Belts of the Highest Quality
ISO 9001:2000 Certified
Service no less than Exceptional

PYRAMID INCORPORATED

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WELDED BELTS VERSUS MOLDED BELTS

Often times our customers inquire as to the strength of the weld of our products. Below are some thoughts about our position as to why we feel that the PYRATHANE Power Transmission Stretch Belt is equal, if not superior, to a molded product:

I would like to provide some background as to why we, at Pyramid Inc., believe extruded and welded drive belts are superior to their molded counterparts. One might wonder why ask a manufacturer, who exclusively uses the extrude/weld method to manufacture their belts. When Pyramid was founded in 1967, we provided both molded and extruded products to customers. We continued to manufacture products using both methods until selling our molding equipment in early 1987. During those 20 years, Pyramid experimented rather extensively with injection molded polyurethane drive belts. Believe me, if we thought a molded belt of quality was possible, we would have been producing, and would still be producing, that belt. In our opinion, however, a high quality, durable molded polyurethane drive belt is not a possibility.

I believe there are several important reasons why we, as well as others, have not been successful at producing a quality drive belt using injection molding. First and foremost, one must understand the molding process itself. In the molding process, molten material is introduced under pressure to a relatively cold mold. Polyurethane in its molten state would be approximately 400° Fahrenheit, while the mold is at a relatively cold temperature in the area of 100° Fahrenheit. As the molten material is forced into the mold, the material travels around the o-ring configuration in the shape of a “C”, traveling in both directions from the gate or entrance into the o-ring. As the molten material travels around the mold, its leading edge is continuing to be exposed to the cold surfaces as well as picking up any debris that might be present in the mold. Polyurethane also tends to stick quite tenaciously to a clean steel mold surface. There is generally mold release present to facilitate the removal of the part from the mold. This cooling effect of the leading edge of the molten material plus any debris or mold release that is present can cause a poor or nonexistent molecular bond of the materials where they meet which is called the “knit line”. The knit line is the weak link in an injection molded drive belt. Some molders have designed molds with multiple gates which may be somewhat beneficial but does create multiple knit lines. Another point of concern is the area of the belt at the gate. As the molten material is forced into the mold through a relatively small port or gate, there is turbulence created at the gate which can also create weak links in a drive belt. Because of the great amount of flexural stresses present in drive belt applications, these weak links are often failure points.

(Continued on next page)

Pyramid manufactures drive belts through the extrusion/welding method by first producing long lengths of extruded cord stock. This cord stock is then cut to the desired length just prior to welding and handled so as to keep the freshly exposed cut ends clean. These lengths are then loaded into a welding device that exposes the freshly cut, clean ends to a heat source that returns the material to its molten state. Once that material has reached that molten state, the ends are immediately brought together to create a bond, or weld, and then allowed to solidify in that condition. Using this method, the cut ends of the cord are not cooled by touching any foreign object or contaminated by mold releases or debris prior to or during the welding process. Therefore, we have absolutely clean, ***hot molten*** material being brought together which allows the molecules to fully intermingle at the joint. This welding process creates a joint that possesses at least 80% of the strength of the base cord.

Another important aspect of Pyramid's manufacturing method that is a contributor to the quality of our product is that parts that are injection molded have a jumble, more or less, of molecular configurations within the part as the material is forced into the mold in a rather random pattern. On the other hand, Pyramid's drive belts are extruded and this process, I believe, aligns the molecular structure of the polyurethane as it passes through filtration-type strainers, producing a belt of much greater durability. This may not be scientifically substantiated but it is the only conclusion I can reach after conducting side-by-side tests of belts that were both molded as well as extruded and welded in our facility of the same resin. While specific data on these tests is not available, it did prove beyond any doubt that an extruded and welded belt's abrasion resistance far surpassed that of a molded product. After several weeks of constant running, the extruded/welded belt showed no signs of abrasion or wear. The injection molded product did show a noticeable amount of abrasion.

It should be noted that Pyramid's entire business is, and has been, based on **Drive Belts**. We utilize manufacturing methods that have historically proven to be the best at building **Drive Belts**, not o-ring seals, etc., but **Drive Belts**. We believe our customers expect and deserve the very best drive belt in terms of wearability and quality and while molded belts may be cheaper, it has been demonstrated that they do not measure up to our standards. We firmly believe the **PYRATHANE Power Transmission Stretch Belt**, in the right application, is the finest stretch belt available to industry today and we pledge our ongoing efforts to make that true tomorrow, as well.

Thomas M. Tripp
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