DAVID WEBER OIL CO.
601 Industrial Road • Carlstadt, NJ 07072 | 201.438.7333 phone | 201.438. 3178 fax
www.weberoil.com

GIBRALTAR CAT T0-4 FLUIDS

Gibraltar Cat T0-4 Fluids are a premium line of latest-technology manual transmission oils designed to meet the stringent requirements of today's complex powershift transmissions, wet-disc brakes and final drives. They exhibit excellent friction performance, wear protection and material compatibilty compared to mixed fleet engine oils which were previously used for these applications. They also meet Caterpillar's TO-4 specification which cannot be met with engine oils.

OEM Credentials:

- Caterpillar TO-4
- Allison C-4
- Dana Transmissions
- Eaton Transmissions

Performance Benefits:

• Controlled friction performance with seven friction materials, both metallic and non-metallic.

• Stable friction characteristics, eliminating the problems of excessive brake noise, weakening of the binder in paper materials, and embrittlement of elastomeric materials.

• Eliminates clutch slippage, even under heavy loads on steep inclines. No need to constantly adjust equipment to maintain proper clutch setting.

• Excellent oxidative stability

• Exceeds wear requirements of Caterpillar TO-4

• Excellent low-temperature fluidity, providing easier cold-weather starting and better wear protection under these conditions.

• Excellent shear stability to maintain viscosity grade over the life of the equipment, providing long-term anti-wear protection.

• Protection against copper corrosion and rust.

• Maximum foam protection, ensuring no trapped air that could lead to metal-to-metal contact and wear.

TO-4 Test	SAE 10 Fluid	Requirements
D445 Viscosity at 100°C	6.18	4.1 cSt min
D2602 Cold Cranking at -20°C	2,800	3,500 cP max
D2983 Brookfield Viscosity at -35°C	86,000	150,000 cP max
D4684 Pumpability at -25°C	9,300	30,000 cP max
D4624 High Temperature/High Shear at 150°C	2.22	2.4 cP min
D92 Flash Point, °C	231	160C min
D92 Fire Point, °C	242	175C min
Modified BT-9 Rust	Pass	2 of 3 rods passing at 175 hrs
D130 Copper Strip (2 hrs. at 100°C)	1 A	1 A
Fluid Compatibility	Pass	No Sediment/Precipitation
Homogeneity	Pass	No Sediment/Precipitation
D892 Foaming		
Sequence I	0/0	25/0
Sequence II	20/0	50/0
Sequence III	0/0	25/0
Sequence I with 0.1% water	0/0	25/0
Sequence II with 0.1% water	0/0	50/0
Sequence III with 0.1% water	0/0	25/0
Fluoroelastomer Seal Test	Pass	Less or equal to reference plus 10%
Allison C-4 Seals		
Nitrile (Buna-N)		Batch 1291S
Volume Change (%)	+3.46	No Limits Assigned
Hardness Change (pts)	+5	
Dip Cycle (Polyacrylate)		Batch 191S
Volume Change (%)	+6.72	0.00 to +10.00
Hardness Change (pts)	-4	-5 to 0
Tip Cycle (Silicone)		Batch 191S
Volume Change (%)	+2.86	+1.50 to +6.50
Hardness Change (pts)	-2	-10 to 0
Fluoroelastomer (Viton)		
Volume Change (%)	+1.21	0.00 to +4.00
Hardness Change (pts)	+1	-4 TO +4
D4998 FZG Gear Wear		Avg. of 3 separate runs is less than 100 mg
Run #1 (mg)	98	
Run #2 (mg)	44	
Run #3 (mg)		
Vickers Pump* Test	1 2 3 4	
Vanes weight loss (mg)	7 3 4 6	15 mg max each cartridge
Ring weight loss (mg)	28 12 6 10	75 mg max each cartridge
C-4 THOT	Not Required	
TAN Increase		7.0 max
Carbonyl Absorbance		0.9 max
Viton Seal		Pass
Sludge		Light to medium
VC70 Friction		
Sequence 1219	Pass	Pass
Sequence 1220	Pass	Pass
Sequence 1221	Pass	Pass
Sequence 1222	Pass	Pass
Sequence 1223	Pass	Pass
Sequence 1224	Pass	Pass
Sequence FRRET	Pass	Pass

TO-4 Test	SAE 30 Fluid	Requirements
D445 Viscosity at 100°C	11.13	9.3 to 12.5 cSt min
D2983 Brookfield Viscosity at -25°C	140,000	150,000 cP max
D4684 Pumpability at -15°C	10,100	30,000 cP max
D4624 High Temp./High Shear @ 150°C	3.31	2.9 cP min
D92 Flash Point, °C	260	160C min
D92 Fire Point, °C	270	175C min
Modified BT-9 Rust	Pass at 175 hours	2 of 3 rods passing at 175 hrs
D130 Copper Strip (2 hrs. at 100°C)	1 A	1 A
Fluid Compatibility	Pass	No Sediment/Precipitation
Homogeneity	Pass	No Sediment/Precipitation
D892 Foaming		
Sequence I	0/0	25/0
Sequence II	0/0	50/0
Sequence III	0/0	25/0
Sequence I with 0.1% water	0/0	25/0
Sequence II with 0.1% water	0/0	50/0
Sequence III with 0.1% water	0/0	25/0
Fluoroelastomer Seal Test	Pass	Less or equal to reference plus 10%
Allison C-4 Seals		
Nitrile (Buna-N)		Batch 1291S
Volume Change (%)	+1.59	-0.63 to +5.37
Hardness Change (pts)	+5	-5 to +5
Dip Cycle (Polyacrylate)		Batch 191S
Volume Change (%)	+5.45	0.00 to +10.00
Hardness Change (pts)	-4	-5 to 0
Tip Cycle (Silicone)		Batch 191S
Volume Change (%)	+1.50	+1.50 to +6.50
Hardness Change (pts)	-1	-10 to 0
Fluoroelastomer (Viton)		
Volume Change (%)	+0.82	0.00 to +4.00
Hardness Change (pts)	+1	-4 TO +4
D4998 FZG Gear Wear		Average of 3 separate runs is less than
		100 mg.
Run #1 (mg)	23	
Run #2 (mg)	26	
Run #3 (mg)	22	
Vickers Pump* Test	1 2 3 4	
Vanes weight loss (mg)	Not Required	15 mg max each cartridge
Ring weight loss (mg)		75 mg max each cartridge
C-4 THOT	Pass	
TAN Increase	1.97	7.0 max
Carbonyl Absorbance	0.58	0.9 max
Viton Seal	Pass	Pass
Sludge	Pass	Light to medium
VC70 Friction		
Sequence 1219	Pass	Pass
Sequence 1220	Pass	Pass
Sequence 1221	Pass	Pass
Sequence 1222	Pass	Pass
Sequence 1223	Pass	Pass
Sequence 1224	Pass	Pass
Sequence FRRET	Pass	Pass

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* Vickers data apply to the more severe test run on SAE 10W test.

TO-4 Test		SAE 50 Fluid	Requirements
D445 Viscosity at 100°C		17.90	16.3 to 21.9 cSt min
D2983 Brookfield Viscosity at -15°C			150,000 cP max
D4684 Pumpability at -10°C		13,700	30,000 cP max
D4624 High Temp./High Shear at 150°C		4.96	4.5 cP min
D92 Flash Point, °C		280	160C min
D92 Fire Point, °C		296	175C min
Modified BT-9 Rust		Not Required	2 of 3 rods passing at 175 hrs
D130 Copper Strip (2 hrs. at 100°C)		1 A	1 A
Fluid Compatibility		Pass	No Sediment/Precipitation
Homogeneity		Pass	No Sediment/Precipitation
D892 Foaming			
Sequence I		0/0	25/0
Sequence II		0/0	50/0
Sequence III		0/0	25/0
Sequence I with 0.1% water		0/0	25/0
Sequence II with 0.1% water		0/0	0/0
Sequence III with 0.1% water		0/0	25/0
Fluoroelastomer Seal Test		Not Required	Less or equal to reference plus 10%
Allison C-4 Seals			
Nitrile (Buna-N)		Not Required	
Volume Change (%)		Hardness Change (pts)	
Dip Cycle (Polyacrylate)			
Volume Change (%)			
Hardness Change (pts)			
Tip Cycle (Silicone)			
Volume Change (%)			
Hardness Change (pts)			
Fluoroelastomer (Viton)			
Volume Change (%)			
Hardness Change (pts)			
D4998 FZG Gear Wear		Average of 3 separate runs is less than 100 mg	
Run #1 (mg)		Not Required	
Run #2 (mg)			
Run #3 (mg)			
Vickers Pump*	Test	1 2 3 4	
Vanes weight loss (mg)		Not Required	15 mg max each cartridge
Ring weight loss (mg)			75 mg max each cartridge
C-4 THOT			
TAN Increase			7.0 max
Carbonyl Absorbance			0.9 max
Viton Seal			Pass
Sludge			Light to medium
VC70 Friction			
Sequence 1219		Pass	Pass
Sequence 1220		Pass	Pass
Sequence 1221		Pass	Pass
Sequence 1222		Pass	Pass
Sequence 1223		Pass	Pass
Sequence 1224		Pass	Pass
Sequence FRRET		Pass	Pass

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* Vickers data apply to the more severe test run on SAE 10W test.