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FPT-63-27 - DIMENSIONAL STABILITY,
MODEL 1807 SHAPE CASTINGS

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FPT-63-27 - DIMENSIONAL STABILITY,
MODEL 1807 SHAPE CASTINGS

By

C. M. Walker
Weapons Process Engineering
Research and Engineering
Chemical Processing Department

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

October 18, 1963

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October 18, 1963

FABRICATION PROCESS TESTTest No. FPT-63-27 - Dimensional Stability, Model 1807 Shape CastingsFunctional Area: RMC Line Foundry - Storage Hood HC-22SR**DECLASSIFIED**Objective:

The objective of this test is to reduce the quantity of plutonium inventory material committed to RMC Line processing.

Description of Test:

Due to the sluggish transformation rates of metastable phases, unalloyed plutonium continues to shrink after casting. A pre-machining holding period, of sufficient duration, is therefore required to promote a condition of finished part dimensional stability. The results of this test will determine the holding period that is commensurate with both this requirement for stability and an optimum material inventory level.

Four shortened storage periods will be evaluated (9, 8, 7 and 6 days) and related to the results obtained for parts stored for the standard 10 day period. Evaluation will be based upon dimensional measurements obtained after exposure to the part evaluation cycle described in HW-72296, Section 701.3.4. All processing of involved parts will be in accordance with standard procedures for part fabrication and inspection.

Test Procedure:

Phase I - Evaluation of parts stored eight days prior to machining-to be run concurrently with phase two.

1. One casting per day will be selected per the schedule shown in attachment A. Foundry procedure shall be in accordance with standard practice for shape casting.
2. Cold treat per standard procedure and transfer to storage hood.
3. Remove part from the storage hood after an eight day storage period.
4. Machine castings in accordance with standard procedure. Only parts that contain no visible evidence of defect conditions shall be submitted for radiographic and dimensional inspection. Those parts that are rejected during machining shall be replaced by a part cast on the same day.
5. Hold parts until an accumulated time of ten days after shape casting has been reached, and then re-gage (Sheffield).
6. Submit all parts for dimensional stability analysis (PEC) per HW-72296, Section 701.3.4.

FABRICATION PROCESS TEST
(Continued)

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Phase II - Evaluation of parts stored seven days prior to machining to be run concurrently with Phase I.

1. Process as outlined in Phase I, except that parts shall be stored seven days prior to machining.

Phase III - Evaluation of parts stored nine days prior to machining.

1. Process as outlined in Phase I, except that parts shall be stored nine days prior to machining. This phase will be accomplished only if Phase I and II test results are unsatisfactory.

Phase IV - Evaluation of parts stored six days prior to machining.

1. Process as outlined in Phase I, except that parts shall be stored six days prior to machining. This phase will be accomplished only if Phase II results are satisfactory.

Four storage periods will be evaluated (9, 8, 7, and 6 days duration) and related to the results obtained for parts stored for the standard ten day period. Evaluation will be based upon dimensional changes detected after the part evaluation test referenced in I (5) above.

Sponsor: C. M. Walker

Issued By:

NEVC

[Signature]
Manager-Weapons Process Engineering

Date: 10/23/63

Approvals:

[Signature]
Manager-Research and Engineering

Date: 10/24/63

L.B.

[Signature]
Manager-Weapons Manufacturing

Date: 11-4-63

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ATTACHMENT A: Process Test Schedule For Part Selection

<u>Phase</u>	<u>Storage Period</u>	M	T	W	T	F	-	-	M	T	W	T	F	-	-	M	T	W	T	F
III	9 days	*	*	*					*	*	1	2	3					4	5	
I	8 days	*	*	*	*				*	1	2	3	4							
II	7 days	*	*	*	*	*			1	2	3	4	5							
IV	6 days		*	*	*	*			1	2	3	4						5		
										*										

Note:

* denotes day that one part is placed in storage hood
 Number (-1 to -5) denotes day that one part is removed from the storage hood.

Involved parts shall be selected on the day of introduction into storage. The related foundry data cards shall bear the following information after the prefix designation, FPT-63-27:

Storage period - Test part number

(-9, -8, -7 or -5) - (-1, -2, -3, -4, -5)

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NUCLEAR SAFETY REVIEW

Process Test #FPT-63-27, HC-22SR

Conditions affecting nuclear safety have been reviewed for changes proposed in conducting Fabrication Process Test #FPT-63-27.

Shortening of the holding period for Model 1807 part storage will have no deleterious effect upon nuclear safety.

C. M. Walker
Weapons Process Engineering
Research and Engineering

DATE

FILMED

8/4/94

END