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	Name	Signature
Prepared	D. Keyser	
Reviewed	P. Kilfoil	
Approved	P. Borchardt	

DISTRIBUTION

DEPT				
Quality				
EWS				

NAME	DEPT

Gammatec NDT Supplies SOC Ltd

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1. PURPOSE/OBJECTIVES

The objective of this procedure is:

1.1 To outline the steps taken in the Quality Control Checking and calibration of the Gammatec LED viewer.

2. <u>SCOPE</u>

This procedure is applicable to all personnel within Gammatec NDT Supplies SOC Ltd Electrical Workshop

3. <u>RESPONSIBILITIES AND AUTHORITIES</u>

3.1. Managing Director

The Managing Director is responsible for ensuring that the necessary responsibilities and authorities are defined, assigned and communicated to the applicable personnel within the company.

3.2 Electronic Workshop Manager/Supervisor

- Is responsible for ensuring that the necessary responsibilities and authorities are assigned and communicated to the applicable personnel.
- Is responsible for ensuring that this work instruction is available at point of use.
- Is responsible for delegation and prioritising of work to his staff.
- Is responsible for ensuring that all Repair, Testing and Calibration is recorded on the relevant work sheets and is available for review when required during processing.
- Is responsible for ensuring that all calibrations conducted are traceable to National / International standards, or Manufacturers specification (where required).
- Is responsible for ensuring that customers stated requirements are met for Repair, Testing and Calibration.
- Is responsible for the training, and certification of technicians in accordance with the approved Quality Policy and Work instructions.
- Is responsible for regular reviewing and updating of this work instruction to ensure that it remains current.
- Is responsible for the prompt implementation of corrective/preventive measures regarding any non-conformances originating from the Electrical Workshop.

3.3 Electronic workshop technician

- Is responsible for adherence to the requirements this work instruction.
- Is responsible for ensuring that the required resources and tools are correctly maintained.
- Is responsible for prompt reporting any problems or non-conforming situations to the EWS Manager / Supervisor for advice or resolution.

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3.4. SHEQ Manager

- Is responsible for ensuring that the necessary responsibilities and authorities are assigned and communicated to the applicable personnel.
- Is responsible for ensuring that this work instruction is available at point of use.
- Is responsible for ensuring that tools and resources are identified and provided as required.
- Is responsible for regular reviewing and updating of this work instruction to ensure that it remains current.
- Is responsible for the prompt implementation of corrective/preventive measures regarding any non-conformances originating from the Quality Department.

3.5. QC Supervisor

- Is responsible for ensuring that the necessary responsibilities and authorities are understood and adhered to.
- Is responsible for ensuring that this work instruction is available at point of use.
- Is responsible for supervision and delegation of tasks to the QC Inspectors.
- Is responsible for ensuring that the required resources and tools are correctly maintained.
- Is responsible for prompt resolution of any reported quality problems reported.
- Is responsible for prompt reporting of any non-conforming situation to the SHEQ Manager for advice or resolution.

3.6. QC inspector

- Is responsible for adherence to the requirements this work instruction.
- Is responsible for ensuring that the required resources and tools are correctly maintained.
- Is responsible for prompt reporting of any non-conforming situation to the QC Supervisor for advice or resolution.

4. <u>REFERENCES</u>

- 4.1 ISO 9001 Quality Management System.
- 4.2 ASTM 1390-12 Illuminators Used for Viewing Industrial Radiographs
- **4.3** Applicable procedures and work instructions within Gammatec NDT Supplies SOC Ltd.
- **4.4** Regulatory requirements as applicable within Gammatec NDT Supplies SOC Ltd.

5. **DEFINITIONS**

- 5.1 EWS Electrical Workshop
- 5.2 QC Quality Control

6 PROCEDURE

6.1 Equipment required

• Surface Candela meter (AccuMax Readout Unit Model: XR-1000) and Probe XS555/L.

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- Dark safety glasses.
- Film measurement template.

6.2 Discussion of the process – QC of Standard LED Viewer.

6.2.1. Ensure when taking measurements that **NO DRAGGING/SLIDING** of probe against the surface of the viewer screen is done. Pick up the probe and place it in the selected position of measurement.

6.2.2. New Viewer

6.2.2.1. Bodywork

Check that there are no cracks, dents or scratches on the bodywork Check that housing is square with no gaps between the joints Check that all screws are in place and tightened Check that the Film rest rail at bottom of viewing screen is in place Check that the Footrest is operating correctly

6.2.3.2. Screen

Check that Screen is securely mounted in viewer housing Check that there are **NO** scratches or other blemishes

6.2.3.3. Power Supply

Check the Power lead for any damage or loose connections to cable or plugs Check the Power Supply, leads and connectors for any damage and loose connections

Check that power is supplied to the Viewer.

Check that the Power Switch is securely mounted in the viewer housing Check that ON/OFF operation is correct

Check that Selector Switch activates individual panels in the LED 3.8 viewer. Check that Fuse cover is in place

Check that Fans are securely mounted in viewer housing (Visual check) Check that fans are operating. (Use a piece of paper and verify suction in and blowing out of air)

6.2.3.4. Footswitch

Check that Panel Mount connector is securely mounted in the viewer housing Check that Cable is securely connected at Footswitch and Connector Check that Connector fits and clips in the Panel Mount connector correctly Check that Footswitch is operating correctly (Depress = Bright, release = Dim) Check that no obvious signs of damage to Footswitch are evident.

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6.2.3.5. Dimmer Control

Check that Potentiometer is securely mounted in viewer housing Check that Dimmer control turns smoothly from lock to lock Check that there is no flickering of the LEDs during dimming/brightening

6.2.3.6. Identity Plate

Check that rating information on back of the LED 3.8 viewer is clearly visible and legible as per the example in Figure 1.

DIMMABLE LED INDUSTRIAL FILM VIEWER								
MANUFACTURER	MANUFACTURER Gammatec NDT Supplies SOC Ltd							
MAKE	Gammatec							
MODEL	LED 3.8							
SERIAL #	SERIAL # LED xxx							
Description	Min.	Тур.	Max.	Frequency				
Input Voltage (VAC)	100VAC 230VAC 240VAC 50/60Hz							
Input Current (mA)	Input Current (mA) 4.5A Max.							
Over temperature protection 70°C automatic cut off								
Environment Operation 10 ~ +50°C Storage 10 ~ +85°C								
Max Brightness								

Figure 1

6.2.3.7. Screen Uniformity

Uniformity must be greater than 0.5 across the viewing surface of the screen. The screen shall be divided into sections utilising a template and the readings noted as per the example in Figure 2. Measurements are in cd/m^2 .

Note: Ensure that the viewer is switched on to full luminance and running for 5 minutes before taking measurements. All panels for the LED 3.8 viewer.

47000	50000	57000	61000	65000	62000	63000	60000	54000
48000	54000	64000	67000	68000	66000	64000	58000	55000
46000	52000	58000	62000	66000	65000	61000	57000	52000

Figure 2

Gammatec NDT Supplies SOC Ltd							
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Uniformity shall be calculated by taking the **<u>average</u>** of the four lowest and four highest readings in Figure 2 as per the example in Figure 3:

Readings	Lowest L <i>min</i>	Highest L <i>max</i>	Uniformity >0.5
	46000	64000	L <i>min</i> 49750
	47000	66000	L <i>max</i> 65500
	52000	67000	= 0.76
	54000	68000	
Average	49750	65500	



6.2.3.8. Luminance

The maximum Luminance and maximum viewing density shall be determined by entering the highest reading in Figure 2 in the Y input of the Film Density Calculator **(Appendix 1)** and pressing Enter. The X value then indicates the maximum allowable viewing density to be displayed on the unit calibration sticker together with the maximum brightness as per the example in Figure 4.

Maximum	Viewing	
Iuminance	Density	
68000	3.8	

Figure 4

The minimum Luminance required for a new viewer is 70 000cd/m² to achieve a viewing density of 3.84.

NB!!! Ensure data for each new LED 3.8 viewer is saved under <u>G:\Gammatec Documentation\POLICIES,PROCEDURES,WORK</u> <u>INSTRUCTIONS\Electrical Workshop\4. Print Media\LED3.8</u>

The results of the above-mentioned examinations shall be recorded on the Examination Record for LED Viewers as shown in **Appendix 2**.

Note: Ensure that the "reference calibration equipment" stated on the examination record are within calibration validity period.

The Viewer Verification sticker (Appendix 3) must be put on unit when issuing the Certificate of Conformance (Appendix 4).

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6.2.4. Used Viewer

6.2.4.1. Bodywork

Ensure that Viewer housing is complete with no gaps between the joints or broken panels which would allow insertion of any object into the viewer or loss of light intensity.

Check that all screws are in place and tightened Check that the Film rest rail at bottom of viewing screen is in place Check that the Footrest is operating correctly

6.2.4.2. Screen

Ensure that Screen is securely mounted in viewer housing Check that Scratches or other blemishes do not interfere with the viewing area.

6.2.4.3. Power Supply

Check the Power lead for any damage or loose connections to cable or plugs Check the Power Supply, leads and connectors for any damage and loose connections

Check that power is supplied to the Viewer.

Viewer earthing must be checked using a Multi-meter (Continuity Test) between moulded plug earth pin and female kettle lead insert earth slot.

Check that the Power Switch is securely mounted in the viewer housing Check that ON/OFF operation is correct

Check that Selector Switch activates individual panels in the LED 3.8 viewer. Check that Fuse cover is in place

Check that Fans are securely mounted in viewer housing (Visual check) Check that fans are operating. (Use a piece of paper and verify suction in and blowing out of air)

6.2.4.4. Foot switch

Check that Panel Mount connector is securely mounted in the viewer housing Check that Cable is securely connected at Footswitch and Connector Check that Connector fits and clips in the Panel Mount connector correctly Check that Footswitch is operating correctly (Depress = Bright, release = Dim) Check that no obvious signs of damage to Footswitch are evident.

6.2.4.5. Dimmer Control

Check that the Potentiometer is securely mounted in the viewer housing Check that the Dimmer control turns smoothly from lock to lock Check that there is no flickering of the LEDs during dimming/brightening process Check that the Dimmer push button is securely mounted in the viewer housing

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Check that the Operation of the Dimmer Push button is correct: Depress- bright, Release and Depress- Dim

6.2.4.6. Identity Plate

Check that where applicable, the Identity Plate has been fitted and that the Rating information on left side panel is clearly visible and legible as per Figure 1, S/N and Manufacturers address plate is fitted and visible.

6.2.4.7. Screen Uniformity

AS per 6.2.3.7.

6.2.4.8. Luminance

As per 6.2.3.8.

The results of the above-mentioned examinations shall be recorded on the Examination Record for LED Viewers as shown in **Appendix 2.**

NB!!! Ensure data for each LED 3.8 viewer is stored and compared with original data found in:

<u>G:\Gammatec Documentation\POLICIES,PROCEDURES,WORK</u> INSTRUCTIONS\Electrical Workshop\4. Print Media\LED3.8

Findings to be sent to QA/QC manager, EWS manager and supervisor for review.

Note: Ensure that the "reference calibration equipment" stated on the examination record are within calibration validity period.

6.2.5 QC Verification

If all results obtained are acceptable and within the stated tolerances the QC inspector will generate the Certificate of Conformance in **Appendix 4** if applicable. Details on the Calibration sticker issued by EWS must correspond to the Examination Record.

QC will hand over the completed unit along with the Sales Order, Examination Record and Certificate of Conformance to Stores after signing off the QC section on the Job Card.

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7. <u>RECORDS</u>

Records generated by this procedure are as follows:

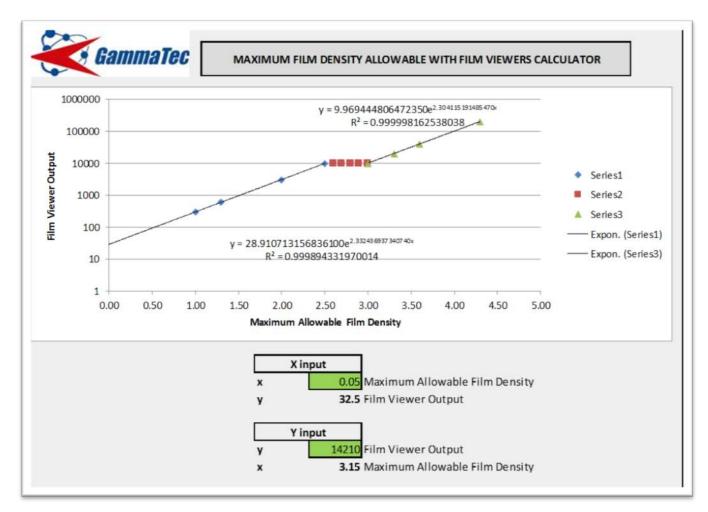
Record	Location/Responsible	Retention Period		
Examination Record	EWS/Archive	5 years		
Certificate of Conformance	QC/Archive	5 years		

8. RECORD OF REVISION / RECORD OF CHANGES

RECORD OF CHANGES, REVISIONS AND CANCELLATIONS							
DATE	DATE NATURE / DETAIL OF CHANGE						
15 February 2012	New	0					
16 September 2013	Extensively revised	1					
21 November 2014	Revised	2					
23 October 2015	Section 7.1.1 and 7.1.5 Amended, Appendixes added	3					
7 December 2015	6.2.3.11 & 6.2.4.12 amended to include calibration reference equipment	4					
November 2018	Updated	5					

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Appendix 1



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PM//GSA/LOG-005.01.024.002 4 Nov 2018 EXAMINATION RECORD EXAMINATION RECORD Customer:	GAMMATEC	VE	SYSTEMS PROCEDURE REV ISSUE VERIFICATION OF PURCHASED PRODUCT DATE PM/GSA/LOG-005.01.024.002 4 Nov 2018											
Customer: Record No.: Reference Standard: ASTM E 1390-12 Item: Film Viewer Make and Model:			P	M/G S							4		Nov 2	2018
Reference Standard: ASTM E 1390-12 Item: Film Viewer Make and Model:					EXAN	IINATIO	N RI	ECC	ORD					
Item: Film Viewer Make and Model:	Customer	. <u> </u>							_	Re	ecord No.			
Make and Model:	Reference	Standa	rd:	AST	M E 1	390-12								
Serial No.:	Item:			Film	Viewe	er 🛛								
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Image: Control of the second	Serial No.:	:												
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POWER SUPPLY Image: Supply state	BODYWORK													
FOOT SWITCH	SCREEN													
DIMMER CONTROL Image: Control of the second se	POWER SUP	PLY												
IDENTITY PLATE Image: Screen luminance uniformity in cd/m² Screen luminance uniformity in cd/m² Screen luminance uniformity in cd/m² PANEL 1 PANEL 2 PANEL 3 PANEL 4 Ssreen luminance uniformity in cd/m² Maximum Viewing Series state State State State State Series state State State State State State Readings Lowest Highest Uniformity Maximum Viewing 47750 61280 Lmin /Lmax > 0.5 Luminance Density 51390 Sesso Sold State State State State 47750 61280 Lmin /Lmax > 0.5 Luminance Density 47750 61280 Lmax Goldsol 0.85 State State 40010 Gonection Factor X 1.0 State State State State 40072018 State 2007/2018 Goldsol 2007/2018 State State <td></td>														
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Appendix 3

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GammaTec	
Serial No.:	
Maximum Brightness:	
Maximum Viewing Density:	
Verification Due Date:	
Verification done by:	Prestiga 108803(b)

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CERTIFICATE OF CONFORMANCE

CERTIFICATE No:

CUSTOMER		
DESCRIPTION	FILM VIEWER	
MODEL		
SERIAL No.		
MEASURED BRIGHTNESS	cd/mª	
MAXIMUM VIEWING DENSITY		
SUPPLIER	GAMMATEC NDT SUPPLIES SOC LTD	
COUNTRY OF ORIGIN	SOUTH AFRICA	
DATE		
DATE EXPIRY		
REPORT		
The above equipment was tested by Gammatec NDT Supplies and		
meets the requirements of ASTM E 1390-12.		

QUALITY ASSURANCE

PM/GSALOG-005.01.024.003 Rev 1