Clippard pioneered the rolled construction cylinder design and continues to be a leader in the design and manufacture of cylinders today. Clippard cylinders are available in 17 bore sizes with strokes to 42”. In addition to the rolled construction and brass lines for which the company has been known for many years, Clippard also manufactures corrosion-resistant cylinders for wash down applications as well as the Air Force One® cylinder for applications where physical size is an issue.
Quality remains a primary feature of every product Clippard produces. This is achieved through the excellence in manufacturing practices and craftsmanship that has continued throughout the years. The high standards set by Leonard Clippard, in company relationships with customers, distributors, suppliers and employees continue to be upheld. The company motto, "Quality People, Quality Products", emphasizes the important role every employee plays in maintaining the company's reputation.

Clippard Minimatic® miniature products have evolved into a widely used system of fluid power control devices, known for quality, value and performance.

Over the past five decades, a diverse range of industries throughout the world have come to rely on Minimatics to control machines, systems and processes through an unlimited list of applications. Clippard’s quality in design, engineering, and manufacturing, as well as expansive produce offering, make Clippard the preferred choice for miniature and sub-miniature pneumatic applications.

Our diverse range of valves is supported by an experienced team of engineers and application specialists devoted to finding a solution to all your engineering challenges.

Web Site
Clippard's complete line of Minimatic® Control Devices includes over 5,000 standard products. Some of the many products offered include valves, cylinders, fittings, modular components, push buttons, stainless steel cylinders, electronic manifold cards, circuit analyzers and pre-piped manifold subplates. Visit www.clippard.com to find complete product information and specifications, engineering drawings, ordering information, literature downloads, useful calculators, product configurators technical assistance, distributor Information and more. Visit www.clippard.com/cylinders/ today!

Full-Line Catalog
Clippard offers a complete full-line, 400 page catalog which displays product photos, technical specifications and drawings, design tips and more. Request your free copy today.
Clippard Releases New On-Line Build-Your-Own Cylinder System

www.clippard.com/cylinders/ was recently designed to make cylinder selection and purchasing much easier, less confusing and more economical!

That’s right, Clippard’s new Cylinder Configurator sets new standards in the fluid power industry for purchasing pneumatic stainless steel cylinders!

With all of the information available on the web for pneumatic products, Clippard continues to provide more and more value-added services for their global customer base.

View . . .
❖ 3D Drawings
❖ Circuits
❖ Cutaways

Give www.clippard.com/cylinders/ a try—we think you’ll be impressed!

System instantly configures and displays complete specs, accessories and pricing!
In the early 1950’s, Clippard introduced miniature pneumatic cylinders and valves to industry. No other manufacturer can boast of the same experience or knowledge of miniature components.

Air cylinders have always been an integral part of the Clippard Minimatic® line. Over the years Clippard has responded to requests from cylinder users to provide additional sizes of air cylinders and auxiliary support products. While competitively priced, these products maintain the Clippard standard for quality and reliability that has been the industry standard for many years.

- Polished ID 304 stainless steel tubes for low breakaway
- Precision rolled construction for a solid, leakproof cylinder at a reasonable price
- Machined aluminum heads are clear anodized for extra protection against corrosion
- Cylinder heads are machined from one side for better concentricity
- Sintered bronze rod bushing
- Sintered bronze clevis bushing on all clevis and universal mount cylinders
- Rods are threaded and bonded to pistons
- Ground, polished and roller burnished 303 stainless rods provide a smoother rod finish that protects rod seals, giving longer life
- Full piston area breakaway to assure full power from the beginning of each stroke
- Buna-N “U”-cup piston seals for full power, low friction and trouble-free performance
- Buna-N “U”-cup rod seals for leakproof operation
- Temperature range: -32°F to 230°F
- Maximum pressure: 250 psig
Ordering System

Cylinder Type
D - Double Acting
S - Single Acting
R - Reverse Acting
F - Front Spring Bias
B - Back Spring Bias

Rod Type
D - Double Ended Rod
R - Rotating Rod
N - Non-Rotating Rod
H - Hollow Rod

Mounting Type
S - Stud
U - Universal
C - Clevis
F - Front Block
E - End Stud
T - Trunnion

Bore
05 - 5/16”
08 - 1/2”
10 - 5/8”
12 - 3/4”
14 - 7/8”
17 - 1 1/16”
20 - 1 1/4”
24 - 1 1/2”
28 - 1 3/4”
32 - 2”
40 - 2 1/2”
48 - 3”

Stroke
In inches & fractions of an inch

Options
B - Bumpers
V - Viton® Seals
C - Cushions
MB - Magnetic Piston for Hall Effect sensors (includes bumpers)
F - Cushion Front End
R - Cushion Rear End
W - Rod Wiper
S - Side Ported
H - Heavy Spring
P - Rotated Ports

Not all combinations are available - consult factory

The force required, operating air pressure and cylinder bore are all factors that must be determined or known when sizing an air cylinder. If two are known the other is easily calculated per the formulas and triangle shown below.

Area is derived using either of the following formulas: Diameter² x .7854 or Radius² x π

Bore Size
5/16” 1/2” 5/8” 3/4” 1-1/16” 1-1/4” 1-3/4” 2” 2-1/2” 3”

Force Factor - Extend (Area)
0.07 0.19 0.31 0.44 0.60 0.88 1.2 1.7 2.4 3.1 4.9 7.0

Rod Size
1/8” 3/16” 1/4” 5/16” 3/8” 7/16” 1/2” 5/8” 3/4”

Rod Area
0.01 0.03 0.05 0.05 0.08 0.11 0.15 0.20 0.31 0.31 0.44

Force Factor - Retract (Area)
0.06 0.16 0.28 0.39 0.55 0.80 1.09 1.55 2.20 2.90 4.59 6.56

Standard Spring Forces (lbs)

<table>
<thead>
<tr>
<th>Bore</th>
<th>5/16”</th>
<th>1/2”</th>
<th>5/8”</th>
<th>3/4”</th>
<th>7/8”</th>
<th>1-1/16”</th>
<th>1-1/4”</th>
<th>1-1/2”</th>
<th>1-3/4”</th>
<th>2”</th>
<th>2-1/2”</th>
</tr>
</thead>
<tbody>
<tr>
<td>At Rest</td>
<td>0.5</td>
<td>0.9</td>
<td>1.3</td>
<td>3.0</td>
<td>3.0</td>
<td>2.0</td>
<td>4.5</td>
<td>4.5</td>
<td>11.0</td>
<td>15.0</td>
<td>15.0</td>
</tr>
<tr>
<td>Compressed</td>
<td>1.0</td>
<td>2.0</td>
<td>4.0</td>
<td>6.0</td>
<td>6.0</td>
<td>7.0</td>
<td>10.0</td>
<td>10.0</td>
<td>24.0</td>
<td>30.0</td>
<td>30.0</td>
</tr>
</tbody>
</table>

Heavy Spring Forces (lbs)

<table>
<thead>
<tr>
<th>Bore</th>
<th>5/16”</th>
<th>1/2”</th>
<th>5/8”</th>
<th>3/4”</th>
<th>7/8”</th>
<th>1-1/16”</th>
<th>1-1/4”</th>
<th>1-1/2”</th>
<th>1-3/4”</th>
<th>2”</th>
<th>2-1/2”</th>
</tr>
</thead>
<tbody>
<tr>
<td>At Rest</td>
<td>N/A</td>
<td>2.0</td>
<td>3.3</td>
<td>5.0</td>
<td>5.0</td>
<td>5.5</td>
<td>8.5</td>
<td>8.5</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Compressed</td>
<td>N/A</td>
<td>4.0</td>
<td>9.0</td>
<td>10.0</td>
<td>10.0</td>
<td>13.0</td>
<td>17.0</td>
<td>17.0</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

F - Force or load in pounds
P - Pressure
A - Area of cylinder

F = P x A
P = F / A
A = F / P

Stainless Steel Cylinder
Standard & Heavy Spring Forces

Clippard
Minimatic®

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If your application requires a custom feature that you do not see in our catalog, please contact our distributor in your area for assistance. We manufacture a wide variety of special cylinders. Examples of our custom cylinder capabilities would include: stroke and rod modifications, special mounting configurations and ports, seal and lubrication options, integrated valving and adjustable stroke cylinders. We also provide application based special cylinder design for those customers having unique parameters.

Standard stroke lengths for each bore size and cylinder style are available. Non-standard stroke lengths up to 24” for single acting cylinders and 36” for double acting cylinders are also available. Stroke length should be specified in inches and fractions of an inch. Consult the factory for other requirements.

In applications, attention should be given to minimizing the side load on the rod to insure a smooth stroke without binding. Also, in applications where the cylinder rod is subjected to an unsupported column load, the load on the rod should be less than the force shown in the table below to prevent buckling of the rod.

<table>
<thead>
<tr>
<th>Rod dia.</th>
<th>1”</th>
<th>5”</th>
<th>10”</th>
<th>15”</th>
<th>20”</th>
<th>25”</th>
<th>30”</th>
<th>35”</th>
<th>40”</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8”</td>
<td>110</td>
<td>12</td>
<td>3</td>
<td>1.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3/16”</td>
<td>262</td>
<td>59</td>
<td>15</td>
<td>6.6</td>
<td>3.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/4”</td>
<td>478</td>
<td>190</td>
<td>47</td>
<td>21</td>
<td>12</td>
<td>7.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/16”</td>
<td>756</td>
<td>451</td>
<td>116</td>
<td>52</td>
<td>29</td>
<td>19</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/8”</td>
<td>1091</td>
<td>786</td>
<td>240</td>
<td>106</td>
<td>60</td>
<td>38</td>
<td>27</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>7/16”</td>
<td>1490</td>
<td>1184</td>
<td>444</td>
<td>197</td>
<td>111</td>
<td>71</td>
<td>49</td>
<td>36</td>
<td>28</td>
</tr>
<tr>
<td>1/2”</td>
<td>1950</td>
<td>1645</td>
<td>757</td>
<td>336</td>
<td>189</td>
<td>120</td>
<td>84</td>
<td>62</td>
<td>47</td>
</tr>
<tr>
<td>5/8”</td>
<td>3055</td>
<td>2750</td>
<td>1795</td>
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<td>462</td>
<td>295</td>
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<td>3/4”</td>
<td>4405</td>
<td>4100</td>
<td>3140</td>
<td>1700</td>
<td>950</td>
<td>613</td>
<td>425</td>
<td>312</td>
<td>240</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Rod Thread</th>
<th>Bore Size</th>
<th>Series</th>
<th>Rod Size</th>
<th>Rod Flats</th>
</tr>
</thead>
<tbody>
<tr>
<td>#5-40 UNC-2A</td>
<td>5/16” 05</td>
<td>1/8” none</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#10-32 UNF-2A</td>
<td>1/2” 08</td>
<td>3/16” none</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#10-32 UNF-2A</td>
<td>5/8” 10</td>
<td>3/16” none</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/4-28 UNF-2A</td>
<td>3/4” 12</td>
<td>1/4” 0.218</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/4-28 UNF-2A</td>
<td>7/8” 14</td>
<td>1/4” 0.218</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/16-24 UNF-2A</td>
<td>1 1/16” 17</td>
<td>5/16” 0.250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/8-24 UNF-2A</td>
<td>1 1/4” 20</td>
<td>3/8” 0.312</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7/16-20 UNF-2A</td>
<td>1 1/2” 24</td>
<td>7/16” 0.375</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2-20 UNF-2A</td>
<td>1 3/4” 28</td>
<td>1/2” 0.437</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2-20 UNF-2A</td>
<td>2” 32</td>
<td>5/8” 0.500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2-20 UNF-2A</td>
<td>2 1/2” 40</td>
<td>5/8” 0.500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/8-18 UNF-2A</td>
<td>3” 48</td>
<td>3/4” 0.625</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Custom Cylinders

If your application requires a custom feature that you do not see in our catalog please contact our distributor in your area for assistance. We manufacture a wide variety of special cylinders. Examples of our custom cylinder capabilities would include: stroke and rod modifications, special mounting configurations and ports, seal and lubrication options, integrated valving and adjustable stroke cylinders. We also provide application based special cylinder design for those customers having unique parameters.

Free Cylinder Sample Program

We invite competitive comparisons. If you are an OEM that uses air cylinders, Clippard will provide a free sample for your evaluation. Contact us or your local distributor and ask for the “Free Sample CILinder” request form.
Stainless Steel Cylinders

Double-Acting, Stud Mounted Cylinders with Rotating Rod (SDR)

Double-Acting, Universal Mounted Cylinders with Rotating Rod (UDR)

Single-Acting, Stud Mounted Cylinders with Rotating Rod (SSR)

Single-Acting, Universal Mounted Cylinders with Rotating Rod (USR)
Stainless Steel Cylinders

Reverse-Acting, Stud Mounted Cylinders with Rotating Rod (SRR)

Reverse-Acting, Universal Mounted Cylinders with Rotating Rod (URR)

Single-Acting, Front Mounted Cylinders with Rotating Rod (FSR)

Single-Acting, Stud Mounted Cylinders with Non-Rotating Rod (SSN)

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Stainless Steel Cylinders

- Single-Acting, Universal Mounted Cylinders with Non-Rotating Rod (USN)
- Double-Acting, Front Mounted Cylinders with Rotating Rod (FDR)
- Double-Acting, Stud Mounted Cylinders with Double Rod (SDD)
- Single- & Double-Acting, Trunnion Mounted Cylinders with Rotating Rod (TDR)
Corrosion Resistant Stainless Steel Cylinders

Clippard’s line of Delrin® head stainless steel cylinders offer all of the advantages of Clippard’s high quality, reliable stainless steel cylinders, with the added benefit of corrosion resistance. These cylinders are ideal for applications where equipment cleanliness is critical, since they can be put to work in harsh environments requiring frequent use of hot water and chemicals.

Clippard corrosion resistant cylinders are available in bore sizes ranging from 5/8” to 1 1/2”. Standard stroke lengths range from 1/2” to 6”. The cylinder tubes and rods are made of stainless steel. The rods are ground, polished, and roller burnished. Buna-N® seals are standard with a Viton® option available for compatibility. A magnetic piston is also optional.

These lightweight cylinders have a temperature range from 32˚ F to 180˚ F, and have a pressure rating of 150 psig (air). A variety of mounting styles are available.

Features
- Delrin heads with a positive double seal
- Available with magnetic pistons
- 303 stainless steel ground, polished an roller burnished piston rods
- Precision rolled construction for a solid leakproof cylinder
- Buna-N seals (Viton optional for compatibility only)
- 304 stainless steel tube
- Pressure Range 0 to 150 psig
- Temperature range: 32 to 180°F
- Optional stainless steel mounting nuts
- Aluminum alloy pistons, optional Delrin pistons available; consult factory

Delrin® and Viton® are registered trademarks of E.I. DuPont Co.
Air Force One®
Compact Cylinders

Clippard Instrument Laboratory, Inc. Air Force One compact cylinders are available in double acting, spring return, spring extend and double rod models. Hall Effect sensors and magnetic piston versions are also available.

The AFO cylinder features include a stainless steel tube and roller burnished piston rod. This means longer rod and piston seal life. For corrosive environments, where dirt and abrasives may be ingested, and cause seals to wear faster than normally expected, the AFO offers the benefit of tie rod construction. This enables seals to be replaced, rather than replacing the entire cylinder. The non-corrosive construction of the AFO cylinder body is reliable in abrasive environments, able to withstand the toughest conditions.

The various mounting configurations available in the AFO cylinders assure freedom to interchange with most cylinders on the market. This means most systems can be upgraded to include quality AFO cylinders.

Available in bore sizes 5/8", 3/4", 1 1/16", 1 1/2", 2" and 2 1/2".

- Oil impregnated sintered bronze rod bushing
- Available with magnetic pistons
- 303 stainless steel ground, polished and roller burnished piston rods
- Double acting, spring return, spring extend & double rod cylinders
- 304 stainless steel tube
- Temperature range: 30 to 180° F
- Anodized aluminum heads
- Air pressure rating to 250 psig

Clear anodized aluminum alloy heads

Buna-N o-ring rod seal

Wrench flats to aid in installation

Sintered bronze rod bushing

303 stainless steel rod, ground, polished and roller burnished for a hard, mirror finish

304 stainless steel tube

303 stainless tie rods

Delrin® piston with Buna-N o-ring piston seal
Clippard offers more types of miniature pneumatic cylinders for the designer’s convenience, including: spring return, spring extend, air retract, double-acting and double rod models. From sub-miniature (5/32” bore) to heavy duty (1 1/8” bore), the extensive Clippard line provides a wide selection of bore sizes to suit any application requirement. An even wider range of strokes are available in the complete Clippard line of miniature cylinders, in stroke sizes ranging from 1/4” to 20”.

Cylinder Tubes:
Machined from heavy wall, cold-drawn brass tubing; ballized internally for precise size, fine finish and low seal friction; 1 1/8” bore: hard coat aluminum

Piston Rods:
Except where otherwise specified, all rods are stainless steel, ground, polished and roller burnished for long seal life, low friction and smooth action

Pistons:
Brass in all models except aluminum in 7/8” bore single acting series

Springs:
Stainless steel for long life and resistance to corrosion

Seals:
Buna-N compound, impervious to a wide range of hydraulic fluids, liquids, and gases; rod seals replaceable on models where applicable; piston seals replaceable only on threaded construction models

Bumpers:
Resilient bumpers of Buna-N or polyurethane absorb shock, increase life and reduce noise level

Finish:
All external brass parts are “bright-dipped” to resist corrosion and preserve finished appearance; 1 1/8” bore: hard coated aluminum with black oxide steel heads

The Clippard line offers numerous choices in the mounting of Clippard Minimatic cylinders. The cylinders are provided in several types of mounting styles including plain end, stud mount, block mount, and clevis mount (male and female). In addition, a complementary line of mounting hardware, including brackets, male and female clevises and Clippard’s Minimatic® super structures are available for almost any application.

Clippard cylinders are of original design, pioneered by the world’s most experienced manufacturer of miniature pneumatic equipment. They are of the finest OEM quality, fully tested for outstanding performance and long life. Special steps in manufacture insure the high quality of Clippard cylinders. These include: ground, polished and roller burnished rods to protect seals and provide smooth action; tube ID precision through “ballizing” with carbide precision balls; high precision screw machine parts manufacture, based on concentric design that lends itself to close tolerance machining. The reputation Clippard has earned in the field is a result of our policy to test every cylinder (100%) we manufacture.

All Clippard cylinders are 100% tested
## Minimatic® Cylinders

<table>
<thead>
<tr>
<th>Minimatic® Cylinders</th>
<th>Engineering Data</th>
<th>Design Features</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/32” Bore Spring Return</td>
<td>Air 0.02 150 psig U-Cup 0.062” Plain</td>
<td>#10-32 3-56 Rolled or Welded</td>
<td>45˚ Tapered rod end on SM-2 Spring force extend- 2 oz, Spring force compressed- 5 oz.</td>
</tr>
<tr>
<td>1/4” Bore 6.35 mm Spring Return</td>
<td>Air 0.05 125 psig U-Cup 0.135” Thd.</td>
<td>#10-32 Rolled</td>
<td>Spring force extend- 6 oz, Spring force compressed- 10 oz.</td>
</tr>
<tr>
<td>3/8” Bore Spring Return</td>
<td>Air 0.10 125 psig U-Cup 3/16” Plain</td>
<td>#10-32 RF Silver Soldered</td>
<td>Model 3PS-1/2 is rolled construction with non-rotating thd. brass rod, others; non-thd. stainless steel Spring force extend- 12 oz, Spring force compressed- 30 oz.</td>
</tr>
<tr>
<td>3/8” Bore Double Acting</td>
<td>Air &amp; Hyd. 0.10 125 psig Air 500 psig-Hyd.* U-Cup Vee Ring 1/8” Plain</td>
<td>#10-32 RF Silver Soldered</td>
<td>Min. of 14 psig to retract</td>
</tr>
<tr>
<td>3/8” Bore Spring Extend Air Retract</td>
<td>Air 0.10 125 psig U-Cup</td>
<td>1/8” Thd. #10-32 RF Silver Soldered</td>
<td>Spring force extend- 12 oz, Spring force compressed- 30 oz.</td>
</tr>
<tr>
<td>9/16” Bore Spring Return</td>
<td>Air 0.22 125 psig U-Cup</td>
<td>3/16” Plain</td>
<td>#10-32 RF Silver Soldered</td>
</tr>
<tr>
<td>9/16” Bore Double Acting</td>
<td>Air &amp; Hyd. 0.22 125 psig Air 500 psig-Hyd.* U-Cup Vee Ring</td>
<td>3/16” Plain</td>
<td>#10-32 RF Silver Soldered</td>
</tr>
<tr>
<td>9/16” Bore Spring Extend Air Retract</td>
<td>Air 0.22 250 psig U-Cup Vee Ring</td>
<td>1/4” Thd. #10-32 Threaded</td>
<td>Min. of 19 psig to retract Spring force extend- 2 lb, Spring force compressed- 4 lb.</td>
</tr>
<tr>
<td>9/16” Bore Heavy Duty Spring Return</td>
<td>Air 0.20 250 psig U-Cup</td>
<td>1/4” Thd. 1/16” NPT Threaded</td>
<td>Spring force extend- 2 lb, Spring force compressed- 4 lb.</td>
</tr>
<tr>
<td>9/16” Bore Heavy Duty Double Acting</td>
<td>Air &amp; Hyd. 0.20 250 psig Air 1000 psig-Hyd.* T-Ring Vee Ring</td>
<td>1/4” Thd. 1/16” NPT Threaded</td>
<td>Sintered bronze rod bushing Spring force extend- 7 lb, Spring force compressed- 12 lb.</td>
</tr>
<tr>
<td>7/8” Bore Spring Return</td>
<td>Air 0.60 250 psig U-Cup</td>
<td>1/4” Thd. 1/8” NPT Threaded</td>
<td>Sintered bronze rod bushing Spring force extend- 7 lb, Spring force compressed- 12 lb.</td>
</tr>
<tr>
<td>7/8” Bore Double Acting</td>
<td>Air &amp; Hyd. 0.60 250 psig Air 1000 psig-Hyd.* T-Ring Vee Ring</td>
<td>1/4” Thd. 1/8” NPT Threaded</td>
<td>Sintered bronze rod bushing Spring force extend- 7 lb, Spring force compressed- 12 lb.</td>
</tr>
<tr>
<td>7/8” Bore Spring Extend Air Retract</td>
<td>Air 0.60 250 psig U-Cup Vee Ring</td>
<td>1/4” Thd. 1/8” NPT Threaded</td>
<td>Min. of 23 psig to retract Spring force extend- 7 lb, Spring force compressed- 12 lb.</td>
</tr>
<tr>
<td>1-1/8” Bore Double Acting</td>
<td>Air 1.0 250 psig U-Cup Vee Ring</td>
<td>3/8” Thd. 1/8” NPT Threaded</td>
<td>Sintered bronze rod bushing Low friction - 2 psig to operate</td>
</tr>
<tr>
<td>1-1/8” Bore Spring Return</td>
<td>Air 1.0 250 psig U-Cup</td>
<td>3/8” Thd. 1/8” NPT Threaded</td>
<td>Spring force extend- 8 lb, Spring force compressed- 12 lb.</td>
</tr>
</tbody>
</table>

**Quick Cylinder Computations:**
Cylinder Force = Force Factor x Pressure
Displacement = Force Factor x Stroke
(Force factor given in table above equals effective piston area)

**NOTE: Double rods also available in these models.**
Temperature: 30 to 230˚ F
*Consult factory for hydraulic applications*
**Brass Minimatic® Cylinders**

- Rods are threaded and bonded to piston
- The original miniature pneumatic cylinder
- Buna-N “U”-cup rod seals for smooth leakproof operation
- Buna-N “U”-cup piston seals for full power, low friction and trouble-free performance
- 100% tested
- Pneumatic and hydraulic performance
- Sturdy, compact and long life
- Temperature range: 30 to 180°F

**Heavy-Duty Brass & Aluminum Cylinders**

- Very low breakaway force - allows for a consistent stroke speed (no sudden jumps)
- Hard-anodized aluminum body - attractive, yet durable
- Force factor of 1 - 100 psig input provides 100 lbs. output force
- Available in many stroke lengths (even up to 8 ft. in special quantities!)
- Brass piston, stainless steel rod

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**Did you know...**

All Clippard Cylinders are 100% tested.
Limit Valves
A limit valve is the best way to have a mechanical limit to return air signals to control valves or circuits. Clippard offers limit valves in ports ranging from 3-56 up to 1/8” NPT, high force and heavy duty limits as well as non-contact sensing valves.

Quick Exhaust Valves
The primary function of a quick exhaust valve is to increase cylinder speed. This also enables the use of smaller directional valves and longer control lines. Offered with several port configurations from #10-32 models up to 1/4”.

Clamps
Clippard’s stainless steel clamps are designed to be used with the Hall Effect and the reed switch. All clamps should be ordered based upon the size of the cylinder on which it will be mounted. The part numbers show the bore size using the numerical code. Each clamp is 3/8” wide stainless steel, and is equipped with a locking screw with #5-40 threads.

Hall Effect Position Sensors
Clippard Hall Effect sensors offer the user more accurate sensing of piston location for the ultimate in pneumatic system control.

The Hall Effect sensor operates with Clippard stainless steel pneumatic cylinders equipped with internal magnets on the pistons. By accurately sensing the magnetic field of the piston when it passes beneath the sensor, the position of the rod piston is determined, and a feedback signal is created.

Flow Controls
Clippard offers a large variety of flow controls and needle valves for adjusting the speed of the cylinder. Several models are available from fine adjustments to coarse adjustments in a variety of mounting configurations.

Reed Switches
The Clippard RS magnetic reed switches have power ranges to 25 watts, current up to 1.5 amperes and a rated life span of 10 million cycles. Plan to use them where the high performance of the Clippard HS Hall Effect switch is not required.

Two models are available: 36 volts or 200 volts AC/DC. Each is a SPST normally open configuration. When the cylinder’s magnet-equipped piston moves to a location where the magnet is positioned below the reed switch, the switch sends a feedback signal to indicate piston location. In the 36 VDC model, an LED provides switch closing indication.

Super Structures
Here’s a building block concept to speed construction of small equipment, fixtures, jigs and tooling. Machined steel blocks adapt to any position on the column and base. Offset extensions are provided through use of fixture and block mounting shafts of various lengths. Use of proper size brass slotted adapter permits mounting small bore cylinders or other parts. Column base is drilled for mounting. The Super Structures are extremely solid and secure, yet fully adjustable.

Mounting Hardware
For efficient power and easy mounting, Clippard has designed and manufactured brackets suitable for each Clippard cylinder.