

Data and statistics

Laser Weld Monitoring (LWM) Technology

*Both Models
(Spot weld and Spot and Seam Weld LWM)*

Data

1. Images acquired and evaluated are saved to the on board computer (Model HDEm LWM) or downloaded in real time to the CPU (Model Gen2HDE LWM), in the .JPG format.
2. All images are automatically labeled with the Image Number, Correlation Value and 'Pass-Fail' label.
3. All Correlation Values are listed on the XLS data sheet in a data table in the CSV format.
4. Statistical summary of each welded assembly.
5. Statistical summary of all the welded assemblies in one lot.
6. Graphical presentation of all the completed welds in one lot, showing the UCL and LCL and the Correlation Values is available.
7. Data may be downloaded (archived) on client's computer server.

Data security

8. Password protection of the system files.
9. Password protection of data.

Statistics



Figure 1. Sample of folder containing both the images and the Statistical Report of the assembly welded.

Graphics are added to enhance the illustration.

1	Weld Information:	
2		
3	Date:	1/27/2016
4	Operator:	Simon
5	Part Number:	Wed1_01270304
6	Lot Number:	1
7	Serial Number:	100
8	Number of Welds Per Assembly:	30
9	Start Monitoring at Weld:	1
10	End Monitoring after Weld:	30
11	Total Welds Monitored:	30
12	Pass Criteria(%):	85
13		
14		

Figure 2. Sample of the file showing the administrative information relating to the laser welded assembly. In this case it is Lot Number 1, Serial Number 100, etc. *Graphics are added to enhance the illustration.*

	A	B	C	D	E	F	G
1		Weld Information:					
2							
3		Date:	1/27/2016				
4		Operator:	Simon				
5		Part Number:	Wed1_01270304				
6		Lot Number:	1				
7		Serial Numbers Starting at:	100				
8		Number of Welds Per Assembly:	30				
9		Start Monitoring at Weld:	1				
10		End Monitoring after Weld:	30				
11		Total Welds Monitored:	30				
12		Pass Criteria(%):	85				
13							
14							
15		Statistics by Lot #:					
16							
17	Average:	98.298					
18	Max:	99.51					
19	Min:	95.84					
20	Std. Dev.:	0.69					
21							
22							
23		Statistics by Serial #:					
24							
25	Serial #	Average	Max	Min	Std. Dev.	Actual # of Pulses	Pass/Fail
26	100	98.29	99.51	96.78	0.638	30	Passed
27	101	98.27	99.46	95.84	0.792	30	Passed
28	102	98.352	99.33	96.77	0.644	31	Failed
29	103	98.281	99.13	96.31	0.705	33	Failed

Figure 3. Sample of the file showing the administrative information plus the statistics of for the entire Lot and for each Serial Number in the lot. In this case it is Lot Number 1,

Figure 3 (continued):

Serial Numbers are 100, 101, 102 and 103 etc.

Assembly Number 102 and 103 'Failed' because there were too many pulses recorded during welding those two assemblies.

The 'Failed' message may also be posted if the correlation values are lower than the 'Pass Criteria(%)' – see **Line 12** in **Figure 3**.

In **Figure 4** see the statistical control graph for these assemblies. The acceptance or rejection of any laser welded assembly would be based on the fit of the Correlation values between the Upper and Lower (control) limits.

Graphics are added to enhance the illustration.

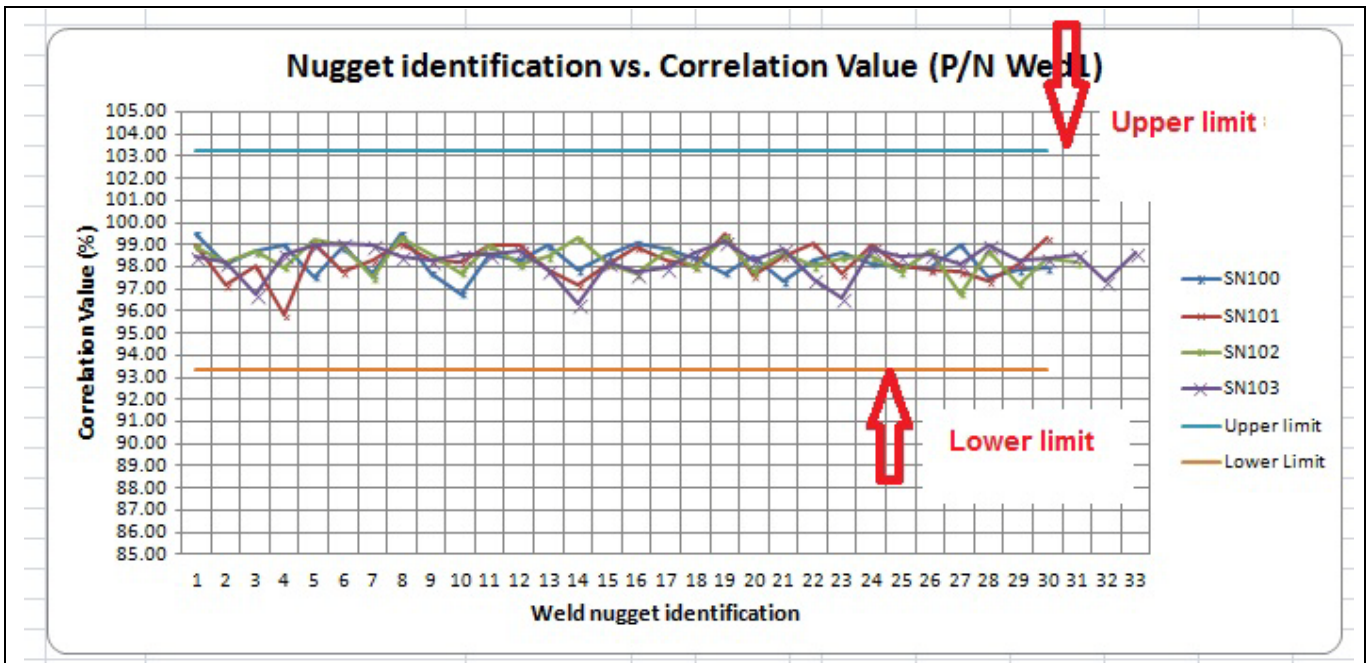


Figure 4. Sample of the Statistical Control Graph showing the Upper and Lower (Control) limits for the laser welded assemblies, SN 100, 101, 102 and 103. These limits are generated based on suggested allowable variations in published Standards.

Graphics are added to enhance the illustration.

Disclaimers

The HDE Pulsed Laser Weld Monitor (LWM) systems are designed to identify changes and variations in the laser welding process with great accuracy in real time, analyze the data and report it to the end user. The accuracy of the data and the reports are subject to a number of process related variables and their interactions with each other and the process limits set by the end user.

The end user is advised to NOT use the HDE Pulsed LWM systems as devices to determine the final absolute quality of the welded product. HDE recommends that the end user continues the normal inspection and testing of the laser welds and the laser welded product as the end user has been doing in the past and as it was approved by the Industry Specific Regulatory Agency.

HDE is not accepting any responsibility as to the accuracy of the HDE Pulsed LWM systems and the final quality and utility of the laser welded components.

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