

Process variables detected

Laser Weld Monitoring (LWM) Technology

The HDE Pulsed LWM systems have been tested and found able to identify

changes

in the following weld process variables:

1. Temporal characteristics - pulse shape – rise time and pulse length.
2. Number of pulses fired in to the material – too few or too many, including tack welds.
3. Spatial characteristics – spatial profile of the laser beam.
4. Laser power – power density, due to contaminated optics and cover slides.

(Hint: since the image processing time is approx. 40 micro seconds, the response of the HDE LWM systems to laser power changes is significantly faster than the response time of most power meters!)

5. AXIAL position of the focused spot (focus shift).
6. TRANSVERSE position of the focused spot with respect to piece part geometry.
7. WELD GEOMETRY – *click on the ‘System calibration’ on the opening page of this web site.*

7.1 Gaps in the weld joint – aligned with the weld:	<< 0.002”.
7.2 Gaps in the weld joint – transverse to the weld:	<< 0.001”.
7.3 Butt weld joint – misaligned parts:	< 0.002”.
7.4 Lap weld joint – gaps between the pieces:	t.b.calibrated
7.5 Changes in heat sink conditions	t.b.calibrated

8. Mechanical interference between the laser beam and clamps, fixtures, etc.
9. Shielding gas – changes in the type of gas, volume and the direction of gas flow.
10. Additional data and techniques are collected continually and added to the Operators Manual!

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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