



# Non-Destructive Testing Newsletter



June 2010

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## From the Chair.....

Another milestone for the cornerstone Task Group of the Nadcap program. In 2009, the NDT Task Group completed over 1000 audits! Although we have always been the most prolific Task Group, and the leader of so many of the Nadcap initiatives, this is the first time any task group has gone over 1000 audits in one year.

This accomplishment represents a tremendous amount of work and dedication by our team of Auditors, our incredible group of Staff Engineers and CSR's, the Subscriber and Supplier Task Group members, and the aerospace NDT community, at large. And we should all take pride in seeing how this program has grown, how the Nadcap process has become ingrained in seemingly every facet of the aerospace world. But at the same time, we should understand the responsibilities and challenges that are presented to us in having this type of enormous impact.

We are all faced with the task of maintaining consistency within an audit staff that is nearing 50 members, and seemingly growing every month. The Staff Engineers must stay in constant communication with each other, and with Subscriber Task Group members, to ensure that we are using the same "eyes" to evaluate the audits. The Task Group must strive to optimize the checklists so the auditors and the suppliers spend their limited time focused on those areas that give us the most payback for the energies invested.

Having become such an integral part of everyday life in the aerospace world, Nadcap in general, and the NDT Task Group specifically, must use the information that is gathered to ensure that it lives up to the Nadcap Charter of developing a world class supplier base, and must continue to strive to do so with cost efficiency in mind.

Recently in China, the National Aerospace NDT Board sponsored a Supplier Meeting to discuss how to prepare for a Nadcap audit. The unusual aspect of this meeting was that the speakers were all suppliers! The purpose of the meeting was to have suppliers who had successfully completed Nadcap audits share their experiences, give their perspective on the Nadcap experience and answer questions about their pre-audit preparation, the pitfalls they encountered, and their general perception of the process. A unique experience, and one that could definitely be called a Best Practice.

2010 marks the 20th anniversary of the Nadcap program, as well as the NDT Task Group. It seems like only yesterday.....

Phil Keown – NDT Task Group Chair

## Nadcap Meeting Schedule

2010	Location
June 21-25	Singapore
October 18-22	Pittsburgh, Pennsylvania, USA
2011	Location
February 28-March 4	Barcelona, Spain



# AC7114 BASELINE QUALIFICATION AND CERTIFICATION REQUIREMENTS

In developing the Nadcap NDT Checklist AC7114, the Task Group utilized NAS 410/EN4179 as the foundation and with some additional subscriber specific requirements in regards to qualification and certification as well as calibration and document control, developed what we call the "Baseline".

Of course, with NAS 410/EN 4179 playing such a large role in this checklist, we at PRI go to the AIA periodically for clarifications. However it is to be clearly understood that this article and any AC7114 checklist question clarification given by PRI staff are clarifications of the baseline requirement only and are not to be in any way construed as an interpretation or clarification of an NAS410/EN4179 requirement.

Now on to the details to look at a few specific issues and define what the auditor, staff and the NDT Task Group should be looking for.

The near vision exam is an annual requirement, but what is the definition of annual? Essentially if an eye exam is given on January 22, 2009, the next eye exam is due on January 22, 2010. Now it is permissible for the supplier to define that eye exams are annual and expire on the last day of the corresponding month that they are given. In this case, the eye exam would actually be good until January 31, 2010. This must, however, be specifically defined by the supplier's written practice.

Which eye exam is acceptable? The baseline requires that the near vision examinations meet Snellen 20/25 test chart at not less than 16 inches/42cm. This, as many of you know, is not correct. Please note that this issue has been temporarily corrected by an auditor/supplier alert specifying the actual requirement of Snellen 20/25 test chart at 16 inches/42cm +/- 1 inch/2.54 cm. This will be revised in Revision E

of the checklist. The other part of that requirement is of course the statement; "or equivalent as determined by the Responsible Level 3". For the purpose of the baseline, Jaeger 1 at not less than 12 inches/30cm is considered acceptable but any alternate that the Responsible Level 3 determines to be equivalent is okay to use. Be careful that whatever you use is clearly defined in your written practice and is acceptable to your customer's requirements.

A current issue resulting in the writing of nonconformances is the requirement for the Level 2 to be examined on developing work instructions if it is part of their duties. This is reasonably straight forward; if the Level 2's duties involve developing work instructions, then they must be examined on this duty. The supplier must define in the written practice that this is required and how it is to be performed. Essentially, the checklist utilized by the examiner for the practical exam of the Level 2 must include a review of the work instructions developed by the candidate.

The last item to discuss has caused a significant amount of work for suppliers and staff alike and has certainly been a "top 5" hitter of late. The issue? "Open Book" specific exams of course. The baseline reads in part; *"The specific examination for all levels shall be an open book examination (Reference material such as specifications, tables, formulas, etc. may be provided as determined by the Responsible Level 3 or Examiner. Questions utilizing such material shall require understanding of the information contained therein rather than merely finding its location)."* A couple of things are clear, the exam must be "Open" and the questions which utilize reference material (open questions) must not be "look up" type questions. In other words, they must be formatted to require understanding of the material rather than

## NDT Newsletter – Want to be on the Circulation?

The NDT newsletter is published periodically throughout the year. The newsletters are read by the subscribing Nadcap Users, Suppliers, Auditors and anybody that happens to click on the latest NDT newsletter on the PRI website ([www.pri-network.org](http://www.pri-network.org)). The aim of the newsletter is to communicate information relating to NDT within the Nadcap program to improve our process and to promote the sharing of best practices at all levels.

Have you stumbled across the NDT Newsletter by chance? Want to receive it on a regular basis? Keep up-to-date of the latest Nadcap NDT information by getting added to the distribution list! To receive notification when a new edition has been published, please e-mail Kellie O'Connor at [koconnor@sae.org](mailto:koconnor@sae.org) with your name, company and email address.

simply finding the answer in the reference material. It should be emphasized that this concept is not new in any way. As in previous requirements, if questions provided reference material, then the question had to be formulated in a certain manner. The difference is that the exam must be given as an "open exam". This is not to say that any set number of questions must be formulated in this manner, simply that some questions must be. The number of questions which require reference material and what reference material is required is still covered by the statement *"as determined by the Responsible Level 3 or Examiner"*. One hint though: the questions requiring reference material should be identified as such so it is clear to all parties involved.

Hope this information provides clarity and does not cause more confusion.

**Mark D. Aubele** – NDT Senior Staff Engineer

## Radiography & Such

Suppliers are always asking "What is new or revised in the Nadcap checklists?", or "When should I make changes to my procedures?" and finally "When do these changes take effect?".

First, there aren't a whole lot of "new" things in the latest revision. Most were just clarifications of existing criteria. One of the most overlooked is recognition of the timer for monitoring eye adaptation. We

all take it for granted that a timer of some fashion will be used to determine when eye adaptation is completed. But what many have not done is added it to the written procedure. As with any piece of equipment

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it needs to be referenced for use. Just because there is no calibration required, does not exclude it from reference in the procedure. Eye adaptation is a crucial part of film review. And the times should be noted as a minimum for the mere reason that not everyone's eyes adapt at the same rate. Age plays a huge part in this physiological function. From experience, I know my eyes adapt much slower than say someone half my age, which would be about 20 years old. Okay...maybe 25... alright 30!!! Regardless, waiting that extra time is necessary to see the 2T hole or whatever indicator is required to ascertain the proper quality level.

When should you make changes to incorporate the latest revision? In the case of a few specifications (NAS 410) the implementation date is noted on the front page in the margin. Some implementation times are flowed down by the customer when they revise a specification.

In the case of Nadcap it is expected that the supplier will implement the changes when the revised document is released for use. This can be found under 'Resources' - 'Documents' - 'Audit Checklists'. Click on the appropriate commodity and the date for use is indicated in the title (for example - "to be used on or after 2-July-

2010"). Therefore if your audit is scheduled for 5 July 2010, you will be audited to the latest requirement. Your procedure(s) need to reflect the changes and evidence of implementation (data) to show compliance to the revised criteria. That is why it is important to periodically verify if a change to Nadcap requirements has taken effect.

**P. Michael Guttridge** – Senior Staff Engineer, NDT / WLD / AQS

## Penetrant Water Wash Requirements

AC7114/1, paragraph 6.9, Penetrant Removal states in part:

- 6.9.1 Is the rinse water controlled to provide a coarse spray?
- 6.9.2 Is the rinse water temperature controlled within the range of 50°F (10°C) to 100 °F (38°C)?
- 6.9.3 Is the rinse water pressure controlled to 40 psi (275 kPa) maximum?
- 6.9.7 If used, is the air pressure on the hydro-air nozzle controlled to 25 psi (170 kPa) maximum?

While the ASTM 1417 paragraph 7.3 states:

7.3.1.1 Manual Spray—Water pressure adequate to remove the Penetrant shall be used but shall not exceed 40 psi [275 kPa]. Water temperature shall be between 50 to 100°F [10 to 38°C]. When hydro-air nozzles are used the air pressure shall not exceed 25 psi [172 kPa]. A coarse spray shall be used with a minimum distance of 12 in. [30 cm], when possible between the spray nozzle and the part.

Keep in mind that some subscribers do not allow the use of hydro-air nozzles and some may have different requirements for temperatures and pressures.

So what is a coarse spray? And how do we obtain this "coarse spray" to meet the Baseline checklist and customer requirements?

Trying to define a coarse spray is very difficult without resorting to pictures of an acceptable spray pattern and an unacceptable spray pattern or stating exactly, which spray guns can or cannot be used. Looking through the internet you will find that some organizations do clearly define the size of the spray. The table below is taken from the British Crop Protection Council.

Volume Median Diameter	Size Classification
Less than 25µm	Fine aerosol ('Fog' or 'Very fine spray')
26 to 50µm	Coarse aerosol ('Fog' or 'Very fine spray')
51 to 100µm	Mist ('Very fine spray')
101 to 200µm	Fine spray
201 to 300µm	Medium spray
More than 300µm	Coarse spray

**Spray quality-** A classification reflecting the size of a droplet in a spray, normally expressed in terms of the 'Volume Median Diameter (VMD)'.

Does the NDT Task Group need to go to the extremes of using pictures, specifying the gun type or defining the droplet size or can common sense apply?

There are a variety of different spray guns on the market ranging from the garden hose spray variety (generally having an adjustable spray pattern) to the ones supplied by the Penetrant equipment manufacturers or to guns provided by specialist manufacturers. Different types of guns will produce a droplet size ranging from a very fine mist to a solid stream of water and a spray pattern ranging from a large cone to a narrow jet. Some manufacturers including the garden hose sprays have several different types of nozzles/adaptors available to fit a standard gun, which are used to produce different spray patterns and droplet sizes. This wide variety and their differences in cost do not help the supplier's Level 3 make the correct choice.

During the compliance jobs, the Nadcap NDT auditor will be looking to see that both the customer and baseline requirements for temperature and pressure are being complied with and the gun produces a medium size cone consisting of a coarse (large droplet) water spray. Where the garden hose spray guns with adjustable nozzles are being used the auditor will also look to ensure the nozzle is permanently fixed and it cannot be changed from a coarse spray to a water jet by the operator or Level 3. Where the hydro-air nozzle is employed, they will look to see if the air pressure added does not generate a mist or solid stream.

So what is the general consensus? Do very specific requirements need to be flowed down from the NDT Task Group stating droplet size or spray cone angle? Should there be pictures of acceptable and unacceptable spray patterns? Perhaps a list of approved spray guns? Or is the current terminology sufficient?

**Phil Ford** – NDT Senior Staff Engineer

# National Aerospace NDT Board in Italy

The kick-off meeting of the Italian Aerospace NDT Board (ITANDTB) was held in Rome on 1st July 2004. The Board is embedded as Technical Committee within UNAVIA (Italian Association for Standards Training and Qualification Standardization Organization) and in term UNAVIA is part of AIAD (Italian Industries Federation for Aerospace, Defense and Security) acting as Stakeholder.

ITANDTB is an independent national aerospace body chartered by the following aerospace prime contractors holding manufacturing and design certification for EASA Part 21 and/or maintenance activities certification per EASA Part 145 Regulations: Alenia Aermacchi, Alitalia CAI, AgustaWestland, Avio, Alenia Aeronautica, Microtecnica, Thales Alenia Space and Piaggio Aero Industries. The Board was recognized by ENAC (Italian Civil Aviation Authority) as a National Aerospace NDT Board on 13th October 2004, complying with EC 2042/2003 Regulation requirements and with EN 4179 procedure for qualification of NDT personnel. General Aeronautical Armaments Directorate of the Italian Ministry of Defence (IMoD) also has appointed its Representative members inside of ITANDTB. Both ENAC and IMoD People are observer Members in the Executive Committee with veto right.

The Role of ITANDTB is:

- Directly provide NDT Level 3 personnel examination by its Technical Commissions and issue the qualification certificate.
- Indirectly provide Level 1 and 2 training and examination by Outside Agencies and /or by Employer responsible Level 3 that are approved by the Board.

That means that the employer is responsible to verify that customer NDT specific requirements are met by the qualified personnel (e.g. Level 3 examination to cover supplemental requirements administered directly by Boeing/Honeywell/Pratt & Whitney/Rolls-Royce examiner or Company Level 3 Responsible as applicable being developed) and qualify Company Level 1 and 2 personnel using its Level 3 and /or Outside Agencies ITANDTB approved.

- Provide guidance support and service in the NDT processes to the Italian Aerospace Industries in relation and accordance with European and Italian Regulation /Standards.
- Interface with others NANDTB (National Aerospace NDT Boards), EFNDT (European Forum for NANDTB) and Nadcap for discussion on both the best common approach to achieve the intent of the EN4179 requirements and interpretation and implementation of NDT processes requirements.

- Update the ITANDTB home page where procedure, relevant documentation and Board events are accessible.

The ITANDTB Steering Committee is comprising by:

- Chairman appointed by UNAVIA Steering Committee
- Vice Chairman elected from the members of ITANDTB Technical Committee and appointed by UNAVIA Steering Committee. He's also the Technical Committee's Chairman
- Regulation/standard procedures Committee Chairman
- One ENAC nominated Representative
- One IMoD nominated Representative
- One AIAD nominated Representative
- Eight Aerospace Prime Contractors nominated Representatives

A primary secretariat staff take care of all the communication, home page updating, meeting minutes, NDT Boards events etc.

**Mario Bianchi** – Bytest s.r.l. Supplier Voting Member

## CSR Perspective

An important part of the Committee Service Representative (CSR) role is to monitor cycle time/response times between supplier and staff engineer, including supplier cumulative delinquency. Upon audit submittal into eAuditNet, the supplier has 21 days to make their first response. If subsequent rounds of responses are required, the supplier will have 7 days to respond. It is important to understand that no extensions shall be granted for response due dates. Instead, eAuditNet tracks the number of cumulative late days when the Supplier is past due the established due date. The cumulative late days are there to cover holidays, sickness or any unforeseen circumstances in which the supplier may be late in responding. Suppliers are allowed up to 30 cumulative late days over the course of the audit process. Once the 30 days have expired, the audit will be balloted for failure. Of course, no one wants to see this happen. As this is not the intent of Nadcap, the CSR's make weekly attempts, at minimum, to contact suppliers whose responses are past due. This is just a courtesy reminder call/e-mail for the supplier and is also for any suppliers that need help submitting the supplier response.

Although the use of some of the allotted cumulative late days is part of the process, it is important to remember that using an excessive number of them can negatively impact supplier merit, as described in NOP-008. For suppliers attempting to achieve 18-month merit, no more than 14 cumulative late days can be used. Additionally, suppliers who wish to achieve 24-month merit, no more than 7 cumulative late days can be used. This is why it is so important to respond in a timely manner and why CSR's follow up to ensure suppliers as well as the staff engineers keep as close to due dates as is possible.

In addition, suppliers are always welcome to be proactive. If there is a question on how to enter a response, how to complete the feedback questionnaire or questions on the delinquency process in general, please feel free to contact the NDT CSR's for assistance.

**Kellie O'Connor, Rhonda Joseph, Amanda Bonar** – NDT Committee Service Representatives

## Supplier Cycle Time

Supplier Cycle Time is the total days a supplier uses in order to close out an audit.

What does cycle time mean and why is it important?

Cycle time begins when your audit is posted on eAuditNet. It is at this point that you're "on the clock" so to speak for any non conformances that require a response. Initially, the supplier has 21 calendar days to post an initial response. After the initial response, subsequent responses are due within 7 calendar days.

Cycle time is important for several reasons:

1. Supplier merit could be affected.
  - Merit may be affected if a supplier exceeds 14 cumulative late days for 18 month accreditation or 7 cumulative late days for 24 month accreditation (NOP-008). This scenario will have a direct cost impact on the organization if merit is lost due to excessive cycle time.

2. Audit failure mode "E" may be invoked

- Audit failure may be invoked if a supplier is non-responsive after 30 days of cumulative delinquency (NOP-011, Failure Mode "E"). This would be the worst case scenario for a supplier – loss of accreditation.

3. The NDT Task Group tracks Supplier Cycle Time as one of its metrics.

- Target Cycle Time for the NDT Task Group is 25 days (initial and reaccreditation audits). This is one of many metrics the task group tracks in an effort to improve the overall Nadcap system.

The best way to reduce or minimize cycle time is to be prepared for the audit from the start. Perform a pre-audit using the appropriate checklist prior to the actual audit. Identify any issues during the pre-audit and apply the appropriate corrective actions. This should minimize the amount of NCR's during the actual audit which, in turn, should minimize the cycle time due to less time being spent answering

NCR's. If a response is required, do so in a timely manner as issues need to be addressed as soon as possible. It's not a good idea to wait until the "20th day" to send in the initial response. This only adds to the cycle time. With that being said, the responses need to be adequate enough to be effective so that the response is accepted the first time. If the response is not accepted the first time, it must go through another round of responses. This causes extra work for the supplier (and staff), and results in cycle time being extended due to subsequent rounds of responses.

After all, your time is valuable, being well prepared for the audit will help minimize cycle time.

**Gary White** – Orbit Industries, Inc.  
Supplier Voting Member

## Auditor Development

In a previous NDT Newsletter, it was written that it is critical to the Nadcap (and NUCAP) program to have the most competent, well informed and best trained auditors possible. To ensure this is achieved, the NDT Task Group deliver auditor training on an annual basis. The sessions held in the recent past have focused on Subscriber requirements and the Top 5 NCR's written per commodity.

However, one of the constant refrains from the supply chain, and Subscribers that have been through NUCAP, is the approach of auditors varies and because of this variation, there may be perceptions of inconsistency. While acknowledging there are perhaps no 'right way' or 'wrong way' of performing an audit, the NDT Task Group has set out to reduce these inconsistencies and discrepancies.

As well as the regular items the NDT Task Group deals with, a new sub-

group has been formed to review auditor performance and to consider our methods of auditor training. We have applied metrics to enable us to better understand the variances in checklist application by the auditors. Many potential influencing factors have been considered; the figures produced have shown auditors do not differ in their approach because of cultural differences, differences in nationality or differences in technical background. This points to just the typical differences in human beings!

The sub-group hope to reduce the impact of these differences by one or both of the following techniques.

First, working with individual auditors identified their technical needs. These needs may be time management, following checklists, procedure reviews, etc.

Secondly, the intention is to make the October auditor conference more

engaging for all. Usually it is a regular menu of technical information that is similar year on year. For October 2010 it is planned to shake up the regular format a little and hopefully engage all participants more fully. Watch this space!

Many good ideas from the Auditors, Suppliers and the Task Group for possible inclusion into auditor training have been received. It is not possible to include all this year, so bear with us if a recommendation was missed – hopefully it will be included in the future.

If mistakes are encountered, please be patient. The author would like to thank all those participants in advance, and especially those individuals who do not yet know they will be participating!

**Andy Statham**, NDT Task Group Vice Chair

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## In Step with the CSR



Name: Amanda Bonar

Title: Committee Service Representative for NDT, Welding, Heat Treating, Chemical Processing and Aerospace Quality Systems.

Duties: Provides support to Staff Engineers, Task Groups, Suppliers, Committees and Councils. Process audit reports upon submittal and issue certificates upon audit review and completion. Provide general administrative support to ensure the smooth running of the European office. Other daily tasks include payments and maintaining audit projections.

Background: I started PRI in April 2009. I have a BA honors degree in Spanish which I studied for at Liverpool John Moores University and the University of Valencia in Spain.

Personal: My passion is travelling and learning about other cultures. I also love reading, politics and swimming.

### ***PRI Staff Contact Details***

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