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TITLE	GENERAL TURBINE BEARING PURCHASE SPECIFICATION		
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**1.0 GENERAL****제작용**

This specification applies to purchasing material, fabrication, machining, babbitting, assembly, inspection, and preservation, painting, packing, shipping and manufacturing process for journal and thrust bearings for turbines. Journal & Thrust bearings are used to support rotor radial and axial direction.

**2.0 SCOPE OF SUPPLY**

Suppliers are responsible to meet the requirements of these specifications. Responsibility also applies to suppliers of furnished or semi-finished parts for the material used in the manufacture of such parts. All bearings should supply with babbit.

**3.0 GENERAL REQUIREMENTS**

3.1 The following references shall be used as required in the general purchase specification (TPS-11105F or TPS-11105D)

3.2 The following references shall be used as required in the general purchase specification for general quality requirement (TPS-TRI001)

**4.0 CODES AND STANDARDS**

- 1) ASTM-E380 Standard for metric practice
- 2) ASTM-B23 Standard specification for white metal bearing alloys
- 3) ASTM-B339s Standard specification for pig Tin
- 4) ASTM-E165 Standard test method for liquid penetrant examination
- 5) PG13S03200 General Manufacture and Test Specification for Tin-Based Babbitt bearings
- 6) SNT-TC-1A Nondestructive testing personnel qualification and certification

Recommended N.T. is SNT-TC-1A

**5.0 QUALIFICATION REQUIREMENTS****5.1 General**

After award of contract, the Contractor shall submit the detailed procedures to be used and schedule for submitting quality control procedures to the Buyer for approval.

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Quality control procedure shall be established in accordance with the requirements of the applicable contract. These procedure shall detail equipment to be used, limiting conditions, acceptance criteria, technique, etc., that will be employed.

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The quality control procedure shall contain administrative procedures necessary to implement the quality assurance program. The procedure shall designate who is responsible for the implementation of quality assurance program and define the authorities and duties of all personnel associated with quality control. The procedure shall detail how all elements affecting the product quality will be processed and shall include the necessary documentation.

5.2 Personal Qualification

Nondestructive inspection operator and evaluator shall be qualified under the PG13S03200 and relative specifications. Welders shall be qualified with specifications which organized for welders.

5.3 Process Qualification

A comprehensive evaluation for first piece qualification (FPQ) shall be required of a new supplier, or when there is a change in plant location or facilities, or a change in sub-supplier(s). FPQ shall, as a minimum, include the following:

## 1) Process Plan – As set forth in this specification

The prime supplier is required to document and submit all First Piece Qualification data required by this specification for the work he and any sub-supplier(s) is (are) supplying. All suppliers utilizing services of a sub-supplier in any of the following areas of manufacturing must obtain prior approval from M&PE, Structural Materials Engineering prior to performing any operations, as follows:

- Raw Material Source(s)
  - Forging, as applicable
  - Heat treating, as applicable
  - Non-destructive testing
- 2) Mechanical Test – Bond strength, minimum of 6000 psi, required in accordance with approved Chalmers Test procedure.
  - 3) Non-Destructive Test Results – Required accordance with the requirements of this specification.
  - 4) Certification of Conformance in accordance with the requirements of this specifications.

Certificate of Test(CT) from the raw material suppliers. The CT's shall be in accordance with the applicable Material Specifications.

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First Piece Qualification Report(FPQ) – The Supplier shall submit three (3) copies of the FPQ documentation to Doosan Power Generation Sourcing Operation for review/approval by Doosan Quality Assurance and Structural Materials Engineering.

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Upon receipt of first piece qualification the part supplier is approved for production of the specifically approved part. The Process Plan used for the FPQ shall be “frozen”, not to be changed without approval of the revised Process Plan by the Purchaser.

## 6.0 PRODUCTION PROCESS REQUIREMENTS

Bearings shall be manufactured in accordance with a documented supplier Frozen Process Plan which shall be made available for approval by the Purchaser, except in areas which are considered proprietary. In such cases, the approval by the Purchaser shall be limited to objective evidence of the existence and documentation of the instructions. The Process Plan shall be identified by the Supplier and such identity shown on the Certification, herein required.

The Supplier shall monitor the actual processing of the material, compare the processing to the Process Plan and report to the Purchaser any variances from the plan. In addition, the Purchaser reserves the right to periodically audit the Supplier’s facilities and practices used for the processing and testing of the material. Such reviews or audits shall not relieve the Supplier from the responsibility of producing a suitable product.

Manufacture Process Plan(MPP) - The Process Plan, suitably identified including revision level and revision date, shall include as a minimum, the following items:

- 1) Raw material sources
- 2) Heat treatment, including process control
- 3) Alkaline cleaning process, including process control
- 4) Acid cleaning process, including process control
- 5) Flux process, including process control
- 6) Tinning process, including process control
- 7) Babbitt process
- 8) Non-destructive testing
- 9) Final inspection system

## 7.0 GUARANTEE AND WARRANTY

7.1 The warranty period shall two(2) years after commercial operating of each bearing or five(5) years after supplying spare parts which comes earlier, provided, however, that any warranty work performed in the warranty period shall be re-warranted for twelve (12) months from completion of such work.

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7.2 Should any defect in material and bearings be found during the warranty period, contractor agrees to dispatch its supervisors and make all necessary or disable alterations, repairs and replacement of defective items of the bearings at contractor's responsibilities and expense.

7.3 If supplier does not correct such defects within a reasonable period, Doosan may proceed to do the work at the Supplier's expense provided that he does so in a reasonable manner and notifies the supplier of his intention so to do.

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7.4 The items to be guaranteed by the vendor are as follows

- 1) Defects due to poor manufacture
- 2) Defects due to poor selection of material
- 3) Defects due to poor workmanship
- 4) Defects due to poor design to the extent defined by the design criterion in the specification, as well as in the referenced codes and standards.
- 5) Defects due to supervisory service
- 6) Defects due to poor specification
- 7) Non-conformance

7.5 In the event that the equipment and/or its components fail to comply with or meet the guarantee, the vendor shall refurbish relevant materials and shall replace the faulty equipment, material and workmanship or faulty performance free of cost to Doosan up to the completion of replacement work.

7.6 Despite DOOSAN's approval of the drawing and specification prepared by Vendor, if the "Work" fails to meet the requirements of "design or engineering" including "design or engineering warranty" stated in MPS, Vendor shall make correction to the "Work", at Vendor's expense, to the extent that the "Work" fully satisfies such requirements.

## 8.0 SUBMITTAL DOCUMENTS

The supplier shall paper, submit and control the list of submittal drawings and data in accordance with "Drawing and Data submittal requirements." The list shall include part list with dimensions and material, submittal propose, delivery schedule, quantity and type etc.

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Document which submitted by the contractor will be reviewed by the purchaser within three(3) weeks after receipt the order.

Following documents at the minimum, but not to limit, shall be submitted to purchaser and additional documents shall also be provided when purchaser requires.

### 제작용

Table.1 Listed document should be submitted before shown schedule.

No.	Document	Purpose		Date	Remarks
		Approval	Q'ty		
1	ITP (Inspection & Test Plan)	0	1	7 Days before fabrication	
2	Manufacture schedule	0	1	7 Days before fabrication	
3	Mill sheet	0	1	With shipping	Raw Material
4	Heat treatment report for base (back) metal	0	1	3 Days before machining	
5	Babbitt chemical composition and mechanical specifications	0	1	7 Days before babbitting	
6	UT Test for Babbitt bonding and bearing casing	0	1	1 Day before pad cutting	
7	PT Test for Babbitt bonding	0	1	3Days after bearing pad final machining	
8	Material Test Report (MTR) for sub items	0	1	3Days after bearing pad final machining	
9	MPP for each process of bearing and sub-items.	0	1	3Days after bearing pad final machining	
10	Flatness & Taper check sheet for thrust bearing, if supply thrust bearing	0	1	3Days after bearing pad final machining	
11	Dimension check sheet including part list	0	1	7Days after bearing pad final machining	
12	Certificate of Compliance for all commercial items	0	1	Before shipping	

- Korean supplier should refer to Attachment.1

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**9.0 PACKING AND SHIPMENT****9.1 General**

Release for shipment shall not relieve the contractor of the responsibility for correcting any nonconformance which may exist after the materials and bearings are released for shipment. Contractor shall pack the equipment in such manner as to be reasonably required to prevent damage to or deterioration of the bearings, while transported or stored, under the foreseeable circumstances. The contractor shall also put the mark on the package in accordance with the instructions of the purchaser.

**9.2 Preservation**

All bearings shall be protected during manufacture and shipment, as suitable preservation procedure.

**9.3 Packing**

Each bearing, or separate part thereof, shall be suitably wrapped with a moisture barrier material and boxed, crated or palleted for shipment, each part within a common package must be properly separated to prevent damage during shipment.

**9.4 Marking**

Each shipping/storage container shall be marked with the following information:

- 1) Part Drawing Number, including revision letter or number (as applicable)
- 2) Manufacturers Name of Trademark
- 3) Purchase Order Number
- 4) Any additional requirements set forth in the Purchase Order documents

The required information shall be legibly marked on a “permanent” (metal or plastic) type label which must be firmly attached to the container in a location which is both readily accessible and protected from accidental damage during handling.

**10.0 CONFIDENTIALITY**

- 1) In here, (A) means Contractor and (B) means Provider.
- 2) (B) without (A)'s prior written consent shall not disclose to a third party any information such as data, technical information, tangible/intangible know-how provided by (A) or technical process, manufacturing technology obtained based on (A)'s technical support and provision thereof ( the “Confidential Information”). (B) may provide the Confidential

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Information to its employees or agents provided only that they need to know such Confidential Information in connection to (B)'s performance of this Contract and in such case (B) shall be responsible to cause the said employees or agents to enter the same confidentiality agreement as this and be liable for any loss or damages incurred by breach thereof by the said employees or agents.

- 3) (B) shall not use the Confidential information provided by (A) for any purpose other than performance of its obligations under the Contract without (A)'s prior written consent.
- 4) (B) is shall not make and keep any copy of the Confidential Information in any form, whether electronic or printed for any purposes other than performance of its obligations under the Contract without (A)'s prior written consent. Upon termination or expiration of the Contract or upon (A)'s demand, whichever comes first, (B) shall immediately suspend the use of the Confidential Information, and shall return all the Confidential Information or dispose of the said Confidential Information as requested by (A). Within one (1) month of return or disposal of the Confidential Information, (B) shall submit to (A) a confirmation notice signed by its official representative stating that all Confidential Information has been duly returned or disposed of.
- 5) (B) shall be fully liable for all loss or damages suffered by (A) if caused by (B)'s use of the Confidential Information without (A)'s prior written consent.
- 6) If there is any profits or enrichment unjustly obtained by (B) using the Confidential Information without (A)'s prior written consent, (B) shall return to (A) all such profits or enrichment.
- 7) As per this clause, (B)'s obligations under this Article shall take effect from the date when the Confidential Information is disclosed to (B) and shall remain effective until 5 years after the termination or expiration of this Contract.
- 8) In the event that any party admits that it has violated this clause or that such party receives a written notification from other party of violation of its obligations under the Contract and fails to correct such violation within 30 days from the date of the notice received, the other party may terminate this Contract by sending a written notice as such, in addition to other remedies permitted under the law or in view of principle of equity.

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## 11.0 DEVIATION

If any, deviations should be given on the first page of bidder's proposal specification. When disagreements occur, follow contractor's decision.

Bidder shall comply with all technical requirements of MPS with the appendices but deviations (technical data) which have been written in deviation sheets with the attached foam.

Bidder's deviations(technical data) which have not been written in deviation sheet are not valid,  
even if written in bidder's technical data

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- Korean supplier should follow as below

No.	Document	자료요구 목적	권리구속 관계	인도일/인도방법	자료제공대가여부/ 방법
1	ITP (Inspection & Test Plan)	품질관리	협력사	7 Days before fabrication	대가없음
2	Manufacture schedule	공정관리	협력사	7 Days before fabrication	대가없음
3	Mill sheet	품질관리	협력사	With shipping	대가없음
4	Heat treatment report for base (back) metal	품질관리	협력사	3 Days before machining	대가없음
5	Babbitt chemical composition and mechanical specifications	고객승인	협력사	7 Days before babbitting	대가없음
6	UT Test for Babbitt bonding and bearing casing	고객승인	협력사	1 Day before pad cutting	대가없음
7	PT Test for Babbitt bonding	고객승인	협력사	3Days after bearing pad final machining	대가없음
8	Material Test Report (MTR) for sub items	품질관리	협력사	3Days after bearing pad final machining	대가없음
9	MPP for each process of bearing and sub-items.	품질관리	협력사	3Days after bearing pad final machining	대가없음
10	Flatness & Taper check sheet for thrust bearing, if supply thrust bearing	품질관리	협력사	3Days after bearing pad final machining	대가없음
11	Dimension check sheet including part list	품질관리	협력사	7Days after bearing pad final machining	대가없음
12	Certificate of Compliance for all commercial items	품질관리	협력사	Before shipping	대가없음

[권리구속 관계] 본 MPS로 인한 계약 상대방이 선정되는 경우, 필요에 따라 선정회사와 협의하여 대사  
정할 수 있다.

[대가] ‘비밀유지에 관한 사항’에서 정한 바와 같이 회사는 선정되지 못한 공급자로부터 수령한  
기술자료는 본 계약 상대방 선정 후 즉시 폐기하거나 반환하므로 해당 공급자에게는 원칙적으로

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별도의 대가를 지급하지 않는다. 다만, 별도의 대가가 필요한 기술자료가 있다면 (기술자료 제출 전)  
적정한 대가 등 관련 의견을 회사에 미리 전달하여 협의한다.

[비밀유지에 대한 사항] 회사는 원칙적으로 위에 표시된 모든 기술자료에 대하여 비밀로서 보안 및  
유지의무를 부담하고 선량한 관리자로서 주의의무를 기울이며 이에 따라, 상대방의 사전 서면승낙 없이  
비밀정보를 포함하여 상호 제공한 정보나 자료를 공표하거나 제 3자에게 알려서는 아니된다.”

회사는 본 MPS 로 인한 계약 상대방으로 선정되자 못한 공급자로부터 수령한 기술자료는 계약 상대방  
선정 후 즉시 폐기하거나 반환한다.

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