



Body Shape Classifications of Males 26 to 35 Using Size USA Three-Dimensional Scan Data

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More than half of male consumers have difficulty finding good fit in apparel (Chattaraman, Simmons, & Ulrich, 2013; DesMarteau, 2000). Among factors contributing to the fit and sizing issues found in the apparel industry are the lack of consistency in sizing across brands and a currently outdated standardized sizing system (Sindicich, & Black, 2011; Staples, 1995). Current standardized sizing systems are based on averages and percentages that do not fully capture every size and shape in the population and does not take into consideration that two consumers the same height and weight can have very different body shapes due to factors such as age or ethnicity. While there is a wealth of research surrounding body size and shape for women, research in these areas for men is lacking.

The limited literature regarding the fit and sizing in men's apparel indicates that standardized sizing for men evolved from measurements taken of soldiers during the American Civil War for the mass production of military uniforms (<http://museum.nist.gov/exhibits/apparel/history.htm>; [TC]², 2004; Zernike, 2004). These male sizing standards did not represent the entirety of the population of its time nor does it represent the differences present in body size, shape, and proportion in the current population due to the demographic changes that have occurred since the 1800s. At present, there is no ASTM sizing table available for men younger than 35 which demonstrated the void for a sizing standard that addressed the body size and shape needs for men younger than 35 years of age.

The purpose of this research was to provide a method for using 3D scan data to determine shape categories for the male population in the United States between the ages of 26 and 35. Specific research questions included: (1) Can SizeUSA data (<http://www.sizeusa.com/>) collected for men be used to identify the predominant shapes of male bodies in the US for men ages 26 to 35? (2) Based on literature review and the visual properties of the bodies within each shape, can a descriptive label be identified that would aid in an understanding of the shape differentiators? (3) Does the current ASTM sizing system developed for mature males meet the measurement needs of the male subjects with the 26 to 35 age range from the SizeUSA sizing survey?

Two different methods utilizing five drop values were used to determine shape clusters that identified the predominant shapes of male bodies in the US for males age 26 to 35 utilizing SizeUSA scan data. One set of clusters was based on the shape clusters identified by a cluster analysis and the other set was based on shape clusters identified using a new shape identification software developed in Microsoft Excel called MSIT (Male Shape Identification Technique) for Apparel.

Three shape classifications (Oval, Rectangle, Trapezoid) were identified through cluster analysis, however, further analysis was conducted on the basis that each of the three clusters contained subjects that did not seem to belong. As a result, further analysis using drop values and ratios calculated from significant measurements (chest, waist, hip, and high hip) were used in Excel to develop formulas (MSIT) that were applied to the entire sample set of SizeUSA measurement data for males ages 26 to 35 to further differentiate the shapes identified through cluster analysis. This process identified 4 different shape clusters: Oval, Rectangle, Trapezoid, and Triangle.

From a sample of 788 US male subjects ages 26 to 35, obtained from SizeUSA data, shape clusters were identified and assigned a descriptive category label. The category labels were: Oval (5.6%), Rectangle (68%), Trapezoid (8.8%), and Inverted Trapezoid (1%) (See Figure 1). Not all subjects could be easily identified by the four shape categories. There were subjects whose body measurements did not fit within the broad shape categories, in addition to subjects that fell into more than one category which demonstrates four shapes are not enough to clearly meet the needs of everyone in this age range (or likely others).

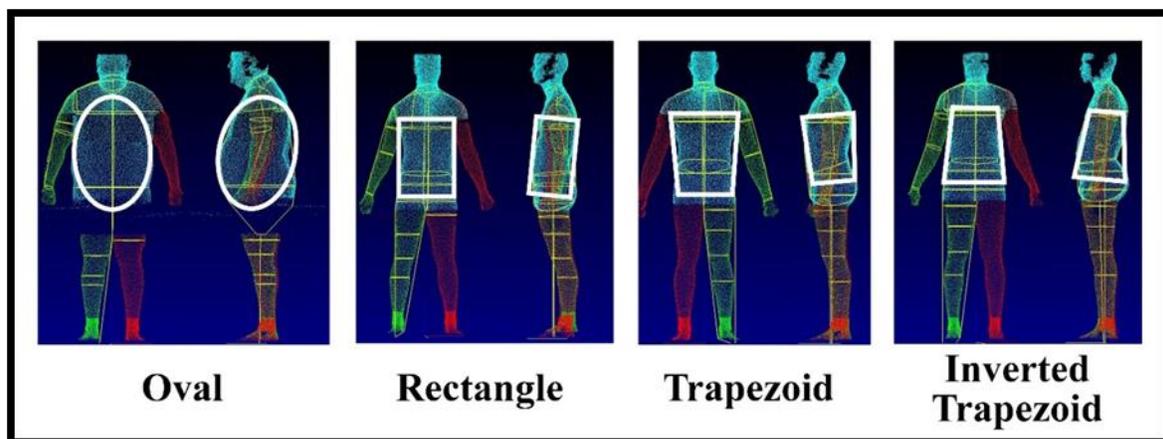


Figure 1. Body Shape Categories generated from MSIT for Apparel

Additionally, minimum and maximum values were identified for ASTM drop values that corresponded with the drop values generated from the SizeUSA measurement data for males age 26 to 35. The minimum and maximum values in each ASTM drop were used to create a range for each drop. These ranges were used in a formula in Microsoft Excel to determine if any of the ASTM sizing standards for males satisfied the measurement needs of the male subjects ages 26 to 35 in the SizeUSA data in each of the shape categories. This analysis showed that there were no subjects that had all five drops satisfied by the current ASTM D6240 sizing standard for males.

This research is of value to the apparel industry because it demonstrates that a large percentage of the US male population's measurement needs are not being met. This information

will assist in establishing a baseline for further studies in the area of body shape categories for males. The findings in this research study can aid apparel industry professionals in achieving and communicating better fitting apparel for US males in the 26 to 35 age range and has the potential to help with other age ranges.

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