



Corrective Action 1347
Carondelet Division - CA / PA / RGA Database
Corrective Action Type NCR
Date 8/1/2005
CA Originator C. Ruud
Applies to: A-1Coil

Description of Defect / Non-Conformance

Wall thickness below model minimum. Localized areas were measured below the 1.375" minimum wall thickness during metrology. MetalTek independently verified wall thickness and confirmed condition.

Root Cause

Cannot be determined at this time. Under evaluation.

Corrective Action

Request "Use As Is" disposition on wall thickness related dimensions on A-1 coil.

Verification of Corrective Action

Not required. PPPL independently verified in conjunction with ORNL the design performance at a wall thickness of 1.05". Results were deemed adequate. Minimum measured dimension is 1.18" (to be verified).

Preventive Action

Several steps need to be taken to resolve and propose:

1. Validation of 3D Scanco data. MetalTek proposes to use Romer Arm with Laser scanner as validation technique. This instrument will be used to validate subsequent parts and minimizes measurement technique error. Date TBD.
2. Report to PPPL/ORNL. Understanding the concern that the wall not be thinner than measured and the limitations of the process, e.g. setting a large core into a mold with overhead crane, MetalTek will submit layout results to EIO wand set teleconference to review remediations to tool. Date TBD.
3. Upon verification of 3D Scanco data, MetalTek will confirm results to EIO team to begin root cause determination. Additional layout may be required to assure compliance of tooling, depending on results of layout. Date TBD.
4. Modification to tooling. Limited tooling modifications may be performed without severely impacting schedule or negating previous engineering (solidification modeling, etc.). These will be evaluated and proposed, where appropriate.
5. Permanent deviation. Based on results of above, a permanent deviation may be required to dimensional tolerances in limited areas of the component. These will be known in greater detail later.

Estimated Completion Date TBD

Actual Completion Date TBD

Signed: C. Ruud

A handwritten signature in black ink, appearing to be 'C. Ruud', written in a cursive style.

CC: Roger Broman, Barry Craig, Joe Edwards, E.J. Kubick

NCSX Disposition to CA 1347

Analyses were performed to determine the effect of the thin section on deflections and stresses and are summarized below.

- Thin shell areas like that of A1 **has an extremely minor affect on the stresses and displacements in ANY of the coils or shells** with the thickness being either 1.18” as for A1 or even with the thickness being 1.05” which MTK projects is the minimum if the shell is not changed. Reasons:
 - a) The shape of the tee is not changed by this, and the tee provides most of the bending stiffness
 - b) Some EM forces are transferred to the shell B from the wing.
 - c) The thin wall region is not the location for the peak stress and much of the area will be machined away.

<u>Run #</u>	<u>Configuration</u>	<u>Shell Type A</u>		<u>Coil Type A</u>		<u>All Coils</u>	
		Max. Displacement - mm	Max. Stress - Mpa	Max. Displacement - mm	Max. Stress - Mpa	Max. Displacement - mm	Max. Stress - Mpa
1	Baseline	0.98	168	1.246	239	2.711	239
5	Updated E	1.17	160	1.513	248	2.934	248
6	Updated E; thin sect. =1.18"	1.169	161	1.516	249	2.984	249
4	Updated E; thin sect. =1.05"	1.168	161	1.517	248	2.971	248

Since the effect has been shown to be extremely minor, the disposition for the A1 winding form is **Accept As Is**.

However, since the root cause determination is still underway, this NCR should be kept open. It is requested that EIO re-issue an amended CA with the root cause determination and preventive action; PPPL will disposition that portion of the NCR at that time.

Approved:

P. Heitzenroeder, Tech. Rep.

B. Nelson, RLM