

ISG-3

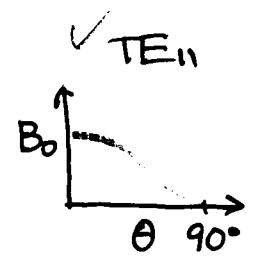
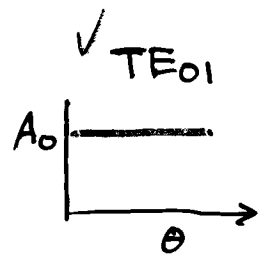
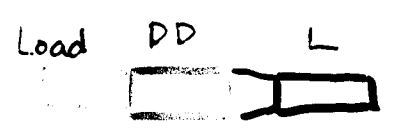
~~Plans for~~ DLDS cold test  
Present status of

KEK

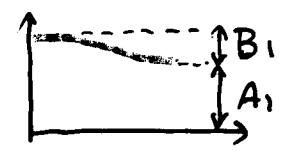
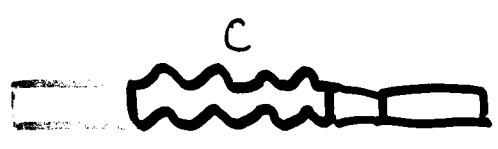
S. Yamaguchi

# DLDS Cold test

## ✓ 1. Launcher

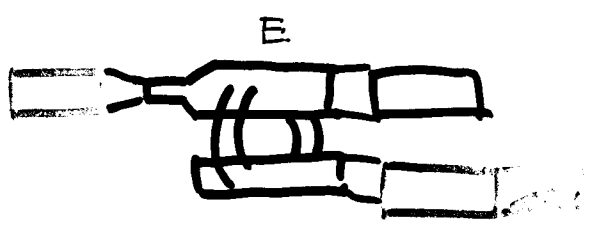


## ✓ 2. Converter (Serpentine)



$$\epsilon = 1 - B_1/B_0$$

## 3. Extractor

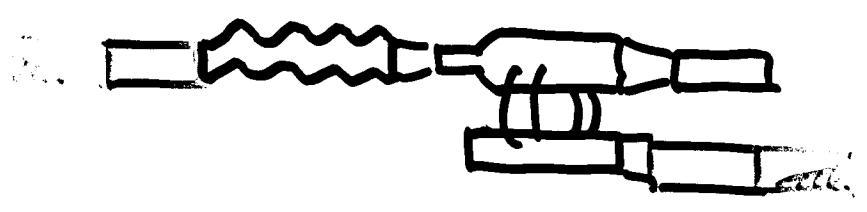


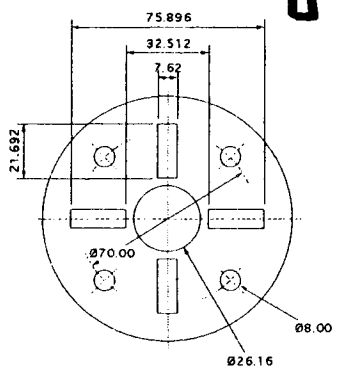
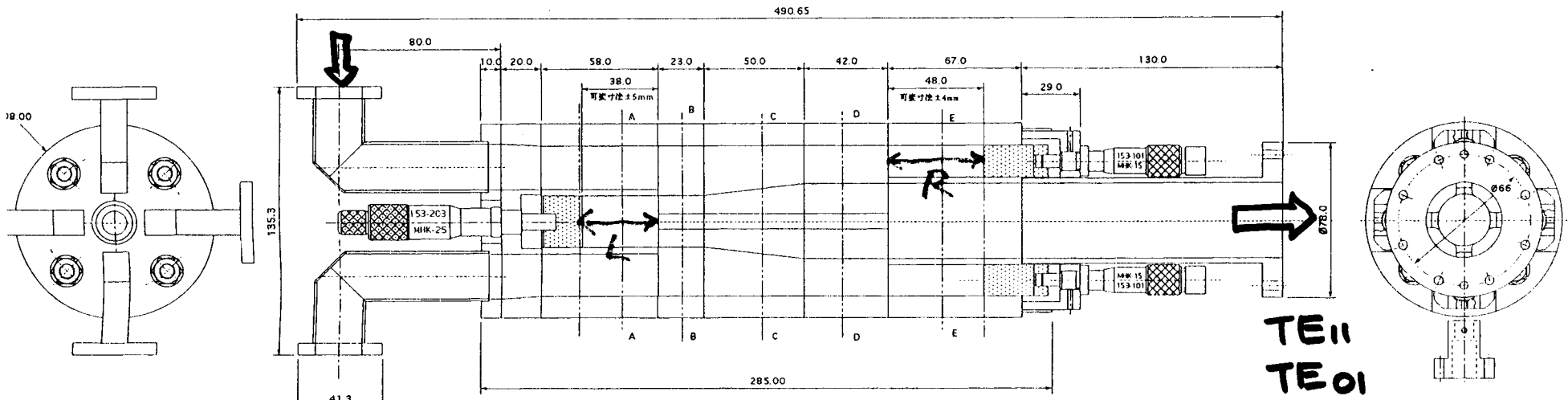
$$\epsilon = \frac{A_2}{A_0}$$



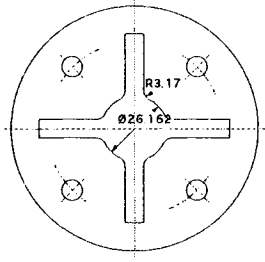
$$\epsilon = \frac{B_2}{B_0}$$

## 4. Whole system

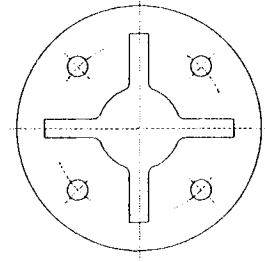




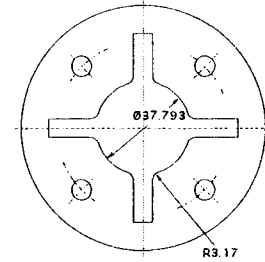
断面 A-A



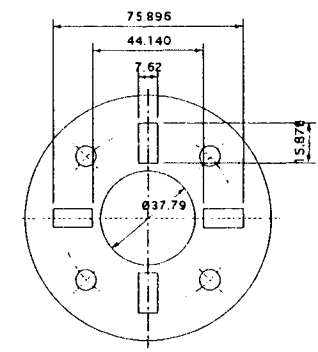
断面 B-B



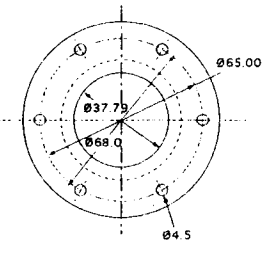
断面 C-C



断面 D-D



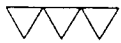
断面 E-E



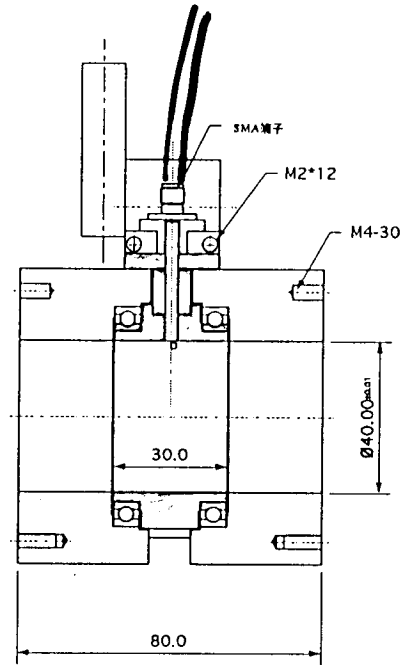
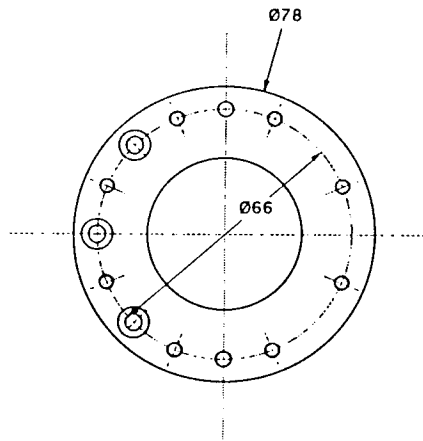
フランジ

# LAUNCHER

| PART NO | NAME  | MATERIAL | SIZE      | NUMBER | SPEC |
|---------|-------|----------|-----------|--------|------|
| 作成      | TITLE |          |           |        |      |
| 実装      | ロンチャー |          |           |        |      |
| DR      | SCALE | DWG NO   | 980807-01 |        |      |

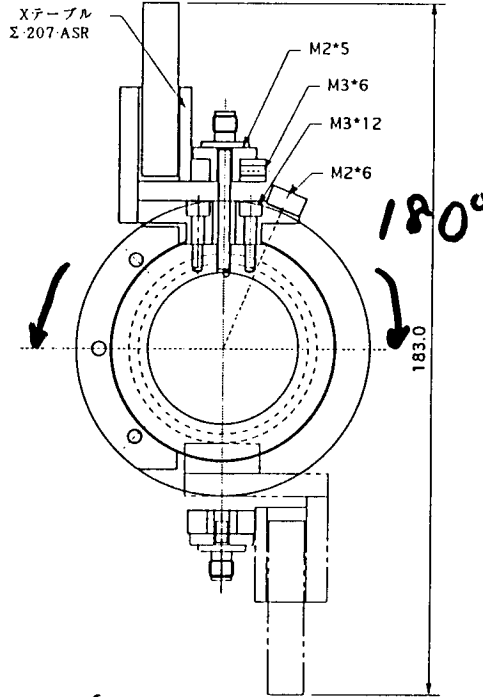


N.A.

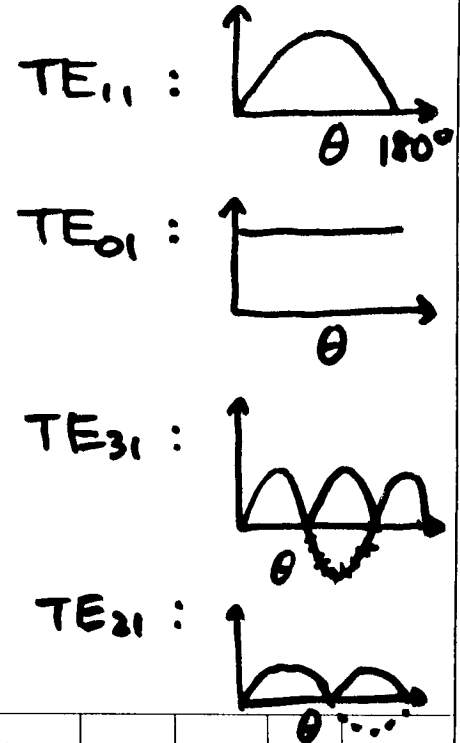


ベアリング  
6809

mode  
TE<sub>11</sub>  
TE<sub>01</sub>



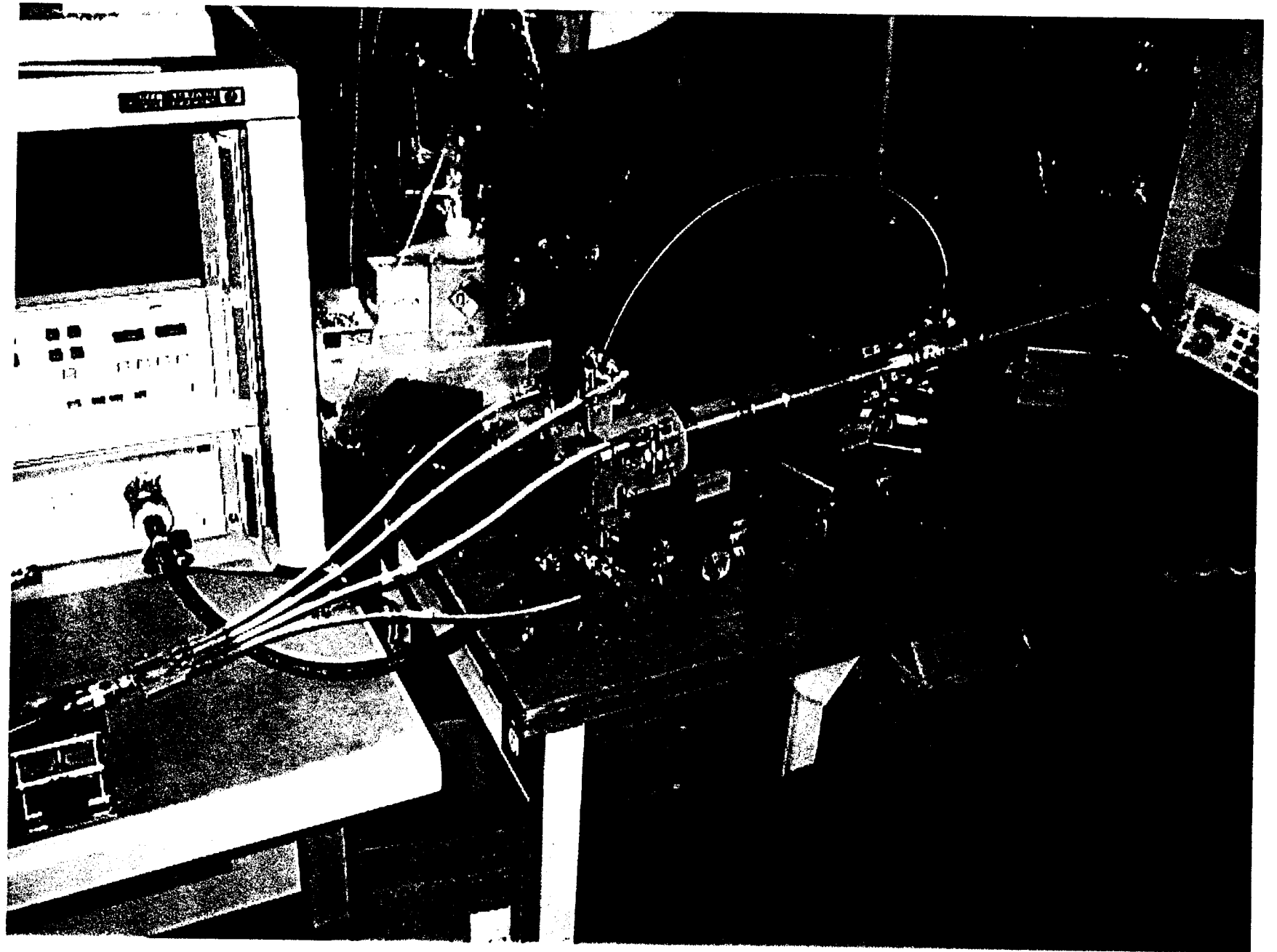
antena  
probe  
loop



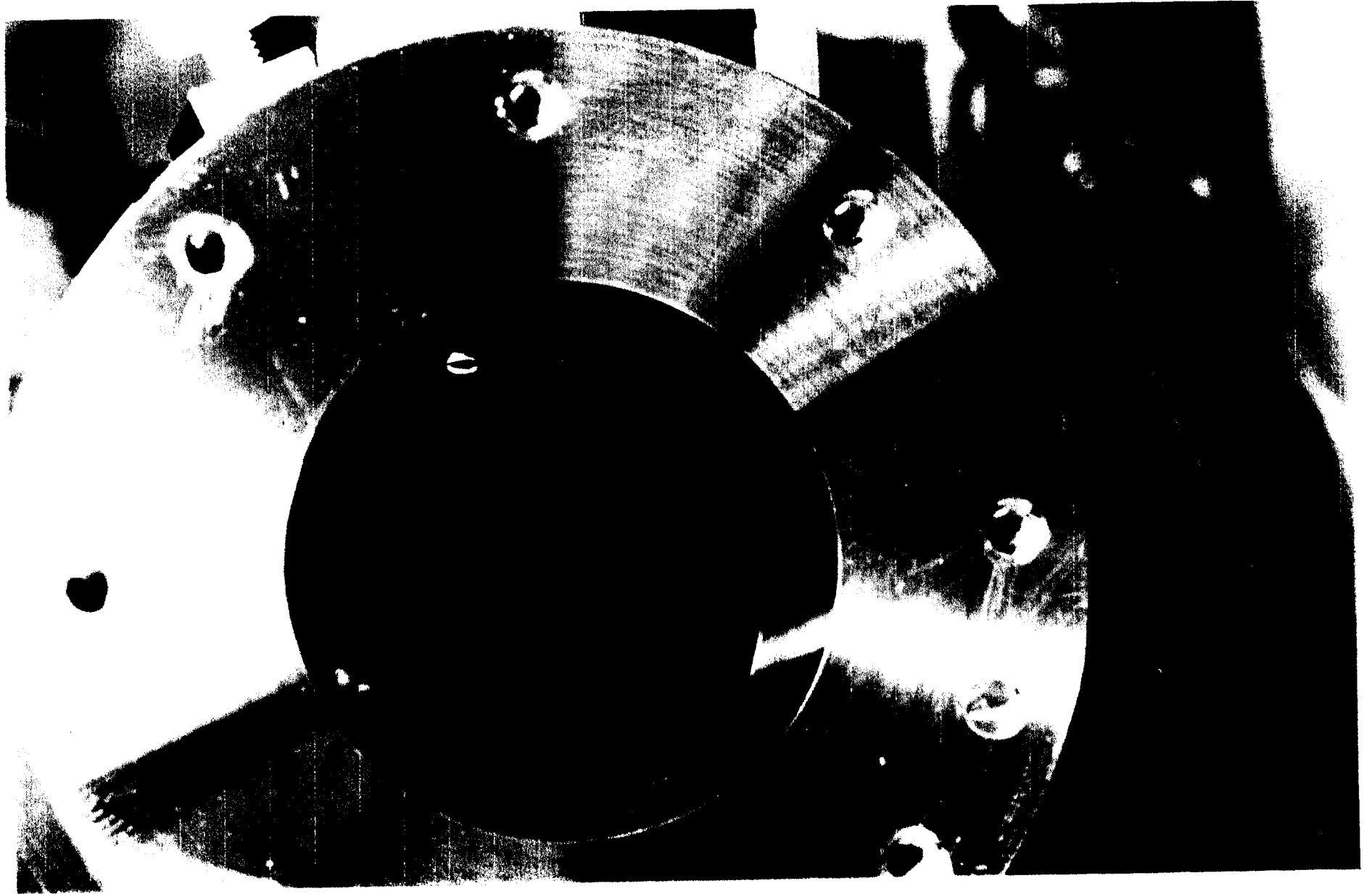
# Mode Detector

| PART NO      | NAME             | MATERIAL | SIZE      | NUMBER    | SPEC |
|--------------|------------------|----------|-----------|-----------|------|
| 作成           | TITLE            |          |           |           |      |
| 変更           | ダイテクティング<br>デバイス |          |           |           |      |
| 一般公差等級 1 2 級 |                  |          |           |           |      |
| 大塚製作所        | DR               | SCALE    | DWG<br>NO | 980903-01 |      |

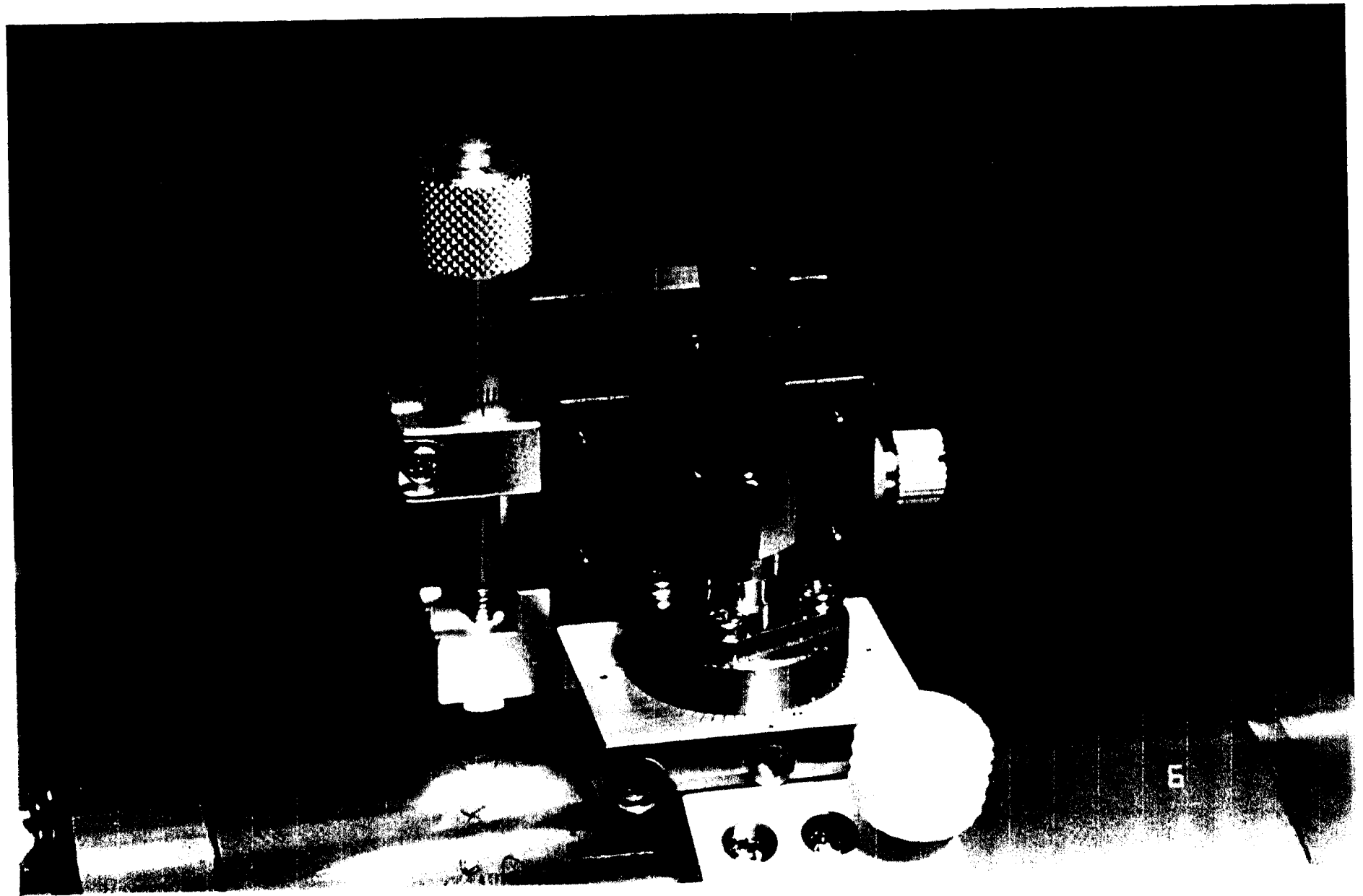
A2

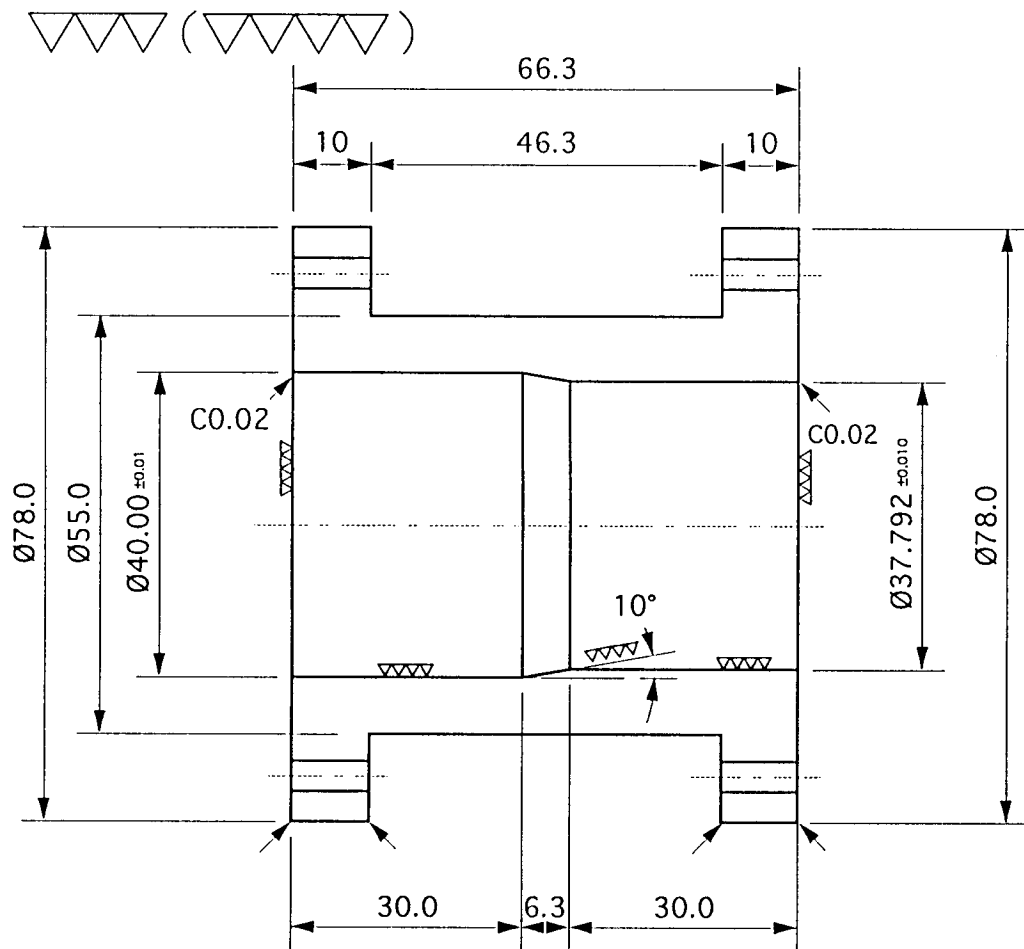


# Mode Detector



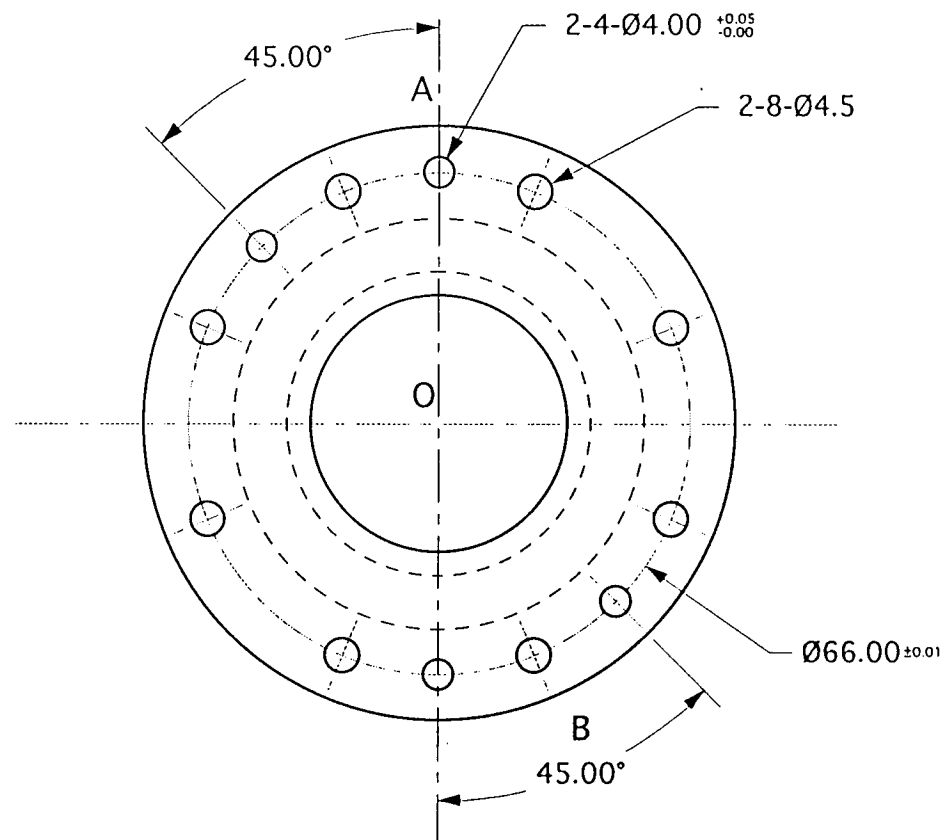
Mode Detector





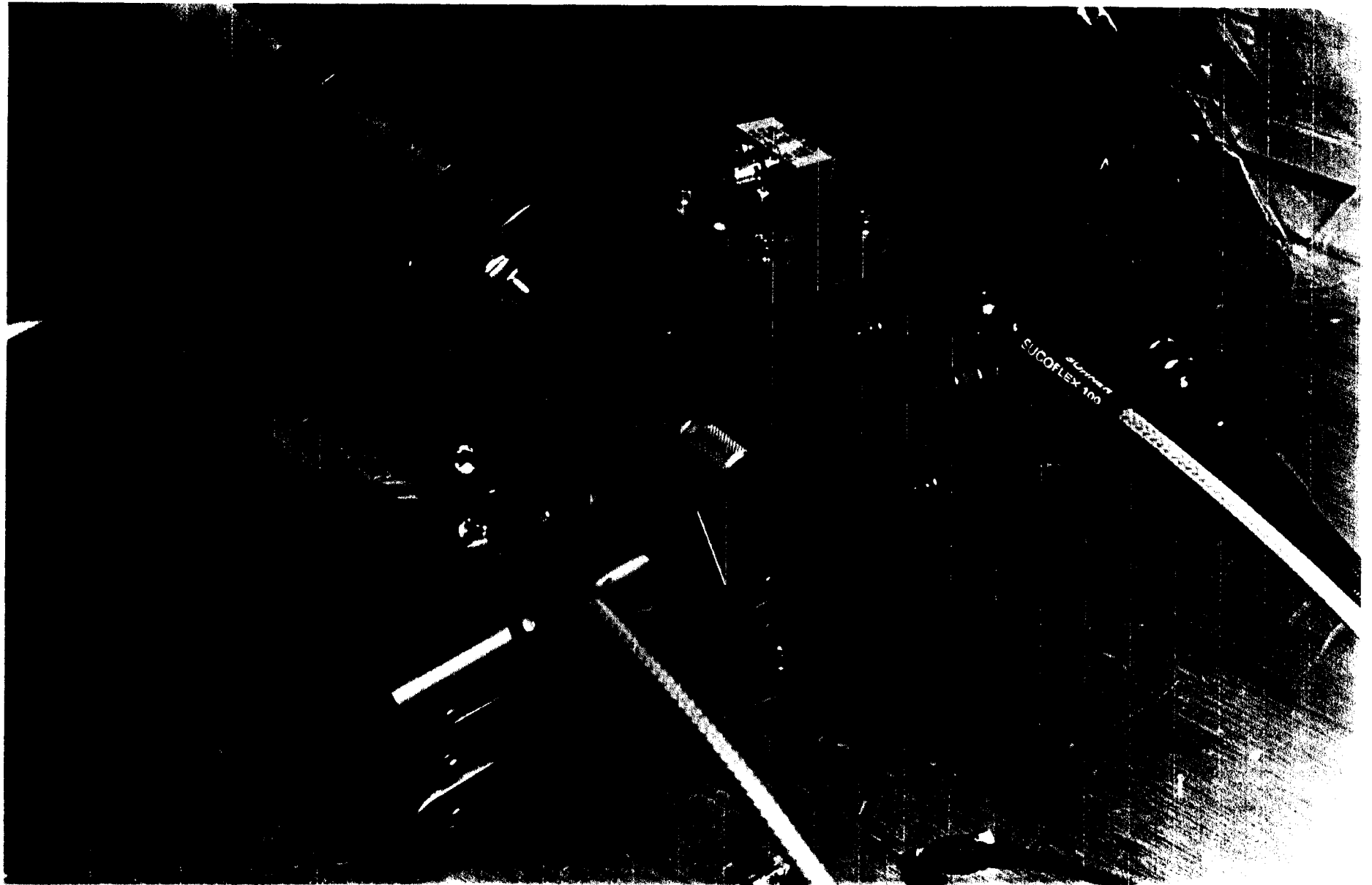
断面 A-O-B

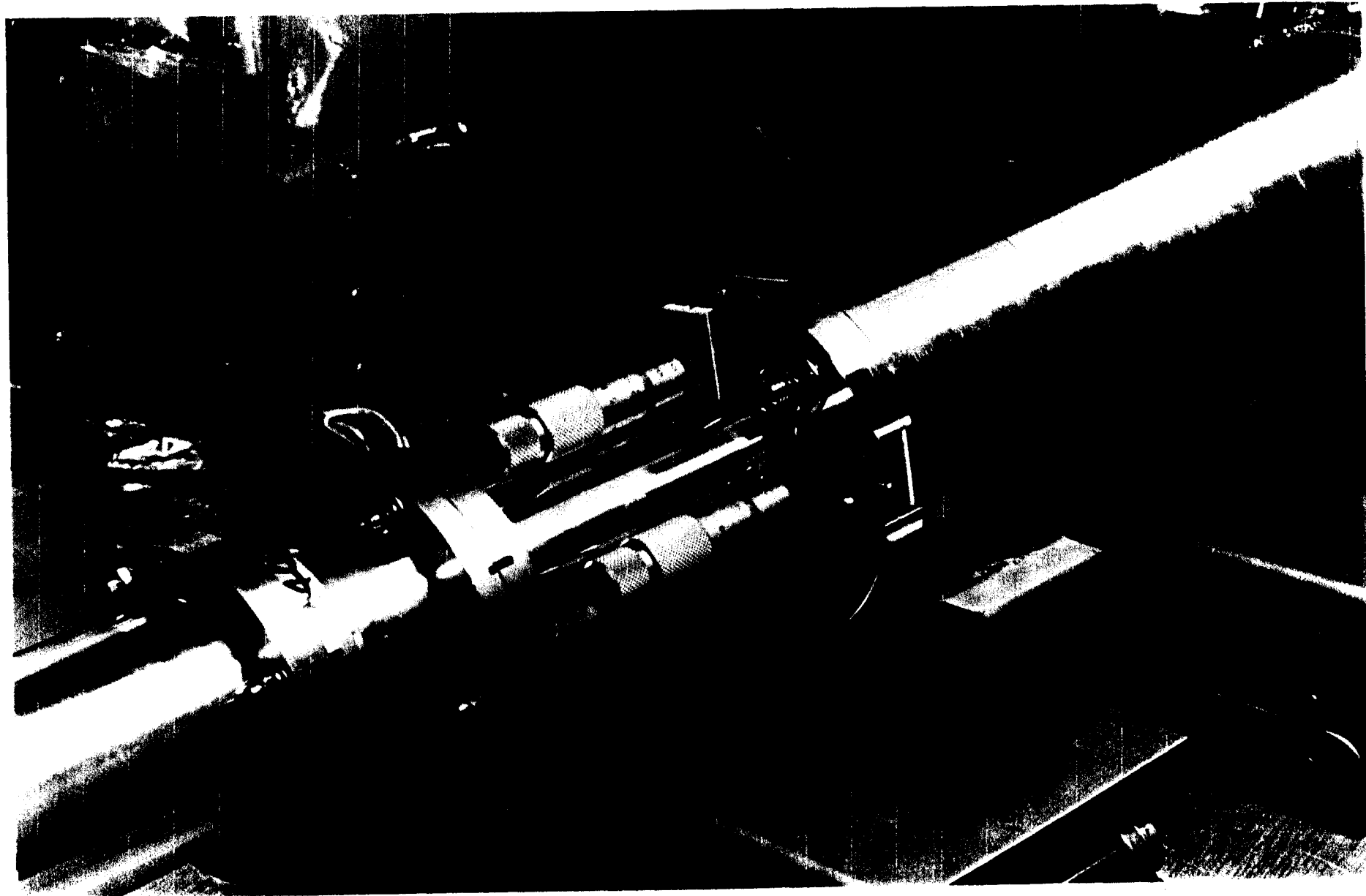
C0.3

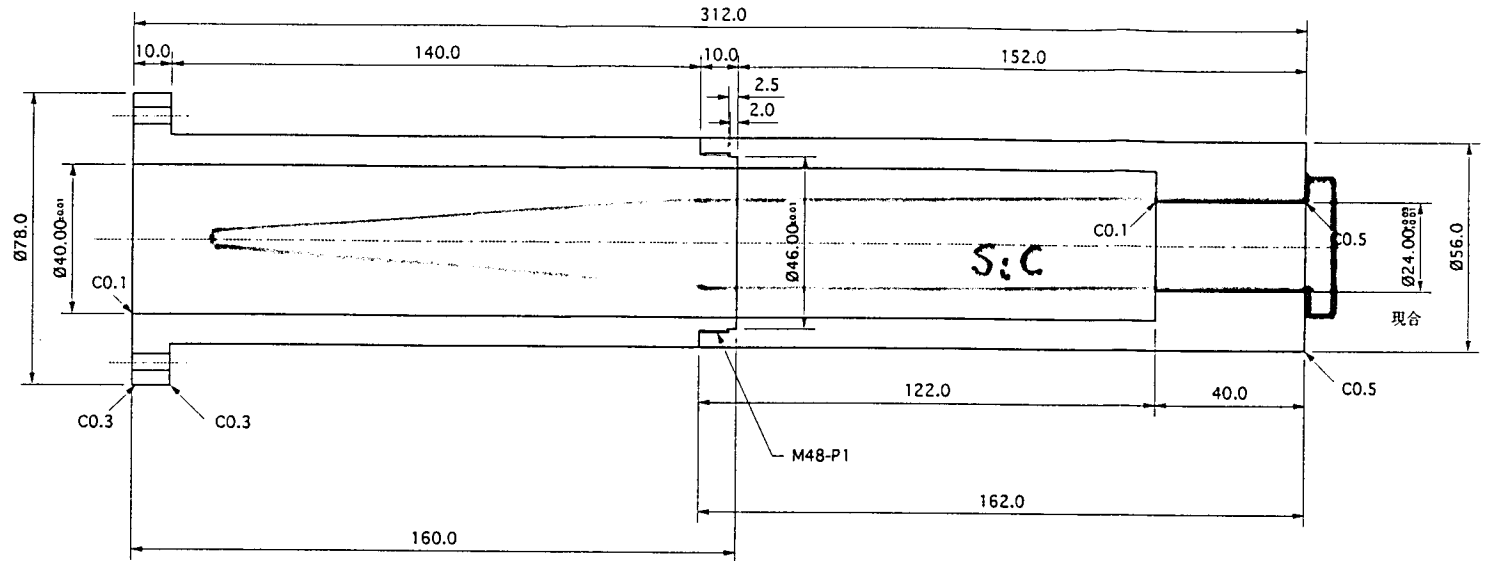
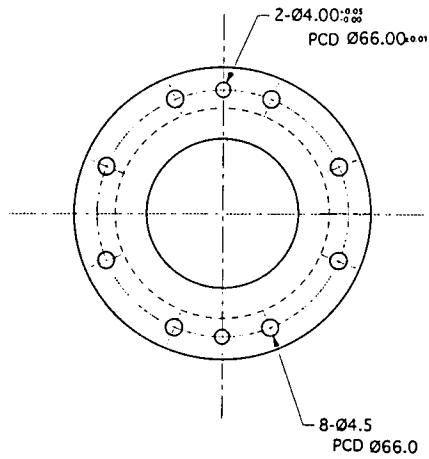


| 06           | Taper 6 | BsBm     |                            | 1      |           |
|--------------|---------|----------|----------------------------|--------|-----------|
| PART NO      | NAME    | MATERIAL | SIZE                       | NUNBER | SPEC      |
| 作成<br>変更     |         |          | TITLE<br>Tapers<br>Taper 6 |        |           |
| 一般公差等級 1 2 級 |         |          |                            |        |           |
| A4           | 大塚製作所   | DR       | SCALE                      | DWG NO | 981012-06 |





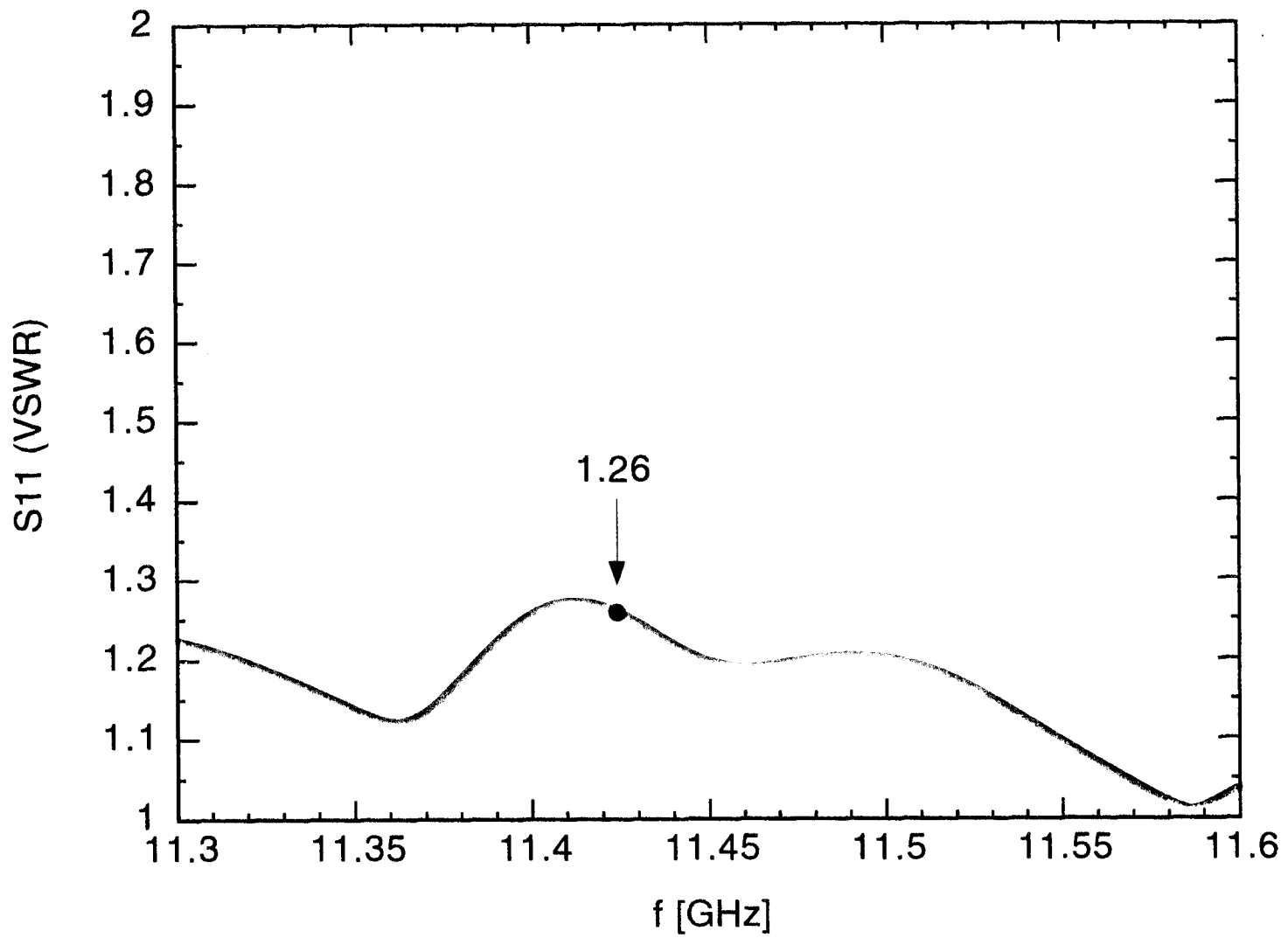




RF load

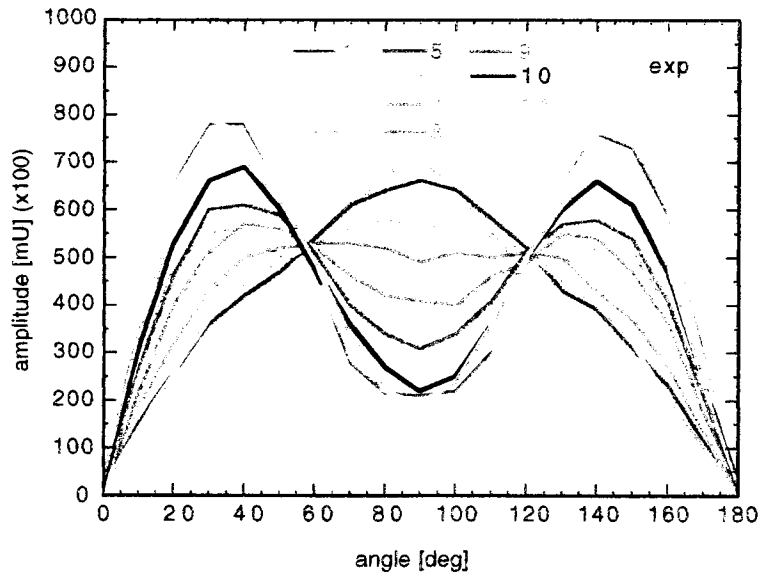
| 01           | ダミーロード | BsBm     |        | 2      |           |
|--------------|--------|----------|--------|--------|-----------|
| PART NO      | NAME   | MATERIAL | SIZE   | NUMBER | SPEC      |
| 作成           |        |          | TITLE  |        |           |
| 変更           |        |          | ダミーロード |        |           |
| 一般公差等級 1 2 級 |        |          |        |        |           |
| 大塚製作所        |        | DR       | SCALE  | DWG NO | 981013-01 |

A2

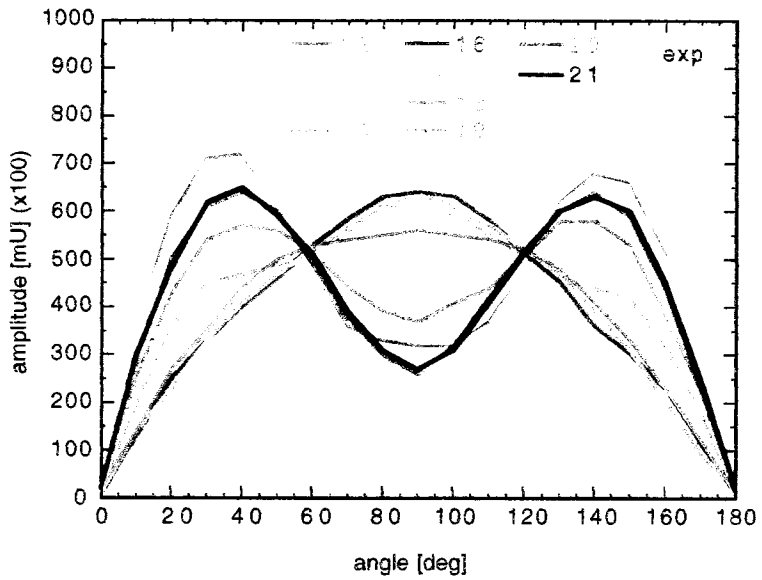


# MODE LAUNCHER, TE11

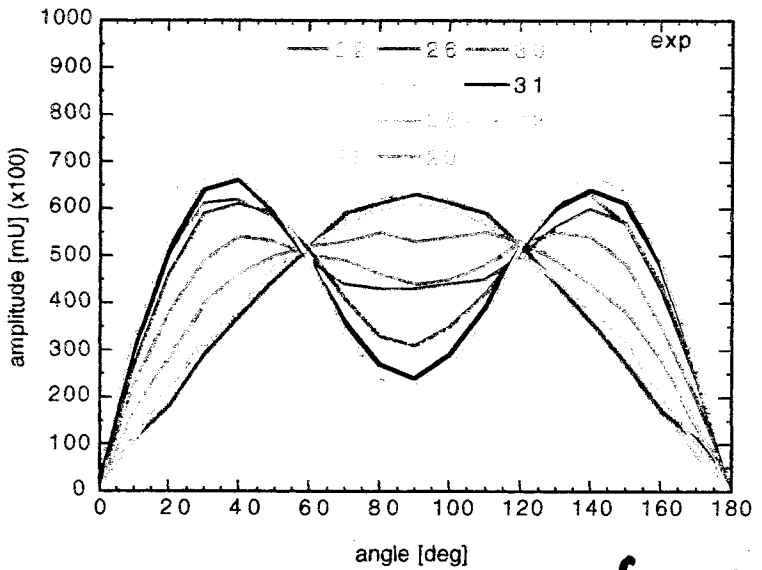
R=48 mm



R=50 mm



R=52 mm

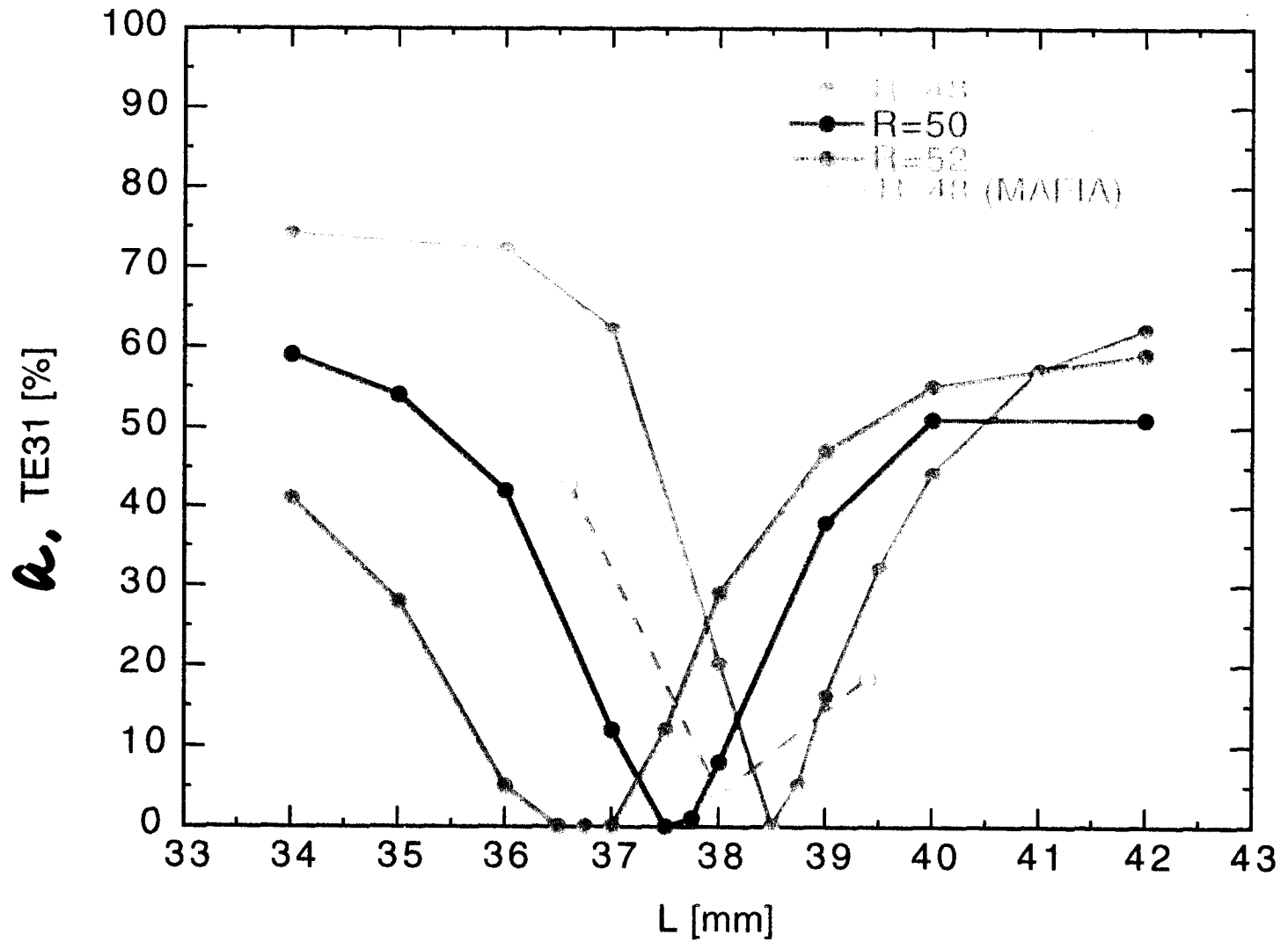


$$E = k (\sin \theta + a \sin 3\theta)$$

$f_c = 4.4 \text{ GHz}$   
10.0  
15.3

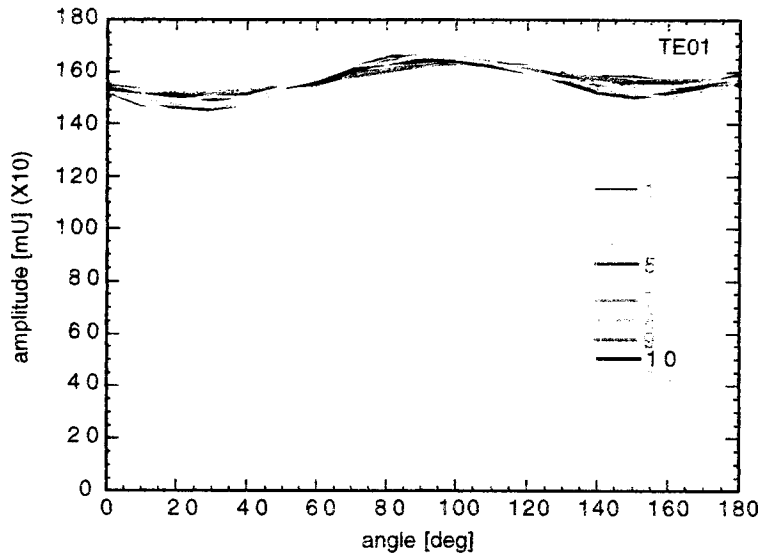
TE<sub>11</sub>  
TE<sub>31</sub>  
TE<sub>51</sub>

# DLDS - MODE LAUNCHER - TE11

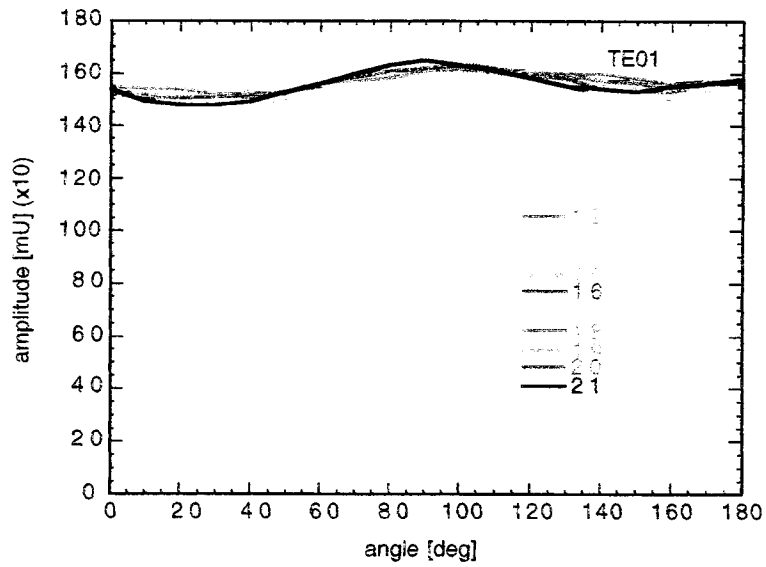


# MODE LAUNCHER, TE01

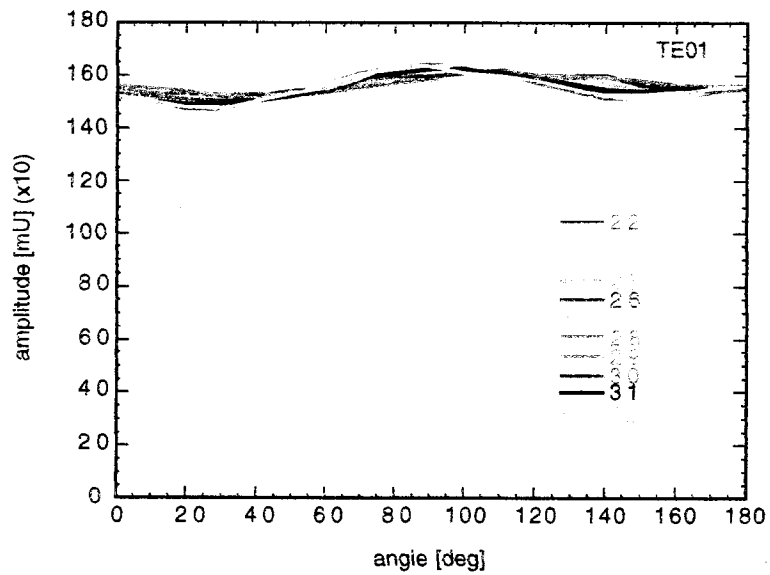
R=48 mm



R=50 mm

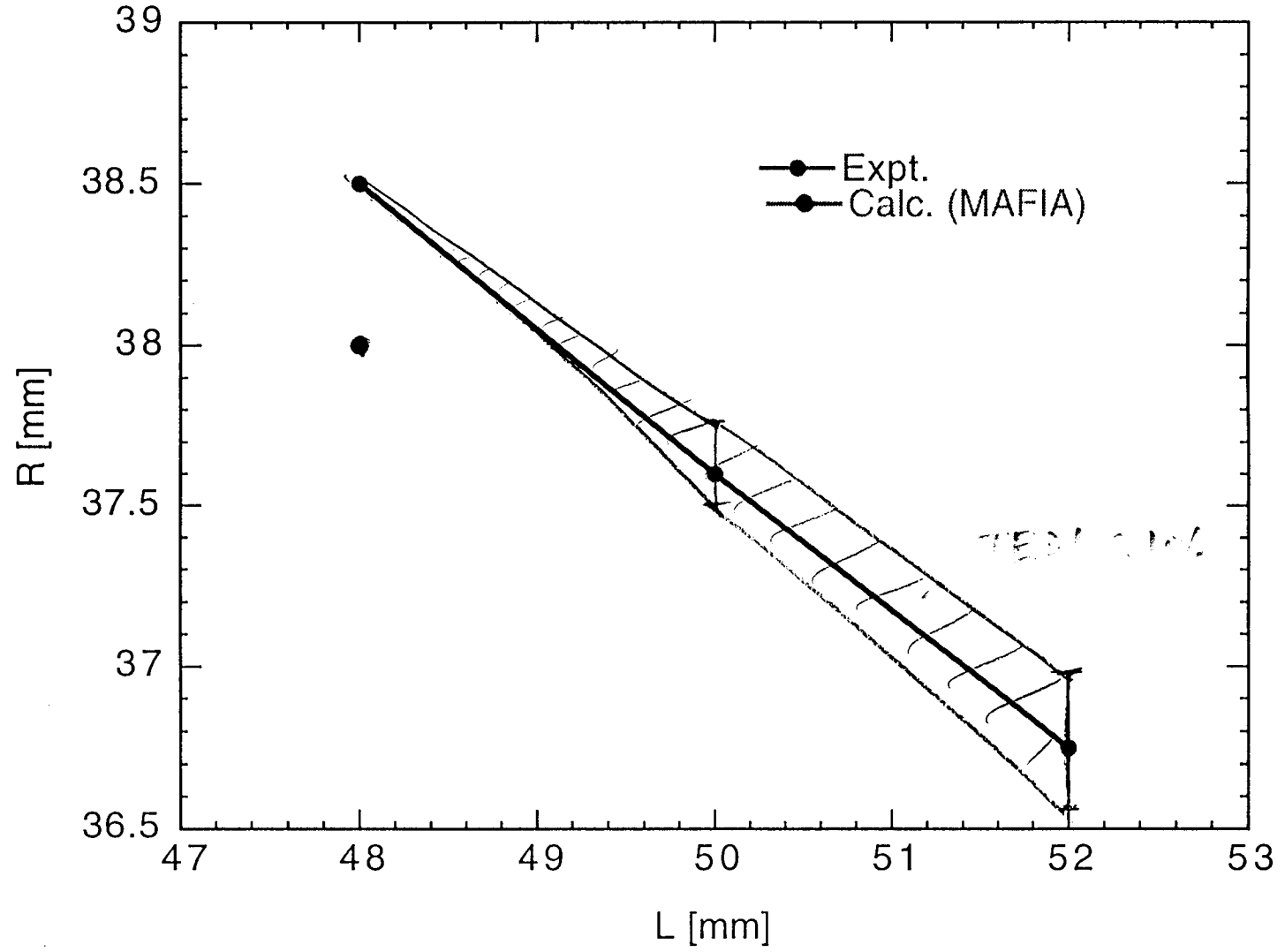


R=52 mm



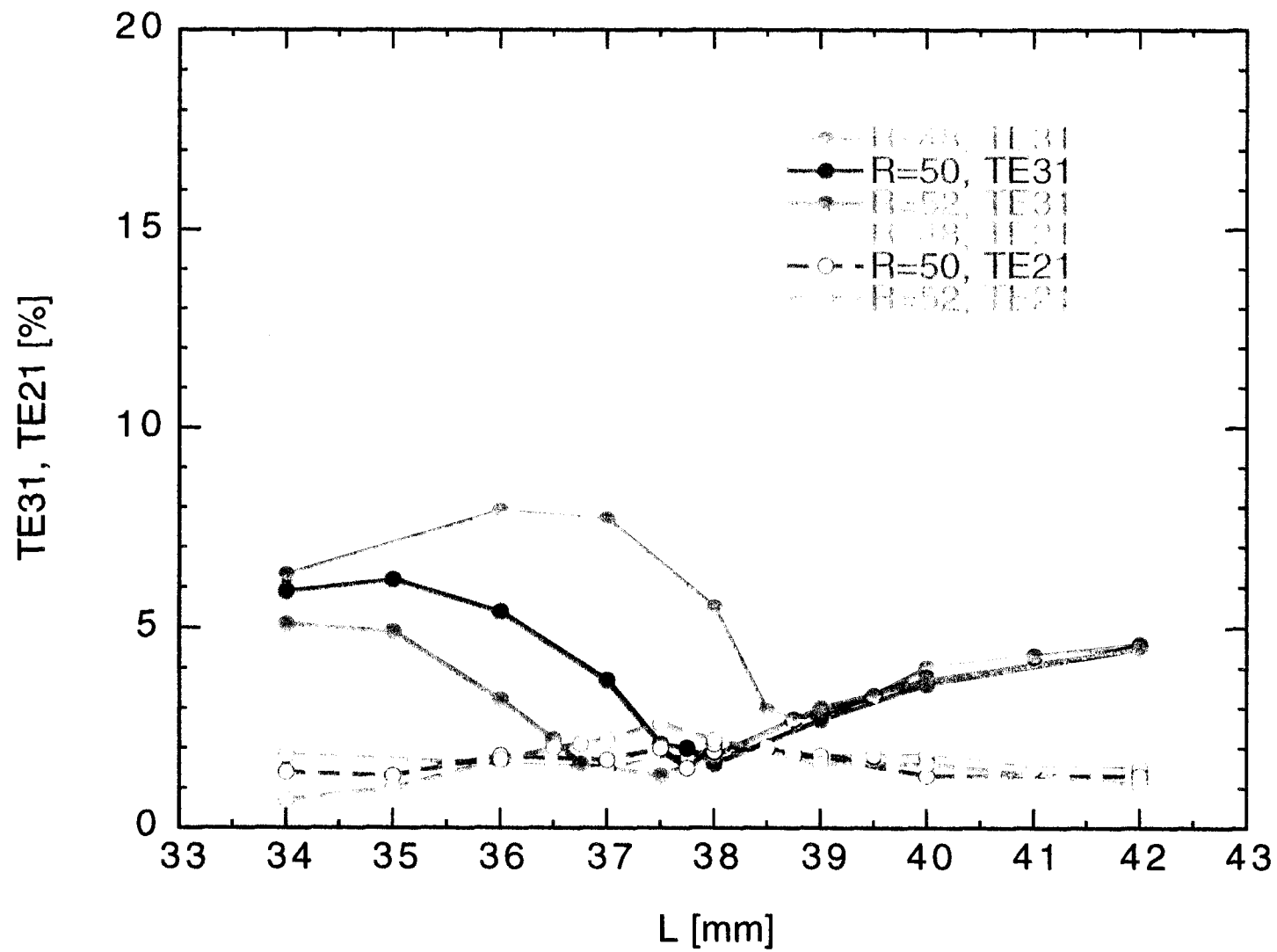
$$E = k(1 + a \sin 2\theta + b \sin 3\theta)$$

# LAUNCHER TE11

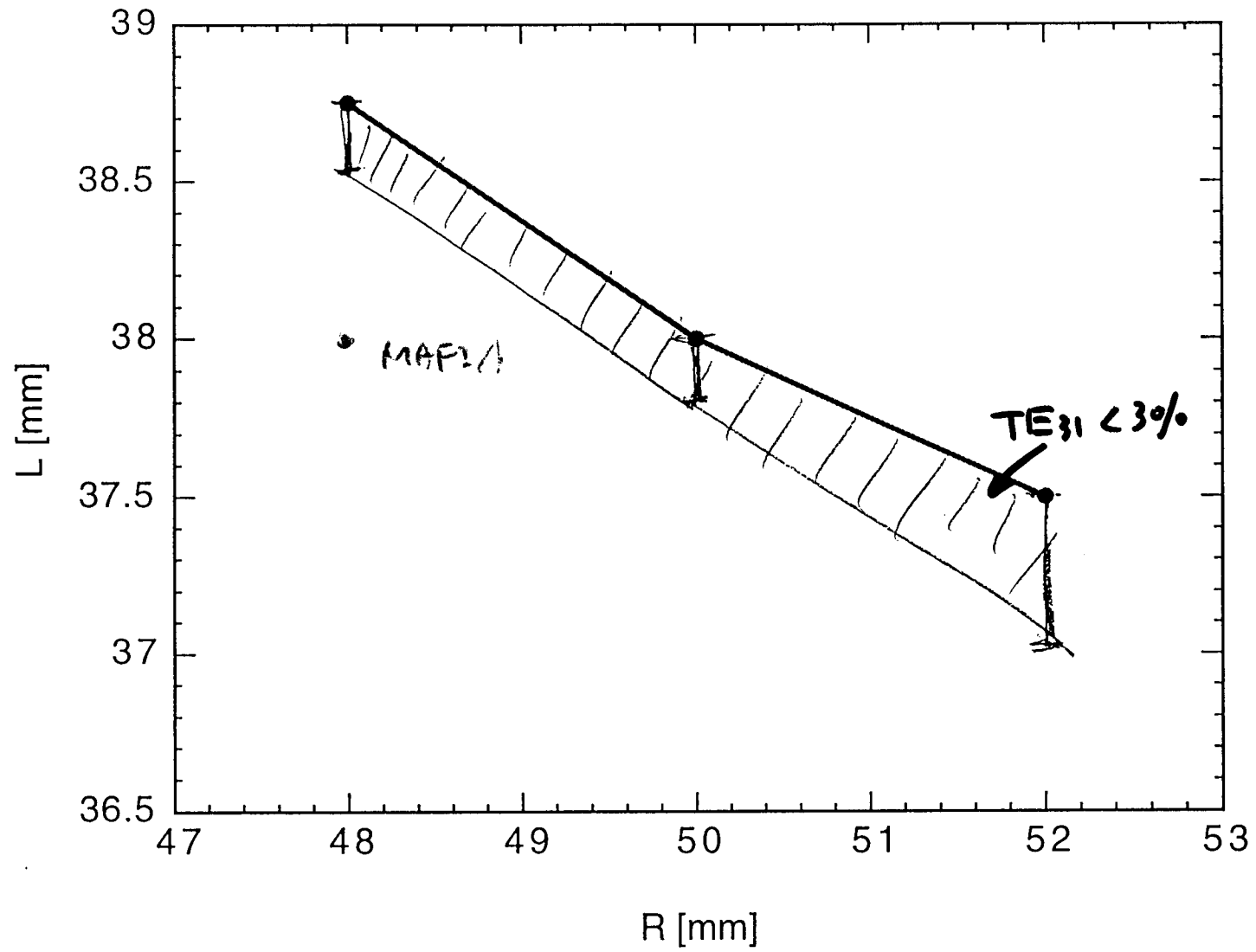


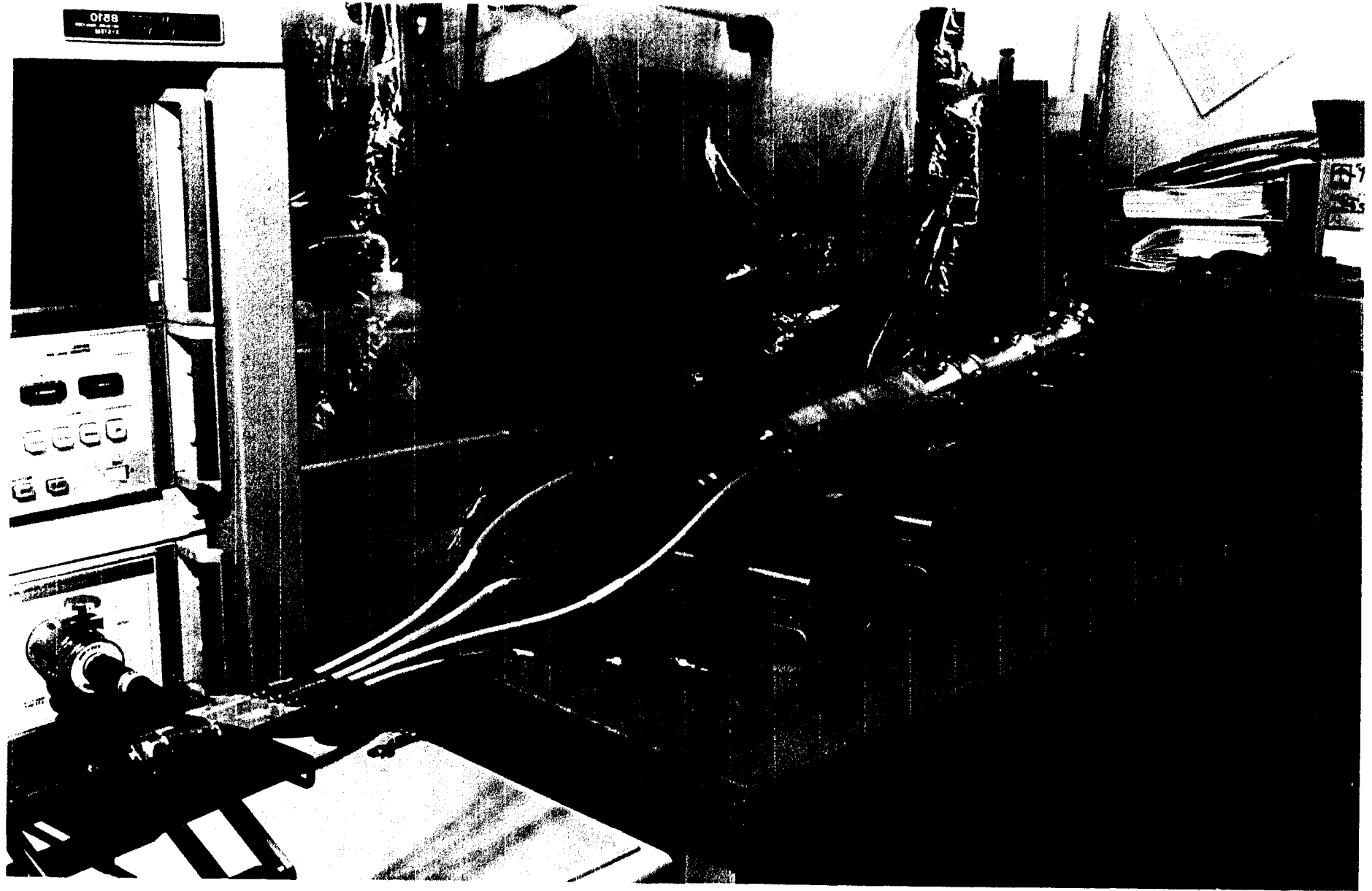


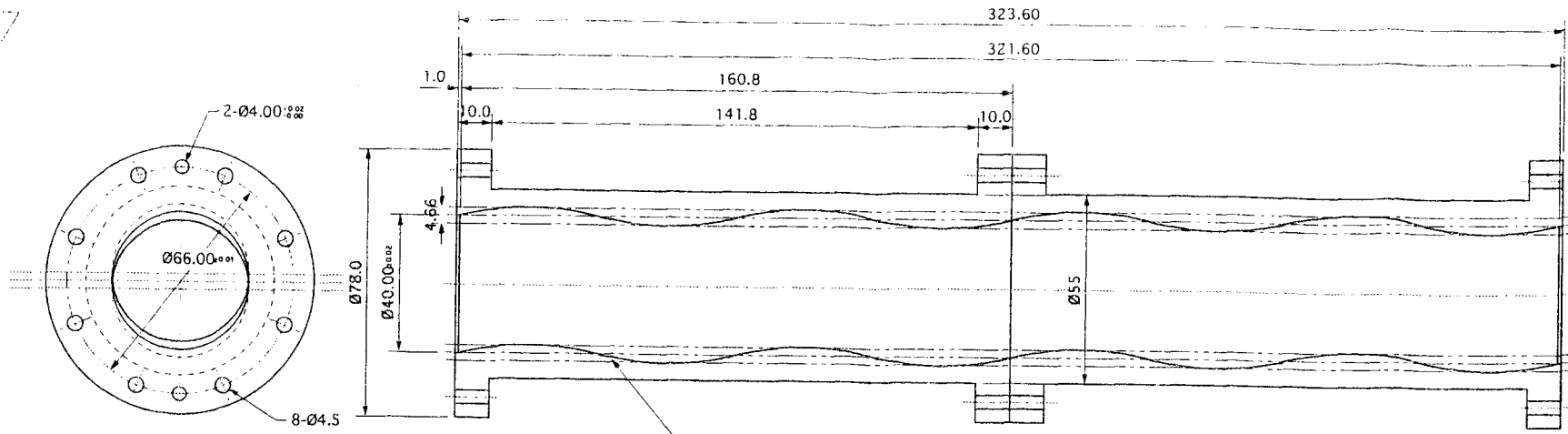
# DLDS - MODE LAUNCHER - TE01



# LAUNCHER TE10

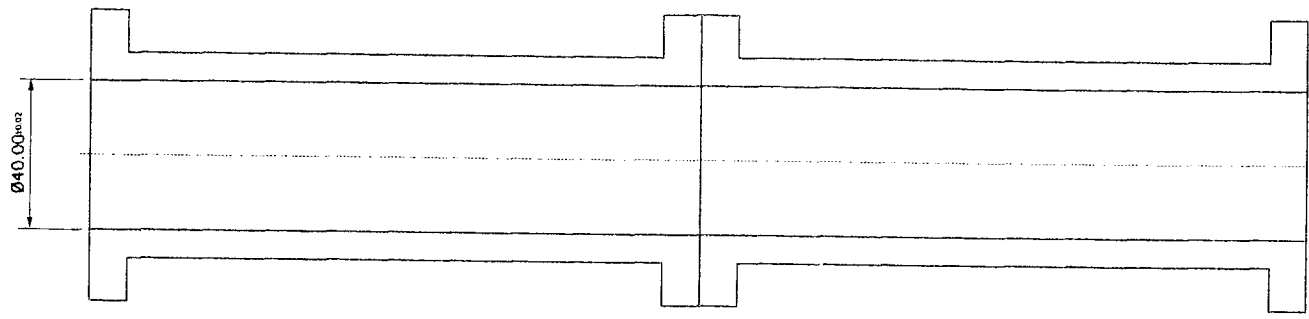






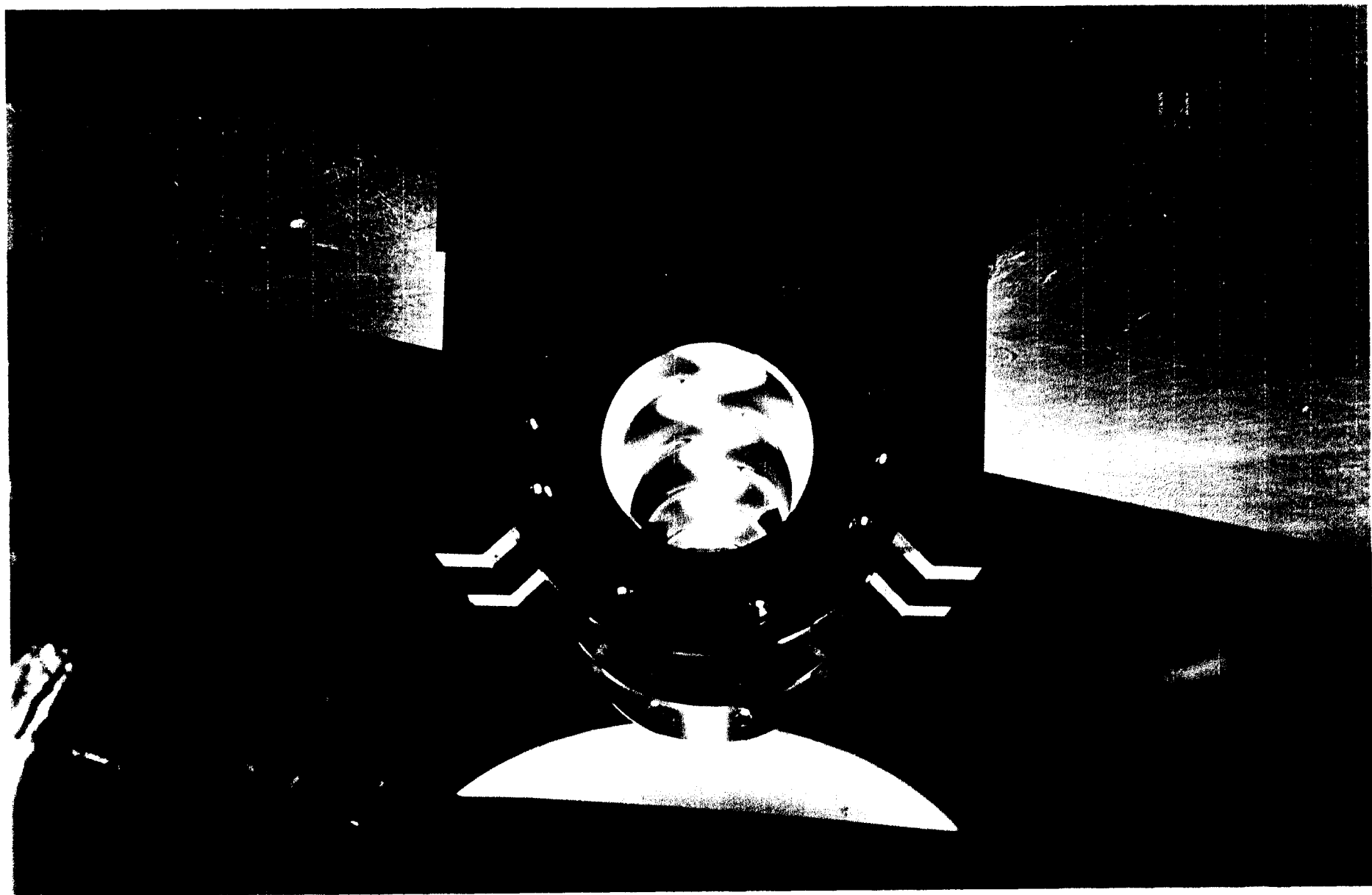
$$\Delta y = A \cdot \sin 2\pi \cdot Z/L$$

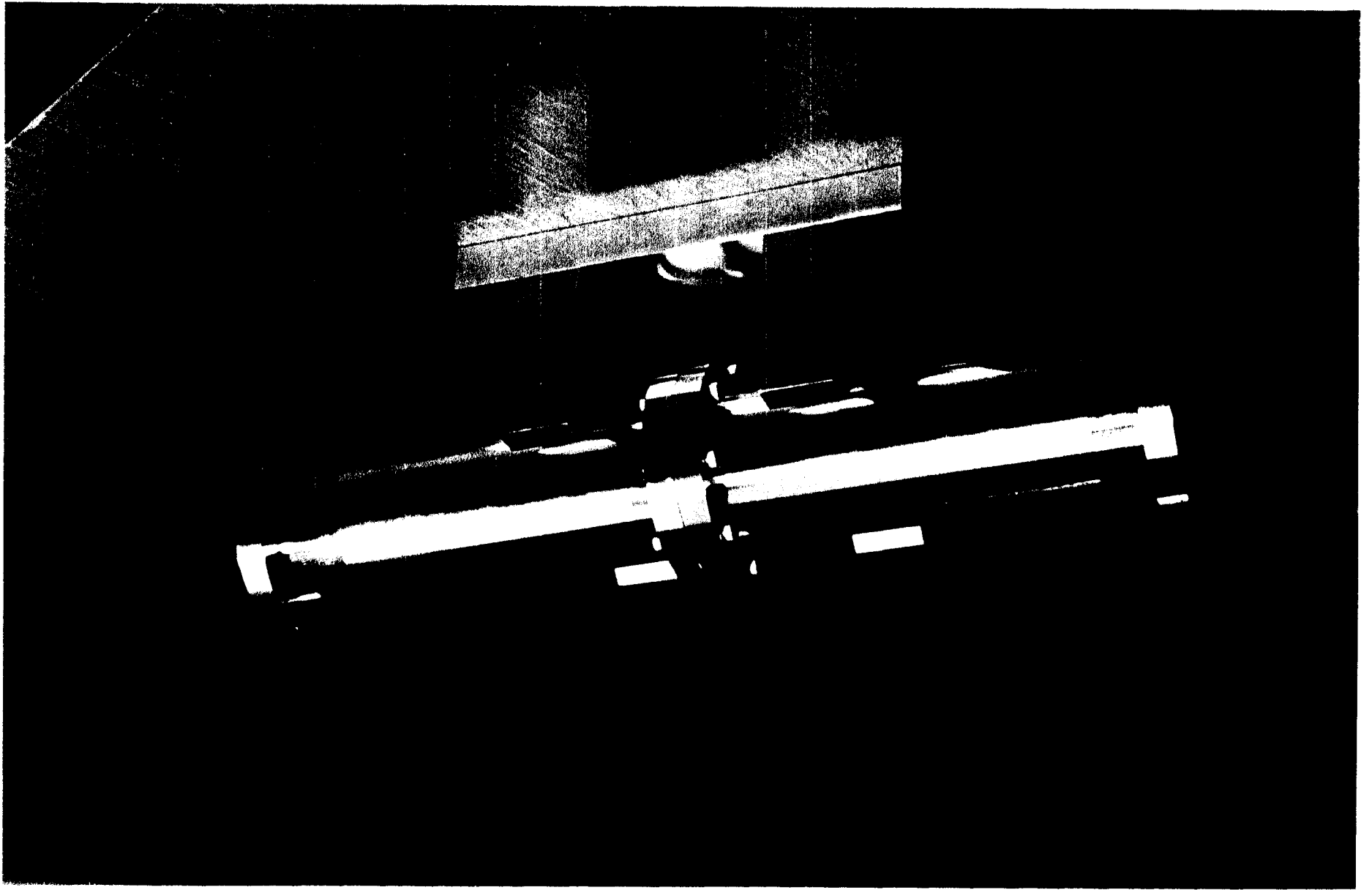
A=2.33 L=80.4

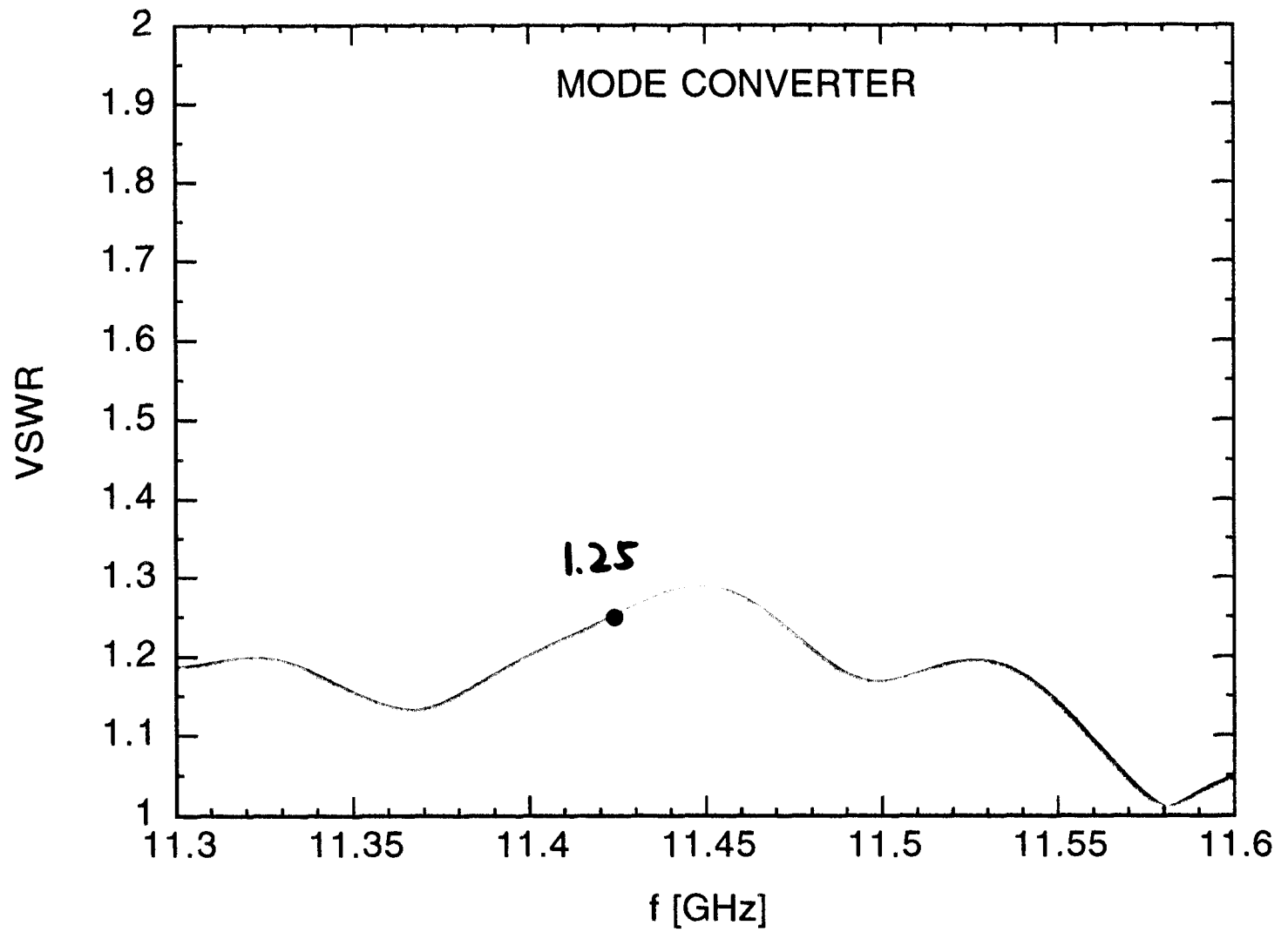


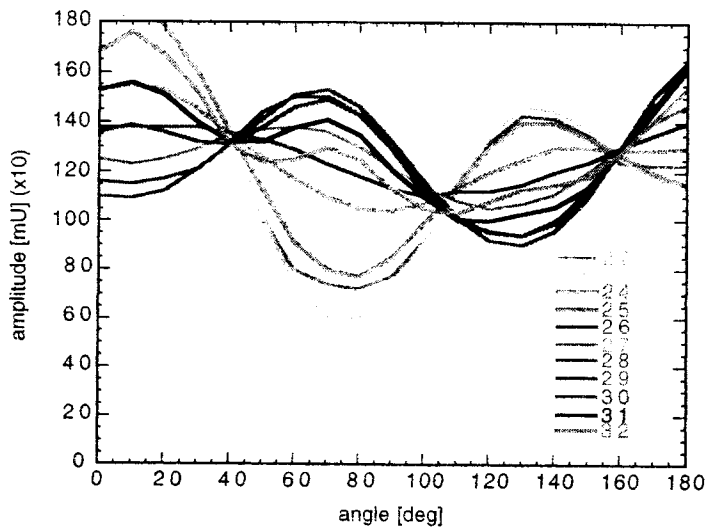
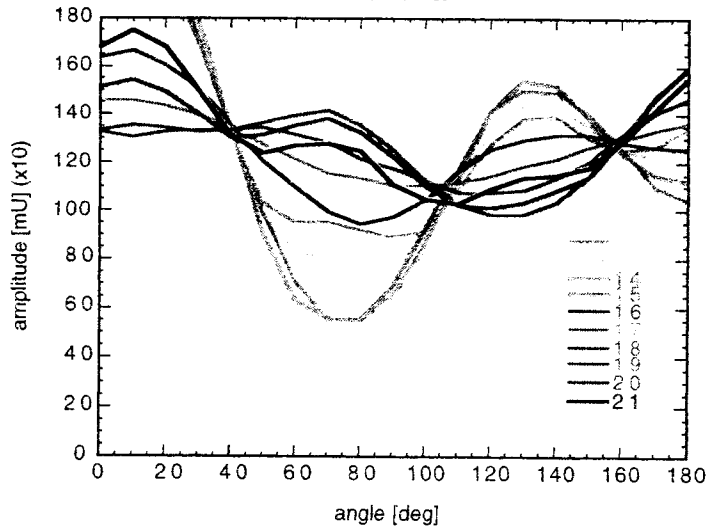
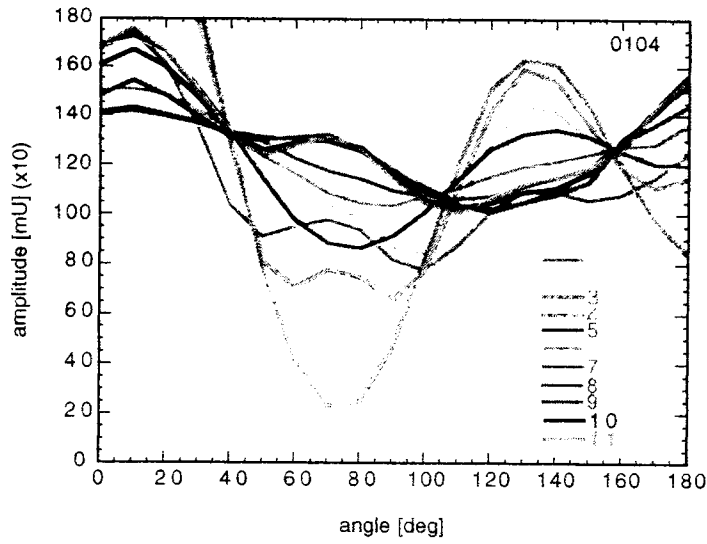
# Mode Converter (Serpentine)

|              |       | BsBm     |         | 1      |           |
|--------------|-------|----------|---------|--------|-----------|
| PART NO      | NAME  | MATERIAL | SIZE    | NUMBER | SPEC      |
| 作成           |       |          | TITLE   |        |           |
| 変更           |       |          | サーベントイン |        |           |
| 一般公差等級 1 2 級 |       |          | 全体図     |        |           |
| A2           | 大塚製作所 | DR       | SCALE   | DWG NO | 980810-02 |





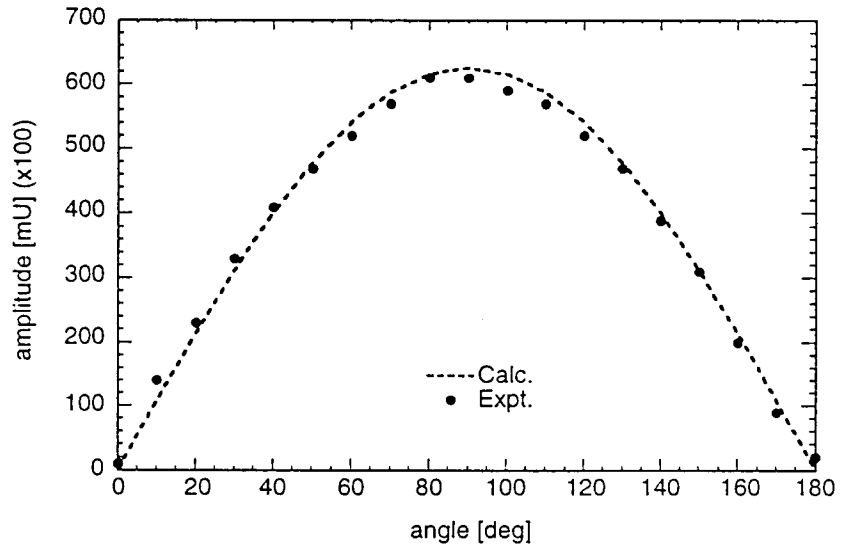




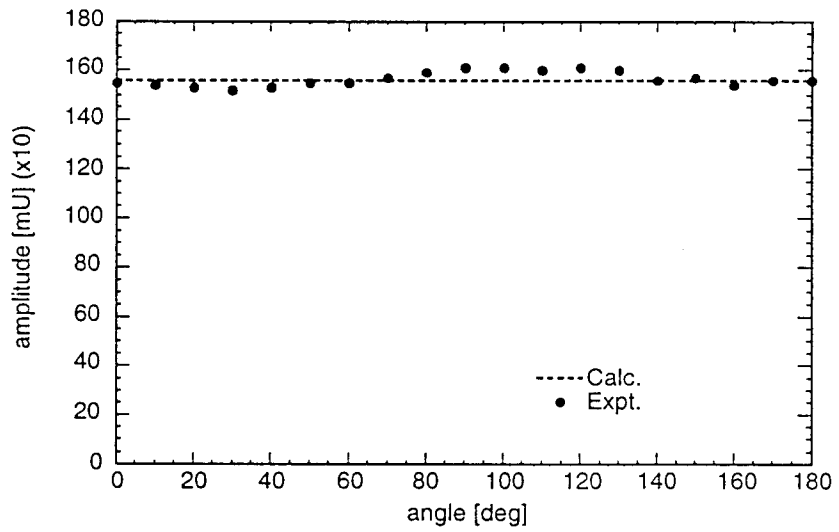


# MODE LAUNCHER

TE11

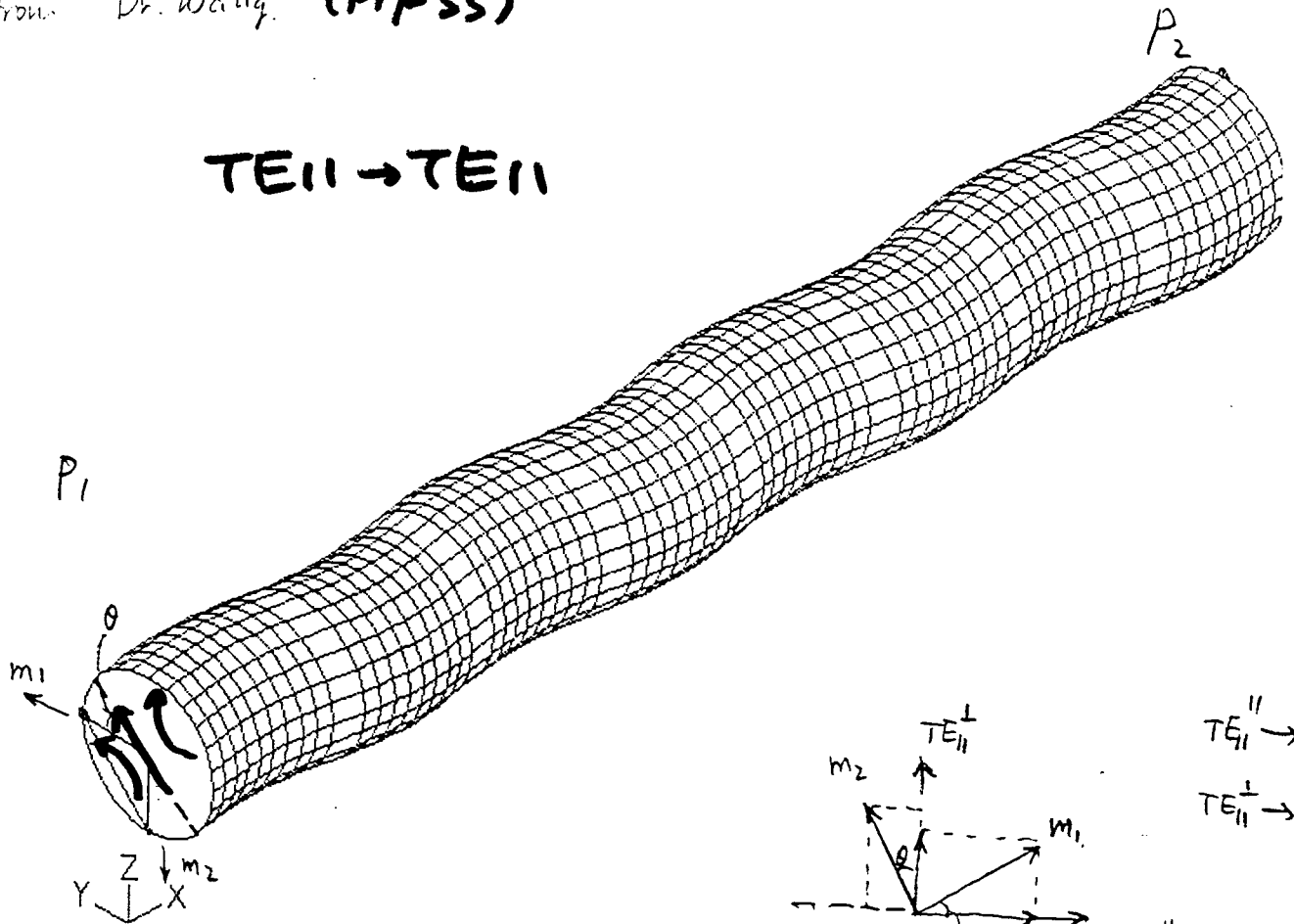


TE01



from Dr. Wang. (MFSS)

TE<sub>11</sub> → TE<sub>11</sub>



$\theta = 0^\circ$

|                  |              |                               |          |        |
|------------------|--------------|-------------------------------|----------|--------|
| TE <sub>11</sub> | $\epsilon_1$ | $P_1 m_1 \rightarrow P_2 m_1$ | $S_{21}$ | 0.9974 |
|                  | $\epsilon_1$ | $P_1 m_1 \rightarrow P_2 m_2$ |          | 0.002  |
|                  | $\epsilon_1$ | $P_1 m_1 \rightarrow P_2 m_6$ |          | 0.001  |

|                               |          |       |
|-------------------------------|----------|-------|
| $P_1 m_2 \rightarrow P_2 m_1$ | $S_{21}$ | 0.001 |
| $P_1 m_2 \rightarrow P_2 m_2$ |          | 0.016 |
| $P_1 m_2 \rightarrow P_2 m_6$ |          | 0.998 |

$\theta = 15^\circ$

|                               |        |
|-------------------------------|--------|
| $P_1 m_1 \rightarrow P_2 m_1$ | 0.9301 |
| $P_1 m_1 \rightarrow P_2 m_2$ | 0.2516 |
| $P_1 m_1 \rightarrow P_2 m_6$ | 0.2585 |

|                               |        |
|-------------------------------|--------|
| $P_1 m_2 \rightarrow P_2 m_1$ | 0.2510 |
| $P_1 m_2 \rightarrow P_2 m_2$ | 0.063  |
| $P_1 m_2 \rightarrow P_2 m_6$ | 0.9636 |

$\sin 15^\circ = 0.2588$   
 $\cos 15^\circ = 0.9659$

$\theta = 45^\circ$

|                               |        |
|-------------------------------|--------|
| $P_1 m_1 \rightarrow P_2 m_1$ | 0.4928 |
| $P_1 m_1 \rightarrow P_2 m_2$ | 0.5044 |
| $P_1 m_1 \rightarrow P_2 m_6$ | 0.7065 |

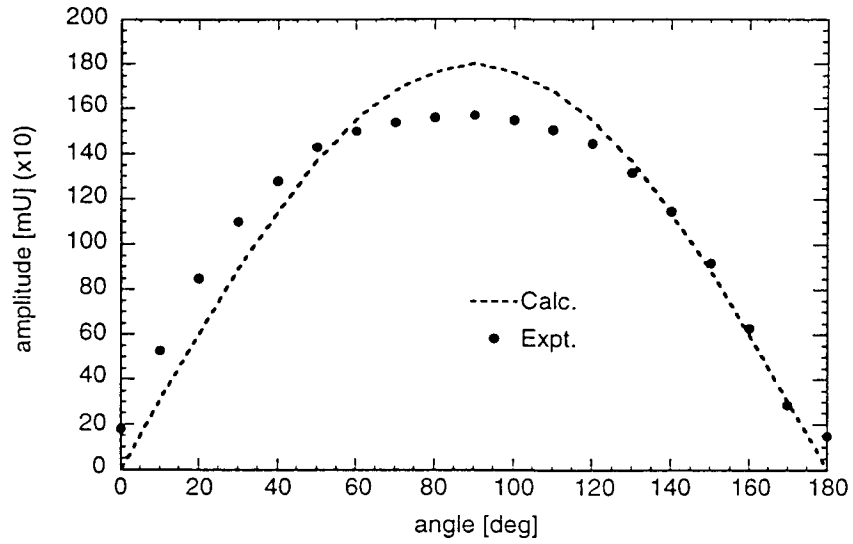
|                               |        |
|-------------------------------|--------|
| $P_1 m_2 \rightarrow P_2 m_1$ | 0.5041 |
| $P_1 m_2 \rightarrow P_2 m_2$ | 0.4941 |
| $P_1 m_2 \rightarrow P_2 m_6$ | 0.7055 |

$\sin 45^\circ = 0.707$

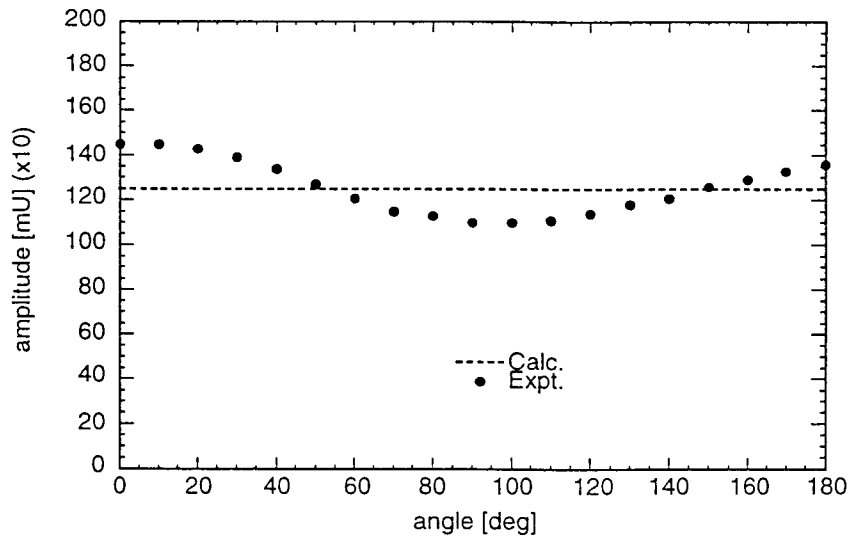
$\theta = 90^\circ$   
 1/21/99

# MODE CONVERTER

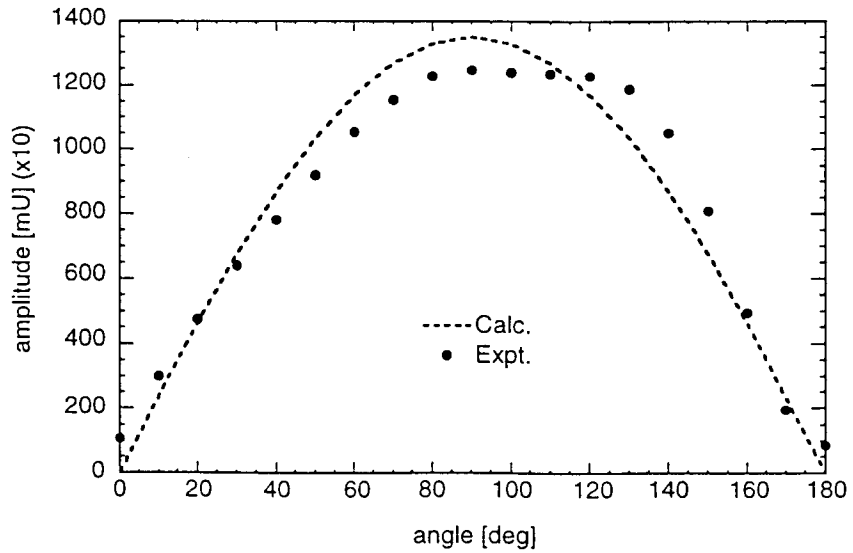
TE11->TE11

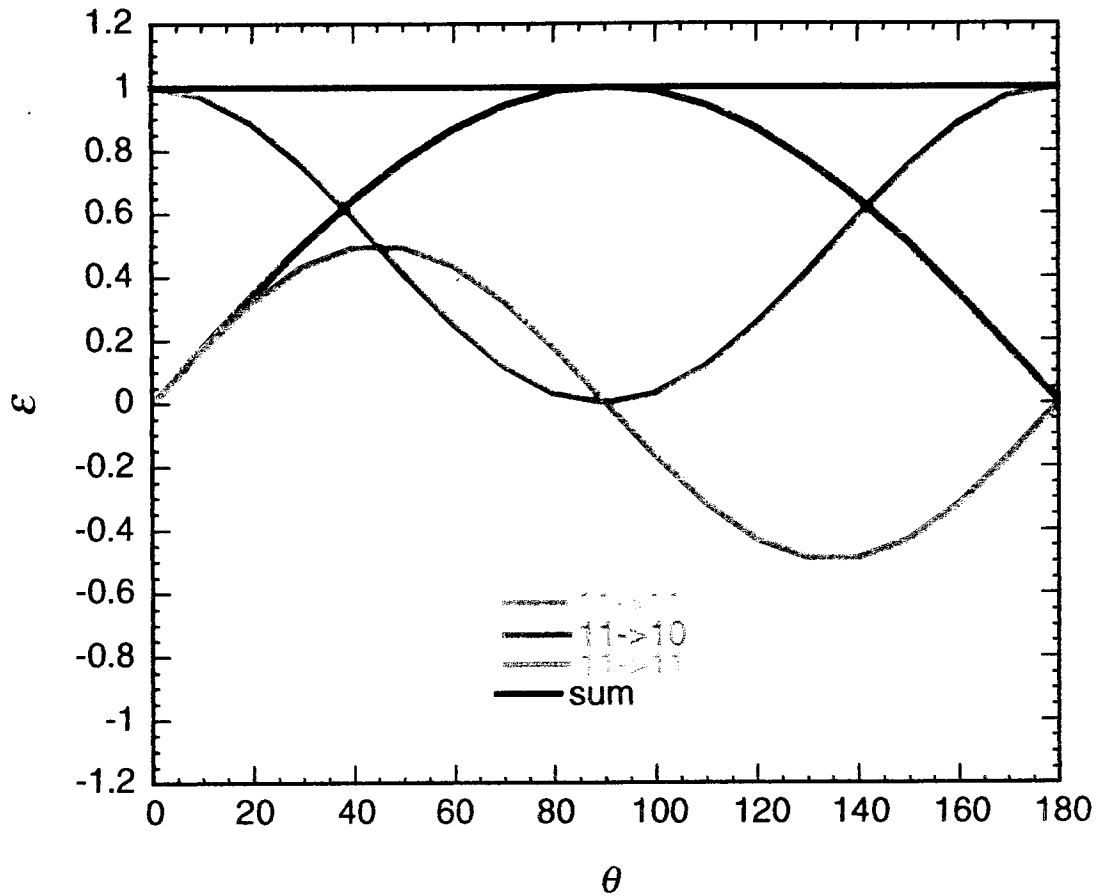


TE11->TE01



TE01->TE11





$$\epsilon (\text{TE}_{11} \rightarrow \text{TE}_{11}) = \cos^2 \theta = \epsilon_1$$

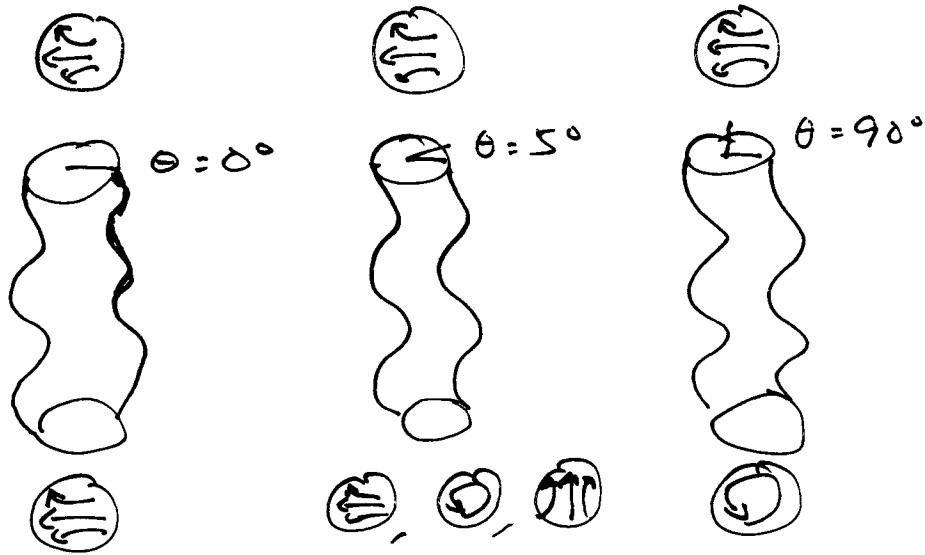
$$\epsilon (\text{TE}_{11} \rightarrow \text{TE}_{10}) = \sin \theta = \epsilon_2$$

$$\epsilon (\text{TE}_{11} \rightarrow \text{TE}_{11'}) = 0.5 \sin(2\theta) = \epsilon_3$$

$$E = \epsilon_1^2 + \epsilon_2^2 + \epsilon_3^2$$

$$= \cos^4 \theta + \sin^2 \theta + 0.25 \sin^2(2\theta)$$

$$= 1$$



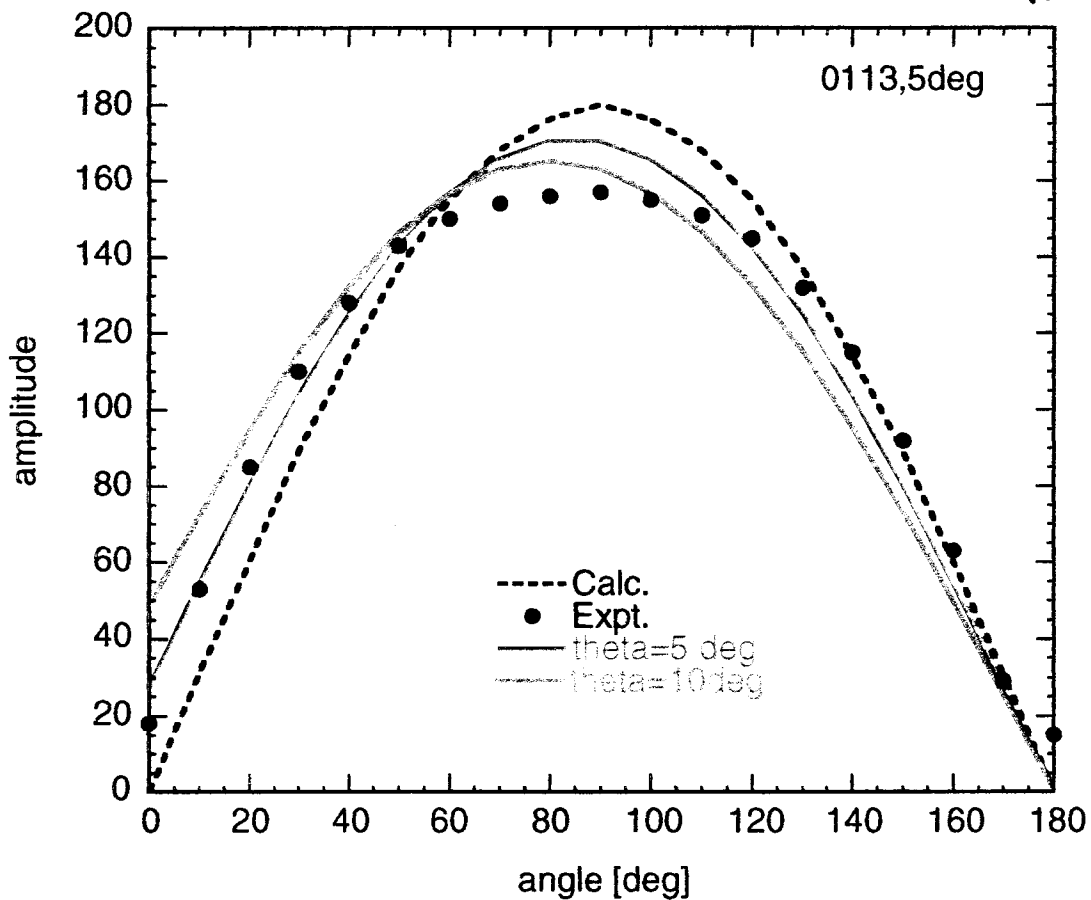
$11 \rightarrow 11$      $\epsilon_1 = 1$   
 $11 \rightarrow 01$      $\epsilon_2 = 0$   
 $11 \rightarrow 11'$     $\epsilon_3 = 0$

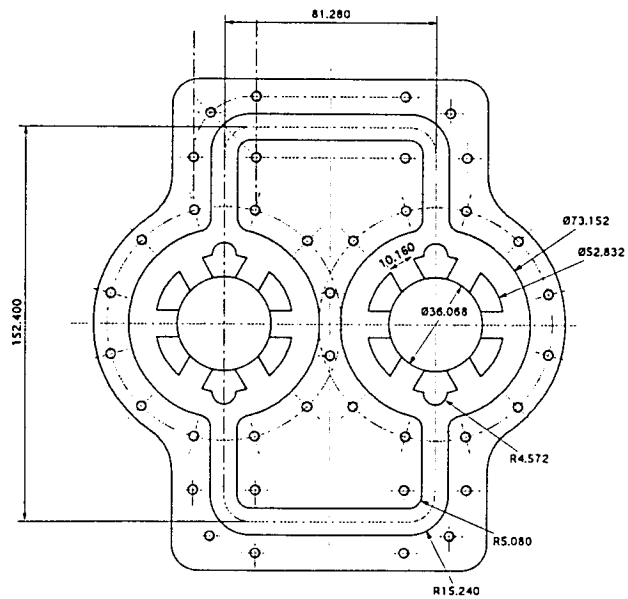
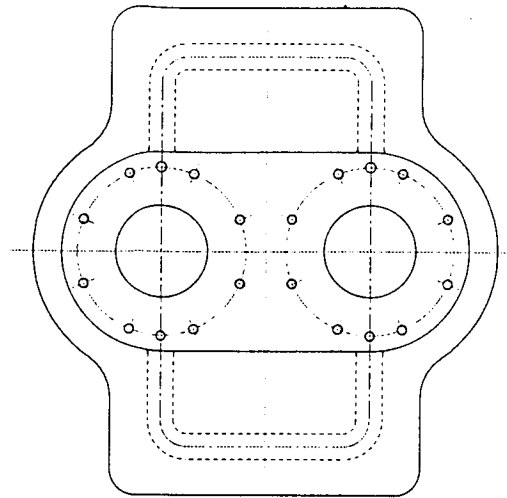
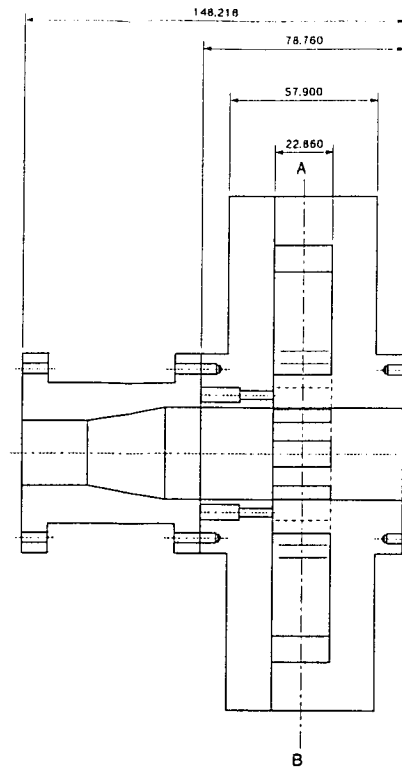
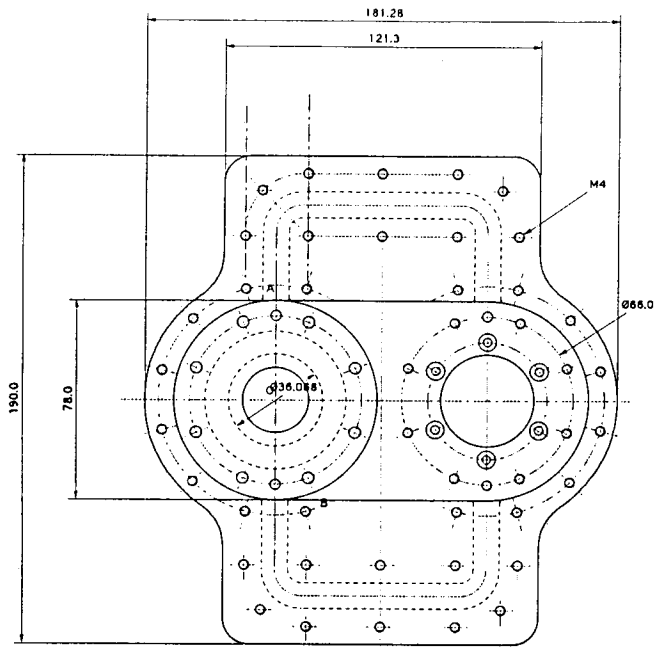
$\epsilon_1 = 0.992$   
 $\epsilon_2 = 0.087$   
 $\epsilon_3 = 0.087$

$\epsilon_1 > 0$   
 $\epsilon_2 > 1$   
 $\epsilon_3 = 0$

$$E = \epsilon_1 \sin \theta + \epsilon_2 \times 1 + \epsilon_3 \sin(\theta + 90^\circ)$$

$TE_{11}$                    $TE_{01}$                    $TE_{11}'$





断面A-B

# Mode Extractor

| PART NO     | NAME           | MATERIAL | SIZE   | NUMBER    | SPEC |
|-------------|----------------|----------|--------|-----------|------|
| 作成          | TITLE          |          |        |           |      |
| 変更          | Mode Extractor |          |        |           |      |
| 一般公差参照 J2 編 | 全体図            |          |        |           |      |
| 大塚製作所       | DR             | SCALE    | DWG NO | 981216-01 |      |

A1

