TABLE 01: FOR CLARIFICATION OF BIDDING DOCUMENTS OF PACKAGE NN1_CD-GT02 (No.03)

(Attached to the Letter No.: 1299 /2025/CC47-BDT dated August 15, 2025)

Sr. No.	Specification No & Clause	Specification Requirement	Bidder's Comment / Clarification Query	Purchaser reply
1.	Vol. 1, Section 4.5.1 – Functional Guarantees Technical Proposal, page 11/25 3.1.Generator	4. Lightning wave impulse withstand voltage (1.2/50 micro-second) 95 kV	It is recommended that Lightning wave impulse withstand voltage shall be 4Un+5kV(60.2kV) per standard IEC60034-15. Please confirm.	Lightning wave Impulse withstand voltage is applied for generator and generator voltage level equipment (IPB, GCB, DS, …) synchroniously so Bidder is requested to comply with Bidding Document
2.	Vol. 1, Section 4.5.1 – Functional Guarantees Technical Proposal, page 11/25 3.1.Generator	5. Power-frequency withstand voltage (in 1 min) 38 kV	It is recommended that the test voltage shall be 2Un+1kV (28.6kV) for 1 min per standard IEC60034-33. Please confirm.	Power-frequency withstand voltage is applied for generator and generator voltage level equipment (IPB, GCB, DS, …) synchroniously so Bidder is requested to comply with Bidding Document
	Vol. 1, Section 4.5.1 – Functional Guarantees Technical Proposal, page 12/25 3.1.Generator	16. Dielectric strength test during 60s for: a. Assembled stator winding 38000V		
3.	Vol. 1, Section 4.5.1 – Functional Guarantees Technical Proposal, page 11/25 3.1.Generator	12. Flywheel effect of generator (GD2)≥ 2100 ton*m2	The two GD2 values are not the same, please clarify which one is correct.	Flywheel effect of generator (GD2) ≥ 2150 ton*m^2. However, The Contractor can offer suitable value/ range, the Contractor shall be submited calculation appendix and formula to Employer.

Sr. No.	Specification No & Clause	Specification Requirement	Bidder's Comment / Clarification Query	Purchaser reply
	Vol. 3, Section 5.2.2 – Special Technical Specifications Chapter 3.5 – Generator, page 04-6, 1.3.2. Main characteristics	9. GD2 of revolving parts: GD2 ≥ 2150 T.m2, The Contractor can offer suitable value/ range, the Contractor shall be submited calculation appendix and formula to Employer;		
4.	Vol. 1, Section 4.5.1 – Functional Guarantees Technical Proposal, page 12/25 3.1.Generator	14. Maximum temperature rises d. Rotor core 70K	It is recommended to cancel this item because there is no measure method in normal design as per international standard. Please confirm.	Bidder is requested to comply with Bidding Document
5.	Vol. 2, Section 5.2.1 Chapter 01 02 – General Technical Specifications on mechanical equipment, page 02-7, 3.5. Special Design Criteria, (2) Shaft critical speed	The first shaft natural critical speed shall exceed the maximum runaway with 20% or more. The shaft natural critical speeds shall be more than 140% or more compared to the rated operating speed, to the line frequency (50Hz).	The two first critical speed values are not the same, please clarify which one is correct.	The critical speed of the complete generating unit shall be at least 15% above the maximum runaway over-speed
	Vol. 3, Section 5.2.2 – Special Technical Specifications Chapter 3.5 – Generator, page 04-9, 1.4.3.3 Critical speed	The critical speed of the complete generating unit shall be at least 15% above the maximum runaway over-speed.		
6.	Vol. 1, Section 4.5.1 – Functional Guarantees Technical Proposal , page 12/25 3.1.19 Short-circuit ratio, saturated not less than 0.8Pu	Short-circuit ratio, saturated not less than 0.8Pu	For Short-circuit ratio, the requirement is different in above two items. Please clarify which one is correct.	Short circuit ratio saturated not less than 1.05. 2% penalties of generator value when saturation short circuit ratio Kc < 1.05. The Employer can reject

Sr. No.	Specification No & Clause	Specification Requirement	Bidder's Comment / Clarification Query	Purchaser reply
	Vol. 3, Section 5.2.2 – Special Technical Specifications Chapter 05 04 – Generator, page 04-12, 1.5.2.4 Short circuit ratio	2% penalties of generator value when saturation short circuit ratio Kc < 1.05. The Employer can reject generator when saturation short circuit ratio Kc<1.		generator when saturation short circuit ratio Kc<1.
7.	Vol. 3, Section 5.2.2 – Special Technical Specifications Chapter 05 04 – Generator, page 04-11, 1.5.1.5 Other guarantees	Short circuit ratio Kc: ± 15% of Kc	Based on the saturation short circuit ratio Kc with tolerance ±15%, as our understanding, the requirement Kc in item 1.5.2.4 shall consider this tolerance, it means measured Kc can be in range 0.89 to 1.2 if the required is 1.05. So, penalties will happen while Kc less than 0.89, rejection will happen while Kc less than 0.8. Please confirm it.	Delete "Short circuit ratio Kc: ± 15% of Kc"
	Vol. 3, Section 5.2.2 – Special Technical Specifications Chapter 05 04 – Generator, page 04-12, 1.5.2.4 Short circuit ratio	2% penalties of generator value when saturation short circuit ratio Kc < 1.05. The Employer can reject generator when saturation short circuit ratio Kc<1.		Short circuit ratio saturated not less than 1.05. 2% penalties of generator value when saturation short circuit ratio Kc < 1.05. The Employer can reject generator when saturation short circuit ratio Kc<1.

8.	Vol. 3, Section 5.2.2 – Special Technical Specifications Chapter 05 04 – Generator, page 04-15 2.3.1.4 Stator winding	The main insulation thickness shall be such that the voltage gradient between inner and outer corona protection shall be not exceed 2.3 kV/mm, at the highest operating voltage, and it shall not be less than 2.5 mm either.	Based on current advanced design for hydro generator, the main insulation thickness shall be such that the voltage gradient between inner and outer corona protection shall be much higher than 2.3 kV/mm at rated voltage. For this project, we propose a voltage stress level as per our design guideline. Because reduction of the voltage stress (e.g., towards the specified 2.3 kV/mm) cannot be recommended, as no relevant and significant improvement of the lifetime of the winding can be achieved in this way. On the contrary, there are several ways that such thick stator main insulation would have an adverse influence on the lifetime of the winding and the machine: • *The added insulation thickness would represent an unnecessary thermal barrier between the stator bar copper and the stator core. This would negatively affect the method of removing heat from the generator.*	Agreed Bidder can use their own insulation technical to design.

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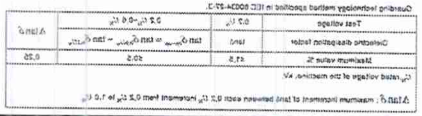
			• *Thicker stator bar insulation would increase the magnetic saturation of the stator teeth. In this way the core losses in the teeth portion of the machine would increase.* Please confirm the supplier can use their own insulation technical to design.	
9.	Vol. 3, Section 5.2.2 – Special Technical Specifications Chapter 05 04 – Generator, page 04-15 2.3.1.4 Stator winding	The insulation loss factor gradient A(tg δ)/(dU/Un) shall not exceed 0.20 % / 20 % of Un in the whole area up to 1.2 x Un for the whole slot portion.	It is recommended that the maximum dielectric dissipation factor Δtg δ shall not exceed 0.25 % per standard IEC60034-33. Please confirm. 	IEC standard in picture is different from IEC standard which Bider refer to. Bidder is requested to comply with Bidding Document.
10.	Vol. 3, Section 5.2.2 – Special Technical Specifications Chapter 05 04 – Generator, page 04-5 1.3.2 Main characteristics	11. Air temperature at cooler outlets (maximum): 40°C;	Air temperature at cooler outlets (maximum): 40°C shall be correct, please confirm.	Maximun air temperature at cooler outlets shall be of 40°C; Vol. 3, Section 5.2.2, Chapter 0504 **Generator**, page 04-22,

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	Vol. 3, Section 5.2.2 – Special Technical Specifications Chapter 05 04 – Generator, page 04-22 2.3.7 Air cooling system	The heat exchange area shall also be such that the difference between the air at the outlet and the water at the inlets is less than 5°C at rated output and normal voltage.		2.3.7 Air cooling system is corrected as following: "The heat exchange area shall also be such that the difference between the ~~air~~ water at the outlet and the water at the inlets is less than 5°C at rated output and normal voltage".
11.	Vol. 3, Section 5.2.2 – Special Technical Specifications Chapter 05 04 – Generator, page 04-13 2.2.2 Oil and air coolers	Oil and air coolers shall be made from stainless material.	There are contradictions in the explanations of material in these two places; please clarify which one is correct.	Oil and air coolers shall be of cupro-nickel and shall have adequate excess capacity to allow for 10% plugging of cooler tubes.
	Vol. 3, Section 5.2.2 – Special Technical Specifications Chapter 05 04 – Generator, page 04-18 2.3.5. Generator thrust and guide bearings	The tubes of the oil coolers shall be of cupro-nickel and shall have adequate excess capacity to allow for 10% plugging of cooler tubes.		
12.	Vol. 3, Section 5.2.2 – Special Technical Specifications Chapter 05 04 – Generator, page 04-27 3.3.3.5 Acceptance tests	(3) Determination of efficiency by the segregated losses method according to IEC publications No. 60034.2 and 60034.2A (on one generator only). The generator lower guide bearing losses and the excitation losses will be taken into account in the generator losses.	Please clarify whether the generator thrust bearing losses (only include the losses due to its own rotating parts of the generator itself) will be considered in its efficiency calculation?	Please refer to to IEC publications No. 60034.2 and 60034.2A.