

Men's and women's body types in the global garment sizing systems

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Abstract

Apparel companies define their target customers to integrate consumers' needs into their product development processes. The sizing standards play a significant role in ready-to-wear garment business. Consumers' body build and sizes are different according to gender, age, and body type. The consumers' morphological feature of the one geographical area has changed with immigration, aging, and lifestyle change. In this study the way of defining body types in the standard garment sizing systems published in USA., UK, Germany, Japan, and Korea were compared. The results of this study show that most of the systems classified the body types by the index value. The chest-waist drop value was used for men's body type classification. Women's body types were defined by hip proportion. The hip-bust drop value was used for it. German and European garment sizing systems provide a wide range of men's body types. US men's garment sizes are developed for very conservative body type. US women's garment sizing system has had clearly defined women's body types. The *Misses* body types projected in the US garment sizing system had changed as women's waist girth got bigger compared to the past. In 2011 the US *Misses* sizes were divided into *Curvy Misses* size and *Straight Misses* size by the hip-waist drop value. The *Curvy Misses* sizes have smaller waist girth and larger hip girth than the *Straight Misses* sizes.

Keywords: body type, garment sizing system, global standard

I . Introduction

With the increasing globalization of trade, the importance of size designation of clothing has increase significantly (Chun-Yoon and Jasper, 1996). Apparel manufacturers and retailers have desired to identify the sizes and body types in their target population. The consumers' morphological feature of the one geographical area has changed with immigration, aging, and lifestyle change. In global market we can easily meet various figure types. The standard garment

sizing systems have been developed in many countries. An anthropometric sizing for clothing is based on the concept of dividing the population into subgroups of individuals who are more or less similar in certain relevant body size dimensions (McConville et al., 1979). They developed it based on their consumers' body measurements range or body types. Most of garment size standards classified consumers into several body types to give appropriate garment fit for them. The body types in the garment standards were classified by the index value. For example, for men's garment sizing system, they use the chest-waist drop value

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for constitution of body type classification. Women's body types were often classified by hip-bust drop value.

Consumers' body types are diverse. Regular size takes care of approximately 50% of possible customers. Regular size is for a person who is neither tall nor short nor stout, and nor thin, and has a good posture. In 1970s the US women's apparel industry defined the average figure as someone who had a difference of 7~8 inches between the bust girth and waist girth, and their hips are about 3 inches larger than the bust. However, the body shapes can be different by their ethnicity and age. Consumers in various countries show diversity in their body shapes which is based on their life environments. Recently, consumers' body shapes have significantly changed. More consumers in nowadays have larger waist size than the consumers back in 1970s. Researchers continually traced the change of the consumer's body shape and garment manufacturers and retailers and governments revised their garment sizing tables to provide good fit with ready-to-wear garments.

The global garment sizing systems have similarities and dissimilarities in its approach to define body types. Most of the countries reregulated their standard garment sizing system based on the analysis of anthropometric data. The purpose of revising of their standard sizing system is to improve the fit of ready-to-wear garments. To give a good garment fit, the garment sizing system classifies consumers into 3~10 body types. Some systems classify body type by height or index value while others defines body type comparing with regular body build. In terms of body type, the word *regular* has been used for many years to state the body type close to the average body measurement of the key dimension. For better understanding of women's figure types, Douty (1968) developed two scales: the *Body Build Scale (BBS)* and the *Posture Scale (PS)*. BBS classified women's figure types by body mass. She suggested five body

build scales: *thin, slender, average, stocky, and heavy*. She measured the relation among all body segments to each others in terms of size and weight. Posture was also used to classify women's body type. The five body posture scales (*PS*) were bad, poor, average, good, and excellent. *PS* value was measured by the alignment of the body segments. In most of the standard sizing system, they had adopted *BBS*. Most of the garment sizing systems considered body build scale while posture is not considered in the garment sizing system yet.

II. Methods

In this study the standard garment sizing systems published in USA., UK, Germany, Japan, and Korea were compared. The way of defining body types was analyzed. The U.S garment sizing systems were sizing system for women's garments (ASTM D5585-95, 2001; ASTM D6829-02, 2008; ASTM D5585-11, 2011), and for men's garments (ASTM D6240-98, 2006). The UK garment sizing systems were BS 3666 (1982), BS 6185 (1982), and BS EN 13402-3(2004). German sizing system was DOB-Verband (1983). The International Organization for Standardizations were ISO 3636 (1977) and ISO/TR 10652 (1991). The Japanese standards were JIS L 4004 (1997) and JIS L 4005 (1997). The Korean standards were KS K 0050 (2004), and KS K 0051 (2004).

III. Results

1. ISO garment sizing system

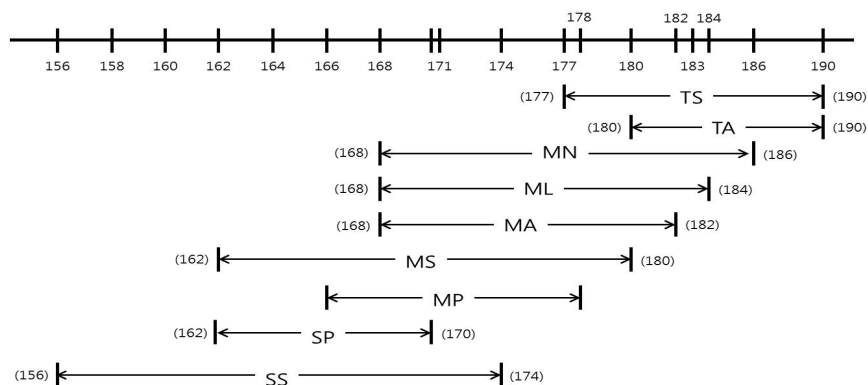
The garment sizing system of International Organization for Standard (ISO/TR 10652:1991) suggested five body types for men's garment sizing system: *Athletic (A)*, *Regular (R)*, *Portly (P)*, *Stout (S)*, and *Corpulent (C)* (International Organization for Standardization, 1991). In ISO garment sizing system men's body types were defined by chest-waist drop value. The chest-waist drop value ranges from -6cm to

16cm. The athletic body type (A) has 16cm drop value. The regular body type (R) has 12cm drop value. The drop values of the full body types (P, S and C) were 6cm, 0cm, and -6cm, respectively. All body types have five height groups: 164cm, 170cm, 176cm, 182cm and 188cm. Women's garment sizes are given for three body types: A, M and H types. Women's body types were defined according to the hip-bust drop value. The average body type (A) has 12cm drop value. Woman's hip girth belonged to the body type A exceeds her bust girth by at least 9cm. The body type M has 6cm drop value. The hip girth of women belonged to the body type M exceeds her bust girth by 4~8cm. The body type H has 0cm drop value which means that the hip girth is approximately equal to the bust girth. All body types are sized for three height groups: 160cm (S, short), 168cm (R, regular) and 176cm (L, long).

2. German garment sizing system

In German men's garment sizing system, body types are classified with three height groups and five body-build types. Height ranges from 156cm to 190cm and it is divided into three groups: *Short* (S), *Medium* (M), and *Tall* (T). Five body builds types are *Athletic* (A), *Normal* (N), *Slim* (S), *Large* (L), and *Stocky* (S). Nine body types are given by the combination of height and body-build index terms:

TA, TS, MA, MN, ML, MS, MP, SS, and SP. The chest-waist drop value ranges from -8 to 16cm. The chest-waist drop value is different according to the body types: 16cm for *Medium Athletic* (MA) and *Tall Athletic* (TA), 12cm for *Tall Slim* (TS) and *Medium Normal* (MN), 6~8cm for *Medium Stocky* (MS) and *Medium Large* (ML), and 4~6cm for *Short Stocky* (SS). It means that the relatively heavy body types, *Medium Stocky* (MS) and *Medium Large* (ML), have 6~8cm larger chest measurements than their waist measurements. The full figures, *Medium Portly* (MP) and *Short Portly* (SP), have 4~8cm larger waist girths than their chest girths. The chest size ranged from 88cm to 116cm with 4cm interval. The waist size ranged from 72cm to 120 cm with 4cm interval. For each chest size 4~5 waist sizes are available (Table 1). The tall body types (TS and TA) are made for men's height from 177cm to 190cm. The medium height body types (MN, ML, MA, MS, and MP) are for men's height from 162cm to 184cm. The short height body types (SS and SP) are for men's height from 156cm to 174cm. It shows that the height type in German men's garment sizing system is different from other country's sizing system. They named height group compared with the body builds. For example, a man whose height belongs to 168~174cm can be classified into medium height group or short height group



<Fig. 1> Height of the men's body types in the German garment sizing system.

<Table 1> Distribution of men's figure types and drop value in German garment sizing system

(Unit: cm)

<div> <div>Chest</div> <div>Waist</div> </div>	88	92	96	100	104	108	112	116
72	<i>MA/TA</i> (16)							
76	<i>TS/MN</i> (12)	<i>MA/TA</i> (16)						
80	<i>MS/ML</i> (8)	<i>TS/MN</i> (12)	<i>MA/TA</i> (16)					
82	<i>SS</i> (6)							
84		<i>MS/ML</i> (8)	<i>TS/MN</i> (12)	<i>MA/TA</i> (16)				
86		<i>SS</i> (6)						
88			<i>MS/ML</i> (8)	<i>TS/MN</i> (12)	<i>MA/TA</i> (16)			
90			<i>SS</i> (6)					
92				<i>MS/ML</i> (8)	<i>TS/MN</i> (12)	<i>MA</i> (16)		
94				<i>SS</i> (6)				
96		<i>MP</i> (- 4)			<i>MS/ML</i> (8)	<i>TS</i> (12)		
98					<i>SS</i> (6)	<i>MN</i> (10)		
100			<i>SP/MP</i> (- 4)			<i>MS</i> (8)		
102						<i>SS/ML</i> (6)	<i>MN</i> (10)	
104				<i>SP/MP</i> (- 4)				
106							<i>MS/SS/ML</i> (6)	
108								<i>MN</i> (8)
110					<i>SP/MP</i> (- 6)			<i>MS</i> (6)
112								<i>SS</i> (4)
114						<i>SP/MP</i> (- 6)		
120							<i>SP/MP</i> (- 8)	

by his body build. A man whose height belongs to 177~190cm can be classified as tall height or medium height by his body build (Fig. 1).

German men's garment size does not cover the extremely large body build compared to US or European standards. German men's garment size starts from 88cm and end at 116cm of chest girth measurement. The size interval for chest girth is 4cm. The waist size starts from 72cm and ends up at 120cm. The size interval for chest girth is 2~6cm. The waist girth size range is different by body type. For athletic body types (*TA* or *MA*) the waist sizes start at 72cm and end at 92cm. The body types *MN*, *MS*, and *SS* have very wide range of the waist sizes. The waist size of *MN* starts at 76cm and ends at 108cm, *MS* size starts at 80cm and ends at 110cm, and *SS* size starts at 82cm and ends at 112cm. For the full figure types (*MP* or *SP*) the waist size starts from 96cm and ends at 120cm. For each body type, five to eight sizes are available. Fifty-nine sizes are proposed in total (Table 1).

German women's garment sizing system (DOB-Verband, 1983) has nine body types: *SL*, *SM*, *SS*, *RL*, *RM*, *RS*, *TL*, *TM*, and *TS*. They are classified by height and hip proportion. The first letter stands for height

group and second letter represents hip proportion type. The height groups are classified by short height (*S*, 160cm), regular height (*R*, 168cm), and tall height (*T*, 176cm). The hip proportion types are defined with the hip-bust drop value. The large hip type (*L*) has 8~14cm drop value and the medium hip type (*M*) has 2~8cm drop value. The small hip type (*S*) may have smaller hip measurement than bust measurement. The drop value is -4~2cm. The small hip type may have larger waist girth than the chest girth. Each women's body types has 6~10 sizes. 73 women's garment sizes are available in total (Table 2). The body types with regular height and medium hip proportion (*RM*) or the regular height and large hip proportion (*RL*) have 10 sizes each. The body type with tall height and slim hip proportion (*TS*) has only 6 sizes. The bust size starts from 84cm for all of the body types. The very large bust sizes (126~136.5cm) are available for regular height group (Table 2).

3. European garment sizing system

European standard men's garment sizing system (BS EN 13402-3) provides a wide range of body build. Fourteen chest sizes are given from 84cm to 144cm with 4cm interval. Fourteen waist sizes are

<Table 2> Bust and hip girth range and number of sizes for German women's garment size

Hip type Height	Small hip (-4~2cm drop)	Medium hip (2~8cm drop)	Large hip (8~cm drop)	Number of sizes
Short (160cm)	<i>SS</i> Bust: 84~116cm Hip: 85~113cm (7 sizes)	<i>SM</i> Bust: 84~122cm Hip: 91~125cm (9 sizes)	<i>SL</i> Bust: 84~116cm Hip: 97~125.5cm (8 sizes)	24 sizes
Regular (168cm)	<i>RS</i> Bust: 84~128cm Hip: 85~124.5cm (8 sizes)	<i>RM</i> Bust: 84~128cm Hip: 91~130cm (10 sizes)	<i>RL</i> Bust: 84~128cm Hip: 97~136.5cm (10 sizes)	28 sizes
Tall (176cm)	<i>TS</i> Bust: 84~110cm Hip: 88.5~108cm (6 sizes)	<i>TM</i> Bust: 84~116cm Hip: 91~119.5cm (8 sizes)	<i>TL</i> Bust: 84~110cm Hip: 97~122cm (7 sizes)	21 sizes
Number of sizes	21 sizes	27 sizes	25 sizes	73 sizes

<Table 3> Distribution of men's garment size and chest-waist drop value in European system (Unit: cm)

Chest Waist	84	88	92	96	100	104	108	112	116	120	126	132	138	144
72	12		20											
76		12		20										
80	4		12		20									
84		4		12		20								
88	-4		4		12		20							
92		-4		4		12		20						
96			-4		4		12		20					
100				-4		4		12		20				
104					-4		4		12		22			
108						-4		4		12		24		
114							-4		4		12		24	
120								-4		4		12		24
126									-4		0		12	
132										-4		0		12

given from 72cm to 132cm with 4cm interval (British Standards Institution, 2004). European standard men's garment sizing system does not specify body types. However it gives 2~4 different waist sizes for each chest size. Seven chest-waist drop values are offered: 24cm, 22cm, 20cm, 12cm, 4cm, 0cm, and -4cm. 48 sizes are available in total (Table 3). Men's garment sizes are available with various height groups. Nine height sizes are available from 160cm to 192cm with 4cm interval.

European standard women's garment sizing system provides wide range of bust, hip, and height sizes. Sixteen bust sizes are given from 76cm to 152cm with 4cm interval. Eighteen hip sizes are given from 76cm to 147 cm with 4~5cm interval. European standard women's garment sizing system does not declare specific body types. However it gives 5 different hip sizes for each bust size. Women's garment sizes are available with various hip proportions. The hip-bust drop values for bust sizes from 76~96cm are 16cm, 12cm, 8cm, 4cm, and 0cm. For the bust size 100cm or above the range of drop value is increased. From -2cm to 17cm drop values are given

for bust size 110cm and -4cm to 16cm drop values are given for bust size 116cm. Body types that has larger bust girth than hip girth are available from bust size 110cm. 77 bust and hip combination sizes are available in total (Table 4). Three height groups are available for women's garment sizes: 160cm, 168cm, and 176cm with 8cm interval.

4. US garment sizing system

US standard men's garment sizing system (ASTM D6240-98) gives 27 sizes from 34 to 60. They are simplified to seven letter sizes: *S*, *M*, *L*, *XL*, *2XL*, *3XL*, and *4XL*. The smallest size is size 34. It is for men with chest girth 86.4cm and waist girth 71.1cm. The largest size is size 60. It is for men with chest girth 152.4cm and waist girth 157.5cm. US men's garment sizing system does not define body types. Seven chest-waist drop values are given at the European standard. However US men's garment sizes are developed for very conservative drop value range. US men's garment sizes from sizes 34 to 45 are for men's body type that has good proportion. These sizes kept the constant chest-waist drop value:

<Table 4> Distribution of European women's garment sizes with its hip-bust drop value

(Unit: cm)

Bust Hip	76	80	84	88	92	96	100	104	110	116	122	128	134	140	146	152
76	0															
80	4	0														
84	8	4	0													
88	12	8	4	0												
92	16	12	8	4	0											
96		16	12	8	4	0										
100			16	12	8	4	0									
104				16	12	8	4	0								
108					16	12	8	4	-2							
112						16	12	8	2	-4						
117							17	13	7	1	-5					
122								18	12	6	0	-6				
127									17	11	5	-1	-7			
132										16	10	4	-2	-8		
137											15	9	3	-3	-9	
142												14	8	2	-4	-10
147													13	7	1	-5
152														12	6	0

15.2~15.3cm. The drop value decreases for larger sizes. Men's sizes from 48 to 50 have 12.5cm drop value. The drop values are sharply decreased for extremely large sizes. Size 56 is for men with chest girth 142cm. Its drop value is 5.1cm. The chest girth and waist girth for size 58 are same. Sizes 59 and 60 have 3~5cm larger waist girth than chest girth. The size *Small (S)* is applicable to size 34 to size 37. It covers chest girth from 86.4cm to 94.0cm and waist girth 71.1cm to 78.7cm. Its drop value is 15.3cm. The size *Medium (M)* is applicable to size 38 to size 41. It covers chest girth from 96.5cm to 104.1cm and waist girth 81.3cm to 98.9cm. Its drop value is 15.2cm. The size *Large (L)* corresponded to sizes from 42 to 45. It covers chest girth from 106.7cm to 114.3cm and waist girth 91.4cm to 99.7cm. Its drop value is from 14.6 to 15.3cm. Size *Extra-Large (XL)* is applicable to sizes from 46 to 49. It covers chest girth from 116.3cm to 124.5cm

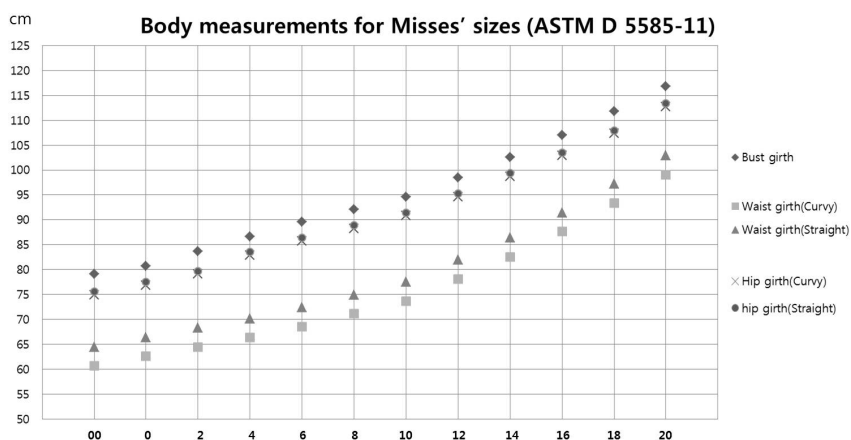
and waist girth 102.9cm to 112.4cm. Its drop value ranges from 12.1cm to 13.3cm. Size *Two-Extra-Large (2XL)* is applicable to sizes from 50 to 53. It covers chest girth from 127.0cm to 134.6cm and waist girth from 115.6cm to 125.7cm. Its drop value ranges from 8.9cm to 11.4cm. Size *Three-Extra-Large (3XL)* is applicable to sizes from 54 to 57. It covers chest girth from 137.2cm to 144.8cm and waist girth from 129.5cm to 142.2cm. Its drop value ranges from 2.6cm to 7.7cm. Size *Four-Extra-Large (4XL)* is applicable to sizes from 58 to 60. It covers chest girth from 147.3cm to 152.4cm and waist girth 147.3cm to 157.5cm. Its drop value ranges from -5.1cm to 0cm. It means that the size *4XL* is for men whose waist girth larger than their chest girth.

US sizing systems for women's garments had provided four body types: *Misses*, *Women's*, *Half-sizes*, and *Junior*. In US sizing system women's body

types have been clearly defined for a long time. U.S manufacturers during the 1920's felt the need for a new and younger looking garment which was called a "Misses" or "Missy" size and gave a new size range designation of 10 to 20 (Handford, 1980). U.S women's garment sizing system has been developed for each body type. *Misses'* size is made for women with more slender body build than *women's* size body type. In 1920 it was considered that *Misses* sizes represented garment size for young ladies whose age was from 14 to 20 years old. However, *Misses* size garments were worn by a considerable proportion of adult women as well. It became a major body type of the women's ready-to-wear garments in USA. *Women's* sizes became the sizes for women with full body build and normal height. Retailers and manufacturers began to realize that this matured body type consumer group is big enough to be concerned. They realized that the large size garments need to be made not only for adult women but for all age groups (Cook, 1988). The name of that affluent figure type, *Women's* size, was changed into the *Plus* size to appeal for general consumer group. Height is another index of women's body type in US garment sizing system. Garment size for short figures has been available.

Various names for that body type appeared and disappeared in the retail market: *Short*, *Half-size*, and *Petite*. In these days *Petite* size takes the place of short or half-size. In the American fashion business *Petite* size was defined as women who stand between 4 feet 8 inches to 5 feet 4 inches. Retailers claimed that women who are under 5 feet 4 feet in height were half of all American women (Ondovcsik, 1981) or over 14 million in 1990 (Mangan, 1990). The retailers claimed that the demand for petites was strong enough and the petite size garments should be totally, completely engineered for her in proportion (Griffin, 1980).

In the 1930's, the *Junior* size was introduced. *Junior* size was for a young figure with a higher and smaller bust, slimmer through hips, shorter waist length. *Junior* sizes ranged adopted the odd numbers in sizes, 3 through 15, to distinguish it from the *Misses* size range (Handford, 1980). *Junior* size had been designed for girls who still have the physique of children, but for those who desire to have garments which give to them more of a grown-up look. The figure type for these garments was rather narrower in the shoulders and more flat-breasted than regular *Misses* sizes. However, the *Junior* size garments have been worn by a considerable proportion



<Fig. 2> Waist and hip girths of US *Misses* sizes from 00 to 20 in 2011: *Curvy Misses* and *Straight Misses*

of adult women (Wallach, 1986).

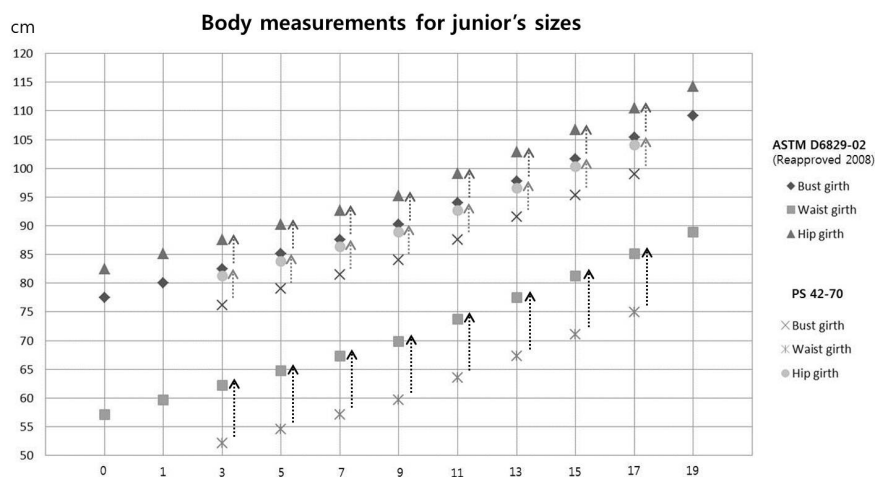
US women's garment sizes have been coded with numbers. The even numbers are used for *Misses'* sizes and odd numbers are used for *Junior* sizes. The vanity sizes are increased for last few decades (Chun-Yoon & Jasper, 1993). In 2011 the *Misses* sizes were divided into *Curvy Misses* size and *Straight Misses* size in ASTM D5585-11. Both body type sizes have the same bust size, but the *Curvy Misses* sizes have 4cm smaller waist girth and 2cm larger hip girth measurements than the *Straight Misses* sizes (Fig. 2). The range of hip-bust drop value for *Misses Curvy* size is from 7.0 to 7.6cm, while the *Misses Straight* sizes' drop value is from 5.1 to 5.4cm. The range of bust-waist drop value is from 24.8cm to 28.6cm for *Misses Curvy* sizes and from 19.1cm to 22.9cm for *Misses Straight* sizes. The range of hip-waist drop value is from 17.8cm to 21.0cm for *Misses Curvy* sizes and from 14.0cm to 17.2cm for *Misses Straight* sizes.

The body type projected in *Junior* size has changed as well. *Juniors'* size in the previous standard issued in 1970s garment sizing standard, PS 42-70, had much smaller body measurements for bust, waist, and hip girths than the current *Junior* size in ASTM

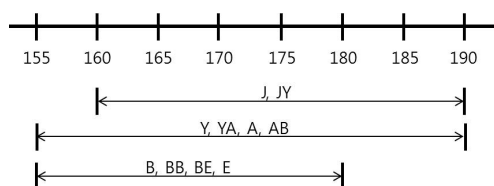
D6829-02. For example, the bust, waist and hip girth measurements for *Junior* size 11 were 89.0cm, 63.5cm and 92.7cm respectively in 1970. However the corresponding dimensions became 94.0cm, 73.7cm, and 99.1cm in 2008. Bust measure increased 5cm and hip girth enlarged 6.4cm. The waist girth measurement enlarged 10.2cm. It shows that women's waist girth getting bigger compared to the past. Also three *Junior* sizes 0, 1, and 19 had been added (Fig. 3).

5. Japanese garment sizing system

In Japanese men's garment sizing system (JIS L 4004:1997) ten body types are given (Table 5). Men's body types are defined by chest-waist drop value. Athletic body types (*J*, *JY*, and *Y*) have 20cm, 18cm, and 16cm drop values respectively. Average body types (*YA*, *A*, and *AB*) have 14cm, 12cm, and 10cm drop values respectively. Full body types (*B*, *BB*, *BE*, and *E*) have 8cm, 6cm, 4cm, and 0cm drop values respectively and they show stocky body build with short height comparing to the athletic or average body types. *J* and *JY* type sizes are made for people whose heights are between 160~190cm. The popular body type sizes, *Y*, *YA*, *A* and *AB* sizes, are made for 155~190cm in height. The full body type



〈Fig. 3〉 Change of body proportion in US *Junior* sizes in 1970s to 2008



<Fig. 4> Height range by body types in Japanese men's garment sizing system

sizes, *B*, *BB*, *BE*, and *E*, are made for 155~180cm in height (Fig. 4).

Seventy-four chest and waist combination sizes are proposed in total. Japanese men's garment size covers smaller body build compared to US or European standards. Japanese men's garment sizes start from 86cm and end up at 104cm of chest girth measurement. The size interval for chest girth is 2cm. Waist size starts from 68cm and end up at 104cm. The size interval for chest girth is 2~4cm. The waist girth size range is different by body type. For athletic body types (*J*, *JY*, and *Y*) and average body types (*YA* and *A*) waist sizes start at 68~74cm and end at 86~88cm. For the full figure types (*B*, *BB*, *BE*, and *E*) waist sizes start from 82~94cm and ends at 94~104cm. For each body type six to nine sizes are available. Six sizes are proposed for each of *J*, *JY*, *BE*, and *E* body type and nine sizes are given for each of *YA* and *AB* body type (Table 5).

In Japanese garment sizing system (JIS L 4005: 1997) women's body types are defined by hip proportion and height: Four height types (*PP*, *P*, *R*, and *T*) are ranged from 142cm to 166cm with 8cm interval. Even a very short woman will be able to find her garment size in Japanese women's sizing system. However a woman who is taller than 170cm would not be able to find her garment size in Japanese women's sizing system. The height type *PP* is for 142cm, *P* is for 150cm, *R* is for 158cm and *T* is for 166cm in height. For hip proportion types, four hip proportion types (*Y*, *A*, *AB*, and *B*) are developed. Body type *A* stands for a regular body type. Japanese women's body types are diversified with referenced to the regular body type, *A*. JIS defined the body type *A* as the most frequently appeared body type. The hip-bust drop value varied within the body type. Larger size has the smaller drop value than the smaller size in each body type (Table 6). Body type *A* has 8 sizes for very short women (*PP*, 142cm), 10 sizes for short women (*P*, 150cm), 9 sizes for women 158cm (*R*) and 166cm (*T*) in height each and 36 sizes in total. *AB* and *B* types are full hip proportion types. Body type *AB* has 4cm larger hips than body type *A*. Body type *AB* has 6 sizes for very short women 142cm in height (*PP*), 10 sizes for short women 150cm in height (*P*),

<Table 5> Distribution of Japanese men's garment sizes (JIS L 4004:1997)

(Unit: cm)

Chest size Body type	86	88	90	92	94	96	98	100	102	104
<i>J</i>	-	68	70	72	74	76	78	80	-	-
<i>JY</i>	-	70	72	74	76	78	80	82	-	-
<i>Y</i>	70	72	74	76	78	80	82	84	-	-
<i>YA</i>	72	74	76	78	80	82	84	86	88	-
<i>A</i>	74	76	78	80	82	84	86	88	-	-
<i>AB</i>	-	78	80	82	84	86	88	90	92	94
<i>B</i>	-	-	82	84	86	88	90	92	94	-
<i>BB</i>	-	-	-	86	88	90	92	94	96	98
<i>BE</i>	-	-	-	-	90	92	94	96	98	100
<i>E</i>	-	-	-	-	94	96	98	100	102	104

<Table 6> Bust and hip girths range, hip-bust drop value and number of sizes for Japanese women's garment size

Hip type Height	Small hip <i>Y</i>	Medium hip <i>A</i>	Large hip <i>AB</i>	Very Large hip <i>B</i>
Very Short (142cm) <i>PP</i>	<i>YPP</i> Bust: 83~92cm Hip: 85~91cm Hip - Bust: 2~-1cm (4 sizes)	<i>APP</i> Bust: 77~100cm Hip: 85~99cm Hip - Bust: 8~-1cm (8 sizes)	<i>ABPP</i> Bust: 80~96cm Hip: 91~101cm Hip - Bust: 11~5cm (6 sizes)	Not available
Short (150cm) <i>P</i>	<i>YP</i> Bust: 77~96cm Hip: 85~93cm Hip - Bust: 2~-3cm (7 sizes)	<i>AP</i> Bust: 74~104cm Hip: 83~101cm Hip - Bust: 9~-3cm (10 sizes)	<i>ABP</i> Bust: 74~104cm Hip: 87~105cm Hip - Bust: 13~1cm (10 sizes)	<i>BP</i> Bust: 77~100cm Hip: 93~107cm Hip - Bust: 16~7cm (8 sizes)
Regular (158cm) <i>R</i>	<i>YR</i> Bust: 74~100cm Hip: 81~97cm Hip - Bust: 7~-3cm (9 sizes)	<i>AR</i> Bust: 74~100cm Hip: 85~101cm Hip - Bust: 11~1cm (9 sizes)	<i>ABR</i> Bust: 74~124cm Hip: 89~117cm Hip - Bust: 15~-7cm (15 sizes)	<i>RP</i> Bust: 80~100cm Hip: 97~109cm Hip - Bust: 17~9cm (7 sizes)
Regular (166cm) <i>T</i>	<i>YT</i> Bust: 77~92cm Hip: 85~95cm Hip - Bust: 8~3cm (6 sizes)	<i>TA</i> Bust: 74~100cm Hip: 87~103cm Hip - Bust: 13~3cm (9 sizes)	<i>ABR</i> Bust: 77~92cm Hip: 93~103cm Hip - Bust: 16~11cm (6 sizes)	Not available

15 sizes for women 158cm in height (*R*) and 6 sizes for 166cm in height (*T*) and 37 sizes in total. Body type *B* has 8cm larger hips than the body type *A*. Body type *B* has 8 sizes for short women 150cm in height and 7 sizes for women 158cm in height and 15 sizes in total. The very short height (*PP*) and the tall height (*T*) are not available for full hip type (*B*). Body type *Y* has 4cm smaller hip girth than body type *A*. Body type *Y* has 4 sizes for very short women (*PP*, 142cm), 7 sizes for short women (*P*, 150cm), 9 sizes for women 158cm in height and 6 sizes for 166cm in height and 26 sizes in total (Table 6).

6. Korean garment sizing system

In Korean men's garment sizing system (KS K 0050:2004) men's garment sizes are proposed for four body types: *Y*, *A*, *B*, and *BB*. Korean men's garment standards states that those men's body types are for upper-body garment sizes. Men's body types

are defined by chest-waist drop value. Athletic body type (*Y*) sizes have 21cm drop value for 165~185cm in height. Average body type (*A*) have 15cm drop value for 160~180cm in height. Full body types (*B* and *BB*) have 12cm and 9cm drop values respectively. Sizes of the body type *B* are available for 160~180cm height. The garment sizes of body type *BB* are available for 160~175cm in height. Korean men's garment sizes start from 85cm and end up at 103~109cm in chest girth measurement. The range of waist girth size varies by body type. Waist girth size of the athletic body type (*Y*) starts from 67cm and ends at 85cm. For average body type *A*, waist girth starts from 70cm to 94cm. For body types *B* the waist size starts from 73cm and ends at 97cm for 160~180cm in height. The waist size starts from 82cm and ends at 97cm for the full body type (*BB*). The size interval for waist girth or chest girth is 3cm (Korean Standards Association, 2004a).

In Korean women's garment sizing system (KS K

0051:2004) three women's body types are defined by hip-bust drop value for upper-body garments: *N*, *A*, and *H*. *N* type stands for the regular body type with 3~9cm drop value. Twenty sizes are available for body type *N*. They are for women 150~165cm height. Bust size starts from 79cm and ends up at 91cm with 3cm interval: 79, 82, 85, 88, and 91. Hip size starts from 85cm and ends at 97cm with 3cm interval: 85, 88, 91, 94, and 97. Body type *A* has 3~6cm larger hip size than the regular body type (*N*). Body type *A* type has 9~12cm drop value and 10 sizes are available in 160~165cm height. The bust size starts from 79cm and ends up at 85cm with 3cm interval: 79, 82, and 85. Hip size starts from 88cm and ends at 94cm with 3cm interval: 88, 91, and 94. Body type *H* is for women who have smaller hips than the regular body type. Their bust girth is same as hip girth. Body type *H* size has 0cm drop value and 6 sizes are proposed in 150~160cm height. Bust size starts from 88cm and ends at 94cm with 3cm interval: 88, 91, and 94. Hip size starts from 88cm and ends at 94cm with 3cm interval: 85, 88, 91, 94, and 97. Thirty-six women's garment sizes are proposed in total (Korean Standards Association, 2004b).

IV. Conclusion

In this study the way of defining body types in the standard garment sizing systems published in USA., EU, Germany, Japan, and Korea were compared. The results of this study show that most of the systems classified the body types by the index value. The chest-waist drop value was used for men's body type classification. Women's body types were defined by hip proportion. The hip-bust drop value was used for it. European garment sizing systems provided a wide range of men's body types. US men's garment sizes were developed for very conservative body type. US women's garment sizing system has had clearly defined women's body types.

Recently, consumers' body shapes have significantly changed. More consumers have larger waist size than the consumers back in 1970s. The body type projected in garment size has changed as women's waist girth got bigger compared to the past. In 2011 the US *Misses* sizes were divided into *Curvy Misses* size and *Straight Misses* size. The *Curvy Misses* sizes have smaller waist girth and larger hip girth than the *Straight Misses* sizes. Comparing international sizing systems has an indispensable limitation that the issued dates of the standards are not aligned. Some countries revised their standards such as every five years while other countries did not revise their standards that often. The goal of the sizing system is to satisfy consumer's needs for apparel that fits their body dimension. Consumers demand informative size information and some importers offer the size conversion table on the garment tag or the website to make shoppers choose the garment that will fit them well. With technological advance, online shopping is spreading rapidly and 3D body scanners are replacing the tape measuring. Customers may enjoy the personalized service like mass customization. 3D body scanning data might be useful today and in near future as 3D data could enhance current size and shape database. Virtual garment design and fit could be offered also. Although one challenge is to provide clothing that fits diverse populations. In these day consumers' morphological feature of the one geographical area has changed with immigration, aging, and lifestyle change. Demands of changing consumers are guiding new approaches to sizing. Regardless of the changes that the consumers are bringing in the industry, apparel companies still need to define their target customers and to integrate consumers' needs into their product development processes. Whether sizing will be selected in the future using computerized system or not, the sizing standard will play a significant role in ready-to-wear garment business. It will provide guidelines for manufacturers and consumers.

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