Title: Minimum Average Roll Value (MARV). Importance to the geotextile industry highlighted a need for a systematic approach resulting in development of ASTM method

Abstract:

MARV is an integral part of manufacturing quality control as it assures conformance to product specifications. MARV is defined as a quality control tool used to establish published values from *normally distributed data, MARV is calculated as the typical value minus two standard deviations from documented quality control test results for a defined population from one specific test method associated with one specific property, See Figure 1.*

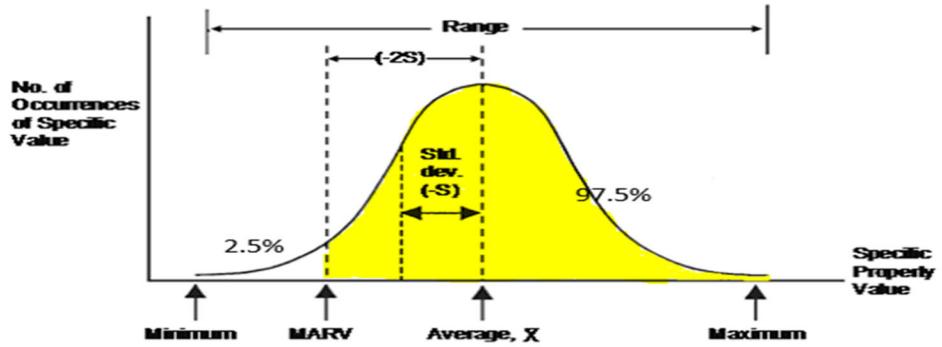

Figure 1: Graphical display of Normal Distribution highlighting 2 standard deviations (MARV), average, minimum, maximum, and range

Historically there have been inconsistencies with interpretation and application of MARV where overtime the published MARV is used as a minimum test value for quality control acceptance. Product produced on a regular basis has established test data that is used to develop a published MARV. However, interpretation of these published MARV values has become an issue and actual data may not support a calculated MARV that meets or exceeds a published MARV. MARV has become an internally agreed threshold with little statistical analysis to determine the actual characteristics with a certain level of confidence. The purpose of this presentation is to demonstrate the various approaches to MARV and the impact based on the approach used. These results will show the need for a systematic approach resulting in the development of an ASTM standard practice.

A certifiable MARV is a statistical value based on a minimum prescribed sampling frequency of a specific production lot. Actual MARV values can only be determined once a given production lot is completed and statistical analysis can be used to determine the actual characteristics of that lot with a certain level of confidence. Figure 2 represents the various interpretations of MARV and their effect on the population. Rolls related to any test values above the specified value are considered good and the inventory associated with those values are released.

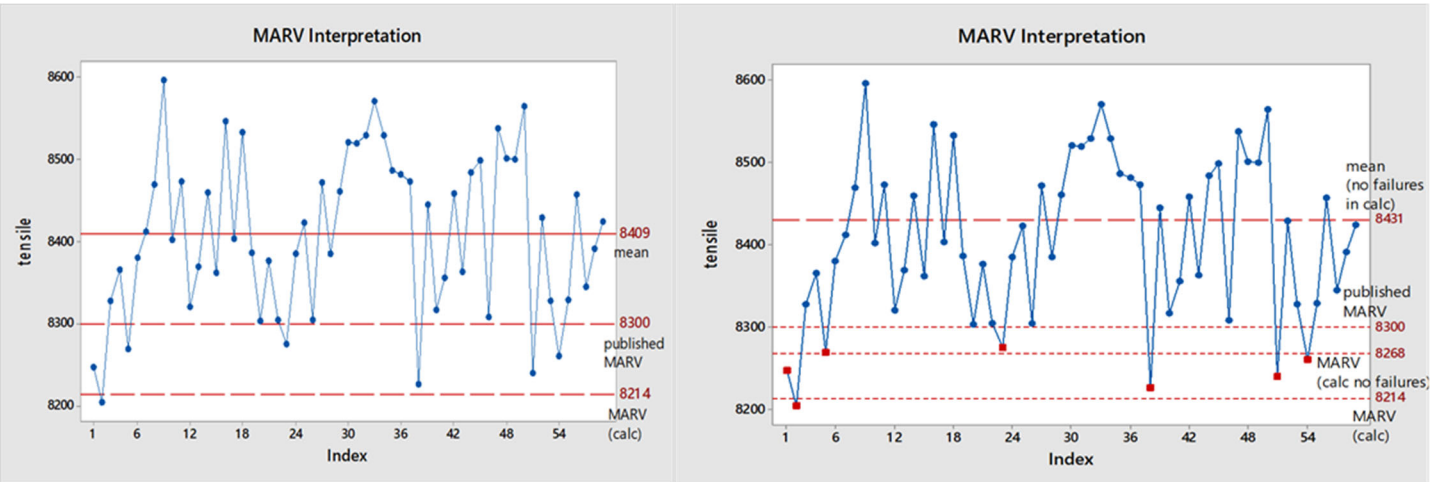

Figure 2: Graphical interpretation of various calculations for MARV.

The released production is certified as meeting the published MARV when the calculated MARV is lower. In other situations where a calculated MARV has been established, there is no clear guidelines as to what data is reported. Since the average and the standard deviation change, based on the period of production, the calculated MARV can be significantly different for a given period of time,

week, month, year. Another issue surrounding the MARV calculation is the removal of outlier test values particularly those values that fall below the published MARV, also seen in figure 2. The removal of these outliers without an assignable cause will skew the end result and the lot will appear to have a higher MARV value than what is actually characteristic for the lot. Certifications for the product originate from the available test data usually certifying to a MARV value. Based on the various methods and the various interpretations of MARV the certification must express the logic behind how the calculated MARV was established. An emphasis must be placed on clear requirements around the calculation as well as application, and defined amount of production. Recognizing these issues in the industry, a task group was established and D8102, Standard Practice for Manufacturing Quality Control of Geotextiles was developed.

REFERENCES

AASHTO M288-06. Standard Specification for Geotextile Specification for Highway Applications, *American Association of State Highway and Transportation Officials*, Washington D.C., USA
Koerner, R.M. & Koerner, G (2011) The Dual Roles of Using MARV, *GRI White Paper #10,* Folsom, PA, USA

Bio

Beth Young has been with TenCate Geosynthetics for over 20 years. During most of that time she led the Quality Department and was instrumental in achieving ISO 17025 laboratory and ISO 9001 quality management accreditation. Her current role at TenCate Geosynthetics is Director of Product Management. She is actively involved in ASTM Committee D35 on Geosynthetics and was recently recognized for her efforts in the development of D8102 Practice for Manufacturing Quality Control of Geotextiles. She continues to work in the quality area and has coauthored a paper and given several presentations on the MARV topic and its impact on the geosynthetics industry.

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