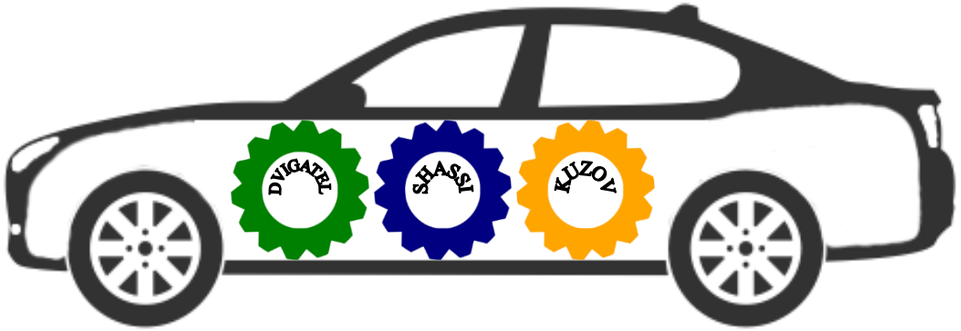
VEHICLES CONSTRUCTION

AVTOMOBILLAR KONSTRUKSIYASI



6th Topic: Lubrication System.

(6-Mavzu: Moylash tizimi)

Part 1

Associate Professor: Yusupov Sarvarbek

6-Mavzu: Moylash tizimi

(6th Topic: Lubrication System.)

O‘quv rejasi:

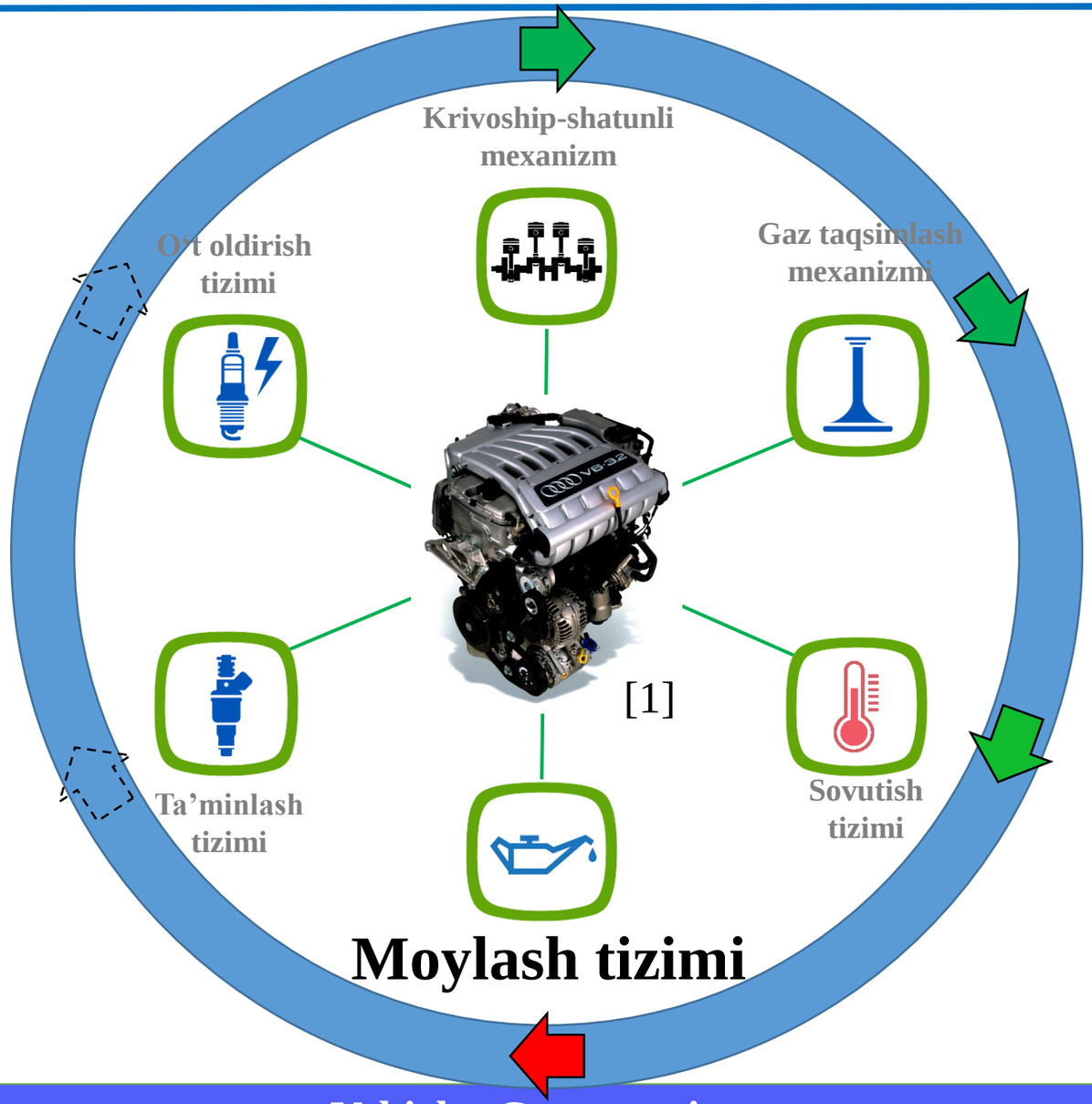
6.1. Moylash tizimining vazifasi va ishlash prinsipi.

6.2. Moylash tizimining usullari.

6.3. Moylash tizimida ishlatiladigan moylar.

6.4. Moylash tizimi qismlarining konstruksiyasi.

6.5. Dvigatel karterini shamollatish.



[1]

6.1. Moylash tizimining vazifasi va tasnifi.

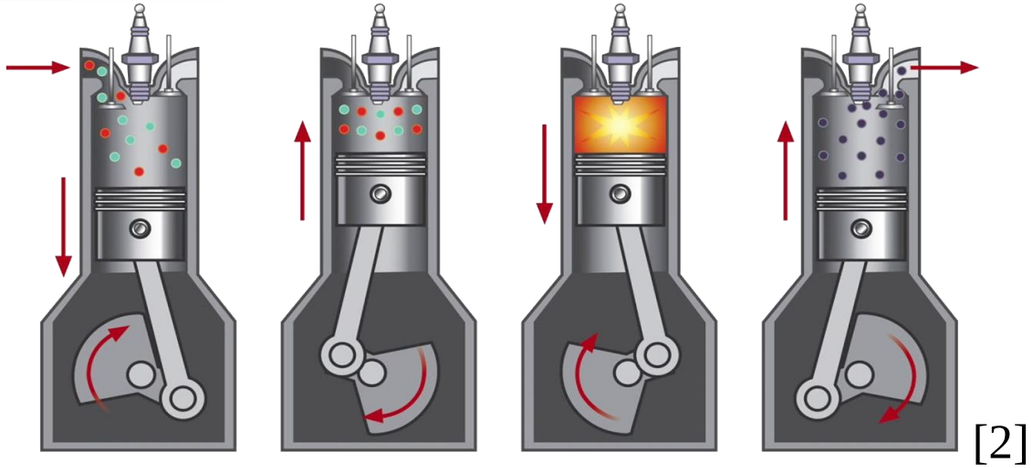
Kirish – yonilg‘i sifatida kimyoviy energiya

100 %

[1]

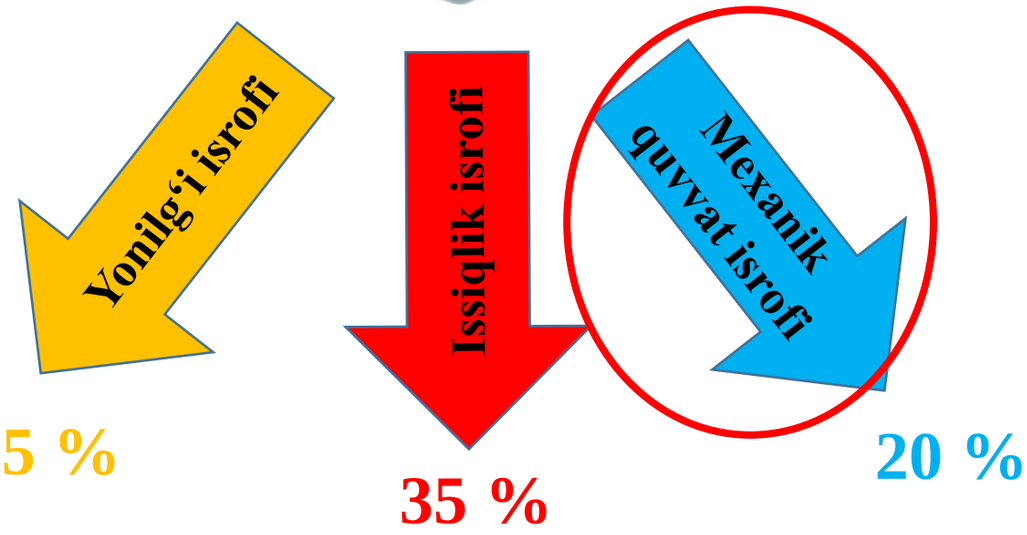
Chiqish – quvvat dvigatelning tirsakli valida hozil bo‘ladi

20 %



[2]

Kiritish | Siqish | Kengayish (ish yo‘li) | Chiqarish

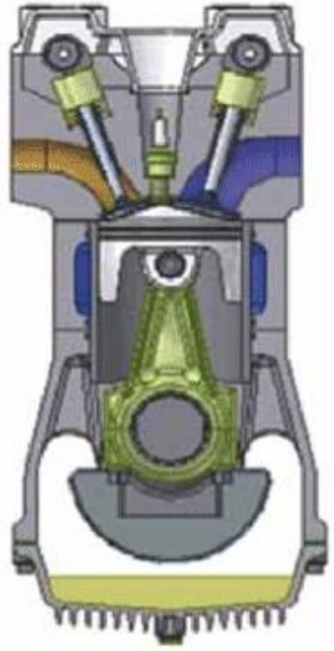


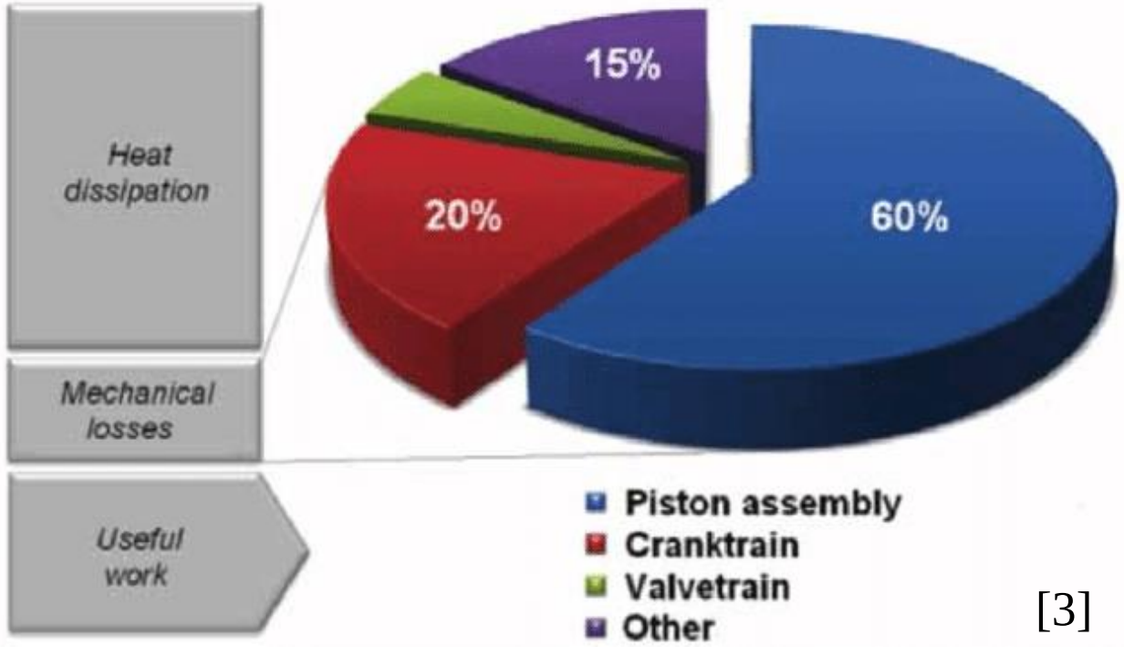
Umumiy yo‘qotish – 80 %

Dvigatelning ma’lum quvvati detallarning o‘zaro ishqalanishidan vujudga keladigan qarshilikni yengishga sarflanadi.

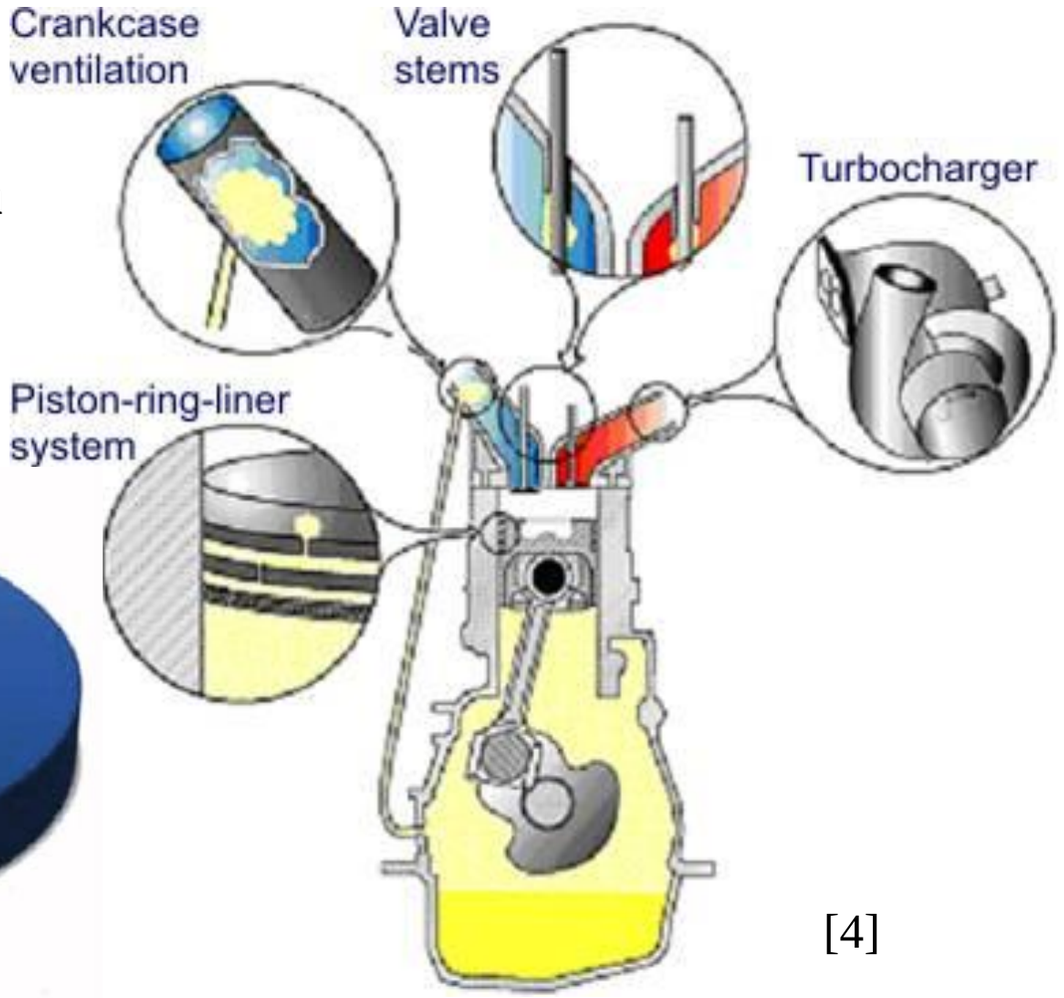
Mexanik isrofi dvigatel mexanizmlaridagi ulushi

Lubricating Oil Consumption





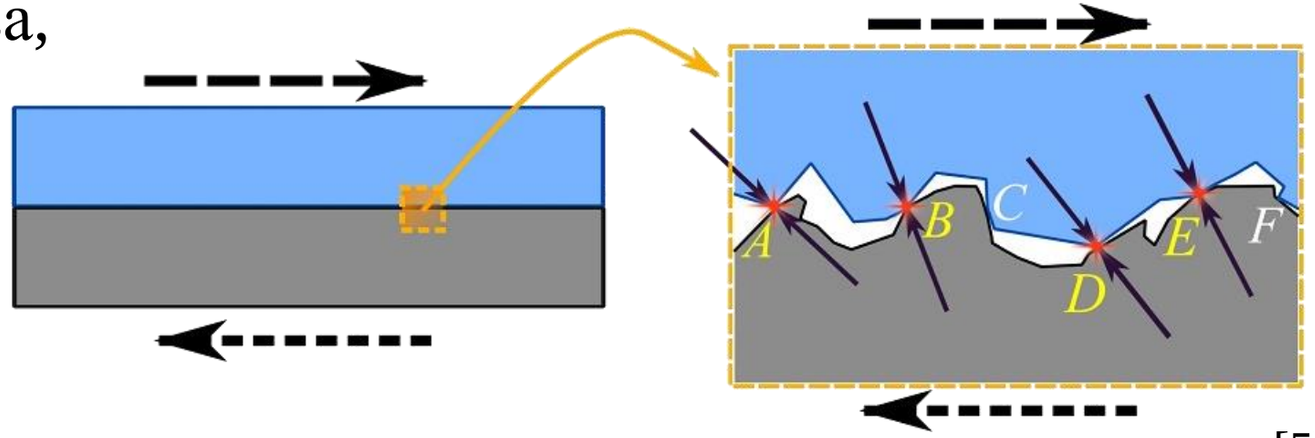
[3]



[4]

Detallardagi ishqalanish yuqori bo‘lsa,

- **Tez yeyiladi**;
- **Qiziydi**;
- **Dvigatelning quvvati;**
- **Tejamkorligi pasayadi**.



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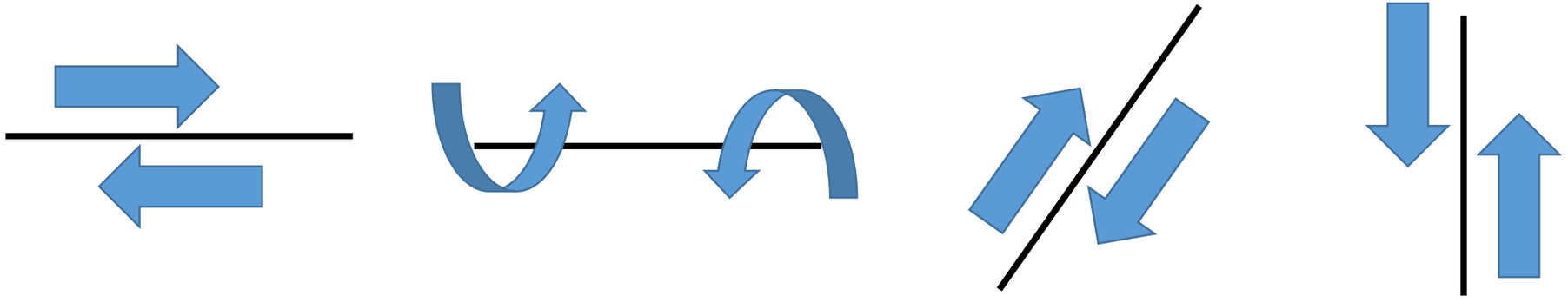
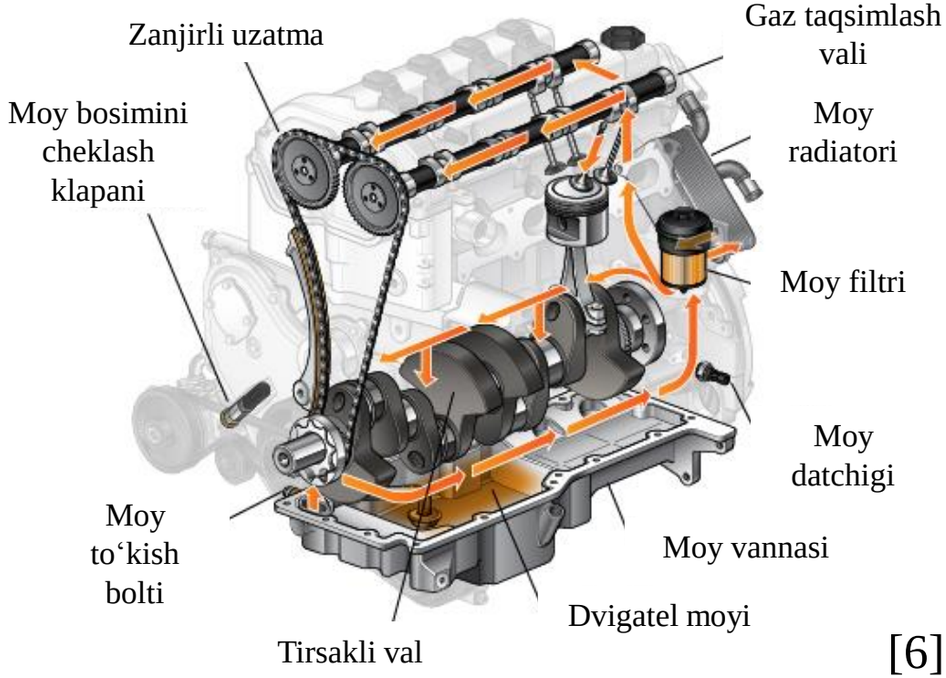


Moylash tizimi dvigatel detallarining ishqalanuvchi yuzalariga yetarli miqdorda moy yetkazib berish uchun xizmat qiladi.

Maqsad detal yuzalarida ishqalanish kuchini va yeyilishini kamaytirishdir.

Shu bilan birga, moy yuzani qirindilardan tozalaydi, korroziyadan himoyalaydi hamda detallarni qisman sovitish vazifasini bajaradi.



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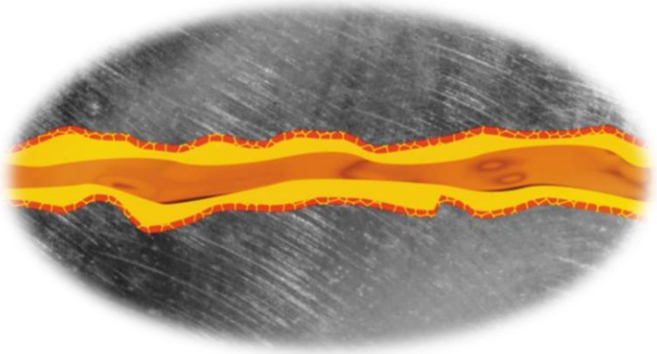


[7]

Moyning tizimining ishlash prinsipi.

[8]

6.2. Moylash tizimining usullari.

Moy dvigatel detallariga

- **Sachratish,**
- **Bosim ostida yoki aralash usulda berilishi mumkin.**

Shunga ko‘ra, zamonaviy avtomobil dvigatellarida asosan **kombinatsiyalashgan** (*aralash*) moylash tizimi qo‘llaniladi.

Bu turdagi moylash tizimida katta yuklanib ishlaydigan detal yuzalariga moy nasos orqali bosim ostida majburiy,

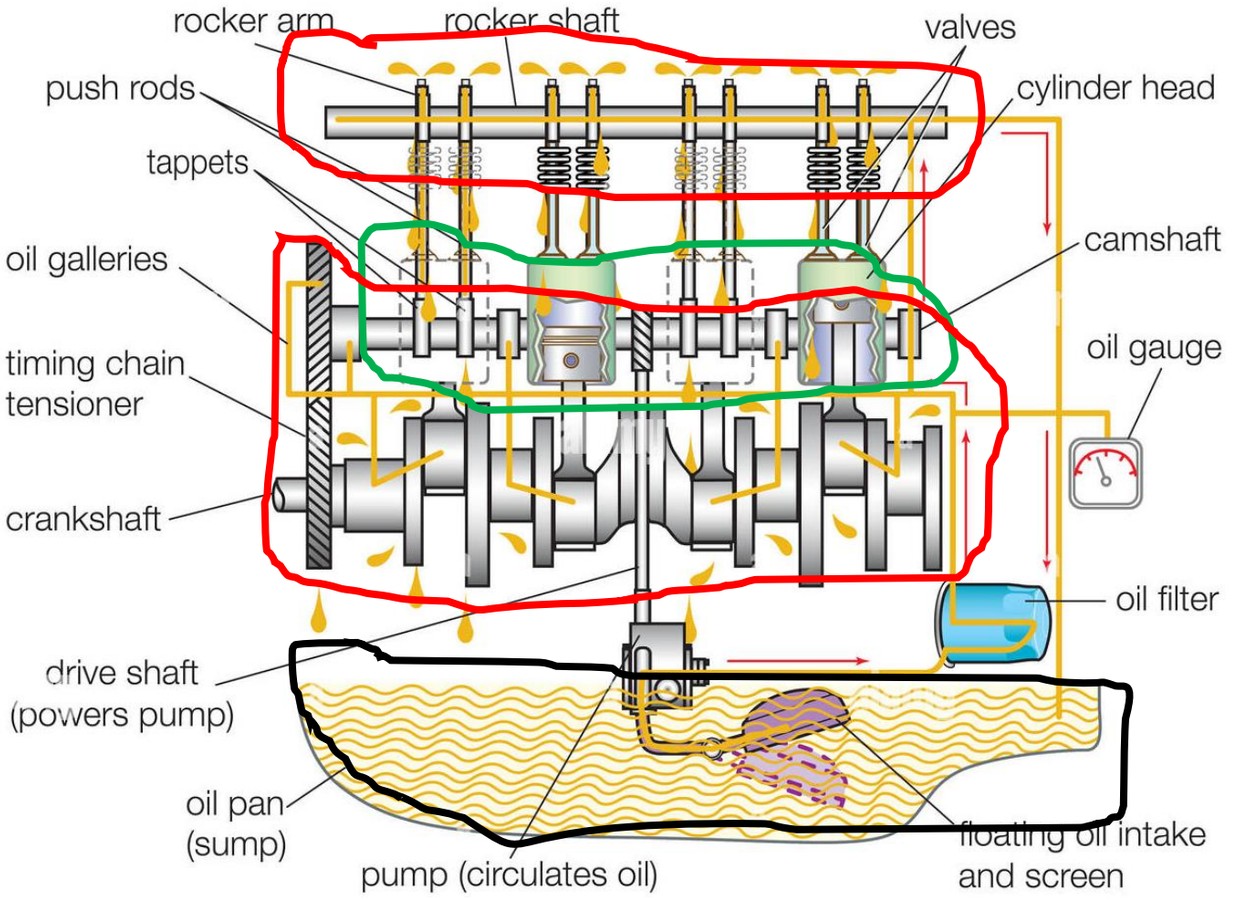
qolganlariga esa **sachratish**

va **tomchi usuli** bilan yuboriladi.

Silindr ichiga moy sachratish usulida yetkaziladi.

Porshen bilan bog‘liq detallar moylanadi.

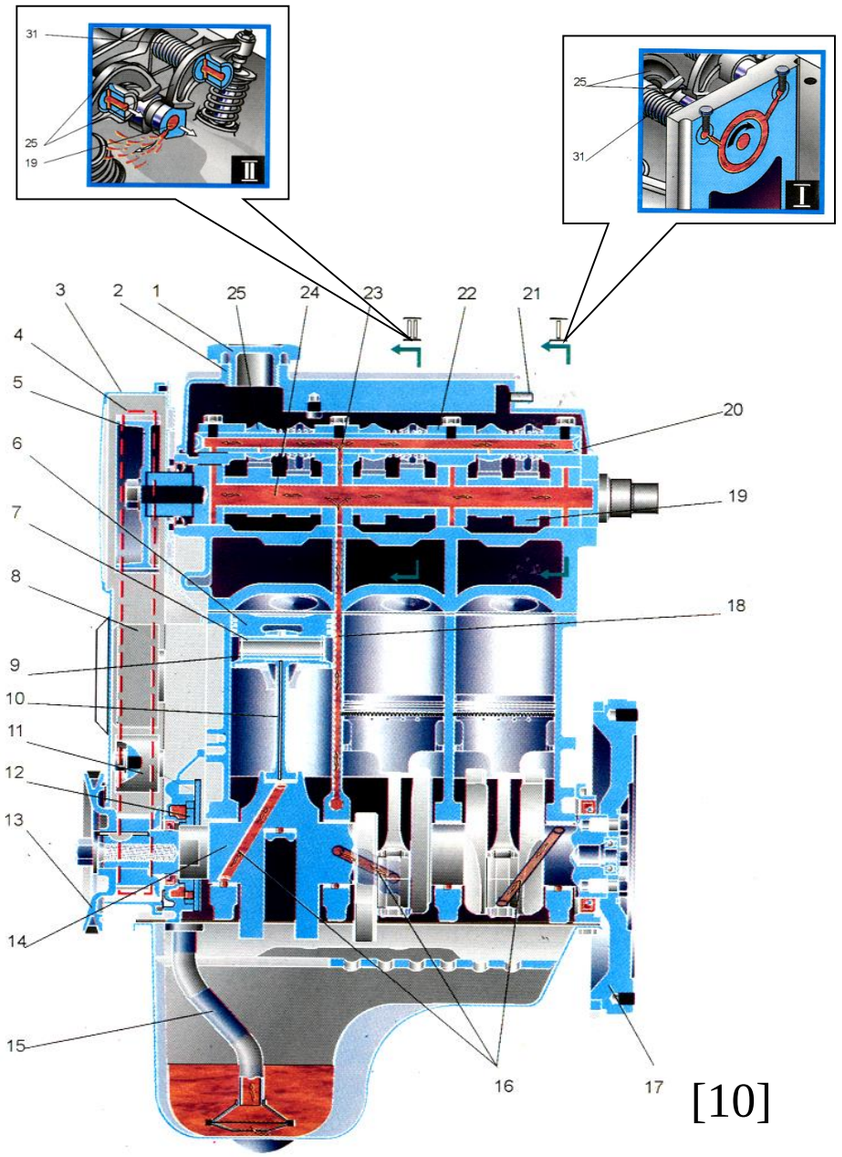
Dvigatelning tirsakli val, gaz taqsimlash vali, koromislo o‘qlari bo‘yinlari bosim ostida moylanadi.



[9]

Moylangan yuzadan chiqayotgan moy karterga tushadi.

Uch silindrli avtomobilning moylash tizimi



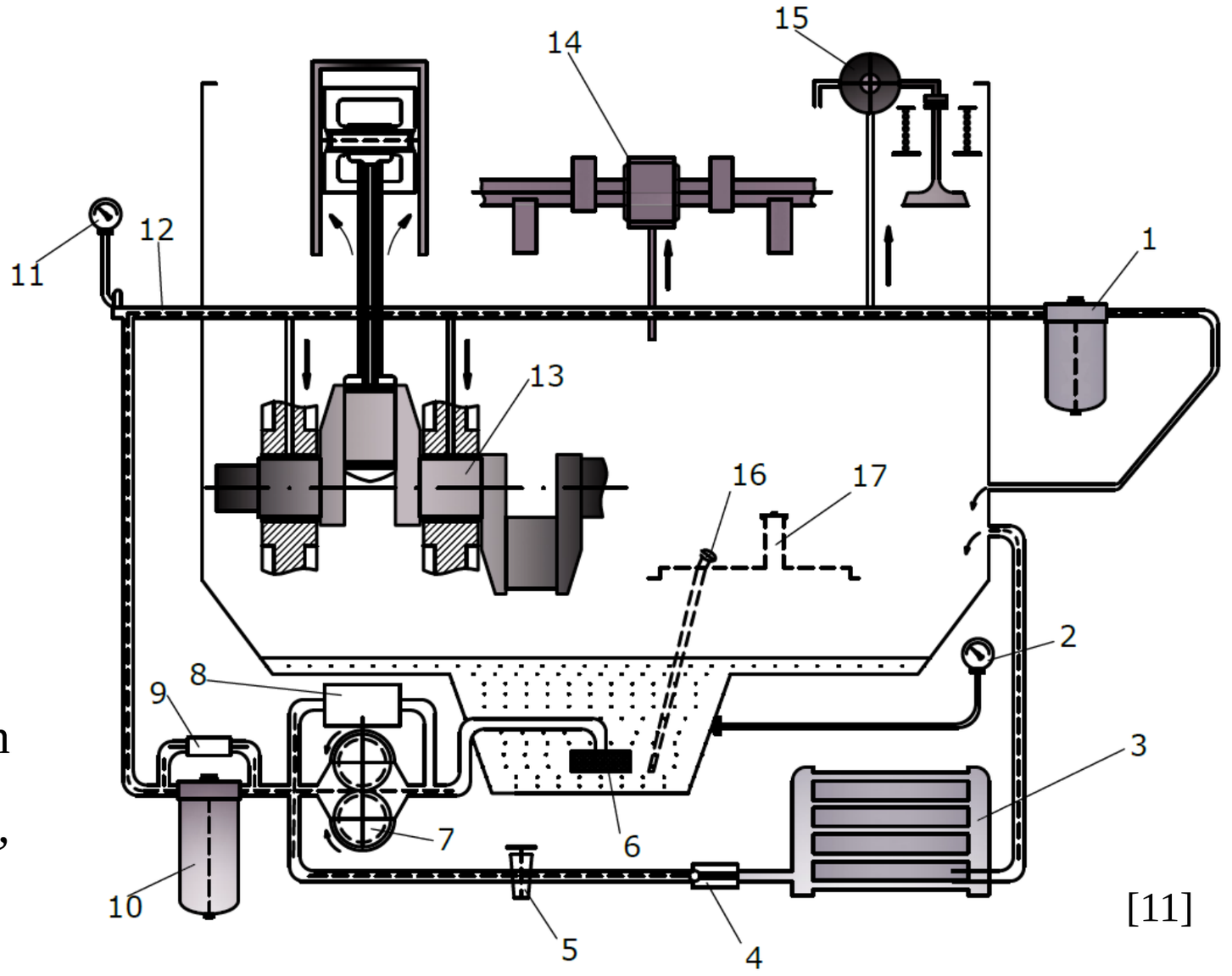
[10]

1-moy quyish bo‘g‘inining qopqog‘i, 2-moy quyish bo‘g‘izi, 3-himoyalovchi qobiq, 4-taqsimlovchi val yuritmasining tishli tasmasi, 5-taqsimlash vali yuritmasining tishli shkivi, 6-orshen, 7-porshen barmog‘i, 8-suv nasosi yuritmasining tishli shkivi, 9-stopor halqa, 10-shatun, 11-tishli tasmani taranglovchi qurilma, 12-moy nasosi, 13-generatorni harakatga keltiruvchi shkiv, 14-tirsakli val, 15-moy so‘rgich, 16-moyni o‘zak podshipnikdan shatun podshipnikga o‘tkazish kanali, 17-maxovik, 18-blok kallagi magistraliga moy o‘tkazish kanali, 19-taqsimlash valining kulachogi, 20-koromislolar o‘qi, 21-karter gazlarini o‘tkazish kanali, 22-koromislolar o‘qlari tayanchining qopqog‘i, 23-koromislo o‘qidagi moy kanali, 24-taqsimlash validagi moy kanali, 25-koromislo, 26-reduktsion klapan, 27-moy nasosining qopqog‘i, 28- moy nasosining yetaklovchi shesternyasi, 29- moy nasosining yetaklanuvchi sherternyasi, 30- moy nasosining korpusi, 31-koromisloning qaytaruvchi prujinasi, 32-moy filtrining korpusi, 33-filtrlovchi element, 34-o‘tkazib yuboruvchi klapan.

Moylash tizimining oddiy sxemasi

1-mayin filtr; 2-termometr;
3-moy radiatori; 4-saqlagich klapani;
5-jo‘mrak; 6-moy qabul qilgich;
7-moy nasosi: 8-reduksion klapan;
9-o‘tkazish klapani; 10-dag‘alfiltr;
11-manometr; 12-asosiy moy kanali;
13-tirsakli valning o‘zak bo‘yinlari;
14-taqsimlash valining bo‘yinlari;
15-koromislo o‘qi; 16-moy sathini
o‘lchagich; 17-moy quyish bo‘g‘zi
patrubogi.

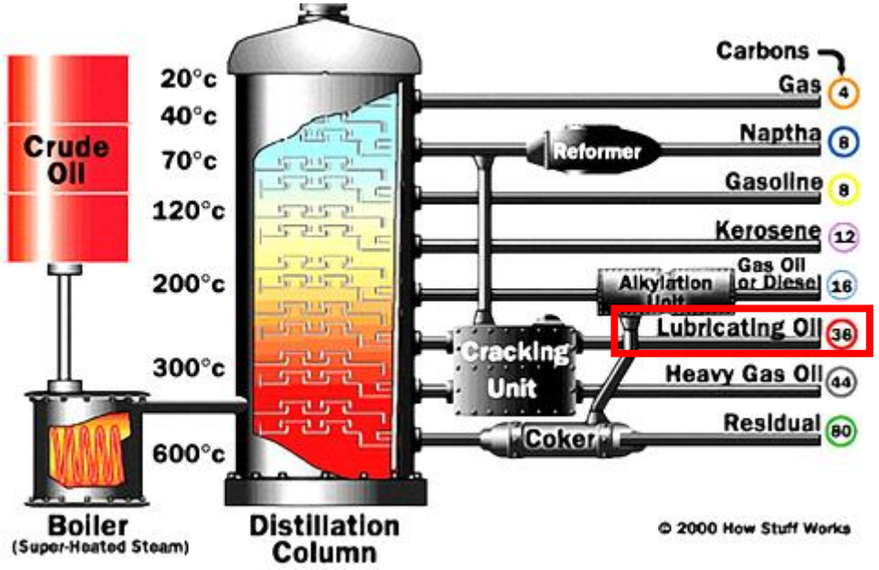
Tizimdagi moyning bosimi **100 kPa** dan **pasayganda**, saqlagich klapani berkilib, radiatorga moyning **o‘tishini to‘xtatadi**.



[11]

6.3. Moylash tizimida ishlatiladigan moylar.

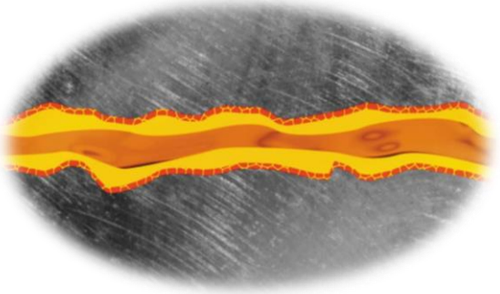
Dvigatel detallarini moylash uchun ishlatiladigan moylar mazotni qayta haydash yo‘li bilan olinadi va ular erigan aralashmalaridan tozalangan ***moylar*** deb ataladi.



[12]

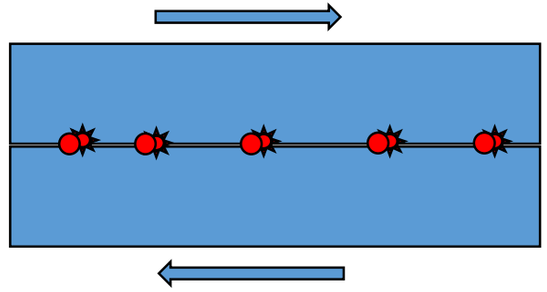
Ishlatiladigan moyning **moylash xususiyati** ishqalanuvchi detallarning yuzalariga yupqa moy pardasini hosil qilishi

va ishqalanish paytida bo‘rtib chiqmaydigan oksidlar pardasining hosil bo‘lishini ta’minlashdan iborat.



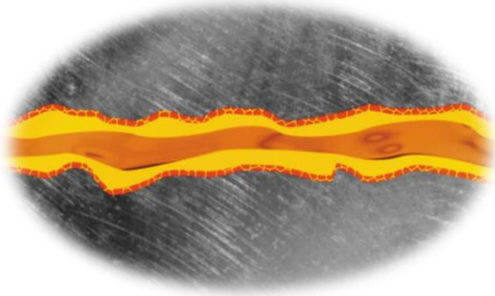
[7]

Bu moy pardasi ishqalanuvchi detallarning bir - biriga bevosita tegib turishiga,



yeyilish zarrachalarining ishqalanuvchi yuzalarining payvandlanib qolishiga

va detallarnig tez yeyilishiga yo‘l qo‘ymaydi.



[7]

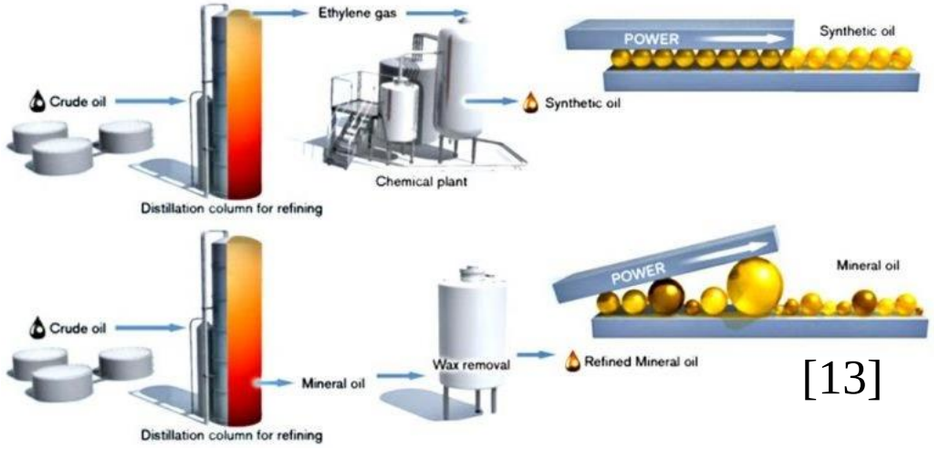
Bu pardalar 100^{o}C gacha issiqlikda ham qovushqoqligini

va moylash xususiyatini **saqlab qolish lozim.**

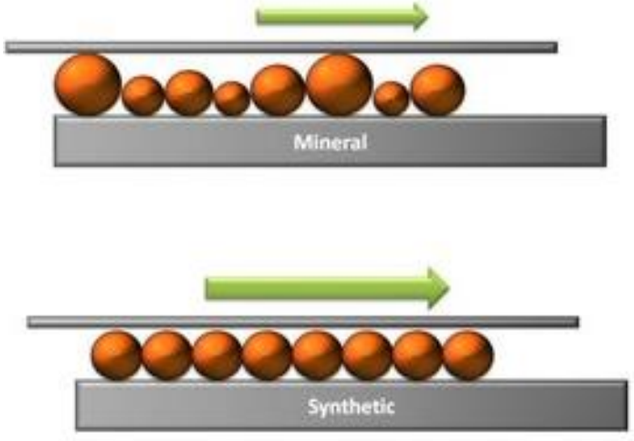
Dvigatel moylari asosan quyidagilarga bo‘linadi:

- An’anaviy (mineral) moylash materiallari;
- Sintetik moylash materiallari;
- Yarim-sintetik moylash materiallari.

Neft mahsuloti	Qo‘shimcha prisadkalar
75% - 95%	**5% - 25%**



[13]



[14]

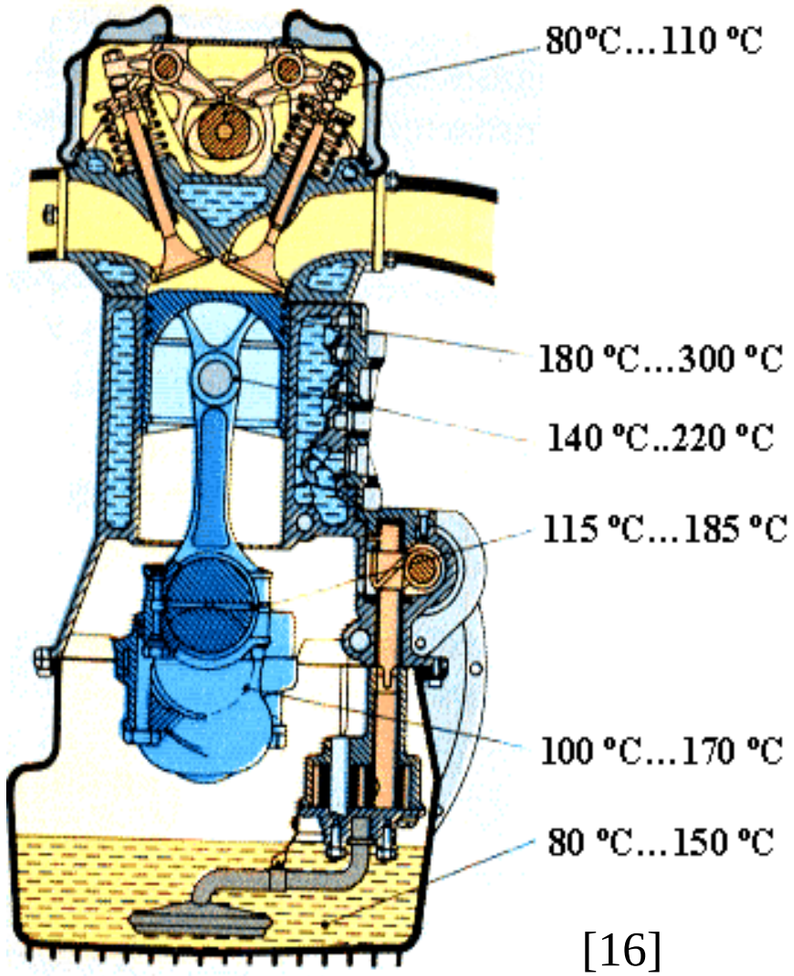
Moylash xususiyati (qovushqoqligi)

Kamayadi — **°C** — **Nisbatan kamayadi**

Mineral Oil	Synthetic Oil
✓ Driving in urban areas, at fixed speed	✓ Driving at high speed
✓ Short-distance driving	✓ Long-distance driving

[15]

Moyning tizimdagi haroratlari



[16]

Moy ishqalanuvchi detallar qizigan yuzalarining issiqligini o‘ziga olib, ularni sovutish xususiyatiga ham ega bo‘lishi kerak.

Moyning qovushqoqligi **zanglamaslik,** **oksidlanishga chidamliligini oshirish**, **yuvib ketish hodisalarini yaxshilash,** **yuqori haroratda suyulmaydigan bo‘lishi** uchun unga 3...14 % har xil tarkibli **murakkab qo‘shilma qo‘shiladi.**

Benzinli dvigatellar uchun ishlatiladigan moyning belgisi **AS-8** yoki **AS-10** (GOST-10514-61).

Belgidagi **A** harfi moyning avtomobil moyi ekanligini, **S** harfi **sellektiv usulda tozalanganligini**, **8** raqami esa moyning 364 K dagi qovushqoqligini bildiradi.

Raqam qancha katta bo‘lsa, moyning qovushqoqligi shuncha yuqori bo‘ladi.

Sovuq iqlimda ishlaydigan dvigatellarda qovushqoqligi 8 va undan past,

Issiq iqlimda ishlaydigan dvigatellarda esa qovushqoqligi 10 va undan yuqori belgili moylar ishlatiladi.

Dizel dvigatellari uchun maxsus yuqori sifatli moylar ishlatiladi.

Qishda DS-8,

Yozda DS-11 (GOST-8581-61) moylari ishlatiladi.

Avtomobilning boshqa mexanizm va ishqalanuvchi detallari uchun boshqa turli moylar ishlatiladi.

Yengil avtomobillarda ishlatiladigan suyuqliklar va

moylovchi materiallarning sig‘imi

60 000 – 70 000 km

[17]

NEXIA

1,5 L

motor	**- 3,8 L**
mkpp	- 1,8 L
gur	-1,0 L
antifreeze	- 6,2 L
tormoz	-1,2 L

1,6 L

motor	**- 3,7 L**
mkpp	- 1,8 L
gur	-1,0 L
antifreeze	- 6,2 L
tormoz	-1,2 L

60 000 km

MATIZ

1,0 L

motor	**- 3,2 L**
mkpp	- 2,1 L
akpp	- 3,0 L
gur	-1,0 L
antifreeze	- 4,2 L
tormoz	-1,0 L

0,8 L

motor	**- 2,7 L**
mkpp	- 2,1 L
akpp	- 3,0 L
gur	-1,0 L
antifreeze	- 3,8 L
tormoz	-1,0 L

[18]

60 000 km

DAMAS

0,8 L

motor	**- 2,7 L**
mkpp	- 1,3 L
akpp	- 4,0 L
most	- 1,3 L
antifreeze	- 3,8 L
tormoz	-1,0 L

[19]

SPARK

60 000 – 70 000 km

1,0 L

motor	**- 3,75 L**
mkpp	- 2,5 L
akpp	- 4,0 L
gur	-1,0 L
antifreeze	- 4,5 L
tormoz	-1,0 L

1,25 L

motor	**- 3,8 L**
mkpp	- 2,5 L
akpp	- 4,0 L
gur	-1,0 L
antifreeze	- 4,5 L
tormoz	-1,0 L

1,2 L

motor	**- 3,75 L**
mkpp	- 2,5 L
gur	-1,0 L
antifreeze	- 4,5 L
tormoz	-1,0 L

[20]

LACETTI

60 000 – 70 000 km

1,5 L

motor	**- 3,75 L**
mkpp	- 1,8 L
akpp	- 5,8 L
gur	-1,0 L
antifreeze	- 7,2 L
tormoz	-0,5 L

1,8 L

motor	**- 3,75 L**
mkpp	- 1,8 L
akpp	- 6,9 L
gur	- 1,0 L
antifreeze	- 7,2 L
tormoz	- 0,5 L

[22]

COBALT

60 000 km

1,5 L

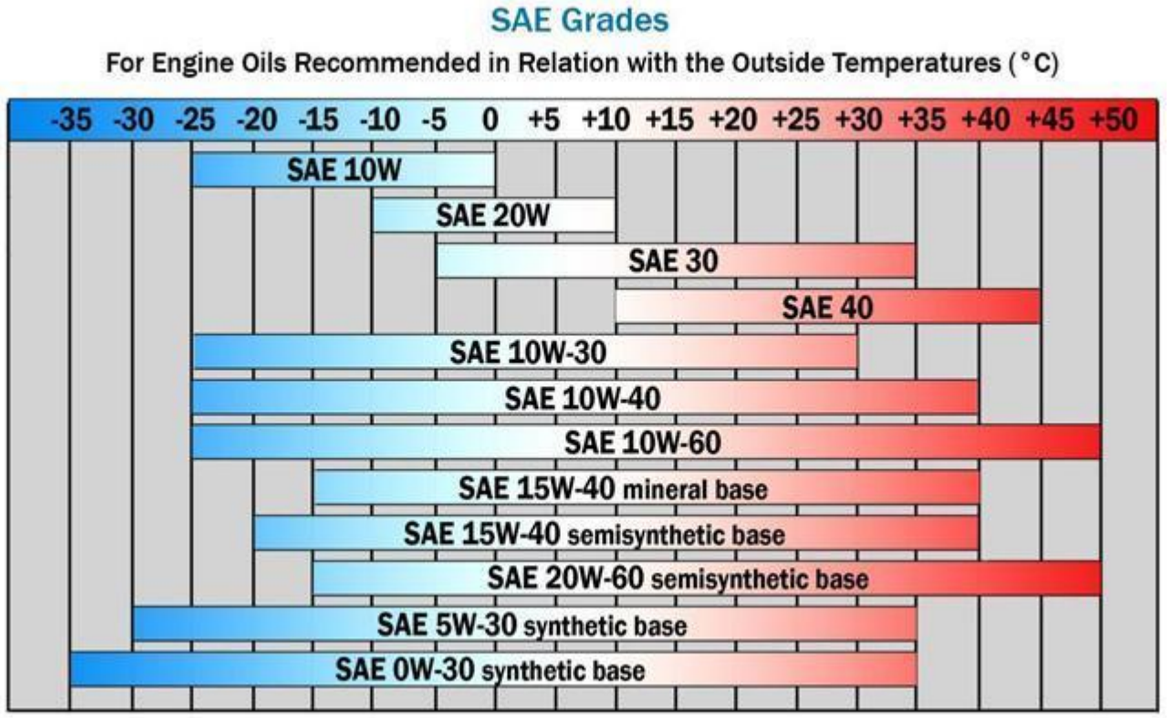
motor	**- 3,75 L**
mkpp	- 2,0 L
akpp	- 6,0 L
gur	-1,0 L
antifreeze	- 6,0 L
tormoz	- 1,0 L

[21]

1911 yilda Avtomobil muhandislari jamiyati (SAE-Society of Automotive Engineers)da motor moylarini qovushqoqlik xususiyatlariga ko‘ra tasniflash uchun raqamli kodli tizimi (SAE J300 Dvigatel moyining qovushqoqligi tasnifi) yaratildi.

Ushbu tasnif motor moylarini **0W** dan **60** gacha bo‘lgan **12 sinfga ajratadi:**

- **6 qishki** (0W, 5W, 10W, 15W, 20W, 25W)
- **6 yozgi** (10, 20, 30, 40, 50, 60) qovushqoqlik sinflari.



[23]

FOYDALANILGAN ADABIYOTLAR

1. The 3.2 and 3.6 liter FSI Engine. Self Study Program 924603. Audi of America, Inc. Service Training Printed in U.S.A. Printed 10/2006. –pp. 5.
2. What Does This Thing Do: Pistons. [Online Image] [Accessed on 30 November 2017]. https://i.ytimg.com/vi/RV1xWCpBEr8/maxresdefault.jpg
3. Boris Zhmud. “Pursuit for Better Fuel Economy: Reducing Engine Friction Helps Maxing out Miles per Gallon.” Article. May 2012. https://www.researchgate.net/profile/Boris-Zhmud/publication/259867897/figure/fig2/AS:669548697112576@1536644257129/Estimated-energy-losses-within-the-internal-combustion-engine-This-loss-can-be-further.png
4. Lubricating Oil Consumption. [Online Image] [Accessed on October 2014]. https://dieselnet.com/tech/images/fuel/lube/cons/sources.jpg
5. Engineering at Alberta Courses » Dry friction. [Online Image] [Accessed in 2017]. https://engcourses-uofa.ca/wp-content/uploads/eng130C8_1-768x256.jpg
6. Engine oil. [Online Image] [Accessed in 2018]. https://repairpal.com/stored_images/64577
7. How to Reduce Friction between Surfaces. [Online Image] [Accessed on 13 March 2018]. https://media.noria.com/sites/Uploads/2018/3/13/d6f2de2a-8c14-4378-a481-30e4cb78cdd9_reduce-friction_extra_large.jpeg
8. Engine lubrication system / How does it work? (3D animation). [Online Video] [Accessed on 7 December 2022]. https://youtu.be/9lse1SfDq7M
9. Typical gasoline engine lubrication system Stock Photo – Alamy. [Online Image] [Accessed on 4 October 2023]. https://c8.alamy.com/comp/BB4DTP/typical-gasoline-engine-lubrication-system-BB4DTP.jpg
10. Tico avtomobili tuzilishining katalogi. –Toshkent. -2000. 6-varaq.
11. Yusupov S. “Avtomobillar konstruksiyasi” 1-qism. O‘quv-uslubiy majmua. A.: AndMI. 2019 yil, -b. 81 (493).
12. Motor Oil Base Stock - Select Synthetics - AMSOIL Authorized Dealer. [Online Image] [Accessed in 2020]. https://www.selectsynthetics.com/images/oil-refining-diagram--PNG-.png
13. Difference Between Synthetic Mineral Lube Oil? [Online Image] [Accessed in 2021]. https://4.bp.blogspot.com/-pio-BKYq4Lc/W3kzub5yiII/AAAAAAAAEUE/nKZsIWiSMfcqbG7fLl7uZd2zNtBrSI5aACLcBGAs/w1200-h630-p-k-no-nu/synthetic-oil-mineral-oil-1024x459.jpg
14. Motor Oil Base Stock - Select Synthetics - AMSOIL Authorized Dealer. [Online Image] [Accessed in 2020]. https://www.selectsynthetics.com/images/fig_4_synthetic_vs_mineral_oil.jpg
15. Difference Between Synthetic Mineral Lube Oil? [Online Image] [Accessed in 2021]. https://news.kixxoil.com/wp-content/uploads/2022/08/Kixx-Newsroom_Smart-Tips_5_%EB%B3%B8%EB%AC%B8_ENG_6_v1.jpg
16. Yusupov S. “Avtomobillar konstruksiyasi” 1-qism. O‘quv-uslubiy majmua. A.: AndMI. 2019 yil, -b. 93 (493).
17. Daewoo Nexia I поколение рестайлинг. [Online Image] [Accessed in 2015]. https://quto.ru/thumb/1720x0/filters:quality(75):no_upscale()/service-imgs/4b/be/e2/9d/4bbee29d35d3c.jpeg
18. Дэу матис (26 фото). [Online Image] [Accessed on January 2021]. https://hdpic.club/uploads/posts/2022-01/thumbs/1643257639_11-hdpic-club-p-deu-matis-33.jpg
19. Производство автомобилей Damas в Узбекистане перенесут на запад страны. [Online Image] [Accessed on 28 February 2023]. https://cdn.trend.az/2013/02/28/Damas_Auto_280213.jpg
20. Ремонт Chevrolet Spark. [Online Image] [Accessed in 2023]. https://www.gmclub.ru/upload/medialibrary/1d3/spark.jpg
21. Chevrolet Cobalt. [Online Image] [Accessed on October 2013]. https://avtomonitor.ru/wp-content/uploads/2013/10/chevrolet_cobalt-2014.jpg
22. Коротко о Daewoo Gentra. [Online Image] [Accessed on 8 May 2015]. https://a.d-cd.net/4e1e012s-960.jpg
23. Which diesel engine oil should I use? [Online Image] [Accessed in 2023]. https://www.tdxltd.co.nz/Content/CMS/Images/2jpg00dde1.jpg

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