

Materials List for:

Subsurface Defect Localization by Structured Heating Using Laser Projected Photothermal Thermography

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Materials

Name	Company	Catalog Number	Comments
500 W diode laser system, 940 nm	Laserline	LDM 500 - 20	Pilot laser class 2 @ 650 nm, diode laser is a class 4 laser system --> special laboratory needed
Laser control box	Laserline	Laser control box LDM	Add on to the laser system, used to switch electronically, laser threshold, shutter, laser on 0 V..5 V TTL
Control box scanner	Laserline		Add on to the laser system, used to adjust the optical output power via analog signal from 0 V..10 V
Fiber Laser Mount 2", f = 80 mm	Laserline		Add on to the laser system
Multifunction Data Acquisition (DAQ) Device + BNC Terminal	National Instruments	NI-USB 6251	The DAQ card is used to trigger the IR camera, the DLP Light Commander 5500, control Laser and diode PDA 36A
Standard - PC			Control PC - graphic card for two screens, at least 4 x USB, Windows based
BNC cabel			Standard cable
HDMI cable			Standard cable
Micro USB to USB cable			Standard cable
LabVIEW 2013 SP1 Development System	National Instruments		Development environment for device control
LPPT control software	BAM		part of the LPPT software package by LabVIEW 2013 SP1
LPPT intensity software	BAM		part of the LPPT software package by LabVIEW 2013 SP1
LPPT laser control software	BAM		part of the LPPT software package by LabVIEW 2013 SP1
Matlab 2016b	MathWorks		Postprocessing of the measurement data
LPPT postprocessing software	BAM		Postprocessing of the measurement data
IR camera control PC	InfraTec		Control PC is supplied by camera distributor
IR camera control software	InfraTec	Irbis 3 Professional	
InfraTec SDK	InfraTec		Dynamic Link Library as interface between the native data aquisition format of Infratec and Matlab
IR camera	InfraTec	Image IR 8300	640 x 512, cooled InSb detector, wavelength 2 µm..5.7 µm, noise = 20 mK + accessories (LAN cable,

			Digital in/out cable, space ring, power supply, case)
Tripod	Manfrotto	161MK2B	
IR camera mount	Manfrotto	405	
Projector development kit (PDK) for digital light processing (DLP) technology (DLP Light Commander 5500)	Logic PD	DLP-LC-DLP5500-10R	DLP5500 Digital Micromirror Device from Texas Instruments included , light engine and case need to be disassembled
PDK control software	Logic PD		Included when delivered, DLP Light Commander control software
Mechanical platform for the PDK	BAM		Self made (140 x 230 x 420) mm ³
Power meter control unit	Ophir	Vega	USB Interface
30 W power meter head	Ophir	30(150)A-LP1-18	Power meter head to determine Transmission of the projector system
500 W power meter head	Ophir	FL500A	Power meter for process supervision
Motion controller	Newport	ESP301	with USB Interface
Translation stage	Newport	M-ILS200CC	Connected to ESP301
Photodiode with amplifier	Thorlabs	PDA 36A-EC	1" mount
Reflective filter ND1	Thorlabs	ND10A	to be mounted to the PDA 36A
Pinhole 1"	Thorlabs	P1000S	to be mounted to the PDA 36A
Optical aluminium breadboard	Thorlabs	MB60120/M	(1,200 mm x 900 mm) base
Plano Convex Lens f = 200 mm	Thorlabs	LA1979-B	Coated for IR, first telescope lens
Plano Convex Lens f = 75 mm	Thorlabs	LA1145-B	Coated for IR, second telescope lens
xy-translation stage	Newport	M401	Used for adjusting the telescope
Beamsampler	Thorlabs	BSF20-B	Splits the optical output, used to reduce the optical input for the projector system
Mirror	Thorlabs	BB2-E03	Mirror for coupling the beam to the DLP Light Commander
Heavy duty lab jack	Thorlabs	L490	Used for the fiber mount and on top of the linear stage to position the sample (2x)
PDK-objective	Nikon	Nikon AF Nikkor 50 mm 1:1.8:D	Objective for DLP Light Commander, 50 mm
Plano Convex Lens f = 100 mm	Thorlabs	LA1050 -B	Lens is attached to the Nikon Objective
Bi-Convex Lens f = 60 mm	Thorlabs	LB1723 -B	Lens to be attached to the Nikon objective in order to determine the optical transmission with the 30 W measurement head
Square protected gold mirror	Thorlabs	PFSQ20-03-M01	
High power IR sensor card	Newport	F-IRC-HP-M	Sensor card to check the optical pathway
2" crosshairs	BAM		Self-made
1" crosshairs	BAM		Self-made
Bullseye level	Thorlabs	LCL01	
Translation Stage	Newport	M-UMR8.25	Used for measuring the beam profile
Micrometer screw	Newport	DM17-25	Used with translation stage M-UMR8.25

Mounted Zero Aperture Iris	Thorlabs	ID75Z/M	used to check the optical pathway
Bases and Post Holders Essentials Kit, Metric and Universal Components	Thorlabs	ESK01/M	Basis
Posts & Accessories Essentials Kit, Metric and Universal Components	Thorlabs	ESK03/M	
M6 Cap Screw and Hardware Kit	Thorlabs	HW-KIT2/M	
Construction Rails	Thorlabs	XE25L700/M	
1" Construction Cube	Thorlabs	RM1G	Used to mount construction rails
Electrical discharge machining	Sodick	AG60L	www.sodick.de
St37 block of steel (100 x 100 x 40) mm ³	BAM		self-made, hidden defect with remaining wall thicknesses of 0.25 mm, 0.5 mm, 0.70 mm, 1.25 mm (shown in Figure 5)
St37 block of steel (100 x 100 x 40) mm	BAM		self-made, hidden defect with remaining wall thicknesses of 1 mm, 1.5 mm, 1.75 mm, 2 mm (shown in Figure 5)
Graphite spray	CRC Industries Europe NV	GRAPHIT 33	Ref. 20760, 200 mL aerosol (Kontakt-Chemie)
Protective tape	Tesa	tesakrepp 4348	used to protect the hidden defects while coating