

**PSL/44 – ANNEX A Issue 1**

dated 1<sup>st</sup> October 2017

**VISION REQUIREMENTS – guidance on company procedures for vision testing**

**PLEASE REFER TO PSL-44 FOR RECORD OF VISION TEST**

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**PREAMBLE:**

**From BS EN ISO 9712:2012**

**7.4 Vision requirements – all levels**

The candidate shall provide documentary evidence of satisfactory vision in accordance with the following requirements:

- a. near vision acuity shall permit reading a minimum of Jaeger number 1 or Times Roman N 4.5 or equivalent letters (having a height of 1,6 mm) at not less than 30 cm with one or both eyes, either corrected or uncorrected:
- b. Colour vision shall be sufficient that the candidate can distinguish and differentiate contrast between the colours or shades of grey used in the NDT method concerned, as specified by the employer.

The certification body may consider replacing the requirements in a) by compliance with an alternative.

Subsequent to certification, the tests of near visual acuity shall be carried out annually and verified by the employer.

**FROM PCN/GEN:**

Vision Requirements

9.1. The PCN requirements for colour perception and acuity of vision, together with the qualifications of those administering the vision tests, are fully defined in PCN document PSL/44, which includes a form for recording the results of vision tests and PSL/44 Annex A for guidance on what a company's procedure for vision testing is expected to include. The requirements are reproduced below for ease of information:

9.2. Candidates for PCN examinations will be required, on the day of the examination, to provide proof of a satisfactory vision test conducted within the 12 months preceding the examination.

9.2.1. Near vision acuity shall permit reading a minimum of Jaeger number 1 or Times Roman N 4.5 or equivalent letters (having a height of 1,6 mm) at not less than 30 cm with one or both eyes, either corrected or uncorrected;

9.2.2. Colour vision shall be sufficient that the candidate can distinguish and differentiate contrast between the colours or shades of grey used in the NDT method concerned as specified by the employer.

NOTE: Subsequent to certification, the documented tests of visual acuity shall be carried out at least every twelve months and verified by the employer.

**NOTE: Luminance contrast**

The luminance contrasts shall be increased for people over 45 years old, due to a decrease of sensitivity to contrast.

Note: the EN ISO 9241-303 standard recommends increasing the contrast by at least 30 % for people above 45, and doubling it for people above 55.

*EN ISO 9241-303 Ergonomics of human-system interaction. Requirements for electronic visual displays*

*Descriptors Ergonomics, Display devices (computers), Office machines, Computer terminals, Computer peripheral equipment, Electronic equipment and components, Environment (working), Optical properties of materials, Luminance, Visual perception, Angles (geometry), Size, Graphic characters, Resolution, Legibility, Flicker, Stability, Glare, Reflection, Reflection factor, Reflectance factor, Reflective materials, Colour, Colorimetric characteristics, Chromaticity, Optical phenomena, Old people.*

# EXAMPLE VISION TESTING PROCEDURE

## CONTENTS.

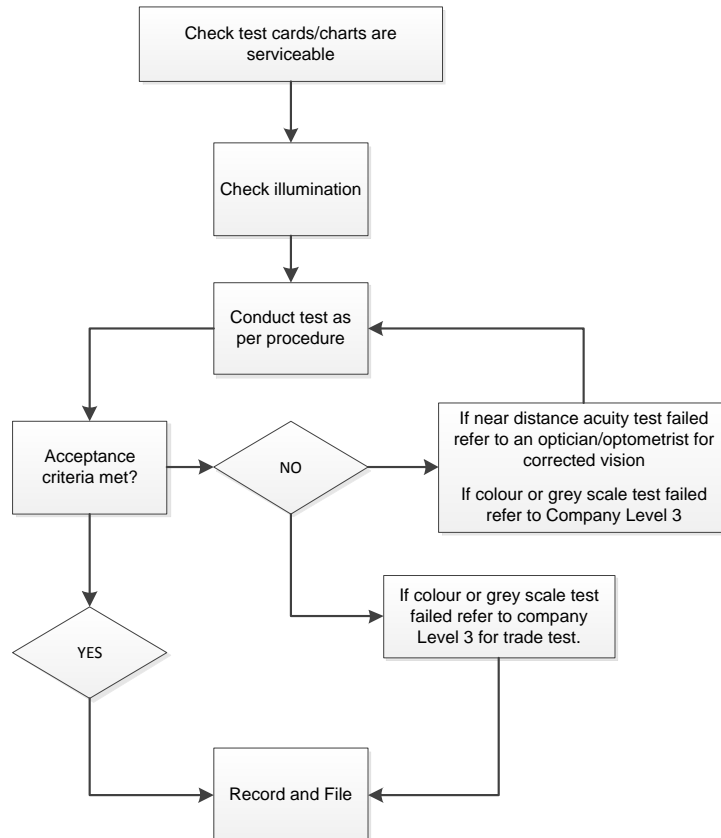
Page No.

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Issue Date: XX:XX:XXXX

Revision 1      APPROVED BY:  
SIGNATURE:

## 1 FLOW CHART



## 2 PURPOSE

This procedure specifies the test procedure and acceptance criteria for the vision testing of personnel involved in NDT and Inspection Tasks. Covered are the qualification requirements for personnel approved to carry out the vision testing. The procedure is applicable to near and far distance acuity, colour and grey scale vision tests.

## 3 SCOPE

This procedure is applicable to the personnel appointed by the company to administer the tests and to the staff who require testing.

All the tests shall be conducted at the commencement of employment. The near distance test shall be administered annually thereafter and the colour plus grey scale test every five years or sooner if a medical condition such as diabetes becomes apparent.

## 4 REFERENCES AND ADDREVIATIONS

BS EN ISO 9712:2012 Non-destructive testing – Qualification and certification of NDT personnel – General principles

BS EN ISO 18490:2015 Non-destructive Testing. Evaluation of vision acuity of NDT personnel

BINDT The British Institute of NDT (the certification body)

NDT Non-Destructive Testing

PCN Personal Certification in NDT

PSL/44 VISION REQUIREMENTS

Ishihara 24 plate test Colour perception test.

Jaeger number 1 or Times Roman N 4.5 or equivalent letters (having a height of 1,6 mm)  
Near distance vision test.

Tumbling E Chart Near distance test chart from BS EN ISO 18490:2015

<http://www.eminspection.co.uk/visiontests/>

Near distance vision test

Dr Kolbl ONE/TUV/BV Eye Examination: Shades of Gray Rev 1 14 August 2002 <http://www.winning-teams.com/dkthomas/colortest/shadesofgrey.pdf>. Shades of Grey Perception Test Chart. SKERIK GREY SCALE TEST. Test can be downloaded for free from [www.cswip.com](http://www.cswip.com). Shades of Grey Perception Test Chart

## 5 ROLES AND RESPONSIBILITIES

Personnel administering vision tests: - To undertake vision tests in line with this procedure; to be either a qualified Optician/Optomtrist or A person designated by a responsible Level 3, having completed sufficient training to demonstrate by assessment, a required level of familiarity and application of the vision test.

Any person conducting NDT tests or inspections on behalf of the company: - Includes but not limited to NDT inspectors, Inspection Engineers, Plant Inspectors, Technical Authorities and Subcontractors, shall have and Pass an annual vision tests from an approved tester. Where necessary, they are required to wear corrective lenses during the vision test as they would when carrying out inspection work.

The Company shall: - To monitor vision tests to ensure they remain valid. To save documentation of appointment to conduct the tests and the vision tests/trade tests records in the individual's electronic file, a paper copy in training folder and records kept by the Company.

## 6 TRAINING

Those conducting vision tests shall be either a qualified Optician/Optomtrist or appointed by the Company PCN (or equivalent) Level 3 practitioners after providing satisfactory evidence of having attended vision test training with the Company Appointed Doctor

## 7 TEST CARDS/CHARTS

7.1 With exception of the Ishihara plates, vision test charts shall be printed in black ink on white paper and be in good condition. The printing equipment and the paper used shall be of an adequate quality for the purpose.

7.2 Ishihara plates should not be touched or kept open for prolonged periods of time so as not to deteriorate the colours.

## 8 EYE WEAR

8.1 Candidates shall wear the same eyewear, if any, as used during routine inspections. 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.

8.2 Where candidates do not achieve the required level vision acuity, they will be referred to an optician or optometrist and be asked to complete the test again.

8.3 The use of tinted lenses is permitted; however, photo chromatic lenses are not permitted for use during fluorescent Magnetic Particle Testing or Penetrant Testing techniques.

8.4 Where a new medical issue/condition arises, inspectors are required to arrange further eye examinations.

## 9 ILLUMINATION LEVEL

9.1 The test shall be administered in an area with good lighting conditions. Should there be any doubt that the light is not sufficient; a visible, white light of 500 lux shall be used to illuminate the chart. This shall be measured at the position of the chart using a calibrated visible light meter.

9.2 Higher levels of background light may adversely affect results. Spurious light sources, bright objects etc. should not be present within the field of view of the candidate.

## 10 CONDITIONS

The test shall be carried out under the conditions defined above and should not be limited to a test of an individual eye. Generally both eyes (binocular vision) shall be used together as it would be for normal inspection. Limited or no vision in one eye does not preclude a candidate from taking the test;

however, care should be taken to make sure that any other requirements for binocular vision are accommodated.

## 11 EYE TESTS AND ACCEPTANCE CRITERIA

### 11.1 Near Vision Test

**11.1.1** Company provided near vision test cards shall be used to conduct the near vision test. The card shall be positioned at an angle of up to 30° and the candidate should hold the card no closer than a distance of 30cm. 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 distance and the accuracy of measurement shall be appropriate but detailed calibration is not a requirement.

**11.1.2** The candidate shall read the complete text aloud or until such times that they are unable to read the text further.



**ISO 18490 Near Vision Standard**

**ISO 18490 Vision Charts**  
Visual acuity charts for the NDT industry

Welcome to the web site for the download of vision test charts to the requirements of ISO 18490. With the publication of ISO 18490:2015, the vision requirement mandated by the UK NANDTB, NANDTB/24, has now been superseded. This content requires Adobe PDF reader which can be downloaded [HERE](#).

To generate a random test PDF click the link opposite. To ensure correct size of the printed test select 'Page Scaling - None' in the print menu. See instructions for print quality information.

To return to the previous page click the 'BACK' button opposite.

**Generate Test**

**<< Back**

#### 11.1.3 Acceptance Criteria

Corrected or uncorrected near vision acuity shall permit reading a minimum of Times Roman or Jaeger 1 or equivalent letters at not less than 30cm. N4.5

Where a candidate fails to achieve this, the examiner shall verify that the test card and test conditions were not the cause of failure before making recommendation that the candidate arranges for further tests with a registered optician or optometrist.

### 11.2 Far Vision Test - Note this is not a mandatory requirement but is strongly recommended.

**11.2.1** Company provided far vision test charts shall be used to conduct the far vision test. The chart shall be positioned on a flat wall or surface and the candidate will stand at a distance of 6 metres from the chart. At no time shall the candidate be permitted to get closer. A tape measure may be used to verify the distance and the accuracy of measurement shall be appropriate but detailed calibration is not a requirement.

**11.2.2** 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 character.

**11.2.3** Candidates should be encouraged to provide answers even when they express some uncertainty in their ability to identify the characters.

#### 11.2.4 Acceptance Criteria

Corrected or uncorrected far vision acuity shall have a minimum value of 0.8 (or imperial measurement 6/7.5 i.e. the candidate will be able to read the characters on the line marked 7.5 M-units at a distance of 6 metres).

Where a candidate fails to achieve this, the examiner shall verify that the test card and test conditions were not the cause of failure before making recommendation that the candidate arranges for further tests with a registered optician or optometrist.

### **11.3 Ishihara Colour Acuity Test**

**11.3.1** Company provided Ishihara test plates shall be used to conduct the colour acuity test. Plates should be held at arm's length and tilted so that the plates are at a right angle to the line of vision.

**11.3.2** Answers should be given without more than 3 seconds delay.

**11.3.3** Colour vision shall be sufficient that the candidate can distinguish colour contrast between the colours or shades in the NDT method.

#### **11.3.4 Acceptance Criteria**

The candidate can identify each of the numerals on plates 1-17 within the allowed time limit.

Note: if the candidate is not able to read numerals, plates 18-24 can be used and the winding lines can be traced with a brush.

In the event that a colour perception deficiency is indicated by misreading any of the first 17 plates, a further trade test is to be carried out to ascertain whether the detected colour perception deficiency affects the individual's ability to perform the NDT for which he/she is certified.

The trade test will be agreed with the Technical Authority/PCN Level 3 certificate holder and results are to be documented on the Vision Test form and signed by the Company PCN (or equivalent) Level 3 practitioner.

### **11.4 Shades of Grey Test**

**11.4.1** The Shades of Grey test developed by Dr Kolbl of ONE/TUV/BV shall be used to assess ability to distinguish between shades of grey. Only Company approved copies of this test card shall be used. The eye test card shall be viewed at a distance between 30-50cm.

#### **11.4.2 Acceptance Criteria**

A minimum of 20 correct readings is required.

In the event that this test indicates a perception deficiency, a further trade test is to be carried out to ascertain whether the perception deficiency affects the individual's ability to perform the NDT for which he/she is certified.

The trade test will be agreed with the Technical Authority/PCN Level 3 certificate holder and results are to be documented on the Vision Test form and signed by the Company PCN (or equivalent) Level 3 practitioner.

## **12 RECORDS AND STORAGE**

**12.1** The person administering the vision tests shall record results.

**12.2** Completed forms shall be saved in the individual's file and records kept by the company.

**12.3** Letters of appointment by the Company PCN (or equivalent) Level 3 shall be kept by the company.

**12.4** Also acceptable are vision tests from other parties, for example, Authorised Qualifying Body, medically trained personnel, opticians/optometrists, etc. only when all of the tests listed in this procedure are completed and evidence is provided.

**12.5** Copies of vision tests shall be maintained securely on file by the Company for a period no less than 6 years.

# APPENDIX 1 SHADES OF GREY EYE EXAMINATION

Dr Kolbl ONE/TUV/BV Eye Examination: Shades of Gray Rev 1 14 August 2002.

## Eye Examination: Shades of Gray



Instructions: Use as a hardcopy or on the Computer screen at a distance of 30-50 cm under normal desktop working light conditions.

Passing grade: min. 20 correct readings required.

2	7	8	2	1
23	6	4	32	5
5	4	65	65	46
1	64	32	542	64
46		35	46	63

developed by Dr. Kölbl of FMTÜBV, Langemarckstr. 20, 45141 Essen, Germany, Tel. +49-201-8900900, [www.onetb.com](http://www.onetb.com)

This chart may be distributed free of charge only. Not for sale!

### The Skerik grey scale test was developed to:

1. Provide simple and small test chart for industrial use.
2. Provide a test which can be viewed on paper or on a monitor.
3. Allow the definition of a common requirement for contrast sensitivity.
4. Provide a test which will be easily available.

Below is one of the Skerik Grey Scale Test options.



## SKERIK GREY SCALE TEST

CONTRAST SENSITIVITY TEST DEVELOPED BY TWI

Skerik grey scale test complies with the requirements of EN ISO 9712:2012, SNT-TC-1A ed. 2011 and NAS 410 rev. 4. It is intended to be used for verification of grey scale perception of inspection and non-destructive testing personnel. This grey scale test is suitable for use as printed paper hardcopy as well as in form of pattern on the monitor screen.

	S6 (± 6 %)	S5 (± 5 %)	S4 (± 4 %)	S3 (± 3 %)	S2 (± 2 %)	S1 (± 1 %)
<b>Black</b> (10 % of scale)	E	V	S	R	O	
<b>Grey</b> (50 % of scale)	L	F	S	G	K	
<b>White</b> (95 % of scale)	U	Y	Y	A	U	G

Test can be downloaded for free from [www.cswip.com](http://www.cswip.com).

This test is free for use provided that it is not modified.

Quality of test pattern shall be verified on calibration pattern prior to use. It is recommended that a record of verification is kept for audit purposes.

**Contrast modification** - It is required that contrast of 2 % and above shall be clearly discriminated on pattern while contrast of less than 1 % shall not be visible.

**Dimensional distortion** - Reduction in size (180 mm) is not acceptable. Enlargement is acceptable provided that whole pattern can be observed together.

