

METAL REMOVAL FLUIDS

Date 5/09



TYPICAL PROPERTIES FOR CITGO METAL REMOVAL FLUIDS

PRODUCT	Appearance	Gravity °API	Flash °F(°C)	Pour °F(°C)	Viscosity		Sulfur Present	Chlorine Present	Fat Present	Phos Present	Falex EP Lbs.	4-Ball EP	
					cSt @ 40°C	SUS @ 100°F						Weld Pt. Kg	LWI Kg
Non Staining													
Clairo 160	Amber	23.0	310(154)	-10(-23)	31.95	166	No	Yes	No	No	N.D.	160	N.D.
Extrusion Oil 1677	Dark Brown	20.6	478(248)	21(-6)	129	671	Yes	Yes	Yes	Yes	3250	620	97.4
Non Staining (Chlorine-Free)													
NC 400	Lt. Amber	33.7	329(157)	10(-12)	13	73.2	Yes	No	Yes	Yes	2250	N.D.	N.D.
NC 420	Lt. Amber	31.7	406(208)	-11(-24)	23	120	No	No	Yes	Yes	3250	N.D.	N.D.
NC 425	Lt. Amber	29.9	433(223)	5(-15)	41	210	Yes	No	Yes	Yes	4000	N.D.	N.D.
Active Sulfur Oil (Chlorine-Free)													
NC 130	Amber Brown	31.0	388(198)	0(-18)	23	105	Yes	No	Yes	Yes	2500	N.D.	N.D.
NC 140	Black	30.0	399(204)	5(-15)	23	116	Yes	No	Yes	Yes	2250	N.D.	N.D.
NC 150	Black	28.0	374(190)	10(-12)	33	170	Yes	No	Yes	Yes	3000	N.D.	N.D.
Autokut 250	Dark Brown	21.3	310(154)	5(-15)	50.5	260	Yes	No	Yes	No	2050	800+	100+
Tulkut Base	Dark Brown	12.8		60(16)	38	200	Yes	No	Yes	No	N.D.	N.D.	N.D.
Active Sulfur Oil													
Transkut HD 200	Amber	19.8	320(160)	-20(-29)	38.95	203	Yes	Yes	Yes	No	4260	800+	100+
Ordnance 1200	Lt. Amber	29.9	330(166)	9(-13)	13.2		Yes	Yes	Yes	No	3650	500	86.0
Ordnance 1400	Lt. Amber	27.3	392(200)	10(-12)	35.9		Yes	Yes	Yes	No	4015	620	112.0
Ordnance 1500	Lt. Amber	24.0	385(196)	10(-12)	59.2		Yes	Yes	Yes	Yes	4100	500	72.7

METAL REMOVAL PRODUCT RECOMMENDATION



Date 5/09

	Machinability >70%	Machinability <70% & >50%	Machinability <50%	Cast Iron	Aluminum Alloys	Copper and Brass	Copper Alloys	Magnesium Alloys	Nickel Alloys	Titanium Alloys
Machining Characteristics	Easy	Moderate	Difficult	Easy to Moderate	Easy to Moderate	Easy	Easy to Moderate	Easy	Difficult	Difficult
Electric Discharge Machining (EDM)	No Product	No Product	No Product	No Product	No Product	No Product	No Product	No Product	No Product	No Product
Honing	Sentry 15 Ordnance 1200 NC 130	Sentry 15 Ordnance 1200 NC 130	Sentry 15 Ordnance 1200 NC 130	Sentry 15 Ordnance 1200 NC 130	Sentry 15 Trukut 205 Trukut 210 Trukut 220	Sentry 15 NC 400	Sentry 15 NC 400	Sentry 15 Clario 160 NC 400	Sentry 15 Ordnance 1200 NC 130	Sentry 15 Ordnance 1200 Trukut 230
Form Grinding	Transkut HD200 Ordnance 1400 NC 140 NC 150 NC 425 CITCOOL 33	Transkut HD200 Ordnance 1400 NC 140 NC 150 NC 425 CITCOOL 33	Transkut HD 200 Ordnance 1400 Ordnance 1500 NC 140 NC 150 Trukut 230 CITCOOL 33	Sentry 15 Clario 160 NC 425 CITCOOL 33	Sentry 15 Clario 160 NC 400	Sentry 15 Clario 160 NC 400	Sentry 15 Clario 160 NC 400	Sentry 15 Clario 160 NC 400	Transkut HD 200 Ordnance 140 Ordnance 1500 Autokut 250 Trukut 230	NC 150 Autokut 250 Trukut 230
Grinding	Clario 160 NC 400 Trukut 205 Trukut 210 CITCOOL 33	Clario 160 NC 400 Trukut 205 Trukut 210 CITCOOL 33	Clario 160 NC 400 Trukut 215 Trukut 230 CITCOOL 33	Clario 160 NC 400 Trukut 205 Trukut 210 Trukut 220 Trukut 230 CITCOOL 33	Sentry 15 Trukut 205 Trukut 220 Trukut 230	Sentry 15 Trukut 205 Trukut 210 Clario 160 NC 400	Sentry 15 Trukut 205 Trukut 210 Clario 160 NC 400	Sentry 15 Clario 160 NC 400	Ordnance 1200 NC 150 Autokut 250 Trukut 205 Trukut 210 Trukut 220 Trukut 230	NC 150 Autokut 250 Trukut 205 Trukut 210 Trukut 220 Trukut 230
Sawing	Trukut 205 Trukut 210 CITCOOL 33	Trukut 205 Trukut 210 CITCOOL 33	Trukut 220 Trukut 230 CITCOOL 33	Trukut 205 Trukut 210 CITCOOL 33	Trukut 205 Trukut 210	Trukut 205 Trukut 210	Trukut 205 Trukut 210	Sentry 15	Trukut 220 Trukut 230	Trukut 230
Automatic Screw Machines	Clario 160 NC 400 Transkut HD 200 Ordnance 1400 NC 130	NC 425 Transkut HD 200 Ordnance 1400 NC 130 NC 140 NC 150 CITCOOL 33	NC 150 NC 140 Transkut HD 200 Ordnance 1400 Trukut 230 CITCOOL 33	Clario 160 NC 400 Trukut 205 Trukut 210 CITCOOL 33	Sentry 15 Trukut 220 Trukut 230	Sentry 15 Trukut 205 Trukut 210	Clario 160 NC 400 NC 425 Trukut 205 Trukut 210	Sentry 15 Clario 160 NC 400	Transkut HD 200 Ordnance 1400 Ordnance 1500 Autokut 250 Trukut 230	Autokut 250 NC 150 Trukut 230
Turning Planing Milling Drilling Shaping Boring Reaming	Clario 160 NC 400 Transkut HD 200 Ordnance 1400 NC 130 Trukut 205 Trukut 210 CITCOOL 33	NC 425 Transkut HD 200 Ordnance 1400 NC 130 CITCOOL 33	NC 150 NC 140 Autokut 250 CITCOOL 33	Clario 160 NC 400 Trukut 205 Trukut 210 CITCOOL 33	Sentry 15 Trukut 220	Sentry 15 Trukut 205 Trukut 210	Clario 160 NC 400 NC 425	Sentry 15 Clario 160 NC 400	Transkut HD 200 Ordnance 1400 NC 130 NC 140 NC 150	NC 140 NC 150 Trukut 205 Trukut 210

METAL REMOVAL PRODUCT RECOMMENDATION



Date 5/09 - (Continued)

	Machinability >70%	Machinability <70% & >50%	Machinability <50%	Cast Iron	Aluminum Alloys	Copper and Brass	Copper Alloys	Magnesium Alloys	Nickel Alloys	Titanium Alloys
Machining Characteristics	Easy	Moderate	Difficult	Easy to Moderate	Easy to Moderate	Easy	Easy to Moderate	Easy	Difficult	Difficult
Deep Hole Drilling Gundrilling Trepinning Rifle Boring	Clario 160 NC 400 Ordnance 1200 NC 130 CITCOOL 33	Ordnance 1200 NC 130 NC 140 NC 150 Trukut 230	Clario 160 NC 400 Trankut HD 200 Ordnance 1400 Ordnance 1500 NC 140 Trukut 230	Clario 160 NC 400 Trukut 205 Trukut 210 NC 425 CITCOOL 33	Sentry 15 Trukut 220	Sentry 15 Trukut 205 Trukut 210	Clario 160 NC 400 NC 425 Trukut 205 Trukut 210	Sentry 15 Clario 160 NC 140 NC 150 NC 400	Trankut HD 200 Ordnance 1400 Autokut 250 NC 140 NC 150 Trukut 230	NC 130 NC 140 NC 150 Trukut 230
Gear Hobbing Spline Hobbing Gear Shaping Gear Shaving	Ordnance 1200 NC 130 NC 140 NC 150 Trukut 205 Trukut 210 CITCOOL 33	Trankut HD 200 Ordnance 1400 NC 130 NC 140 NC 150 Trukut 230 CITCOOL 33	NC 140 NC 150 Ordnance 1400 Ordnance 1500 Trukut 230 CITCOOL 33	Ordnance 1200 NC 130 Trukut 205 Trukut 210 NC 140 CITCOOL 33	Sentry 15 Trukut 220	Sentry 15 Trukut 205 Trukut 210	Clario 160 NC 140 NC 400 Trukut 205 Trukut 210	Sentry 15 Clario 160 NC 400	Trankut HD 200 Ordnance 1400 NC 140 NC 150 Trukut 230	NC 140 NC 150 Autokut 250 Trukut 230
Threading	NC 140 NC 150 Trukut 220 CITCOOL 33	NC 140 NC 150 CITCOOL 33	Trankut HD 200 Ordnance 1400 Ordnance 1500 Autokut 250 NC 150 Trukut 230 CITCOOL 33	Clario 160 NC 400 Trukut 205 Trukut 210 CITCOOL 33	Sentry 15 Trukut 220	Sentry 15 Trukut 205 Trukut 210	Clario 160 NC 400 NC 425	Sentry 15 Clario 160 NC 400	Trankut HD 200 Ordnance 1400 Ordnance 1500 Autokut 250 Trukut 230	Autokut 250 NC 150 Trukut 230
Tapping	NC 140 NC 150 Trukut 220	NC 140 NC 150 Autokut 250 CITCOOL 33	Trankut HD 200 Ordnance 1400 Ordnance 1500 Autokut 250 NC 150 Trukut 230 CITCOOL 33	Clario 160 NC 400 Ordnance 1200	Sentry 15 Trukut 220 NC 425 Trukut 230	Sentry 15 Trukut 205 Trukut 210 Trukut 220	Clario 160 NC 425 Trukut 230	Sentry 15 Clario 160 NC 400	Trankut HD 200 Ordnance 1400 Ordnance 1500 Autokut 250 NC 150 Trukut 230	Autokut 250 NC 150 Trukut 230
Thread Forming Internal Broaching Surface Broaching	NC 150 NC 140 CITCOOL 33	NC 150 Autokut 250 Trankut HD 200 Ordnance 1400 Ordnance 1500 Ext 1677 CITCOOL 33	NC 150 Autokut 250 Trankut HD 200 Ordnance 1400 Ordnance 1500 Ext 1677 Trukut 230 CITCOOL 33	Ordnance 1200 NC 130 Trukut 205 Trukut 120 CITCOOL 33	Sentry 15 Clario 160 NC 400 Trukut 220 Trukut 230	Sentry 15 Trukut 205 Trukut 210	Clario 160 NC 425	Sentry 15 Clario 160 NC 400	Trankut HD 200 Ordnance 1400 Ordnance 1500 NC 150 Autokut 250 Trukut 230	NC 150 Autokut 250