



**THE Q & A FORUM** at [www.shotpeener.com](http://www.shotpeener.com) is the ideal place to get advice on a wide range of topics from industry leaders and colleagues from around the world that have tackled and solved your challenges.

You don't need to register to browse the forum. If you would like to post or respond to a post, however, you do need to register and it's very simple to do. The following are a sampling of the forum's posts. Maybe you will find an answer here to an issue you're facing.

### Verification Strips

**Questioner #1:** Can someone please clear up my confusion regarding acceptance test.

Intensity is determined by performing a saturation curve [J443], and coverage by [J2277], which are two completely independent processes.

The time required to obtain the coverage of our part is considerably shorter than the T1 time, therefore if we run a verification strip at the part process parameters the arc height will not be the same as what was obtained during the saturation curve. Or should the verification strips be run at the times used to determine the intensity?

If this is the latter, this will impinge on our available manufacturing hours which are already to capacity.

**Answerer #1:** Your statement: "...which are two completely independent processes" is key to this question. To validate intensity you must expose the Almen test strip at (or near) the T1 time derived from the saturation curve. Using shorter exposure times will not give consistent results or reliable information.

The verification strips should be run at the times used to determine the intensity.

**Answerer #2: J443 3.5.2:** When using a single holder on a fixture, a single strip may be used to verify intensity. This strip should, ideally, be exposed for the time T derived from the saturation curve and its arc height shall be within the stated tolerance. In practice, this is not always possible (for example, when integral values of strokes or rotations are used). When that condition occurs, the value used shall be rounded to the nearest practical time to T. An arc height is then obtained from the intersection of the saturation curve with that nearest practical time of T, see Figure 3. This intersection shall be called a Target Arc Height. A single strip subsequently peened for the selected nearest practical time must repeat the target arc height to within  $\pm 0.038$  mm (0.0015 inch) or other value acceptable to the responsible authority.

If you have enough data collected to prove your process is stable and repeatable, perhaps you can supply that information to your customer and extend the intensity verification time?

**Questioner #1:** Thanks for the clarification.

**Questioner #2:** Does this mean that if you have enough data that you can test (verify your T1) your machine in the morning only or every eight hours of operation?

Does this also apply if I have different part geometries and intensities within that eight hour operation period?

If I have all saturation curves for all parts and all locations then how do I correlate doing a test in the morning only to verify (every eight hours)?

How do other folks go about not verifying your T1 for every part and every location within that part? I'd love to know your thoughts...

**Answerer #2:** What is the actual shot peening specification you are working to? If AMS2430 then J443 would apply.

Remember the actual peening specification that is imposed on your purchase order or engineering drawing is boss.

"Does this mean that if you have enough data that you can test (verify your T1) your machine in the morning only or every eight hours of operation?"

### J443 Revision 2017-08

#### 3.5 Verification of Intensity

3.5.1 When the machine settings are found that yield an intensity within the specified tolerance, a means of process verification and control shall be implemented. Intensity verification arc height readings shall be taken at a frequency determined to be appropriate for assuring consistent peening intensity. The frequency of intensity verifications shall not be longer than eight hours of operation.

Two schemes for intensity confirmation, one involving a single holder and strip, the other involving multiple holders and strips, are offered in 3.5.1.1 and 3.5.1.2. Note that the practice of intensity confirmation does not constitute an intensity determination since this would require development of a full saturation curve per SAE J443 using a minimum of four strips.

### AMS2430 REV U

4.2.1 Acceptance Tests 4.2.1.1 Peening intensity verification (3.5.1 and 3.11.1) is an acceptance test shall be performed at

the beginning and, for lot sizes greater than one, at the end of each lot or every eight machine peening hours, whichever is less. Peening intensity verification shall also be performed whenever the in-process media requirements are violated or whenever the size, type, or all of media in the machine is changed. The intensity verification arc height shall be documented in accordance with 4.5. If approved by the cognizant engineering organization, intensity verification intervals may be changed.

“How do other folks go about not verifying your T1 for every part and every location within that part? I'd love to know your thoughts...”

If you have multiple parts that are processed using the exact same process and the same test fixture you should be able to use the data from the first verification across all parts processed for the next eight hours or end of lot.

If you change the process then a new verification test must be run.

**Questioner #2:** Thanks for your feedback on this...

How do you define a lot? Same part? Same geometry? Or could it be classed as eight hour working day?

“If you change the process then a new verification test must be run.” Does part and part geometry come into play? Even if I were using the same intensity?

I'm trying to set up our machine so that we only verify that the machine is running at an intensity range of 6-12N on a standardized set up first thing in the morning at 45 degrees and 90 degrees. If both angles are ok then I'm ok to peen correct? I then know anything between these angles are also ok.

I have previously completed all my sat curves but just want to check that the machine is still running correct, once in the morning but not on every part and part location. A typical day would see different parts and geometries for that intensity range. I currently check all areas on all parts for verification and want to reduce some of our testing.

Would checking the intensity first thing (6-12N) be acceptable and ok to run many different part shapes and geometries? Is this also ok from an audit standpoint?

**Answerer #2: From AS7766 Terms Used in Aerospace Metals Specifications:** MATERIAL LOT: Material taken from a single heat of metal, processed at the same time into the same size and shape of product, and heat treated as a single heat treat lot. Note that many specifications contain definitions that take precedence.

“If you change the process then a new verification test must be run. Does part and part geometry come into play? even if I were using the same intensity?” If the machine is using the exact same parameters and the exact same intensity verification fixture, then yes you could use the verification

data across different part numbers in my opinion. However, it's best to check with your customer and get it in writing.

I would suggest you list all the part numbers you are processing on the same Process Parameter sheet.

Again, in **AMS2430 REV U 4.5:** If approved by the cognizant engineering organization, intensity verification intervals may be changed. If you were to do this the customer would probably like to see a fairly significant amount of data, probably with less variation than the allowed  $\pm 0.0015$ .

### Contamination of Cast Steel Shots

**Questioner #1:** Dear all, We are a aerospace components manufacturer in China. Recently we buy two tons cast steel shots from US, the shots meet to specification AMS-2431/1.

Opened the bag, we find that there have rust on the shots surface. Could anybody tell me how to remove this rust, and no effect to shots quality?

In the paragraph 3.6 of AMS-2431/1: Contamination shot shall be clean and free of dirt, grit, oil, or grease.

And the rust will effect lower peening intensity and deficient peening coverage, or not? Or other peening quality, such as part colouration?

Thank you very much.

**Answerer #1:** You should load the shot into your machine and blast a hardened steel plate for as many cycles as it takes to remove the “rust”.

**Answerer #2:** This occurs quite commonly, especially when product is shipped overseas with freight sitting in containers over extended periods of time. A major manufacturer of engineered steel shot and grit poly lines all shipments, but rust is inevitable.

As mentioned above, it's best to cycle the media by blasting it against a target. Depending on the size of your machine and the quantity of shot it holds, you'll have to time it accordingly.

Rust is a surface phenomenon, and descaling it will not impact your arc height values. If the particle size gets reduced by impacts (which is the natural failure mode for any peening media), it will get eliminated by your airwash separator, cyclone or bottom screen in your classifier. “Descaled” shot will also help with avoiding part discoloration.

For your information, AMS grade material goes through a conditioning process prior to shipment. In other words, there is no surface rust on the shot particle during shipment. Transit rust is what you're noticing on the product.

We discussed this at a recent SAE meeting and none of us felt the need to make a statement about rust in the documents since it's subjective and a rather simple fix.

Hope this helps. ●