NANDTB/25
Training Pack for Personnel Required to Administer Near Vision Vission Test per ISO 18490

Compiled by the UK NANDTB

Issue 5 - April 2022

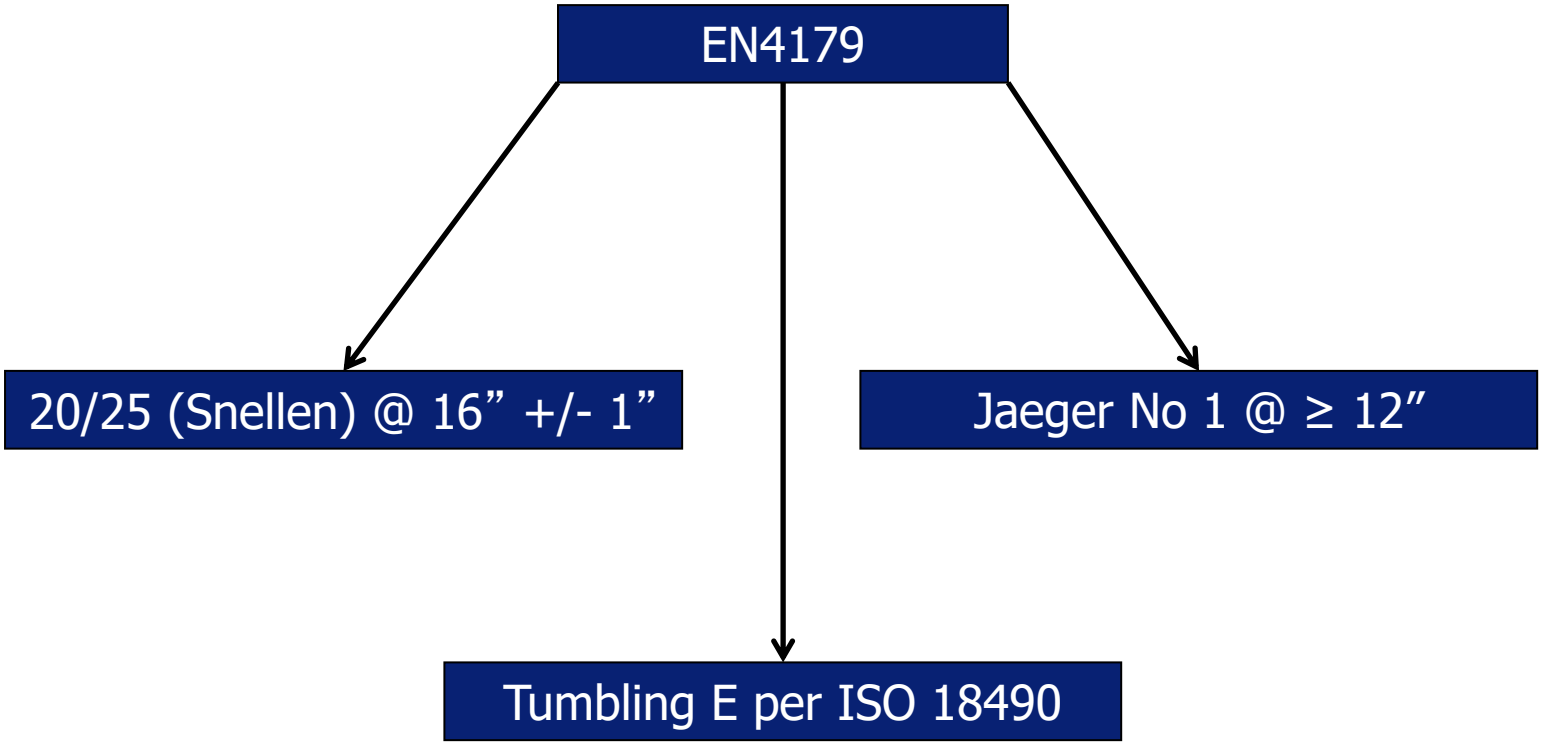
Next planned review Jan 2025

Review Trigger event - new release of ISO 18490

Background

- EN4179:2005 required near vision acuity to Jaeger No 1 or equivalent, not less than 30 cm/12 in in at least one eye, natural or corrected.
- Vision acuity in EN4179:2009 changed to 20/25 (Snellen) at 16" (42 cm) +/- 1" (2.54 cm) or equivalent in at least one eye, natural or corrected.
- There are methods other than Snellen for examining near vision eyesight acuity and there is considerable debate even within the medical field as to 'equivalency' of vision requirements.
- Responsible Level 3s will find it difficult to obtain clearly defined supporting medical evidence regarding the equivalency of vision requirements. The numerous potential avenues for determining equivalency provides scope for variation and error.
- BS EN4179:2021 now only permits three examination methods and no equivalency.

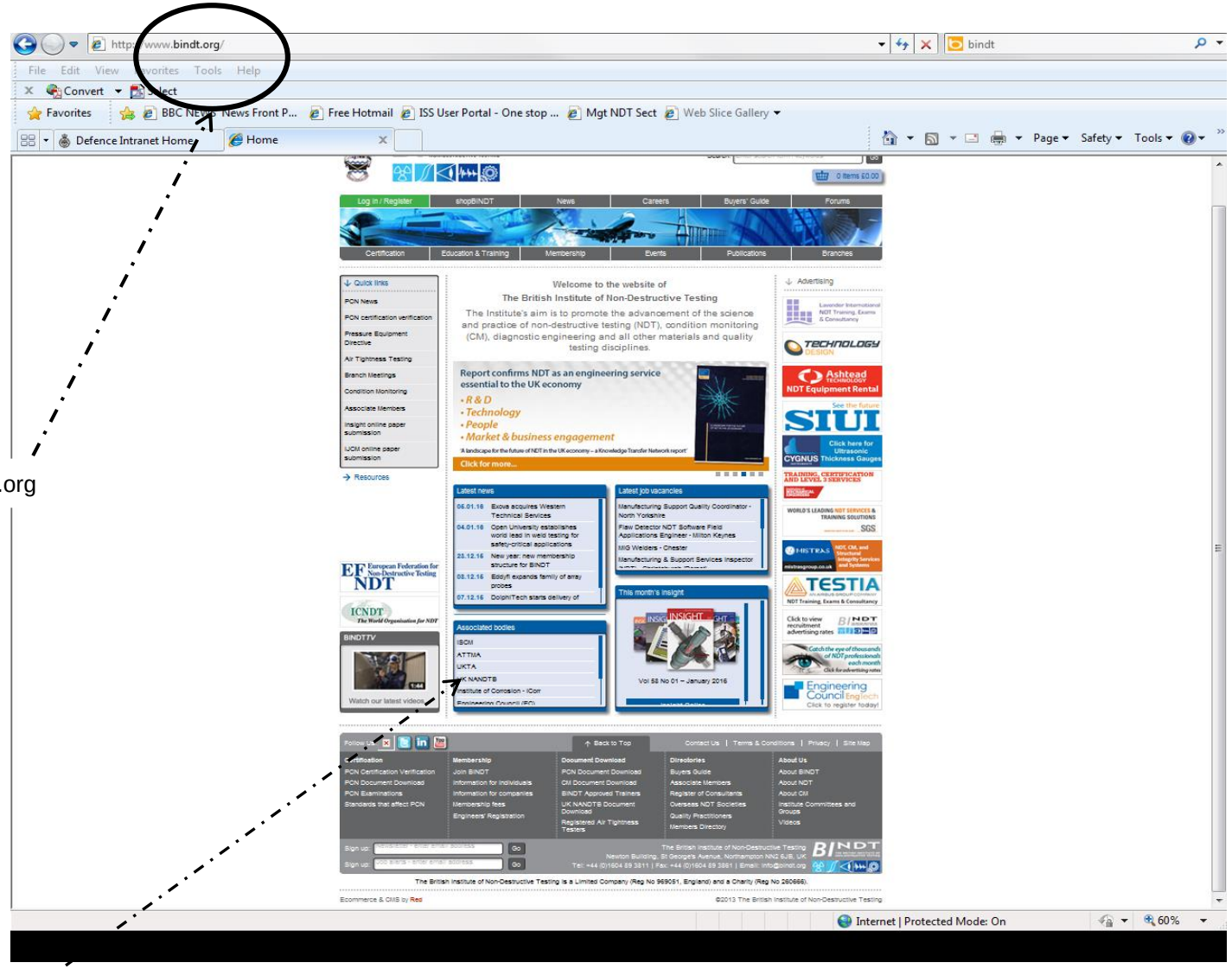
BS EN4179:2021 Compliance



UK NANDTB Vision Requirements

- For Aerospace NDT personnel within the United Kingdom, Near Vision Acuity examination using the Tumbling E test in accordance with BS EN ISO 18490 is mandatory.
- BS EN ISO 18490 does not address the colour vision requirement as specified by BS EN4179.
- Level 3's are responsible are accountable for training and authorising personnel to administer the Tumbling E vision test, including medical practioners.

<Insert what your written practice or procedure states>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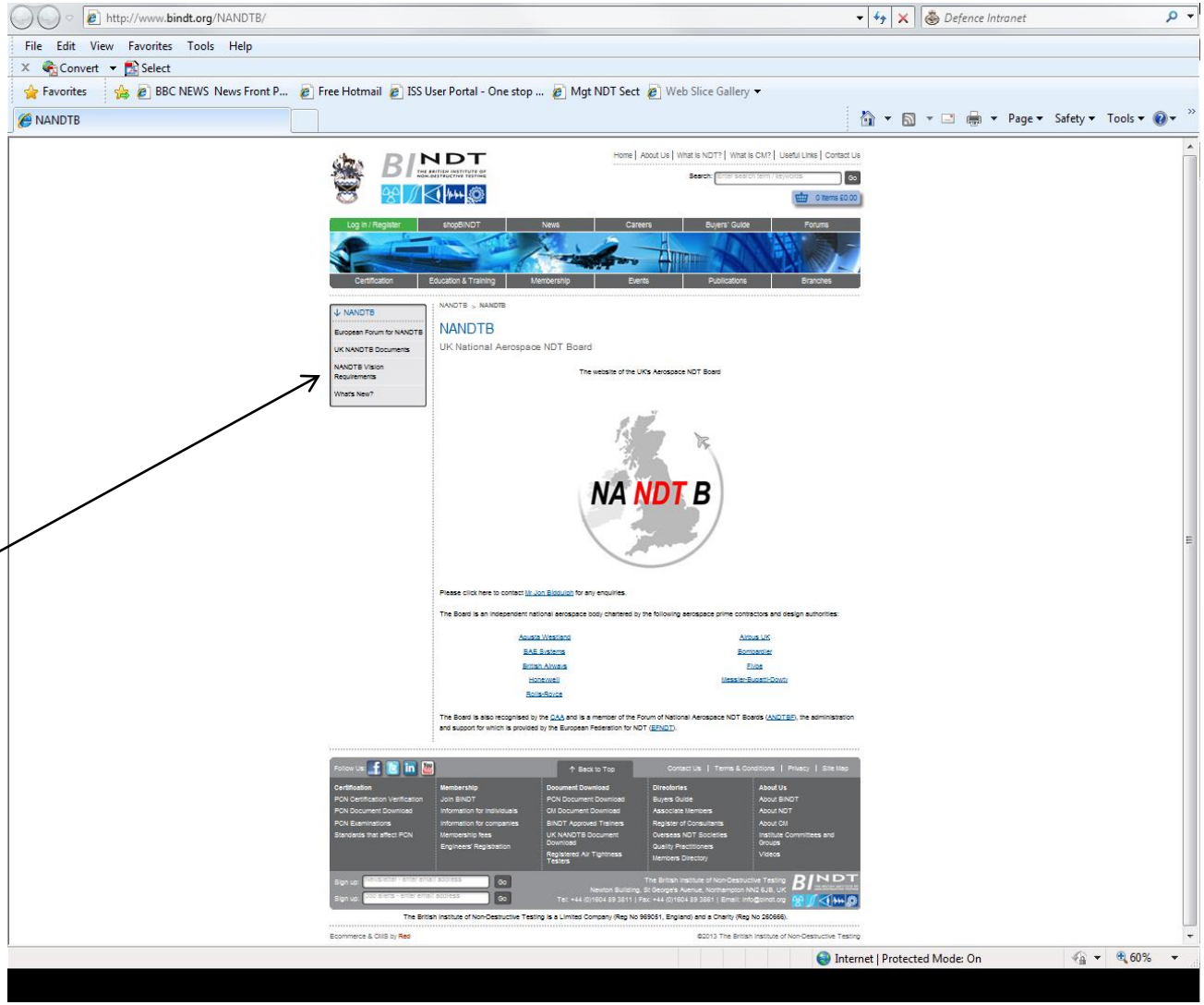
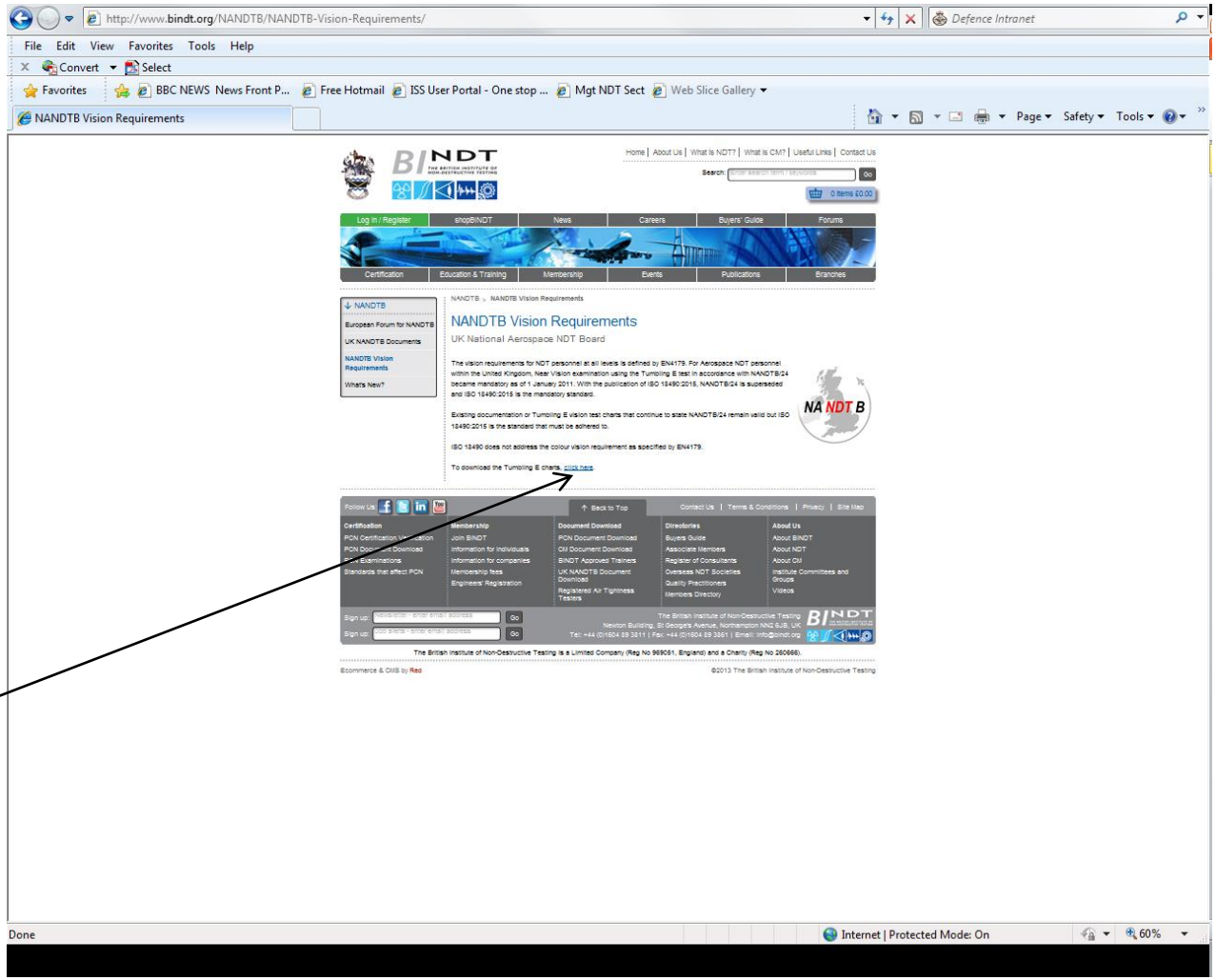
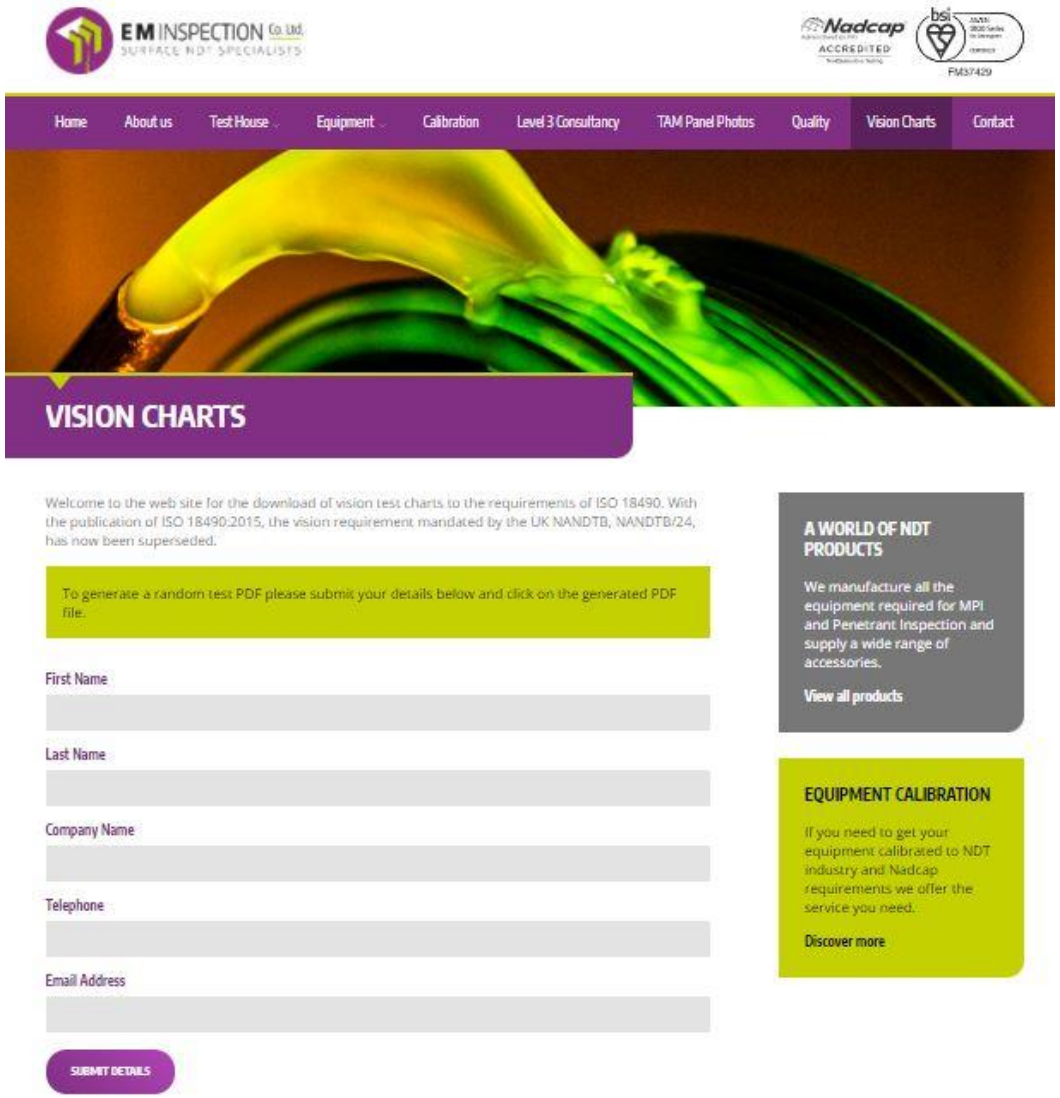
Vision Requirements



NA NDT B



Tumbling E Test Chart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ISO 18490:2015(E) Chart

NDT Near Vision Acuity Test

To be administered in accordance with the conditions defined in ISO 18490:2015(E).

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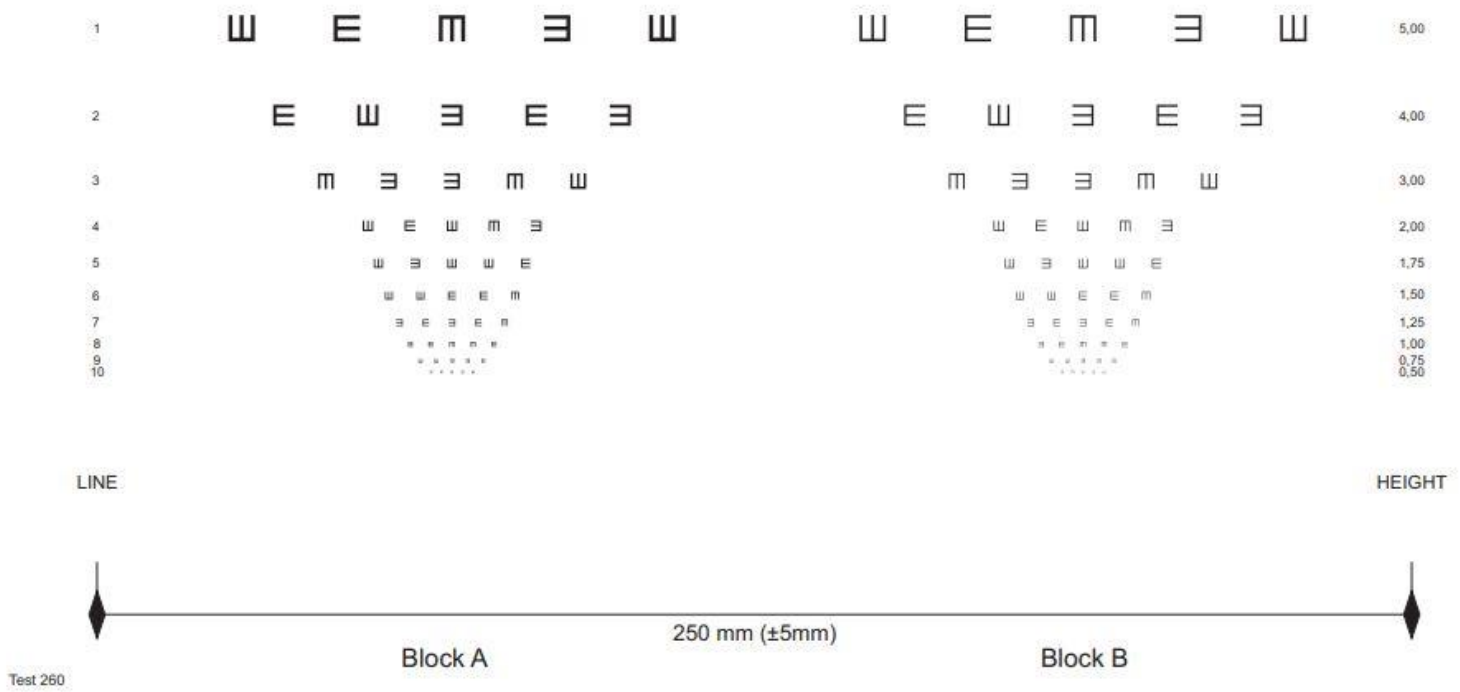


Salient Points

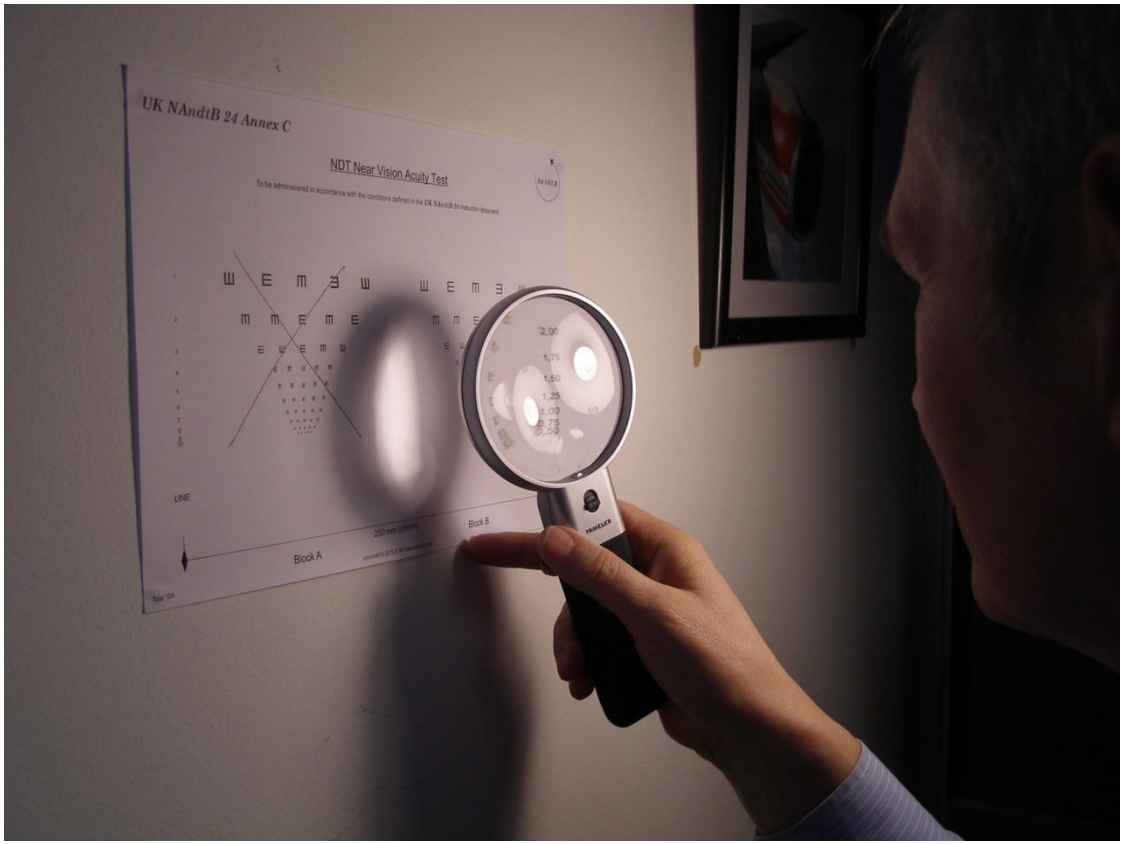
- Failure of persons to meet the defined level of vision acuity, in some cases, could be attributed to the quality of the test chart produced. Therefore, care should be exercised to ensure that the quality of the test chart is satisfactory in meeting the requirements of ISO 18490. Where personnel fail to meet the required level for vision acuity the quality of the chart should be reviewed before declaring an individual has inadequate near vision.
- Personnel administering the near vision acuity test shall be trained and familiar with the requirements before administering vision acuity tests. Persons trained shall be designated by a Level 3. Such designation (including Level 3 self-designation) shall be made in writing and form as part of the formal records for that individual.
- Two types of optotype (BS EN 18490 Annex A) for Tumbling E shaped characters of defined proportions and of various sizes may be used to verify near vision acuity which have been developed for use with various printing hardware and media. Charts shall be printed in black ink on white paper which is of an adequate quality ensuring the print quality is suitable for the purpose, the best chart, which may be verified using 10X magnification should be selected for use. For full details on print, quality, size etc, refer to ISO 18490.
- The annotated 250mm distance between the defined marks shall be measured and shall not be less than 245mm nor more than 255mm.
- The charts are generated randomly.

Salient Points (Cont)

- The test shall be administered under controlled lighting conditions. Visible, white light, of minimum intensity 500 lux, and maximum intensity 750 lux shall be used to evenly illuminate the chart confirmed at the position of the chart using a calibrated visible light meter. Ambient light in the surrounding area may be beneficial but this should be lower than the test level. Higher levels of background may adversely affect results. Spurious light sources, such as bright objects should not be present the candidates field of view.
- Test charts shall be positioned perpendicular to the line of sight on a flat surface, candidates shall be 400 ± 25 mm from the chart surface, at no time shall the candidate be permitted to get closer to the chart. A ruler or gauge stick may be used to verify the test distance.
- Candidates shall wear the same eyewear, if any, as used during routine NDT testing. This may be personal protective equipment and/or corrective lenses. Lenses used during an eye examination and not intended for regular use shall not be permitted. Where corrective lenses are necessary to achieve the required level of near vision acuity, this shall be recorded as part of the results of the test.
- Candidates shall identify the orientation of each of the individual optotypes. The normal response will be to define where the open end of the E character is, so responses of “UP, DOWN, LEFT, and RIGHT” would typically be used. However, any unambiguous form of response, verbal or visible, may also be used. The candidate and the test administrator shall establish the method of communication which best suits prior to commencement of the test.

Check Illumination at the Test Chart Surface

Check the Optotypes to be used are Clear and Fully Formed using x10 magnifcation



Gauge Eye to Test Chart Distance

The Test

- The test shall not be limited to a test of an individual eye. Both eyes shall be used together as for normal NDT inspection.
- The administrator will have established which of the two blocks of optotypes are to be administered as the test and the chart may optionally be identified by a pen line through the redundant block.
- The candidate shall identify the characters starting from the left side of line 1 moving to the right until a response is given for each of the 5 characters. This shall be repeated for lines 2 onwards until the candidate reaches the limit of their capability.
- The administrator should prepare a results sheet in advance or record the candidate's response in a manner that allows verification of correctness.
- Near vision acuity is considered acceptable where the candidate correctly identifies all the individual optotypes (5 out of 5 on each line) for lines 1 to 9 inclusive. Where a candidate fails to achieve this the administrator shall verify that the test chart or test conditions were not the cause of failure before sending the candidate for further tests for corrective lenses or a more comprehensive assessment of near vision acuity.

Record

The visual acuity test (or separate record sheet) shall be annotated with the following information as a minimum;

- Name of individual
- Employee ID or Staff No
- Date tested
- White Light Lux Level
- Optical aids worn during test
- Acuity level achieved (including a record of individual optotype orientations)
- Name/signature of designated test administrator
- Test Chart Number (if information is held on a separate record)

Benefits

- Is Universal - No language/alphabet dependency
- Based on vision acuity – not reading ability
- Based on resolution of 6 mins of arc - as 20/25 Snellen
- Can be administered locally
- Directly controlled by Level 3
- Basically “fail safe”
- Administered under defined conditions
- Auditable
- Based on accepted scientific principles (eg BS 4274-1, ISO 8596)
- Can be carried out in inspection area
- May be carried out in conjunction with annual maintenance review