

## Comparison Study on Brassiere Patterns for Chinese Adult Women

– Focused on brassiere patterns of U.S., France, Italy –

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### Abstract

This study is to suggest a brassiere pattern suitable to the Chinese woman by recognizing the differences among the brassiere patterns of Europe, America and Italy by comparison. Collected data was analyzed by using SPSS 12.0.

1. If seeing the length of the ordinary brassiere's wing in Korea, the mean is 31.02cm to be shorter than these 3 patterns. The length of a wing should be adjusted according to the degree of fabric's elasticity.

2. The ESMOD type shows a high angle of 60° as the position of a shoulder strip is placed outward a lot compared with other patterns.

3. For the FIT and Marangoni types, the lengths of the inside and the external diameters show similarly to each other but the ESMOD type shows that its inside diameter is 7.5cm and external one is 9.6cm to have the difference of 2.1cm so that it is considered to put the bust together stronger than the others.

4. The cup circumference of the FIT pattern shows to be the biggest and that of the FIT pattern is the smallest. As the FIT pattern has the shape to wrap the side of the bust, it has large circumference but as it has a narrow angle of a dart, it seems to be fit to the woman with a small and flat bust.

5. For 1/2 of the nipple distance of the brassiere for the Korean adult women, it shows to be 6.12cm, much narrower than the patterns studied, and it is noticed that the ESMOD pattern is very similar to the brassier in the Korean market.

6. As the mean keeper height is 6.5cm, it is noticed that it is very similar to the brassier for the Korean adult women if comparing that the brassiere for the Korean adult has the keeper height of 6.5~8.6cm. The Marangoni pattern tends to have a little low and the ESMOD and FIT patterns have a ordinary measure.

**Key Words** : Brassiere, Pattern, ESMOD, FIT, Marangoni

## I . Introduction

While trade between Korean and China had grown rapidly since the beginning of diplomatic relations between Korea and China in 1992, it showed decrease for a while at the time of the financial crisis of 1998 in Asia but it has been back on a trend of increase as Asian economy recovered from 1999. As the amount of export from Korea to China was US\$ 18,610 million as of 2000, the increase of 37.6% compared of the previous year, China was ranked third in the volume of export of Korea after America and Japan<sup>1)</sup>.

The fashion market of China has emerged as an important market of many countries in the world as well as Korea. Especially, the world has paid attention to the great potential of the Chinese innerwear market by not only that it is a large market with a population of 1.4 billion but also that its improved income level throughout China has led to a mature innerwear market. Experts expect that the innerwear market of China will grow every 20% annually for 10 years from now continuously and that the market will expand to be a large-sized one of 500 billion Yuan in the future<sup>2)</sup>.

In China, there had been only the concept of underwear in the innerwear market until a few years ago. But recently the consumption of underwear that has various factors of scientific functionality, fashionability, brand image, etc. as well as quality has been on a actively increasing trend mainly at the large cities of Beijing, Shanghai and so on. There is a accelerating tendency preferring a brand of a high price as well as quality and design like the outer garment mainly by the women in urban areas who adopt fashion aggressively. The market share of quality goods has gradually expanded in the female

underwear market according to such a trend and foreign and high-quality innerwear brands have already been given a great deal of weight at every department<sup>3)</sup>.

Foreign and global innerwear brands had been launched from 1990s and they have already settled in China. And as they sell at high prices, the products manufactured by local subsidiaries in China and imported goods occupy 60% of the overall market share in the view of the amount.

While there are about 3,000 Chinese innerwear manufacturers, only few ones among such a number of brands have put down roots in the market<sup>4)</sup>. As the Chinese innerwear market shows polarization, it is divided into imported brands of high prices and unknown ones of low prices. And Triumph is a brand preferred in the Chinese innerwear market among them. Like the case of Triumph, Korean corporations are required to penetrate into the high-priced quality market rather than the low-priced market. Although it was possible to enter into the Chinese market with low-priced goods before, it needs to supply the innerwear of functionality and beauty through the strategy of quality as many Chinese local brands have entered to settle down in the Chinese market with low-priced products.

Especially as customers are getting hard to be pleased for the brassiere as they have met with various imports, a fit is considered to be more important than anything else. However, there has been no study on the development of the brassiere pattern for the Chinese adult in China as well as in Korea so far.

Therefore, this study is to suggest a brassiere pattern suitable to the Chinese woman by recognizing the differences among the brassiere patterns of Europe, America and Italy by comparison.

## II. Methods of Study and Procedures

### 1. Subject of Study

For developing brassiere patterns for Chinese adult women, the patterns of ESMOD<sup>5)</sup>, FIT<sup>6)</sup>, and Marangoni<sup>7)</sup> which are the typical schools of France, U.S., and Italy are selected for comparative analysis of the brassiere patterns. The design of an experimental brassiere was selected to be the design of nonwoven 3/4 cup one dart for the comparison of the patterns. The size applied was used with the data measured by Sookmyung Women's University in 2004, which was conducted on commission by Samsung Fashion Laboratory. And the difference was compared with and analyzed after producing patterns.

### 2. Study Method

After producing the patterns of the French ESMOD, American FIT and Italian Marangoni styles in a same size, the dimensions and angles of the patterns were measured and their formation methods were analyzed. The feature of each pattern was examined to compare them with and then a pattern of a brassiere was suggested for the Chinese adult woman.

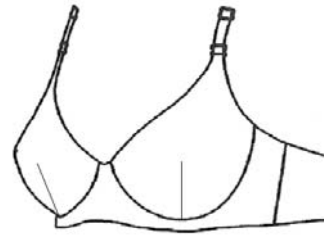
#### 1) Design of a brassiere

The brassiere design selected for the comparison analysis of the patterns was the one dart style of the round type used with a nonwoven 3/4 cup.

#### 2) Application Size

For comparative analysis of the brassiere patterns for Chinese adult female, a pattern applied with 2004 measurement size is made, and regarding domestic brand size after five brands are decided and designers of the brand are asked to make the

patterns with the same design and size. The domestic brand size is offered after getting average value through measuring the size of each part of the patterns.



<Figure 1> 3/4 Cup Round Brassiere

### 3. Methods of Data Process and Analysis

Collected data was analyzed by using SPSS 12.0. The one-way ANOVA and Duncan test were executed to verify significant difference per evaluation item among the patterns.

## III. Results and Consideration

### 1. Drafting of Brassiere Patterns

#### 1) Brassiere pattern of the ESMOD type

The brassiere pattern of the ESMOD type has the shape that is formed with the pattern of the bust's foundation fit to the body. And then a cup, front bodice and wing are drawn in order as the shape of a brassier that wraps the entire bust by the different dimensions between the bust and the underbust circumferences. 16 items were used as the referential areas to draw the pattern of the bust's foundation and a brassiere pattern and <Table 1> shows the dimensions per area. The following is the drawing method of the bust and the brassiere pattern based on the size of the Chinese adult women in their early 20s:

<Table 1> Application Size

Unit: cm

Requirement Part	Size	ESMOD	FIT	Marangoni
Chest Circumference				81.5
Bust Circumference		82.5	82.5	82.5
Under Bust Circumference		72.5		
Waist Circumference		65.7	65.7	65.7
Hip Circumference				
Neck Base Circumference		36.4		36.4
Waist Front Length		32.6		32.6
Waist Back Length		37.0	37.0	37.0
Shoulder Length		12.7	12.7	
Bust Breadth			26.4	
Interscye, Front		32.0		32.0
Interscye, Back		35.0	35.0	35.0
Bust Line - Waist Line Length		16.7		
Armscye Under Point to Waist Line Length		23.2		
Bust Point - Bust Point		17.1		17.1
Bust Under Side Diameter		5.1		
Bust Under Side Length		7.5		
Armscye Depth		9.4		
Bust External Side Length		9.5		
Neck Back Point- Shoulder Point Length				19.2
Status				160
Cervical Height				135.6
Scye Depth				17.5
Neck Back Point -Bust Point Length				32.9

(1) Drawing of the pattern of the bust's foundation<Figure 2>

a. Formation of the basic line

① Draw a X-Y axis corresponding to the waist line.

② Draw a vertical line at L1 to set up the center front line.

③  $L1L2 = \frac{1}{2}$  of the distance between the nipples:  $\frac{1}{2} \times 17.1 = 8.55\text{cm}$

④  $L2L3 =$  length of the bust' external side: as this area was not measured in the measurement of 2004, 9.5cm was used as it is, which is the

length of the bust's external side in the size 38 of the ESMOD.

⑤  $L3L4 =$ armhole depth: set L4 as 9.8cm and draw a vertical line.

⑥  $L4L5 = \frac{1}{2}$  of the back width: fix L5 as 17.5cm and then draw a vertical line. Set L8 as 37cm, the waist back length from L5 to draw the center back line and then draw a normal line.

⑦  $L1L6 =$ bust circumference line-waist line, set L6 as 16.7cm and then draw a normal line to set up the bust circumference line. Set the

intersection between the vertical line of L2 and the bust circumference line as P, the nipple.

⑧  $L6L7$ =lower diameter of the bust: set L7 as the lower diameter of the bust, 5.1cm at L6 and then draw a normal line to set up the underbust circumference line. Set the intersection between the vertical line from L2 and the underbust circumference line as G, the connecting point below the bust.

⑨  $L6'L9=L8L9$ : draw a normal line at L9, the intermediate point of  $L6'L8$  to set up the back breadth line.

⑩  $L13=L1L5/2$ : draw a vertical line at L13, the intermediate point of L1L5 to set L10 as the trunk line (18.9cm: arm pit-waist line's length) and then draw a normal line.

⑪  $L=L9B/2$ : draw a vertical line at L, the intermediate point (8.7cm) of L9B. Set L14, the intersection with the waist line.

⑫  $L1L11$ =waist front length: set L11 as the waist front length(32.6cm) at L1 and draw a normal line.

⑬  $L12L12''=1/2$  of the interscye( $1/2 \times 32$ )+1cm=17cm: set L12 as the intersection with  $L6L11$ , the extended line of L9 and then set  $L12''$  as 17cm to set up the interscye line.

b. Setting of the neck base circumference line

① Back neck base circumference

$L8A(1/2$  of back neck breadth)= $1/5$  of neck base circumference( $1/5 \times 35.4=7.28$ cm)

$AA1$ (back neck depth)=2cm

Draw the back neck base circumference line by connecting L8 and A1.

② Front neck base circumference

$L11D(1/2$  of front neck breadth)= $1/5$  of neck base circumference

$-0.5$ cm( $1/5 \times 35.4 - 0.5=7.28 - 0.5=6.78$ cm)

$DD1$ (front neck depth)=( $1/5$  of neck base circumference $-0.5$ cm) $-0.3$ cm= $1/5 \times 35.4 - 0.5 - 0.3$

$=6.78 - 0.3= 6.48$ cm

Draw the front neck base circumference line by connecting L11 and D1.

c. Settings of the shoulder line and dart

① Back shoulder line

•  $BC=1/5$  of neck base circumference+2cm ( $1/5 \times 35.4 + 2=7.28 + 2=9.28$ cm): Set C on the vertically-extended line at the back width line and draw a normal line extended to set up the shoulder point.

•  $A1C1$ (shoulder length)=12.7cm: set C1 which the vertically-extended line of C and A1 meet as C1, the shoulder length and then draw the shoulder line.

② Front shoulder line

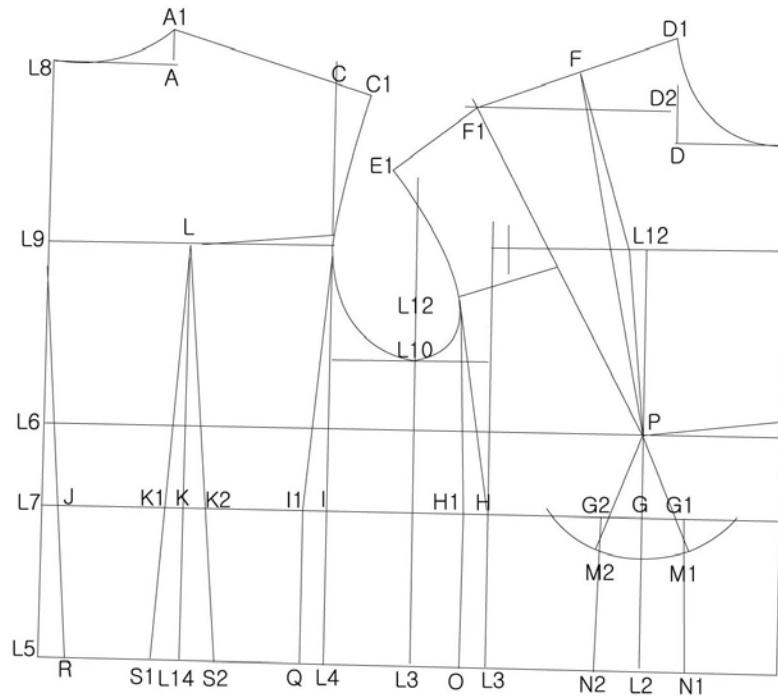
•  $DD2=DD1/3$ : draw a vertical line extended from D2, a trisection point of DD1.

•  $D1E$ (shoulder length)=12.7cm: set E as the shoulder length at D1.

•  $FF1$ (front shoulder's dart intake)= $1/10$  of the bust circumference $-1.5$ cm ( $1/10 \times 82.5 - 1.5=8.25 - 1.5=6.75$ cm): set the intermediate point of the shoulder length as F and set F1 with the front shoulder dart intake at the extended line of D1E and then connect it with P, the nipple to draw a dart line. Fold the shoulder dart (FF1) and then set E1 as the shoulder length at the extended line of D1F to draw the front shoulder line and to draw the interscye line again.

d. Setting of the interscye line

$L12L12''$ (interscye line)= $1/2$  of interscye+1cm ( $1/2 \times 32$ )+1=16+1=17cm: draw the interscye line by setting  $L12''$  as the interscye on the extended line of  $L12L12''$ . That is, convert 1cm added when setting up the interscye to adjust the volume of the upper part of the bust as the dart of FL12' P.



<Figure 2> Drawing of the pattern of the ESMOD bust's foundation

e. Setting of the armhole line

- $BB1=0.7\text{cm}$ : construct the dart on the back width line.

- By connecting  $C1B1L10$  with a curve, draw the back armhole line. By connecting  $E1L12''L10$  with a curve, draw the front armhole line.

f. Setting of the waist dart

① Calculation of dart intake

As the pattern of the bust' foundation of the ESMOD is added with the extra intake of 8cm in the mass,  $1/2$  of the bust circumference ( $L6L6'$ ) is " $1/2(82.5+8)=1/2 \times 90.5=45.25\text{cm}$ ". 9cm, the different dimensions between  $1/2$  of the bust circumference ( $L6L6'$ )= $45.25\text{cm}$  and  $1/2$  the underbust circumference ( $72.5\text{cm}/2=36.25\text{cm}$ : body size) shall finally be dart intake.

② Dart placement and intake

A. The dart placement and intake on the underbust circumference line are as follows:

- $GG1=GG2=2.5\text{cm}$ : set  $G1$  and  $G2$  by 2.5cm from a connecting point of the bust. Draw an arc with the radius of the lower length (7.5cm) of the bust.  $L7G1=L7M1$ ,  $HG2=HM2$ : find the arc with the waist back length to  $L7G1$  at  $L7$  to decide it as  $M1$  and find the arc with the waist back length to  $HG2$  at  $H$  to decide it as  $M2$  and then connect them to  $P$  to construct the dart line below the bust.

- $HH1=1.5\text{cm}$ : set  $H1$  as 1.5cm at  $H$  and then connect it with  $L12''$ .

- $I1=1.5\text{cm}$ : set  $I1$  as 1.5cm at  $I$  and then connect it with  $B$ .

- $KK1=KK2=1.25\text{cm}$ : set  $K1$  and  $K2$  by 1.25cm at  $K$  respectively and then connect them with  $L$ .

- $L7'J=1\text{cm}$ : decide J as 1cm at  $L7'$  and then connect it with  $L9$ .

B. The dart placement and intake on the waist line are as follows:

- $L2N1=L2N2=2.75\text{cm}$ : set  $N1$  and  $N2$  by 2.75cm at  $L2$  respectively and then connect them with  $G1$  and  $G2$ .

- $L3O=1.5\text{cm}$ : set O as 1.5cm at  $LL3$  and then connect it with  $H1$ .

- $L4Q=1.5\text{cm}$ : set Q as 1.5cm at  $L4$  and then connect it with  $I1$ .

- Set the intersection of the extended line of  $L9J$  and the waist line as R.

- Set the intersection of the extended line of  $LK1$  and the waist line as  $S1$ . Set the intersection of the extended line of  $LK2$  and the waist line as  $S2$ . If folding all darts on the waist line, it shall be  $1/2$  of the waist line( $=65.7/2=32.85\text{cm}$ ).

- $L6T=1\text{cm}$ : as other matters, dart is constructed by setting T as 1cm at  $L6$  and dart intake is decided after fitting.

(2) Formation of the front bodice of a brassiere

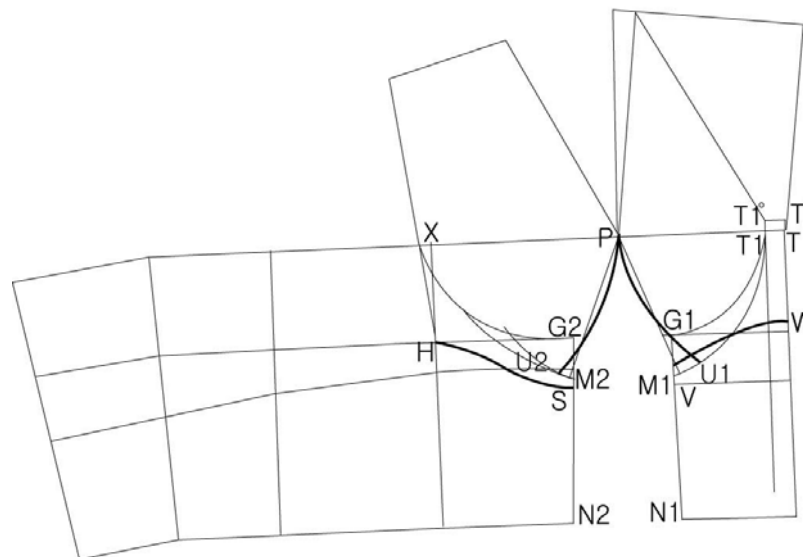
If the end part of the internal side of the brassiere wire is placed about 0.5cm above the bust circumference line, on the wire is marked with the point of contact that the wire meets the connecting point below the bust.

After placing the point of contact of the wire at  $G1$ , draw the wire's internal curve from  $G1$  to  $T1$  and then place the point of contact of the wire at  $G2$ . And by drawing the wire's internal curve from  $G2$  to  $X$ , complete the cup circumference line of the front. Lower a certain length from the underbust circumference line to construct the hemline and then draw the design line.

(3) Formation of a brassiere cup

a. Formation of a lower cup

① Setting up of the lower side of a lower cup:  $T1G1=T1U1$ : place the wire's point of contact



<Figure 3> Drawing of the pattern of the ESMOD Brassiere cup

on a position of G1 and fix the wire on a position of T1. Draw the internal curve (inside diameter) of the wire while stretching out the wire on the point of contact toward the curve and then set U1 by measuring the position which has the waist back length to the curve T1G1 from T1 and then set up the internal lower side of the lower cup.

② Setting up of the external lower side of a lower cup:  $XG2=XU2$ : place the wire's point of contact on a position of G2 and fix the wire on a position of X. Draw the internal curve of the wire while stretching out the wire on the point of contact toward the curve and then set U2 by measuring the position which has the waist back length to the curve XG2 on X and then set up the external lower side of the lower cup.

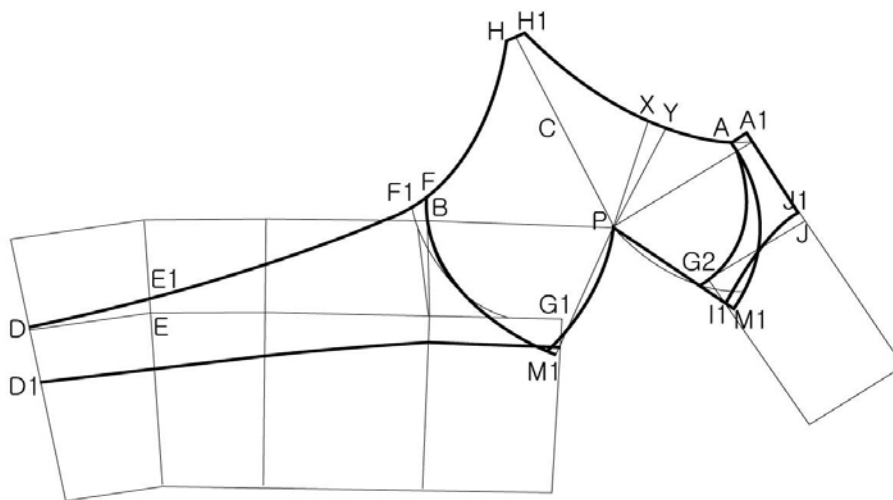
③ Formation of the volume of the dart line below the bust: to form the volume below the bust, make the straight lines of PU1 and PU2, the dart lines below the bust as curves and decide the amount of volume as the result of correction after wearing.

b. Formation of an upper cup; after folding the shoulder dart, draw the neck line that wraps the overall upper part of the bust. Construct a dart on the parts of the side line of the upper cup (FB) and the internal neck line (XP) for the correction effect that puts the bust together.

- $FF1=1\text{cm}$ : by fixing F1 by 1cm from F, connect it with B and then construct a dart on the side line of the upper cup.

- $XY=1\text{cm}$ : by fixing Y by 1cm from X, connect them with P respectively and then construct a dart on the internal neck line.

(4) Formation of a wing; for the formation of a wing, set D1 by lowering as much as the breadth of the wing from D, the intersection between the center back line and the underbust circumference after folding all waist darts and then connect it with the front's hemline naturally to set up the lower side of the wing. Connect the upper side of the wing with the external neck line of the lower cup naturally.



<Figure 4> Drawing of the pattern of the ESMOD Brassiere Wing



2) Brassiere pattern of the FIT type

The brassiere pattern of the FIT type is the method that constructs the bodice pattern that allows the eases of 10cm at the bust circumference and 4cm at the waist line and then draws a brassiere pattern that wraps the bust area in the mass by overlapping the front and rear bodices to deduct the ease. As 6 items are the referential areas to draw the bodice and the brassier patterns, <Table 1> shows the dimensions per area and size.

(1) Bodice pattern; 6 measures are required for the bodice pattern. They are waist back length(37.0cm), bust circumference(82.5cm)+ease of 10cm, shoulder length(12.7cm), back breadth(35.0cm)+ease of 1.6cm, bust breadth(26.4cm)+ease of 0.6cm and waist line(65.7cm)+ease of 4cm.

a. Drawing of the basic line

① 0-1 draw a vertical line of the waist back length  $(37.0\text{cm})+2\text{cm}=39\text{cm}$  and then mark it as the center back line. Draw a cross line vertical to 1.

② 0-2 after drawing a normal line by bust circumference/2+0.5cm

$(82.5/2+0.5=41.25+0.5=41.75\text{cm})$  and then draw a rectangle.

③ 0-3 draw a cross line vertically by lowering 2cm.

④ 3-4 after completing 1-3/2, draw the bust circumference line by lowering more 4 cm toward the waist.

⑤ 4-5 draw the underarm line by lowering 3cm.

⑥ 5-7 draw the back breadth line by completing 5-3/2.

b. Drawing of the back beck

① 0-8 draw a rectangle by calculating the

neck base circumference/5

$-0.2\text{cm}(36.4/5-0.2=7.28-0.2=7.08\text{cm})$ . Draw the back neckline by raising its side 1.5cm.

c. Drawing of the front neck

① 2-9 draw a line by lowering vertically from the neck base circumference/5-1.6cm  $(36.4/5-1.6=7.28-1.6=5.68\text{cm})$ .

② 2-10 after calculating the neck base circumference/5+0.2cm

$(36.4/5+0.2=7.28+0.2=7.48\text{cm})$ , draw the front neck circumference line by raising its side 2.5cm.

d. Drawing of the front and back bodices

① 7-11 bisect the shoulder breadth(35/2=17cm). Draw a normal line up to the armhole base line. Mark "12" on the center part.

② Trisect 3-7 and draw a normal line after subtracting 0.4cm.

③ After adding the measure of 2.4cm to draw the dart intake and shoulder at 7-11, connect them to draw the shoulder temporarily.

④ Shoulder length/2+0.5cm  $(12.7/2+0.5=6.35+0.5=6.85\text{cm})$

⑤ Draw a dart up to the point above 2cm from the back breadth line by deciding the dart intake of 1.4cm at the shoulder.

⑥ 10-18 after bisecting 10-6, draw a normal line by lowering 2cm toward the waist.

⑦ 18-19 bisect the bust breadth  $(26.4/2=13.2\text{cm})$  and then add the dart intake of 2.2cm. Draw a vertical line up to the armhole base line downwards.

⑧ 10-20 add 4.3cm, the measure to draw the dart intake and the shoulder to 18-19.

⑨ 20-21 0.3cm

⑩ 9-21 connect the front shoulder line temporarily.

⑪ 22 draw a horizontal line at the front center

line by bisecting the interscye line.

⑫ 21-23 connect the dart apart as long as 14-15.

⑬ 23-24 calculate the bisecting measure of the bust circumference/8-0.3cm( $41.25/8-0.3=5.15-0.3=4.85$ cm) and then draw 22-24 by extension randomly.

⑭ 25 the center of 5-6

⑮ 27-28 after raising 1.3cm above the waist and then connect 1-27.

e. Drawing of the armhole line

① Back armhole: after drawing 0.2cm inward from the center of 14-11, draw the back armhole line by raising 14-25 2.5cm above the side.

② Front armhole: draw a guide line of 19-21. After drawing 0.8cm inward from the center of 21-19, draw the armhole line by raising 2.3cm above the side.

f. Waist dart intake of the bodice

Add the ease of 4cm to be fit to the waist freely. And the calculation of the dart intake is as follows:

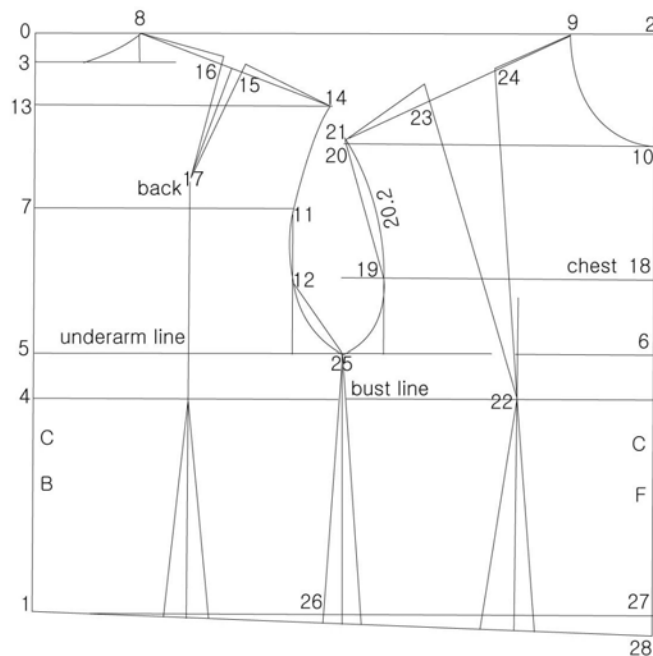
① Measure the length of 1-28. Subtract 1/2 of the waist line ( $65.7/2=32.85$ cm) from the measure. Then, the remained is the waist dart intake.

② Make the dart of the side line smaller than the back and front waist dart to maintain a natural fitting.

g. Dart placement at the waist line

① Dart placement of the back waist: draw an extension line from 17, the end of the shoulder dart to the waist line to draw the line which forms the center line of the back waist dart.

② Side line: draw the dart intake to both sides by making the center line of the dart with the line of 25-26.



<Figure 5> Drawing of the pattern of the FIT bust's foundation

③ Dart placement of the front waist: after drawing vertically down from the nipple, draw 1/3 of the dart intake of the front waist toward the front center line and another 2/3 toward the side line.

h. Completion of a pattern: fold the front and back shoulder darts and then draw the final shoulder line at 8-14 and 9-21. After folding the waist dart and side line, connect 1-28 with a smooth curve. Connect the front and the back shoulder lines and then check whether the neckline is connected to the armhole line. Mark CB, CF, bust circumference line, interscye line and back breadth line.

(2) Brassiere pattern; the basic bodice pattern is the best choice for a brassiere pattern. It is required to deduct all eases to prepare a bodice pattern suitable to a brassiere. Proper preparation for a brassiere shall be based on the body size.

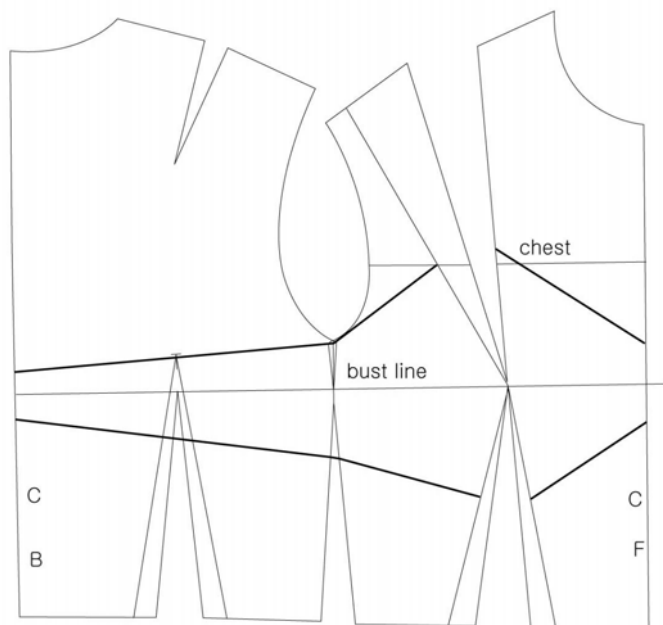
a. Arrangement of the bodice pattern

① Draw the side line and the waist dart on the bodice pattern lightly. Draw the bust circumference line to draw by overlapping the front bodice pattern (the bust circumference line is a very important line to draw two critical areas of the shoulder and the waist.)

② Mark bust circumference/2( $82.5/2=41.25\text{cm}$ ) from the center back on the bust circumference line. This point shall form the precise breadth that has no ease at all for a brassiere and become the center front. Draw the center front of the front bodice pattern at the center front of the brassiere. The side line is drawn by being overlapped by the ease. Draw the bust and the waist dart and then the interscye line.

b. Formation of the brassiere pattern

① Draw the side line at the position of 1/2 that the front and the back bodices overlap. Delete the overlapped side line to avoid confusing.



<Figure 6> Drawing of the pattern of the FIT Brassiere Cup

② Increase the waist dart 2 times from the armhole. Extend the length of the back waist dart more 2.5cm above the bust circumference line. Draw the front and back waist darts 2 times larger.

③ Formation of the upper and lower cup lines of the brassiere pattern

\* Formation of the upper cup line

- Raise 1.5cm from the center back.
- Raise 3cm from the side line.
- Raise 9cm from the nipple to mark them on both sides of the dart.
- Raise 2.5cm from the center front.

\* Formation of the lower cup line

- Lower 1.5cm from the center back.
- Lower 4.5cm from the side line.
- Lower 7.5cm from the nipple to mark them on both sides of the dart.
- Lower 2.5cm from the center front.

3) Brassiere pattern of the Marangoni type

The brassiere pattern of the Marangoni type has the method that constructs the basic fitted body with a form of a body suit and then completes the pattern by separating parts necessary to a brassiere.

\* Formation of the bust's fitted foundation

(1) Cervicale: draw the center back line and

then mark the cervicale at the left end of the center back line.

(2) Axilla level: the position that moves as long as the "length of the axilla height above the thoracic vertebrae behind the neck(17.5cm)".

(3) Posterior waist point: the position that moves as long as the "wasit back length (37.0cm)" 1 to the right from Point.

(4) Back width: the position that moves as long as "1/2 of the back width(1/2×35.0= 17.5cm)" upward from Point 2.

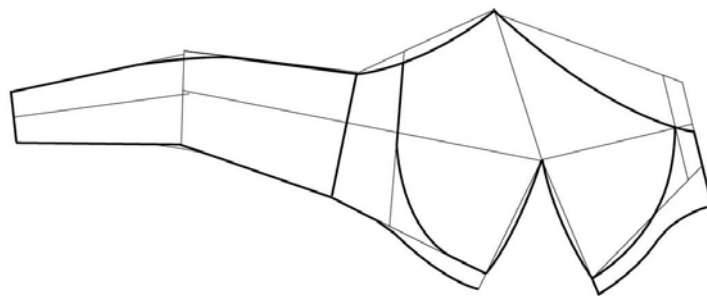
(5) Interscye: the position that moves as long as the "armhole breadth

-1cm=11.2-1=10.2cm" upward from Point 4. At this time, the armhole breadth shall be "(1/2 of the interscye+1/2 of the back breadth) ÷3=(1/2×32+1/2×35)÷3 =(16+17.5)÷3 =33.5÷3 =11.2cm".

(6) Center front line: the position that moves as long as the "1/2 of the bust circumference (1/2×82.5=41.25cm)". Draw a horizontal line across Point 6.

(7) Anterior waist point: the intersection between the horizontal line across Point 6 and the vertical line across Point 3.

(8) Side line: the intermediate point between Point 2 and 6. Draw two horizontal lines to the left of Point 4 and 5 and to the right of Point 8 respectively.



<Figure 7> Drawing of the pattern of the FIT Brassiere

(9) Lateral waist point: the intersection between the horizontal line across Point 8 and the vertical line across Point 3.

(10) Anterior neck point: the position that moves as long as the "center front length (32.6cm)" to the left from Point 7.

(11) Anterior neck breadth: the position that moves as long as the " $(\frac{1}{2} \text{ of the neck base circumference} \div 3) + 1\text{cm} = (\frac{1}{2} \times 36.4 \div 3) + 1 = (18.2 \div 3) + 1 = 6.1 + 1 = 7.1\text{cm}$ " downwards from Point 10. Draw a horizontal line to the left from Point 11.

(12) Anterior neck depth: the position that moves as long as the "anterior neck breadth + 0.4cm = 7.1 + 0.4 = 7.5cm" to the left from Point 11. Draw the anterior neck circumference line connecting Point 10~12.

(13) Nipple distance: the position that moves as long as the " $\frac{1}{2}$  of the bust circumference  $\div 5$  ( $\frac{1}{2} \times 82.5 \div 5 = 41.25 \div 5 = 8.25\text{cm}$ )" from Point 6. Draw a horizontal line across Point 13.

(14) The intersection between the horizontal line across Point 13 and the vertical line across Point 3.

(15) Nipple: the position that the length to the horizontal line across Point 12 is "cervical to breast point length - back neckline length (32.9 - 7.9 = 25cm)".

(16) Front shoulder height: the position that moves as long as the "measure of the front shoulder dart" to the right from Point 12. At this time the measure of the front shoulder dart(R) shall be the " $(\text{distance between Point 15 and 5} - 1\text{cm}) \times \frac{3}{4} = (9 - 1) \times \frac{3}{4} = 6\text{cm}$ ". Draw a vertical line across Point 16 downwards.

(17) Back neck breadth: the position that moves as long as the "anterior neck depth (7.5cm)" upward from Point 1.

(18) Back neck depth: the position that moves as long as the "anterior neck breadth  $\div 3$  (7.1

$\div 3 = 2.36\text{cm}$ )". Draw the back neckline connecting Point 1~18.

(19) Back shoulder height: the position that moves as long as the "measure of the front shoulder dart - 0.5cm (5.5 - 0.5 = 5cm)" to the right from Point 18. Draw a vertical line upward across Point 18.

(20) Back shoulder point: the position that the distance of the vertical line from Point 1 to Point 19 is the "back shoulder point~shoulder point + 1cm (measure of the back shoulder dart)". Connect Point 20 and 18 with a straight line.

(21) The position that moves as long as the "armhole breadth" upward from Point 2.

(22) The intersection between the horizontal line across Point 21 and the vertical line across Point 3.

(23) Back waist dart point: the position that moves 1.5cm to the left from Point 21.

(24) Back shoulder dart point: the position that moves as long as the "distance between Point 1~2  $\div 2$ " to the left from Point 23.

(25) Back shoulder dart start 1: the position that moves as long as the "distance between Point 4~8" along Point 18.

(26) Back shoulder dart start 2: the position that the distance between Point 26~24 is same to the "distance between Point 25~24" while being apart 1cm (measure of the back shoulder dart) at Point 25. Connect Point 25 and 24, Point 26 and 24, and Point 26 and 20 with straight lines, respectively. Measure the shoulder seam lengths to "Point 26~20 + Point 18~25" respectively.

(27) Front shoulder point: the position that moves as long as the "distance between Point 19~20 - 1cm (measure of the back shoulder dart) + measure of the front shoulder dart = 11.4cm" downward from Point 16.

(28) Front shoulder dart start 2: the position

that is apart the "distance between Point 26~20 (interior shoulder length)" while being apart the "distance between Point 18~25(interior shoulder length)+measure of the front shoulder dart" at Point 12. Connect Point 12 and 28, and Point 28 and 27 with straight lines, respectively.

(29) Front shoulder dart start 1: the position that moves as long as the "distance between Point 18~25" along the shoulder slope at Point 12. Connect Point 28 and 15, and Point 29 and 15 with straight lines, respectively.

(30) Back width point: the position that moves as long as the "back neck breadth (7.5cm)" to the left from point 4.

(31) Front width point: the position that moves as long as the "front neck breadth (7.1cm)" to the left from point 5.

Draw an armhole line passing Point 20~30~31~27 in order.

(32) The intermediate point of Point 1 and 2.

(33) Center back waist dart: the position that moves 1.5cm upward from Point 3. Connect Point 32 and 33 with a straight line.

(34, 35) Back bodice's center waist dart: the positions that move 1.25cm upward and downward from Point 22 respectively. Connect Point 34 and 23, and Point 35 and 23 with straight lines respectively.

(36, 37) Side shoulder dart: the positions that move 2cm upward and downward from Point 9 respectively. Connect Point 36 and 8, and Point 37 and 8 with straight lines respectively.

(38, 39) Front shoulder dart: the positions that move 1.25cm upward and downward from Point 14 respectively. Connect Point 38 and 15, and Point 39 and 15 with straight lines respectively.

(40) Draw a circle with a radius of "1/2 of the nipple distance( $1/2 \times 17.1 = 8.55\text{cm}$ )" with the Point 15(nipple).

(41) The "measure of the total cup dart" to

form a brassiere cup shall be the "measure of the front bodice's shoulder dart $\times 3$ ". The measure of the total cup dart is divided according to the standard below and then after measuring the measure of the dart along the circumference, mark 3 cup darts respectively.

a, a'. dart downward nipple= $(R) \times 3/2 = 4 \times 3/2 = 6\text{cm}$

b, b'. dart to the direction of the center front= $(R) \times 1 = 4\text{cm}$

c, c'. dart to the direction of the shoulder= $(R) \times 1/2 = 2\text{cm}$

(42) Underbust circumference line: draw a straight line that intersects vertically with the cup dart line across Point a to the direction of the center front. Mark the position which is apart as long as the "distance between Point 7~38" along a slant line at Point a and then draw a vertical line downward at that point.

(43) The intersection between the vertical line across Point 42 and the horizontal line across Point 38.

(44) The intersection between the vertical line across Point 42 and the horizontal line across Point 39.

(45) The intersection between the vertical line across Point 42 and the slant line connecting Point 8~36. Draw a vertical line across Point a and a'(movement of the front bodice's underbust circumference line).

(45-1) Mark the position apart as long as the "distance between Point 44~45" downward at Point a and then relocate the side line between Point 45 and 8 with the same slope and length to the end of Point 45-1 and draw as it is

(46) Mark the position apart as long as the "distance between Point 7~38" upward at Point a and then draw a horizontal line across this point.

(47) The intersection between the vertical line

across Point 15 and the horizontal line across Point 46. Mark an underbust circumference line even on the back bodice of the fitted foundation by adjusting to the level of Point 45.

\* Formation of the brassiere pattern

(1) After copying the "cup+front bodice" pattern on a new paper, fold all of 3 cup darts to make a cone.

(2) Fold the pattern vertically for both dart lines of the dart below the nipple to be just overlapped. At this time, the folding line created vertically shall be a new "lengthwise grainline".

(3) Fold the pattern horizontally for the top and bottom of the new lengthwise grainline" to be overlapped centering around the nipple. At this time, the folding line of the pattern created horizontally shall be a new "elasticity line".

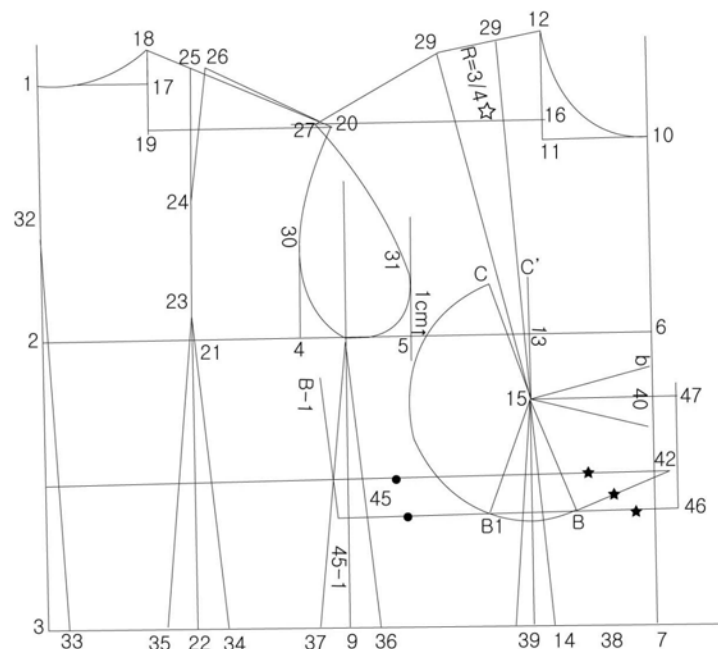
(4) Fold 1cm of the summit of the cone at the condition that the pattern is folded horizontally to make the protrusion on the nipple

of the cup smooth and then cut the lower dart of the nipple and unfold the pattern.

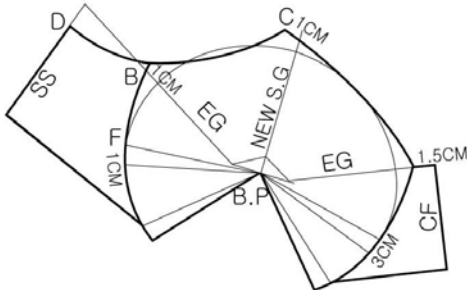
(5) Find and mark a new nipple on the position that the pattern is folded and then adjust the "elasticity line" which is bent from the new nipple and reconnect it in a straight line.

(6) Draw a new internal cup circumference line that is across a new internal cup circumference line 1.25cm apart from the center front along the "elasticity line" and a new cup circumference line on the side that is across the point past 1cm to the direction of the side line from the previous cup circumference line on the side.

(7) Mark the position that is moved 1cm to the side from the position that the top of the circle showing the cup and the "lengthwise grainline" meet as the shoulder point and then draw a cup's upper curve that connects Point A and C.



<Figure 8> Drawing of the pattern of the Marangoni bust's foundation



<Figure 9> Drawing of the pattern of the Marangoni Brassiere Cup

(8) Mark the position that is moved 1.5cm downward along the side line from the side line's top point and then draw the upper side curve that connects Point C and D.

(9) After cutting the cup pattern to the direction of the nipple at the position 5cm apart inward and toward the side respectively along the dart starts of both cups, spread the pattern about 1cm from the cutting line.

(10) Completion of the cup pattern: separate only the cup from the "cup+front bodice" pattern and copy it on a new paper. Modify both sides of the cup dart below the nipple into a curve. And then modify the cup circumference line to

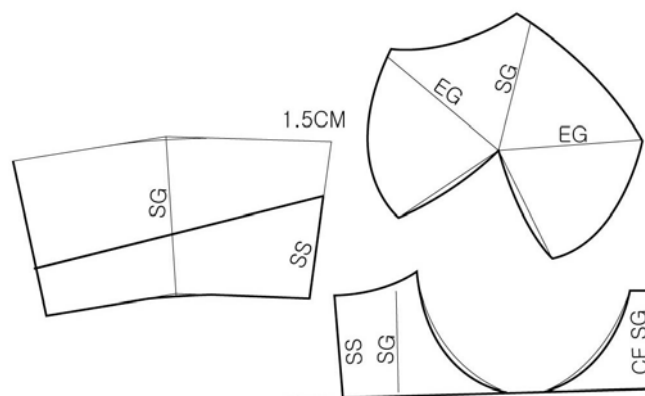
be smooth in the mass when the dart line is closed.

(11) Completion of the front bodice pattern: copy the bodice part from the "cup+front bodice" pattern on a new paper. Modify the cup circumference line of the front bodice pattern to be round and smooth in the mass.

(12) Completion of the wing pattern: copy the wing part in the condition of that all waist darts are bent from the back bodice of the complete bust's fitted foundation and mark a new "lengthwise grainline" to the direction of the folding line. Draw a wing's upper curve in the condition that the front bodice and the side line of the wing pattern are connected.

## 2. Comparison of the brassiere patterns

3 patterns of the French ESMOD, American FIT and Italian Marangoni were produced by using the size of the women in their 20s, measured at Shanghai, China in 2004, to compare and analyze the brassiere patterns. And then each part of the patterns were measured <Figure 11>.



<Figure 10> Drawing of the pattern of the Marangoni Brassiere

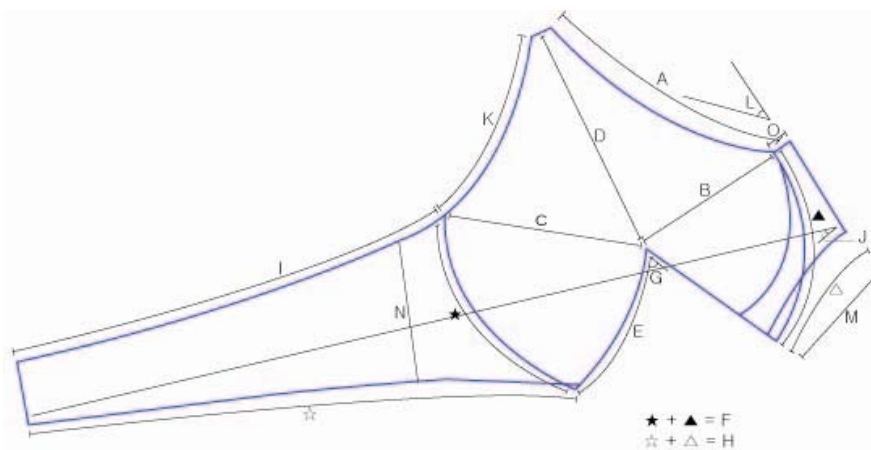


Produced brassiere patterns were measured for 15 items of the length of the cup's upper side, inside, external and lower diameters, cup circumference, angle of the cup dart, length of the wing's upper side, length of the wing, armhole, angle of the cup's upper side, 1/2 of the nipple distance, keeper height and 1/2 of the center breadth of the cup holder. The inside diameter was measured for the lineal length inside a cup from the nipple on the bust circumference line and the external diameter was measured for the outer lineal length inside a cup from the nipple on the bust circumference line. The upper diameter was measured for the lineal length from the nipple to the attaching area of the shoulder string of a brassiere and the lower diameter was measured for the longest part from the nipple to the cup's lower part. The cup circumference was measured for the length of the lower curve of a cup and the angle of the cup dart was measured for the degree of being flat of a dart centering around the nipple. The angle of the wing was measured for the angle

between the line that connects the vertical line of a center front and a center front and the lower end of a wing. The angle of the cup's upper side was measured for the angle between a center front line and a cup's upper side <Table 2>.

The brassiere patterns were constructed by the method that the brassiere patterns were obtained after producing all of the bust's foundation patterns of ESMOD, FIT and Marangoni, but there were some difference in their final patterns.

As the bust's foundation pattern of the ESMOD type is added with the ease of 8cm totally<sup>8)</sup>, the remained dimensions is treated as a dart to be a brassiere fit well to the body. For the pattern of the FIT type, although it includes ease, that ease is removed for use by drawing for the pattern to be overlapped to 1/2 of the bust circumference. For the pattern of the Marangoni type, it is constructed by using a pattern without ease as it is. As a brassiere pattern should be just fit to the body so that it



<Figure 11> Measuring Part of Brassiere Pattern

- A: Upper Cup Length B: Inner Side Diameter C: External Side Diameter D: Upper Side Diameter
- E: Under Side Diameter F: Circumference of Cup G: Slope of Cup Dart H: Length of Wing
- I: Upper Wing Length J: Slope of Wing K: Armscye Circumference L: Slope of Upper Cup
- M: 1/2Bust Point to Bust Point Length N: Keeper Height O: 1/2Cup center Width

functions to support the body, it is constructed by removing all ease and to be rather smaller than the size of the body by increasing the existing dart intake a little according to the degree of fabric's elasticity.

1) Length of a wing and its angle

The dimensions of the Chinese women in their early 20s used in this study are 72.5cm of the underbust circumference and 82.5cm of the bust circumference, and the size of a brassier are the size of 75A that its underbust circumference is above 67.6cm and less than 72.5cm and its different dimensions is 10 cm between the underbust and the bust circumferences<sup>9)</sup>.

For the length of a wing, the ESMOD type is 33.5cm, FIT type 37.5cm and Marangoni type 35.8cm so that the mean is 35.6cm. For the ESMOD pattern, the length of a wing decreased a

lot by allowing more darts by 1.5cm to the front and the back bodices in the underbust and the bust circumferences respectively when constructing a brassiere pattern. For the FIT pattern, the length of a wing did not decrease a lot as the decrease of dimensions was small at the underbust circumference though allowing the dart intakes of the back waist and front bust 2 times. If seeing the length of the ordinary brassiere's wing in Korea, the mean is 31.02cm to be shorter than these 3 patterns<sup>10)</sup>. The length of a wing should be adjusted according to the degree of fabric's elasticity.

For the angle of a wing, the brassiere pattern for the Korean adult is 11.2° on average<sup>11)</sup> and the angle of this study showed 11.33° on average very similarly. But for the FIT pattern, it has a wide angle of 18° and the shape of its wing is bent a lot downward to be different from other patterns.

<Table 2> Size of Pattern measurement

Unit:cm

Part	Pattern	ESMOD	FIT	Marangoni	Korean Brand
A. Upper Cup Length		11.6	12.6	11.1	
B. Inner Side Diameter		7.5	8.0	9.0	
C. External Side Diameter		9.6	8.6	9.1	
D. Upper Side Diameter		11.5	9.2	8.5	
E. Under Side Diameter		7.5	7.5	7.5	
F. Circumference of Cup		19.5	25	20.7	19.0
G. Slope of Cup Dart		78°	48°	83°	
H. Length of Wing		33.5	37.5	35.8	31.02
I. Upper Wing Length		20.8	23.4	23.7	21.09
J. Slope of Wing		9°	18°	7°	11.2
K. Armscye Circumference		9.5	6.0	8.2	
L. Slope of Upper Cup		60°	46°	42°	
M. 1/2Bust Point to Bust Point Length		6.5	8.2	8.0	6.12
N. Keeper Height		6.5	7.5	5.5	7.38
O. 1/2Cup center Width		1.0	1.0	1.3	1.14

2) Length of a cup's upper side and its angle

The average length of a cup's upper side is 21.63cm and it shows the position of a shoulder strip and the degree that wraps the upper area of the bust. Although this factor depends on design and trend, it needs to be adjusted considering the correction effect of a brassiere. The angle of a cup's upper side is 49.33° on average. And the ESMOD type shows a high angle of 60° as the position of a shoulder strip is placed outward a lot compared with other patterns.

3) Inside, external, upper and lower diameters of a cup

As a cup's inside and external diameters decide the most extruded area of the bust, it is

8.17cm for the inside diameter and 9.1cm for the external one on average. As the bust of the adult women lose draft of the breast tissue, it droops and the distance between nipples gets wider as they get older<sup>12)</sup>. Therefore, as a brassiere works to put the bust together and to support it, the inside diameter is more narrow than the external one. For the FIT and Marangoni types, the lengths of the inside and the external diameters show similarly to each other but the ESMOD type shows that its inside diameter is 7.5cm and external one is 9.6cm to have the difference of 2.1cm so that it is considered to put the bust together stronger than the others.

As the upper diameter shows the degree that wraps the upper area of the bust, the mean is 9.73cm on average, but the ESMOD pattern is 11.5cm so that it has the shape to wrap the

<Table 3> Statistics Results of the Brassiere Pattern Comparative Analysis

	N	Average	standard deviation	standard error	Confidence interval 95% about Mean		Minimum	Maximum
					Infimum	Supremum		
Upper Cup Length	3	11.77	.76	.44	9.87	13.66	11.10	12.60
Inner Side Diameter	3	8.17	.76	.44	6.27	10.06	7.50	9.00
External Side Diameter	3	9.10	.50	.29	7.86	10.34	8.60	9.60
Upper Side Diameter	3	9.73	1.57	.91	5.83	13.63	8.50	11.50
Under Side Diameter	3	7.50	.00	.00	7.50	7.50	7.50	7.50
Circumference of Cup	3	21.73	2.89	1.67	14.55	28.92	19.50	25.00
Slope of Cup Dart	3	69.67	18.93	10.93	22.64	116.69	48.00	83.00
Length of Wing	3	35.60	2.01	1.16	30.61	40.59	33.50	37.50
Upper Wing Length	3	21.63	1.53	0.88	17.83	21.44	20.80	23.70
Slope of Wing	3	11.33	5.86	3.38	-3.22	25.89	7.00	18.00
Armscye Circumference	3	7.90	1.77	1.02	3.51	12.30	6.00	9.50
Slope of Upper Cup	3	49.33	9.45	5.46	25.85	72.81	42.00	60.00
1/2Bust Point to Bust Point Length	3	7.57	.93	.54	5.26	9.88	6.50	8.20
Keeper Height	3	6.50	1.00	.58	4.02	8.98	5.50	7.50
1/2Cup center Width	3	1.10	.17	.10	.10	1.53	1.00	1.30

upper area more than the others. For the brassiere pattern of Korean companies, the mean is about 7.1cm on average<sup>13)</sup> and it is considered that there is difference as it has the shape to wrap the entire bust mainly for the pattern and physical factor rather than the design factor.

As all of 3 patterns show 7.5cm for their lower diameter, there is little difference.

#### 4) Cup circumference and the angle of a cup dart

If the bust extrudes and have bigger volume for an adult, the angle of a cup dart becomes to be flat. And if the dimensions of a cup circumference has the shape to wrap the bust, it becomes larger. The mean cup circumference of a pattern is 21.73cm and the mean angle of a cup dart is 69.67°. The cup circumference of the FIT pattern shows to be the biggest and that of the ESMOD pattern is the smallest. As the FIT pattern has the shape to wrap the side of the bust, it has large circumference but as it has a narrow angle of a dart, it seems to be fit to the woman with a small and flat bust. The ESMOD and Marangoni patterns have very similar sizes. The brassiere for the Korean women show 19cm for its cup circumference on average<sup>14)</sup>, it is considered that it is lowered for the side line and center front by considering an aesthetical factor.

#### 5) 1/2 of the nipple distance

1/2 of the nipple distance is 7.57cm on average. And as it is about 2cm shorter than 17.1cm of the horizontal distance between the nipples, it is noticed that it puts the bust together to a center. For the ESMOD pattern, it has the smallest one of 6.5cm and the FIT and

Marangoni patterns are 8.2cm and 8cm to be almost alike. For 1/2 of the nipple distance of the brassiere for the Korean adult women, it shows to be 6.12cm, much narrower than the patterns studied<sup>15)</sup>, and it is noticed that the ESMOD pattern is very similar to the brassiere in the Korean market.

#### 6) Keeper height

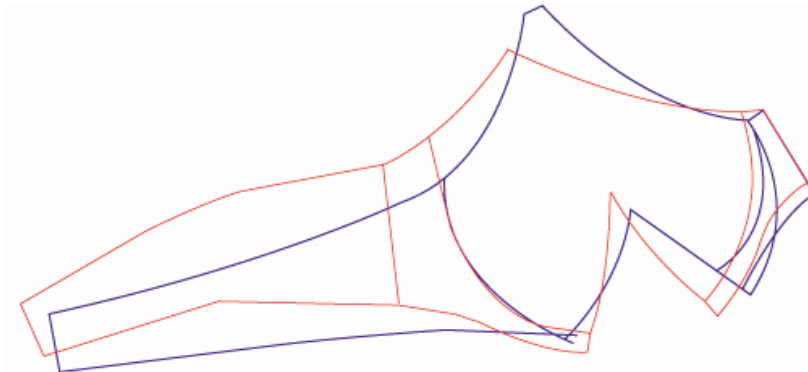
As the bust spread sideward by getting older, the function to hold the bust from the side is required. Therefore, a brassiere for an adult should maintain some degree of the keeper height to have the function. As the mean keeper height is 6.5cm, it is noticed that it is very similar to the brassier for the Korean adult women if comparing that the brassiere for the Korean adult has the keeper height of 6.5~8.6cm<sup>16)</sup>. The Marangoni pattern tends to have a little low and the ESMOD and FIT patterns have a ordinary measure.

<Figure 12> shows the degree of polymerization and the center of the front is overlapped. Regarding 1/2Bust Point to Bust Point Length the FIT pattern is longer than the ESMOD pattern. The degree of wrapping bust is the ESMOD pattern is bigger than the FIT. In terms of Slope of Wing the FIT patterns has a bent shape from the middle to the lower part, and the other hand the ESMOD pattern has a smooth shape to the lower part.

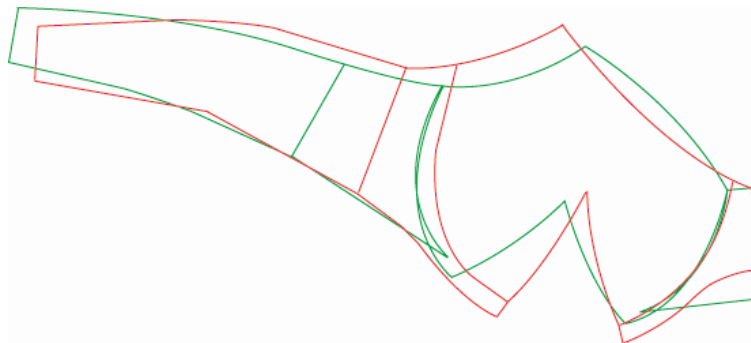
<Figure 13> is the degree of polymerization of the FIT pattern and the Marangoni pattern, the angle of the wing shows the similar shape with bending to the lower part. Regarding 1/2Bust Point to Bust Point Length FIT pattern is bigger than Marangoni pattern. In terms of the length of the wing Marangoni patterns is longer than FIT pattern even though the same size is applied.

<Figure 14> is the degree of polymerization of the ESMOD pattern and the Marangoni pattern, regarding 1/2Bust Point to Bust Point Length the ESMOD is shorter, the Marangoni pattern is wider, and the angle of the Cup Dart is similar. In terms of

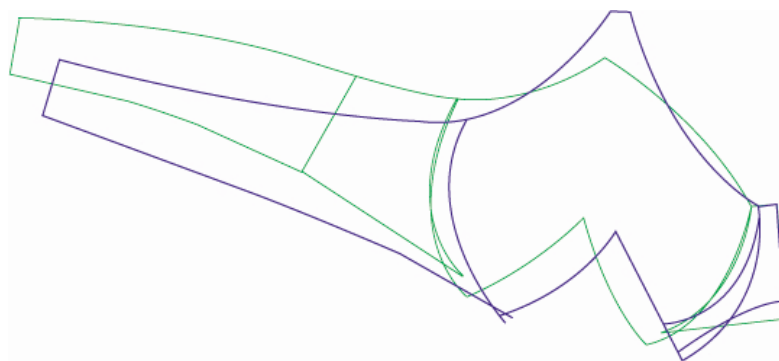
the length of the wing the Marangoni pattern is longer than ESMOD patterns, and the ESMOD pattern has the shape facing down regarding the angle of the wing.



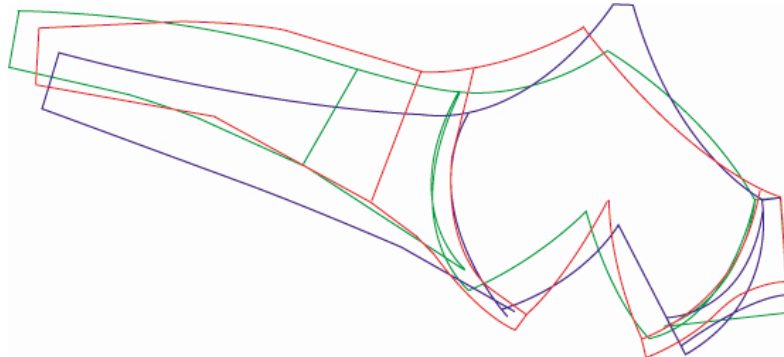
<Figure 12> Polymerization of ESMOD and FIT(-ESMOD, -FIT )



<Figure 13> Polymerization of FIT and Marangoni(-FIT, -Marangoni)



<Figure 14> Polymerization of ESMOD and Marangoni(-ESMOD, -Marangoni)



<Figure 15> Polymerization of ESMOD, FIT and Marangoni  
(-ESMOD, -FIT, -Marangoni)

<Figure 15> is the degree of polymerization of the ESMOD pattern, FIT pattern, and the Marangoni pattern. In terms of 1/2Bust Point to Bust Point Length the ESMOD pattern is the shortest, and Marangoni pattern and FIT patterns are listed in order of shortness. The degree of the Dart of ESMOD and FIT are similar that of Marangoni is rather smaller than them. Regarding the Length of the Wing the Marangoni, FIT, ESMOD are listed in order of length and the Marangoni is the longest one.

#### IV. Conclusion and Proposal

The following is the conclusions and suggestions of this study, which was conducted to suggest a brassiere pattern suitable to the Chinese women by comparing the brassiere patterns of Europe, America and Italy to know their difference:

1. If seeing the length of the ordinary brassiere's wing in Korea, the mean is 31.02cm to be shorter than these 3 patterns. The length of a wing should be adjusted according to the degree of fabric's elasticity.

For the angle of a wing, the brassiere pattern for the Korean adult is 11.2° on average and the angle of this study showed 11.33° on average very similarly. But for the FIT pattern, it has a wide angle of 18° and the shape of its wing is bent a lot downward to be different from other patterns.

2. The ESMOD type shows a high angle of 60° as the position of a shoulder strip is placed outward a lot compared with other patterns.

3. For the FIT and Marangoni types, the lengths of the inside and the external diameters show similarly to each other but the ESMOD type shows that its inside diameter is 7.5cm and external one is 9.6cm to have the difference of 2.1cm so that it is considered to put the bust together stronger than the others.

4. The mean cup circumference of a pattern is 21.73cm and the mean angle of a cup dart is 69.67°. The cup circumference of the FIT pattern shows to be the biggest and that of the FIT pattern is the smallest. As the FIT pattern has the shape to wrap the side of the bust, it has large circumference but as it has a narrow angle of a dart, it seems to be fit to the woman with a small and flat bust.

5. 1/2 of the nipple distance is 7.57cm on

average. And as it is about 2cm shorter than 17.1cm of the horizontal distance between the nipples, it is noticed that it puts the bust together to a center. For 1/2 of the nipple distance of the brassiere for the Korean adult women, it shows to be 6.12cm, much narrower than the patterns studied, and it is noticed that the ESMOD pattern is very similar to the brassier in the Korean market.

6. As the mean keeper height is 6.5cm, it is noticed that it is very similar to the brassier for the Korean adult women if comparing that the brassier for the Korean adult has the keeper height of 6.5~8.6cm. The Marangoni pattern tends to have a little low and the ESMOD and FIT patterns have a ordinary measure.

After making a brassiere using nonwoven fabric with the ESMOD, FIT, and Marangoni pattern, the result of the fitting test with Chinese adult women shows that regarding ESMOD pattern the length of the wing is rather short and there is puckering with remained a lot of extra part because the height of the Cup is higher than that of bust. The FIT pattern is the best in terms of the degree of wrapping bust among three patterns, but it does not cover the length of the bust due to the lack of the cup length. The Marangoni pattern is demonstrated the best suitable pattern for Chinese adult women. When wearing a brassiere made with of the Marangoni pattern, the length and angle of the wing are appropriate and it easily covers the bust and the capacity of the bust is good to cover the bust properly and support the bust comfortably. The position of the shoulder strap is appropriate and the degree of the closeness around the center of front is suitable, which demonstrate the best comfortable and beautiful figure. Therefore, the Marangoni pattern is considered a good standard for developing the Chinese adult brassiere pattern.

## Reference

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