



Power Transmission Products, Inc.



Tech Tips



OIL AND CHEMICAL RESISTANCE OF V-BELTS

In general, the presence of oil or chemicals in contact with a belt drive system can materially affect the life span and operational characteristics of the system. The concentration of the chemical or the oil involved, length and type of exposure, choice of the belt type used, and environmental conditions such as heat and humidity, all contribute to the rate and degree of effect on the performance and deterioration.

Two effects may be noted when belts are exposed to oil and/or chemicals. The most obvious is a swelling or increase in dimensions of the cross section so that they no longer fit the sheave or pulley groove properly. Less apparent at casual observation, is the deterioration of the original physical properties, which includes adhesion between the belt components. If the degree of swelling and/or loss of physical properties is significant, the life of the belt will be substantially shortened.

The above effects may be brought about by a large variety of chemicals, notably oils, acids, and solvents.

No one synthetic rubber is resistant to all of these. Some compounds may be excellent for one chemical, but poor for another, and only adequate for still another.

Because of this, all stock belts manufactured by RMA member manufacturers are constructed to be reasonably oil and chemical resistant. The nature of the compounds and/or belt construction may minimize swelling and deterioration. Occasional splattering by oils and greases does not usually adversely affect standard belts. The automotive fan belt is a typical example.

In addition, there are a great many chemicals, such as gasoline, which swell rubber or extract ingredients from the belt rubber compounds. These may cause embrittlement, cracking or swelling of the belt, which results in deterioration of performance.

It is not practical to categorize the materials which may deteriorate belts without getting involved in the chemistry of each. The problem is further complicated by proprietary formulations of petroleum and chemical manufacturers. The formulation of these is often unknown and the only real test of satisfactory belt performance is a careful laboratory study. Belt compounds vary from manufacturer to manufacturer. Usually, those which are specified as oil resistant will withstand moderate attack from most commonly used oils and solvents. If the drive is subjected to an accumulation of a considerable amount of oil and grease on the belt, it may preclude the use of a V-belt or a v-ribbed belt.

It is assumed that where there is an available large presence of oil, a V-belt will not have to operate under these conditions. Synchronous belts are not substantially affected by the loss of friction coefficient and are capable of operation under these conditions. Depending on the drive and the nature of the oil, it may be possible to use a synchronous belt submerged in oil. Consult Carlisle for recommendations.

As can be seen from the above, there are many variables. However, the following general guidelines might be of use in selecting a belt drive system subjected to a chemical environment.

1. Prevent the accumulation of contaminants.
2. If the belts are to be subjected to only occasional contamination contact, a standard construction Vee or synchronous belt can be used.
3. If the belts are expected to give long, trouble-free operation on an industrial drive, and they are in contact with oil or exposed to an atmosphere laden with chemicals or solvents, consult Carlisle for recommendations.