θ' Theta Prime Materials- θ"
3 Temperature Way
Precipitation, OR 97203
(503) 943-7432

February 15, 2016

Students
Materials Science Laboratory
5000 N. Willamette Blvd.
Portland, Oregon 97203

Dear Students,

I am requesting your assistance in evaluating material performance of an aluminum alloy. I understand that last week you conducted testing to investigate the cold rolling and annealing of copper. This week, I would like you to conduct tests to investigate the effects of elevated temperature on 2024 aluminum alloy in the context of both processing (intentional heat treating) and service applications (long term exposure to elevated temperature).

As with most technical letters, you should convince me (using facts and data, not a "sales pitch") that you understand what is going on (or at least what you think should be happening) and interpret for me the meaning of the results. Think of yourself as a trial attorney trying to layout a logical argument for the jury. You need to start with an introduction/ summary/overview (big picture overview) so the jury has a sense of what to expect. Then educate them on the relevant knowledge of the subject (background). Then discuss your evidence (aka data - perhaps it behaves as expected, perhaps not), and finally reach a conclusion (attorneys call this a closing argument – at least on TV).

This lab's background should be a bit more extensive than typical since you are not only communicating to me, you are also teaching yourself. Therefore, this letter can be up to two pages maximum (plus attachments). You should describe the microstructure at each step of heat treating: during solution heat treating; after quenching in water; and after precipitation heat treating. You should explain what over aging is (its effects on properties and microstructure). You should discuss 2024 aluminum (its composition and how it is typically strengthened). You should discuss how other aluminum alloys might behave under similar conditions (are all aluminum alloys heat treatable, do they all naturally age, do they all overage?). Sketches or photographs are often ***very helpful*** in written documents (properly cite them if they are not your own figures). Again, ASM Handbooks[1] may be of help.

Thank you for your help in this matter. If you have further questions, do not hesitate to call me at (503) 943-7432 or lulay@up.edu. (Yes, you need to write a technical letter for this.)

Sincerely,
(electronic signature)
Kenneth Lulay
Theta Prime Materials
Enclosed: eleven (11) test specimens of 2024-T351 aluminum alloy

[1]*http://0-products.asminternational.org.clark.up.edu/hbk/index.jsp*

Heat Treatment of Aluminum Laboratory Data Sheet

I actively participated in the collection of this data. The information contained here has not been falsified and to the best of my knowledge correctly records the data obtained in lab.

Print name:_____Signature:_____

Calibration	Date Calibration Expires	Target Temp (reference)
Furnace #1, Temperature Calibration		950°F
Furnace #2, Temperature Calibration		500°F
Furnace #3, Temperature Calibration		250°F
Rockwell Hardness Tester		n/a

Calibration Blocks	Cal Block S/N	Certified Hardness (HRB)	Measured Hardness (HRB)
Block 1			
Block 2			

2024-T351:_____HRB

Precipitation Heat Treat Time	Solution HT conducted by:	Hardness measured by:	Precipitation Heat Treat Temperature (degrees Fahrenheit)		
			Natural Aged	Artificial Aged	Artificial Aged
		Temperature:	70°F	250°F	500°F
2024-W	Each section	Each section			
5 min	Each section	Each section			
10 min	Each section	Each section			
15 min	Each section	Each section			
20 min	Each section	Each section			
30 min	Each section	Each section			
24 hours	Section A	Tue. PM		N/A	
48 hours	Section A	Wed. PM		N/A	
72 hours	Section A	Thurs PM		N/A	
1 year	All	All		N/A	N/A

Note: 2024-W, the “W” is the designation meaning “solution heat treated, but not yet aged.”

Photos: furnace___hardness tester____specimens____.