



Specification 137: Oil approval list for VSE steering and suspension systems

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Author : J.W. van der Krol

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Approval VSE:

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Revisions

Nr	Status	Date	Author	Approved by	Modification
0	OBJ	28-03-2006	JWK	-	1 st draw
1	REL	04-04-2006	JWK	RdZ	1 st release
2	REL	13-08-2007	JWK	RdZ	Anderol Royco 717 added; English translation
3	REL	31-03-2008	JWK	RdZ	Total Equivis XLT 32 added
4	FIN	07-12-2010	FRO		Oil purity specification changed and LHM type for applications with electric driven pump added
5	FIN	03-10-2012	OMR	RdZ	Viscosity requirements for alternative oils added
6	FIN	25-01-2013	MSP	RdZ	GIPOL-RS added (limited use), temperature ranges added

References

Ref	Name	Description
[Ref.1]	ISO 4406: 1999	Hydraulic fluid power – Fluids – Method for coding the level of contamination by solid particles
[Ref.2]	NAS 1638	A particulate contamination coding system used in the fluid power industry
[Ref.3]	Filter Selection Guide-E.pdf	Information on oil filtration by Itron

Software versions

This document relates to the following software versions:

Name	Description
N/A	

Abbreviations

Abbreviation	Description
DTS	Dynamic Truck & Trailer Suspension
EMAS	Electronically controlled Multi-Axle Steering
ETS	Electronic Truck & Trailer Steering
EVS	Electronically controlled Vehicle Steering system
HPVS	Hydraulic-Pneumatic Suspension System
ISO	International Organization for Standardization
N/A	Not Available (or Not Applicable)
NAS	National Aerospace Standard
TBD	To Be Defined
VSE	Vehicle Systems Engineering B.V.

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1 Purpose

This document lists the oil types approved for use in HPVS and DTS suspension systems as well as EVS and ETS steering systems.

This lists has been drawn up on the basis of data given by the oil manufacturer (viscosity, VI-index, etc.), compared to the demanded values, as well as by tests carried out on the, at that time known and used, material compounds used in these systems.

2 Request for approval

Types of oil not listed in this document are NOT approved by VSE to be used in HPVS, DTS and/or EVS, ETS systems.

Responsibility cannot be taken after the use of not approved oils.

A request for approval of a new type of oil has to be addressed to VSE. In consultation with VSE will be decided which party will carry out any necessary tests. This can be VSE, the oil manufacturer/supplier, or a separate party.

Possibly, tests can be omitted if test results of the oil on the material compounds are already available. VSE will decide on the basis of these test results.

Please send requests for oil approvals to:

V.S.E. Vehicle Systems Engineering B.V.
Ravelijn 2
NL-3905 NV Veenendaal

Tel.: +31 (0)318 54 57 44

Fax: +31 (0)318 54 57 99

Email: info@v-s-e.nl

Please note that costs can be charged to the applicant.

3 Approved oils

3.1 Steering system for trucks and trailers (engine driven pump)

3.1.1 Application

This specification applies to:

- EMAS
- ETS, ETS1, ETS2, ETS2+1

3.1.2 Specification

All oils are approved that meet the following requirements:

Type	:	ATF mineral based
Specifications	:	GM-6137M (Dexron-IID) GM-6297M (Dexron-IIIF) GM-6417M (Dexron-IIIG)
Viscosity @ 100°C	:	7 cSt ± 0.5
Viscosity @ 40°	:	39 cSt ± 4
Viscosity @ -20°C	:	2000 cSt ± 590
Viscosity @ -40°C	:	50000 cSt ± 6750
VI-index	:	± 150
Purity	:	class 18/16/13 according [Ref.1] or class7 according [Ref.2]

NOTE: See chapter 5 for allowed ambient temperature range.

3.2 Steering system for trucks and trailers (electric motor driven pump)

3.2.1 Application

This specification applies to:

- ETS, ETS1, ETS2, ETS2+1

3.2.2 Specification

All oils are approved that meet the following requirements:

Type	:	LHM
Oil specification	:	ISO 7308
Viscosity @ 100°C	:	6 cSt ± 1
Viscosity @ 40°	:	19 cSt ± 2
Viscosity @ -20°C	:	300 cSt ± 175
Viscosity @ -40°C	:	1260 cSt ± 1000
VI-index	:	≥ 300
Purity	:	class 18/16/13 according [Ref.1] class7 according [Ref.2]

Alternative approved oils:

Brand <i>(in alphabetical order)</i>	Type	Specification	Viscosity (in cSt)				VI-index
			@ 100 °C	@ 40 °C	@ -20 °C	@ -40 °C	
Anderol	Royco 717	R717: 13 aug. 2007 RH	10.1	29.3	312	870	360
Castrol	Brayco 717	November 15 2000 Rev4	8.7	26.0	300	1510	375
Esso	Univis HVI 26	05-2003	9.3	25.8	Not specified	896	376
Polyefir	GIPOL-RS	TU 0253-007-77820966-06	5	20	Max. 1300	11000	192
Total	Equivis XLT 32	N/A.	10.7	32	Not specified	1200	350

Purity : class 18/16/13 according [Ref.1] or
class7 according [Ref.2]

NOTE: See chapter 5 for allowed ambient temperature range.

3.3 Suspension system for trucks (engine driven pump)

3.3.1 Application

This specification applies to:

- HPVS
- DTS, DTS1, DTS2, DTS3

3.3.2 Specification

Brand <i>(in alphabetical order)</i>	Type	Specification	Viscosity (in cSt)				VI-index
			@ 100 °C	@ 40 °C	@ -20 °C	@ -40 °C	
Anderol	Royco 717	R717: 13 aug. 2007 RH	10.1	29.3	312	870	360
Castrol	Brayco 717	November 15 2000 Rev4	8.7	26.0	300	1510	375
Esso	Univis HVI 26	05-2003	9.3	25.8	Not specified	896	376
Polyefir	GIPOL-RS	TU 0253-007-77820966-06	5	20	Max. 1300	11000	192
Total	Equivis XLT 32	N/A.	10.7	32	Not specified	1200	350

Purity : class 18/16/13 according [Ref.1] or class7 according [Ref.2]

NOTE: See chapter 5 for allowed ambient temperature range.

3.4 Suspension system for trucks or trailers (electric motor driven pump)

3.4.1 Application

This specification applies to:

- DTS, DTS1, DTS2, DTS3

3.4.2 Specification

All oils are approved that meet the following requirements:

Type	:	LHM
Oil specification	:	ISO 7308
Viscosity @ 100°C	:	6 cSt ± 1
Viscosity @ 40°	:	19 cSt ± 2
Viscosity @ -20°C	:	300 cSt ± 175
Viscosity @ -40°C	:	1260 cSt ± 1000
VI-index	:	≥ 300
Purity	:	class 18/16/13 according [Ref.1] class7 according [Ref.2]

Alternative approved oils:

Brand <i>(in alphabetical order)</i>	Type	Specification	Viscosity (in cSt)				VI-index
			@ 100 °C	@ 40 °C	@ -20 °C	@ -40 °C	
Anderol	Royco 717	R717: 13 aug. 2007 RH	10.1	29.3	312	870	360
Castrol	Brayco 717	November 15 2000 Rev4	8.7	26.0	300	1510	375
Esso	Univis HVI 26	05-2003	9.3	25.8	Not specified	896	376
Polyefir	GIPOL-RS	TU 0253-007-77820966-06	5	20	Max. 1300	11000	192
Total	Equival XLT 32	N/A.	10.7	32	Not specified	1200	350

Purity : class 18/16/13 according [Ref.1] or
class7 according [Ref.2]

NOTE: See chapter 5 for allowed ambient temperature range.

3.5 Suspension & steering system combined for trucks (engine driven pump)

3.5.1 Application

This specification applies to:

- EVS with HPVS
- ETS, ETS1, ETS2 with DTS, DTS1, DTS2, DTS3
- ETS-A with DTS, DTS1, DTS2, DTS3

3.5.2 Specification

Brand <i>(in alphabetical order)</i>	Type	Specification	Viscosity (in cSt)				VI-index
			@ 100 °C	@ 40 °C	@ -20 °C	@ -40 °C	
Anderol	Royco 717	R717: 13 aug. 2007 RH	10.1	29.3	312	870	360
Castrol	Brayco 717	November 15 2000 Rev4	8.7	26.0	300	1510	375
Esso	Univis HVI 26	05-2003	9.3	25.8	Not specified	896	376
Polyefir	GIPOL-RS	TU 0253-007-77820966-06	5	20	Max. 1300	11000	192
Total	Equivis XLT 32	N/A.	10.7	32	Not specified	1200	350

Purity : class 18/16/13 according [Ref.1] or class7 according [Ref.2]

NOTE: See chapter 5 for allowed ambient temperature range.

4 Mixing oils

In principle, oils of equal specification are mixable. However, it is preferable not to do so. The system's components as delivered by VSE can contain an amount of oil out of the production process (e.g. Esso Unavis HVI 26). This amount of oil can be used without obligation in a system filled up with a different oil of the approval list (e.g. Castrol Brayco 717).

When replacing the system's oil by oil of a different type it is recommended to drain the 'old type' oil as much as possible and to rinse the systems (with the 'new type' of oil). **Max.** part 'foreign' oil: 10%.

5 Temperature range

All approved oils shall be used only in accordance with the hereunder stated ambient temperature range:

From -30°C to +45°C

Complementary, the oil temperature during operation must be within the limits stated in the table below at all times:

Oil <i>(in alphabetical order)</i>	Oil temperature range <i>(from approx. 10 – 500 cSt)</i>
Anderol Royco 717	From -35°C to 100°C
ATF mineral based oil	From -10°C to 85°C
Castrol Brayco 717	From -35°C to 100°C
Esso Unavis HVI 26	From -40°C to 100°C
LHM	From -30°C to 70°C
Polyefir GIPOL-RS	From -10°C to 65°C
Total Equivis XLT 32	From -35°C to 100°C