WEIGH SCALE BLENDER

JANUARY 1, 1999

TECHNICAL INFORMATION

SPECIFICATIONS

FEATURES

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MAGUIRE PRODUCTS, INC.
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MAGUIRE PRODUCTS has sold color metering equipment for over 19 years. Color metering represents more than 90 percent of our business. We build the most accurate VOLUMETRIC metering systems, both liquid color and pelleted concentrate, available.

However, 20 years of actual observation in plants all over the country, has taught us one thing; no matter how accurate VOLUMETRIC equipment may be in a test lab, employees seldom obtain this accuracy on the plant floor.

The key to accuracy with VOLUMETRIC equipment is frequent CALIBRATION and CORRECTION of control settings. Unfortunately, the time required to do this is seldom available to personnel on the floor.

When color amount is too LOW, the error is visible and a correction to INCREASE color is always made.

However, when color amount is too HIGH, the problem is not visible and adjustments are NOT made. Only a CALIBRATION check will correct such a problem.

What happens is this; Settings are frequently INCREASED to maintain production of acceptable parts, but almost NEVER are settings REDUCED.

This excess color usage is almost always a MINIMUM of 10 percent and usually much more. In fact, excess color usage of 50 to 100 percent is not uncommon.

A WEIGH SCALE BLENDER solves this problem. It AUTOMATES the job of CALIBRATION and CORRECTION. It checks and adjusts every cycle.

For an ANALYSIS OF SAVINGS for ONE molding press, we make the following assumptions:

Average part weight: 300 grams.
Average cycle time: 30 seconds.
Production rate: 20 hrs./day, 5 days/week, 50 weeks/yr.
Color usage: 4 parts color to 100 pounds natural.
Color cost: $4.00 per pound.

Based on these numbers, material usage is: 400,000 pounds per year.
which breaks down to: 384,615 pounds of NATURAL
15,385 pounds of COLOR

Cost of COLOR is: $61,540

Assuming a minimum error of ONLY 10 percent, we see that COLOR COSTS will be $6,154 too high. That is over $6,000 PROFIT LOST.
And that is at a MINIMUM error of only 10 percent.

To find out exactly what savings are possible for your company, we suggest that you check with your purchasing agent. He is usually most aware that the THEORETICAL amount of color required to do a job is NEVER enough.
Calculate the THEORETICAL COST of color for your operation and compare it to the ACTUAL DOLLARS SPENT. The difference is what a WEIGH SCALE BLENDER will save you.

Next to the cost of virgin resin, COLOR is the most expensive raw material in the production of parts. If you could buy virgin material for 1 cent less per pound, you would probably do it. Color represents a cost of about 16 cents per pound of finished product. With a Weigh Scale Blender you can probably save at least 1.6 cents, if not 3 or 4 cents per pound. This is AUTOMATION with a REAL PAYOFF.

Other benefits come along for free:

Material usage totals are available at each machine. These totals may be printed or ported to a computer. Access to color settings can be limited through password restriction. Regrind scrap can be added back into the process accurately. Regrind scrap is never colored twice for additional color savings of 10 to 20 percent.

A WEIGH SCALE BLENDER is AUTOMATION that WORKS. It pays for itself directly and indirectly over and over.

Will it really work for you:

Tests run in a large Automotive plant show this. Their current system of coloring uses volumetric feeders with motor speed control and timer control (not our feeders). Color metering is at the throat. Even though this plant has over two years experience with these feeders, color usage is consistently between 6 and 14 percent instead of the 4 percent that is desired. Our Model WSB221 Weigh Scale Blender, right from the start, consistently delivered 4.00 to 4.02 percent color usage for a savings of about $5,000 every month, on one machine alone.

The number of personnel who must understand and calibrate the color blending equipment in this plant is over 50. It is extremely difficult to train 50 employees to PROPERLY operate equipment that requires constant monitoring and calibration. Since the Weigh Scale Blender requires no checking or calibration, it does its job ACCURATELY, without a problem and without intervention from operators, saving money day after day, month after month.

The savings are very real.

MAGUIRE PRODUCTS is the leading manufacturer of gravimetric blenders for the plastics industry.

As of January 1, 1999:
Over 11,000 blenders have been sold worldwide
Each carries a THREE YEAR WARRANTY.
WEIGH SCALE BLENDER - SIZES AVAILABLE

MODELS: are designated "WSB", followed by three digits, and option designators. (except Micro Blender which is WSB-MB)

Example: Model WSB-242

1st digit: BATCH size in kilograms (1, 2, 4, 9, or 18),
2nd digit: NUMBER of DISPENSE valves and hopper compartments above blender, (1 to 6).
3rd digit: NUMBER of add-on AUGER FEEDERS (up to 8).
          On MB and 100 series: no feeders.
          On 200, and 400 series: 2 with standard frame, 4 with E frame.
          On 900 and 1800 series: up to 6.
          Other custom configurations available.

Additional designations:

E          Extender frame, allows 3 or 4 auger feeders to fit on 200 and 400 series.
R          2 REMOVABLE hopper compartments, replaces 2 fixed, available on 100, 200, and 400 series.
S          2 SMALLER removable hoppers, Micro Blender size, available on 100, 200, and 400 series.
m1 to m4   hoppers fitted with Micro Pulse valves, up to 4. (for dispenses below 1% only)
          available on MB, 100, 200, and 400 series.
T          TWELVE component software, available on all models.

Note: If the full model number designation exceeds 8 digits, the WSB prefix is shorted to W. (Example W-140Rm2)

Available systems are:

400 gram Micro Blenders rated up to 160 lbs/hr (70 kg/hr).
MB model has 4 removable hoppers with self contained dispense valves. Micro-Pulse valves available.

1000 gram systems rated up to 400 lbs/hr. (90 k/h)
"140" model has 4 compartment hopper, 4 dispense valves.
Removable hoppers (2) optional.
Micro-Pulse valves available.

2000 gram systems rated up to 800 lbs/hr. (180 k/h)
"220" model has 2 compartment hopper, 2 dispense valves.
"240" model has 4 compartment hopper, 4 dispense valves.
Removable hoppers (2) optional.
Micro-Pulse valves available.
2 auger feeders may be added to standard model.
4 auger feeders may be added to E model.
4000 gram systems rated up to 1600 lbs/hr. (360 k/h)
"420" model has 2 compartment hopper, 2 dispense valves.
"440" model has 4 compartment hopper, 4 dispense valves.
2 auger feeders may be added to standard model.

Page 5
4 auger feeders may be added to E model

9000 gram systems rated over 3600 lbs/hr. (900 k/h)
"940" model has 4 compartment hopper, 4 dispense valves.
"950" and "960" models have partitions added to the hopper compartments and additional dispense valves
Up to 6 auger feeders may be added, depending on type of feeder and layout of slide gates.

18000 gram systems rated to 7200 lbs/hr. (1800 k/h)
Configuration the same as the 9000 gram series above.

T indicates TWELVE component software. No "T" means standard FOUR component software. For controlling more than four components, add "T" to the model number.

STANDARD DISPENSE VALVES are correct for components over 1 percent of the mix.

REMOVABLE hoppers have VERTICAL dispense valves, correct for nearly all fractional percentages. Removable hoppers are easier to clean than standard fixed hoppers.

AUGER FEEDERS are correct for components being added at 4 percent or less. Since auger feeders add to the cycle time for each batch and REDUCE overall throughput rates, we recommend them for low percentage components only. Auger feeders have removable hoppers which are easier to clean than standard fixed hoppers.

MICRO PULSE feeders dispense about 1 gram per second, recommended for very small dispenses only, 1/10 percent for example.

FOUR component software is standard and controls up to 4 components.
Some "4 valve" models may have 1 or 2 auger feeders added to accommodate low percentage components, thus making 5 or 6 hoppers available. Standard FOUR software will control only 4 components at one time.

TWELVE component software controls five or more components.

MODEL DESIGNATIONS:

WSB-MB is our smallest blender. The footprint is 6" x 6", with four removable hoppers, 400 gram batches, about 50 pounds per hour throughput. Standard or Micro-Pulse valves are available.

WSB140 has a 4 component controller. The frame footprint measures 10" x 10" and holds a 1000 GRAM weigh bin, 5 pound capacity mix chamber, single 4 compartment hopper, with 4 dump valves.
WSB220 has a 4 component controller. The frame footprint measures 10" x 14" and holds a 2000 GRAM weigh bin, 10 pound capacity mix chamber, single 2 compartment hopper, with 2 dump valves. This model is suitable for NATURAL and REGRIND or two NATURALS. Dump valves are fast fill valves and are not recommended for dispenses below 1 percent.

WSB221 is a WSB220 with the addition of 1 auger feeder. This is the system to order if you are adding color. Even if you are blending only NATURAL and COLOR, without REGRIND, order this 3 component system to obtain the accuracy of the auger feeder. WSB222 is the same but with 2 feeders.

WSB240 is a four component system using all dump valves, no augers, with a single 4 compartment hopper, 1.5 cu ft. each. R, S, and m options available.

WSB241 and WSB242 are WSB240s with 1 or 2 auger feeders added.

WSB420, 421, 422, 440, 441, and 442 models are the same as the 200 series described above except they use 4000 gram capacity weigh bins, and larger mix chamber. Output is approximately double, and overall height is increased 6 inches.

WSB940 uses a larger frame. The "footprint" measures 16 x 20", holds a 9000 GRAM weigh bin, removable 50 pound capacity mix chamber, and a single 4 compartment hopper. All 4 components use slide gate dispense valves.

WSB941 and WSB942 are WSB940s with the addition of 1 or 2 auger feeders. Dump valves generally are not recommended for low percentage dispenses. If color or an additive is to be added at less than 1 percent, then you may wish to purchase an auger feeder to do this. This may reduce overall feed rate of the system but provides greater precision when required.

WSB960 is a WSB940 with the two larger hopper compartments partitioned and 2 additional dispense valves added. This allows 6 components to be blended.

WSB961 and WSB962 are the same with one or two auger feeders added.

WSB1840 and WSB1860 are like 940 systems, but taller. They use two mix chambers, one above the other and a larger weigh bin with heavier load cells. The frame is 19 inches taller than a 940.

On all models: add "T" to model number for more than 4 components.

Other model configurations not listed here are possible.

FEEDERS are available on 200 and larger series blenders. We use 1/2",
1", and 2" augers. 1/2" and 1" have stainless steel removable hoppers. 2" hopper is painted steel and is not removable, but a clean out chute is fitted.

1/2" augers meter about 1 gram/rev, 60 grams/min.
1" augers meter about 8 grams/rev, 1 pound/min.
2" augers meter about 40 grams/rev, 5 pounds/min.

MICRO PULSE feeders are available on MB, 100, 200, and 400 series blenders. Output is comparable to a 1/2 inch auger. Micro Pulse is recommended for very low usage components only, less then 10 grams per batch.

REMOVABLE hoppers, with VERTICAL valves, are standard on MB models and available on 100, 200, and 400 series blenders. VERTICAL valves offer feed rates of about 40 grams per second, suitable for low percentage dispenses. Clean out is easier then fixed hoppers, and they cost less then auger feeders. Today, most applications use standard vertical valves instead of feeders.

WSB - HARDWARE SELECTION

SELECTION is based on:

FIRST: BATCH SIZE.
SECOND: SLIDE GATE configuration for the MAJOR components.
THIRD: REMOVABLE HOPPERS or AUGER FEEDERS for the MINOR components.

FIRST: BATCH SIZE.

All MAGUIRE Weigh Scale Blenders are BATCH blenders. They are sized first, according to the weight of the batch they blend.

SIX batch sizes are available and each has an approximate upper limit in its throughput.

Based on three components, 4 percent color:

<table>
<thead>
<tr>
<th>Model</th>
<th>Batch size in grams:</th>
<th>approximate maximum throughput in pounds:</th>
<th>in kilos:</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB</td>
<td>400</td>
<td>160</td>
<td>70</td>
</tr>
<tr>
<td>100</td>
<td>1000</td>
<td>500</td>
<td>225</td>
</tr>
<tr>
<td>200</td>
<td>2000</td>
<td>1000</td>
<td>450</td>
</tr>
<tr>
<td>400</td>
<td>4000</td>
<td>1600</td>
<td>720</td>
</tr>
<tr>
<td>900</td>
<td>9000</td>
<td>4500</td>
<td>2000</td>
</tr>
<tr>
<td>1800</td>
<td>18000</td>
<td>5500</td>
<td>2400</td>
</tr>
</tbody>
</table>

Based on four components, 6 percent total color and additive:

<table>
<thead>
<tr>
<th>Model</th>
<th>Batch size in grams:</th>
<th>approximate maximum throughput in pounds:</th>
<th>in kilos:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

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<p>| | | | |
|       |                      |                                           |           |</p>
<table>
<thead>
<tr>
<th>Model</th>
<th>Batch size</th>
<th>approximate maximum throughput</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>in grams:</td>
<td>in pounds:</td>
</tr>
<tr>
<td>+-----+------------+------------+-------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MB</td>
<td>400</td>
<td>150</td>
</tr>
<tr>
<td>100</td>
<td>1000</td>
<td>480</td>
</tr>
<tr>
<td>200</td>
<td>2000</td>
<td>900</td>
</tr>
<tr>
<td>400</td>
<td>4000</td>
<td>1360</td>
</tr>
<tr>
<td>900</td>
<td>9000</td>
<td>3600</td>
</tr>
<tr>
<td>1800</td>
<td>18000</td>
<td>4500</td>
</tr>
</tbody>
</table>

Additional components lower output. Each application must be evaluated separately to determine actual through-put.

After you believe you have selected the correct system, check the THROUGHPUT section to verify blender rate.

SECOND: SLIDE GATE configuration.

400 gram Micro Blenders use FOUR vertical in-hopper valves. Micro-Pulse is available in any position.

1000 gram fixed hopper systems have FOUR valves:
Two are slightly larger to accommodate higher percentage components. Two are smaller for color and additives. Two Removable hoppers with Vertical valves can be fitted. Micro-Pulse is available in any position.

2000 and 4000 gram systems have TWO configurations:
TWO slide gates, or
FOUR slide gates.
Two Removable hoppers with Vertical valves can be fitted. Micro-Pulse is available in any position.

9000 gram systems have TWO configurations:
FOUR slide gates standard, FIVE or SIX optional.

18000 gram systems have TWO configurations:
FOUR slide gates standard, FIVE or SIX optional.

Micro-Pulse valves can be fitted to replace standard valves. Removable hoppers have vertical valves. Auger feeders generally provide additional components.

ALSO.... materials that do not flow well from a hopper, or tend to bridge, should be handled by special feeders designed for powder.

THIRD: AUGER FEEDER configuration.

For each size batch and each slide gate configuration we can add a selected number of auger feeders. The model numbers below specify batch size (first digit) and number of slide gates (second digit).
Here is the maximum number of feeders that can be added to each model.

**BASE MODEL** MAXIMUM number of feeders.

WSB 140 and MB Auger feeders can not be added. Removable hoppers with vertical valves are used for low percentages.

WSB 220 and 420 TWO standard feeders.

WSB 220E and 420E FOUR standard feeders.

WSB 240 and 440 TWO standard feeders.

WSB 940 and 1840 FOUR standard feeders.

WSB 960 and 1860 TWO standard feeders.

Powder feeders are interchangeable with Standard feeders.

Maguire WEIGH SCALE BLENDERS are available with TWO types of software:

- FOUR component software, and
- TWELVE component software.

FOUR component software is somewhat easier to learn and use. It is, however, limited to 4 components and these components are limited as to material type. If your requirements are more complicated, TWELVE component software is the answer. (see below)

The added complexity of the TWELVE software is due only to its added versatility. Once it is set up for your particular application, it is very easy to use and does not require any special knowledge on the part of the operator.

You need TWELVE software if you are blending 5 or more components.

You need TWELVE software if you blend components that are not the standard mix of 1 regrind, 1 natural, and 2 additives.

**EXPLANATION:**

We consider all materials to be of one of three types:

1. **REGRIND**
2. **NATURAL**
3. **ADDITIVE** (this includes color)

**SETTINGS** for these are treated differently. The MATH routines are not the same for each type.

- **REGRIND** settings are read as a PERCENTAGE of the ENTIRE MIX.
- **NATURAL** settings are read as the RATIO of that Natural to the other Naturals.
- **ADDITIVE** settings, (including COLOR), are read as PERCENTAGE of all the NATURALS added together.

FOUR software is designed for 1 Natural, 1 Regrind and 2 Additives, or for 2 Naturals and 2 Additives. No other combinations are possible.

TWELVE component software is much more versatile than FOUR software.
Besides allowing up to 12 components, you may also specify each component as to type, either REGRIND, NATURAL, or ADDITIVE, depending on your requirements and how you like to read the settings.

In a FOUR system, three thumbwheel switches are sufficient to control all FOUR components. (NATURAL is calculated by default)

However, in a TWELVE system all settings are entered by KEYPAD. Switches can be assigned, if you want, to control any three of the components, the remaining components must use the keypad for setting entry.

NORMAL OPERATING SEQUENCE

OPERATION: ....very simple.

1. Load all hoppers with material.

2. Set THUMBWHEEL switches for percentages desired.
   - REGRIND, enter as a percent of the entire mix. (xx percent)
   - COLOR, as a percent of the NATURAL. (xx.x percent)
   - ADDITIVE, as a percent of the NATURAL. (xx.x percent)

3. Turn the unit on.
   The system will operate automatically to maintain a level of material high enough to cover the sensor in the mix chamber.

NORMAL OPERATING SEQUENCE - EACH CYCLE

As the sensor is uncovered, a dispense cycle begins. The target weight of a complete batch is 400, 1000, 2000, 4000, 9000, or 18000 grams, depending on model.

REGRIND, if requested, will dispense first. After the Regrind dispense the space remaining in the weigh bin is calculated.

NATURAL will dispense second. This dispense is calculated to fill the bin leaving just enough space for the Color and Additive dispenses, based on their settings. After the Natural dispense is complete the exact weight of this dispense is determined and, based on only the Natural weight, the Color and Additive dispenses are calculated.

COLOR and ADDITIVE are now dispensed one at a time as requested. These dispenses are a percentage of the NATURAL component only.

If the Natural, Color, or Additive components fail to reach the requested weight, the process does NOT CONTINUE. Instead, the dispense is retried, over and over. The ALARM Strobe light flashes and the system holds until the problem is remedied and the full dispense is
As each component is being dispensed and weighed, the corresponding letter (R, N, C, or A) is displayed. The total updated bin weight is displayed about 2 seconds AFTER each dispense.

Each dispense weight is checked and recorded. Rate recalibration takes place every cycle to ensure continuous process accuracy. The total batch is then blended in the mixing chamber before entering the throat of the process machine. The capacity of the mix chamber is two to three batches. If the unit is mounted over a bin or gaylord, a flow control valve is added to hold the mix in the mix chamber to insure adequate blending.

PASSWORD ACCESS
Two passwords allow limited access to two levels of keypad functions. The first level, Manual Mode, allows an operator to manually test each dispense function and run Rate Calibration routines if necessary.

The second level, Program Mode, allows changing of internal operating parameters. You may also restrict the entry of settings to only those who know this password.

ALARMS
When any component fails to meter properly, the unit will sound an audible beeper and flash a strobe light. The blending process will hold at this point until the hopper that is low is refilled. Once the low condition is corrected, the blending continues automatically. All or selected components may be programed to alarm.

RECIPES
There is provision for Recipe storage. However, the ease of setting the unit for the mix that you want generally makes recipe storage unnecessary.

100 recipes can be stored and retrieved directly using the keypad. When ported to a computer, the number of recipes is unlimited. Each recipe consists of the thumbwheel settings for each component. Retrieving a recipe will automatically load the proper settings and override the thumbwheel settings.

BATCH OPERATION
You can set the unit to mix and dispense a predetermined weight of material, for example to fill a Gaylord or barrel. When the preselected weight is reached, the unit will stop and sound the alarm.

VOLUMETRIC MODE
Should the load cells become damaged, the unit can be run in a volumetric mode until replacement load cells are available. This feature also allows dry run testing without material present.
UP TO TWELVE COMPONENTS
Software is available to control of up to twelve components. The modular hardware design of our system allows the addition of feeders and dump valves with minimum hardware modification. Various hardware configurations are available to match your requirements, the most complex, at this time, being 6 dump valves and 4 feeders.

IMMUNE TO VIBRATION
Unlike competitive units, our system works accurately even when mounted directly to an injection molding press. Vibration and press movement do not effect accuracy.

MATERIAL USAGE / PRINTER OUTPUT / COMPUTER COMMUNICATIONS
See following pages.

There are MANY OTHER FEATURES built into the software. Request our complete operation manual to learn about all the features.

Material Usage Information can be retrieved in THREE ways;

1. From the DISPLAY on the control panel,
2. From a PRINTER plugged directly into the controller,
3. From a COMPUTER that gathers data from one or many blenders and then produces reports summarizing this data.

DISPLAY
Pressing the VIEW key will allow you to see the current grand totals of all material that has passed through the system since the last time this information was cleared. This information is displayed one material at a time on the panel front display.

PRINTER
Pressing the VIEW key followed by the * key will cause two sets of material usage totals to be printed if a printer is connected. These totals are 1) grand totals - since the last time cleared, and 2) current totals - since the last time printed.

This same information may be printed PERIODICALLY and AUTOMATICALLY, by setting the PRT parameter to a time interval number. For example, when PRT is set to 120, this printout will occur automatically, every two hours.

The printout looks like this:

<table>
<thead>
<tr>
<th>DATE</th>
<th>TIME</th>
<th>TOTALS:</th>
<th>GRAND</th>
<th>PCT</th>
<th>CURRENT</th>
<th>PCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENT</td>
<td>11/01/90</td>
<td>18:26:45</td>
<td>CYCLES</td>
<td>342</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>LAST PRINTED</td>
<td>11/01/90</td>
<td>18:19:59</td>
<td>REGRIND</td>
<td>6.2</td>
<td>.4</td>
<td>0</td>
</tr>
<tr>
<td>LAST CLEARED</td>
<td>10/30/90</td>
<td>20:02:36</td>
<td>NATURAL</td>
<td>1485.4</td>
<td>20.2</td>
<td></td>
</tr>
</tbody>
</table>
The PRINTER port is a standard DB25 (25 pin) parallel printer port (female) found on the back of most PC computers. A standard "off the shelf" PARALLEL printer will plug in here and operate with no additional modifications required.

The controller may be set to output information lines to the printer at the end of each cycle. The printout after a normal cycle looks like this:

```
**REG 20** **NATURAL** **COL 04.0** **ADD 01.0** TOTAL*
* 03/27/90* * 16:34:40* * ID# 003 * *********** ******
FINAL: DISP,% 400.0 20.0 1523.8 60.9 4.0 15.2 1.0 2000.0
RATE: GR/TIME 29823 976 33000 976 10240 31232 10240 31232
1ST DISP,TIME 302.1 130 1488.3 440 60.9 1857 15.2 463
```

Heading line: designates columns for each component information and its setting. This line prints at the top of each page.

DATE LINE: Current DATE, Current TIME, and ID# for this controller.

FINAL: Actual final dispense weight and percent, each component.

RATE: Dispense Rate: 1/10th grams / interrupts.

Example: For Regrind as shown above; 29823 976
29823 = 2982.3 grams
976 interrupts = 4 seconds; (244 interrupts = 1 second)
The computer will use this dispense rate to calculate the time for the next dispense. In this example 400 grams of Regrind is required to be dispensed. A dispense time of 130 interrupts is computed:
400 x 976 / 2982.3 = 130.9 (130 interrupts)

1ST: Actual dispense WEIGHT and TIME for last cycle on the FIRST try only. If retries occur, they are not added in.
Example: Regrind shown above; 302.1 130
The actual weight dispensed on the first try = 302.1.
The actual dispense time that was used = 130 interrupts.
If additional retries had occurred, these numbers would not equal the FINAL dispense weight shown in the GRAM line. The FIRST try dispense weight and time, are the numbers that error correction and recalibration is based on.

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COMPUTER COMMUNICATIONS
MLAN - MAGUIRE LOCAL AREA NETWORK

OVERVIEW

The MAGUIRE LOCAL AREA NETWORK (MLAN) is the name we give to the package of PROGRAMS written exclusively for all MAGUIRE Weigh Scale Blenders.

MLAN enables your IBM or compatible computer to communicate with one, or many, WSB controllers.

MLAN provides TWO WAY COMMUNICATION; both DOWNLOADING and RETRIEVAL of information from WSB controllers for:
1. **EXACT WEIGHT** of all MATERIALS processed,
2. **SETTINGS**,  
3. **RECIPES**,  
4. **WORK ORDER** and OPERATOR numbers.

MLAN organizes and tracks your MATERIAL INVENTORY, allowing you to gather accurate material usage information based on:
1. TIME period, by day, or shift, or other time period.
2. MACHINE number,
3. **WORK ORDER** and OPERATOR numbers.

MLAN allows you to maintain a RAW MATERIAL list, and then build RECIPES from this list for all the products that you manufacture.

MLAN produces REPORTS to show totals for each MATERIAL used, between selected dates, broken down by Date, Time period, Machine number, Work Order number, and Operator number.

MLAN programs are MENU driven, and very user friendly. The package is
ready to go with very little training or start up time required.

HARDWARE REQUIREMENTS

1. COMPUTER, TERMINAL, and KEYBOARD.
   COMPUTER           -   IBM-PC, 486 minimum, Pentium recommended.
   OPERATING SYSTEM   -   MS-DOS, 2.1 or WINDOWS.
   HARD DRIVE         -   20 MB Minimum (40 MB recommended)
   MONITOR            -   VGA
   MEMORY             -   8 MB minimum (16 MB recommended).

2. MLAN SIGNAL INTERFACE BOX, required for most installations.
   This device is positioned right next to the computer for signal
   conversion and amplification.

3. COMMUNICATION CABLE
   A single 4 conductor shielded cable connects all WSB controllers
   to the computer. This is generally done with a single cable run
   through the ceiling over all the process machines with "drops" to
   each controller.

4. PRINTER
   An 80 column parallel printer is required to obtain reports.

FOR MORE INFORMATION; request our COMPUTER COMMUNICATIONS MANUAL.

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COMPUTING THROUGHPUT - ALL SYSTEMS

Maguire Weigh Scale Blenders blend material in batches of a preset
weight. The size of the batch and the time required to blend each
batch determines maximum throughput. This is the CYCLE time. Here is
the list of operations that make up the cycle time.

The first event of each cycle is TARE weight.
Tare weight requires a 1/2 second settle time
and 1 second weighing time, for a total of ............ 1.5 seconds

Since most of the mix comes from slide valves,
we add the time to fill the bin from a slide valve.

   Micro Blender vertical valves dispense about 40 gr/sec,
   100 series valves, about 250 grams / second,
   200 and 400 series 3" round slide valves and 2" x 3" valves,
   about 650 grams / second.
   900 and 1800 series 3" x 6" valves, about 2500 grams / second.

So....
To fill a  400 gram bin takes about ..................... 10 seconds
To fill a 1000 gram bin takes about .....................  4 seconds
To fill a 2000 gram bin takes about .....................  3 seconds
To fill a 4000 gram bin takes about .....................  6 seconds
To fill a 9000 gram bin takes about .....................  4 seconds
To fill a 18000 gram bin takes about ....................  8 seconds

Each component requires an additional 1/2 second settle time
and 1 second weighing time.
So each component adds settle/weigh time of: ........ 1.5 seconds
To empty the 400 gram weigh bin takes about ........... 2 seconds
To empty the 1000 gram weigh bin takes about ........... 2 seconds
To empty the 2000 gram weigh bin takes about ........... 2 seconds
To empty the 4000 gram weigh bin takes about ........... 2 seconds
To empty the 9000 gram weigh bin takes about ........... 2 seconds
To empty the 18000 gram weigh bin takes about .......... 4 seconds

Auger feeders or micro pulse valves, if used, add a lot of time. Available are 1/2", 1", or 2" auger feeder, and vertical or horizontal micro pulse valves.

1/2" augers dispense about 1 gram per sec.
1" augers (STANDARD) dispense about 20 grams per sec.
2" augers dispense about 50 grams per sec.
Micropulse valves (both vertical and horizontal) dispense about 1 gram per sec.
Vertical (tube) valves, used on Micro, 100, and 200 series removable hoppers, dispense about 40 grams per sec.

On 9000 and 18000 gram systems, filling time is based on 3 x 6 valves. Components 3 and 4 use smaller 2x3 valves. 6 valve systems also use all smaller valves. To adjust for this add 2 extra seconds for any component using a smaller 2x3 valve.

Use the chart and formula on the next page to compute throughput.

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To COMPUTE THROUGH-PUT:

FIRST, compute cycle time.

Select from the correct column and add up the times that apply.

<table>
<thead>
<tr>
<th>Batch weight of system:</th>
<th>400</th>
<th>1000</th>
<th>2000</th>
<th>4000</th>
<th>9000</th>
<th>18000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base time (seconds)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(tare+dispense+empty):</td>
<td>13.5</td>
<td>7.5</td>
<td>6.5</td>
<td>9.5</td>
<td>7.5</td>
<td>15.5</td>
</tr>
<tr>
<td>For each component, add:</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>For each percent using:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical Valve add:</td>
<td>-</td>
<td>0.2</td>
<td>0.5</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1 inch auger add:</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>2.5</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>1/2 inch auger add:</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td>40</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Micro Pulse valve add:</td>
<td>4</td>
<td>10</td>
<td>20</td>
<td>40</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

On 900 and 1800 series:
If component 3 is used add: | - | - | - | - | 2 | 4 |
If component 4 is used add: | - | - | - | - | 2 | 4 |
960 and 1860 models, add:  | - | - | - | - | 8 | 16 |

SECOND, apply this formula to determine maximum throughput.

POUNDS per hour = 8 x (batch weight of system) / total sec
KILOS per hour = 3.6 x (batch weight of system) / total sec

EXAMPLE: 4 components, 4% color, 2% additive, 2000 gram system:

6.5 base time
6 4 components (4x1.5)
4 1" auger at 4% (1x4)
_2_ 1" auger at 2% (1x2)
18.5 sec. 8 x 2000 / 18.5 = 864 POUNDS/hr

This will give MAXIMUM theoretical throughput. Allow some margin for times when material runs out or other problems.

DOUBLING OF THROUGHPUT

The FAST (FAST REPEAT) key on your controller will allow rapid repeat cycles to occur that do not take the time to weigh each component. These are Volumetric dispenses and can occur up to four (4) times after each gravimetric dispense. The increased speed of these dispenses will generally DOUBLE the throughput.

ACCURACY

The question of accuracy comes up frequently. It is a confusing subject. There is no accepted standard in the plastics industry to express accuracy. It is common for this industry to express accuracy as simply plus or minus a percent, without telling us, or even knowing what this number means. When pressed for an explanation, it is rare that anyone knows the basis for their claim. I personally believe that marketing pressure requires that we all make claims at least equal to our competitors without really knowing how these numbers are derived.

Take, for example, the accuracy claim of plus or minus 1 percent.

We might ask:

Percent of what?
If we wanted to dispense 4 percent color, does plus or minus 1 percent mean a dispense range of 3 to 5 percent color is to be expected, (which is plus or minus 1 percent), or is it 3.96 to 4.04 (which is also plus or minus 1 percent).

How about sample size? Is this accuracy achieved after a single dispense of 10 grams, or over a much longer run of say 100 pounds. One percent of 10 grams is about 4 pellets of color, not a realistic goal from an auger that dispenses about 360 pellets with each turn. In addition to the irregular shape and size of the pellets, augers have a unfortunate pulsating output due to auger
flight interference. About 2/3 of the pellets (about 240 pellets) are dispensed in the first half of a turn, while the other 1/3 (120) are dispensed in the second half of the turn. How can you predict what degree of rotation will cause 4 pellets, or even 100 pellets, to fall since 180 degrees of rotation can dispense anywhere from 120 to 240 pellets.

100 pounds, plus or minus 1 percent, is, on the other hand, a very achievable accuracy goal despite the pulsating output of the auger. Even the irregular shape and size of the pellets will be averaged out over such a long run.

In our sales literature we claim for our blenders an accuracy of plus or minus 1/10 percent.

If you want 4 percent color, are we saying you will get 3.9 to 4.1, (which is plus or minus 1/10 percent), or do we mean you will get 3.996 to 4.004 percent color (also plus or minus 1/10 percent).

We actually do mean the second example, that is 1/10 percent of requested target, the more difficult goal to achieve.

However we can achieve this goal only over time, only with pellets that are fairly uniform in shape and weight, only if the hopper material level is held steady (an aid to uniform metering), and only if internal parameters are set correctly.

When these conditions are met, it is not uncommon for the actual color quantity dispensed over 20 or 30 cycles to be within a few grams of the exact calculated target amount. As long as the requested target amount is large enough, say 4 percent, or 80 grams, per batch, and we run enough batches, say 30, then we can achieve our 1/10 percent accuracy claim.

A slide gate set to dispense 2000 grams per cycle, 10 cycles in a row, can achieve a total dispense weight within 10 grams of the 20,000 gram target. This also meets our claim of 1/10 percent accuracy.

But lets take an example under the worst conditions; blender batch size is 2000 grams, regrind usage is 50 percent, and you want to add 1/2 percent color to the natural portion. In this case you are looking to dispense 5 grams color each cycle. A one inch auger has a know predictable dispense error of 2 grams due to the pulsating output of the auger, something that is true of all augers. So you can expect, and you should expect errors of 2 grams batch to batch. Two grams is a FORTY percent error from the requested five gram target.

No one will publish such an error in their literature, but all of us, customers and suppliers alike, must deal with this reality.

This is not to say that it is impossible to get it exactly right if we had to. We could. But the time required to dispense slowly, a few grams at a time, followed by careful weighing and even smaller corrections, would consume valuable time. Process throughput rate would be far too low. Another way we could do it is with much more
equipment, very expensive equipment, more complicated and probably less reliable equipment. If the industry absolutely required this, then this would be done.

But lets look at the reality of the process and the needs of the industry.

Even in our example above showing 40 percent error, we are only talking about a few grams. The batch that follows will most likely produce an equal error in the other direction. In fact, "pulsation" errors occur plus and minus equally. The blender mix chamber holds about 3 batches so there is averaging going on in the mix chamber. In addition, all plastic processing machines contain a barrel which holds up to 3 or 4 more blender batches and a screw which vigorously blends all these components together.

The blending action of the screw is what allows a single color pellet to typically color 25 times it's weight in Natural and do it very well. In fact, in a four inch extruder, 1 color pellet will disperse across a full pound of natural material, a blend of 1 part to about 15,000 parts. We see this when 1 stray color pellet, red for example, enters the flow of what is supposed to be a white product. About a pound of "light pink" material will be scrapped due to contamination from this single pellet.

All this is to make one simple point: The very substantial mixing that occurs before the final product is produced assures us that one or two grams of color error per cycle has no impact on the quality of the final product. In fact, blending is so complete that even in careful lab analysis, these errors are not detectable.

Blender design is geared to deliver exactly what the plastics processor needs, consistent accuracy over time, with batch to batch errors low enough so that the blending of the process makes these errors undetectable in the final product.

This we do.

Here are some of the details as to how we do it.

Load cell resolution is 1/40 of a gram (about 1 pellet). This means that in the "raw signal" readout mode, the addition of 1 pellet to the weigh bin will cause the output reading to increment by 1. This is what the circuitry can detect.

Software resolution is 1/10 of a gram (about 4 pellets). All weights that are taken and recorded by the software are in tenths of grams (full grams for larger models). This is what the software records.

Over an extended time period the system is extremely accurate. Every batch is followed by an error correction routine that assures that the next batch "learns" from any significant error that might have occurred. In this way the system continuously, but cautiously, hunts toward perfect average dispense weight.
Accuracy of the dispense of any one component in any single batch depends on the repeatability of the dispense device.

For example, augers are known to have a slightly pulsating output. Our one-inch auger dispenses about 9 grams per full revolution, but half of this revolution puts out about 1/3 of the 9 grams while the other half puts out 2/3. This 1/3 difference (about 3 grams) will produce, under the right circumstances, a variation from batch to batch of 3 grams.

Air operated dispense valves, for Natural and Regrind, are accurate to plus or minus about 5 grams on average and can vary by as much as 20 grams or more depending on the free flow characteristics of the material. Most dispenses will fall between plus or minus 10 grams with an average error of 5 grams.

Since color and additive are added last and are added based on the actual weight of natural dispensed, only the color and additive dispenses are critical to the accuracy of the blend. The accuracy from one cycle to the next is the same as the repeatability of the metering device when it is bench tested in a lab. The great advantage of a weigh scale blender is that every cycle is weighed and followed by any necessary corrections if the error is significant enough to dictate such a correction.

"Loss in Weight" systems have the same limitation in that accuracy can be no better than the device that is doing the metering. In addition, they have the added problem that since all components are metering simultaneously, color may drift one way while natural drifts the other way. The result is a larger potential for error. There is no quick way to detect or track these errors in "loss in weight" systems. The load cells of these system support heavier loads and can not detect single gram weight changes.

Volumetric systems also drift with no provision to detect the drift other than an operator periodically weighing the outputs.

In our system each component of each batch is weighed to a 1/10 gram (or 1 gram depending on model) and any error for that batch is detected. If the error is significant, that is greater than normal unavoidable variation, a correction in flow rate is computed and used for the next batch. Since 2 to 3 batches are in the mix chamber at any one time, batch errors are averaged for a more uniform blend.

In addition, the blending that takes place in the screw of your process machine further evens out small batch to batch errors. What is important is that overall, batch to batch errors are not significant enough to be detectable in the finished product.

By using a printer connected to the controller you can track dispense weights of each component for each batch and follow exactly how well your system is performing from batch to batch and over an extended time.

When a significant dispense error does occur in a single batch, we can always add a little more if the dispense was short, but we can do
nothing about a dispense that has put in too much. However, the chance of an over dispense is slight since most dispense problems relate to an inadequate flow of material for one reason or another. The decision of whether or not to add more after a "short" dispense is based on parameters that you can set yourself.

We are able to produce accuracies of 1/10 of one percent of expected output. This is based on a long run where each dispense may be over or under the exact target weight but the long term total dispense is nearly exactly on target.

The batch to batch accuracy of our dispense valves and auger feeders depends, to a great extent, on the consistency of the pellets and their uniform size and bulk density. If these factors are good, batch to batch dispenses of sufficient size will vary no more than one percent up or down.

REMEMBER:
More important then batch to batch accuracy, the problem in most plants is that operators do not have time to calibrate equipment frequently and consequently never achieve full rated accuracy. Our system checks and calibrates itself every cycle thus automating this job.

The results, both lower color costs and lower scrap rates, are dramatic.

DUMP VALVE REPEATABILITY

Tests show that our slide gate style dispense valves are very, very accurate. In fact, they are just as accurate as auger feeders when dispensing large quantities.

A series of 20 consecutive dispenses of natural material (high impact styrene pellets) produced the following results:

The target weight for each dispense was 2000 grams.
The total of all 20 dispenses was 40,038 grams for an average dispense of 2002 grams, 1/10th of a percent error.
The dispenses ranged from a low of 1982 grams, (9/10ths of a percent low), to a high of 2014 grams, (7/10ths of a percent high).
The average error, over or under, was 8 grams, 4/10ths of a percent average error per batch.
This is as good as, or better than, all other equipment on the market that we have seen. Material that does not flow smoothly or has varying bulk density will not perform this well.

These accuracies are obtainable as long as the amount dispensed is relatively large. Dispense accuracy is about plus or minus 10 grams at best regardless of the size of the dispense. For a 2000 gram dispense, this is extremely accurate, but for a 100 gram dispense, this is plus or minus 10 percent. For low volume dispenses such as color and other additives, an auger feeder is much better.

AUGER FEEDER REPEATABILITY

Using a 1" auger feeder, a test series of 4 dispenses produced the following results:

<table>
<thead>
<tr>
<th>NATURAL dispense</th>
<th>COLOR (set for 20%)</th>
<th>ADDITIVE (set for 20%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
<td>Target disp. %</td>
<td>actual actual actual gram</td>
</tr>
<tr>
<td></td>
<td>(20%)</td>
<td></td>
</tr>
<tr>
<td>361.6</td>
<td>72.32</td>
<td>72.7</td>
</tr>
<tr>
<td>362.4</td>
<td>72.48</td>
<td>73.1</td>
</tr>
<tr>
<td>361.0</td>
<td>72.20</td>
<td>72.3</td>
</tr>
<tr>
<td>367.4</td>
<td>73.48</td>
<td>73.0</td>
</tr>
</tbody>
</table>

We see that color and additive errors vary from -.19 to +.36 percent. These are weight errors from -.62 to +1.3 grams. These errors are to be expected from a one inch auger which has a potential pulsation error of at least 2 grams above or below target dispense.

Over a longer run we would expect occasional dispenses to display even greater errors. However, we would also expect plus errors to cancel minus errors and the total net error to approach zero.

HOW WE COMPARE TO OTHER "GRAVIMETRIC" SYSTEMS

There was a time when all of our gravimetric competitors were "loss-in-weight" systems. Today, our "gain in weight" technology, developed entirely by Maguire Products, dominates the blender market. We offer here a comparison first against "loss-in-weight" systems. Then we compare our Weigh Scale Blenders to the many attempted copies on the market today.

LOSS-IN-WEIGHT:

Four component Loss-in-Weight systems use from 8 to 12 load cells, with each component weighed by a separate set of two or three cells. A shift in the calibration of any one load cell will alter the mix ratio. Recalibration, the only way to detect such a problem, is required to maintain mix ratio accuracy.
Our system uses only TWO LOAD CELLS, and these two cells are responsible for weighing ALL components. A shift in load cell calibration affects all components equally. Therefore, the MIX RATIO remains accurate. Recalibration is not required.

Only two load cells means lower initial cost, higher reliability and less maintenance.

Continuous LOSS IN WEIGHT metering requires variable speed D.C. motors driving augers, each with its own motor speed control circuitry. BATCH metering allows the use of single speed AC motors and timed dispense valves.

No D.C. motors and no D.C. motor controllers mean initial cost is lower, maintenance is reduced, and reliability is improved.

In a "loss in weight" system, where all components are metered simultaneously, the range of mix ratios available is limited by the adjustment range of the variable speed drive motors, generally a range of 20 to 1.

In our batch system the mix ratio can span the range from 1/100 of one percent up to 100 percent for a range of 10,000 to 1. Changing ratios is as simple as changing thumbwheel settings.

When components are metering one at a time instead of simultaneously, overall feed rate is lower. "Loss in weight" systems deliver rates of 4000 pounds per hour or more.

Since "loss in weight" metering requires load cells to support an entire hopper full of material, the load cells must be rated for hundreds of pounds. These high-load cells are not as sensitive to small metering errors as our load cells. Ours detect weights as low as 1/40 gram (1 pellet). Software resolution is in 1/10 grams, about four pellets.

Unlike other systems, machine mounting is possible. Our unique weighing technique makes our system virtually immune to VIBRATION.

GAIN-IN-WEIGHT copies:

The single most obvious advantage that we have over all our competitors' copies is the single fact that we have over 11000 units operating worldwide. That means 11000 units being tested every hour of every day, tested in real world environments, in all types of applications, under all types of adverse conditions, with all levels of operator expertise. Our systems have been operating under these conditions for over nine years. When problems arose, design or software improvements were made. You, the customer, are the beneficiary of all this real time research and product improvement.

Specific advantages are:

Our software uses advanced weighing techniques that make our systems
immune to most vibration.

Many unique design features of our hardware make us better than all others unless, of course, then have copied our designs exactly (which a few have). Our newest features are Patent Protected.

Our software has dozens of advanced features, the result of years of meeting customers special needs, all of which are available should you have similar special requirements.

Every Blender comes with a three year warranty, proof that we are entirely confident in the design and construction of our blender.

Our reputation for quality is evident in our product from the day you first install it through the years that follow, as your blender continues to perform like new for many years to come.

Only a customer's extreme loyalty to another supplier will cause us to lose a sale to a competitor. More often then not we are selected later, when the competitive product does not live up to its promised level of performance.

Comments we hear most often are that our system is surprisingly easy to set up, works correctly right from the start, and is so easy to operate that everyone likes it. Even "old school", "just about to retire", maintenance guys say it just seems to make everyone's life easier, including their's.

Our years of factory experience with our electronics and software has allowed our equipment to evolve into an extremely reliable performer. Customers often tell us that their Maguire Blenders are their most dependable production equipment in their factory.

MLAN, the unique data gathering software that only MAGUIRE offers, will take you into the 21st century with capabilities for comprehensive material usage information gathering and analysis. With over 250 MLAN packages installed to date, we can say with certainty that it really works. Our competitors can say what they want, but they have no installed base to back up their claims.

HOW WE COMPARE TO "VOLUMETRIC" SYSTEMS

Volumetric systems can be just as accurate as gravimetric systems, provided they are calibrated properly and frequently. After 16 years of observing the actual operation of color equipment in hundreds of plants, I can say that very seldom are they calibrated properly. Regardless of how accurate the equipment is, the time required to achieve that accuracy is seldom available.

A WEIGH SCALE BLENDER solves this problem. Settings are simple; direct settings of the percent of color, additive, and regrind that you want. The system does the rest. It adjusts, checks itself, and re-adjusts as
necessary to maintain accuracy all the time. No formulas to remember, no shot weights to remember, no metering rate to check, no sample dispenses or calibration checks are ever required.

All metering systems claim accuracies that have been achieved only in a lab. Our WEIGH SCALE BLENDER delivers it on the floor day after day, month after month, year after year, for different parts, different colors, different operators, different shifts, and all without operator intervention.

With our WEIGH SCALE BLENDER, you can LOCK IN a setting and LOCK OUT operator intervention, if you wish. In this way settings can be set and changed only when the proper "password" is used.

You may also lock in UPPER LIMITS to settings. This allows your operators some discretion in setting the thumbwheels but prevents excessively high settings.

If a material runs out, an ALARM sounds. The system will not continue if the correct blend is not achieved.

Continuous totaling of all components takes place as the unit operates. These totals are available for direct visual readout, output to a printer, or output to a computer for compiling and reports.

RELIABILITY and SERVICEABILITY

* The weigh bin slides out for cleanup, without tools.
* Clear hinged doors provide full access to the mix chamber.
* The Mix blade is removable for cleaning if necessary.
* All dispense and dump valves are simple in design. Their operation is visible through clear acrylic windows so you can observe the proper operation of the system at each step.
* Parts that contact the materials are stainless steel.
* The controller is completely portable; all external connections are plug-in. Should an electronic problem occur, it takes only a minute to exchange controllers.
* The load cells are prewired and sold in matched sets. Should they be damaged, only 4 bolts need be removed to install new load cells.
* Volumetric mode allows running even with damaged load cells.
* AC motors drive the feeders, and air solenoids control the dispense valves. Both are simple and reliable.

STANDS - When WSBs are NOT machine mounted

AWS-2B and AWS-9B    Barrel-style Stand
40" high by 36" wide; clearance 38" high by 29" wide.

AWS-2G and AWS-9G    Gaylord-style Stand
48" high by 56" wide; clearance 46" high by 49" wide.

VTA-2 and VTA-9      Vacuum Takeoff Stand Assembly 27" high by 36"
wide: holds, in reserve, 2 cubic feet for 2000 gram systems and 3 cu. ft. for 9000 gram systems.

All are available as PORTABLE with 6" wheels (2 fixed and 2 swivel). 1 material probe is included with a standard VTA.

avp  Additional Vacuum Probes
ahm05  6" Wheels Add-On (Set of 4)

AUGER FEEDER Add-Ons – When purchased separately

AWF-4  1/2" Feeder Add-On
AWF-8  1" Feeder Add-On (standard)
AWF-16  2" Feeder Add-On
         Feeder mounting bracket, required for 240, 440, 940.
AWL  Liquid color Pump

MATERIAL LOADERS

MLS  Central Vacuum Systems, Up to 8 stations.
ML  Venturi Color Loader
ML-A  Venturi Color Loader with Low Level Alarm

OTHER OPTIONS

FCA  Material Flow Control Assembly
     (when unit is mounted over a bin or Vacuum Take Off Assembly)
al  Lid adapted for Loader other than standard.
AEC-10  Remote Kit for WSB Controller (10' extension)
AEC-20  Remote Kit for WSB Controller (20' extension)
MLAN-S  Software Package: Allows downloading and retrieval of information from a computer.
MLAN-H  Hardware Interface for computer communication to multiple systems.
MLAN-C  Cable and Connectors are computer communication.

EXTRUSION CONTROL allows your blender to control extruder output.

Page 26
SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model:</th>
<th>MB</th>
<th>140</th>
<th>220</th>
<th>240</th>
<th>420</th>
<th>440</th>
<th>940</th>
<th>1840</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. lbs/hr:</td>
<td>140</td>
<td>480</td>
<td>900</td>
<td>900</td>
<td>1360</td>
<td>1360</td>
<td>3600</td>
<td>4500</td>
</tr>
<tr>
<td>Disp. valves:</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>4/6</td>
<td>4/6</td>
</tr>
<tr>
<td>Add. feeders:</td>
<td>*0</td>
<td>*0</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4/2</td>
<td>4/2</td>
</tr>
<tr>
<td>---------------</td>
<td>----</td>
<td>----</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td><em>Model MB and 140, valves may be exchanged for micro pulse valves.</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Batch grams:</td>
<td>400</td>
<td>1000</td>
<td>2000</td>
<td>4000</td>
<td>9000</td>
<td>18000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall ht:</td>
<td>24&quot;</td>
<td>33&quot;</td>
<td>41&quot;</td>
<td>47&quot;</td>
<td>60&quot;</td>
<td>79&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400 series models are dimensional the same as 200 series except weigh bin and mix chamber are each 3 inches higher. Total added height = 6&quot;.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>900 and 1800 series models are the same except weigh bin is deeper and a second mix chamber is added. Total added height = 19&quot;.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size of base:</td>
<td>6x6</td>
<td>10x10</td>
<td>10 x 14</td>
<td>16 x 20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bolt pattern:</td>
<td>(4)</td>
<td>(4) 5/8&quot; holes; 8&quot;x 8&quot; square.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>940 and 1840 also have 14.5 x 15 pattern.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3&quot;x3&quot;</td>
<td>Other bolt patterns may be added.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Units may be machine mounted, stand mounted over a gaylord, drum, or hopper, or provided with a vacuum take-off assembly.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow control:</td>
<td>optional</td>
<td>standard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual gate:</td>
<td>opt.</td>
<td>standard</td>
<td>optional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6&quot;sq. Manual slide gate assembly is 10&quot; square, 1&quot; thick with 8&quot;x 8&quot; bolt pattern</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction:</td>
<td>1/8&quot;</td>
<td>Frame: 1/4&quot; plate and 1.5&quot; x 1/4&quot; angle welded.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>plate</td>
<td>Windows: 1/2&quot; acrylic or 1/8&quot; lexan.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outlet size:</td>
<td>2&quot;</td>
<td>3&quot; round</td>
<td>4&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

HOPPERS:

<table>
<thead>
<tr>
<th>Model:</th>
<th>MB</th>
<th>140</th>
<th>220</th>
<th>240</th>
<th>420</th>
<th>440</th>
<th>940</th>
<th>1840</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hopper size:</td>
<td>8x8</td>
<td>26x28</td>
<td>26x32</td>
<td>28x42</td>
<td>26x32</td>
<td>28x42</td>
<td>28x46</td>
<td>28x46</td>
</tr>
</tbody>
</table>
Optional hoppers for models 940 and 1840:
- Stainless steel hopper, 40 x 46 inches, increased capacity - 50 percent.
- Painted steel hopper, 40 x 46 inches, and 8 inches higher, double capacity.

<table>
<thead>
<tr>
<th>compartments:</th>
<th>4</th>
<th>4</th>
<th>2</th>
<th>4</th>
<th>2</th>
<th>4</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of each:</td>
<td>8x8</td>
<td>13x14</td>
<td>13x16</td>
<td>14x21</td>
<td>13x16</td>
<td>14x21</td>
<td>17x28</td>
</tr>
<tr>
<td>Other hopper configure's available:</td>
<td>-</td>
<td>2 or 3</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>3</td>
<td>3, 5 or 6</td>
</tr>
<tr>
<td>Cap. cu ft:</td>
<td>.3</td>
<td>.9</td>
<td>1.5</td>
<td>1.2</td>
<td>1.5</td>
<td>1.2</td>
<td>2</td>
</tr>
</tbody>
</table>

940 and 1840 hoppers have 2 large and 2 small compartments. For 6 compartments, partitions divide the large compartments in half.

<table>
<thead>
<tr>
<th>Construction:</th>
<th>16 gauge painted steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean outs:</td>
<td>remove 4 x 6</td>
</tr>
<tr>
<td>hoppers</td>
<td>Hopper compartments have hinged 1/2 inch acrylic clean out doors.</td>
</tr>
<tr>
<td>Lids:</td>
<td>4</td>
</tr>
<tr>
<td>lids</td>
<td>A single lid covers all compartments.</td>
</tr>
<tr>
<td>Some lids are hinged for top access.</td>
<td></td>
</tr>
<tr>
<td>A 10&quot; round hole is provide over each compartment for mounting of a vacuum loader.</td>
<td></td>
</tr>
</tbody>
</table>

---

ELECTRICAL:

<table>
<thead>
<tr>
<th>Model:</th>
<th>MB</th>
<th>140</th>
<th>220</th>
<th>240</th>
<th>420</th>
<th>440</th>
<th>940</th>
<th>1840</th>
</tr>
</thead>
</table>
**U.S.A.**

**Voltage:** 120 volt 60 cycle

1800 units also require a separate 240 volt single phase supply for the mix motors.

<table>
<thead>
<tr>
<th>Full amp load</th>
<th>2.0</th>
<th>4.8</th>
<th>8.5</th>
<th>8.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fused at</td>
<td>10 amps</td>
<td>20 amps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controller</td>
<td>Draws less than 1 amp.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air solenoids</td>
<td>24 volts in both domestic and export models. 5.4 watts each. Only one active at a time.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Export:**

**Voltage:** 220 volt single phase

<table>
<thead>
<tr>
<th>Full amp load</th>
<th>1.0</th>
<th>2.5</th>
<th>4.3</th>
<th>8.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fused at</td>
<td>10 amps</td>
<td>20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MOTORS:**

**Model 940 mixer motor:**

Split Phase Gearmotor, 1/2 HP, 22 RPM, TEFC, Continuous duty, Reversible, 120/240 volt, 60 cycle AC, Ball Bearing input, Needle Bearing output. (Export model = 400v/50hz/3 phase)

**Model 220, 240, 442, and 440 mixer motor:**

Permanent Split Capacitor Gearmotors, 1/6 HP, 40 RPM at 60 Hz, 33 RPM at 50 Hz, TEFC, Continuous duty, Reversible, 115/230 volt, 50/60 cycle AC, Ball Bearing input, Needle Bearing output.

**AIR:**

<table>
<thead>
<tr>
<th>MB</th>
<th>all others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommend psi</td>
<td>40</td>
</tr>
<tr>
<td>Min req psi</td>
<td>25 psi</td>
</tr>
<tr>
<td>Air cons.</td>
<td>10 cu. ft. per hour.</td>
</tr>
</tbody>
</table>

**ADD ON feeders:**
### Auger sizes:

<table>
<thead>
<tr>
<th></th>
<th>1/2&quot;</th>
<th>1&quot;</th>
<th>1&quot; Powder</th>
<th>2&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>use:</td>
<td>under 1%</td>
<td>standard</td>
<td>powder</td>
<td>high output</td>
</tr>
<tr>
<td>Output - grams/sec:</td>
<td>1</td>
<td>8</td>
<td>5</td>
<td>40</td>
</tr>
</tbody>
</table>

### Hopper:
- removable
  - fixed

### Clean out:
- remove hopper
  - drain chute

### Hopper opening:
- 8" x 16" | 5" x 8" | 16" x 16"

### Capacity:
- 1/2 cu ft | 1/4 cu ft | 1.5 cu ft

### Hopper Extension:
- 10" - to 1 cu ft | to 1/2 cf

### Lids:
- hinged or removable
  - bolted

### Hopper:
- 16 gauge stainless
  - 16 ga steel

### Hopper support:
- 12 gauge stainless
  - stainless

### Auger tube:
- celcon plastic
  - steel tube

### Augers:
- Machined from cold rolled steel bar, nickel plated; except powder feeder - uses 1" stainless wire "spring" auger.

---

**Feeder motors:**

Permanent Split Capacitor Gearmotors, 1/15 HP, 120 RPM, TEFC, Continuous duty, Reversible, 120/240 volt, 1.3/.65 amps, 50/60 cycle AC, Ball Bearing input, Needle Bearing output.

Higher speed motors are available to shorten cycle time and increase throughput.
ADDITIONAL OUTPUTS
(24 VOLT SOLENOIDS - 17 PIN CONNECTOR)

All controllers have TWO auger drive motor outputs, standard. Additional motor outputs are possible by using slide valve outputs to power external relays. On these models, an add-on black box is provided with the required connections.

CONFIGURATION: MODELS:

17 pin, no added outputs:  140, 131, 122
                        220, 221, 222, 240, 241, 242
                        420, 421, 422, 440, 441, 442
                        940, 941, 942, 950, 951, 952
                        960, 961, 962
                        1840, 1841, 1842, 1850, 1851, 1852
                        1860, 1861, 1862

17 pin, 1 added output:    113
                        223, 243
                        423, 443
                        943 953, 963
                        1843 1853, 1863

17 pin, 2 added outputs:   224, 234, 244
                        424, 434, 444
                        924, 934, 944, 954, 964
                        1824, 1834, 1844, 1854, 1864

17 pin, 3 added outputs:   925, 935
                        1825, 1835

17 pin, 4 added outputs:   926
                        1826

Other models:

940 and 1840 series can be sold as:

930 and 1830 series:  940 or 1840 with center partition removed, 2 valves plumbed together. Priced as 940.

920 and 1820 series:  940 or 1840 with two center valves blocked to not operate. Priced as 940.

950 and 1850 series:  940 or 1840 with 1 partition added, 1 large valve replaced with 2 small valves, 8 gang solenoid replaces 6 gang. Priced in the price list.

960 and 1860 series:  940 or 1840 with 2 partitions added, both large valves replaced with 4 small valves, 8 gang solenoid replaces 6 gang. Priced in the price list.
The addition of feeders to some models requires that certain brackets be added to the blender frame. This list is a reference as to the brackets required for all models.

<table>
<thead>
<tr>
<th>MODELS:</th>
<th>FEEDER BRACKETS REQUIRED:</th>
</tr>
</thead>
<tbody>
<tr>
<td>140, 131, 122, 113</td>
<td>None required</td>
</tr>
<tr>
<td>220, 221, 222, 240</td>
<td></td>
</tr>
<tr>
<td>420, 421, 422, 440</td>
<td></td>
</tr>
<tr>
<td>940, 950, 960</td>
<td></td>
</tr>
<tr>
<td>1840, 1850, 1860</td>
<td></td>
</tr>
<tr>
<td>241, 242**</td>
<td>FLAT TOP* single feeder brackets, 1 per feeder</td>
</tr>
<tr>
<td>441, 442</td>
<td></td>
</tr>
<tr>
<td>941, 951, 952</td>
<td>ANGLE TOP single feeder brackets, 1 per feeder</td>
</tr>
<tr>
<td>1841, 1851, 1852</td>
<td></td>
</tr>
<tr>
<td>942</td>
<td>either 2 ANGLE TOP singles or 1 DUAL bracket.</td>
</tr>
<tr>
<td>1842</td>
<td></td>
</tr>
<tr>
<td>943</td>
<td>1 DUAL* feeder bracket plus 1 ANGLE TOP single feeder</td>
</tr>
<tr>
<td>1843</td>
<td></td>
</tr>
<tr>
<td>924, 934, 944</td>
<td>2 DUAL* feeder brackets</td>
</tr>
<tr>
<td>1824, 1834, 1844</td>
<td></td>
</tr>
<tr>
<td>961, 962</td>
<td>BROAD TOP brackets, 1 per feeder.</td>
</tr>
<tr>
<td>1861, 1862</td>
<td></td>
</tr>
<tr>
<td>953</td>
<td>2 ANGLE TOP singles and 1 BROAD TOP single bracket</td>
</tr>
<tr>
<td>1853</td>
<td></td>
</tr>
<tr>
<td>223, 224, 233, 234, 243, 244</td>
<td>&quot;E&quot; style frames. Special order required.</td>
</tr>
<tr>
<td>423, 424, 433, 434, 443, 444</td>
<td></td>
</tr>
<tr>
<td>925, 935</td>
<td>2 DUAL* brackets and 1 BROAD TOP bracket</td>
</tr>
<tr>
<td>1825, 1835</td>
<td></td>
</tr>
<tr>
<td>926</td>
<td>2 DUAL* brackets and 2 BROAD TOP brackets</td>
</tr>
<tr>
<td>1826</td>
<td></td>
</tr>
</tbody>
</table>

Models not listed: call factory for feasibility and delivery.

* FLAT TOP brackets and DUAL feeder brackets:
  Two holes in the frame must be drilled out to 3/8" or 10mm.

** Model 242:
The controller tray must be moved down to allow clearance above the controller for the feeder. One mounting hole exists. One must be added.
On units shipped before 5/96 the required solenoid must be added.

Page 32
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>QTY</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>501-420</td>
<td>WSB 420 Frame</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>as583-4</td>
<td>Front Door Assy-400</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>as504</td>
<td>Hopper Assy-220/420</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>as08-4</td>
<td>Mix Motor Assy-400</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>as52</td>
<td>Valve Assy-3' round</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>alc-4</td>
<td>Load Cell Assy-3 kg</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>as05-h</td>
<td>Weigh Bin Holder Assy-200/400</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>as05-4</td>
<td>Weigh Bin-400</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>s25-4w</td>
<td>Mix Blade-400</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>s18-4</td>
<td>Mix Chamber Saddle-400</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>s17-4</td>
<td>Mix Chamber-400</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>es8</td>
<td>Safety Interlock</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>as06-4</td>
<td>WSB Tray &amp; Air Assy-4 valve</td>
</tr>
<tr>
<td>14</td>
<td>2</td>
<td>s5022s</td>
<td>Sidel Enclosure-220/420</td>
</tr>
<tr>
<td>15</td>
<td>1</td>
<td>aspt-01</td>
<td>Level Sensor-30mm</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>nv24-4</td>
<td>Air Solenoid Set-4 valve</td>
</tr>
<tr>
<td>17</td>
<td>1</td>
<td>m62818</td>
<td>Motor-30 rpm 1/6 hp. PSC</td>
</tr>
<tr>
<td>18</td>
<td>2</td>
<td>ncv15</td>
<td>Air Cylinder 3' stroke, 1.06 bore</td>
</tr>
<tr>
<td>19</td>
<td>2</td>
<td>as505-1w</td>
<td>WSB Hopper Window-small</td>
</tr>
<tr>
<td>20</td>
<td>4</td>
<td>nv24-sol</td>
<td>24V Solenoid Valve, 1 segment</td>
</tr>
</tbody>
</table>

**Detail:** Rear View of Controller Tray

---

**MAGUIRE**

WSB 420 Exploded View

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This warranty shall not apply to any Weigh Scale Blender which shall have been repaired or altered outside MAGUIRE PRODUCTS factory, unless such repair or alteration was, in our judgment, not responsible for the failure; nor which has been subject to misuse, negligence or accident, incorrect wiring by others, or installation or use not in accord with instructions furnished by Maguire Products.

Our liability under this warranty will extend only to equipment that is returned to our factory in Media, Pennsylvania, PREPAID.

Please note that we always strive to satisfy our customers in whatever manner is deemed most expedient to overcome any problems they may have in connection with our equipment.

EXCLUDED ITEMS:
LOAD CELLS on our WEIGH SCALE BLENDER are covered as long as they have not been damaged from improper handling. MB, 100 and 200 series units use load cells rated for 6.6 pounds (3KG) maximum load. 400, 900 and 1800 series units use load cells rated for 22 pounds (10KG). DO NOT press on them manually. DO NOT disassemble them from their mounting enclosures. Do not DROP them. Do not drop the frame to which they are mounted. If the frame is dropped from a height of two feet, the load cells will most likely be damaged.

DISCLAIMER:
Processing conditions and materials vary widely from customer to customer and from product to product. It is IMPOSSIBLE for us to anticipate ALL processing conditions and requirements, or to be certain that our equipment will perform properly in all instances. You, the customer, must observe and verify the performance level of our equipment in your plant as part of your overall manufacturing process. You must verify to your own satisfaction that this level of performance meets your requirements. We CAN NOT be responsible for losses due to product that is blended incorrectly, even when due to equipment malfunction or design incorrect for your requirements; and/or for any consequential losses as a result of our equipment not blending to your requirements.

We will only be responsible to correct, repair, replace, or accept return for full refund if we have inadvertently misrepresented our equipment for your application.