Bulletin 4480-T13-US

Technical Manual
Assembly Machine

Effective: March, 2006
Supercedes: March 1998

TH2-7 Push-On Fitting Stand
Parker Safety Guide for Selecting and Using Hose, Tubing, Fittings and Related Accessories

Parker Publication No. 4400-B.1
Revised: May, 2002

WARNING: Failure or improper selection or improper use of hose, tubing, fittings, assemblies or related accessories (“Products”) can cause death, personal injury and property damage. Possible consequences of failure or improper selection or improper use of these Products include but are not limited to:

- Fittings thrown off at high speed.
- High velocity fluid discharge.
- Explosion or bursting of the conveyed fluid.
- Electrocution from high voltage electric powerlines.
- Contact with suddenly moving or falling objects that are controlled by the conveyed fluid.
- Injections by high-pressure fluid discharge.
- Dangerously whipping Hose.
- Contact with conveyed fluids that may be hot, cold, toxic or otherwise injurious.
- Sparking or explosion caused by static electricity buildup or other sources of electricity.
- Sparking or explosion while spraying paint or flammable liquids.
- Injuries resulting from inhalation, ingestion or exposure to fluids.

Before selecting or using any of these Products, it is important that you read and follow the instructions below. Only Hose from Parker’s Stratoflex Products Division is approved for in-flight aerospace applications, and no other Hose can be used for such in-flight applications.

Offer of Sale

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the “Offer of Sale”.

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WARNING

When using this machine, always exercise basic safety precautions, including the following:

1.) Use the machine only for its intended purpose: to push fittings onto the hose.

2.) This machine must be properly installed and located in accordance with the installation instructions before it is used.

To minimize the possibility of injury:

1.) Keep hands away from the sliding jaw holder and jaws which are red in color.
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Help us help you ...

Read this guide carefully.

It is designed to help you operate and maintain your TH2-7. If you don’t understand something or need more help, call:

Technical Service Department
Parker Hannifin Corporation
Hose Products Division
Phone: (440) 943-5700
Fax: (440) 943-3129

or write:
Parker Hannifin Corporation
Hose Products Division
30240 Lakeland Blvd.
Wickliffe, OH 44092

Write down the Model and Serial Numbers:

TH2-7

Model Number

Serial Number

Use these numbers in any correspondence or service calls.

RECEIVING INSTRUCTIONS: UNPACKING – Remove all documents and components from shipping containers.

INSPECTION – Visually inspect all components for shipping damage. If any shipping damage is found, notify the carrier at once. Shipping damage is not covered by the Parker warranty. The carrier is responsible for all repair and replacement costs resulting from such damage.
Receiving Instructions: Remove all documents and components from shipping containers.

Inspection: Visually inspect all components for shipping damage. If any shipping damage is found, notify the carrier at once. Shipping damage is not covered by the Parker warranty. The carrier is responsible for all repair and replacement costs resulting from damage.

Unpackaging: Carefully remove the fully assembled machine from the shipping container. The tools shipped with the machine include:

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TH2-7-SMS</td>
<td>Straight Mandrel Kit Includes:</td>
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<tr>
<td>TH2-7-11</td>
<td>PUSHER 2&quot; SPACER</td>
<td>1</td>
</tr>
<tr>
<td>TH2-7-12</td>
<td>PUSHER 4&quot; SPACER</td>
<td>2</td>
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<tr>
<td>TH2-7-16</td>
<td>MANDREL ASSEMBLY - 4</td>
<td>1</td>
</tr>
<tr>
<td>TH2-7-17</td>
<td>MANDREL ASSEMBLY - 5</td>
<td>1</td>
</tr>
<tr>
<td>TH2-7-18</td>
<td>MANDREL ASSEMBLY - 6</td>
<td>1</td>
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<tr>
<td>TH2-7-19</td>
<td>MANDREL ASSEMBLY - 8</td>
<td>1</td>
</tr>
<tr>
<td>TH2-7-20</td>
<td>MANDREL ASSEMBLY - 10</td>
<td>1</td>
</tr>
<tr>
<td>TH2-7-21</td>
<td>MANDREL ASSEMBLY - 12</td>
<td>1</td>
</tr>
<tr>
<td>TH2-7-22</td>
<td>MANDREL ASSEMBLY - 16</td>
<td>1</td>
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<td>TH2-7-23</td>
<td>MANDREL ASSEMBLY - 20</td>
<td>1</td>
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<tr>
<td>TH2-7-24</td>
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<td>1</td>
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<tr>
<td>TH2-7-25</td>
<td>MANDREL ASSEMBLY - 32</td>
<td>1</td>
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<tr>
<td>TH2-7-PIN</td>
<td>3/16&quot; X 1.3&quot; LONG QUICK RELEASE PIN</td>
<td>3</td>
</tr>
<tr>
<td>TH2-7-9</td>
<td>MANDREL ADAPTER BASE</td>
<td>1</td>
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</tbody>
</table>
INSTALLATION:

1.) Carefully remove machine and accessories from shipping crate.

2.) Locate machine in a well illuminated area. Secure to floor using floor mounting brackets as shown.

3.) Connect shop air supply to air filter. Air supply should be a minimum of 80 psi.
Overview and Specifications: The TH2-7 Fitting Push-On Stand assembles fitting onto the hose from 1/4” to 2” ID. This is accomplished with a pair of cylinders with one size jaw for all size hose and a pusher cylinder. Shop air supply of 80 psi (min.) is sufficient for the assembly purpose.

Straight fittings use the respective size mandrel and bent fittings use the elbow pusher block and the respective elbow holder plate for assembly.

Standard Equipment: Model TH2-7 Includes:

Machine base with jaw & pusher cylinders, one size jaw, jaw guard, left & right trays, foot switch with guard, filter regulator-lubricator and stand.

Standard Tooling Description: Part Number
Mandrels for size -4 through -32 TH2-7-16 thru TH2-7-25
Mandrel Adapter Base TH2-7-9
2” long Pusher Spacer TH2-7-11
4” long Pusher Spacer TH2-7-12
Ø 3/16” x 1.2” lg. Quick Release Pins TH2-7-PIN

Optional Tooling: Optional Tooling Description: Part Number
Elbow Pusher Block TH2-7-ELP
Elbow Pusher Plate TH2-7-EH4 thru TH2-7-EH32
Quick Release Adapter for Elbow Pusher TH2-7-10

Specifications:

Dimensions: 33-1/2” Wide
            30-1/8” Deep
            40-1/2” Tall

Weight: 200lb. Machine
         17lb. Straight tooling
<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<td>1</td>
<td>TH2-7-1</td>
<td>MACHINE BASE PLATE</td>
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<td>2</td>
<td>TH2-7-2</td>
<td>CYLINDER MOUNTING BRACKET</td>
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<tr>
<td>3</td>
<td>TH2-7-3</td>
<td>JAW HOLDER</td>
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<tr>
<td>4</td>
<td>TH2-7-4</td>
<td>JAW</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>TH2-7-5</td>
<td>JAW SLIDE PLATE</td>
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<td>6</td>
<td>TH2-7-7</td>
<td>LEFT TRAY</td>
<td>1</td>
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<tr>
<td>7</td>
<td>TH2-7-8</td>
<td>RIGHT TRAY</td>
<td>1</td>
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<td>8</td>
<td>TH2-7-9</td>
<td>MANDREL ADAPTER BASE</td>
<td>3</td>
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<tr>
<td>9</td>
<td>TH2-7-GUARD</td>
<td>CLEAR POLYCARBONATE GUARD</td>
<td>1</td>
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<td>10</td>
<td>TH2-7-PIN</td>
<td>Ø3/16&quot; x 1.3&quot; GRIP LENGTH T HANDLE PIN</td>
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<td>11</td>
<td>TH2-7-STAND</td>
<td>PARFRAME STAND</td>
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<td>12</td>
<td>TH2-7-SMS</td>
<td>STRAIGHT MANDREL KIT</td>
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<td>13</td>
<td>FW2D110721W/3</td>
<td>AIR CYLINDER FOR JAWS</td>
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<td>14</td>
<td>FW2D110721W/4</td>
<td>AIR CYLINDER FOR PUSHER</td>
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<td>15</td>
<td>PS707P</td>
<td>FRL MOUNTING BRACKET</td>
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<td>EM37</td>
<td>AIR MUFFLER</td>
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<td>17</td>
<td>06G21A13A1B</td>
<td>3/8&quot; FILTER/REGULATOR/LUBRICATOR</td>
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<td>18</td>
<td>S50B</td>
<td>FLOW CONTROL VALVE</td>
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<td>19</td>
<td>TH18-100-36</td>
<td>ONE PIECE CLAMP ON COLLAR</td>
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<td>20</td>
<td>TH18-500-6</td>
<td>1/4&quot; NPT, 2&quot; PRESSURE GAUGE FOR FRL</td>
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<td>21</td>
<td>TH18-500-8</td>
<td>PARKER CC637B FOOT VALVE</td>
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<td>22</td>
<td>TH18-500-9</td>
<td>FOOT PEDAL GUARD</td>
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<td>23</td>
<td>TH18-B-29</td>
<td>5/16-18 x 3/4&quot; SOCKET HEAD SHOULDER SCREW</td>
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<tr>
<td>24</td>
<td>TH18-B-16</td>
<td>5/16-18 x 3/4&quot; SOCKET HEAD CAP SCREW</td>
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<td>25</td>
<td>TH18-B-23</td>
<td>1/4-20 X 1&quot; SOCKET HEAD CAP SCREW</td>
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<td>26</td>
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<td>3/8-16 X 1 1/2&quot; SOCKET HEAD CAP SCREW</td>
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<td>27</td>
<td>TH18-B-30</td>
<td>3/8-16 x 1-1/2 FLAT COUNTERSUNK SOCKET HEAD CAP SCREW</td>
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<td>TH18-D-4</td>
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<td>31</td>
<td>TH18-D-8</td>
<td>PINCH POINT DECAL</td>
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<td>32</td>
<td>TH18-L-1</td>
<td>3/8&quot; LOCKWASHER</td>
<td>18</td>
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<td>TH18-L-3</td>
<td>1/4&quot; SPLIT LOCKWASHER</td>
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<td>1/4-20 HEX NUT</td>
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<td>36</td>
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<td>37</td>
<td>TH18-W-3</td>
<td>1/4&quot; FLAT WASHER</td>
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<td>38</td>
<td>TH18-W-5</td>
<td>3/8&quot; FLAT WASHER</td>
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<td>39</td>
<td>8-8 CTX-S(2103-8-8)</td>
<td>TUBE FITTINGS ADAPTER</td>
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<td>40</td>
<td>1/2 FF-S(0101-8-8)</td>
<td>TUBE FITTINGS ADAPTER</td>
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<tr>
<td>41</td>
<td>1/2 DD-S(2202-8-8)</td>
<td>TUBE FITTINGS ADAPTER</td>
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<td>8-8-8 RTX-S(013T-8-8-8)</td>
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<td>43</td>
<td>1/2 CD-S(2102-8-8)</td>
<td>TUBE FITTINGS ADAPTER</td>
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<td>44</td>
<td>8 FTX-S(0103-6-8)</td>
<td>TUBE FITTINGS ADAPTER</td>
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<td>45</td>
<td>8 CTX-S(2103-6-8)</td>
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<td>46</td>
<td>8 JTX-S(033T-8-8)</td>
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<td>47</td>
<td>30682-8-8</td>
<td>PARKER HOSE FITTING</td>
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<td>801-8</td>
<td>PUSH-LOK HOSE</td>
<td>30 ft.</td>
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<td>49</td>
<td>4480-T13-US</td>
<td>TECHNICAL MANUAL</td>
<td>1</td>
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</tbody>
</table>
1. Connect the machine to the air supply with -6 size Push-lok hose (not provided). At this point the jaws are at “open” position.

2. Pull up the regulator knob and turn to increase or decrease air pressure. NOTE: A suggested initial pressure setting is 40 psi.

3. Select the corresponding size mandrel as the hose and fitting and insert it to the mandrel adapter base attached to pusher cylinder by rotating and pushing at the same time. Sizes -4 through -12 fittings may need 2” and 4” long pusher spacers depending on the fitting series. In that case the spacers need to be inserted (like mandrels) to the mandrel adapter base prior to the mandrels. Insert quick release pins after aligning the holes in mandrel adapter base and mandrels (see illustration A).

4. Insert the fitting onto the mandrel and make sure that the distance between the skirt end of the shell and the back face of the jaws is greater than the hose insertion depth by approx. 1” (Reference Parker Catalog 4400 or CrimpSource online for insertion depth numbers). A shaft collar on pusher cylinder rod can be used to fix this distance for repeated assembly of fittings of same size and series (see illustration A).

5. To assure complete insertion of the hose in to the fitting, the hose insertion deoth should be marked. Guide the insertion depth marked hose onto the mandrel and to the fitting and press the foot switch. The jaws slide towards the center and holds the hose from both sides before the pusher cylinder inserts the fitting onto the hose. The jaws are in “closed” position now. NOTE: Make sure that there is no lubricant present inside the face of jaw which can cause the hose to slip while the fitting is inserted in to the hose. If any slippage of the hose occurs, hold the hose and apply enough force against the motion of the hose to resist slippage. (See illustration A).

6. Release the foot switch when the fitting is fully inserted and the skirt end of shell aligns with the insertion depth mark on the hose. The jaws return to its “open” position and the assembly can be removed from the mandrel. Repeat step #3 for the next fitting to be assembled.
1. Remove the spacers and mandrels by pulling them from the mandrel adapter base attached to the pusher cylinder.

2. Fasten the master elbow pusher block to the mandrel adapter base with quick release adapter TH2-7-10 and make sure that the smaller width of the pusher block leg is parallel to the machine base (see illustration B).

3. Select the corresponding size elbow holder plate and fasten it to the pusher block legs with (2) flat countersunk screws provided.

4. Slide the bent fitting through the slot in the elbow holder plate. The hex portion of the fitting near the pre-crimp area should be outside the slot and resting against the face of the pusher plate. The tube portion of the fitting should be inside the slot (see illustration B). The distance between the skirt end of the shell and the back face of the jaws should be approximately 1" greater than hose insertion depth.

NOTE: Ensure that the correct size elbow holder plate is used, otherwise the center line of the fitting may be off with the centerline of jaws which can cause assembly difficulties.

5. Go to step #5 on page 10.
Maintenance

1. Keep surface inside of jaws clean and dry. Lubricants on the inside surface can cause the hose to slip while assembling.

2. Keep the sliding plate clean so that the jaws can open and close without any hindrance.

3. For every 10 to 15 cycles or fittings being assembled, one drop of air tool oil from lubricator should be sent in to the cylinders. The lubricator knob can be turned to get the right amount of oil flowing in to the cylinders. This is seen through the clear sight glass on lubricator.

4. Check the oil level in lubricator daily. Suggested lubricant: Parker F442. Available through Parker Pneumatic Division. Petroleum based oil of 100 to 200 SUS viscosity at 100°F and an aniline point greater than 200°F (mobile DTE24 and Sun Company Sunvis 932 are good examples). Do not use oils with adhesives, compound oils containing solvents, graphite, detergents or synthetic oils.

5. Drain water from filter regularly.

6. Inspect fasteners to assure they are tight.
Parker Safety Guide for Selecting and Using Hose, Tubing, Fittings and Related Accessories

Parker Publication No. 4400-8.1
Revised: May, 2002

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• Fittings thrown off at high speed.
• High velocity fluid discharge.
• Explosion or burning of the conveyed fluid.
• Electrocutioon from high voltage electric powerlines.
• Contact with suddenly moving or falling objects that are controlled by the conveyed fluid.
• Injections by high pressure fluid discharge.
• Dangerously whipping Hose.
• Contact with conveyed fluids that may be hot, cold, toxic or otherwise injurious.
• Sparking or explosion caused by static electricity buildup or other sources of electricity.
• Sparking or explosion while spraying paint or flammable liquids.
• Injures resulting from inhalation, ingestion or exposure to fluids.

Before selecting or using any of these Products, it is important that you read and follow the instructions below. Only Hose from Parker’s Stratoflex Products Division is approved for flight aerospace applications, and no other Hose can be used for such in flight applications.

1.0 GENERAL INSTRUCTIONS

1.1 Scope: This safety guide provides instructions for selecting and using (including assembling, installing, and maintaining) these Products. For convenience, all rubber and/or thermoplastic products commonly called “hose” or “tubing” are called “Hose” in this safety guide. All assemblies made with Hose are called “Hose Assemblies”. All products commonly called “fittings” or “couplings” are called “Fittings”. All related accessories (including crimping and swaging machines and tools) are called “Related Accessories”. This safety guide is a supplement to and is to be used with, the specific Parker publications for the specific Hose, Fittings and Related Accessories that are being considered for use.

1.2 Fail-Safe: Hose, and Hose Assemblies and Fittings can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of the Hose or Hose Assembly or Fitting will not endanger persons or property.

1.3 Distribution: Provide a copy of this safety guide to each person that is responsible for selecting or using Hose and Fitting products. Do not select or use Parker Hose or Fittings without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the products considered or selected.

1.4 User Responsibility: Due to the wide variety of operating conditions and applications for Hose and Fittings, Parker and its distributors do not represent or warrant that any particular Hose or Fitting is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:

• Making the final selection of the Hose and Fitting.
• Assuring that the user’s requirements are met and that the application presents no health or safety hazards.
• Providing all appropriate health and safety warnings on the equipment on which the Hose and Fittings are used.
• Assuring compliance with all applicable government and industry standards.

1.5 Additional Questions: Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2.0 HOSE AND FITTING SELECTION INSTRUCTIONS

2.1 Electrical Conductivity: Certain applications require that the Hose be nonconductive to prevent electrical current flow or to maintain electrical isolation. For these applications that require Hose to be electrically nonconductive, including but not limited to applications near high voltage electric lines, only special nonconductive Hose can be used. The manufacturer of the equipment in which the nonconductive Hose is to be used must be consulted to be certain that the Hose and Fittings that are selected are proper for the application. Do not use any Parker Hose or Fitting for any such application requiring nonconductive Hose, including but not limited to applications near high voltage electric lines, unless (i) the application is expressly approved in the Parker technical publication for the product, (ii) the Hose is marked “nonconductive”, and (iii) the manufacturer of the equipment on which the Hose is to be used specifically approves the particular Parker Hose and Fitting for such use.

2.2.1 Electrically Nonconductive Hose: Parker manufactures special Hose for conveying paint in airless paint spraying applications. This Hose is labeled “Electrically Conductive Airless Paint Spray Hose” on its layline and packaging. This Hose must be properly connected to the appropriate Parker Fittings and properly grounded in order to dissipate dangerous static charge buildup, which occurs in all airless paint spraying applications. Do not use any other Hose for airless paint spraying even if electrically conductive. Use of any other Hose or failure to properly connect the Hose can cause a fire or an explosion resulting in death, personal injury, and property damage.

Parker manufactures a special Hose for certain compressed natural gas (“CNG”) applications where static electricity buildup may occur. Parker CNG Hose assemblies comply with AGA Requirements 1-93, “Hoses for Natural Gas Vehicles and Fuel Dispensers”. This Hose is labeled “Electrically Conductive for CNG Use” on its layline and packaging. This Hose must be properly connected to the appropriate Parker Fittings and properly grounded in order to dissipate dangerous static charge buildup, which occurs in, for example, high velocity CNG dispensing or transfer. Do not use any other Hose for CNG applications where static charge buildup may occur, even if electrically conductive. Use of other Hoses in CNG applications or failure to properly connect or ground this Hose can cause a fire or an explosion resulting in death, personal injury, and property damage. Care must also be taken to protect against CNG permeation through the Hose wall. See section 2.6, Permeation, for more information. Parker CNG Hose is intended for dispenser and vehicle use at a maximum temperature of 180°F. Parker CNG Hose should not be used in confined spaces or unventilated areas or areas exceeding 180°F. Final assemblies must be tested for leaks. CNG Hose Assemblies should be tested on a monthly basis for conductivity per AGA 1-93.

Parker Hannifin Corporation
Hose Products Division
Wickliffe, OH
Parker manufacturers special Hose for aerospace in flight applications. Aerospace in flight applications employing Hose to transmit fuel, lubricating fluids and hydraulic fluids require a special Hose with a conductive inner tube. This Hose for in flight applications is available only from Parker's Stratoflex Products Division. Do not use any other Parker Hose for in flight applications, even if electrically conductive. Use of other Hoses for in flight applications or failure to properly connect or ground this Hose can cause a fire or an explosion resulting in death, personal injury, and property damage. These Hose assemblies for in flight applications must meet all applicable aerospace industry, aircraft engine, and aircraft requirements.

2.2 Pressure: Hose selection must be made so that the published maximum recommended working pressure of the Hose is equal to or greater than the maximum system pressure. Surge pressures or peak transient pressures in the system must be below the published maximum working pressure for the Hose. Surge pressures and peak pressures can usually only be determined by sensitive electrical instrumentation that measures and indicates pressures at milliseconds intervals. Mechanical pressure gauges indicate only average pressures and cannot be used to determine surge pressures or peak transient pressures. Published burst pressure ratings for Hose is for manufacturing test purposes only and is no indication that the Product can be used in applications at the burst pressure or otherwise abuse system capacity.

2.3 Suction: Hoses used for suction applications must be selected to insure that the Hose will withstand the vacuum and pressure of the system. Improperly selected Hose may collapse in suction application.

2.4 Temperature: Be certain that fluid and ambient temperatures, both steady and transient, do not exceed the limitations of the Hose. Temperatures below and above the recommended limitation may degrade Hose to a point where a failure may occur and release fluid. Properly insulate and protect the Hose Assembly when routing near hot objects (e.g. manifolds). Do not use any Hose in any application where failure of the Hose could result in the conveyed fluids (or vapors or mist from the conveyed fluids) contacting any open flame, molten metal, or other potential fire ignition source that could cause burning or explosion of the conveyed fluids or vapors.

2.5 Fluid Compatibility: Hose Assembly selection must assure compatibility of the Hose tube, cover, reinforcement, and Fittings with the fluid media used. See the fluid compatibility chart in the Parker publication for the product being considered or used. This information is offered only as a guide. Actual service life can only be determined by the end user by testing under all extreme conditions and other analysis.

Hose that is chemically compatible with a particular fluid must be assembled using Fittings and adapters containing likewise compatible seals.

2.6 Permeation: Permeation (that is, seepage through the Hose) will occur from inside the Hose to outside when Hose is used with gases, liquid and gas fuels, and the elements (including but not limited to such materials as helium, diesel fuel, gasoline, natural gas, or LPG). This permeation may result in high concentrations of vapors which are potentially flammable, explosive, or toxic, and in loss of fluid. Dangerous explosions, fires, and other hazards can result when using the wrong Hose for such applications. The system designer must take into account the fact that this permeation will take place and must not use Hose if this permeation could be hazardous. The system designer must take into account all legal, government, insurance, or any other special regulations which govern the use of fuels and refrigerants. Never use a Hose even though the fluid compatibility is acceptable without considering the potential hazardous effects that can result from permeation through the Hose Assembly.

Permeation of moisture from outside the Hose to inside the Hose will also occur in Hose assemblies, regardless of internal pressure. If this moisture permeation would have detrimental effects (particularly, but not limited to refrigeration and air conditioning systems), incorporation of sufficient drying capacity in the system or other appropriate system safeguards should be selected and used.

2.7 Size: Transmission of power by means of pressurized fluid varies with pressure and rate of flow. The size of the components must be adequate to keep pressure losses to a minimum and avoid damage due to heat generation or excessive fluid velocity.

2.8 Routing: Attention must be given to optimum routing to minimize inherent problems (kinking or flow restriction due to Hose collapse, twisting of the Hose, proximity to hot objects or heat sources).

2.9 Environment: Care must be taken to insure that the Hose and Fittings are either compatible with or protected from the environment (that is, surrounding conditions) to which they are exposed. Environmental conditions including but not limited to (unlighted) aircraft engines, ozone, moisture, water, salt, water, chemicals, and air pollutants can cause degradation and premature failure.

2.10 Mechanical Loads: External forces can significantly reduce Hose life or cause failure. Mechanical loads which must be considered include excessive flexing, twist, kinking, tensile or side loads, bend radius, and vibration. Use of swivel type Fittings or adapters may be required to insure no twist is put into the Hose. Unusual applications may require special testing prior to Hose selection.

2.11 Physical Damage: Care must be taken to protect Hose from wear, snagging, kinking, bending smaller that minimum bend radius, and cutting, any of which can cause premature Hose failure. Any Hose that has been kinked or bent to a radius smaller than the minimum bend radius, and any Hose that has been cut or is cracked or is otherwise damaged, should be removed and discarded.

2.12 Proper End Fitting: See instructions 3.2 through 3.5. These recommendations may be substantiated by testing to industry standards such as SAE J517 for hydraulic applications, or MIL-A-5070, AS1335, or AS5317 for Hoses from Parker's Stratoflex Products Division for aerospace applications.

2.13 Length: When establishing a proper Hose length, motion absorption, Hose length changes due to pressure, and Hose and machine tolerances and movement must be considered.

2.14 Specifications and Standards: When selecting Hose and Fittings, government, industry, and Parker specifications and recommendations must be reviewed and followed as applicable.

2.15 Hose Cleanliness: Hose components may vary in cleanliness levels. Care must be taken to insure that the Hose Assembly selected has an adequate level of cleanliness for the application.

2.16 Fire Resistant Fluids: Some fire resistant fluids that are to be conveyed by Hose require use of the same type of Hose as used with petroleum base fluids. Some such fluids require a special Hose, while a few fluids will not work with any Hose at all. See instructions 2.5 and 1.5. The wrong Hose may fail after a very short service. In addition, all liquids but pure water may burn fiercely under certain conditions, and even pure water leakage may be hazardous.

2.17 Radiant Heat: Hose can be heated to destruction without contact by such nearby items as hot manifolds or molten metal. The same heat source may then initiate a fire. This can occur despite the presence of cool air around the Hose.

2.18 Welding or Brazing: When using a torch or arc-weld in close proximity to hydraulic lines, the hydraulic lines should be removed or shielded with appropriate fire resistant materials. Flame or weld spatter could burn through the Hose and possibly ignite escaping fluid resulting in a catastrophic failure. Heating of plated parts, including Hose Fittings and adapters, above 450°F (232°C) such as during welding, brazing, or soldering may emit deadly gases.

2.19 Atomic Radiation: Atomic radiation affects all materials used in Hose assemblies. Since the long-term effects may be unknown, do not expose Hose assemblies to atomic radiation.

2.20 Aerospace Applications: The only Hose and Fittings that may be used for in flight aerospace applications are those available from Parker’s Stratoflex Products Division. Do not use any other Hose or Fittings for in flight applications. Do not use any Hose or Fittings from Parker’s Stratoflex Products Division with any other Hose or Fittings, unless expressly approved in writing by the engineering manager or chief engineer of Stratoflex Products Division and verified by the user’s own testing and aerospace industry standards.

2.21 Unlocking Couplings: Ball locking couplings or other couplings with disconnect sleeves can unintentionally disconnect if they are dragged over obstructions or if the sleeve is bumped or moved enough to cause disconnect. Threaded couplings should be considered where there is a potential for accidental uncoupling.

3.0 HOSE AND FITTING ASSEMBLY AND INSTALLATION

INSTRUCTIONS

3.1 Component Inspection: Prior to assembly, a careful examination of the Hose and Fittings must be performed. All components must be checked for correct style, size, catalog number, and length. The Hose must be examined for cleanliness, obstructions, blisters, cover looseness, kinks, cracks, cuts or any other visible defects. Inspect the Fitting and sealing surfaces for burrs, nicks, corrosion or other imperfections. DO NOT use any component that displays any signs of nonconformance.

3.2 Hose and Fitting Assembly: Do not assemble a Parker Fitting on a Parker Hose that is not specifically listed by Parker for that Fitting, unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division. Do not assemble a Parker Fitting on another manufacturer’s Hose or a Parker Hose on another manufacturers Fitting unless (i) the engineering manager or chief engineer of the appropriate Parker division approves the Assembly in writing or that combination is expressly approved in the appropriate Parker literature for the specific Parker product, and (ii) the user verifies the Assembly and the application through analysis and testing. For Parker Hose
that does not specify a Parker Fitting, the user is solely responsible for the selection of the proper Fitting and Hose Assembly procedures. See instruction 1.4.

The Parker published instructions must be followed for assembling the Fittings on the Hose. These instructions are provided in the Parker Fitting catalog for the specific Parker Fitting being used, or by calling 1-800-CPRAKER, or at www.parker.com.

3.3 Related Accessories: Do not crimp or swage any Parker Hose or Fitting with anything but the listed swage or crimp machine and dies in accordance with Parker published instructions. Do not crimp or swage another manufacturers Fitting with a Parker crimp or swage die unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division.

3.4 Parts: Do not use any Parker Fitting part (including but not limited to socket, shell, nipple, or insert) except with the correct Parker mating parts, in accordance with Parker published instructions, unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division.

3.5 Reusable/Permanent: Do not reuse any field attachable (reusable) Hose Fitting that has blown or pulled off a Hose. Do not reuse a Parker permanent Hose Fitting (crimped or swaged) or any part thereof. Complete Hose Assemblies may only be reused after proper inspection under section 4.0. Do not assemble Fittings to any previously used hydraulic Hose that was in service, for use in a fluid power application.

3.6 Pre-Installation Inspection: Prior to installation, a careful examination of the Hose Assembly must be performed. Inspect the Hose Assembly for any damage or defects. Do NOT use any Hose Assembly that displays any signs of nonconformance.

3.7 Minimum Bend Radius: Installation of a Hose at less than the minimum listed bend radius may significantly reduce the Hose life. Particular attention must be given to preclude sharp bending at the Hose to Fitting juncture. Any bending during installation at less than the minimum bend radius must be avoided. If any Hose is kinked during installation, the Hose must be discarded.

3.8 Twist Angle and Orientation: Hose assembly installation must be such that relative motion of machine components does not produce twisting.

3.9 Securement: In many applications, it may be necessary to restrain, protect, or guide the Hose to protect it from damage by unnecessary flexing, pressure surges, and contact with other mechanical components. Care must be taken to ensure such restraints do not introduce additional stress or wear points.

3.10 Proper Connection of Parts: Proper physical installation of the Hose Assembly requires a correctly installed port connection insuring that no twist or torque is transferred to the Hose when the Fittings are being tightened or otherwise during use.

3.11 External Damage: Proper installation is not complete without insuring that tensile loads, side loads, kinking, flattening, potential abrasion, thread damage, or damage to sealing surfaces are corrected or eliminated. See instruction 2.10.

3.12 System Checkout: All air entrapment must be eliminated and the system pressurized to the maximum system pressure (at or below the Hose maximum working pressure) and checked for proper function and freedom from leaks. Personnel must stay out of potential hazardous areas while testing and using.

3.13 Routing: The Hose Assembly should be routed in such a manner so if a failure does occur, the escaping media will not cause personal injury or property damage. In addition, if fluid media comes in contact with hot surfaces, open flame, or sparks, a fire or explosion may occur. See section 2.4.

4.0 HOSE AND FITTING MAINTENANCE AND REPLACEMENT INSTRUCTIONS

4.1 Even with proper selection and installation, Hose life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a possible Hose failure, and experience with any Hose failures in the application or in similar applications should determine the frequency of the inspection and the replacement for the Products so that Products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.7.

4.2 Visual Inspection Hose/Fitting: Any of the following conditions require immediate shut down and replacement of the Hose Assembly:

- Fitting slippage on Hose,
- Damaged, cracked, cut or abraded cover (any reinforcement exposed);
- Hard, stiff, heat cracked, or charred Hose;
- Cracked, damaged, or badly corroded Fittings;
- Leaks at Fitting or in Hose;
- Kinked, crushed, flattened or twisted Hose; and
- Blistered, soft, degraded, or loose cover.

4.3 Visual Inspection All Other: The following items must be tightened, repaired, corrected or replaced as required:

- Leaking port conditions;
- Excess dirt buildup;
- Worn clamps, guards or shields; and
- System fluid level, fluid type, and any air entrapment.

4.4 Functional Test: Operate the system at maximum operating pressure and check for possible malfunctions and leaks. Personnel must avoid potential hazardous areas while testing and using the system. See section 2.2.

4.5 Replacement Intervals: Hose assemblies and elastomeric seals used on Hose fittings and adapters will eventually age, harden, wear and deteriorate under thermal cycling and compression set. Hose Assemblies and elastomeric seals should be inspected and replaced at specific replacement intervals, based on previous service life, government or industry recommendations, or when failures could result in unacceptable downtime, damage, or injury risk. See section 1.2.

4.6 Hose Inspection and Failure: Hydraulic power is accomplished by utilizing high-pressure fluids to transfer energy and do work. Hoses, Fittings, and Hose Assemblies all contribute to this by transmitting energy and doing work. The high pressures, fluids under pressure can be dangerous and potentially lethal and, therefore, extreme caution must be exercised when working with fluids under pressure and handling the Hoses transporting the fluids. From time to time, Hose Assemblies will fail if they are not replaced at proper time intervals. Usually these failures are the result of some form of misapplication, abuse, wear, or failure to perform proper maintenance. When Hoses fail, generally the high-pressure fluids inside escape in a stream which may or may not be visible to the user. Under no circumstances should the user attempt to locate the leak by “feeling” with their hands or any other part of their body. High-pressure fluids can and will penetrate the skin and cause severe tissue damage and possibly loss of limb. Even seemingly minor hydraulic fluid injection injuries must be treated immediately by a physician with knowledge of the tissue damaging properties of hydraulic fluid.

If a Hose failure occurs, immediately shut down the equipment and leave the area until pressure has been completely released from the Hose Assembly. Simply shutting down the hydraulic pump may or may not eliminate the pressure in the Hose Assembly. Many times check valves, etc., are employed in a system and can cause pressure to remain in a Hose Assembly even when pumps or equipment is shut down. Tiny holes in the Hose, commonly known as pinholes, can collect small, dangerously powerful but hard to see streams of hydraulic fluid. It may take several minutes or even hours for the pressure to be relieved so that the Hose Assembly may be examined safely.

Once the pressure has been reduced to zero, the Hose Assembly may be taken off the equipment and examined. It must always be replaced if a failure has occurred. Never attempt to patch or repair a Hose Assembly that has failed. Consult the nearest Parker distributor or the appropriate Parker division for Hose Assembly replacement information.

Never touch or examine a failed Hose Assembly unless it is obvious that the Hose no longer contains fluid under pressure. The high-pressure fluid is extremely dangerous and can cause serious and potentially fatal injury.

4.7 Elastomeric seals: Elastomeric seals will eventually age, harden, wear and deteriorate under thermal cycling and compression set. Elastomeric seals should be inspected and replaced.

4.8 Refrigerant gases: Special care should be taken when working with refrigeration systems. Sudden escape of refrigerant gases can cause blindness if the escaping gases contact the eye and can cause freezing or other severe injuries if it contacts any other portion of the body.

4.9 Compressed natural gas (CNG): Parker CNG Hose Assemblies should be tested after installation and before use, and at least on a monthly basis per AGA 1-93 Section 4.2 “Visual Inspection Hose/Fitting”. The recommended procedure is to pressurize the Hose and check for leaks and to visually inspect the Hose for damage.

Caution: Matches, candles, open flame or other sources of ignition shall not be used for Hose inspection. Leak check solutions should be rinsed off after use.
Offer of Sale

The items described in this document and other documents or descriptions provided by Parker Hannifin Corporation, as subsidiaries and its authorized distributors are hereby offered for sale at prices to be established by Parker Hannifin Corporation, its subsidiaries and its authorized distributors. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any such item, when communicated to Parker Hannifin Corporation, its subsidiary or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

1. Terms and Conditions of Sale: All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer’s acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller. Seller’s acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer’s offer. Acceptance of Seller’s products shall in all events constitute such assent.

2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer’s receipt of the shipment.

3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller’s plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller’s delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

4. Warranty: Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 365 days from the date of shipment to Buyer, or 2,000 hours of use, whichever expires first. THIS WARRANTY COMPRISSES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GURANTEE OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED. NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLELY OR PARTIALLY, TO BUYER’S DESIGNS OR SPECIFICATIONS.

5. Limitation Of Remedy: SELLER’S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER’S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER TO BUYER OR ANY THIRD PARTY, INCLUDING BUT NOT LIMITED TO, LOST PROFITS, LOST TIME, LOST BUSINESS, DAMAGE OR DESTRUCTION OF PROPERTY, DAMAGE TO OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.

6. Changes, Reschedules and Cancellations: Buyer may request to modify the designs or specifications for the items sold herunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller’s discretion, and shall be upon such terms and conditions as Seller may require.

7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller’s property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

8. Buyer’s Property: Any designs, tools, patterns, materials, drawings, confiden-tial information or equipment furnished by Buyer or any other items which become Buyer’s property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller’s possession or control.

9. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller of if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. Indemnity For Infringement of Intellectual Property Rights: Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets (hereinafter “Intellectual Property Rights”), Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes in the Intellectual Property Rights of a third party. Seller’s obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and options, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwith-standing the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller’s sole and exclusive liability and Buyer’s sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller’s obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter “Events of Force Majeure”). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller’s control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agree-ment concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.