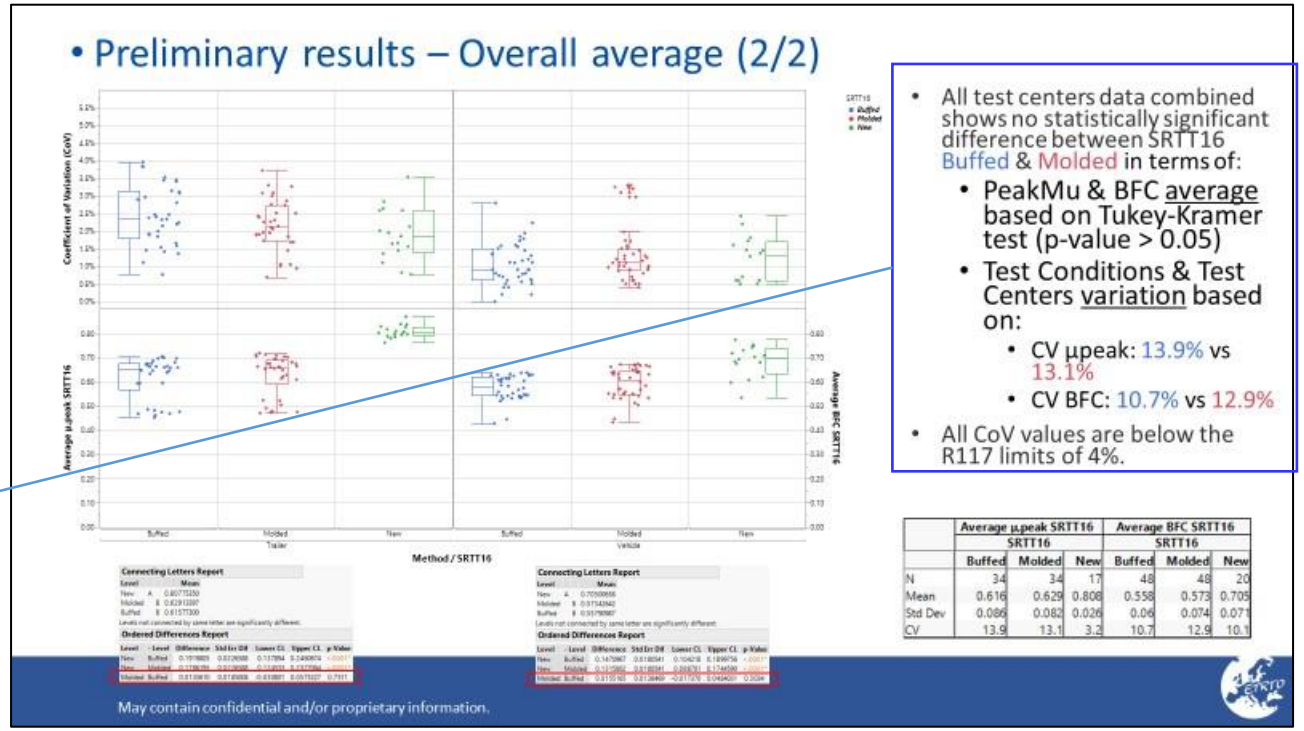
Variation for each test

Tyre category	New tyre wet test		Worn tyre wet test Applied to R117-04
	Obsoleted test	Current (ISO23671 equivalent)	
Normal	0.083	0.065	0.079
3PMSF	0.088	0.060	0.097

Target (KPI) is the precision of the Current R117 wet test. (ISO 23671 equivalent)

① Molded SRTTworn application

- All test centers data combined shows no statistically significant difference between SRTT16 Buffed & Molded in terms of:
  - PeakMu & BFC average based on Tukey-Kramer test (p-value > 0.05)
  - Test Conditions & Test Centers variation based on:
    - CV µpeak: 13.9% vs 13.1%
    - CV BFC: 10.7% vs 12.9%
- All CoV values are below the R117 limits of 4%



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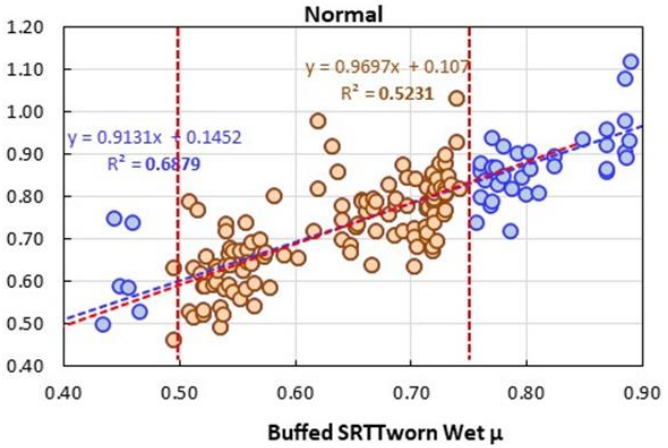
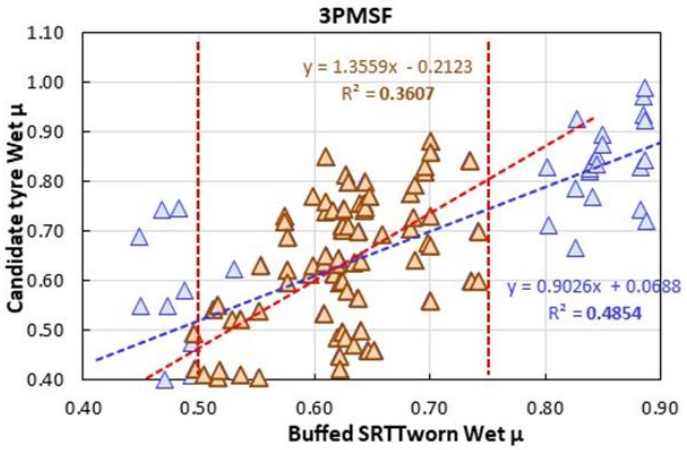
We believe that Molded SRTTworn application can be effective for improvement of test precision but unfortunately no significant statistical difference were found from 2023 test campaign.

② Test track surface friction range

[2019-'21 test campaign, Norma / 3PMSF screening test data]



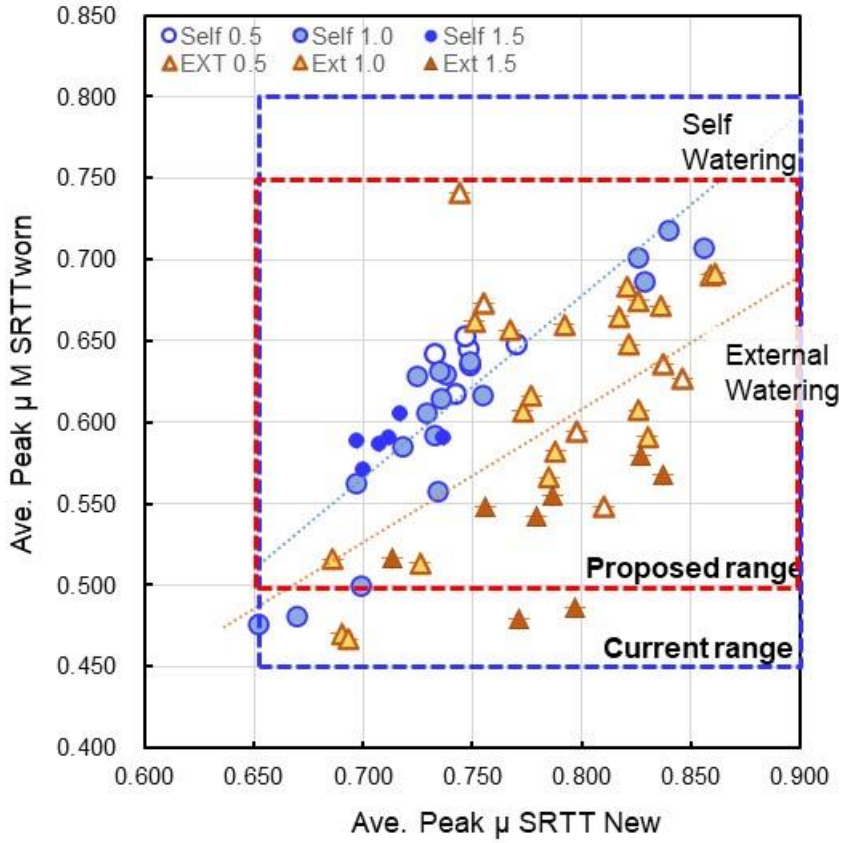


μ Range	Normal	3PMSF
0.45-0.80	R^2=0.68	0.48
0.50-0.75	**0.52**	**0.36**

[2019-21 Test campaign results]

If the friction range is narrowed, however SRTT-Candidate tyre correlations is the same or worse.

[2022 Mold SRTTworn test campaign data]



From the 2023 test campaign result, only 2 test centers were out of the friction range (0.50 - 0.75)

3. JASIC Proposals (3) Revised test campaign proposal to Co-Chair proposals.

In addition to the extension of the test campaign schedule presented at the IWG WGWT on 23 May, JASIC would like to propose a Step by Step study plan.

Candidate tyres: Total 40 specs ;
Normal : 20 specs 3PMSF : 20 specs

Outcome of previous activity is included ;
- only Molded SRTT worn is used
- Wet surface friction range is reduced

Plan A: Schedule extension

Plan B: Step by Step proposals

Phase 1 Target WD submission : to GRBP Feb. 2026 session.

[In case Phase1 result is not meet the target]

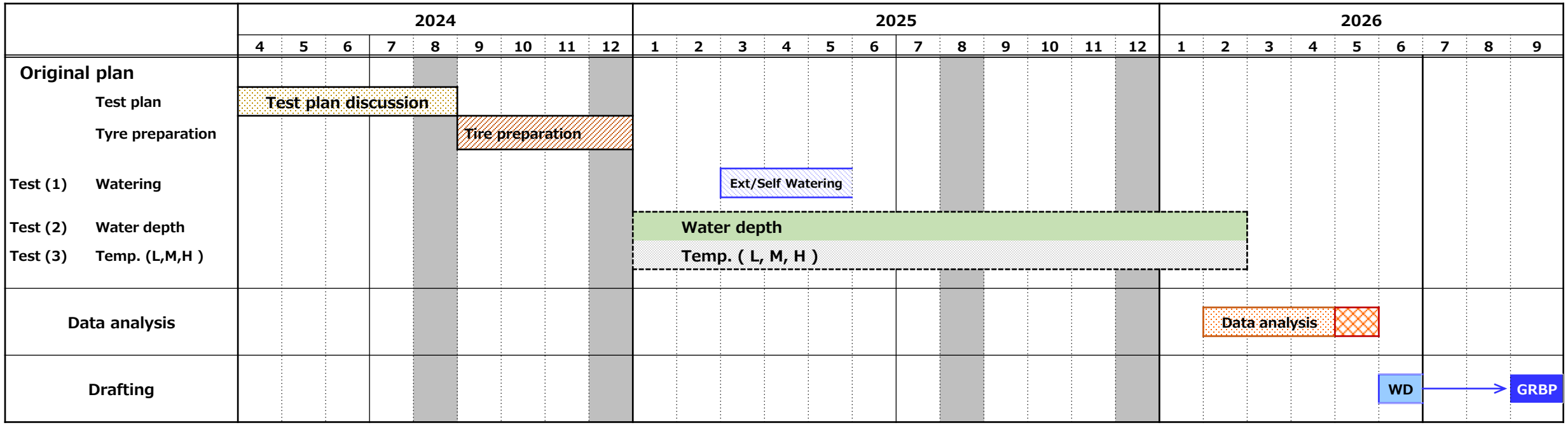
Phase 2 Precision improvement study continues.

Target WD submission : to GRBP Sep. 2026 session.

Both plans reduce testing workload as much as possible.

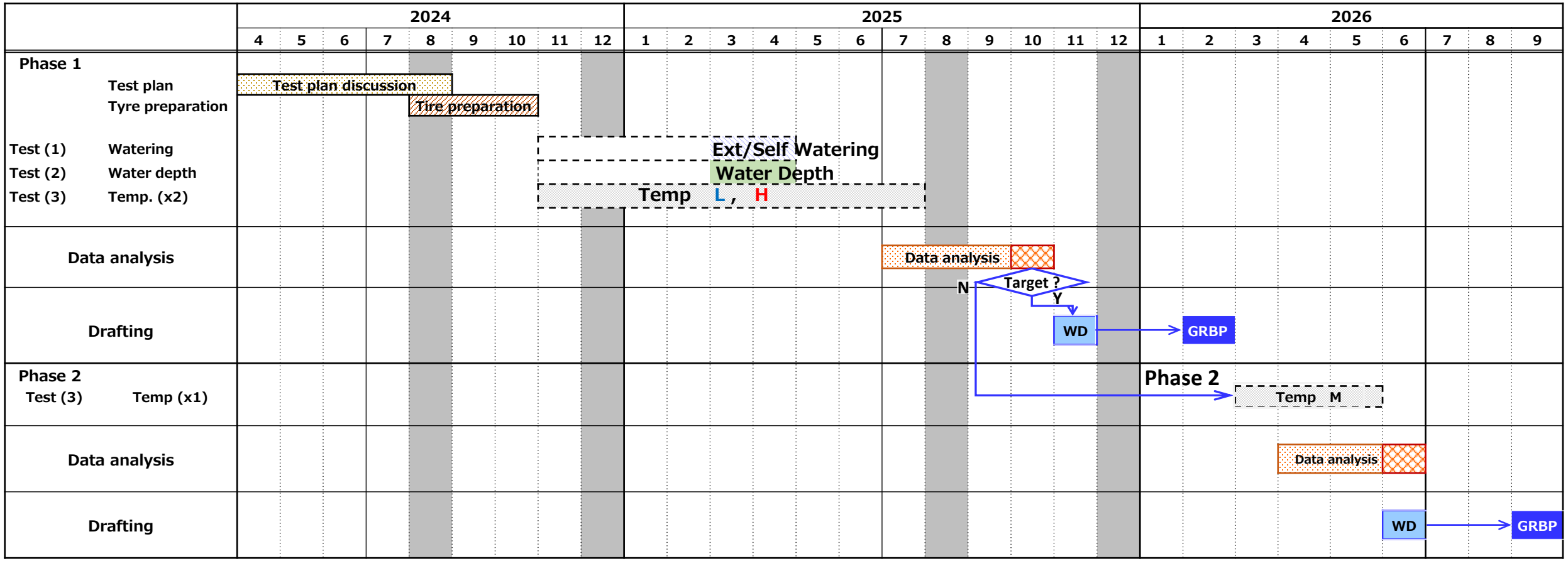
① Schedule

Plan A : Schedule extension



① Schedule

Plan B : Step-by-Step test plan



② Test volume at each test center

	JASIC-1	JASIC-2 JASIC-3 JASIC-4	
Test center	**#5,#6,#8**	**#1, #9, #11, #13, #14, #15**	**#2, #3, #7, #10, #12**
Capability	**Ext-Self / Water depth**	**Water depth (2 conditions)**	**—**
Original test plan	**180**	**156**	**78**
Plan A			
Plan A Schedule extension	**156 (-24)**	**132 (-24)**	**78**
Plan B Step-by-step			
Phase 1 (Ext-Self, WD, 2 temp.)	**130 (-50)**	**106 (-50)**	**52**

If the target is achieved in Phase 1, the study is completed. If not achieved, conduct Phase 2.

Phase 2 (+ 1 Temp.)	52	52	26
Step-by-Step test total	182	158	78

[Tests]

② Test volume at each test center

Plan A : Original plan （Schedule extension）

Test center capability		Ext-Self, Water depth	Water depth	–
Test temp. 3 conditions	Ext-Self	**48** T 12 x WD 2 x Temp 1 x Wat 2		
	Water depth 0.7/1.2	**56** T 28 x WD 2 x Temp 1	**80** T 40 x WD 2 x Temp 1	
	Temp 3 conditions @ 1.2mm @ 1mm	**52** T 26 x WD 1 x Temp **2** (Water depth condition data will be used as another condition)	**52** T 26 x WD 1 x Temp **2** (Water depth condition data will be used as another condition)	**78** T 26 x WD 1 x Temp **3**
		156	**132**	**78**

Test center who can adjust the water depth can reduce the test sets by interpolating 1.0mm condition from 0.7 /1.2mm or substituting the 1.2mm data for 1.0mm in tests at different temp.

② Test volume at each test center

Plan B : Step-by-Step plan

Test center capability		Ext-Self, Water depth	Water depth	–
Phase 1 **Temp. 2 conditions L & H**	Ext-Self	**48** T 12 x WD 2 x Temp 1 x Wat 2		
	Water depth 0.7/1.2	**56** T 28 x WD 2 x Temp 1	**80** T 40 x WD 2 x Temp 1	
	Temp 2 Conditions @ 1.2mm @ 1mm	**26** T 26 x WD 1 x Temp **1** (Water depth condition data will be used as another condition)	**26** T 26 x WD 1 x Temp **1** (Water depth condition data will be used as another condition)	**52** T 26 x WD 1 x Temp **2**
		130	**106**	**52**

Phase 2 **Additional test temp. M**	Temp 1 condition Water depth 0.7/1.2	**52** T 26 x WD **2** x Temp 1	**52** T 26 x WD **2** x Temp 1	
	Temp 1 condition @ 1mm			**26** T 26 x WD 1 x Temp 1
		52	**52**	**26**

Test center who can adjust the water depth can reduce the test sets by interpolating 1.0mm condition from 0.7 /1.2mm or substituting the 1.2mm data for 1.0mm in tests at different temp.

JASIC prepared two scenario with reduction of test volume;

Plan A : Schedule extension

Target WD submission : to GRBP Sep. 2026 session.

Plan B : Step by Step proposals

Phase 1 Target WD submission : to GRBP Feb. 2026 session.

(if the result will not meet KPI, phase 2 is necessary.)

Please give us your feedback in 60th IWG WGWT session.