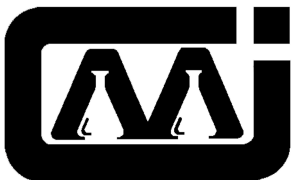


# PLURAL COMPONENT COATING APPLICATION EQUIPMENT

## BASIC CONFIGURATION DESCRIPTION



*The World Leader for Infrastructural Coatings*

**Madison Chemical Industries Inc.**

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## **INTRODUCTION**

One of the Madison's core competencies is our broad range of plural component coatings. These fast setting, solvent-free, high performance coatings have become accepted in a broad range of end uses and industries. For thirty years, they have been preserving and protecting the infrastructure upon which modern society depends: everything from storage vessels to marine vessels, from oil pipelines to water and wastewater pipelines, from things that move, such as transportation equipment, to things that do not, like municipal, industrial, military and commercial complexes.

Madison formulates products in three types of format. This memorandum explores the application of our plural component, fast setting systems. The two other formats are mix-and-apply and PreCatalyzed. Products offered in these two other formats can be applied using more paint-like equipment and techniques.

For user-friendliness, all of Madison's plural component coatings are designed to have balanced viscosities and a mix ratio of one to one by volume. Generally speaking, the necessary spray assembly is high pressure, airless, heated equipment. There are several manufacturers to choose from and Madison Chemical is constantly evaluating the latest technology. Currently, Madison works with Glas-Craft, Graco, Binks and Gusmer equipment. A large inventory of spare parts is available from Madison to provide the quickest possible service. We have the capability to customize the equipment setup to the individual needs of the customer. This technical capability allows the customer to 'one-stop shop' for their coating requirements to include coating material, application equipment, parts and technical assistance from one source.

Madison provides head office and on-site support to all our applicators and customers. We also supply training to our Approved Applicators, Certified O.E.M. Applicators and to any other customers who wish such training. Madison's TechService On Demand Program provides for the cost of this service to be split between Madison and the customer, thus ensuring that the cost is always reasonable.

## **BASIC CONFIGURATION OF APPLICATION EQUIPMENT**

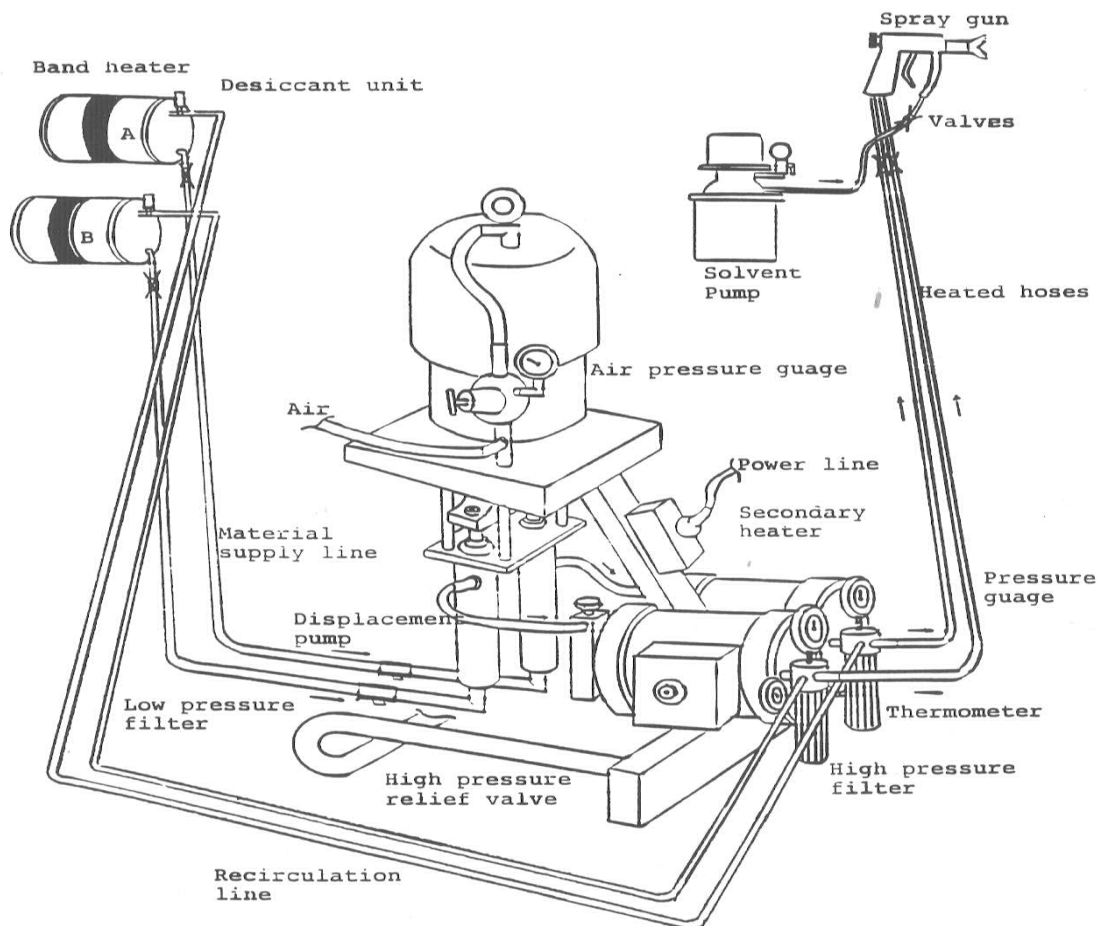
Madison has developed a basic standard configuration for applying our plural component coatings. The spray system is composed of the product storage/supply assembly, a proportioning pump, heated hoses and plural component spray gun. The proportioning pump is sometimes referred to as a displacement pump because it works on the principal of positive displacement. Sometimes, it is simply called a proportioner. Additional components can be added to this standard configuration for special needs such as high volume applications or the internal lining of pipe.

The coating components, which are designated Part "A" and Part "B", are kept separate until they enter the nozzle or the mixing chamber of the gun. Prior to entering the pump, the individual materials are filtered through "Y" strainers. Each component is fed to the proportioning pump legs (which are driven by an air motor or, in some setups, a hydraulic motor) and are pressurized to 2000 p.s.i. or greater. From there, the still-separate liquids go through a

pressure relief valve (a safety precaution and pass through powerful heaters). The materials are filtered again as they leave the heaters. Following this, they enter heated high pressure hoses capable of maintaining the temperature to which they have just been heated. The final item of equipment is the gun, where both components are, at long last, mixed together and atomized at the tip or nozzle.

Madison's basic set up also includes a recirculation system. This is used each morning to pre-heat and to provide a certain amount of mixing of the liquid coating ingredients. For better mixing, the purchase of drum mixers (power agitators) is recommended. Drum mixers are not part of the standard configuration because they may not be necessary (where the customer uses the product quickly, for example) and because the exact configuration depends on the customers coating storage arrangement.

Shown below is a Graco equipment setup, one of the older and widely used configurations on the market.



*Basic Plural Equipment Set-Up*

## PRODUCT STORAGE AND SUPPLY

Madison offers several types of packaging alternatives. Products may be shipped in cans, pails, drums or bins. Specifically, the customer has the choice of 1 gallon (4 litre) cans, 5 gallon (19 litre) pails, 55 gallon (110 litre) drums, or 275/330 gallon (1050/1250 litre) bulk bins. Plural component products are usually ordered in drums or bins. The basic equipment configuration uses a gravity feed system to supply the product from the container to the proportioner. For large volume setups, a transfer pump can be used to ensure a constant supply of material to the proportioner.

Generally speaking, the coating product should be entering the system at approximately 80°F to 100°F (roughly 25°C to 40°C). For this reason we recommend the use of band heaters on the storage or product supply containers. Madison can supply these. For large volume or industrial applications, other heating systems can be utilized such as hot water jacketed tanks; these are supplied or sourced by the customer.

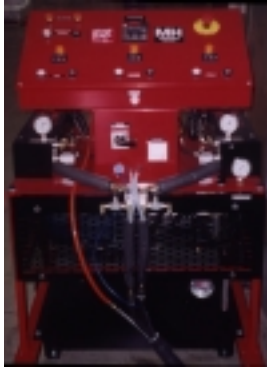
In their liquid form, polyurethanes are sensitive to the moisture in the air. Thus, a dryer or “desiccant” system must be utilized in order to reduce the risk of moisture contamination in the supply container. Generally, we configure for the customer a Drierite™ assembly in the air intake of the container. Alternatively, a “nitrogen blanket” can be maintained on the surface of the coating after the containers have been opened for use; a slight positive pressure of nitrogen gas will prevent contamination of the liquid coating.

## PLURAL COMPONENT PROPORTIONER PUMP

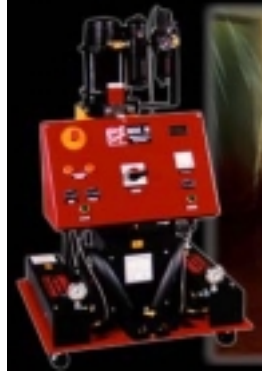
The equipment alternatives recommended by Madison are:

Pump	Manufacturer	Operation	Comments
MH II	Glas-Craft	Hydraulic Pump	The main drive of this equipment is an electrical hydraulic pump. All safety and temperature controls are digital. This equipment can deliver large outputs.
MX II	Glas-Craft	Air Motor	The air motor of this pump is equipped with a muffler for a noiseless operation. All temperature and safety controls are digital.
HydroCat 34:1	Graco	Air Motor	This pump is compact and solid built. The size and lightness of this pump allows flexibility in the job site.

Each of these three is illustrated on the next page.



*Fig MH II*



*Fig MX II*



*HydraCat 34:1*

## HEATED HOSES

The plural component pump connects to the heated hose assembly. These assemblies come in 50 foot lengths, can be added to each other to a maximum of 200 feet and are insulated so as to maintain the product temperature until it is sprayed through the tip of the gun. Madison's basic configuration includes "whip ends"; this is a pair of short uninsulated hoses immediately before the gun, which allows more flexibility for the spray gun operator.

The typical heated hose assemblies offered by Madison are:

Glas-Craft	<ul style="list-style-type: none"> <li>- Automatic Hose assembly 50ft</li> <li>- Manual Hose assembly 50ft</li> </ul>	To operate with MX II or MH II pumps
Graco	<ul style="list-style-type: none"> <li>- Therma-Trol 3/8 in hose 50ft</li> <li>- Therma-Trol 1/4in hose 50ft</li> </ul>	To operate with Bulldog pumps

## SPRAY GUNS (MANUAL OR HAND HELD)

After evaluating a large number of guns in the market, Madison has selected two guns for the application of the plural component polyurethane products: the Binks 43P and the Gusmer GX7-400 (not to be confused with the older GX7).

These two guns are configured quite differently. With the Binks 43P, the "A" and "B" mix inside the gun in a "mixing chamber" and then are forced through a standard airless spray tip (or "nozzle"). A "static mixer" can be attached in front of the gun just before the nozzle to ensure a perfect mix every time. The Binks 43P is a solvent purge gun, so there is a third line going to the gun to carry the solvent. Turning a knob on the back of the gun allows solvent to flow through the mixing chamber, static mixer and nozzle. The operation of the trigger is simple mechanical leverage. The advantages of this arrangement are: thorough mixing of the "A" and "B" is more assured; since any standard spray tip can be attached, there is much more control over output; the unit is somewhat forgiving of "triggering", which is the bad habit of releasing and pulling the trigger while spraying. The disadvantage is that the use of solvent to clean the

gun introduces a flammable element into a coating system that is otherwise solvent-free and non-flammable.

The Gusmer GX7-400 is a mechanical purge solvent free gun. The gun is a little bigger and bulkier than the Binks unit, but it is manufactured in lighter metal. The gun is actually operated by an air piston, which is activated by the trigger. The material is mixed internally in the gun in a disposable part called a “mixing module”. This gun handles larger outputs of coating. It is sometimes chosen because it is solvent-free but it is harder to handle and the output cannot be controlled as well as with the 43P. Both guns are shown below.



*Fig Binks 43 P*



*Fig Gusmer GX7-400*

Solvent purge	Mechanical purge
Mechanical operated trigger	Pneumatic trigger
Static Mixer	Mix Module

## **AUTOMATIC SPRAYING**

Automatic spraying tends to be limited to applications that can be easily applied in an automated environment such as pipeline coatings. In-plant application of Madison's coatings is achieved using a Binks 43PA automatic gun or an automatic Gusmer GX7-400 gun. Various spray tips are used to control the fan of the spray pattern as well as output volumes. Madison can adjust the spray system to alter production rates, coating thicknesses and cure times. Spinning pipes, automated lances, and varying spray tips can be used to coat external and internal surfaces. Pipe with internal diameters ranging from 6 inches to 10 feet have been sprayed automatically using Madison's plural component coatings.

The present document is just a brief description of the equipment technology available from Madison. For additional details on equipment specifications and our equipment training and set-up programs, please contact Madison head office.

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