








**DEHDASHT PETROCHEMICAL INDUSTRY COMPANY**  
**DEHDASHT HIGH DENSITY POLYETHYLENE PROJECT**



|                                 |   |                      |                 |
|---------------------------------|---|----------------------|-----------------|
| <b>Contract No.: DPIC/98-12</b> | <b>DOCUMENT TITLE: Inspection and Test Procedure for Compressor</b> | <b>POI: IFA</b>      | <b>Rev.: D0</b> |
|                                 | <b>DOCUMENT No: DPIC9812-000-VD-1002-ME-PRC-0065</b>                | <b>Sheet 1 of 36</b> |                 |

## Inspection and Test Procedure for Compressor



| PURCHASER'S COMMENT/APPROVAL STATUS |  |                         |                 |                |                 | Purchaser: NARGAN  |
|-------------------------------------|--|-------------------------|-----------------|----------------|-----------------|--|
| 1                                   | AP: Approved (Released for Manufacturing)                  |                         |                 |                |                 | Requisition No.: DPIC98-12-001-000-ME-MR-4150-0001-D1<br>Item No. (Tag No.): PK-6101<br>Vendor Doc. No.: DPIC9812-000-VD-1002-ME-PRC-0065-D0                                   |
| 2                                   | AN: Approved With Minor Comments (Fabrication may Proceed) |                         |                 |                |                 |  |
| 3                                   | NF: Approved With Comments (Fabrication not Proceed)       |                         |                 |                |                 |  |
| 4                                   | RJ: Rejected   |                         |                 |                |                 |  |
| 5                                   | NR: Not be Returned  |                         |                 |                |                 |  |
| Date:                               | XX.XX.XX   | Signature:              |                 |                |                 |  |
|                                     |  |                         |                 |                |                 | <br> |
|                                     |  |                         |                 |                |                 |  |
|                                     |  |                         |                 |                |                 |  |
|                                     |  |                         |                 |                |                 |  |
| D0                                  | 23-Oct-21  | IFA                     | Sakaguchi       | kato           | M.Malekinia     |  |
| <b>REV.</b>                         | <b>DATE ISSUE</b>  | <b>Purpose of Issue</b> | <b>PREPARED</b> | <b>CHECKED</b> | <b>APPROVED</b> |  |

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| <br> | <b>DEHDASHT PETROCHEMICAL INDUSTRY COMPANY</b><br><b>DEHDASHT HIGH DENSITY POLYETHYLENE PROJECT</b> |  |                 |
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| 16   | x      |        |        |        |        |
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| 19   | x      |        |        |        |        |
| 20   | x      |        |        |        |        |
| 21   | x      |        |        |        |        |
| 22   | x      |        |        |        |        |
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|  | <b>DEHDASHT PETROCHEMICAL INDUSTRY COMPANY</b><br><br><b>DEHDASHT HIGH DENSITY POLYETHYLENE PROJECT</b> |  |                 |
| <b>Contract No.: DPIC/98-12</b>  | <b>DOCUMENT TITLE: Inspection and Test Procedure for Compressor</b>                                     | <b>POI: IFA</b>  | <b>Rev.: D0</b> |
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## Screw Rotor Dynamic Balance Test

### 1. Scope

Rotor dynamic balance test is carried out to check whether the compressor's rotor dynamic balance is within the standard value of the standard "Rotating machines - Balance quality requirement of rigid rotors" (JIS B 0905-1992).

### 2. Dynamic Balance Test

#### 2.1 Method of Dynamic Balance Test

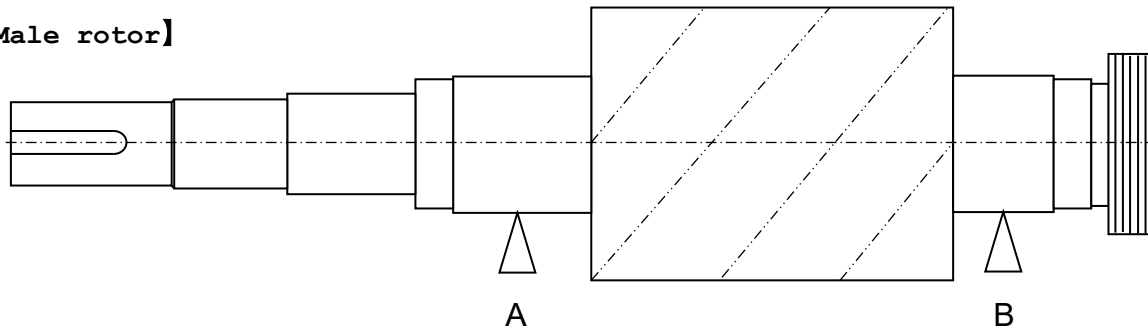
Rotor dynamic balance is measured at two points on each rotor using a screw rotor balancing machine.

Measuring points (see the figures below)

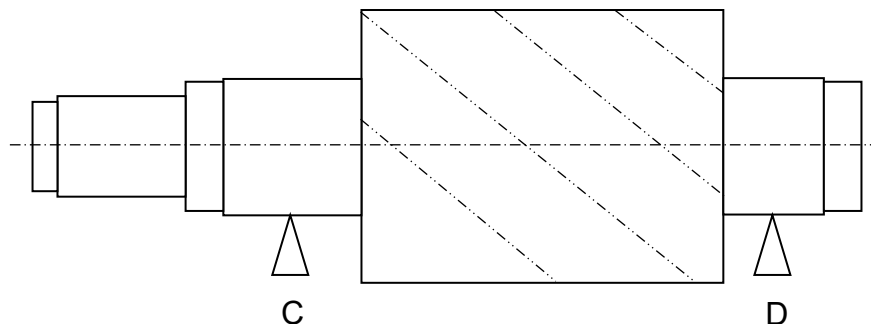
Male rotor            At points A and B



Female rotor        At points C and D

#### [Male rotor]



#### [Female rotor]



|  |   |  |                 |
|--|---|--|-----------------|
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## 2.2 Measuring equipment

| Manufacturer              | Measuring equipment       | Model         |
|---------------------------|---------------------------|---------------|
| NAGAHAMA SEISAKUSHO LTD., | Dynamic balancing machine | H40U<br>H20NB |

## 3. Acceptance Criteria

The acceptance criteria is as per JIS B 0905 Class G2.5 or Class 1.0 and the measured values must not exceed these criteria. Refer to the following tables as the standard values differ from rotor materials.

|                |                                 |  |                                     |
|----------------|---------------------------------|--|-------------------------------------|
| Rotor Material | <input type="checkbox"/> FCD600 | <input checked="" type="checkbox"/> SFCM930S   | <input type="checkbox"/> SFCM740S   |
| Balance class  |                                 | <input checked="" type="checkbox"/> Class G2.5 | <input type="checkbox"/> Class G1.0 |

### 3.1.1 JIS G5502 : FCD600 (Ductile Iron) JIS B 0905 Class G2.5 <Single stage compressor>

| Model | Standard value |      |              |      | Test Speed<br>(rpm) |
|-------|----------------|------|--------------|------|---------------------|
|       | Male rotor     |      | Female rotor |      |                     |
|       | g              | g·cm | g            | g·cm | ---                 |
| 125S  | 0.7            | 4.6  | 0.6          | 3.5  | 1265                |
| 125L  | 0.9            | 6.0  | 0.7          | 4.6  | 1265                |
| 160S  | 1.2            | 9.5  | 0.9          | 7.4  | 1265                |
| 160M  | 1.3            | 11.0 | 1.0          | 8.6  | 1265                |
| 160L  | 1.5            | 12.5 | 1.2          | 9.8  | 1265                |
| 160WS | 1.2            | 9.7  | 0.9          | 7.5  | 1265                |
| 160WM | 1.4            | 11.1 | 1.1          | 8.7  | 1265                |
| 160WL | 1.5            | 12.6 | 1.2          | 9.9  | 1265                |
| 200S  | 1.7            | 17.8 | 1.4          | 13.8 | 1265                |
| 200M  | 2.0            | 20.7 | 1.6          | 16.2 | 1265                |

Continued on the following page






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|       |     |       |     |       |      |
|-------|-----|-------|-----|-------|------|
| 200L  | 2.3 | 23.5  | 1.8 | 18.5  | 1265 |
| 200WS | 1.8 | 18.1  | 1.4 | 14.0  | 1265 |
| 200WM | 2.1 | 21.0  | 1.6 | 16.3  | 1265 |
| 200WL | 2.3 | 23.8  | 1.8 | 18.6  | 1265 |
| 250S  | 2.6 | 33.5  | 2.1 | 26.4  | 750  |
| 250M  | 3.1 | 39.3  | 2.4 | 31.1  | 750  |
| 250L  | 3.5 | 44.7  | 2.8 | 35.6  | 750  |
| 250LL | 4.1 | 51.8  | 3.3 | 41.9  | 750  |
| 250WS | 2.7 | 34.4  | 2.2 | 27.7  | 750  |
| 250WM | 3.1 | 40.1  | 2.5 | 32.4  | 750  |
| 250WL | 3.6 | 45.6  | 2.9 | 36.9  | 750  |
| 320S  | 4.2 | 68.1  | 3.3 | 53.8  | 430  |
| 320M  | 4.9 | 79.3  | 3.9 | 62.9  | 430  |
| 320L  | 5.6 | 90.4  | 4.5 | 71.8  | 430  |
| 320LL | 6.5 | 104.3 | 5.2 | 84.2  | 430  |
| 320WS | 4.3 | 69.7  | 3.5 | 56.1  | 430  |
| 320WM | 5.0 | 80.9  | 4.1 | 65.2  | 430  |
| 320WL | 5.7 | 92.0  | 4.6 | 74.2  | 430  |
| 400S  | 7.1 | 145.6 | 5.7 | 115.5 | 430  |
| 400M  | 8.3 | 169.2 | 6.6 | 134.6 | 430  |
| 400L  | 9.4 | 191.4 | 7.5 | 152.6 | 430  |

| Model | Standard value |      |              |      | Test Speed<br>(rpm) |
|-------|----------------|------|--------------|------|---------------------|
|       | Male rotor     |      | Female rotor |      |                     |
|       | g              | g·cm | g            | g·cm | ---                 |
| 170JS | 1.2            | 9.8  | 0.8          | 6.0  | 1265                |
| 170JM | 1.4            | 11.4 | 0.9          | 7.0  | 1265                |
| 170JL | 1.6            | 13.5 | 1.2          | 8.6  | 1265                |
| 220JS | 2.1            | 23.3 | 1.5          | 14.6 | 1265                |
| 220JM | 2.5            | 27.6 | 1.8          | 17.5 | 1265                |
| 220JL | 3.0            | 32.9 | 2.2          | 21.3 | 1265                |
| 280JS | 4.5            | 64.3 | 3.2          | 40.2 | 750                 |
| 280JM | 5.3            | 75.6 | 3.9          | 48.1 | 750                 |
| 280JL | 6.4            | 90.2 | 4.7          | 58.9 | 750                 |

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**3.1.2 JIS G5502 : FCD600 (Ductile Iron) JIS B 0905 Class G1.0 <Single stage compressor>**

| Model | Standard value |      |              |      | Test Speed<br>(rpm) |
|-------|----------------|------|--------------|------|---------------------|
|       | Male rotor     |      | Female rotor |      |                     |
|       | g              | g*cm | g            | g*cm |                     |
| 160S  | 0.5            | 3.8  | 0.4          | 2.9  | 1265                |
| 160M  | 0.5            | 4.4  | 0.4          | 3.4  | 1265                |
| 160L  | 0.6            | 5.0  | 0.5          | 3.9  | 1265                |
| 160WS | 0.5            | 3.9  | 0.4          | 3.0  | 1265                |
| 160WM | 0.5            | 4.5  | 0.4          | 3.5  | 1265                |
| 160WL | 0.6            | 5.1  | 0.5          | 3.9  | 1265                |
| 200S  | 0.7            | 7.1  | 0.5          | 5.5  | 1265                |
| 200M  | 0.8            | 8.3  | 0.6          | 6.5  | 1265                |
| 200L  | 0.9            | 9.4  | 0.7          | 7.4  | 1265                |
| 200WS | 0.7            | 7.2  | 0.5          | 5.6  | 1265                |
| 200WM | 0.8            | 8.4  | 0.6          | 6.5  | 1265                |
| 200WL | 0.9            | 9.5  | 0.7          | 7.5  | 1265                |
| 250S  | 1.1            | 13.4 | 0.8          | 10.6 | 750                 |
| 250M  | 1.2            | 15.7 | 1.0          | 12.5 | 750                 |
| 250L  | 1.4            | 17.9 | 1.1          | 14.2 | 750                 |
| 250LL | 1.6            | 20.7 | 1.3          | 16.7 | 750                 |
| 250WS | 1.1            | 13.8 | 0.9          | 11.1 | 750                 |
| 250WM | 1.3            | 16.1 | 1.0          | 13.0 | 750                 |
| 250WL | 1.4            | 18.2 | 1.2          | 14.7 | 750                 |
| 320S  | 1.7            | 27.2 | 1.3          | 21.5 | 430                 |
| 320M  | 2.0            | 31.7 | 1.6          | 25.1 | 430                 |
| 320L  | 2.3            | 36.1 | 1.8          | 28.7 | 430                 |
| 320LL | 2.6            | 41.7 | 2.1          | 33.7 | 430                 |
| 320WS | 1.7            | 27.9 | 1.4          | 22.4 | 430                 |
| 320WM | 2.0            | 32.4 | 1.6          | 26.1 | 430                 |
| 320WL | 2.3            | 36.8 | 1.8          | 29.7 | 430                 |
| 400S  | 2.9            | 58.2 | 2.3          | 46.2 | 430                 |
| 400M  | 3.3            | 67.7 | 2.6          | 53.8 | 430                 |
| 400L  | 3.8            | 76.5 | 3.0          | 61.0 | 430                 |




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| <b>Contract No.: DPIC/98-12</b>   | <b>DOCUMENT TITLE: Inspection and Test Procedure for Compressor</b>                                     | <b>POI: IFA</b>  | <b>Rev.: D0</b> |
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**3.1.3 JIS G3221 : SFCM930S,SFCM740S (Forged Steel) JIS B 0905 Class G2.5 <Single stage compressor>**

| Model | Standard value |      |              |      | Test Speed<br>(rpm) |
|-------|----------------|------|--------------|------|---------------------|
|       | Male rotor     |      | Female rotor |      |                     |
|       | g              | g·cm | g            | g·cm |                     |
| 125S  | 0.8            | 5.1  | 0.6          | 3.9  | 1265                |
| 125L  | 1.0            | 6.7  | 0.8          | 5.1  | 1265                |
| 160S  | 1.3            | 10.5 | 1.0          | 8.1  | 1265                |
| 160M  | 1.5            | 12.1 | 1.2          | 9.4  | 1265                |
| 160L  | 1.7            | 13.7 | 1.3          | 10.8 | 1265                |
| 160WS | 1.3            | 10.7 | 1.0          | 8.2  | 1265                |
| 160WM | 1.5            | 12.3 | 1.2          | 9.5  | 1265                |
| 160WL | 1.7            | 13.9 | 1.3          | 10.9 | 1265                |
| 200S  | 1.9            | 19.6 | 1.5          | 15.2 | 1265                |
| 200M  | 2.2            | 22.8 | 1.8          | 17.9 | 1265                |
| 200L  | 2.5            | 25.9 | 2.0          | 20.4 | 1265                |
| 200WS | 2.0            | 20.0 | 1.5          | 15.4 | 1265                |
| 200WM | 2.3            | 23.2 | 1.8          | 18.0 | 1265                |
| 200WL | 2.6            | 26.3 | 2.0          | 20.5 | 1265                |
| 250S  | 2.9            | 37.0 | 2.3          | 29.2 | 750                 |
| 250M  | 3.4            | 43.3 | 2.7          | 34.3 | 750                 |
| 250L  | 3.9            | 49.3 | 3.1          | 39.2 | 750                 |
| 250LL | 4.5            | 57.1 | 3.6          | 46.2 | 750                 |

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| <br> | <b>DEHDASHT PETROCHEMICAL INDUSTRY COMPANY</b><br><br><b>DEHDASHT HIGH DENSITY POLYETHYLENE PROJECT</b> | <br>شرکت صنایع پتروشیمی خلیج فارس<br>Persian Gulf Petrochemical Industries Co<br>PGPIC<br>شرکت صنایع پتروشیمی دهشت (سهامی عام) |                 |
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| Model         | Standard value |              |              |              | Test Speed<br>(rpm) |
|---------------|----------------|--------------|--------------|--------------|---------------------|
|               | Male rotor     |              | Female rotor |              |                     |
|               | g              | g*cm         | g            | g*cm         | ---                 |
| 250WS         | 3.0            | 37.9         | 2.4          | 30.6         | 750                 |
| 250WM         | 3.5            | 44.3         | 2.8          | 35.8         | 750                 |
| 250WL         | 3.9            | 50.3         | 3.2          | 40.6         | 750                 |
| 320S          | 4.7            | 75.1         | 3.7          | 59.3         | 430                 |
| 320M          | 5.4            | 87.5         | 4.3          | 69.3         | 430                 |
| 320L          | 6.2            | 99.7         | 4.9          | 79.2         | 430                 |
| 320LL         | 7.2            | 115.1        | 5.8          | 92.9         | 430                 |
| 320WS         | 4.8            | 76.9         | 3.9          | 61.9         | 430                 |
| 320WM         | 5.6            | 89.3         | 4.5          | 71.9         | 430                 |
| 320WL         | 6.3            | 101.5        | 5.1          | 81.8         | 430                 |
| 400S          | 7.9            | 160.6        | 6.2          | 127.3        | 430                 |
| 400M          | 9.1            | 186.6        | 7.3          | 148.5        | 430                 |
| 400L          | 10.3           | 211.0        | 8.3          | 168.3        | 430                 |
| 400LL         | 11.7           | 238.6        | 9.3          | 190.7        | 430                 |
| 400XL         | 12.8           | 261.7        | 10.3         | 209.5        | 430                 |
| <b>400XXL</b> | <b>14.1</b>    | <b>288.0</b> | <b>11.3</b>  | <b>230.8</b> | <b>430</b>          |

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| <br> | <b>DEHDASHT PETROCHEMICAL INDUSTRY COMPANY</b><br><br><b>DEHDASHT HIGH DENSITY POLYETHYLENE PROJECT</b> | <br>شرکت صنایع پتروشیمی خلیج فارس<br>Persian Gulf Petrochemical Industries Co<br>PGPIC<br>شرکت صنایع پتروشیمی دهشت (سهامی عام) |                 |
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**3.1.4 JIS G3221 : SFCM930S,SFCM740S (Forged Steel) JIS B 0905 Class G1.0 <Single stage compressor>**

| Model | Standard value |      |              |      | Test Speed<br>(rpm) |
|-------|----------------|------|--------------|------|---------------------|
|       | Male rotor     |      | Female rotor |      |                     |
|       | g              | g·cm | g            | g·cm | ---                 |
| 160S  | 0.5            | 4.2  | 0.4          | 3.2  | 1265                |
| 160M  | 0.6            | 4.8  | 0.5          | 3.8  | 1265                |
| 160L  | 0.7            | 5.5  | 0.5          | 4.3  | 1265                |
| 160WS | 0.5            | 4.3  | 0.4          | 3.3  | 1265                |
| 160WM | 0.6            | 4.9  | 0.5          | 3.8  | 1265                |
| 160WL | 0.7            | 5.6  | 0.5          | 4.3  | 1265                |
| 200S  | 0.8            | 7.8  | 0.6          | 6.1  | 1265                |
| 200M  | 0.9            | 9.1  | 0.7          | 7.1  | 1265                |
| 200L  | 1.0            | 10.4 | 0.8          | 8.2  | 1265                |
| 200WS | 0.8            | 8.0  | 0.6          | 6.2  | 1265                |
| 200WM | 0.9            | 9.3  | 0.7          | 7.2  | 1265                |
| 200WL | 1.0            | 10.5 | 0.8          | 8.2  | 1265                |
| 250S  | 1.2            | 14.8 | 0.9          | 11.7 | 750                 |
| 250M  | 1.4            | 17.3 | 1.1          | 13.7 | 750                 |
| 250L  | 1.5            | 19.7 | 1.2          | 15.7 | 750                 |
| 250LL | 1.8            | 22.8 | 1.4          | 18.5 | 750                 |





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|                                 |   |                       |                 |
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| <b>Contract No.: DPIC/98-12</b> | <b>DOCUMENT TITLE: Inspection and Test Procedure for Compressor</b> | <b>POI: IFA</b>       | <b>Rev.: D0</b> |
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| Model         | Standard value |              |              |             | Test Speed<br>(rpm) |
|---------------|----------------|--------------|--------------|-------------|---------------------|
|               | Male rotor     |              | Female rotor |             |                     |
|               | g              | g·cm         | g            | g·cm        | ---                 |
| 250WS         | 1.2            | 15.2         | 1.0          | 12.2        | 750                 |
| 250WM         | 1.4            | 17.7         | 1.1          | 14.3        | 750                 |
| 250WL         | 1.6            | 20.1         | 1.3          | 16.3        | 750                 |
| 320S          | 1.9            | 30.0         | 1.5          | 23.7        | 430                 |
| 320M          | 2.2            | 35.0         | 1.7          | 27.7        | 430                 |
| 320L          | 2.5            | 39.9         | 2.0          | 31.7        | 430                 |
| 320LL         | 2.9            | 46.0         | 2.3          | 37.2        | 430                 |
| 320WS         | 1.9            | 30.8         | 1.5          | 24.8        | 430                 |
| 320WM         | 2.2            | 35.7         | 1.8          | 28.8        | 430                 |
| 320WL         | 2.5            | 40.6         | 2.0          | 32.7        | 430                 |
| 400S          | 3.1            | 64.2         | 2.5          | 50.9        | 430                 |
| 400M          | 3.7            | 74.6         | 2.9          | 59.4        | 430                 |
| 400L          | 4.1            | 84.4         | 3.3          | 67.3        | 430                 |
| 400LL         | 4.7            | 95.5         | 3.7          | 76.3        | 430                 |
| 400XL         | 5.1            | 104.7        | 4.1          | 83.8        | 430                 |
| <b>400XXL</b> | <b>5.6</b>     | <b>115.2</b> | <b>4.5</b>   | <b>92.3</b> | <b>430</b>          |

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**3.2.1 JIS G5502 : FCD600 (Ductile Iron) JIS B 0905 Class G2.5 <Compound two-stage compressor>**

| model |   |    | Standard value |      |              |      | Test Speed<br>(rpm) |
|-------|---|----|----------------|------|--------------|------|---------------------|
|       |   |    | Male rotor     |      | Female rotor |      |                     |
|       |   |    | g              | g·cm | g            | g·cm |                     |
| 1610  | low stage                                   | S  | 1.1            | 8.7  | 0.8          | 6.7  | 1265                |
|       | high stage                                  | L  | 0.6            | 3.2  | 0.5          | 2.7  | 1265                |
| 1612  | low stage<br>*: mounted on<br>speed-up gear | S  | 1.1            | 8.9  | 0.8          | 6.7  | 1265                |
|       |   | M  | 1.3            | 10.4 | 1.0          | 7.9  | 1265                |
|       |   | L  | 1.5            | 11.8 | 1.1          | 9.1  | 1265                |
|       |   | L* | 1.5            | 12.0 | 1.1          | 9.1  | 1265                |
|       | high stage                                  | S  | 0.6            | 4.0  | 0.5          | 3.4  | 1265                |
|       |   | L  | 0.9            | 5.4  | 0.7          | 4.5  | 1265                |
| 2016  | low stage                                   | S  | 1.7            | 17.0 | 1.3          | 13.6 | 1265                |
|       |   | M  | 2.0            | 19.9 | 1.6          | 16.0 | 1265                |
|       |   | L  | 2.2            | 22.7 | 1.8          | 18.3 | 1265                |
|       | high stage                                  | S  | 1.0            | 8.4  | 0.9          | 7.0  | 1265                |
|       |   | M  | 1.2            | 9.9  | 1.0          | 8.2  | 1265                |
|       |   | L  | 1.4            | 11.4 | 1.1          | 9.4  | 1265                |

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| model |            |    | Standard value |       |              |       | Test Speed<br>(rpm) |
|-------|------------|----|----------------|-------|--------------|-------|---------------------|
|       |            |    | Male rotor     |       | Female rotor |       |                     |
|       |            |    | g              | g*cm  | g            | g*cm  | ---                 |
| 2520  | low stage  | S  | 2.6            | 32.8  | 2.1          | 26.4  | 750                 |
|       |            | M  | 3.0            | 38.5  | 2.4          | 31.1  | 750                 |
|       |            | L  | 3.4            | 44.0  | 2.8          | 35.6  | 750                 |
|       | high stage | S  | 1.7            | 16.9  | 1.4          | 13.8  | 1265                |
|       |            | M  | 1.9            | 19.9  | 1.6          | 16.2  | 1265                |
|       |            | L  | 2.2            | 22.7  | 1.8          | 18.5  | 1265                |
| 3225  | low stage  | S  | 4.1            | 66.3  | 3.3          | 53.8  | 430                 |
|       |            | M  | 4.8            | 77.5  | 3.9          | 62.9  | 430                 |
|       |            | L  | 5.5            | 88.6  | 4.5          | 71.8  | 430                 |
|       |            | LL | 6.3            | 100.9 | 5.1          | 81.9  | 430                 |
|       | high stage | S  | 2.5            | 31.6  | 2.0          | 25.9  | 750                 |
|       |            | WS | 2.5            | 32.5  | 2.1          | 27.2  | 750                 |
|       |            | M  | 2.9            | 37.4  | 2.4          | 30.6  | 750                 |
|       |            | WM | 3.0            | 38.3  | 2.5          | 31.9  | 750                 |
|       |            | L  | 3.4            | 42.9  | 2.7          | 35.0  | 750                 |
|       |            | WL | 3.4            | 43.7  | 2.8          | 36.3  | 750                 |
| 4032  | low stage  | S  | 7.0            | 142.4 | 5.7          | 115.5 | 430                 |
|       |            | M  | 8.1            | 166.0 | 6.6          | 134.6 | 430                 |
|       |            | L  | 9.2            | 188.2 | 7.5          | 152.6 | 430                 |
|       |            | LL | 10.5           | 213.2 | 8.5          | 172.9 | 430                 |
|       |            | XL | 11.5           | 234.1 | 9.3          | 189.9 | 430                 |
|       | high stage | S  | 4.1            | 65.2  | 3.3          | 53.8  | 430                 |
|       |            | WS | 4.2            | 66.9  | 3.5          | 56.1  | 430                 |
|       |            | M  | 4.8            | 76.4  | 3.9          | 62.9  | 430                 |
|       |            | WM | 4.9            | 78.1  | 4.1          | 65.2  | 430                 |
|       |            | L  | 5.4            | 87.5  | 4.5          | 71.8  | 430                 |
|       |            | WL | 5.5            | 89.1  | 4.6          | 74.2  | 430                 |
|       |            | LL | 6.3            | 101.5 | 5.2          | 84.2  | 430                 |




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**JIS 3.2.2**




**<G5502 : FCD600 (Ductile Iron) JIS B 0905 Class G1.0 <Compound two-stage compressor**

| model |  |    | Standard value |      |              |      | Test Speed<br>(rpm) |
|-------|--|----|----------------|------|--------------|------|---------------------|
|       |  |    | Male rotor     |      | Female rotor |      |                     |
|       |  |    | g              | g*cm | g            | g*cm |                     |
| 1610  | low stage                                      | S  | 0.4            | 3.5  | 0.3          | 2.7  | 1265                |
| 1612  | low stage<br>*: mounted<br>on speed-up<br>gear | S  | 0.4            | 3.6  | 0.3          | 2.7  | 1265                |
|       |  | M  | 0.5            | 4.1  | 0.4          | 3.1  | 1265                |
|       |  | L  | 0.6            | 4.7  | 0.4          | 3.6  | 1265                |
|       |  | L* | 0.6            | 4.8  | 0.4          | 3.6  | 1265                |
| 2016  | low stage                                      | S  | 0.7            | 6.8  | 0.5          | 5.4  | 1265                |
|       |  | M  | 0.8            | 8.0  | 0.6          | 6.4  | 1265                |
|       |  | L  | 0.9            | 9.1  | 0.7          | 7.3  | 1265                |
|       | high stage                                     | S  | 0.4            | 3.4  | 0.3          | 2.8  | 1265                |
|       |  | M  | 0.5            | 4.0  | 0.4          | 3.3  | 1265                |
|       |  | L  | 0.6            | 4.6  | 0.5          | 3.7  | 1265                |
| 2520  | low stage                                      | S  | 1.0            | 13.1 | 0.8          | 10.6 | 750                 |
|       |  | M  | 1.2            | 15.4 | 1.0          | 12.5 | 750                 |
|       |  | L  | 1.4            | 17.6 | 1.1          | 14.2 | 750                 |
|       | high stage                                     | S  | 0.7            | 6.8  | 0.5          | 5.5  | 1265                |
|       |  | M  | 0.8            | 7.9  | 0.6          | 6.5  | 1265                |
|       |  | L  | 0.9            | 9.1  | 0.7          | 7.4  | 1265                |
| 3225  | low stage                                      | S  | 1.7            | 26.5 | 1.3          | 21.5 | 430                 |
|       |  | M  | 1.9            | 31.0 | 1.6          | 25.1 | 430                 |
|       |  | L  | 2.2            | 35.4 | 1.8          | 28.7 | 430                 |
|       |  | LL | 2.5            | 40.4 | 2.0          | 32.7 | 430                 |
|       | high stage                                     | S  | 1.0            | 12.7 | 0.8          | 10.4 | 750                 |
|       |  | WS | 1.0            | 13.0 | 0.9          | 10.9 | 750                 |
|       |  | M  | 1.2            | 15.0 | 1.0          | 12.2 | 750                 |
|       |  | WM | 1.2            | 15.3 | 1.0          | 12.7 | 750                 |
|       |  | L  | 1.3            | 17.1 | 1.1          | 14.0 | 750                 |
|       |  | WL | 1.4            | 17.5 | 1.1          | 14.5 | 750                 |

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on the  
following  
page

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| model |            |    | Standard value |      |              |      | Test Speed<br>(rpm) |
|-------|------------|----|----------------|------|--------------|------|---------------------|
|       |            |    | Male rotor     |      | Female rotor |      |                     |
|       |            |    | g              | g*cm | g            | g*cm | ---                 |
| 4032  | low stage  | S  | 2.8            | 57.0 | 2.3          | 46.2 | 430                 |
|       |            | M  | 3.3            | 66.4 | 2.6          | 53.8 | 430                 |
|       |            | L  | 3.7            | 75.3 | 3.0          | 61.0 | 430                 |
|       |            | LL | 4.2            | 85.3 | 3.4          | 69.2 | 430                 |
|       |            | XL | 4.6            | 93.7 | 3.7          | 76.0 | 430                 |
|       | high stage | S  | 1.6            | 26.1 | 1.3          | 21.5 | 430                 |
|       |            | WS | 1.7            | 26.7 | 1.4          | 22.4 | 430                 |
|       |            | M  | 1.9            | 30.6 | 1.6          | 25.1 | 430                 |
|       |            | WM | 1.9            | 31.2 | 1.6          | 26.1 | 430                 |
|       |            | L  | 2.2            | 35.0 | 1.8          | 28.7 | 430                 |
|       |            | WL | 2.2            | 35.6 | 1.8          | 29.7 | 430                 |
|       |            | LL | 2.5            | 40.6 | 2.1          | 33.7 | 430                 |

|   |   |  |                 |
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**3.2.3 JIS G3221 : SFCM930S,SFCM740S (Forged Steel) JIS B 0905 Class G2.5 <Compound two-stage compressor>**

| model |   |    | Standard value |      |              |      | Test Speed<br>(rpm) |
|-------|---|----|----------------|------|--------------|------|---------------------|
|       |   |    | Male rotor     |      | Female rotor |      |                     |
|       |   |    | g              | g*cm | g            | g*cm |                     |
| 1610  | low stage                                   | S  | 1.2            | 9.6  | 0.9          | 7.3  | 1265                |
|       | high stage                                  | L  | 0.7            | 3.6  | 0.6          | 2.9  | 1265                |
| 1612  | low stage<br>*: mounted on<br>speed-up gear | S  | 1.2            | 9.8  | 0.9          | 7.3  | 1265                |
|       |   | M  | 1.4            | 11.4 | 1.1          | 8.7  | 1265                |
|       |   | L  | 1.6            | 13.1 | 1.2          | 10.0 | 1265                |
|       |   | L* | 1.6            | 13.3 | 1.2          | 10.0 | 1265                |
|       | high stage                                  | S  | 0.7            | 4.4  | 0.6          | 3.7  | 1265                |
|       |   | L  | 0.9            | 6.0  | 0.8          | 5.0  | 1265                |
| 2016  | low stage                                   | S  | 1.8            | 18.7 | 1.5          | 15.0 | 1265                |
|       |   | M  | 2.2            | 22.0 | 1.7          | 17.6 | 1265                |
|       |   | L  | 2.5            | 25.1 | 2.0          | 20.1 | 1265                |
|       | high stage                                  | S  | 1.1            | 9.3  | 0.9          | 7.7  | 1265                |
|       |   | M  | 1.3            | 10.9 | 1.1          | 9.0  | 1265                |
|       |   | L  | 1.5            | 12.6 | 1.3          | 10.3 | 1265                |

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| model |            |    | Standard value |       |              |       | Test Speed<br>(rpm) |
|-------|------------|----|----------------|-------|--------------|-------|---------------------|
|       |            |    | Male rotor     |       | Female rotor |       |                     |
|       |            |    | g              | g*cm  | g            | g*cm  |                     |
| 2520  | low stage  | S  | 2.8            | 36.1  | 2.3          | 29.2  | 750                 |
|       |            | M  | 3.3            | 42.5  | 2.7          | 34.3  | 750                 |
|       |            | L  | 3.8            | 48.5  | 3.1          | 39.2  | 750                 |
|       | high stage | S  | 1.8            | 18.7  | 1.5          | 15.2  | 1265                |
|       |            | M  | 2.1            | 21.9  | 1.8          | 17.9  | 1265                |
|       |            | L  | 2.5            | 25.0  | 2.0          | 20.4  | 1265                |
| 3225  | low stage  | S  | 4.6            | 73.2  | 3.7          | 59.3  | 430                 |
|       |            | M  | 5.3            | 85.5  | 4.3          | 69.3  | 430                 |
|       |            | L  | 6.1            | 97.7  | 4.9          | 79.2  | 430                 |
|       |            | LL | 6.9            | 111.3 | 5.6          | 90.3  | 430                 |
|       | high stage | S  | 2.7            | 34.9  | 2.2          | 28.6  | 750                 |
|       |            | WS | 2.8            | 35.8  | 2.3          | 30.0  | 750                 |
|       |            | M  | 3.2            | 41.3  | 2.6          | 33.8  | 750                 |
|       |            | WM | 3.3            | 42.2  | 2.8          | 35.1  | 750                 |
|       |            | L  | 3.7            | 47.3  | 3.0          | 38.7  | 750                 |
|       |            | WL | 3.8            | 48.2  | 3.1          | 40.0  | 750                 |
| 4032  | low stage  | S  | 7.7            | 157.1 | 6.2          | 127.3 | 430                 |
|       |            | M  | 9.0            | 183.1 | 7.3          | 148.5 | 430                 |
|       |            | L  | 10.2           | 207.5 | 8.3          | 168.3 | 430                 |
|       |            | LL | 11.5           | 235.1 | 9.3          | 190.7 | 430                 |
|       |            | XL | 12.7           | 258.2 | 10.3         | 209.5 | 430                 |
|       | high stage | S  | 4.5            | 71.9  | 3.7          | 59.3  | 430                 |
|       |            | WS | 4.6            | 73.7  | 3.9          | 61.9  | 430                 |
|       |            | M  | 5.2            | 84.3  | 4.3          | 69.3  | 430                 |
|       |            | WM | 5.4            | 86.1  | 4.5          | 71.9  | 430                 |
|       |            | L  | 6.0            | 96.5  | 4.9          | 79.2  | 430                 |
|       |            | WL | 6.1            | 98.3  | 5.1          | 81.8  | 430                 |
|       |            | LL | 7.0            | 111.9 | 5.8          | 92.9  | 430                 |




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JIS G3221 : 3.2.4

<SFCM930S,SFCM740S (Forged Steel) JIS B 0905 Class G1.0 <Compound two-stage compressor

| model |  |    | Standard value |      |              |      | Test Speed<br>(rpm) |
|-------|--|----|----------------|------|--------------|------|---------------------|
|       |  |    | Male rotor     |      | Female rotor |      |                     |
|       |  |    | g              | g·cm | g            | g·cm |                     |
| 1610  | low stage                                      | S  | 0.5            | 3.8  | 0.4          | 2.9  | 1265                |
| 1612  | low stage<br>*: mounted<br>on speed-up<br>gear | S  | 0.5            | 3.9  | 0.4          | 2.9  | 1265                |
|       |  | M  | 0.6            | 4.6  | 0.4          | 3.5  | 1265                |
|       |  | L  | 0.6            | 5.2  | 0.5          | 4.0  | 1265                |
|       |  | L* | 0.7            | 5.3  | 0.5          | 4.0  | 1265                |
| 2016  | low stage                                      | S  | 0.7            | 7.5  | 0.6          | 6.0  | 1265                |
|       |  | M  | 0.9            | 8.8  | 0.7          | 7.0  | 1265                |
|       |  | L  | 1.0            | 10.0 | 0.8          | 8.1  | 1265                |
|       | high stage                                     | S  | 0.5            | 3.7  | 0.4          | 3.1  | 1265                |
|       |  | M  | 0.5            | 4.4  | 0.4          | 3.6  | 1265                |
|       |  | L  | 0.6            | 5.0  | 0.5          | 4.1  | 1265                |
| 2520  | low stage                                      | S  | 1.1            | 14.5 | 0.9          | 11.7 | 750                 |
|       |  | M  | 1.3            | 17.0 | 1.1          | 13.7 | 750                 |
|       |  | L  | 1.5            | 19.4 | 1.2          | 15.7 | 750                 |
|       | high stage                                     | S  | 0.7            | 7.5  | 0.6          | 6.1  | 1265                |
|       |  | M  | 0.9            | 8.8  | 0.7          | 7.1  | 1265                |
|       |  | L  | 1.0            | 10.0 | 0.8          | 8.2  | 1265                |
| 3225  | low stage                                      | S  | 1.8            | 29.3 | 1.5          | 23.7 | 430                 |
|       |  | M  | 2.1            | 34.2 | 1.7          | 27.7 | 430                 |
|       |  | L  | 2.4            | 39.1 | 2.0          | 31.7 | 430                 |
|       |  | LL | 2.8            | 44.5 | 2.2          | 36.1 | 430                 |
|       | high stage                                     | S  | 1.1            | 14.0 | 0.9          | 11.4 | 750                 |
|       |  | WS | 1.1            | 14.3 | 0.9          | 12.0 | 750                 |
|       |  | M  | 1.3            | 16.5 | 1.1          | 13.5 | 750                 |
|       |  | WM | 1.3            | 16.9 | 1.1          | 14.1 | 750                 |
|       |  | L  | 1.5            | 18.9 | 1.2          | 15.5 | 750                 |
|       |  | WL | 1.5            | 19.3 | 1.3          | 16.0 | 750                 |

Continued  
on the  
following  
page

|   |   |  |                 |
|---|---|--|-----------------|
| <br> | <b>DEHDASHT PETROCHEMICAL INDUSTRY COMPANY</b><br><br><b>DEHDASHT HIGH DENSITY POLYETHYLENE PROJECT</b> |  |                 |
| <b>Contract No.: DPIC/98-12</b>   | <b>DOCUMENT TITLE: Inspection and Test Procedure for Compressor</b>                                     | <b>POI: IFA</b>  | <b>Rev.: D0</b> |
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| model |            |    | Standard value |       |              |      | Test Speed<br>(rpm) |
|-------|------------|----|----------------|-------|--------------|------|---------------------|
|       |            |    | Male rotor     |       | Female rotor |      |                     |
|       |            |    | g              | g*cm  | g            | g*cm | ---                 |
| 4032  | low stage  | S  | 3.1            | 62.8  | 2.5          | 50.9 | 430                 |
|       |            | M  | 3.6            | 73.2  | 2.9          | 59.4 | 430                 |
|       |            | L  | 4.1            | 83.0  | 3.3          | 67.3 | 430                 |
|       |            | LL | 4.6            | 94.1  | 3.7          | 76.3 | 430                 |
|       |            | XL | 5.1            | 103.3 | 4.1          | 83.8 | 430                 |
|       | high stage | S  | 1.8            | 28.8  | 1.5          | 23.7 | 430                 |
|       |            | WS | 1.8            | 29.5  | 1.5          | 24.8 | 430                 |
|       |            | M  | 2.1            | 33.7  | 1.7          | 27.7 | 430                 |
|       |            | WM | 2.1            | 34.4  | 1.8          | 28.8 | 430                 |
|       |            | L  | 2.4            | 38.6  | 2.0          | 31.7 | 430                 |
|       |            | WL | 2.4            | 39.3  | 2.0          | 32.7 | 430                 |
|       |            | LL | 2.8            | 44.8  | 2.3          | 37.2 | 430                 |

#### 4. Records

The test results and judgment are recorded on Appendix-1: MALE/FEMALE ROTOR BALANCING TEST REPORT.



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DEHDASHT HIGH DENSITY POLYETHYLENE PROJECT



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Appendix-1 SAMPLE



Item No. -

Report No. 0  
Serial No. 0

Rotor Balancing Test Report

| Model No. | Material | Test Speed | Correction Radius |
|-----------|----------|------------|-------------------|
| 0         | 0        | 0          | 0                 |

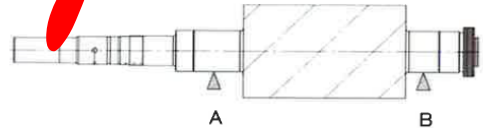
$$\text{Allowable Residual Unbalance value} = \frac{0 \times 9550}{3600} \times \frac{M}{2} \times \frac{1}{10} \quad \text{Class: G 0} \quad \text{(ISO B 0905)}$$

Rotor Weight (M) : 0      Testing Device : NISHIHAMA-SCHENCK  
Female Rotor Height (H) :      Model : 100

Sample

MALE ROTOR

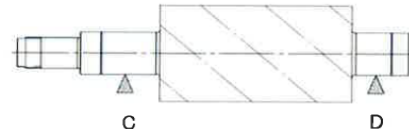
| Rotor No. | Date            |
|-----------|-----------------|
| 0         | January 0, 1900 |



|                              | Unbalanced Value at the Left Side (A) |           |             | Unbalanced Value at the Right Side (B) |           |             |
|------------------------------|---------------------------------------|-----------|-------------|--|-----------|-------------|
|                              | (g)                                   | Angle (°) | Value(g.cm) | (g)                                    | Angle (°) | Value(g.cm) |
| Allowable Residual Unbalance | ---                                   | ---       | 0           | ---                                    | ---       | 0           |
| Before Adjustment            | 0.000                                 | 0         | 0.0         | 0.000                                  | 0         | 0.0         |
| After Adjustment             | ---                                   | ---       | ---         | ---                                    | ---       | ---         |

FEMALE ROTOR

| Rotor No. | Date            |
|-----------|-----------------|
| 0         | January 0, 1900 |





|                              | Unbalanced Value at the Left Side (C) |           |             | Unbalanced Value at the Right Side (D) |           |             |
|------------------------------|---------------------------------------|-----------|-------------|--|-----------|-------------|
|                              | (g)                                   | Angle (°) | Value(g.cm) | (g)                                    | Angle (°) | Value(g.cm) |
| Allowable Residual Unbalance | ---                                   | ---       | 0           | ---                                    | ---       | 0           |
| Before Adjustment            | 0.000                                 | 0         | 0.0         | 0.000                                  | 0         | 0.0         |
| After Adjustment             | ---                                   | ---       | ---         | ---                                    | ---       | ---         |

Criteria Judgment : Accepted

SURVEYOR

Checked by : \_\_\_\_\_

Approved by : \_\_\_\_\_

|  |   |  |                 |
|--|---|--|-----------------|
|  | <b>DEHDASHT PETROCHEMICAL INDUSTRY COMPANY</b><br><br><b>DEHDASHT HIGH DENSITY POLYETHYLENE PROJECT</b> |  |                 |
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## Screw Compressor Standard Inspection Procedures Hydrostatic Test

### Hydrostatic Test

#### 1. Scope

This procedure defines the hydrostatic test performed at Moriya Plant, by the Compressor Manufacturing Division.

#### 2. Hydrostatic test

##### 2.1 Test Procedure

After assembling the compressor, it is filled with refrigeration oil.

The hydrostatic test is performed under the conditions shown in Table-1 for 30 minutes.

Table-1

|                 |         |
|-----------------|---------|
| Design pressure | 2.6MPaG |
| Test pressure   | 3.9MPaG |

Note: Two pressure gauges are used.

The test pressure is 1.5 times the design pressure.

The fluid used for the hydrostatic test is lubrication oil VG32 as standard.

#### 3. Acceptance Criteria

The acceptance criterion is a visual inspection to ensure there are no distortions and leakages.

#### 4. Records

The test results are recorded in Appendix-1: Hydrostatic & Pneumatic Tests Report.



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[Appendix]-1

**SAMPLE**

Hydrostatic &  
Pneumatic Tests  
Report



Report No. 0

**Hydrostatic & Pneumatic Tests Report**

|                              |                         |
|------------------------------|-------------------------|
| <b>Name of Client</b>        |                         |
| <b>Type of Compressor</b>    | <b>Screw Compressor</b> |
| <b>Compressor Model No.</b>  | <b>0</b>                |
| <b>Compressor Serial No.</b> | <b>0</b>                |

**TEST RECORD**

| Item                    | Design Pressure MPaG | Test Pressure MPaG | Used Fluid | Hold Time(Min) | Tested Date       | Judgment |
|-------------------------|----------------------|--------------------|------------|----------------|-------------------|----------|
| Hydrostatic test        | 2.6                  | 3.9                | OIL        | 30             | March 13, 2012    | Accepted |
| Pneumatic Pressure test | 2.6                  | 2.6                | Air        | 30             | December 31, 2012 | Accepted |

**USED PRESSURE GAUGES**



| Item                    | Dia × Max. Pres. MPa.G | Manufacturer | Class(JIS) | No.  |
|-------------------------|------------------------|--------------|------------|------|
| Hydrostatic test        | φ 100 × 5.0            | NAGANO       | 1.5        | 1, 2 |
| Pneumatic Pressure test | φ 100 × 3.5            | NAGANO       | 1.5        | 3, 4 |

Note :  
MYCOM Control No.  
AA-5.0100  
AA-5.0103  
3, AA-3.5001  
4, AA-3.5002

SURVEYOR

Checked by : \_\_\_\_\_

Approved by : \_\_\_\_\_

|  |   |  |                 |
|--|---|--|-----------------|
|  | <b>DEHDASHT PETROCHEMICAL INDUSTRY COMPANY</b><br><br><b>DEHDASHT HIGH DENSITY POLYETHYLENE PROJECT</b> |  |                 |
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## Screw Compressor Standard Inspection Procedures Gas Leak Test

### Gas Leak Test

#### 1. Scope

This procedure defines the gas leak test performed at Moriya Plant, by the Compressor Manufacturing Division.

#### 2. Gas Leak Test

##### 2.1 Test procedure

The gas leak test should be performed after the hydrostatic test.

The gas leak test is performed under the conditions shown in Table-1 by submerging the compressor under water for 30 minutes.

Table-1

|                 |         |
|-----------------|---------|
| Design pressure | 2.6MPaG |
| Test pressure   | 2.6MPaG |

Note: Two pressure gauges are used.

The test pressure is the same as the design pressure.

The gas used for the gas leak test is dry air as standard.

#### 3. Acceptance Criteria

The acceptance criterion is a visual inspection to ensure no air bubbles are evident.

#### 4. Records

The test results are recorded in Appendix-1:Hydrostatic & Gas Leak Tests Report.



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**MYCOM**

**SAMPLE**

Appendix-1:  
Hydrostatic &  
Gas Leak Tests  
Report

Report No. 0

**Hydrostatic & Gas Leak Test Report**

|                       |                  |
|-----------------------|------------------|
| Item No.              | -                |
| Type of Compressor    | Screw Compressor |
| Compressor Model No.  | 0                |
| Compressor Serial No. | 0                |

**TEST RECORD**

| Item             | Design Pressure MPaG | Test Pressure MPaG | Used Fluid | Hold Time(Min) | Tested Date | Judgment |
|------------------|----------------------|--------------------|------------|----------------|-------------|----------|
| Hydrostatic test | 2.6                  | 3.9                | OIL        | 30             |             | Accepted |
| Gas Leak test    | 2.6                  | 2.6                | Air        | 30             |             | Accepted |

**USED PRESSURE GAUGES**

| Item             | Dia × Max. Pres. MPa.G | Manufacturer | Class(JIS) | No.  |
|------------------|------------------------|--------------|------------|------|
| Hydrostatic test | φ 100 × 7.0            | NAGANO       | 1.5        | 1, 2 |
| Gas Leak test    | φ 100 × 5.0            | NAGANO       | 1.5        | 3, 4 |



Note :

| No. | Registration No. | Terms of validity |
|-----|------------------|-------------------|
| 1   | AA-70105         | Feb,2017          |
| 2   | AA-70107         | Feb,2017          |
| 3   | AA-50005         | Oct,2016          |
| 4   | AA-50006         | Oct,2016          |

SURVEYOR

Checked by : \_\_\_\_\_

Approved by : \_\_\_\_\_

|  |   |  |                 |
|--|---|--|-----------------|
|  | <b>DEHDASHT PETROCHEMICAL INDUSTRY COMPANY</b><br><br><b>DEHDASHT HIGH DENSITY POLYETHYLENE PROJECT</b> |  |                 |
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## Screw Compressor Standard Inspection Procedures



### Performance Test, Mechanical Running Test, Noise and Vibration Test

#### 1. Scope

These procedures apply to the performance test, mechanical running test, vibration and noise tests of MYCOM screw compressors at the compressor manufacturing division of Mayekawa's Moriya plant, using air test equipment. The test fluid should be air. For equipment required for these tests such as couplings, motors, oil separators, cooler and measurement equipment, the test benches at the plant are used.

#### 2. Applicable Models

|   | Model   | Type                   | Manufacture<br>d from | Remarks  |
|---|---|------------------------|-----------------------|--|
| 1 | UD/G series                                     | 125*U*/*G<br>320*U*/*U | ~<br>1970             | Single stage compressor<br>(side discharge,<br>downward discharge) |
| 2 | SCV series                                      | 160V**~250V**          | 1991                  | Single stage compressor<br>(side discharge,<br>downward discharge) |
| 3 | SCV series                                      | 320V**                 | 1998                  | Single stage compressor<br>(side discharge,<br>downward discharge) |
| 4 | VR series                                       | 160V*R                 | 1996                  | Single stage compressor<br>(with gear box)                         |
| 5 | Compound type<br>two-stage<br>compressor series | 1610**C~3225**C        | 1975                  |  |
| 6 | Compound type<br>two-stage<br>compressor series | 4032**C                | 2001                  |  |
| 7 | UD series                                       | 400*UD                 | 2002                  | Single stage compressor<br>(side discharge)                        |
| 8 | J series  | 170*J, 220J*, 280J*    | 2011                  | Single stage compressor  |

|  |   |  |                 |
|--|---|--|-----------------|
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### 3. Tests

- 1) Performance test
  - capacity
  - brake horse power
- 2) Mechanical running test
- 3) Vibration and noise tests

### 4. Performance Test

#### [Capacity]

#### 4.1 Purpose

This test is carried out to determine that the volume flow rate of suction gas at the inlet of the compressor and the brake horse power meet the criteria.

#### 4.2 Measuring Method/Equipment and Test Conditions

In accordance with the JIS standard *Measurement of Fluid Flow by Means of Orifice Plates, Nozzles And Venturi Tubes* (JIS Z 8762:2007), we measure pressures and temperatures required for calculating the volume rate of flows from ① to ⑬ shown in the Figure-1: Test Equipment and Measurement Points using pressure gauge, manometer and thermometers. Performance measurement will be done during the mechanical running test.

The test fluid used for performance test and mechanical running test should be air. Testing is conducted under standard testing conditions (refer to Table-1). Motor revolution is controlled by 2950-3000 rpm (2P) or 1450-1500rpm (4P). Gears and the like are not used to increase the speed of the compressor. The load operating conditions should be 100%, that is, the slide valve opening should be 100%.

The standard temperature of compressor lubrication oil should be 30°C to 50°C. The standard pressure of compressor lubrication oil on the discharge side is 0.2 to 0.3MPaG higher than the discharge pressure. When discharge pressure is 0.7 MPaG, then (with a tolerance of between 0.2 to 0.3) the standard pressure should be 0.9 to 1.0 MPaG.

Measurement equipment differs according to the test bench required for each compressor type. Refer to Appendix Table-2: Measurement Equipment List for details as reference.

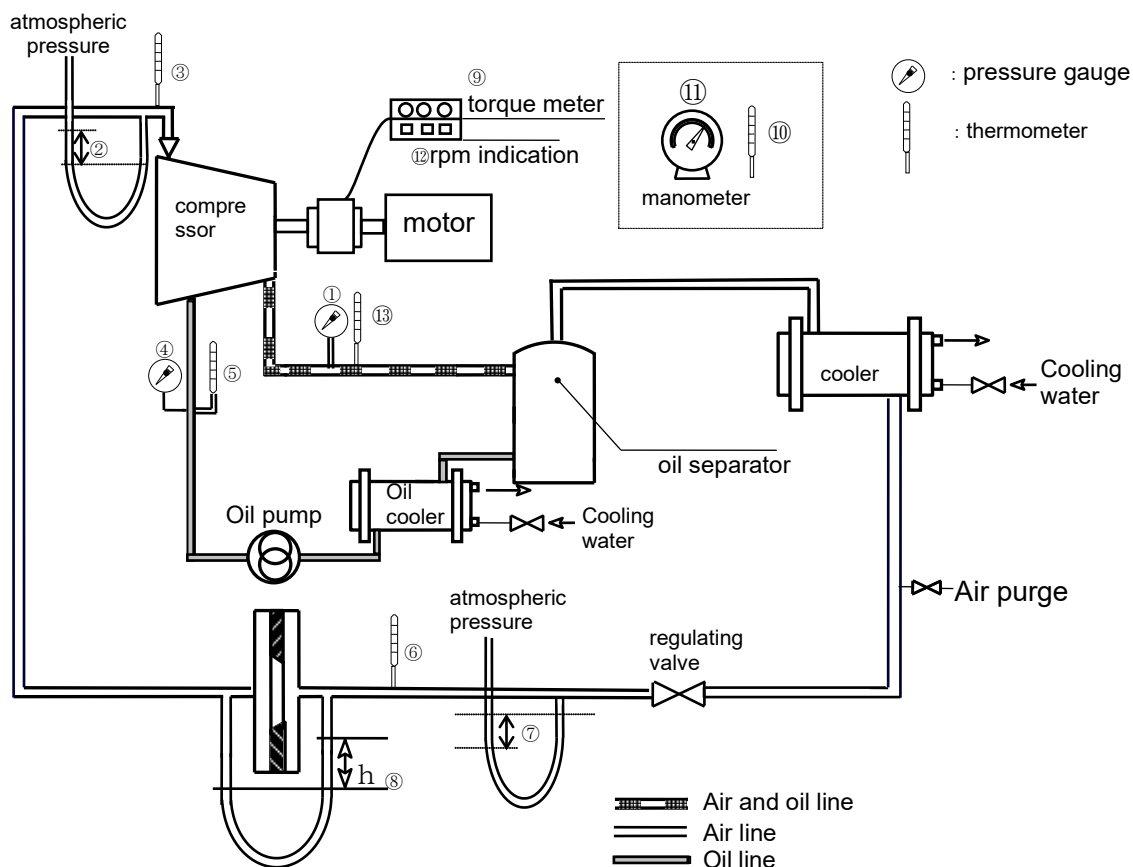


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Figure-1 : Test Equipment and Measurement Points



|                                     |        |                                   |                       |
|-------------------------------------|--------|-----------------------------------|-----------------------|
| ① : Discharge pressure              | (MPaG) | ⑧ : Orifice differential pressure | (kPa)                 |
| ② : Suction pressure                | (kPaG) | ⑨ : Torque                        | ( Nm)                 |
| ③ : Suction temperature             | (°C)   | ⑩ : Room temperature              | (°C)                  |
| ④ : Lubrication oil supply pressure | (MPaG) | ⑪ : Atmospheric pressure          | ( hPa )               |
| ⑤ : Lubrication oil temperature     | (°C )  | ⑫ : Motor revolution              | ( min <sup>-1</sup> ) |
| ⑥ : Temperature before orifice      | (°C )  | ⑬ : Discharge temperature         | (°C)                  |
| ⑦ : Pressure before orifice         | (kPaG) |                                   |                       |

In addition intermediate temperature and intermediate pressure are measured for compound type compressors.



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Unit : MPaG

| Code | Classification          | Suction pressure | Discharge pressure |
|------|-------------------------|------------------|--------------------|
| F    | Single stage type       | V i : 1.8        | 0. 0 0             |
| J    |                         | V i : 2.0        | 0. 0 0             |
| K    |                         | V i : 2.2        | 0. 0 0             |
| L    |                         | V i : 2.6        | 0. 0 0             |
| M    |                         | V i : 3.6        | 0. 0 0             |
| H    |                         | V i : 5.8        | 0. 0 0             |
| C    | Compound type           | 0. 0 0           | 0. 7 0             |
| B    | Booster type            | 0. 0 0           | 0. 3 0             |
| DD   | Slide Valve with groove | 0. 0 0           | 0. 3 0             |

Note) Vi : design volume ratio



[Table-1:Standard pressure conditions]

### 4.3. Calculation of the Volume Flow Rate of Suction Gas

Calculate the volume ratio of suction gas flow before orifice (Qa) from formula (1) below using orifice differential pressure, pressure before orifice and temperature.

$$Q_a = \varepsilon \cdot \alpha \cdot \pi / 4 (dt \times 10^{-3})^2 \sqrt{2 \cdot \Delta H} \times 10^6 \times V_O \times 3600 \cdot \cdot (1)$$

|    |  |                        |
|----|--|------------------------|
| Qa | the volume flow rate of suction gas before orifice | ( m <sup>3</sup> /h )  |
| ε  | expansibility factor                               | ( — )                  |
| α  | flow coefficient                                   | ( — )                  |
| dt | Diameter of orifice                                | ( mm )                 |
| ΔH | Differential pressure around orifice plate         | ( MPa )                |
| Vo | Gas specific volume before orifice                 | ( m <sup>3</sup> /kg ) |

|  |   |  |                 |
|--|---|--|-----------------|
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Calculate the volume ratio of flow of suction gas at compressor inlet (Qs) from formula (2) using gas volume ratio before the orifice and at the suction inlet.

$$Q_s = Q_a \times \frac{V_S}{V_O} \dots \dots (2)$$

|    |   |                        |
|----|---|------------------------|
| Qs | the volume flow rate of suction gas at the compressor inlet | ( m <sup>3</sup> /h )  |
| Qa | the volume flow rate of suction gas before orifice          | ( m <sup>3</sup> /h )  |
| VS | Gas specific volume at compressor inlet                     | ( m <sup>3</sup> /kg ) |
| VO | Gas specific volume before orifice                          | ( m <sup>3</sup> /kg ) |

#### 4.3.1 Acceptance Criteria

The volume rate flow of suction gas calculated from the actual values should be acceptable if it is over 95% of the standard volume flow rate of suction gas. The standard volume flow rate of suction gas is calculated by the approximate expression that has been developed based on the test results of numerous compressors over many years.

#### 4.3.2 Records

The test results are recorded in Appendix-1: Screw Compressor Test Records.

#### [Break Horse Power]

#### 4.4 Measuring Break Horse Power

##### 4.4.1 Purpose

Torque and motor revolutions are measured to calculate the break horse power.

##### 4.4.2. Measurement Method/Equipment and Conditions

Measurement conditions are the same as for the capacity test.



Torque is measured using the torque meter mounted on the rotational axis.

Motor revolutions are measured using a tachometer.

**4.4.3. Break horse power is calculated from the formula (3) below using the reading value of the torque meter.**

$$kW = \frac{1}{1000} \times \frac{2\pi}{60} \times \text{RPM} \times \text{TRQ} \dots \dots (3)$$

|     |                   |                      |
|-----|-------------------|----------------------|
| kW  | break horse power | (kW)                 |
| RPM | motor revolution  | (min <sup>-1</sup> ) |
| TRQ | torque            | (Nm)                 |

|  |   |  |                 |
|--|---|--|-----------------|
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#### 4.4.4. Acceptance Criteria

If the break horse power from above is less than 105% of the standard power value, it should be acceptable. The standard power value is calculated by the approximate expression which has been developed based on the test results of numerous compressors for many years.

#### 4.4.5. Records

The test results are recorded in Appendix-1: Screw Compressor Test Records.

### 5. Mechanical Running Test

#### 5.1 Purpose

After compressor operation stabilizes\*, perform a two hour running test to check for faults by measuring the surface temperature of the compressor.

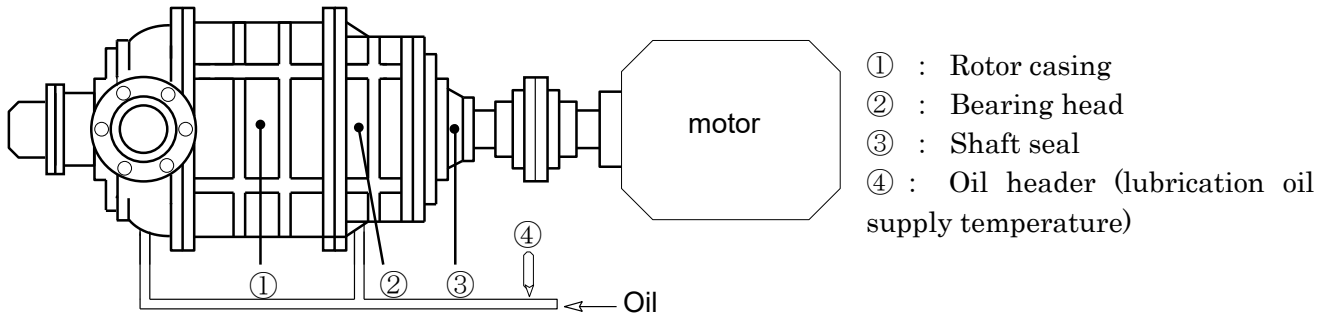
\*Stable operation state means the change of lubrication oil temperature is within 3 degrees in 30minutes while meeting the test conditions stipulated in paragraph 4.2 and Table-1, 30minutes after start-up.

#### 5.2 Measurement Method/Equipment and Conditions

In 30minutes after start-up when the compressor operation reaches stable state while maintaining the test conditions stipulated in paragraph 4.2 and Table-1, measure the surface temperature at each point shown in Figure-2 and Figure-3 and check the lubrication, vibration, noise and for other abnormalities.

The surface temperature measurement locations are shown in Figures 2 and 3.

Figure 2: Single Stage Compressor





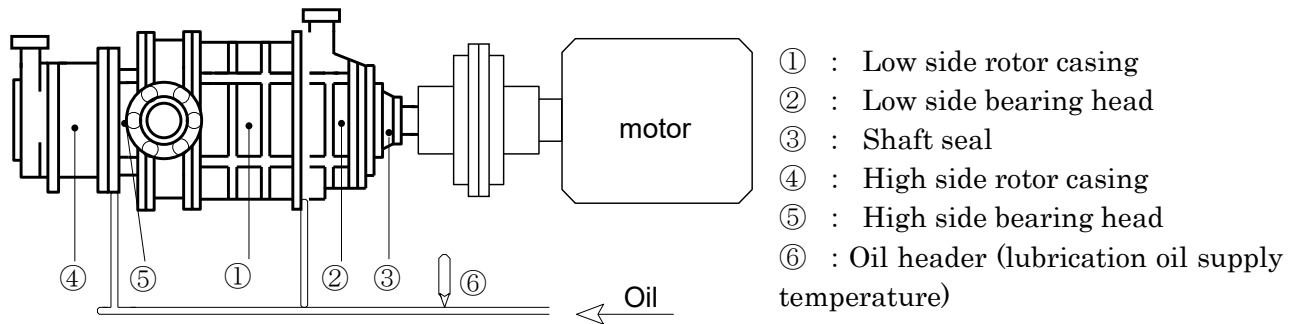
|  |   |  |                 |
|--|---|--|-----------------|
|  | <b>DEHDASHT PETROCHEMICAL INDUSTRY COMPANY</b><br><br><b>DEHDASHT HIGH DENSITY POLYETHYLENE PROJECT</b> |  |                 |
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Figure 3: Compound Type Compressor



### 5.3 Acceptance Criteria

Measurement values that do not exceed the values indicated in Table-2 are accepted.

| Single stage compressor | Compound type two stage compressor | Allowable value                   |
|-------------------------|------------------------------------|-----------------------------------|
| ① Rotor casing          | ① Low side rotor casing            | Lubrication oil temperature +35°C |
| ② Bearing head          | ② Low side bearing head            | Lubrication oil temperature +35°C |
| ③ Shaft seal            | ③ Shaft seal                       | Lubrication oil temperature +20°C |
|                         | ④ High side rotor casing           | Lubrication oil temperature +35°C |
|                         | ⑤ High side bearing head           | Lubrication oil temperature +35°C |

Table 2 Surface Temperature Criteria

### 5.4 Records

The test results are recorded in Appendix 1: Screw Compressor Test Records.

## 6. Vibration and Noise Tests



### 6.1 Purpose

Noise and vibration tests are carried out during mechanical running test to check whether the compressor's noise and vibration are within the standard shipping values or not.

### 6.2 Measurement Method

#### 6.2.1 Vibration

The amplitude of vibration is measured with a general purpose vibrometer (frequency analysis of the vibration is not performed.)

|  |   |  |                 |
|--|---|--|-----------------|
|  | <b>DEHDASHT PETROCHEMICAL INDUSTRY COMPANY</b><br><br><b>DEHDASHT HIGH DENSITY POLYETHYLENE PROJECT</b> |  |                 |
| <b>Contract No.: DPIC/98-12</b>  | <b>DOCUMENT TITLE: Inspection and Test Procedure for Compressor</b>                                     | <b>POI: IFA</b>  | <b>Rev.: D0</b> |
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### 6.2.2 Measurement Method

Measurement points are shown in Figures 4 and Figure 5. Using a magnetic pickup, amplitudes are measured at each point (V, H, A for single stage compressors and VL, HL, AL, VH, HH, AH for compound type compressors).

### 6.2.3 Noise

Noise is measured using a sound level meter as specified in the standard JIS C 1509 (2017) *Electroacoustics-Sound level meters-* in accordance with JIS B 8346 (1991) *Fans, blowers and compressors - Determination of A-weighted sound pressure level.* When the difference between the actual measurement and the background noise value is less than 10 dB, the actual measurement value should be corrected according to JIS Z 8731 (2019) *Acoustics -- Description and measurement of environmental noise.*

### 6.2.4 Measurement Method

Noise measurement points are shown as P-point in Figures 4 and 5.

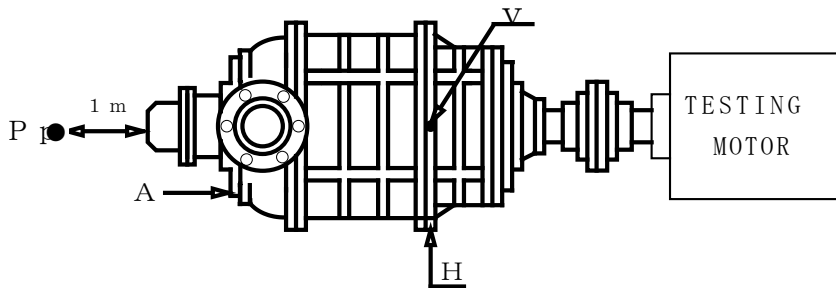


Figure 4  
Single Stage Compressor

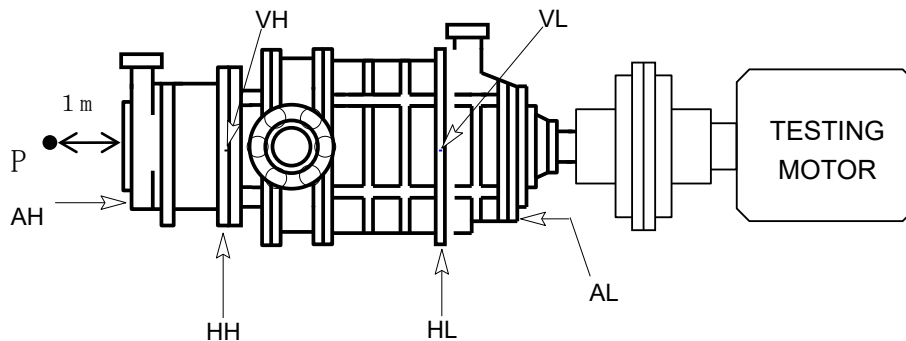




Figure 5  
Compound Type Compressor

### 6.3 Acceptance Criteria

Compressors with results not exceeding the values shown in Table 1 *Noise and Vibration Shipment Standards for Screw Compressors* are accepted.

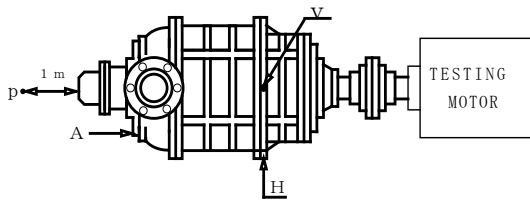
|  |   |  |                 |
|--|---|--|-----------------|
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#### 6.4 Records

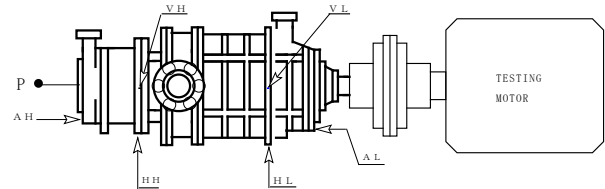
The test results are recorded in Appendix-1: Screw Compressor Test Records.

#### Appendix Table 1




### Noise and Vibration Shipment Standards for Screw Compressors



Single stage compressor



Compound type compressor

|   |   |   |  |
|---|---|---|--|
| <br> | <b>DEHDASHT PETROCHEMICAL INDUSTRY COMPANY</b><br><br><b>DEHDASHT HIGH DENSITY POLYETHYLENE PROJECT</b> |   |  |
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[Noise]

| Compressor type               | Discharge port | Acceptance value | Compressor type   | Discharge port | Acceptance value |
|-------------------------------|----------------|------------------|---|----------------|------------------|
| 1 2 5 SUD                     | L.M.H          | 8 4              | 1 6 0 VSD   | L.M.H          | 8 4              |
| 1 2 5 LUD                     | L.M.H          | 8 4              | 1 6 0 VMD   | L.M.H          | 8 4              |
| 1 6 0 SUD                     | L.M.H          | 8 4              | 1 6 0 VLD   | L.M.H          | 8 5              |
| 1 6 0 MUD                     | L.M.H          | 8 4              | 2 0 0 VSD   | L.M.H          | 8 6              |
| 1 6 0 LUD                     | L.M.H          | 8 5              | 2 0 0 VMD   | L.M.H          | 8 7              |
| 2 0 0 SUD                     | L.M.H          | 8 6              | 2 0 0 VLD   | L.M.H          | 8 8              |
| 2 0 0 MUD                     | L.M.H          | 8 7              | 2 5 0 VSD   | L.M.H          | 8 8              |
| 2 0 0 LUD                     | L.M.H          | 8 8              | 2 5 0 VMD   | L.M.H          | 9 0              |
| 2 5 0 SUD                     | L.M.H          | 8 8              | 2 5 0 VLD   | L.M.H          | 9 0              |
| 2 5 0 MUD                     | L.M.H          | 9 0              | 2 5 0 VLLD  | L.M.H          | 9 2              |
| 2 5 0 LUD                     | L.M.H          | 9 0              | 3 2 0 VSD   | L.M.H          | 9 5              |
| 3 2 0 SUD                     | L.M.H          | 9 5              | 3 2 0 VMD   | L.M.H          | 9 7              |
| 3 2 0 MUD                     | L.M.H          | 9 7              | 3 2 0 VLD   | L.M.H          | 9 8              |
| 3 2 0 LUD                     | L.M.H          | 9 8              | 4 0 0 VSD   | L.M.H          | 1 0 3            |
| 3 2 0 LLUD                    | L.M.H          | 1 0 3            | 4 0 0 VMD   | L.M.H          | 1 0 4            |
| 4 0 0 SUD                     | L.M.H          | 1 0 3            | 1 6 0 VSR   | L.M.H          | 8 7              |
| 4 0 0 MUD                     | L.M.H          | 1 0 4            | 1 6 0 VLR   | L.M.H          | 8 8              |
| 4 0 0 LUD                     | L.M.H          | 1 0 5            | 2 0 0 VSR   | L.M.H          | 8 9              |
| 4 0 0 LLUD                    | L.M.H          | 1 0 6            | 2 0 0 VLR   | L.M.H          | 9 1              |
| 4 0 0 XLUD                    | L.M.H          | 1 0 7            | 2 5 0 VSR   | L.M.H          | 9 1              |
| 4 0 0 XXLUD                   | L.M.H          | 1 0 8            | 2 5 0 VLR   | L.M.H          | 9 3              |
| 1610C                         | L.M.H          | 8 4              | <b>Vibration</b><br>(Frequency range: 10 - 1000 Hz) (half amplitude peak value)<br>Values in gray column are reference values as per API619 |                |                  |
| 1612C                         | L.M.H          | 8 6              |   |                |                  |
| 1612C 2poles Speed increasing | L.M.H          | 9 0              |   |                |                  |
| 1612C 4poles Speed increasing | L.M.H          | 8 8              |   |                |                  |
| 2 0 1 6 C                     | L.M.H          | 8 7              |   |                |                  |
| 2 5 2 0 C                     | L.M.H          | 9 2              |   |                |                  |
| 3 2 2 5 C                     | L.M.H          | 9 8              |   |                |                  |
| 4 0 2 5 C                     | L.M.H          | 1 0 5            |   |                |                  |
| 4 0 3 2 C                     | L.M.H          | 1 0 8            |   |                |                  |
| 1 7 0 JS                      | L.M.H          | 8 1              |   |                |                  |
| 1 7 0 JM                      | L.M.H          | 8 4              |   |                |                  |
| 1 7 0 JL                      | L.M.H          | 8 6              |   |                |                  |
| 2 2 0 JS                      | L.M.H          | 8 6              |   |                |                  |
| 2 2 0 JM                      | L.M.H          | 8 6              |   |                |                  |
| 2 2 0 JL                      | L.M.H          | 8 9              |   |                |                  |
| 2 8 0 JS                      | L.M.H          | 8 8              |   |                |                  |
| 2 8 0 JM                      | L.M.H          | 9 0              |   |                |                  |
| 2 8 0 JL                      | L.M.H          | 9 2              |   |                |                  |

| Type                                | Measurement points | Allowance value for amplitude<br>μm (half amplitude peak value) | allowance value for velocity<br>mm/s (RMS) |
|-------------------------------------|--------------------|---|--|
| Single stage Compressors            | V                  | 2 0   | 8  |
|                                     | H                  | 2 0   | 8  |
|                                     | A                  | 2 0   | 8  |
| Compound type two stage compressors | VH                 | 2 0   | 8  |
|                                     | HH                 | 2 0   | 8  |
|                                     | AH                 | 2 0   | 8  |
|                                     | VL                 | 2 0   | 8  |
|                                     | HL                 | 2 0   | 8  |
|                                     | AL                 | 2 0   | 8  |

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\* This criteria is acceptable for the downward discharge type compressors.

|  |   |  |                 |
|--|---|--|-----------------|
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## Appendix Table 2

### Measurement Equipment List

\*This list is only for reference. Actual instruments differ depending on test benches.

| Name                           | Use place                            | Registration No. | Type                          | Term of validity |
|--------------------------------|--------------------------------------|------------------|-------------------------------|------------------|
| U tube manometer               | Pressure Before Orifice              | AA11007          | PM12-231 (0~14.6kPa)          | May, 2014        |
|                                | Suction Pressure                     | AA11008          | PM12-231 (0~14.6kPa)          | May, 2014        |
|                                | Differential Pressure Across Orifice | AA11009          | PM12-231 (0~14.6kPa)          | May, 2014        |
| Bourdon tube pressure gauge    | Discharge Pressure                   | AA20201          | DU3/8 x 150mm x 2.0MPa        | Aug., 2011       |
|                                | Oil Pressure                         | AA20202          | DU1/2 x 50mm x 2.0MPa         | Aug., 2011       |
| Aneroid atmospheric meter      | Atmospheric Pressure                 | AA-AK002         | 930~1070hPa                   | March, 2012      |
| Strain gauge type torque meter | Running Torque                       | AATQ008          | TMNR-5KNM                     | Aug., 2011       |
| Rotating meter                 |                                      | AAPR003          | HT-4200                       | Oct., 2011       |
| Bar type thermometer           | Suction Temperature                  | On48             | Alcohol temperature gauge     | Jan., 2012       |
|                                | Discharge Temperature                | On50             |                               | Jan., 2012       |
|                                | Temperature Before Orifice           | On70             |                               | Jan., 2012       |
|                                | Oil Temperature                      | On54             |                               | Jan., 2012       |
| Noise meter                    |                                      | AA-SN004         | NL-26                         | March, 2014      |
| Vibration meter                |                                      | AA-SD004         | VM-83                         | July, 2013       |
| Bar type thermometer           | Rotor casing                         | On17             | Alcohol temperature gauge     | Jan., 2012       |
|                                | Bearing head                         | On67             |                               | Jan., 2012       |
|                                | Shaft seal                           | On51             |                               | Jan., 2012       |
| Motors                         |                                      | No.7             | 6300V x 2100KW x 2P x 4000rpm |                  |

Instruments above are regularly calibrated according to the company rules.



DEHDASHT PETROCHEMICAL INDUSTRY COMPANY  
DEHDASHT HIGH DENSITY POLYETHYLENE PROJECT



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SAMPLE

[Appendix 1 : Screw Compressor Test Records 1/3]

**MYCOM**

Report No. 0

Screw Compressor Test Record

|                  |                   |
|------------------|-------------------|
| Item No.         | : -               |
| Date             | : January 0, 1900 |
| Model            | : 0               |
| Serial No.       | : 0               |
| Test fluid       | : AIR             |
| Orifice No.      | : 0               |
| Time             | : 0:00            |
| Inspection items | : Internal test   |

SURVEYOR

|                                |                                |                   |
|--------------------------------|--------------------------------|-------------------|
| Revolution                     | 0                              | min <sup>-1</sup> |
| Running torque                 | 0.0                            | N·m               |
| Room Temperature               | 0.0                            | °C                |
| Atmospheric Pressure           | 0.0                            | kPa               |
| Discharge Pressure             | 0.0                            | kPa               |
| Suction Pressure               | L( 0.00 ) kPa<br>R( 0.00 ) kPa | 0.00 kPa          |
| Pressure Before Orifice        | L( 0.00 ) kPa<br>R( 0.00 ) kPa | 0.00 kPa          |
| Pressure Difference at Orifice | L( 0.00 ) kPa<br>R( 0.00 ) kPa | 0.00 kPa          |
| Oil Pressure                   | 0.00                           | MPa.G             |
| Suction Temperature            | 0.0                            | °C                |
| Temperature Before Orifice     | 0.0                            | °C                |
| Oil Temperature                | 0.0                            | °C                |
| Discharge Temperature          | 0.0                            | °C                |

|                  |     |        |
|------------------|-----|--------|
| Noise            | 0.0 | dB (A) |
| Background Noise | 0.0 | dB (A) |

TEST RESULTS;

|                       |     |      |
|-----------------------|-----|------|
| Temp. of Rotor Casing | 0.0 | °C   |
| Temp. of Bearing Head | 0.0 | °C   |
| Temp. of Shaft Seal   | 0.0 | °C   |
| Test of Vibration     | V   | 0 μm |
|                       | H   | 0 μm |
|                       | A   | 0 μm |

Approved by : \_\_\_\_\_

Checked by : \_\_\_\_\_



DEHDASHT PETROCHEMICAL INDUSTRY COMPANY  
DEHDASHT HIGH DENSITY POLYETHYLENE PROJECT



|                          |  |                |          |
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SAMPLE  
[Appendix 1 : Screw Compressor Test Records 2/3]



Report No. 0

Screw Compressor Test Results

SURVEYOR

GENERAL INFORMATION;

Item No. :  
Model :  
Serial No. :  
Date : January 0, 2000  
Tested at : MAYEKAWA MFG. CO.,LTD. MORIYA PLANT  
2000, Tatsuzawa Moriya-City, Ibaraki Pref., 302-0118, Japan

PERFORMANCE TEST ;

|                                | STANDARD | ACTUAL          | Judgment | CRITERIA     |
|--------------------------------|----------|-----------------|----------|--------------|
| Capacity (m <sup>3</sup> /h) : | 1.0      | 2.0 ( 200.0 % ) | Accepted | 95% and more |
| Brake Kilowatts (BkW) :        | 3.0      | 4.0 ( 133.3 % ) | Accepted | 105% or less |

MECHANICAL RUNNING TEST ;

|                         | ALLOWABLE MAXIMUM | ACTUAL | Judgment |
|-------------------------|-------------------|--------|----------|
| Temp. of Rotor Casing : | 35.0              | 0.0 °C | Accepted |
| Temp. of Bearing Head : | 35.0              | 0.0 °C | Accepted |
| Temp. of Shaft Seal :   | 20.0              | 0.0 °C | Accepted |

VIBRATION AND NOISE TESTS ;

|   | ALLOWABLE MAXIMUM | ACTUAL    | Judgment |
|---|-------------------|-----------|----------|
| Noise :                                   | 92                | 0.0 dB(A) | Accepted |
| Vibration (Frequency range : 10 - 1000Hz) |                   |           |          |
| V : :                                     | 20                | 0 μm      | Accepted |
| H : :                                     | 20                | 0 μm      | Accepted |
| A : :                                     | 20                | 0 μm      | Accepted |

Approved by : \_\_\_\_\_ Checked by : \_\_\_\_\_