

# Machining Guidelines



Machining ZL® materials is easy, but use only sharp tools with high cutting speeds and low feed. In order to obtain exact dimensions, machining should be done in several steps to allow the component to cool down properly. When drilling large diameters, start with a pilot hole of 10 - 12 mm. When machined, all corners should be rounded to avoid failure due to the notch effect.

Diamond coated tools and pre-heating of the stock shapes are recommended when machining glass-fiber filled engineering plastics.

### Drilling

$a$  = side relief angle(°)  
 $\gamma$  = rake angle(°)  
 $q$  = top angle(°)  
 $v$  = cutting speed (m/min)  
 $s$  = feed (mm/rev)

### Turning on a Lathe

$\alpha$  = side relief angle(°)  
 $\gamma$  = rake angle(°)  
 $\chi$  = setting angle(°)  
 $v$  = cutting speed (m/min)  
 $s$  = feed (mm/rev)

ZL Product	$a$	$\gamma$	$q$	$v$	$s$
ZL® 900 (Acetal)	5-10	3-5	60-90	50-100	0.1-0.3
ZL® 1400 (PET)	5-10	10-20	90	50-150	0.2-0.3
ZL® 250 (Nylon 6/6)	10-15	3-5	60-90	50-100	0.1-0.5
ZL® 1100 (Cast Nylon 6)	10-15	3-5	60-90	50-100	0.1-0.5
ZL® 1500 (PEEK)	5-10	10-30	90-120	70-200	0.1-0.3

$a$	$\gamma$	$\chi$	$v$	$s$
5-10	0-5	0-45	200-500	0.05-0.5
5-10	0-5	0-45	200-500	0.05-0.5
5-15	0-10	0-45	200-500	0.1-0.5
5-15	0-10	0-45	200-500	0.1-0.5
6-8	0-5	45-60	250-500	0.1-0.4

### Sawing

$\alpha$  = clearance angle(°)  
 $\gamma$  = effective cutting angle(°)  
 $v$  = cutting speed (m/min)  
 $t$  = number of teeth

### Milling

$\alpha$  = side relief angle(°)  
 $\gamma$  = rake angle(°)  
 $v$  = cutting speed (m/min)

ZL Product	Band Saw				Circular Saw			
	$a$	$\gamma$	$v$	$t$	$a$	$\gamma$	$v$	$t$
ZL® 900 (Acetal)	30-40	0-8	200-1000	3-5/in	10-15	0-10	1000-3500	24-80
ZL® 1400 (PET)	15-30	5-8	300	2-8/in	10-15	0-10	1000-3500	24-80
ZL® 250 (Nylon 6/6)	30-40	0-8	200-1000	3-5/in	10-15	0-10	1000-3500	24-80
ZL® 1100 (Cast Nylon 6)	30-40	0-8	200-1000	2-8/in	10-15	0-10	1000-3500	24-80
ZL® 1500 (PEEK)	15-30	0-5	500-800	3-5/in	10-15	0-10	1000-3500	24-80

$a$	$\gamma$	$v$
5-15	5-15	250-500
5-15	5-15	250-400
10-20	5-15	250-500
10-20	5-15	250-500
5-15	6-10	180-450

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