



WP6 – ADVANCED MATERIALS, ADDITIVES AND PRODUCT DESIGN FOR HIGH SPEED WELDING

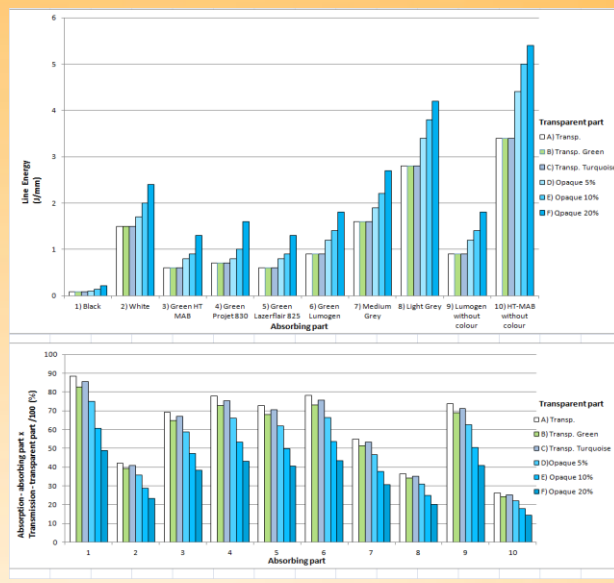


ABSTRACT

Evaluation of the weldability when different absorbers and colours are combined. Colours play an important role in product design, and it's important to understand their influence on the laser welding properties.

		A	B	C	D	E	F		
		Transparent	Transparent green (tube)	Transparent turquoise (DMA)	Opaque turquoise (Hockenheim) 5%	Opaque turquoise (Hockenheim) 10%	Opaque turquoise (Hockenheim) 20%	Power (W)	Speed (mm/s)
1	Carbon Black 0.5%	40	40	40	50	70	110		
		500	500	500	500	500	500		
2	White HT-MAB PP 91491	150	150	150	170	200	240		
		1.50	1.50	1.50	1.70	2.00	2.40		
3	Green HT-MAB PP 61179 LSA	60	60	60	80	90	130		
		0.60	0.60	0.60	0.80	0.90	1.30		
4	Green + 1% Project 830 PGL 53042	70	70	70	80	100	160		
		0.70	0.70	0.70	0.80	1.00	1.60		
5	Green + 1% Lazair 825 Coloplast 151M	60	60	60	80	90	130		
		0.60	0.60	0.60	0.80	0.90	1.30		
6	Green + 250 ppm Lumogen 788	90	90	90	120	140	180		
		0.90	0.90	0.90	1.20	1.40	1.80		
7	Medium grey	160	160	160	190	220	270		
		1.60	1.60	1.60	1.90	2.20	2.70		
8	Light grey	140	140	140	170	190	210		
		50	50	50	50	50	50		
9	Lumogen without colour	2.80	2.80	2.80	3.40	3.80	4.20		
		90	90	90	120	140	180		
10	HT-MAB PP 61179 LSA without colour	0.90	0.90	0.90	1.20	1.40	1.80		
		170	170	170	220	250	270		
		50	50	50	50	50	50		
		3.40	3.40	3.40	4.40	5.00	5.40		

Welding trial setup



Welding results



Catheter housing

METHOD

- A welding trial is setup with 10 different absorbing partners, all welded to 6 different transparent upper joining partners (see figure left)
- The minimum line energy for welding is identified and compared to absorption and transmission properties of all parts (see figure right)
- The colours are all chosen from relevant Coloplast' design manual

HIGHLIGHTS

- Accordance between minimum line energy and measured optical properties
- It's possible to see the effect of absorption in the absorbing part, and transmission in the transparent part
- In collaboration with Treffert, a laser-absorbing Green has been developed as an alternative to the present used expensive Lumogen absorber

OUTLOOK

- Trials with 1500 nm diode are scheduled to investigate if this can reduce the needed energy when welding opaque transparent parts
- Results from WP6 will form the basis for the work in WP8 and the demonstrator

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