Nu-Saf™
Scored Forward Acting Rupture Disks
The XN-85 is specially manufactured by forming the disk first and then scoring. This creates a minimally stressed score pattern offering optimum service life and an extended operating pressure limit of 85% of marked burst pressure or 90% of minimum burst pressure, even under cyclic conditions. Consult us with your particular operating requirements.

**Features**

- Solid metal
- Precision scored
- Designed for non-fragmentation
- Withstands full vacuum without support
- Operates up to 85% of the disk’s marked pressure or 90% of minimum burst pressure
- Liquid and gas service (acceptable for liquid service with gas driven liquid conditions; consult factory)
- Damage safety ratio <1
- Optimum forward acting disk for pulsating or cycling conditions
- 0%, -5% and -10% manufacturing design range

**Burst Tolerance**

<table>
<thead>
<tr>
<th>Marked burst pressure</th>
<th>Burst tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 40 psig (2.76 barg)</td>
<td>± 2 psig (0.138 barg)</td>
</tr>
<tr>
<td>&gt; 40 psig (2.76 barg)</td>
<td>± 5%</td>
</tr>
</tbody>
</table>

**Manufacturing Design Range (MDR)**

The choice of a 0%, -5% or -10% MDR is available. The total range is placed on the minus side of requested burst pressure.

<table>
<thead>
<tr>
<th>Material</th>
<th>Maximum Recommended Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>250°F 121°C</td>
</tr>
<tr>
<td>Nickel (alloy 200)</td>
<td>750°F 399°C</td>
</tr>
<tr>
<td>Monel (alloy 400)</td>
<td>900°F 482°C</td>
</tr>
<tr>
<td>Inconel (alloy 600)</td>
<td>1100°F 593°C</td>
</tr>
<tr>
<td>316 stainless steel</td>
<td>900°F 482°C</td>
</tr>
<tr>
<td>Hastelloy C-276 (alloy C-276)</td>
<td>900°F 482°C</td>
</tr>
</tbody>
</table>

**Tank Size**

<table>
<thead>
<tr>
<th>Disk Size</th>
<th>Aluminum</th>
<th>Nickel Alloy 200</th>
<th>Inconel® Alloy 600</th>
<th>Monel® Alloy 400</th>
<th>316ss</th>
</tr>
</thead>
<tbody>
<tr>
<td>in / mm</td>
<td>psig / barg</td>
<td>psig / barg</td>
<td>psig / barg</td>
<td>psig / barg</td>
<td>psig / barg</td>
</tr>
<tr>
<td></td>
<td>Min / Max</td>
<td>Min / Max</td>
<td>Min / Max</td>
<td>Min / Max</td>
<td>Min / Max</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>113 / 188</td>
<td>8 / 13</td>
<td>118 / 188</td>
<td>13 / 103</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td>45 / 75</td>
<td>3 / 5</td>
<td>75 / 1200</td>
<td>5 / 82</td>
</tr>
<tr>
<td>6</td>
<td>150</td>
<td>36 / 60</td>
<td>3 / 4</td>
<td>60 / 1100</td>
<td>4 / 76</td>
</tr>
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<td>16</td>
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<td>-</td>
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<tr>
<td>18</td>
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<tr>
<td>20</td>
<td>500</td>
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<tr>
<td>24</td>
<td>600</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Optional liner; liners are available in all sizes on the process or downstream side (or for both; consult factory). Fluoropolymer film application range -40°F (-40°C) to 500°F (260°C)
### Type XT™ Advanced Rupture Disk Performance from a Forward Acting, Tension Loaded Design

**Burst Tolerance**

<table>
<thead>
<tr>
<th>Marked Burst Pressure</th>
<th>Burst Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 40 psig (2.76 barg)</td>
<td>+ 2 psig (0.138 barg)</td>
</tr>
<tr>
<td>&gt; 40 psig (2.76 barg)</td>
<td>+ 5%</td>
</tr>
</tbody>
</table>

### Burst Pressure Capabilities at 72°F (22°C) for XT Disk in gas service

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Aluminum</th>
<th>Nickel Alloy 200 &amp; Tantalum</th>
<th>Inconel® Alloy 600 &amp; Monel® alloy 400</th>
<th>316ss</th>
<th>Hastelloy® Alloy C-276, C-22</th>
</tr>
</thead>
<tbody>
<tr>
<td>in/mm</td>
<td>psig/bar</td>
<td>psig/bar</td>
<td>psig/bar</td>
<td>psig/bar</td>
<td>psig/bar</td>
</tr>
<tr>
<td>1</td>
<td></td>
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<tr>
<td>1.5</td>
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<td></td>
</tr>
<tr>
<td>2</td>
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<td></td>
<td></td>
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<tr>
<td>3</td>
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<td></td>
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<tr>
<td>4</td>
<td></td>
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<tr>
<td>6</td>
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<tr>
<td>8</td>
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<td></td>
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<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### Burst Pressure Capabilities at 72°F (22°C) for XT Disk in liquid service

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Aluminum</th>
<th>Nickel Alloy 200 &amp; Tantalum</th>
<th>Inconel® Alloy 600 &amp; Monel® alloy 400</th>
<th>316ss</th>
<th>Hastelloy® Alloy C-276, C-22</th>
</tr>
</thead>
<tbody>
<tr>
<td>in/mm</td>
<td>psig/bar</td>
<td>psig/bar</td>
<td>psig/bar</td>
<td>psig/bar</td>
<td>psig/bar</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>2</td>
<td></td>
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<td></td>
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<tr>
<td>3</td>
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<tr>
<td>10</td>
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<td></td>
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<tr>
<td>12</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### Features
- Sizes 1-12 inches (25-300 mm)
- Seven standard materials; wide range of corrosion resistance - Refer to the material temperature table
- ‘X’ shaped score pattern; designed for non-fragmentation; excellent for relief valve isolation
- Smooth surface on process side; resistant to product accumulation
- Operates up to 80% of marked burst pressure or 85% of minimum burst pressure
- Designed for gas service or liquid service
- High flow capacity / low flow resistance: certified for gas and liquid service
- Fail safe: design safety ratio < 1
- 1 piece solid metal construction; excellent leak tightness
- Withstands full vacuum without support
- Available “CE” marked or ASME stamped (UD)
- For use in pretorqued BS&B safety heads type NFI-7RS and NF-7RS or preassembled safety head types NX-7R and NF-7R
- XT-K welded assembly option is available A 90% operating pressure ratio may apply under static operating conditions; consult factory
Type XB™
Rupture Disks for High Pressure

The XB rupture disk (also referred to as “Scored B” or “SCD B”) is a non-fragmenting, high pressure rupture disk that opens along score lines. The XB offers a broader range of burst pressures and sizes.

Burst Tolerance

<table>
<thead>
<tr>
<th>Marked Burst Pressure</th>
<th>Burst Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 40 psig (2.76 barg)</td>
<td>± 2 psig (0.138 barg)</td>
</tr>
<tr>
<td>&gt; 40 psig (2.76 barg)</td>
<td>± 5%</td>
</tr>
</tbody>
</table>

Manufacturing Design Range (MDR)
The XB is available with either -5% or -10% MDR. Consult BS&B for manufacturing design ranges less than -5%.

<table>
<thead>
<tr>
<th>Material</th>
<th>Maximum Recommended Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel alloy 200</td>
<td>750°F (399°C)</td>
</tr>
<tr>
<td>Monel® alloy 400</td>
<td>900°F (482°C)</td>
</tr>
<tr>
<td>Inconel® alloy 600</td>
<td>1100°F (593°C)</td>
</tr>
<tr>
<td>Stainless steel 316</td>
<td>900°F (482°C)</td>
</tr>
<tr>
<td>Hastelloy® (alloy C-276 or C-22)</td>
<td>900°F (482°C)</td>
</tr>
<tr>
<td>Aluminum</td>
<td>250°F (121°C)</td>
</tr>
<tr>
<td>Tantalum</td>
<td>500°F (260°C)</td>
</tr>
</tbody>
</table>

 XB Disk Specifications Minimum / Maximum Pressure Ratings at 72°F (22°C)

<table>
<thead>
<tr>
<th>Disk Size</th>
<th>Aluminum</th>
<th>Nickel alloy 200</th>
<th>Inconel® Alloy 600</th>
<th>Monel® Alloy 400</th>
<th>Hastelloy® Alloy C 276 and 316ss</th>
</tr>
</thead>
<tbody>
<tr>
<td>in / mm</td>
<td>psig / barg</td>
<td>psig / barg</td>
<td>psig / barg</td>
<td>psig / barg</td>
<td>psig / barg</td>
</tr>
<tr>
<td>1 / 25</td>
<td>125 / 9</td>
<td>100 / 9</td>
<td>125 / 9</td>
<td>125 / 9</td>
<td>125 / 9</td>
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<tr>
<td>1.5 / 40</td>
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<td>4 / 100</td>
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<td>-</td>
</tr>
<tr>
<td>5 / 125</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6 / 150</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>8 / 200</td>
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<tr>
<td>10 / 250</td>
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<td>12 / 300</td>
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<tr>
<td>14 / 350</td>
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<tr>
<td>16 / 400</td>
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<tr>
<td>18 / 450</td>
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<tr>
<td>20 / 500</td>
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</tr>
<tr>
<td>24 / 600</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Optional liner: A fluorocarbon film liner is available as an option on the process side of the XT disk.
Fluoropolymer film application range -40°F to 500°F (-40°C to 260°C)
LCN™ Low Pressure Rupture Disk

The type LCN flat rupture disk uses composite technology to achieve low burst ratings from resistant materials that shall be selected to suit application service conditions.

Features
- Flat composite metal construction
- Fluorocarbon film seal
- Can withstand full vacuum
- Operates up to 80% of the minimum burst pressure
- Suitable for gas and liquid applications
- Damage safety ratio < 1
- Standard materials of construction 316ss / fluorocarbon film / 316ss
  - Consult BS&B for other materials
- For use in pretorqued BS&B safety heads type NX-7R and NXV-7R for vacuum

Burst Tolerance

<table>
<thead>
<tr>
<th>Marked Burst Pressure</th>
<th>Burst Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 7 psig (0.48 barg)</td>
<td>±1 psig (0.069 barg)</td>
</tr>
<tr>
<td>&lt; 15 psig (1.03 barg)</td>
<td>±1.5 psig (0.1 barg)</td>
</tr>
<tr>
<td>15 &lt; 40 psig (2.76 barg)</td>
<td>+2 psig (0.138 barg)</td>
</tr>
<tr>
<td>&gt; 40 psig (2.76 barg)</td>
<td>± 5%</td>
</tr>
</tbody>
</table>

Manufacturing Design Range (MDR)

<table>
<thead>
<tr>
<th>Marked Burst Pressure</th>
<th>MDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 40 psig (2.76 barg)</td>
<td>-5% or -10%</td>
</tr>
<tr>
<td>&gt; 15 psig (1.03 barg) and 140 psig (2.76 barg)</td>
<td>-10%</td>
</tr>
<tr>
<td>≤ 15 psig (2.03 barg)</td>
<td>0%**</td>
</tr>
</tbody>
</table>

Vacuum and Back Pressure Resistance

All burst pressures at or above 45 psig (3.1 barg) allow the LCN disk to resist full vacuum. At lower burst pressures the LCN disk will resist partial vacuum up to the equivalent of 35% of the marked burst pressure. Greater vacuum resistance can be provided by the NXV-7™ safety head which has an integral vacuum support.

For back pressure resistance exceeding 15 psi (1.03 bar) the NXV-7R safety head shall be used. Consult BS&B for maximum back pressure resistance. The NXV-7R safety head with integral vacuum support will reduce the free flow area by up to 40%.

Recommended Temperature Limits

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>-40°F</td>
<td>400°F</td>
</tr>
<tr>
<td>Temperature</td>
<td>-40°C</td>
<td>204°C</td>
</tr>
</tbody>
</table>

LCN Specifications: Minimum / Maximum Disk Burst Pressures at 72°F (22°C)

<table>
<thead>
<tr>
<th>Disk Size</th>
<th>316ss / Fluorocarbon Film / 316ss</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>1.5</td>
<td>40</td>
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<td>50</td>
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<td>80</td>
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<td>100</td>
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<td>150</td>
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<td>200</td>
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<td>10</td>
<td>250</td>
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<td>12</td>
<td>300</td>
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<td>14</td>
<td>350</td>
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<td>16</td>
<td>400</td>
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<td>18</td>
<td>450</td>
</tr>
<tr>
<td>20</td>
<td>500</td>
</tr>
<tr>
<td>24</td>
<td>600</td>
</tr>
</tbody>
</table>

The requested burst pressure is the marked burst pressure
NF-7R, NX-7R™, and NXV-7R Pre-Assembled Safety Heads

The NF-7R™, NX-7R™, and NXV-7R Safety Head design incorporates several features which allow easy installation. The NF-7R and NX-7R Safety Heads fit inside the studs of two companion flanges. Asymmetric alignment pins in the Safety Head mate with location holes in the rupture disk and safety head assembly then brought to the point of installation as a modular unit. (Both ASME and EN Standards define the combination of a rupture disk and safety head as the pressure relief device.)

- Inspection capability; while the rupture disk and safety head remain combined, the device may be removed from service for inspection and reinstalled provided the pretorqued cap-screws remain in position

Features of Pretorqued Safety Heads

Types NFI-7RS™ and NF-7RS™

- Pretorqued cap screws or bolts to energize the seal between the rupture disk and safety head, independent of companion flange bolt torque
- Three asymmetric locating pins center the rupture disk within the safety head, which ensures correct direction of disk installation and optimizes flow
- Rupture disk dome fully protected within safety head inlet to avoid damage when installed into piping system
- Proprietary ‘bite seal’ to optimize sealing between rupture disk and safety head process side. Standard for nominal size 2 inch (50 mm) and larger standard in all sizes of SRI-7RS safety heads
- Spiral finish on inlet and outlet enhances disk gasket interface seal performance*
  *ASME / ANSI B165 gasket sealing surface is standard
- J-bolt providing constant visual confirmation of correct dimension of installation
- Available in sizes 1-8 inches (25-200mm)
NFI-7RS™

Pretorqued Safety Heads

Features

- Bite seal in all sizes; proprietary feature which enhances leak tightness
- Light weight; manufactured from a casting, the NFI-7RS takes advantage of advanced metal flow modeling to achieve its light construction and rigid strength
- Self centering; the unique perimeter shape of the NFI-7RS is self centering between ASME / ANSI B16.5, EN, and JIS specification companion flanges, optimizing flow
- Hexagon head pretorque capscrews; supplied with the NFI-7RS safety head, high tensile stainless steel capscrews allow installation using standard workshop tools
- Accessible capscrews; visible after installation of the NFI-7RS safety head between companion flanges, the user can conveniently inspect for proper installation
- Multiple flange rating; each nominal size NFI-7RS safety head can be installed between ASME/ANSI B16.5, EN, JIS (except 3" / 80mm and 4" / 100mm JIS10) companion flanges. A single safety head held in inventory per nominal size will support multiple applications
- Available in sizes 1-8 inches (25-200mm)

Note: The NFI-7RS safety head is US & International Patent Pending.

Materials Available

- Aluminum
- Inconel®
- Carbon steel
- Monel®
- 316ss
- Hastelloy C®

Consult factory for availability of other materials

NFI-7RS Safety Head Specifications

<table>
<thead>
<tr>
<th>Size</th>
<th>Safety Head Flange Rating</th>
<th>Safety Head Flange Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ASME / ANSI</td>
<td>EN</td>
</tr>
<tr>
<td>1</td>
<td>150/300/600</td>
<td>10/16/25/40</td>
</tr>
<tr>
<td>1.5</td>
<td>150/300/600</td>
<td>10/16/25/40</td>
</tr>
<tr>
<td>2</td>
<td>150/300/600</td>
<td>10/16/25/40</td>
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<tr>
<td>3</td>
<td>150/300/600</td>
<td>10/16/25/40</td>
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<td>150/300</td>
<td>10/16/25/40</td>
</tr>
<tr>
<td>6</td>
<td>150/300</td>
<td>10/16/25/40</td>
</tr>
<tr>
<td>8</td>
<td>150/300</td>
<td>10/16/25/40</td>
</tr>
</tbody>
</table>
NF-7RS™
Pre-trqued Safety Heads

Features
- Insert type safety heads that fit inside the bolt circle of companion flanges
- Pretorqued design, cap screws energize the seal between the rupture disk and safety head, independent of companion flange bolt arrangement
- Positive locating pins center the disk correctly in the safety heads, thus eliminating disk slippage and possible incorrect installation
- Bite seal sizes 2” (50mm) and larger
- For extra protection, a J-bolt is standard on the safety head inlets. The safety heads can only fit between the companion flanges in the one direction that allows the J-bolt to mate with the drilled hole in the companion flange inlet. Correct flow direction is thus assured
- Disk dome protected by safety head outlet
- Available in sizes 1-40 inches (25-1000mm)

Materials Available
- Aluminum
- Carbon steel
- 316ss
- Inconel®
- Monel®
- Hastelloy C®

Consult factory for availability of other materials

Note: Hastelloy® is a trademark of Haynes International Inc. Monel® and Inconel® are registered trademarks of Special Metals Corporation and its subsidiaries.

NF-7RS™ Safety Head Dimensions

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## NF-7R™ Safety Head Dimensions

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### Features
- Insert type safety head that fits inside the bolt circle of companion flanges
- Locating pins ensure centering and orientation of disk within the safety head
- Metal-to-metal “bite-type” seal (sizes 2”/50mm and larger)
- Standard materials 316ss and carbon steel – consult BS&B for other materials
- Disk dome protected by safety head outlet
- For extra protection, a J-bolt is standard providing physical and visual confirmation and correct installation direction
**Features**

- Insert type safety head that fits inside the bolt circle of companion flanges
- Positive locating pins ensure centering and orientation of disk in the safety head
- Metal-to-metal “bite-type” size 2” (50 mm) and larger
- The inlet and outlet of the NX-7R safety head and rupture disk are held together by side lugs

**NX-7R™, NXV-7R™ Dimensions**

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- Standard material 316ss
- Consult BS&B for other materials
- Optional dial type vacuum support for full vacuum resistance for LCN disks with burst pressure below 45 psig (3.1 barg) - type NXV-7R. Free flow area will be reduced by 40%. Consult BS&B for specific value
- Disk dome protection sizes 1” to 3” (25 mm to 80 mm) only
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