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RECOMMENDATIONS ON CHOOSING THE TYPE OF LUBRICATING MATERIALS FOR REDUCERS IN MACHINE DETAILS, MECHANISM AND THEORY OF MACHINERY

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Abstract: It reduces the value of the coefficient of friction, reduces the wear of the parts and leads to a decrease in the amount of heat released due to friction and to maintain the strength of the parts for a long time, to reduce vibration and noise, and economically, it does not increase costs.

Keywords: Transmission, oil, indicator, Solidol-24.

In closed gear transmission, the reducer gear must be immersed in the oil level by about 10 mm. The amount of oil put into the reducer is 0.25 dm3 of oil per 1 kW of transmitted power. We choose the brand of oil to be used. We choose industrial I-70A oil according to DAST 20799-75.

We lubricate the bearings using plastic methods. Bearings should be periodically lubricated with a syringe.

As a result of lubrication of reducer parts and lubrication of bearings, it protects them from corrosion.

It reduces the value of the coefficient of friction, reduces the wear of the parts and leads to a decrease in the amount of heat released due to friction and to maintain the strength of the parts for a long time, to reduce vibration and noise, and economically, it does not increase costs.

In order to lubricate the reducer parts, they must be closed, it is planned to store lubricants in the oil sump. Gear reducers working in an open form are almost not intended for lubrication. Therefore, the speed of revolutions of open gears does not exceed 4 km/h.

The type of oil for lubrication of cylindrical gear reducers is selected from the table.

The choice of the type of oil begins with determining the quality of the required kinematic viscosity of the oil: for reducers - according to the rotational speed (table 11.1), for worm gears - according to the sliding speed (table 11.2).

Based on the next found viscosity value, the appropriate oil is selected according to the given table (table 11.3).

Recommended viscosity values for oils at 50°C, for reducers

11.1 - table

Contact voltage, σ_H MPa	kinematic viscosity, 10^{-6}, m^2/h at a circular speed, v, m/h.		
	2 up to	2-5	5 higher than
600	34	28	22
600-1000	60	50	40
1000-1200	70	60	50

Recommended viscosity values for lubricants at 100°C, by sliding speed, for worm gear

11.2 - table

Contact voltage, σ_H MPa	kinematic viscosity, 10^{-6}, m^2/h at a circular speed, v, m/h.		
	2 up to	2-5	5 higher than

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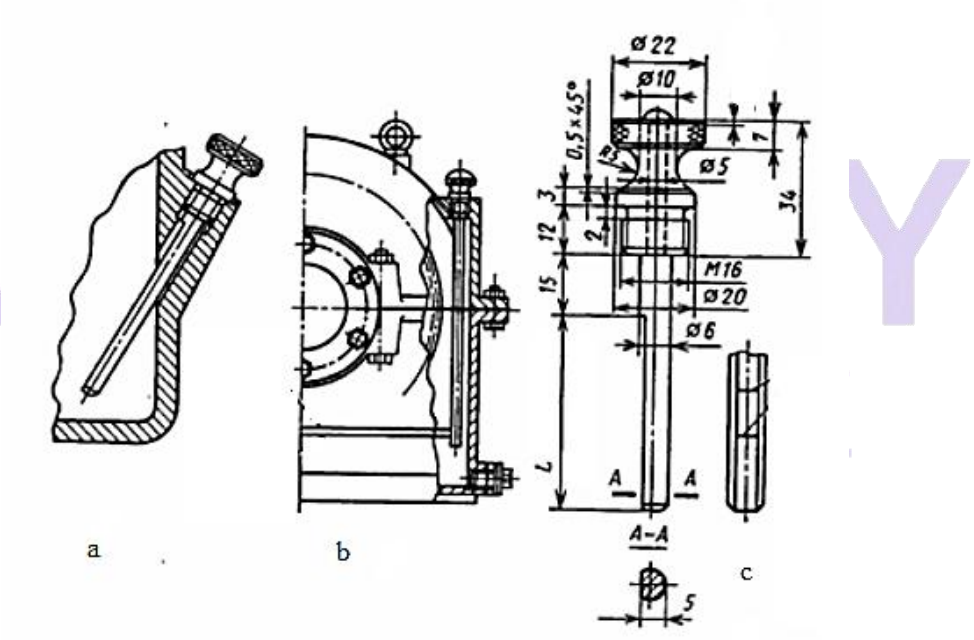
200 200-250 250-300	25 32 40	20 25 30	15 18 23

The following types of oils are used to lubricate gear and worm gears.
11.3 - table

Fields of application of oils	**Brand**	**kinematic viscosity, 10^{-6}, m^2/s**	
In industry	I-12A I-20A I-25A I-30A I-40A I-50A I-70A I-100A	10-14 17-23 24-27 28-33 35-45 47-55 65-75 90-118	50^0 C
In aviation	MS-14 MK-22 MS-20	14 22 20.5	100^0 C
Cylindrical	52	44-59	100^0 C

The oil level in the reducer housing is monitored using oil gauges.

The simplest oil indicator is shown in this picture. Closed dipstick oil indicators are used to monitor the oil level during reducer operation.



11.1 - picture. The simplest oil indicator:
a) installation at the bottom of the reducer housing;
b) mounting on the housing cover;

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c) dimensions of the oil indicator.

How much oil is added to reducers is based on various criteria.

For example: the oil level is also taken as $hm=0.25d_{a2}$. Basically, the amount (volume) of oil is calculated based on the formula $V=0.25\ V_r$.

Vr is the total volume of the reducer, liter

Since we do not intend to calculate the economic efficiency of the reducer that we design, the size of the reducer is not calculated. Therefore, it is not necessary to calculate the volume of oil. It is enough to choose the type of oil.

Plastic lubricants are mainly used for lubrication of rolling bearings. These types of oils include:

- Solidol - 7, 12, 24
- E Fele – MG – 211, 212, 213 plastic oils
- Molykote BR2 plus, Molykote G – 4700 plastic oils
- and so on.

And we choose Solidol-24 brand oil, which is very cheap and has a high viscosity from the economic point of view. The reason is that there are no special requirements for the reducer we are designing.

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