Miller 3MA/4MA Series
Non-Lube NFPA Air Cylinders
General Presentation

- 3MA  1-1/8” – 5” Bores
- 4MA  1-1/2” – 8” Bores
- 3MAJ 1-1/2” – 8” Bores
- 4MAJ 1-1/2” – 8” Bores
The Current World of Air Cylinders

• NFPA air cylinders comprise the largest market segment of air cylinders in North America.
• Miller Fluid Power is the NFPA air cylinder market leader and offers the most diverse product offering:
  - Steel (A, AV, AVN)
  - Aluminum (AL, AL4)
  - Stainless Steel (SA)
Over 17 years ago, we perceived the need for a lightweight, low-cost air cylinder with great performance. This led to the invention of the AL Series, which included breakthroughs such as aluminum tubing, check seal cushions and tie rod mounted sensors, among other improvements.
The Improved Aluminum NFPA Cylinder

- Forecasting demand for even further weight reduction, improved performance and sleek aesthetics, we evolved the AL Series into the AL4 Series. This robust design has been the backbone of the aluminum cylinder market for the past 5 years.

- AL4 Series innovations included new use of aluminum extrusion for endcaps and pistons, an externally-removable threaded gland and a unique extruded profile cylinder body. The result was a lighter weight, lower cost, higher performance package that pleased the eye.
The Next Generation NFPA Cylinder

- Doing business with Miller Fluid Power means that you always have the latest in technology to meet rapidly changing market and application demands.
- The 3MA Series represents the next generation solution for NFPA cylinder applications.
The Next Generation NFPA Cylinder

- Ready to meet the demands for superior performance, increased flexibility, improved safety and new environmental regulations.

- *Miller Fluid Power, the pioneer in the design and development of the aluminum NFPA cylinder, continues its innovation leadership with the release of a new NFPA cylinder platform.*
What are the 3MA & 4MA?

• Primarily, an evolution of the current AL4 Series Non-Lube NFPA Air Cylinder

• Three distinct versions of the same cylinder platform:
  
  • 3MA - Standard Version
  
  • 4MA - Removable Gland Version
  
  • 3MAJ/4MAJ - Rod Lock Versions

• A combination of efficient ideas and technology with US-based manufacturing

• New cylinder series that are truly aligned to market demands
What are the 3MA & 4MA?

• A general-purpose version to meet most NFPA market demands:
  • 3MA - Standard Version

• A flexible construction version to complement the standard version and offer all options or specials:
  • 4MA - Removable Gland Version

• A rod lock version for load-holding and safety demands:
  • 3MAJ/4MAJ - Rod Lock Versions
3MA - New Value for a Common Platform

• Superior Performance – Resulting from efficient design, reduced weight, low friction and advanced sealing technology

• Flexible Mount – Standard mount accommodates NFPA mounts as accessories

• Sensor-Ready – Magnetic piston ring is standard. Sensors “drop-in” to grooves in cylinder body for easy, inexpensive assembly and protection

• Safety – Rod lock version available

• Environmentally Friendly – Reduced noise from RoHS-compliant materials

• 2-D and 3-D CAD Files – Immediately available at: http://www.millerfluidpower.com
3MA - Low Friction with Zero Leakage

All moving components are designed for low friction. Low friction results in less wear, and we accomplish this with zero leakage.

- **Rounded-lip rod seal and piston seals** glide on the lubricant film instead of wiping it away
- **Self-lubricating carboxylated nitrile** material is used to maximize seal life
- **Composite rod bearing and piston** have an extremely low coefficient of friction and are formulated for high speed, low wear applications
- **Rod material is hard chrome plated** and polished to an extremely fine finish
- **Nitrile end seals** on the smooth bore of the cylinder body, the optimal sealing surface
3MA - Reduced Weight Design

- **Use of lighter composites** as a qualified substitute for heavier metals, combined with die cast endcap design, has reduced the average weight of our cylinder by 15%.
3MA - Flexible Mount

- **Heads and caps** are designed with a flexible mounting platform that allows almost every NFPA mount to be fastened as an accessory.

- **Cylinder with mountings** attached at the factory are available, or you may choose to install mountings from separate kits - it’s your choice.

- **Rod lock version** utilizes the 3MA standard head for assembly.
3MA - Proven Exterior Toughness

- **Anodized aluminum alloy** endcaps and cylinder body for high strength, corrosion resistance and low friction
- **Zinc plated steel endcap fasteners** for tough environments
- **Case hardened, hard chrome plated** and polished carbon steel piston rod for damage resistance, long rod seal life and low friction
- **Outboard “Molythane” urethane rod wiper** to remove external debris and adherents from the piston rod during the entire stroke
3MA - Advanced Endcap and Piston Design

- **Full-flow ports**, combined with the low inertia piston rod assembly, minimize cylinder response time.
- **Composite inserts** allow us to offer adjustable cushions at no additional cost.
- **Individual flow geometry** for each bore size results in effective cushioning that is easy to adjust and set.
- **Floating check-seal design** combines the sealing capability of a lipseal with check valve action for quick stroke reversal.
- **Cushioning performance** is outstanding due to symmetrical piston geometry and long-lasting urethane seals.
3MA - Sensor-Ready

- **Unique, extruded-profile cylinder body** offers integrated sensor grooves to minimize sensor installation time, maximize sensor protection and eliminate the need for brackets.

- **All Global and Mini-Global Sensors** are accepted by six grooves on three sides that run the entire length of the cylinder body.

- **Magnetic piston ring** included as standard; the cylinder is already prepared for your position sensing needs.
What is required for Sensor-Ready?

- Magnetic Piston Ring
- Integrated Sensor Grooves
- (Global or Mini-Global Sensor)
3MA – Composite Materials

Key components leverage our experience with composites for industrial applications.

- **Tough and impact resistant**, bearing-grade materials are used in manufacturing all composite parts.
- **Extensive testing** confirms the composite as a qualified alternative to aluminum and bronze for high service life in rigorous installations.
- **Quicker cylinder response times** and potentially lower freight costs are possible through the use of composite materials which significantly reduce inertia of moving parts and total cylinder weight.
- **Additional advantages** include cushions as a standard feature, noise reduction without the need for bumpers, and lower friction than other materials.

Other examples of composite use:
- Boeing 787
- Intake manifolds
3MA - Environment, Health and Safety

The 3MA is designed with goals beyond performance. Driving these efforts are requirements, regulations and other activities that attempt to make the world a better, safer place in which to live and work. Here are some of the results:

• **Reduced Noise Pollution** – the innovative composite piston and endcap inserts reduce noise by 12 dB from the typical aluminum cylinder design. For further noise reduction by as much as 20 dB, specify bumper piston seals.

• **Rod Locks** – when precise load holding and emergency-stop situations arise, the 3MAJR (3MA with Rod Lock) is the perfect addition for your safety solution.

• **Recycle** – all 3MA solid material content is 100% recyclable.

• **CE Approved and UL Listed Sensors**

• **ATEX, NAUMUR (intrinsically safe), CSA, Weld Immune Sensors**
3MA - Common Options

- Stainless steel piston rods (17-4PH, 303, 316)
- Fluorocarbon rod wiper and rod seal
- Aluminum piston
- Bumper piston seals
- ¼” thick bumpers
- Double rod ends
- Rod lock version (3MAJ)

- Combinations with:
  - “HB” slide packages to become guided cylinders (HBC / HBT / HBR / HBB)
  - “B” Series air valves as an air cylinder/valve combination unit (ACVB Option)

- Catalog details the entire list of options…
4MA – Designed for Modification

Although the 3MA is perfectly suited for many applications, there is an occasional need for something different. To accommodate these demands, we designed the highly versatile 4MA Series cylinder. The 4MA will provide the same fit as the 3MA, but its construction offers more flexibility for modification.

General 4MA features include:

• Available in 1½” – 8” bore sizes
• Machined head and cap from extruded aluminum bar stock, black anodized for corrosion resistance
• Externally removable bronze alloy gland/bearing for easy maintenance
  – Dual rod seals (separate wiper)
• Same piston rod assembly options and cylinder body as the 3MA
• Additional mounting options
• Standard and oversize rods
• Sensor-ready thru 5” bore
4MA – Common Options

- Stainless steel piston rods (17-4 PH, 303, 316)
- Fluorocarbon seals (entire cylinder or rod seals only)
- Aluminum piston
- Bumper piston seals (nitrile and fluorocarbon)
- ¼” thick bumpers
- Double rod ends
- Porting options
- High temperature (to +250°F) and low temperature (to -50°F) construction
- Hydraulic service to 400 PSIG (4ML)
- Rod lock version (4MAJ)
- Gland options, including the HI LOAD design for side load conditions and metallic rod wiper design

- Stroke adjuster
- Integrated shock absorber
- Polymyte rod wiper for fine-grain external contaminants (foundries, etc.)
- Custom designs for endcaps, pistons, piston rods, mounts, etc.
- Catalog details the entire list of options…
4MA – Combination Options

The 4MA also offers these additional options:

- **Combination with the following as standard offerings:**
  - “HB” slide packages to become guided cylinders (HBC / HBT / HBR / HBB)
  - “B” Series air valves as an air cylinder/valve combination unit (ACVB Option)
  - Bolt-On Linear Transducer for continuous piston rod position sensing (LPSO Option)

- And many more…
Made in U.S.A. and Canada

- **Location** – 3MA and 4MA cylinders are made in Akron, Ohio; Portland, Oregon; and Milton, Ontario.

- **Quick Delivery** – standard lead time for made-to-order cylinders is a few days, with the capability of shipping some cylinder configurations within 24 hours. We deliver to your request.

- **Non-Standard Designs** – since 50% of applications require cylinders that are not catalog-standard, we organized our entire culture for flexibility.

- **Risk Management** – the absence of international risks when dealing with suppliers from other continents can help you sleep at night. Our goal is to offer you the best product, on time, with your financial concerns in mind.
3MA/4MA Series Catalog AU03-M0929/NA

- Comprehensive catalog includes:
  - Product line introduction and discussions on:
    - NFPA cylinder evolution
    - 3MA Value and Innovations
    - 4MA Value and Innovations
    - Environment, Health & Safety
    - Made in USA and Canada
    - Lean and Advanced Manufacturing
  - All 3MA, 4MA, 4ML, 3MAJ and 4MAJ product information
  - Sensors, complimentary products, application engineering and maintenance sections (with service bulletins)
  - 164 pages total
  - PDF available
  - Hard copies in stock at Miller Fluid Power Catalog Services
**Where are Markets for 3MA & 4MA?**

**Major Markets:**
- Packaging Machinery
- Food and Beverage Machinery
- Semiconductor Machinery
- Automotive Assembly Machinery
- Material Handling Equipment
- Conveyor Systems
- Transportation Equipment
- Tire and Rubber Processing Machinery

- Medical Products Manufacturing
- Pulp & Paper Machinery
- Appliance Manufacturing Machinery
- Industrial Wash Equipment
- Press Machinery
- Machine Tools
- Metalforming Machinery
- Special Industrial Machinery
- and many more…
3MA & 4MA Series – Quick List

General Specifications:

3MA Standard Version
- 1-1/8” to 5” Bores
- Die Cast Aluminum Endcaps
- Composite Bearing
- Cushions Standard (free)
- Standard Rod Size
- Air Service
- Standard Temperature
- Most Economic Version

4MA Removable Gland Version
- 1-1/2” to 8” Bores
- Extruded Aluminum Endcaps
- Machined Gland/Bearing
- Cushions Optional
- Standard and Oversize Rods
- Air and Hydraulic Service (4ML)
- Standard, High and Low Temperatures
- Most Flexible Version

Standard Features common to both series for 1-1/2” to 5” bore:
- TEF Mount (NFPA MX5/MS4)
- Composite Piston (for standard rod sizes)
- Magnetic Piston Ring
- Extruded Aluminum Cylinder Body
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- Standard Rod Size
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**4MA Removable Gland Version**
- 1-1/2” to 8” Bores
- Extruded Aluminum Endcaps
- Machined Gland/Bearing
- Cushions Optional
- Standard and Oversize Rods
- Air and Hydraulic Service (4ML)
- Standard, High and Low Temperatures
- Most Flexible Version

Standard Features common to both series for 1-1/2” to 5” bore:
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- Magnetic Piston Ring
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Thank You!

• For more information, please contact Miller Fluid Power at 1-330-336-3511