



승인 (Approved)		<h1>Technique Sheet</h1>	JW-DG-ITP-UT25-KPCM-IAI-002	Rev. 0	
작성 (Prepared)			Spec No.	AMS STD 2154E	
제목(Title)	Ultrasonic Inspection(Contact A-Scan) of Forged Dome		관리구분 Control Category	<input checked="" type="checkbox"/> 관리본 Controlled Copy <input type="checkbox"/> 비관리본 Uncontrolled Copy	
	JUNG WON E&I CO., LTD		Sheet	1 of 4	

## 1. Standard(시편)

No	Standard No	Standard Name	Standard Configuration
1	R/B-KPCM-Q-47	RSB Straight/Angle	

## 2. Part to be inspected(검사 대상품)

No	Part No	Part Name	Part Configuration/Material
1	FB-25104-421190	Forged Dome	

## 3. Inspection Technique(검사 테크닉)

Type II - Contact

## 4. Equipment(장비)

## [1] Ultrasonic Unit(장비)

Model No. (S/N)	Frequency Range	Specifications			Manufacturer
		Display	Digital gain	Options	
USM36 (15087558)	0.5 ~ 20 MHz	7 inches 800 x 480 pixels	Dynamic range 110 dB adjustable in steps of 0.2 dB	TGC, DAC, DGS Backwall Echo Attenuation	GE

## [2] Transducer(탐촉자)

Type	Frequency	TR Size	Element	P/N	Serial No	Manufacturer
MSEB4	4 MHz	3.5 x 10 mm	1	54304		GE
W-120 45°	2.25 MHz	0.125 inch	1	TBD		Krautkramer
A5015	5 MHz	0.187x0.187 inch	1	1226749		OLYMPUS

## [3] Couplant(접촉 매질)

SAE 30 motor oil according to SAE J300

## 5. Material to be inspected(재질) : Ti-6-4 ELI (SAE AMS 4930)

## 6. Inspection Area(검사 부위) : Whole surface of the part(검사 대상품 전면)

## 7. Inspection(검사)

If an approved procedure or customer specification exists separately, it must be prepared before inspection, and the contents of the TDS must be implemented in the prescribed order.  
승인된 절차서나 고객 사양이 별도 존재한다면 검사전에 구비되어야 하고  
TDS의 내용은 규정된 순서로 시행되어야 한다.

### [1] Part Preparation(파트 준비)

- (1) Check part surface is free from loose, heavy, or uneven scale, machining or grinding particles, or other loose foreign matter.  
검사 대상면에 녹, 가공 또는 연마 부서러기, 또는 기타 외부 물질이 있는지 확인하다.
- (2) Check part surface texture is as required to meet near surface resolution requirement and not rougher than 250  $\mu$ in.  
검사 대상면 거칠기(250 $\mu$ in 이하)가 표면 해상건 요건을 만족하는지 확인한다.
- (3) Clean parts before inspection  
검사 전에 검사 대상면을 깨끗이 한다.
- (4) Check part surface is free from any local grinding depression present that interfere with the inspection.  
검사에 방해가 되는 연마 자국이 있는지 검사 대상면을 확인한다.
- (5) Visually inspect the part or material for cracks, burrs, nicks, gouges, raised areas, irregular machining and tool tears prior to inspection. Any surface defects that will impair inspection shall be removed prior to inspection. If removal is not possible or not practicable, mark such discrepancies on the part for later used during evaluation of indications.  
검사전에 검사 대상면에 크랙, 버, 닉, 고얼즈, 솟은 부위, 불규칙 가공 그리고 치구 부스러기가 있는지 육안 확인한다. 검사에 방해를 줄 수 있는 모든 표면 결함은 제거해야 한다. 제거가 불가능할 경우, 검사 대상면에 표시하여 이후 판독시에 참조한다.

### [2] Standardization

- (1) Technique (Straight)- Use reference block(FBH  $\Phi$  1.2mm) to set the echo height to 80% FSH and draw the TCG. Adjust by adding 7dB to the set sensitivity according to Figure 3.
- (2) Technique (Angle)- Use the reference block(FBH  $\Phi$  1.2mm) to adjust the sensitivity to 80% F.S.H and draw the TCG. Adjust by adding 7dB to the set sensitivity according to Figure 3.
- (3) If required, 6 dB is added for in order that defects can more easily be detected.

### [4] Inspection

- (1) Scan Plan for Bar Stock and Solid Rounds--- Shall be performed as described in Figure 1.
- (2) Scanning must be done in two perpendicular directions, with a single, dual element or angle search unit.
- (3) Scan Plan for Forged Dome-Straight Beam scan from all accessible contact surfaces.
- (4) The scanning speed shall be equal to or less than the speed used during calibration.

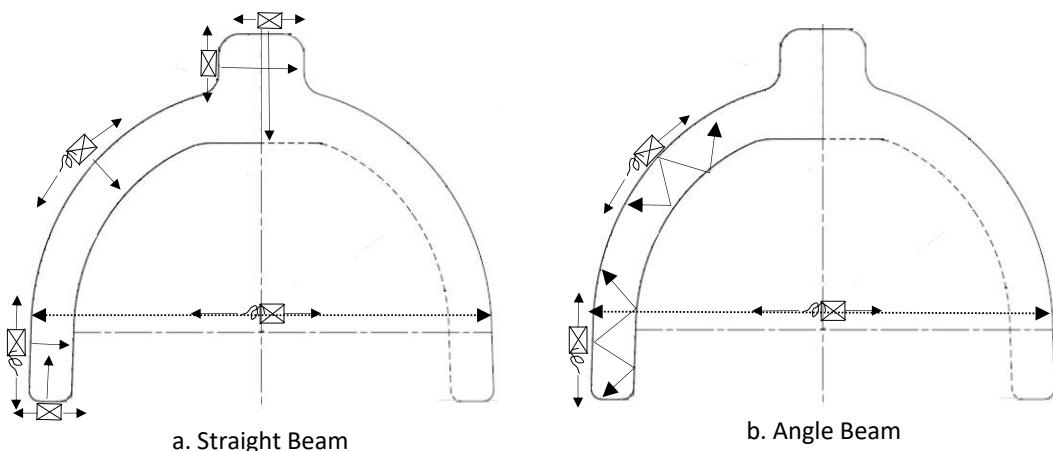


Figure 1. Scan Plan for Forged Dome

## 8. Evaluation and Acceptance Criteria(판독 및 합부 기준)

- [1] Evaluation of indications will be carried out with the gain (attenuation) setting at the calibration reference level.
- [2] Acceptance Criteria(합부 기준)

(1) Refer to below and applicable DWG and AMS-STD-2154

도면 또는 AMS STD 2154 참조한다.

Class	Single Discontinuity Response 1/2/	Multiple Discontinuities 2/ 5/	Linear Discontinuity-Length and Response 3/	Loss of Back Reflection - percent 4/
AA	3/64	2/64	1/2 inch-2/64 response	50

- 1/ Any discontinuity with an indication greater than the response from a reference flat-bottom hole or equivalent notch at the estimated discontinuity depth of the size given (inches diameter) is not acceptable.  
결함 예상 깊이와 동일한 깊이의 시편 평저공 또는 노치에서 발생하는 신호보다 큰 신호의 불연속은 모두 불합격이다.
- 2/ Multiple discontinuities with indications greater than the response from a reference flat-bottom hole or equivalent notch at the estimated discontinuity depth of the size given (inches diameter) are not acceptable if the centers of any two of these discontinuities are less than 1 inch apart.  
결함 예상 깊이와 동일한 깊이의 시편 평저공 또는 노치에서 발생하는 신호보다 큰 신호의 복수 불연속은 불연속 간 간격이 1인치 이하일때 모두 불합격이다.
- 3/ Any discontinuity longer than the length given with indications greater than the response given (flat-bottom hole or equivalent notch response) is not acceptable. Not applicable to class C.  
시편 평저공 또는 동일한 노치에서 발생하는 신호보다 크면서 길이가 더 긴 불연속은 모두 불합격이다. 등급 C 에는 적용되지 않음
- 4/ Loss of back reflection greater than the % given, when compared to non-defective material in a similar or like part, is not acceptable when this loss of back reflection is accompanied by an increase or decrease in noise signal (at least double the normal background noise signal) between the front and back surface. Applicable only to straight beam tests.  
후면 신호의 감쇄가 표면-후면신호 사이의 노이즈 신호 증가 또는 감소( 최소 2배 이상)할 때 시편대비 후면 신호의 크기가 50% 이상 손실되면 불합격이다.
- 5/ When inspecting titanium to class AA, the multiple discontinuity separation shall be 1/4inch.  
등급 AA 에 따라서 타이타늄을 검사할 때, 결함들간 거리는 1/4인치 떨어져 있어야 한다.

## 9. Marking and Post Inspection(표식 및 검사 후 처리)

Refer to KPCM-WIP-NC-N01 5.4.17 and 5.6.1 for marking and post inspection action.

Move part inspected to the next process after removing couplant from the surface.

표식과 검사 후 처리는 KPCM-WIP-NC-N01 5.4.17 과 5.6.1 항을 참조한다.

표면의 접촉매질을 제거하여 다음 공정으로 이동시킨다.

## 10. Drawing of Standard

### [1] R/B-KPCM-Q-47

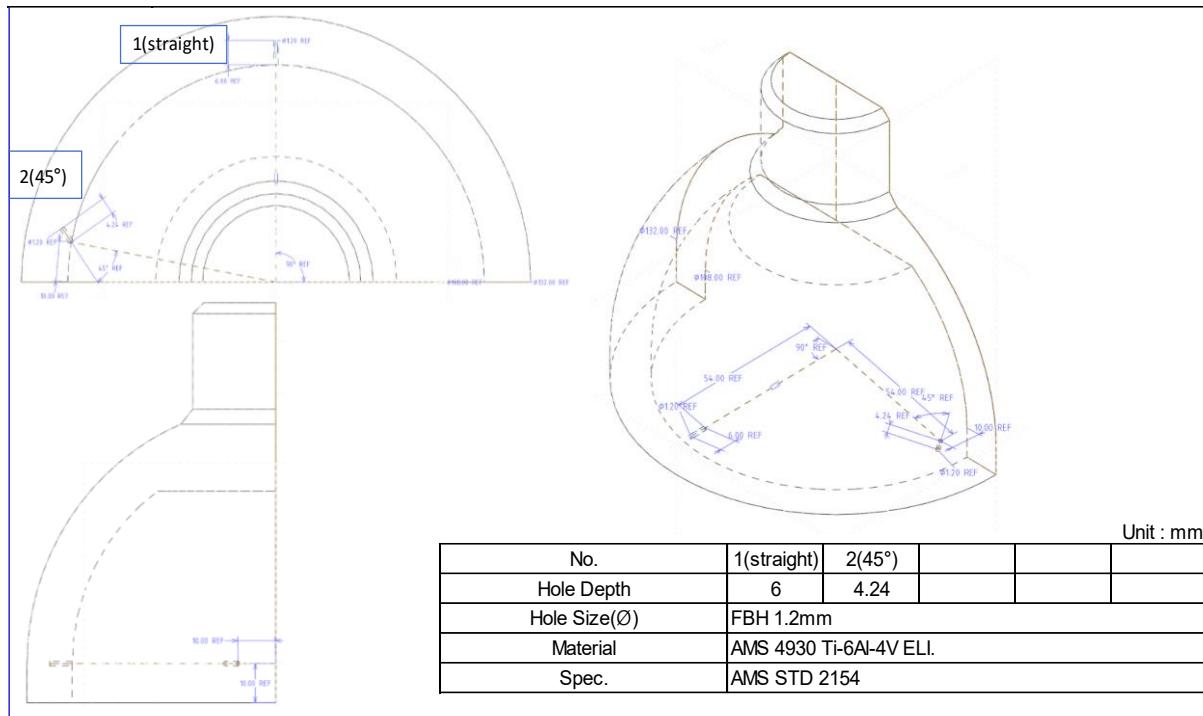


Figure 2. Reference Block : RB-KPCM-Q-36

To FBH Diameter		1/64	2/64	3/64	4/64	5/64	6/64	8/64
1/64	<b>0</b>	+12	+20	+24	+28	+31	+36	
2/64	-12	<b>0</b>	+7	+12	+16	+19	+24	
3/64	-20	-7	<b>0</b>	+5	+9	+12	+17	
4/64	-24	-12	-5	<b>0</b>	+4	+7	+12	
5/64	-28	-16	-9	-4	<b>0</b>	+3	+8	
6/64	-31	-19	-12	-7	-3	<b>0</b>	+5	
8/64	-36	-24	-17	-12	-8	-5	<b>0</b>	

dB change - dB =  $20 \cdot \log(A_1/A_2)$  where A1 and A2 are the areas of the respective FBHs.

Figure 3. dB conversion for FBH size