3.9 BeamCheck™ - Beam profiling system for Additive Manufacturing

- Beam check measures:
  - Focal spot size at the build plane
  - Laser power at the build plane
  - Laser power density at the build plane
  - Changes in spot size & power density over time
- 0.1 to 600 Watt integrated power sensor
- For fiber lasers; 1060 to 1080nm Wavelength
- Power densities to >3MW/cm^2
- Spot sizes – 37um to 3.5mm
- Frame rate – multiple frames per second
- Additive manufacturing system focal length 200mm – >400mm

Additive manufacturing has restructured how prototype, developmental and advanced design mechanical components are made. Direct Laser Melting, Selective Laser Sintering or 3D metal Printing is quickly becoming the standard for designs that could not be fabricated with traditional metal removing techniques.

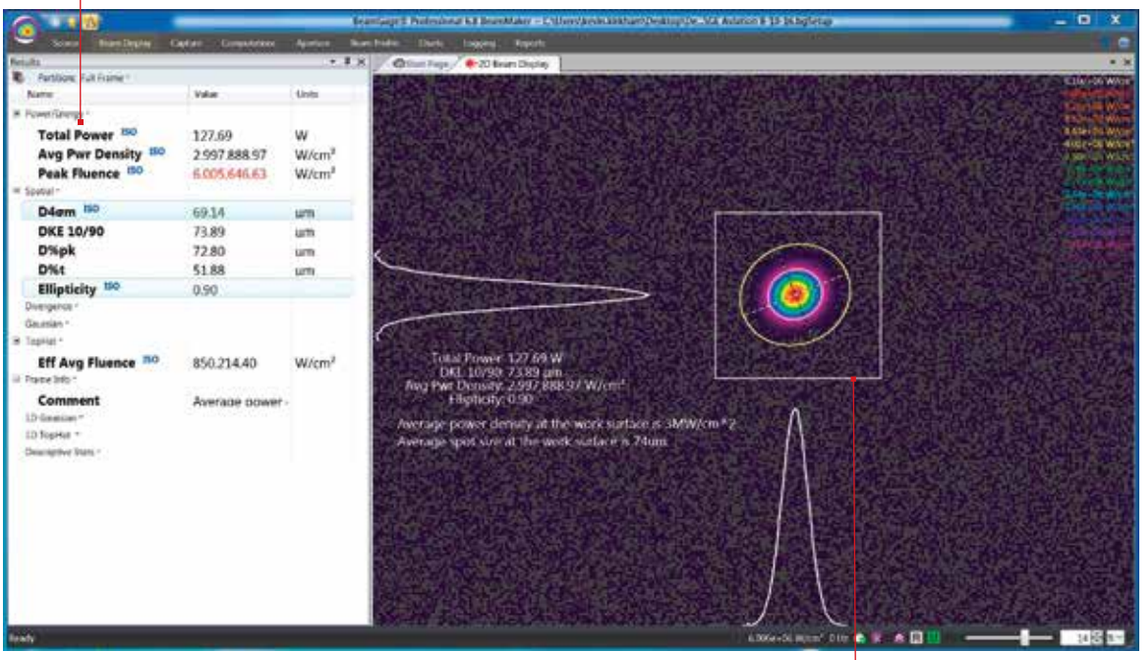
To create consistent, strong structures using laser-based additive manufacturing processes that meet flyable DOD standards or FDA requirements, the metallurgy must be consistent, and a laser beam of known dimension, power density and focal spot location is required.

Quality 3D laser printed processes require a laser delivering the correct amount of power, distributed correctly and focused at the correct location. To insure consistent and structurally sound parts these parameters should be directly measured before and after any critical part is made.

BeamCheck is an integrated laser measurement system designed to measure critical laser beam parameters for laser-based additive manufacturing systems BeamCheck includes a CCD camera for spatial measurements and a NIST-traceable power sensor that will provide a complete analysis of the laser power density profile.

The camera is precisely located at the build plane so that an accurate power density model of the working laser beam can be made. A beam splitter directs a small percentage of the beam to the camera, while the majority of the beam is directed to the integrated power sensor. From these measurements an accurate beam spot size and power density can be derived.

Industry standard ISO measurements



1D and 2D representation of spatial distribution of the power within the beam

BeamCheck Includes

Model	BeamCheck
Beam Profiling	
	SP928 high resolution CCD camera
	• 3.69um square pixel, USB 3.0, multiple frames per second
	CCD is positioned within +/- 50µm of the same distance as the work surface
	LBS-300-NIR laser beam splitter / attenuator
	• Directs the beam to both the camera and power sensor
Power Measurement	
	FL600A-LP2-65 laser power sensor
	• NIST traceable, 600 Watts, fan cooled
	JUNO Smart Sensor to USB Adapter
Software	
	BeamGage Professional Software to run on user supplied PC
	StarLab software to interface power sensor to BeamGage
Data is saved in ASCII and HDF5 formats	
Custom print-out includes;	
	2D False Color Power Density Map
	Total Power
	• NIST/National Lab Traceable certificate
	Beam Diameter (D4sigma, 90/10 Knife Edge, Power-in-a-Bucket)
	Peak Power Density
Calibration Certificates for;	
	FL600A-LP2-65 Power Sensor
	JUNO USB Converter
	SP928 CCD Camera
	Calibration of build plate distance to camera array location
Compliance	CE, UKCA, China RoHS
Ordering Information	
Part Number	**SP90411**