DURLON FILLED PTFE PRODUCT INFORMATION

A GUARANTEE OF QUALITY PRODUCTION PROCEDURES AND PERFORMANCE

UNIFORM DISBURSEMENT OF FILLERS IN FILLED PTFE SHEET GASKET MATERIALS

AN OBJECTIVE COMPARISON BETWEEN THE SKIVED AND CALENDERED METHODS OF MANUFACTURING FILLED PTFE REGARDING UNIFORM DISBURSEMENT AND STRATIFICATION OF FILLERS

This document is a response to unfounded statements that Durlon filled PTFE materials manufactured by the skived, sintered billet method are inferior to layered, filled PTFE materials manufacturer by the calender method. These statements have been made by competitors or their distributors simply to increase sales and are not founded on fact. These claims of inferiority usually focus on the lack of uniformity and stratification of fillers of skived materials.

Typically there is no evidence backing up these claims. However, due to possible concerns of customers, and to cast the same critical eye toward calendered filled PTFE materials, samples of a competitor's material were independently tested for uniformity of filler disbursement. For comparison, in-house density tests from sequential production runs of Durlon 9000 filled PTFE showing uniformity of filler disbursement are included. While these unfounded claims tend to focus on density, it is just one of many in-house QC tests done on every batch of Durlon gasket materials to monitor manufacturing quality as a part of the ISO 9001 quality standard.

INDEPENDENT ASTM D792 DENSITY TESTING, CALENDERED FILLED PTFE

Akron Rubber Development Laboratories (ARDL) of Akron, Ohio was contracted to perform ASTM D792 density tests on a layered filled PTFE manufactured using the calender method. Samples of the same material style from different sheets were tested by both ADRL and in-house. While the Density comparison results below between our in-house tests and ARDL showed good correlation, the variation between the samples are relatively wide showing a manufacturing inconsistency in this calendered filled PTFE material.

Calendered Filled PTFE, Sample#	In-house tests g/cm^3	ARDL g/cm^3	Delta %
C83	1.685	1.695	0.6
C84	1.609	1.636	1.7
C85	1.755	1.766	0.6
C86	1.637	1.656	1.1
C87	1.703	1.696	0.4
C88	1.711	1.706	0.3
Average:	1.683	1.693	0.5
Std. Dev.	0.053	0.045	

ASTM D792DENSITY, DURLON 9000 FILLED PTFE

Below is a typical density distribution for Durlon 9000 filled PTFE that is performed as part of our standard in-house quality control testing on production material. The same ASTM D792 test method as noted in the previous section is part of the QC testing required on every batch of any Durlon material. The low standard deviation indicates consistent, uniform disbursement of the fillers and PTFE resins over the sample period.

Durlon 9000, Sample#	Density g/cm^3
1	2.210
2	2.210
3	2.214
4	2.213
5	2.206
6	2.207
7	2.210
8	2.205
9	2.209
10	2.207
Average:	2.209
Std. Dev.	0.003

BURN OUT TESTING, DURLON FILLED PTFE

BURNOUT TESTING TO FURTHER BACK UP OUR IN-HOUSE DENSITY TESTING.

- Burn Out Tests causes all of the PTFE resins to gas off leaving only the filler material.
- Tests performed by two separate outside laboratories.
- Sets of samples were taken from the top, middle and bottom of a skived billet in two separate locations. One blind sample set was sent to each independent laboratory with the billet location known only to in-house lab personnel.
- Both Laboratories confirmed that there was virtually no standard deviation in the percentage of filler in any of the samples.
- Our research team then went one step further by tracing the Billet documentation through the Billet Number where they could review the Certificate of Analysis. The documentation correlated with the filler content reported by both testing laboratories.

Exact percentages of PTFE and Filler content represents confidential and proprietary information and cannot be disseminated. However, we can assure you that these tests and their documentation are accurately portrayed in this report

CONCLUSION

The uniform density of Durlon filled PTFE materials confirmed by ASTM D792 and blind burnout testing proves that the manufacturing process for Durlon filled PTFE materials is not only cost effective but that the Filler Disbursement is uniform throughout and stratification does not occur. The consistency of density is a clear indication of uniform filler distribution in Durlon filled PTFE gasket materials.

The testing in this report is a testimony to the quality standards used in manufacturing all Durlon gasket materials. Every production run for any Durlon gasket material is tested for consistency within manufacturing guidelines and records are kept as a part of the certified ISO 9001 manufacturing process. All Durlon gasket materials can be used and installed in the same manner as a competitor's corresponding gasket material, with the same expectations of services life and performance.