

HELICAL x STRIGHT cut gears

We are very often asked if are gears stright cut - lots of people things that stright cut gears are for racing better and stronger - THATS NOT TRUE !

Its impossible to say it so easy - problem is much more complicate and is necessary to solve gearbox as complex system - in some applications are stright cust gears the best solution but in other systems are not optimal and is better use helical gearing.

Use of strightcut or helical also relates on bearing type in gearbox.

Generally about bearings:

Ball: can transmit radial and axial forces, lowest load capacity, shorter durability

Roller: can transmit only radial forces, high load capacity, long durability

Conical: can transmit radial and axial forces, high load capacity, long durability

From abowe is visible that best choice is Conical bearings, thats why are conical used on most stressed parst of transmission - for example - all manufacturers use conical bearings on differentials but on shafts use ball and roller bearings.

Generaly :

Inlet shaft - high RPM, low load

(example- 02Q use ball and roller bearings, 02M and 02J use conical bearings)

Outlet shaft - mid RPM, mid load (example- VW use conical bearings usually)

Differential - low RPM, high load

Strightcut gears:

always generate only radial forces,

- when used ball or roller bearings all the force goes radially to casing 100%

It mean that casing must hold all the power in radial direction and is there very stressed

- when used conical bearings - its splited to radial and axial force e.g. 90%+10%

It mean that casing hold all the power in radial and axial directin and is stressed more complex in more directions but radial force is lower than at strightcut

Helical gears:

generate radial and axial forces, ratio of that forces depends on angel of healical gearing

when use helical gearing is possible to erease forces inside gearbox by using oposite angel

on gears and final drive - than are forces pushing against the other and final force

is reduced or zero

Example: Helical gears + conical bearings (02M)

gearbox generate 100% of force

axial force of conical bearings is 10%

axial force of helical gearing is 20% , 15% is ereased by pushing the healical gears (gears against Final Drive) it mean that 15% of power is still holds by steel gears but not by Alu

casing, 5% still push axially to casing

radial forces are only 70% (100% - 10%-20%)

axial forces are 15% (10% + 5%)

So finally is gearbox with helical bearings stressed less and more complex (in radial and axial direction than strightcut gearbox.

Helical Final drives:

SQS use at 02Q/02M DOG kits original Final Drive - its ofcourse helical, thats one of reasonst why is also DOG-kit helical - to enable ereasing of axial forces

Why SQS use original Final drives ?

- The final drives are strong enough!

We install about 70sets of 02M gearkits and only 1x was broken because of power and it was coused by material problem besouce FD was completely NEW, bought from VW dealer, installed in car with less than 500Nm, only 2WD and only 700kg - anyway it breaks in first drive...., after changing it it was working very long time (untill now).

In lots of other cars with higher Torque and 4WD are working well its original FD.

So we are sure that original FD are OK for the DOG kits...

There is very wide range of Final Drives and is possible use older or buy quickly NEW for acceptable price from VW.