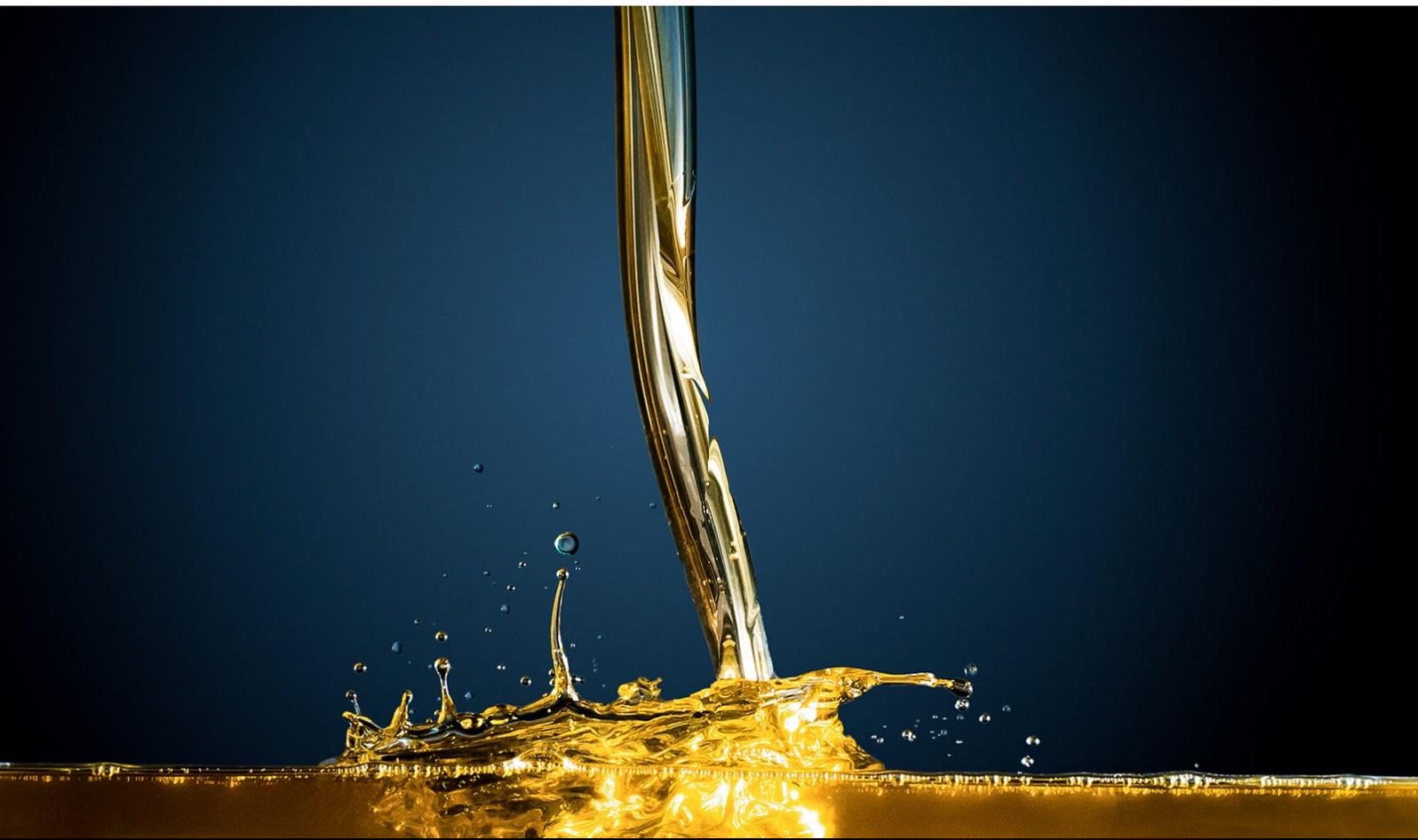




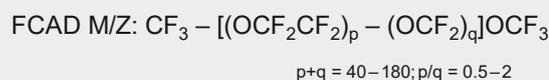
## **PFPE Lubricants**



# FCAD PFPE Lubricants

## Product Data Sheet

If heat, chemicals, solvents, corrosion, toxicity, flammability, compatibility, service life are some of your lubrication problems, we have the solution: FCAD PFPE lubricants.



### What Makes FCAD Lubricants Better?

The following properties and characteristics of FCAD PFPE lubricants are sure to include some that are important to your application:

- Unmatched chemical and solvent resistance
- Excellent thermal resistance
- Excellent electrical resistance
- Non-reactive with metal, plastic, elastomers and rubber
- Inert to liquid and gaseous oxygen
- Excellent radiation hardness
- Good viscosity index
- Nonflammable
- Extremely wide operating temperature range
- Low evaporation loss
- Excellent water washout properties
- Good low and high temperature wear properties
- Easily formulated into greases
- Environmentally safe
- Non-toxic behavior

In addition, certain grades of FCAD PFPE lubricants also offer special features such as:

- Extremely high viscosity index (< 300)
- Excellent low temperature starting torque
- Improved evaporation characteristics

The availability of additivated FCAD PFPE fluids widens the range of applications for perfluorinated fluids and greases in fields demanding high anti-rust properties. These applications include lubrication of bearings, gears, turbine and liquid compressors that may be in contact with condensed water vapor. These additives also provide an opportunity to use FCAD PFPE as a hydraulic fluid, filling fluid and solvents where antirust prevention is one of the primary product specifications.

### Applications Where FCAD Lubricants Are Top Performers

While FCAD PFPE lubricants can be used in their original form, they are often formulated into greases for specific applications in the chemical, electronic, military, nuclear, data processing and other industries in need of high performance lubrication. A few of the critical uses of FCAD PFPE lubricants include:

- Tenter frames in the textile industry
- Deep space rocket nozzle lubrication
- Missile catapult system lubrication
- Sintered metal bearing requiring exceptional operating life
- Anti-lock braking systems
- Oxygen and chlorine valves and pumping systems
- Sealing fluid for vacuum pumps
- Gold contact surface lubrication
- Nuclear industry lubricants
- Instrument lubricants
- Lifetime sealed, maintenance-free bearings
- Lubricants for gasoline tank floats
- Bearings exposed to high temperatures, moisture and aggressive chemicals

## FCAD Y Lubricants

FCAD Y perfluoropolyether fluids have the following unique features:

- Excellent high temperature stability
- Good low temperature properties
- Very good Extreme Pressure (EP) and wear characteristics
- Low evaporative loss
- Good viscosity index

### FCAD Y Lubricant Grades

Typical Properties	Unit	Y04	Y06	Y15	Y25	Y45	YU700	YR	YPL1500	YR1800	Test Method
Approximate ISO grade		15	22	68	100	150	220	320	460	460	
Average molecular weight	amu	2,000	2,400	3,200	3,700	4,100	5,000	6,400	6,900	7,300	
Kinematic viscosity											ASTM D445
at 20 °C	cSt	44	60	156	250	470	740	1,300	1,500	1,850	
at 40 °C	cSt	18	22	56	80	147	214	345	420	510	
at 100 °C	cSt	3.6	4.1	7.7	10	16	22	33	40	47	
Viscosity index		65	73	100	108	117	124	135	144	148	ASTM D2270
Pour point	°C	- 58	- 50	- 45	- 35	- 30	- 27	- 25	- 25	- 20	ASTM D97
Evaporation weight loss at 120 °C, 22 hr	%	9	6	-	-	-	-	-	-	-	ASTM D2595
at 149 °C, 22 hr	%	-	20	2	2	0.7	-	0.5	0.3	-	
at 204 °C, 22 hr	%	-	-	-	15	1.7	1.5	1.2	0.9	0.5	
Surface tension at 20 °C	dyne/cm	21	21	21	22	22	23	24	24	24	ASTM D1331
Density at 20 °C	g/cm <sup>3</sup>	1.87	1.88	1.89	1.90	1.91	1.91	1.91	1.91	1.92	ASTM D4052
Four ball wear test (at 75 °C, 1 hr, 1,200 rpm, 40 kg) Average scar diameter	mm	0.51	0.63	0.66	0.66	0.81	0.88	0.90	0.95	1.2	ASTM D4172

## FCAD M Lubricants

FCAD M perfluoropolyether fluids have the following unique features:

- Excellent viscosity index
- Excellent low temperature torque values
- Very good extreme pressure (EP) characteristics
- Very low evaporative loss properties
- Good thermal stability

### FCAD M Lubricant Grades

Typical Properties	Unit	M03	M07	M15	M30	M60	M100	Test Method
Approximate ISO grade		15	32	100	150	320	680	
Average molecular weight	amu	3,900	5,400	9,700	16,000	18,700	21,900	
Kinematic viscosity								ASTM D445
at 20 °C	cSt	30	66	150	280	550	1,300	
at 40 °C	cSt	17	38	90	159	310	700	
at 100 °C	cSt	5	12	27	45	86	200	
Viscosity index		253	325	329	338	343	384	ASTM D2270
Pour point	°C	- 85	- 80	- 75	- 65	- 60	- 50	ASTM D97
Evaporation weight loss at 149 °C, 22 hr	%	6.5	2	0.8	-	-	-	ASTM D2595
at 204 °C, 22 hr	%	-	-	3.0	0.7	0.4	0.3	
Surface tension at 20 °C	dyne/cm	23	23	24	25	25	25	ASTM D1331
Density at 20 °C	g/cm <sup>3</sup>	1.81	1.82	1.83	1.85	1.86	1.87	ASTM D4052
Four ball wear test (at 75 °C, 1 hr, 1,200 rpm, 40 kg) Average scar diameter	mm	0.74	0.89	0.92	0.97	1.21	-	ASTM D4172

## FCAD W Lubricants

FCAD W perfluoropolyether fluids have the following unique features:

- Good low to high temperature performance
- Very good viscosity index
- Low to high temperature stability
- Low evaporative loss

### FCAD W Lubricant Grades

Typical Properties	Unit	W150	W500	W800	Test Method
Average molecular weight	amu	4,500	7,200	7,400	
Kinematic viscosity					ASTM D445
at 20 °C	cSt	153	543	800	
at 40 °C	cSt	72	208	277	
at 100 °C	cSt	16	34	41	
Viscosity index		236	209	204	ASTM D2270
Pour point	°C	- 68	- 46	- 39	ASTM D97
Evaporation weight					ASTM D2595
loss at 149 °C, 22 hr	%	1.4	0.1	0.1	
at 204 °C, 22 hr	%	13.5	0.9	0.5	
Density at 20 °C	g/cm <sup>3</sup>	1.86	1.89	1.90	ASTM D4052
Four ball wear test (at 75 °C, 1 hr, 1,200 rpm, 40 kg) Average scar diameter	mm	0.7	0.9	1.1	ASTM D4172

## FCAD Z Lubricants

FCAD Z perfluoropolyether fluids have the following unique features:

- Good low temperature viscosity
- Superior evaporative loss
- Very high viscosity indices
- Very good extreme pressure (EP) and wear characteristics

### FCAD Lubricant Grades

Typical Properties	Unit	Z03	Z15	Z25	Z60	Test Method
Approximate ISO grade		15	100	150	320	
Average molecular weight	amu	4,000	9,800	17,100	21,500	
Kinematic viscosity						ASTM D445
at 20 °C	cSt	30	160	223	600	
at 40 °C	cSt	18	92	133	355	
at 100 °C	cSt	5.6	28	42	98	
Viscosity index		291	334	350	350	ASTM D2270
Pour point	°C	- 90	- 80	- 75	- 63	ASTM D97
Evaporation weight						ASTM D2595
loss at 149 °C, 22 hr	%	6.0	0.2	-	-	
at 204 °C, 22 hr	%	-	1.2	0.4	0.2	
Surface tension at 20 °C	dyne/cm	23	24	25	25	ASTM D1331
Density at 20 °C	g/cm <sup>3</sup>	1.82	1.84	1.85	1.85	ASTM D4052
Four ball wear test (at 75 °C, 1 hr, 1,200 rpm, 40 kg) Average scar diameter	mm	0.60	0.66	0.90	0.93	ASTM D4172

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