

INDUSTRY
COMMERCIAL AND
DOMESTIC APPLIANCE

APPLICATION
WASHING MACHINES
AND DRYERS

PRODUCT
POLY-V ELASTIC RUBBER

SITUATION/APPLICATION

Manufacturers in the commercial and domestic appliance industry demand reliable drive systems that are low noise, virtually maintenance-free and energy efficient. To achieve these goals, washing machines and dryers in these sectors largely use rubber PV style v-belts. Also called poly-v, multi-rib, or serpentine, PV belts incorporate grooves or “ribs” along the length of the belt which correspond to matching grooves on the pulleys. These belts connect the motor to the drums used to agitate laundry in washing machines and tumble the laundry dry in dryers. Motor shaft speeds in these appliances can exceed 10,000 rpm and drives must provide quiet, vibration-free high rotational drum speed.

To keep costs low in this highly competitive market, drives are often a “fixed center distance” design. This allows the omission of an idler system or adjustable motor base which is normally the means used to apply installation tension to the belt system. Another common cost-reducing measure to eliminate the cost of a driver pulley is to machine the pulley grooves into the motor shaft so it acts as both motor shaft and driver pulley. The belt wraps around the circumference of the drum eliminating the need for a driven pulley. The large diameter of the drum provides a large degree of “wrap” or belt contact area that provides sufficient grip to avoid slippage, negating the need for the drum to have grooves as a driven pulley normally requires, further reducing drive cost.

THE PROBLEM

With a fixed center distance drive design there is no means to adjust or give tension to the belt system to avoid slippage and guarantee efficient operation. Without adequate tension the belt will slip. The result is the drum in a washer or dryer will not spin at the required speed. This negatively affects efficiency and energy consumption of the appliance. Additionally, the belt will suffer a reduction in life as the slippage generates excessive heat and wear, degrading the belt construction to the point of early failure. The use of the motor shaft as a driver pulley also presents a challenge as its very small diameter does not offer a great amount of contact area for the belt to grip the pulley grooves on the shaft. In the assembly process, it is also desirable that the belt be capable of installation by robotic automation. A standard PV belt requires a complex and expensive robotic system to apply correct tension.



THE SOLUTION

Megadyne has decades of experience providing solutions to manufacturers in this segment with their TEM “tensile elastic member” PV belt construction. Designed specifically to operate on fixed center distance drives, it is “stretched” onto the drive to create the required tension. After installation and a brief stabilization period it automatically adjusts to correct tension and maintains that tension throughout the life of the appliance, eliminating the possibility of an installer on the assembly line setting an incorrect tension. Its construction allows it to compensate for the small wrap angle on the driver pulley /motor shaft and imparts a damping action that minimizes vibration and absorbs temporary or intermittent loads for reduced transmission noise.

THE RESULT

Customers in this sector have seen a reduction in overall cost with an improvement in drive reliability using Megadyne PV TEM belt. The advantages of elimination of tensioning devices, robotic assembly, fewer quality issues due to incorrect belt tension and the elimination of labor associated with applying correct tension manually during assembly process satisfy all the requirements of this demanding application. Customers also enjoy a captive aftermarket as the TEM belt is manufactured according to the specific power characteristics of each drive meaning it cannot be replaced with standard construction PV belts.

