NIIGATA LOADING SYSTEMS, LTD.

NIIGATA STAINLESS STEEL SPECIAL VALVES
FOR CHEMICALS AND CRYOGENIC SERVICE

NIIGATA LOADING SYSTEMS, LTD.
Head Office

1-3-6, Haidocho 3-chome, Chuo-ku, Tokyo 104-8510 JAPAN
TEL. 81-3-3555-7801 (Representatives)
FAX. 81-3-3555-7802

Nagoya Works

5-1, Sekaicho 2-chome, Nagoya-shi, Aichi 460-0031 JAPAN
TEL. 81-53-26-1000
FAX. 81-53-26-1002

Chiba Service Center

Arai Dai-2 Bldg., 1-5-2, Takamatsu-cho, Ichihara-shi, Chiba 290-0056 JAPAN
TEL. 81-436-25-1216
FAX. 81-436-25-1208

Osaka Service Center

YS Bldg., 1-3-2, Sakai-kubokan-cho, Sakai-ku, Osaka 566-0071 JAPAN
TEL. 81-6-630-2101
FAX. 81-6-630-2032

Nagoya Service Center

1-A-301, Takamatsu-cho, Aichi, 477-0077 JAPAN
TEL. 81-562-33-2732
FAX. 81-562-33-2732

Tokyo Boeki Co., Ltd.

13-8, Hatchobori 2-chome, Chuo-ku, Tokyo 104-8510 JAPAN
TEL. 81-3-2287-8677
FAX. 81-3-2287-7033

http://www.niigata-ns.co.jp/

C/o TOKYO BOEKI Ltd.

Suite B-10-3, Level 10, TowerB, Wisma Pantai, No.5 Jalan 4/83A Off Jalan Pantai Baru, 59200 Kuala Lumpur, Malaysia
TEL. 603-2287-1011
FAX. 603-2287-1012

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NIIGATA STAINLESS STEEL SPECIAL VALVES

High Performance Butterfly Valve


Features

- **Stainless-steel with Excellent Corrosion Resistance**
  Through the use of stainless steel we have made our products rustproof, corrosion resistant and very durable.

- **Self-seal Shape Providing an Outstanding Sealing Performance**
  The unique packing shape enables further tighter sealing by the use of fluid pressure. With a close contact structure between the disc and the seal by utilizing fluid pressure for both forward and reverse flows, an extremely high sealing performance is achieved.

- **Achieving a Reduction of Operation Torque and Longer Lifespan of the Seal by Double Eccentric Structure**
  Since the utilization of double eccentric structure, the disk and the seal do not touch each other until just before the complete shutoff. This achieves a reduction of operation torque and long-time reliable sealing performance.

- **Combination with a Broad Range of Operators**
  We comply with ISO5211 for operator installation and various operators can easily installed.

- **Choice of Soft Type and Metal Type Seals Provide a Broader Applicability Range**
  Reinforced PTFE seals and metal seals are available. Optimal for steam, chemicals, medicines and much more.

- **Correspond to Marine Classification**
High Performance Butterfly Valve

Specifications

<table>
<thead>
<tr>
<th>Parts name</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body</td>
<td>SCS13A</td>
</tr>
<tr>
<td>Disk</td>
<td>SCS13A</td>
</tr>
<tr>
<td>Seal</td>
<td>Reinforced PTFE Steel</td>
</tr>
<tr>
<td>Shaft</td>
<td>SUS304</td>
</tr>
<tr>
<td>Pin</td>
<td>SUS304</td>
</tr>
<tr>
<td>Taper pin</td>
<td>SUS304</td>
</tr>
<tr>
<td>Actuator</td>
<td>PTFE</td>
</tr>
<tr>
<td>Bushing</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Thrust ring</td>
<td>PTFE/Sus304</td>
</tr>
<tr>
<td>Bottom cover</td>
<td>SCS13A</td>
</tr>
<tr>
<td>Bottom gland</td>
<td>SUS304</td>
</tr>
<tr>
<td>Hex head bolt</td>
<td>SUS304</td>
</tr>
<tr>
<td>Spring pin</td>
<td>SUS304</td>
</tr>
<tr>
<td>Spring wash</td>
<td>SUS304</td>
</tr>
<tr>
<td>Shaft seal</td>
<td>PTFE V packing (−20°C)</td>
</tr>
</tbody>
</table>

Flow characteristics and Cv value

<table>
<thead>
<tr>
<th>Material</th>
<th>Cv value (full open)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUS304</td>
<td>6750</td>
</tr>
<tr>
<td>SCS13A</td>
<td>4250</td>
</tr>
<tr>
<td>Reinforced PTFE</td>
<td>2450</td>
</tr>
</tbody>
</table>

Flow direction

- Single (Left to Right)
- Bi-directional (Standard is from shaft to disc)

Flow characteristics

<table>
<thead>
<tr>
<th>Flow rate (%)</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal diameter</td>
<td>250A</td>
<td>200A</td>
<td>150A</td>
<td>100A</td>
<td>80A</td>
<td>63A</td>
<td>50A</td>
<td>32A</td>
<td>16A</td>
<td>10A</td>
</tr>
<tr>
<td>Cv value</td>
<td>476</td>
<td>410</td>
<td>343</td>
<td>245</td>
<td>180</td>
<td>125</td>
<td>98</td>
<td>68</td>
<td>46</td>
<td>32</td>
</tr>
</tbody>
</table>

Types of operation

Multiple operation air cylinder (TA type)

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>Type</th>
<th>Main Size (mm)</th>
<th>Cv value</th>
</tr>
</thead>
<tbody>
<tr>
<td>80A (3B)</td>
<td>TA03</td>
<td>323 126 78</td>
<td>8</td>
</tr>
<tr>
<td>100A (4B)</td>
<td>TA05</td>
<td>329 146 96</td>
<td>9</td>
</tr>
<tr>
<td>125A (5B)</td>
<td>TA08</td>
<td>335 165 114</td>
<td>11</td>
</tr>
<tr>
<td>150A (6B)</td>
<td>TA10</td>
<td>341 183 132</td>
<td>13</td>
</tr>
<tr>
<td>200A (8B)</td>
<td>TA15</td>
<td>357 201 150</td>
<td>15</td>
</tr>
<tr>
<td>250A (10B)</td>
<td>TA20</td>
<td>373 217 168</td>
<td>17</td>
</tr>
<tr>
<td>300A (12B)</td>
<td>TA25</td>
<td>390 233 186</td>
<td>19</td>
</tr>
</tbody>
</table>

Electric-powered (AE/HD type)

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>Type</th>
<th>Main Size (mm)</th>
<th>Cv value</th>
</tr>
</thead>
<tbody>
<tr>
<td>80A (3B)</td>
<td>AE01</td>
<td>290 126 78</td>
<td>8</td>
</tr>
<tr>
<td>100A (4B)</td>
<td>AE02</td>
<td>300 146 96</td>
<td>9</td>
</tr>
<tr>
<td>125A (5B)</td>
<td>AE03</td>
<td>315 165 114</td>
<td>11</td>
</tr>
<tr>
<td>150A (6B)</td>
<td>AE04</td>
<td>330 183 132</td>
<td>13</td>
</tr>
<tr>
<td>200A (8B)</td>
<td>AE05</td>
<td>345 201 150</td>
<td>15</td>
</tr>
<tr>
<td>250A (10B)</td>
<td>AE06</td>
<td>360 217 168</td>
<td>17</td>
</tr>
<tr>
<td>300A (12B)</td>
<td>AE07</td>
<td>375 233 186</td>
<td>19</td>
</tr>
</tbody>
</table>

Worm gear

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>Main Size (mm)</th>
<th>Cv value</th>
</tr>
</thead>
<tbody>
<tr>
<td>80A (3B)</td>
<td>218 126 78</td>
<td>8</td>
</tr>
<tr>
<td>100A (4B)</td>
<td>230 146 96</td>
<td>9</td>
</tr>
<tr>
<td>125A (5B)</td>
<td>245 165 114</td>
<td>11</td>
</tr>
<tr>
<td>150A (6B)</td>
<td>260 183 132</td>
<td>13</td>
</tr>
<tr>
<td>200A (8B)</td>
<td>275 201 150</td>
<td>15</td>
</tr>
<tr>
<td>250A (10B)</td>
<td>290 217 168</td>
<td>17</td>
</tr>
<tr>
<td>300A (12B)</td>
<td>305 233 186</td>
<td>19</td>
</tr>
</tbody>
</table>

Lever handle

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>Type</th>
<th>Main Size (mm)</th>
<th>Cv value</th>
</tr>
</thead>
<tbody>
<tr>
<td>80A (3B)</td>
<td>HD01</td>
<td>595 367 295</td>
<td>15</td>
</tr>
<tr>
<td>100A (4B)</td>
<td>HD02</td>
<td>610 382 315</td>
<td>17</td>
</tr>
<tr>
<td>125A (5B)</td>
<td>HD03</td>
<td>625 402 335</td>
<td>19</td>
</tr>
<tr>
<td>150A (6B)</td>
<td>HD04</td>
<td>640 422 355</td>
<td>21</td>
</tr>
</tbody>
</table>

Material Parts name

- SUS304
- PTFE
- Reinforced PTFE
- Metal (SUS)
- Shaft seal
- Disk
- Body

Pressure test

- 1.5 MPa

Valve weir leakage test

- 1.1 MPa

Valve weir leakage standard

- JS G3003 Part 2
Cryogenic Butterfly Valve

Long-time Reliable Sealing Performance and Low Torque Handling Performance Through a Combination of Dual Eccentric Structure and Unique Sealing Mechanism.

Features

- The disk seal has a self seal structure with a stainless steel spring built in a fluororesin type envelope (soft seal)
  - Showing reliable sealing performance by following thermal shrinkage of disc result from temperature change.
  - When the internal pressure rises, the sealing surface pressure increases, and this ensures more reliable sealing performance.
  - The sealing mechanism with a built in spring provides low torque handling performance and enables downsizing of the actuator.
  - It is a practical application of the sealing technology, which proved its high reliability through successful delivery records.

- The shaft seal is a self seal with a stainless steel spring built in a PTFE envelope
  - Since gland packing is unnecessary, the gland bolt, which is normally needed for torque management and further tightening after use, is not used. This makes the maintenance and the inspections easier.
  - Since a shaft seal is provided on the top of the disc as well, an accurate sealing performance is achieved even when the shaft is installed horizontally.

- Disc with Double Eccentric Structure
  - The disc and the disk seal contact just before the shut-off valve completely.
  - Wear of the seal is reduced by a combination with a sealing mechanism with a built-in spring.

- Passes the Actual Use Temperatures Durability Test (Soft Seal)
  - We have performed leakage test in accordance with T.T.O. Low-temperature Valve Guidelines, at the temperatures of actual use and confirmed the following performance after the open/close motion:
    - Forward flow side: 0
    - Reverse flow side: within acceptable range.

- Correspond to Marine Classification (metal seal)
- Meet fire safety requirements
Cryogenic Butterfly Valve

### Specifications

#### Soft Seal Type

<table>
<thead>
<tr>
<th>Material</th>
<th>Rating</th>
<th>Flange Type</th>
<th>Connection</th>
<th>Operation</th>
<th>Parts name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soft Seal Metal</td>
<td>Nominal Diameter</td>
<td>Manual Butt Weld Type (Side Entry)</td>
<td>Butterfly Type (Side Entry)</td>
<td>Worm gear</td>
<td></td>
</tr>
<tr>
<td>seals (for vessels)</td>
<td>100A ~ 750A</td>
<td></td>
<td></td>
<td>Air Cylinder</td>
<td>Body</td>
</tr>
<tr>
<td></td>
<td>(BB ~ 30B)</td>
<td></td>
<td></td>
<td></td>
<td>ASTM A351 CF8M, CF3M</td>
</tr>
<tr>
<td></td>
<td>150A ~ 1000A</td>
<td></td>
<td></td>
<td></td>
<td>Disc</td>
</tr>
<tr>
<td></td>
<td>(BB ~ 40B)</td>
<td></td>
<td></td>
<td></td>
<td>ASTM A564 CF8M</td>
</tr>
</tbody>
</table>

#### Flow characteristics and Cv value

![Flow characteristics and Cv value graph](Image)

<table>
<thead>
<tr>
<th>Type</th>
<th>Soft Seal</th>
<th>Metal seals (for vessels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Rating</td>
<td>Material</td>
</tr>
<tr>
<td>Type</td>
<td>Nominal Diameter</td>
<td>Flange Type</td>
</tr>
<tr>
<td>Type</td>
<td>100A ~ 750A</td>
<td>Manual Butt Weld Type</td>
</tr>
<tr>
<td>Type</td>
<td>(BB ~ 30B)</td>
<td>(Side Entry)</td>
</tr>
<tr>
<td>Type</td>
<td>150A ~ 1000A</td>
<td>(Side Entry)</td>
</tr>
</tbody>
</table>

#### Operation

**Worm gear**

![Worm gear diagram](Image)

**Other types of operation:**
- Air cylinders
- Air motors
- Hydraulic cylinders

<table>
<thead>
<tr>
<th>Material</th>
<th>Nominal Diameter</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>150A (BB)</td>
<td>A194Gr8</td>
</tr>
<tr>
<td></td>
<td>200A (BB)</td>
<td>Graphite</td>
</tr>
<tr>
<td></td>
<td>250A (10B)</td>
<td>PTFE</td>
</tr>
<tr>
<td></td>
<td>300A (12B)</td>
<td>FEP/Stainless Steel</td>
</tr>
<tr>
<td></td>
<td>350A (14B)</td>
<td>Copper/Stainless Steel</td>
</tr>
<tr>
<td></td>
<td>400A (16B)</td>
<td>Hex nut A194G6</td>
</tr>
<tr>
<td></td>
<td>450A (18B)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>500A (20B)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>550A (22B)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>600A (24B)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>650A (26B)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>700A (28B)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>750A (30B)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>800A (32B)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>850A (34B)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>900A (36B)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1000A (40B)</td>
<td></td>
</tr>
</tbody>
</table>
**NLS Introduction of business**

NLS’ s solutions and service network offer strong support for stable energy supply

NLS develops and manufactures products providing optimal solutions for handling of fluid cargo of various kinds of energy and chemical products in the energy industry, and has a strong and comprehensive service system. The company mainly manufactures loading arms, swivel joints, butterfly valves and other fluid cargo handling equipment. These products are generated through close partnerships with world-leading manufacturers and by bringing together leading-edge technologies and our know-how accumulated over many years to meet customers’ demands.

**NLS Introduction of products**

NLS products play important roles in a wide variety of industries and applications, including the energy industry

**Loading arms**

Loading arms are fluid-cargo handling equipment essential for transporting crude oil, chemical products, LPG, LNG and other types of fluids. NLS offers a variety of loading terminals according to the conditions of use in the loading base and the type of fluid, not only for marine loading services but also for trucks and rail cars. We provide customers with total support throughout the design, manufacture, installation and maintenance processes.

**Swivel joints**

Swivel joints are 360-degree rotary joints that support the smooth delivery of fluids and allow fluids to move in any direction through pipes. Swivel joints are specifically developed and designed for LNG, liquid nitrogen, frozen ethylene and other cryogenic fluids and provide a solution for safe and reliable loading. NLS swivel joints are used in a wide variety of industries, such as food and construction.

**Butterfly valves**

NLS butterfly valves are available in many types of models to fit such applications as cryogenic, high-temperature, high-pressure and vacuum services; they are made from a range of materials depending on the application. The valves are completely sealed with advanced technology and have excellent corrosion resistance and durability. NLS is also developing products that satisfy the requirements for automation in larger systems and for valves with larger bore diameters.