

## METALWORKING FLUIDS - FORMULATION EXAMPLES

Arkema's lubricant additives are used in numerous MWF formulations, either neat oils or soluble oils, synthetic and semi-synthetic fluids.

### GRINDING OIL

Function	Type	Content
Oil	Mineral oil	
Boundary lubricants	Triglycerides Fatty esters Polyol esters	10%
EP additives	TPS20/32/37LS or VPS11/15/17	3-5% or 10-15%

### HEAVY DUTY FORMING OIL

Function	Type	Content	
Oil	Mineral oil (high viscosity)		
AW / Lubricity	Beycostat A684 or TBN 400 Calcium Sulfonate	1-3%	5-10%
Boundary lubricants	Triglycerides Fatty esters or acids Polyol esters	20%	20%
EP additives	TPS20/32/37LS	10-15%	3-5%

### SOLUBLE CUTTING OIL

Function	Type	Content
Oil	Mineral oil	40%
Primary emulsifier	Petroleum sulfonate Fatty acids	15% 5%
Secondary emulsifier	Polyalkylene glycol (PAG) Ethoxylated fatty alcohol	5%
Emulsifier, Lubricity, AW	Beycostat A684	3-6%
Coupling agent	Hexylen glycol Butyl carbitol	2%
Buffer, alkaline reserve Biopotentor	MEA, TEA BAE, DBAE	10% 3-5%
EP additive	TPS20/32/37LS	5-8%
Water		Complement to 100%

