



Industrial Technology

ZF assemblies in special purpose vehicles

List of lubricants TE-ML 13

Product groups	Service fill in acc. with Nato code ⁽⁵⁾	Service fill in acc. with ZF list of lubricants TE-ML ^{(1), (4)}
1. Assemblies for wheeled vehicles		
1.1 Powershift transmissions		
- 3/4HP22 / 24; 4HP220 / 240 with and without VG	none	11A, 11B
- 6HP260; 6HP280	none	ZF LifeguardFluid 6 ⁽¹¹⁾ (refer to TE-ML 11), Petronas Tutela Transmission VTL ⁽¹¹⁾
- PW45H1; 4PW95H1; 4PW200H2	O-1178	03A, 03E only at ambient temperatures below -10°C: 03D, 03F
- HP500 / 502; HP600 / 602; HP900 / 902; HP1500; 4HP2000H1	O-1178	14
- EcoLife Offroad	O-1178 ^(13,14)	25 ⁽¹³⁾
1.2 Constant-mesh transmissions	O-226, O-1178	ZF EcoFluid M 02B, 02E, 02H, 02L
1.3 Manual transmissions		
- Ecolite 6S800WO, 6S802WO, 6S1000WO, 6S1005WO	none	ZF EcoFluid M ⁽¹⁰⁾ 02B ^(2,7) , 02E, 02L ⁽²⁾
- Ecomid without ZF-Intarder 8S1110 WD/WO, 9S1110 WD/WO, 8S1310 WO, 9S1310 WO	(O-1178) ^(2,12)	ZF EcoFluid M 02B, 02E ⁽¹²⁾ , 02H, 02L
- Ecosplit without ZF-Intarder	(O-1178) ^(2,12)	ZF EcoFluid M 02B, 02E ⁽¹²⁾ , 02H, 02L
- Ecosplit with ZF-Intarder	(O-1178) ^(2,12)	ZF EcoFluid M 02E ⁽¹²⁾ , 02H, 02L
- Transmatic (Joint oil circuit of basic transmission and converter lock-up clutches)	(O-1178) ⁽²⁾	02H
- Torque converter lock-up clutches (WSK) with <u>separate</u> oil circuit	O-1178	02H, 14
1.4 Automatic transmissions (Note: Instead of the "0" as the last figure, there may also be a: 1;2;3;4;5;6)		
- AS Tronic mid 12 AS 1210 WO, 12 AS 1210 SO 12 AS 1620 WO, 12 AS 1620 SO	(O-1178) ^(2,12)	ZF EcoFluid M ⁽¹⁰⁾ 02B, 02E ⁽¹²⁾ , 02L
- AS Tronic without ZF-Intarder 12 AS 2530 SO, 12 AS 2530 WO, 12 AS 2303 RAIL, 16 AS 2630 SO, 16 AS 2630 WO 12 AS 3040 SO, 12 AS 3040 WO	(O-1178) ^(2,12)	ZF EcoFluid M ⁽¹⁰⁾ 02B, 02E ⁽¹²⁾ , 02L

The list of lubricants TE-ML 13, **edition 01.04.2024** replaces all previous editions. The current list can be requested from any ZF after-sales service center or accessed on the Internet under www.aftermarket.zf.com/lubricants.

ZF Friedrichshafen AG
D-88038 Friedrichshafen
www.zf.com/contact

Product groups	Service fill in acc. with Nato code ⁽⁵⁾	Service fill in acc. with ZF list of lubricants TE-ML ^{(1), (4)}
1.4 Automatic transmissions (continued)		
- AS Tronic with ZF-Intarder 12 AS 2531 SO, 12 AS 2531 WO, 12 AS 2531 16 AS 2631 SO, 16 AS 2631 WO, 16 AS 2603 RAIL 12 AS 3041 SO, 12 AS 3041 WO, 12 AS 3103 RAIL	(O-1178) ^(2,12)	ZF EcoFluid M ⁽¹⁰⁾ 02E ⁽¹²⁾ , 02L
- TraXon without or with mit ZF-Intarder 12 TX 2610 SO, 12 TX 2610 WO 12 TX 3420 SO, 12 TX 3420 WO 16 TX 3440 SO, 12 TX 3440 WO	(O-1178) ^(2,12)	ZF EcoFluid M ⁽¹⁰⁾ 02E ⁽¹²⁾ , 02L
- TC Tronic (Separate oil circuit of basic transmission and converter lock-up clutches) Transmission AS Tronic without ZF-Intarder 12 TC 2740 WOTC, 12 TC 2740 SOTC	(O-1178) ^(2,12)	ZF EcoFluid M ⁽¹⁰⁾ 02B, 02E ⁽¹²⁾ , 02L
Torque converter lock-up clutches (WSK) TC 2	O-1178	02H, 14
- TC Tronic HD (Separate oil circuit of basic transmission and converter lock-up clutches) Transmission AS Tronic with ZF-Intarder 12 TC 3040 TCIT	(O-1178) ^(2,12)	ZF EcoFluid M ⁽¹⁰⁾ 02E ⁽¹²⁾ , 02L
- TraXon Torque (Separate oil circuit of basic transmission and converter lock-up clutches) Transmission TraXon with ZF-Intarder 12 TX 3421 SO, 12 TX 3421 WO	(O-1178) ^(2,12)	ZF EcoFluid M ⁽¹⁰⁾ 02E ⁽¹²⁾ , 02L
Torque converter lock-up clutches (WSK) TCHD, TCHD TT	O-1178	ZF EcoFluid M, 02E ⁽¹²⁾
1.5 Transfer case		
- A800 installed	as main transmission	
- A800 separate installation	O-1178	12
- A230W	O-226 ⁽¹⁸⁾ , (O-1178) ⁽¹⁹⁾	19B ⁽¹⁸⁾ , 19C ⁽²⁰⁾
- VG 250 separate installation	O-1178	02B
- DR 1640	O-226 ⁽¹⁸⁾ , (O-1178) ⁽¹⁹⁾	19B ⁽¹⁸⁾ , 19C ⁽²⁰⁾
- VG 750, VG 750/400, VG 1600, VG 2000, VG 2700, TC 27	O-226 ⁽⁸⁾ , (O-1178) ⁽⁹⁾	19B, 19C, 19D
- TC 27 + PTO	O-226 ⁽¹⁷⁾ , O-186 ⁽¹⁷⁾ , (O-1178) ⁽¹⁷⁾	19C ⁽¹⁷⁾ , 19D ⁽¹⁷⁾
- 1 TC 30	none	19C ⁽¹⁸⁾ (Grease for length compensation of quick-release clutch, refer to footnote ⁽²¹⁾)
1.6 Drive axles, LKST	O-226	19B, 19C
1.7 AAT3000	O-226	12
1.8 APE 60 AUS	O-226 ⁽¹⁶⁾ , (O-186) ⁽¹⁵⁾	19B ⁽¹⁶⁾ , 19C
1.9 Wheel heads RP5000, RP5300 and differentials CK, CK-7, CKZ-7	O-226 ⁽¹⁸⁾ , (O-1178) ⁽¹⁹⁾	19B ⁽¹⁸⁾ , 19C ⁽²⁰⁾

Product groups	Service fill in acc. with Nato code ⁽⁵⁾	Service fill in acc. with ZF list of lubricants TE-ML ^{(1), (4)}
2. Assemblies for tracked vehicles		
2.1 Powershift transmissions		
- 3HP22	none	11A, 11B
- HP500 / 502; HP600 / 602; HP900 / 902	O-1178	14
- EcoLife Offroad	O-1178 ^(13,14)	25 ⁽¹³⁾
- 4HP250; LSG 300, LSG 1500, LSG 2000, LSG 3000	O-1178	14
- LSG 1000, LSG 1000 HD, LSG 1100, LSG 1100 HD	O-1178, O-236 ⁽⁶⁾	ZF EcoFluid A Life (14E), 03A
- LSG 3000 IVECO (C1)	O-1178	
2.2 Final drive		
- P1700, P11000	O-226, OY1005	12
- P25000, P25000HD	O-226, OY1005	12 ⁽³⁾
2.3 Steering gears LGG110	O-226	12
2.4 Spur gear drive ST200, ST300	O-1178	14
3. Greasing points		
Strictly adhere to grease grades listed in the maintenance manual.	G-353, G-395, G-421	
4. Brake systems		
	refer to TE-ML 15	15

Explanation of footnotes and comments

Footnotes

- (1) Available from all After-Sales Service points and on the Internet under www.zf.com.
- (2) **Only permitted from first oil change. The initial oil fill must not be replaced in the first 3 years. If a mileage of 7500 km has not been reached after this time, only ZF EcoFluid M is permissible as a replacement fluid.**
- (3) The following lubricants may also be used:
- | | |
|--|------------------------|
| Exxon Mobil Corporation, Fairfax, Virginia/USA | Mobil Gear SHC XMP 460 |
| Klüber Lubrification, München/D | Klüber Synth EG 4-460 |
- (4) The oil change intervals stated in the List of Lubricants do not apply for these products. Special agreements to be discussed with ZF.
- (5) Low temperature limits:
Pay due attention to the respectively valid vehicle-specific warm-up and reoil specifications.
- (6) Use only permissible for restricted temperature range (> -6°C). Release is granted by ZF.
- (7) In moderate climate zones, shift quality of non-automated transmissions is impaired when using the lubrication class 02B.
- (8) Application for outside temperatures $\geq -20^{\circ}\text{C}$
Oil change intervals every 20,000km / 1 year (oil change required, depending on what occurs first).
Note: For outside temperatures below the above-mentioned low temperature limit, the transmission must be warmed up for at least 10 minutes at the lowest possible speeds and loads. Observe the maintenance specifications provided by the vehicle manufacturer.
- (9) Application for outside temperatures in the range of -46°C to -20°C .
Oil change intervals every 20,000km / 1 year (oil change required, depending on what occurs first).
Before changing over to oil O-1178, new transmissions have to be operated for at least 10,000 km with axle drive oil according to Nato Code O-226 or ZF lubricant class 19B / 19C / 19D.
Note: For outside temperatures below the above-mentioned low temperature limit, the transmission must be warmed up for at least 10 minutes at the lowest possible speeds and loads. Observe the maintenance specifications provided by the vehicle manufacturer.
- (10) First fill: Use exclusively ZF EcoFluid M oil for first fillings of transmissions as well as fillings during transmission break-in (transmission mileage under 7.500 km).
- (11) Oil change intervals every 25,000km / 3 years (oil change required, depending on what occurs first).
- (12) For outside temperatures below -40°C , the Castrol Syntrans Z Long Life or O -1178 oils according to TL 9150-0080 must be used.
- (13) Please refer to the List of Lubricants TE-ML 25 for details regarding oil and filter change intervals for ZF-EcoLife transmissions.
- (14) Where necessary, synthetic automatic transmission fluids as per NATO Code H-548 are permitted if they are listed by name in the lubricant list TE-ML 25, lubricant class 25C.
- (15) Application for outside temperatures in the range of -35°C to $+10^{\circ}\text{C}$ only.
Oil change intervals every 20,000 km / 1 year (oil change required, depending on what occurs first).
Before changing over to oil O-186, new transmissions have to be operated for at least 10,000 km with axle drive oil according to Nato Code O-226 or lubricant class 19B / 19C.
Note: For temperatures below the above-mentioned low temperature limit, the transmission must be warmed up for at least 10 minutes at the lowest possible speeds and loads. Observe the vehicle manufacturer's operating instructions.
- (16) Application for outside temperatures $\geq -10^{\circ}\text{C}$.
Oil change intervals every 20,000km / 1 year (oil change required, depending on what occurs first).
Note: For outside temperatures below the above-mentioned low temperature limit, the transmission must be warmed up for at least 10 minutes at the lowest possible speeds and loads. Observe the maintenance specifications provided by the vehicle manufacturer.

- (17) For the PTO application of the TC 27, the following low-temperature limits and warm-up conditions apply for the approved lubricants:

Low temperatures limits	Lubricant class	Warm-up before PTO application
+...°C to -10°C	O-226	5 minutes in Neutral at 500 rpm
+...°C to -10°C	O-186, 19C, 19D	-
-11°C to -20°C	O-186, 19C, 19D	5 minutes in Neutral at 500 rpm
-21°C to -30°C	O-186, 19D	5 minutes in Neutral at 500 rpm
-31°C to -40°C	O-186, 19D	10 minutes in Neutral at 500 rpm
-10°C to -46°C	O-1178	10 minutes in Neutral at 500 rpm

The following applies to the use of the Nato code oil O-1178:

Application only in the temperature range of -46°C to -10°C.

Oil change intervals every 20,000km / 1 year (oil change required, depending on what occurs first).

Before changing over to oil O-1178, new transmissions have to be operated for at least 10,000 km with axle drive oil according to Nato Code O-226 or ZF lubricant class 19C or 19D.

- (18) Application for outside temperatures $\geq -20^\circ\text{C}$.
 First oil change after 10,000 km or after one year at the latest.
 Every further oil change after every 15,000 km or at least once a year.
 For the RP5000 / RP5300 wheel heads, the first oil change must be carried out after 6,000 km or at the latest after one year, the further oil changes at 6,000 km or at least once a year as well as each time the shaft sealing rings on the input flange are replaced (refer to operating instructions).
 Note: For outside temperatures below the above-mentioned low-temperature limit, the transmission must be warmed up for at least 10 minutes at the lowest possible speeds and loads. Observe the vehicle manufacturer's operating instructions.
- (19) Application for outside temperatures in the range of -46°C to -20°C.
 First oil change after 10,000 km or after one year at the latest.
 Every further oil change after every 15,000 km or at least once a year.
 For the RP5000 / RP5300 wheel heads, the first oil change must be carried out after 6,000 km or at the latest after one year, the further oil changes at 6,000 km or at least once a year as well as each time the shaft sealing rings on the input flange are replaced (refer to operating instructions).
 Before changing over to oil O-1178, new transmissions have to be operated for at least 10,000 km (RP5000 / RP5300 wheel heads at least 6,000 km) with axle drive oil according to Nato Code O-226 or ZF lubricant class 19B / 19C.
 Note: For outside temperatures below the above-mentioned low-temperature limit, the transmission must be warmed up for at least 10 minutes at the lowest possible speeds and loads. Observe the vehicle manufacturer's operating instructions.
- (20) Application for outside temperatures $\geq -40^\circ\text{C}$.
 First oil change after 10,000 km or after one year at the latest.
 Every further oil change after every 15,000 km or at least once a year.
 For the RP5000 / RP5300 wheel heads, the first oil change must be carried out after 6,000 km or at the latest after one year, the further oil changes at 6,000 km or at least once a year as well as each time the shaft sealing rings on the input flange are replaced (refer to operating instructions).
 Note: For outside temperatures below the above-mentioned low-temperature limit, the transmission must be warmed up for at least 10 minutes at the lowest possible speeds and loads. Observe the vehicle manufacturer's operating instructions.
- (21) Service grease for length compensation of quick-release clutch:
 Lubricating grease according to specification / requirement:
 - DIN 51825 classification min. KP1G-30
 and/or ISO 6743-9 classification min. ISO-L-XCCEA1
 - Consistency class: NLGI 1
 - Base oil: API Group 1 / 2 / 3 / 4
 - Thickener type: lithium / lithium complex
 - Temperature application limits: min. -30°C to +100°C

Comments

Additives of any kind added **later** to the oil change the oil in a manner that is unpredictable, and they are therefore not permitted. No liability of any kind will be accepted by ZF for any damage resulting from the use of such additives.