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Technical conditions for operational, lubricating and technical means at ŠkodaAuto.

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Note: In case of any differences between the Czech, English or German language mutation of this ITS, the Czech version takes precedence. The Czech version is available at <http://cts.skoda-auto.com/>.

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6.	2009-02-10	fully revised
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**OPERATIONAL FEATURES**

This section stipulates selection, realization and assembly of lubricating facilities. It is strictly forbidden to use materials containing silicone is strictly forbidden.

**1. Realization of lubricating facilities on machinery****1.1 Central lubricating facilities**

All machines and facilities must be equipped with automatically controlled central lubrication which must allow the possibility to be operated manually as well as automatically.

Lubricating facilities must ensure accurate dosage. On these grounds it is necessary to use individual dosing facilities for the separate lubricating spots.

It is required that lubricating facilities are automatically tact- or time-controlled.

**1.2 Manually lubricated spots**

Manual lubrication of machines and facilities is not allowed. In justified cases it must be approved by ŠkodaAuto.

**1.3 No-maintenance lubrication**

When using so called no-maintenance lubrication service life of five years or 25 000 hours of operation must be ensured.

**1.4 Air lubrication**

All pneumatic machine components for which air lubrication must be equipped with oil facilities for oil mist lubrication. Realization must be approved by ŠkodaAuto.

If necessary facility with automatic refill may be used for oil mist lubrication.

**2. Construction and components of central lubricating facilities****2.1 Distributing components**

The following may be used as distributing components:

- a) Single-pipe distributors
- b) Double-pipe distributors
- c) Progressive distributors
- d) Manifold-pipe distributors
- e) Reducers of flow amount with a minimes connection behind pressure weight

**2.2 Realization of lubricating bores**

All lubricating bores must be equipped with pipe screw of minimum G 1/8".

**2.3 Pipelines and pipeline connectors****2.3.1 Pipeline**

See ITS 1.12 – Hydraulics. With oil lubrication where pressures up to 30 bar it is possible to use plastic pipes where there is a heavy strain through vibrations. These must be protected with a cover against outsider damage.

**2.3.2 Screwing**

See ITS 1.12 – Hydraulics.

**2.3.3 Hose conducts-fittings**

See ITS 1.12 – Hydraulics.

**2.4 Lubricating cans**

Realization according to EN, ČSN, DIN is permissible.

Lubricating cans for pressing must not be used.

**2.5 Filters****2.5.1 Use**

With loss lubrication it is not necessary to use oil filters. Filters are necessary for circuit lubrication.

**2.5.2 Realization**

Pressure filters must be used. When selecting a filter it is necessary to follow the instructions of the manufacturer of hydraulic elements and ITS 1.12. Hydraulics with regard to the prescribed quality of filtration and areal load of filtration units. With key production facilities double exchange filters are required for the main flow.

#### 2.5.3 Checking

Filtration must be equipped with optical or electric signalization of contamination, see art.3.2.1 – ITS 1.12 Hydraulics.

2.5.4 Quality of filtration must be in keeping with ITS 1.12 Hydraulics and ISO 4406 – 1999.

### 2.6 Tank

#### 2.6.1 Capacity

The capacity of lubrication tanks must be sufficient for 500 operational hours in minimum.

#### 2.6.2

Oil flowing over the tank lid during oil leakage, e.g. during replacement of hydraulic elements must not flow back to the tank.

#### 2.6.3 Cleaning opening

All lubricating tanks with a volume over 50 liters must be equipped with a screw-off lid on a well accessible spot. No construction elements may be installed on this lid. It must be possible to chase oil and clean the tank without any obstacles. For smaller tanks with the capacity of up to 50 litres the cover lid must serve as a cleaning opening at the same time. In this case construction components may be placed on the desk. The tank for lubrication means must be separated from the hydraulics tank.

#### 2.6.4 Oil bath

All oil storage tanks must be placed in an oil bath of sufficient size so that the leaking oil does not contaminate the floor. This does not apply to storing oil tanks placed directly on the machine.

#### 2.6.5 Filling opening

Filling opening for the lubricating oil must be protected against dirt contamination.

Filling and refilling is possible only with the use of a filling adapter with the quick-coupling MD – 006,012, see ITS 1.12, art. 9.11.1.

Filling opening of transfer machines must be well-accessible and for volume over 5 liters the minimum diameter must be G 3/4".

#### 2.6.6 Outlet opening

Outlet opening of tanks and transfer machines with capacity over 5 liters must have a minimum diameter of G 1/2".

### 2.7 Checking and indication facility

#### 2.7.1 Checking lubrication facility

Automatically controlled central lubricating facility must be electrically/electronically controlled.

#### 2.7.2 Machine check

If a lubrication defect occurs the machine must be switched off after finishing the working cycle. Repeated switch-on can be performed only if the lubricating machine is again fully functional.

#### 2.7.3 Pressure switches

With automatically controlled single-pipe and double-pipe facilities with the main pipeline longer than five metres the function must be controlled by pressure switch which must be placed on the fixed end of the pipeline. For smaller automatically controlled facilities the pressure switch may be placed directly under the aggregate of the lubricating pump.

#### 2.7.4 Switches indicating the oil level

Oil reservoirs must be equipped with two switches. The first switch warns when oil volume reaches 10 % of remaining oil volume before reaching minimal level. The second switch turn the machine off when the oil volume reaches minimal level but after the ongoing working cycle has finished. Repeated switch-on is possible only for refilling the oil to the prescribed amount.

The level indicating switch must be easy to uninstall for repair purposes without the need to replace other components. The connection can be only realized as a connector.

#### 2.7.5 Manometers

For the purposes of easy optical check the main oil pipeline of the lubricating system must be equipped with a manometer. With complicated machines the manometer must be placed close to the servicing desk as well as on the pressure switch at the end of the main oil pipeline.

#### 2.7.6 Circle oil-level gauges

Circle oil-level gauges on transfer facilities may be used only for screwing or they may be connected with a flange. The oil-level gauge may not be performed in any other way.



### 3. Labelling the construction components

#### 3.1 Type tags

Original type tags must be placed on the facilities. The tags must be clearly visible and permanently fixed on unreplaceable parts. Adhesive tapes are not permitted. The tags must be engraved.

#### 3.2 The tag must contain the following information:

- |                      |  |
|----------------------|--|
| a) pumps             | - manufacturer's name<br>- type labelling<br>- maximum operational pressure<br>- oscillation range<br>- delivered amount<br>- revolving direction<br>- sucking and pressure side |
| b) filters           | - highest operational pressure permitted<br>- nominal flow<br>- filter fineness  |
| c) pressure valves   | - operational pressure<br>- nominal flow   |
| d) distributors      | - voltage<br>- type of voltage<br>- maximum operational pressure permitted<br>- nominal flow   |
| e) pipeline          | - number labelling must follow the plan of central lubrication   |
| f) pressure switches | - pressure range, type labelling   |
| g) tanks             | - type of lubricator according to the table of lubricating means for ŠkodaAuto   |

### 4. Installation of lubricating facilities

#### 4.1 General installing instructions

Lubricating facilities including pumps, distributions and pipelines must be installed by a qualified worker and protected so that any damage during operation or maintenance is done. Sucking aggregates including tanks must be installed on an accessible spot outside of any casing.

#### 4.2 Construction components

All components of lubricating facilities must be installed permanently. They must be well accessible and easily replaceable without the need to uninstall neighbouring parts. Distributors must be installed on the base board or using a flange so that no deformation may occur.

#### 4.3 Installation and fitting of pipelines and hoses

##### 4.3.1 Conducting the pipeline

The pipeline must be easily accessible and laid in such distances that every screwing can be dismantled using standard tools.

##### 4.3.2 Length of pipes

If possible the pipeline should not be installed using smaller components.

##### 4.3.3 Uninstalling

It must be possible to uninstall the pipeline without the necessity to uninstall other components of the lubrication facility.

##### 4.3.4 Removing vibrations

The pipeline must be fixed in order to remove undesired vibrations.

##### 4.3.5 Pipe fixing

Pipe fixtures must not be welded to the pipes.

##### 4.3.6 Hose pipelines

Under no circumstances can the hoses be twisted.

##### 4.3.7 Hose – pipe connection

The transition from a fixed installed pipe to a hose may be realized using a connecting fitting fixed at a machine.

### 5. Working safety

#### 5.1 Protective measures

Lubricating facilities must be placed and installed so that there is no necessity to reach over rotating or moving parts of the machines during operation or maintenance. If there is no other solution the rotating parts must be equipped with a protective cover.

**5.2 Dangerous slide**

Excessive lubricant must under no circumstances stain the workshop's floor where it may cause a dangerous slide.

**6. Technical documentation**

The central lubrication scheme and lubricating plan must be supplied to ŠkodaAuto in two copies for approval. The documentation must be delivered in time so that the necessary changes may be performed before the facility's installation.

We require technical documentation to be delivered in a final corrected form: two paper versions and one data Carrar. For formats recommended see ITS 1.01.

**6.1 Lubricating instructions**

6.1.1 The documentation must contain the lubrication plan according to ČSN EN 13460 which is going to include the following data:

- lubrication scheme
- labelling of lubrication spots
- number of operation hours for periodic replacements of all lubrication spots apart from loss lubrication
- type of lubrication means according to ISO including viscosity and labelling of the manufacturer
- amount (tank capacities, etc.)

6.1.2 A table corresponding with the lubricating plan is to be placed on a suitable and clearly visible spot on the machine.

6.1.3 All lubrication spots to be labelled with signs containing the type of oil or fat.

**6.2 Lubrication scheme must contain the following data:****6.2.1 List of facilities**

The list of components including electric / electronic / controlling machinery, number of pieces, title, type labelling.

**6.2.2 Pipeline scheme**

Schematic signs and dimensions of pipelines and hoses, follow-up numbering of pipelines and lubrication spots and numbering of lubrication spots.

**6.2.3 Components**

Symbols of the connected signs of all components given in the list with necessary data, e.g.

- capacity
- driving power
- revolutions
- delivered amount
- data on pressure
- dosage

**6.2.4 Checking elements**

Placing of checking elements and naming of lubrication spots.

**A) LUBRICATION MEANS**

Table no. 1

<b>Hydraulic oils</b>							
Viscosity at 40 °C		PARAMO	MOBIL	SHELL	ExxonMobil+E SSO	CASTROL	FUCHS
32 Cst		PARAMO HM 32	MOBIL DTE 24	TELIUS S2 MX 32	Nuto H 32	HYSPIN AWS 32	RENOLIN B 10
46 Cst		PARAMO HM 46	MOBIL DTE 25	TELIUS S2 MX 46	Nuto H 46	HYSPIN AWS 46	RENOLIN B 15
68 Cst		PARAMO HM 68	MOBIL DTE 26	TELIUS S2 MX 68	Nuto H 68	HYSPIN AWS 68	RENOLIN B 20
<b>Bearing oils</b>							
3 Cst		PARAMO OL-J3	MOBIL Velocite No 3	MORLINA S2 BL 5	Mobil Velocite No 3	MAGNA 2	RENOLIN MR 0
10 Cst		PARAMO OL-J10	MOBIL Velocite No 6	MORLINA S2 BL 10	Mobil Velocite No 6	MAGNA 100	RENOLIN B 3
22 Cst		PARAMO OL-J22	MOBIL Velocite No10	MORLINA S2 BL 22	Mobil Velocite No 10	HYSPIN AWS 22	RENOLIN B 5
32 Cst		PARAMO OL-J32	MOBIL DTE Oil Light	MORLINA S2 B 32	Mobil DTE Oil Light	HYSPIN AWS 32	RENOLIN B10
46 Cst		PARAMO OL-J46	MOBIL DTE Oil Medium	MORLINA S0 B 46	Mobil Hydraulic Oil HLPD 46	HYSPIN AWS 46	RENOLIN B 15
68 Cst		PARAMO OL-J68	MOBIL DTE Oil Hvymed	MORLINA S2 B 68	Mobil DTE Oil Hvymed	HYSPIN AWS 68	RENOLIN B 20
100 Cst		PARAMO OL-J100	MOBIL DTE oil Heavy	MORLINA S2 B 100	Mobil DTE Oil Heavy	ALPHA SP 100	RENOLIN B 30
<b>Oils for industrial transfers</b>							
150 Cst		PARAMO K12	Mobilgear 600 XP 150	OMALA S2 GX 150	Mobilgear 600 XP 150	ALPHA SP 150	RENOLIN CLP 150
220 Cst		PARAMO K18	Mobilgear 600 XP 220	OMALA S2 GX 220	Mobilgear 600 XP 220	ALPHA SP 220	RENOLIN CLP 220
320 Cst		PARAMO CLP 320	Mobilgear 600 XP 320	OMALA S2 GX 320	Mobilgear 600 XP 320	ALPHA SP 320	RENOLIN CLP 320
<b>Slipping oils</b>							
68 Cst		PARAMO KV 68	MOBIL Vactra Oil No 2	TONNA S2 M 68	Mobil Vactra Oil No 2	MAGNA SW D 68	RENEP CGLP 68
220 Cst		PARAMO KV 220	MOBIL Vactra Oil No 4	TONNA S2 M 200	Mobil Vactra Oil No 4	MAGNA SW D 220	RENEP CGLP 220



Table no. 2

Type of fat						
Penetrationat °C/base	PARAMO	MOBIL	SHELL	ExxonMobil+ ESSO	CASTROL	FUCHS
Při 25 °C nad 395/Al	MOGUL A00	MOBILGRESE FM 101	-----	-----	-----	CASSIDA GREASE RLS 00
Při 25 °C 230- 270/LI	MOGUL LV 2-3	MOBILUX EP 3	GADUS S2 V100 2	Mobil Unirex 2	Spheerol AP 3	RENOLIT B 2
Při 25 °C 240-280/LI	MOGUL LV 2 EP	MOBILUX EP 2	GADUS S2 V220 2	Mobil Unirex EP 2	Spheerol EPL 2	RENOLIT B 2
Při 25 °C 260-300/NA	----	MOBILTHEMS SHC 22	-----		-----	RENOLIT SO-WD 2
Při 25 °C 240-280/CA	MOGUL K 3	MOBILUX EP 004	GADUS S2 V100 3	Mobil Centar XHP 221	-----	RENOLIT CX-EP 2
Při 25 °C 270-310/Al	----	MOBILGREASE FM 222	-----	-----	-----	STABYL AX 2

Any deviations in the selection of lubrication substances must be consulted with ŠkodaAuto

#### RELEASE LIST OF COMPONENTS

##### 1. Central lubrication

###### 1.1 Oil

ARGO HYTOS	SKF Lubrication Systems CZ.
BIJUR DELIMON INTERNATIONAL	Baier + Köppel GmbH+Co.KG
Eugen Woerner GmbH & Co.KG	TriboTec

###### 1.2 Fat

SKF Lubrication Systems CZ.	Baier + Köppel GmbH+Co.KG
BIJUR DELIMON INTERNATIONAL	Eugen Woerner GmbH & Co.KG
PERMA,	SIMALUBE

##### 2. Lubricating machines

SKF Lubrication Systems CZ.	Baier + Köppel GmbH+Co.KG
BIJUR DELIMON INTERNATIONAL	Eugen Woerner GmbH & Co.KG
Hydac	TriboTec