

Shell GARIA® Oils

High quality active sulfur cutting oils

Shell GARIA® Oils are light colored, anti-mist, active sulfur cutting oils designed for use in moderate to severe machining operations. Shell GARIA® cutting oils are available in different EP levels and viscosity grades to cover a wide variety of machining operations and metals. Both the “CM Series” and “M-Series” of Shell GARIA® cutting oils contain unique synergistic extreme pressure additive systems that readily react at the chip-tool interface to form extremely effective boundary lubricating films which reduce frictional heat and prevent metal-to-metal contact of the tool and workpiece.

- Shell GARIA® 422CM-36 and Shell GARIA® 422M-36, all of the product family contain fatty oil additives which increase the lubricity and provides better surface finish of workpieces. All of these cutting oils possess excellent anti-wear and anti-weld properties to help maximize tool life.
- Shell GARIA® 421CM-12 and Shell GARIA® 421M-12 are low viscosity cutting oils, particularly suited for deep hole drilling, grinding, and other operations where a low viscosity cutting oil would be preferred. Chips and grinding swarf readily settle in Shell GARIA® 421CM-12 and Shell GARIA® 421M-12. Due to their low viscosity, loss of oil due to carry-off with the chips is also minimized with Shell GARIA® 421CM-12 and Shell GARIA® 421M-12.
- Shell GARIA® 422CM-36 and Shell GARIA® 421M-36 can be used in a wide variety of operations where the machining requirements range from moderate to severe. Shell GARIA® 422CM-36 and Shell GARIA® 421M-36 contain no fatty oil and are, therefore, particularly useful in operations where surface finish is not critical. Shell GARIA® 422CM-36 is also suitable for use in some of the more severe grinding applications where products containing fat could lead to loading of the grinding wheel.
- Shell GARIA® 621CM-36 and Shell GARIA® 621M-36 are useful in an extremely wide range of applications and are particularly useful in difficult applications where surface finish is of extreme importance. Shell GARIA® 621CM-36 and Shell GARIA® 621M-36 are particularly useful in form grinding applications and in deep hole drilling operations of metals and alloys with very low machinability ratings.
- Shell GARIA® 622S-34 can be used to machine even the most difficult of metals. Shell GARIA® 622S-34 is particularly suited for the machining of titanium and its alloys since it contains no chlorinated additive that may react with the metal and weaken the surface.
- Shell GARIA® 623CS-52 and Shell GARIA® 623S-54 have the highest levels of EP of all the products in this series and can be used where most other cutting oils fail. Shell GARIA® 623CS-52 and Shell GARIA® 623S-54 can handle the most difficult operations and can machine the most difficult metals and alloys.

Performance Features and Benefits

- Light transparent color and low odor properties
- Excellent lubricity and extreme pressure properties
- Chip-to-tool welding (built-up edge) minimization
- Promotes increased tool life
- Closer tolerances
- Corrosion/rust protection of part and machine
- Low smoke/mist tendencies

Main Applications

- Deep hole drilling
- Broaching and tapping
- Gear cutting and shaving
- Reaming
- Grinding, honing and lapping
- Turning, planing, shaping, drilling and milling
- Shell GARIA® products should not be used where staining of copper and its alloys is a concern.

Advice on applications not covered in this handbook may be obtained from your Shell representative.

Protect the Environment

Do not discharge into drains, soil, or water.

Handling and Safety Information

For information on the safe handling, storage, or use of this product, refer to its Material Safety Data Sheet at <http://www.epc.shell.com/>. If you are a Shell Distributor, please call 1+800-332-6457 for all of your service needs. All other customers please call 1+800-237-8645 for all of your service needs.

Typical Physical Properties

Shell GARIA® Oils	Test Method	421CM-12	422CM-36	621CM-36	623CS-52
Appearance		Light Pale	Light Pale	Light Pale	Light Pale
Odor		Mild	Mild	Mild	Mild
Color	D 1500	L1.0	L1.0	L1.5	L1.5
Gravity, °API	D 1298	27.0	30.0	28.9	25.8
Viscosity:					
@ 40 °C, cSt	D 445	12.1	35.4	35.1	52.2
@ 100 °C, cSt	D 445	3.20	6.09	6.32	7.81
@ 100 °F, SUS	D 88	69.6	181.7	179.7	268.4
@ 210 °F, SUS	D 88	41.1	44.4	49	55.5
Viscosity Index	D 2270	134	119	132	116
Flash Point, COC, °F	D 92	290	380	355	380
Pour Point, °F	D 97	-40	10	10	10
Four Ball EP	D 2783				
Load Wear Index, kgf		100	83	82	100
Weld Point, kgf		620	500	500	620
Sulfur		Present	Present	Present	Present
Chlorine		Present	Present	Present	Present
Phosphorus		None	None	None	Present
Fatty Oil		Present	None	Present	Present

These characteristics are typical of current production. While future production will conform to Shell specifications, variation in these characteristics may occur.

Typical Physical Properties

Shell GARIA® Oils	Test Method	421M-12	422M-36	621M-36	622S-34	623S-54
Appearance		Light Pale				
Odor		Mild	Mild	Mild	Mild	Mild
Color	D 1500	L1.5	L2.0	L1.5	L2.0	L2.0
Gravity, °API	D 1298	28.0	30.5	29.5	30.8	26.7
Viscosity:						
@ 40 °C, cSt	D 445	13.0	35.9	36.0	34.1	53.5
@ 100 °C, cSt	D 445	3.22	6.12	6.14	5.96	7.90
@ 100 °F, SUS	D 88	73.5	184.0	184.8	175.1	275.3
@ 210 °F, SUS	D 88	37.1	46.6	46.8	46.2	52.7
Viscosity Index	D 2270	114	117	118	120	114
Copper Corrosion	D 130	1a	1a	1a	1a	1a
Flash Point, COC, °F	D 92	300	395	360	355	360
Pour Point, °F	D 97	-40	10	10	10	10
Four Ball EP	D 2783					
Load Wear Index, kgf		135	116	128	76	133
Weld Point, kgf		620	620	620	500	620
Sulfur		Present	Present	Present	Present	Present
Chlorine		None	None	None	None	None
Phosphorus		None	Present	None	None	Present
Fatty Oil		Present	None	Present	Present	Present

These characteristics are typical of current production. While future production will conform to Shell specifications, variation in these characteristics may occur.