



M-B Companies, Inc.

The Apollo Systems

Professional Thermoplastic Handliner



Manufactured by:

M-B Companies, Inc.

Pavement Marking Equipment Division

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Table of Contents

Section	Page
I. Introduction	1
II. Warning Symbols & Safety Considerations	2
III. Operational Procedures	3
IV. Maintenance of the Apollo Systems	7
V. Troubleshooting the Apollo	9
 Troubleshooting the Line	10
VI. The Apollo Systems Parts List	
Figure 1- Apollo Handliner Assembly Parts	11
Figure 2- Die Handle Assembly	12
Figure 3- Die Lock Assembly	12
Figure 4- Pointer Assembly	13
Figure 5- Beader Box	13
Figure 6- Agitator Assembly	14
Figure 7- Agitator Handle Assembly	14
Figure 8- Die Shield Assembly	15
Figure 9- Apollo I Gas Assembly	16
Figure 10- Apollo III Gas Assembly	16
Figure 11- Apollo II Gas Assembly	17
Figure 11A- Apollo Valve Wiring Detail	17
Figure 12- Standard Die	18
Figure 13- Apollo Extrude Die	19
VII. Parts and Equipment Contacts	20

I. Introduction

This handbook tells you what you need to know to use and maintain the Apollo thermoplastic handliner applicator including all its add-on attachments and features.

Features:

- The Apollo is specifically designed to enable you to comfortably and efficiently apply hot liquid thermoplastic pavement marking such as crosswalks, stop bars, lane lines, arrows, and legends.
- The Apollo is primarily constructed of light weight and rust free aluminum. It is balanced engineered for optimum maneuverability and marking alignment. Pavement markings of required thickness are produced by means of a screed/extrude shaping die [4" to 12" wide] attached to the Apollo. An adjustable, variable width bead dispenser drop spreads a precision amount of beads which firmly anchor to the molten thermoplastic line as it cools and hardens. Propane fired heating systems maintain the correct thermoplastic application temperature as well as the moveable operation of both the material discharge valve and the extrusion die.

The material and line flow are controlled by two convenient handles. At the operators left side is an easy to use material agitator handle. A brake lever is mounted on the operators push handle. A line guidance pointer, mounted at the front, is tension designed to hold any desired position height without bolting.

The Apollo I normally receives premelted material from a heating kettle.

- The Apollo II is convertible into a self contained thermostatically controlled unit unabling you to temperature control the melting and application of a limited amount of material.
- The Apollo III with the premelter option can apply over 1500 square feet of line per day without a premelting kettle.



CAUTION:

DON'T USE EXCESSIVE FORCE ON ANY OF THE HANDLES.



DO NOT WARP the aluminum die by heating it with a torch.

WARNING:

OBSERVE good safety habits.

The Apollo is 400 degrees F Hot when in use, so wear gloves, work boots and a long sleeve shirt!

II. Warning Symbols & Safety Considerations



WARNING*** alerts you to the possibilities of serious injury or death if you do not follow instructions.



CAUTION** alerts you to the possibility of damage to or destruction of equipment if you do not follow instructions.

- * This equipment is for professional use only.
- * Read and understand all instruction manuals, tags, labels before operating the equipment.
- * Use the equipment only for its intended purpose. If you are not sure, call M-B Companies, Inc Technical Services at 1-888-323-2900.
- * Do not alter or modify this equipment.
- * Check equipment daily. Repair or replace worn or damaged parts immediately.
- * Use fluids and solvents which are compatible with the equipment. Read the fluids and solvent manufacturer's warnings.



WARNING***
EQUIPMENT MISUSE HAZARD
 Equipment misuse can cause the equipment to rupture or malfunction and result in serious injury or death.



WARNING***
 Refer to the manufacturer maximum application temperature for thermoplastic material. Never exceed 440 degrees F.

Important safety instructions appearing in the manual are not meant to cover all possible conditions and situations that may occur. It must be understood that common sense, caution and care are factors which are not built into the equipment, but are supplied by the person(s) maintaining and operating it.

Safety Considerations:

1. **Check to see that the following is closed:**
 - **Material Discharge Molasses Valve**
 - **Die Shield Assembly Gas Valve**
(Refer to Figure 9,10,11, Item #4, page 16 & 17)
 - **Pilot and Burner Gas Valve**
(Refer to Figure 10, 11, Item #12, page 16 & 17)
 - **Premelter Gas Valve**
(Refer to Figure 10, Item #4, page 16)
 - **Thermostat Control - turn to 0 position.**
(Refer to Figure 10, 11, Item #19, page 16 & 17)
2. Keep in mind, the material and the machine are very hot (350-440 degrees F). Wear protective clothing.
3. If you burn yourself, treat immediately with ice water and seek medical attention at once.
4. Even though thermoplastic is non-toxic, avoid prolonged inhalation of fumes.
5. Do not remove fuel tank nor fill fuel tank while burners are hot or flaming. Allow the equipment to cool ten minutes before refueling.
6. Check fuel lines and fittings before each use for cracks or leaks. Replace if necessary.
7. **CLEANLINESS is the #1 MAINTENANCE ITEM on all of the Apollo Systems.**

III. Operational Procedures

Maximum enjoyment with the performance of the Apollo is achieved once you fully understand the entire operation and properly take care of the machine. So, before you do anything to the machine, look it over carefully. Go over the descriptive illustration and then scan through this handbook.



1. **Lock position** your Apollo by setting the **brake lever located on the push handle.**
2. Prior to connecting lines, **check that all burner and radiant heater valves are closed.** Securely connect gas line. Check for gas leaks by wetting connections with liquid soap, looking for gas bubbles or a hissing noise.
3. **Attach desired width extrusion die to die mount.** Rotate handle on front of die shroud and position die in center valve under material valve. Release handle. Unlock operator die handle and connect bottom linkage pin to die clevis.
(Refer to Figure 2, Item #5,6 page 12)
4. **Check the die road alignment.** The bottom of the die runners should be flat on the ground. Raise the operator die handle to spring open the die. If it does not set parallel to the road when opened, it must be adjusted by rotating the turnbuckle [above die clevis] to raise or lower the die yoke bar approximately 1/8" off of the die bar. A lock nut is provided on the turnbuckle to maintain this adjustment. (Refer to Figure 2, Item #6, page 12)

The **die trough should be adjusted** to fit flush against the doctor gate by rotating the knob located on the heat shield in front of the radiant heater. (Refer to Figure 3, Item #1, page 12)
5. **Be gentle with the dies** as the tungsten carbide runner inserts can fracture.
(Refer to Figure 13, Item #2, page 19)

6. **Bead Dispenser:** Make sure the beader box is securely locked. (Refer to Figure 5, Item #3, page 13)

IMPORTANT!
Never pull the Apollo backwards when the beader is engaged since it can flip out the rubber seal.

7. Beader box has **knob adjustments** to widen bead flows. To widen, turn knob counterclockwise (*fully open*). To close, turn knob clockwise until snug against neoprene rubber (*fully closed*). (Refer to Figure 5, Item #2, page 13)
8. Make sure **beads are clean and dry** before you pour them into bead tank.
(Refer to Figure 1, Item #10, page 11)
9. **PUT ON YOUR HEAT RESISTANT GLOVES!** About 15 minutes before the Apollo receives material from a separate melting kettle, light the radiant heater. Simultaneously, turn the generant valve clockwise to open and depress and hold the starter pushbutton until burner lights. This will now heat the die and molasses valve assembly.
11. **FOR THE APOLLO I:** About 10 minutes before the Apollo receives premelted thermoplastic, light the pot burner using a long nose torch. With the torch lit and inserted next to pot burner (*located under pot through small access door on left side of unit*), immediately turn on the needle gas valve. (Refer to Figure 9, page 14)

11. **FOR THE APOLLO II:** Check that all gas valves are closed (*in off position*).
- Open main gas line** of 20 lbs. propane bottle.
 - Locate pot burner gas valve** on lower left bottom of unit and turn valve to pilot.
Locate pilot between the two burners. Depress gas valve knob and ignition button. Hold down 45 to 60 seconds. Pilot will light.
 - After releasing knob, pilot should stay lit. Turn gas valve to ON position.**
 - Set thermostat control to the appropriate temperature for the thermoplastic material used without exceeding 450 degrees F.**
 - Carefully maintain** the burner assembly for proper operation. If servicing is required, carefully remove parts and return to M-B Companies for servicing.
12. Aligning your pointer: Snap about a 6 foot long, straight chalk line. Position and lower the front pointer on the chalk line so it centers on the die. Stand in the operator position, behind the push handle and visually check by pushing Apollo a few feet forward, observing that both the pointer and rear die are centered on the chalk line.
- REMEMBER:**
Don't pull the machine backwards unless you have lifted the die and disengaged the beader.
13. When troughing molten material from the kettle **be sure to brake** the Apollo. Always screen strain the molten material and use the agitator a few times (at least every few minutes) to keep material blended.
14. **Don't overfill the applicator** pass the agitator shaft. Keep the top and exterior clean. Make it a habit to always keep the material cover doors closed and locked.
15. *When you first learn the Apollo, it is a good idea to have a helper. It takes a little practice to coordinate the opening and closing of both the material flow valve and the die while pushing the machine. The helper can open and close the material flow spout while you are keeping your eye on the chalk line and while your right hand operates the die handle. It takes practice and is easy once you gain confidence. You may want to practice on a roll of roofing paper.*
16. With the die lowered to the ground, and closed, carefully open material valve and fill die until half full. Open the die and slowly push the Apollo forward. While moving forward, open material valve and add material to die to maintain a half full level.
-  **WARNING*****
17. **Make sure you do not walk on the line or touch it. The material is still veryhot.**
18. **Do not overflow the die.** The material level in the die should be low before you close die at end of line. When the die gate closes it reduces the space in the die trough raising the material level.
- NOTE:**
It is normal practice to use your hip or stomach to push the Apollo, leaving both hands free.
19. Keep the closed die on the ground and moving forward until beads automatically cover the end of the line, then return handle to latched position.
- Never leave the flame on under the pot when it is empty.**
 **WARNING*****

20. **To perform curves** such as a left turn arrow tail, lift the rear wheel with your left hand, slightly off the pavement. You can comfortably shift the machine, easily following any pre-chalked line pattern.

21 When **installing transverse lines**, always work towards curb.

Operating the Premelter / Apollo III:

1. To operate the Apollo III System completely and efficiently, independent of a premelting kettle, mount the premelter speed preheater by removing the port side pot cover at its slide hinges and sliding on the premelter unit. Then attach the gas lines to the regulator.

2. **The PREMELTER is lit only when block-manufactured thermoplastic material is in its melting sleeve.** When the sleeve is empty, the burners must be turned off.

3. **To operate the premelter after inserting a thermoplastic slab:**

(Refer to Figure 10, page 16)

- **Open yellow-handled ball valve.**

- **Open left side needle valve** approximately 1-1/2 turns, add flame with long-nose torch through the lighting port covered by pivoting open the aluminum door.

- **Push button** on premelter safety gas valve, holding it for approximately 45 seconds; burner will light.

- While simultaneously using lit torch, open right side needle valve approximately 1- 1/2 turns; burner will light.

4. Keep feeding slabs of thermoplastic in accordance with the pace of your striping work. A 50-pound block can melt within 15 minutes to a temperature exceeding 300 degrees Fahrenheit. The temperature of the material will rise to about 390 degrees before it flows through the perforated screen. It achieves 400F application temperature when discharged.

5. Keep the sleeve clean by using an aluminum flat bar, approximately 3' x 2" x 1/4" to gently scrape warm sleeve.

Apollo II with Thermostat Temperature Controls

1. The Apollo II is equipped with a self-contained temperature control.

2. **To light the Apollo II:**

(Refer to Figure 11, page 17)

A. **Set the thermostat** at its lowest point and turn white knob on gas control valve to pilot.

B. **Locate pot burner gas valve** on lower left bottom of unit and turn valve to pilot.

Locate pilot between the two burners.

Depress gas valve knob and ignition button, holding it for approximately one minute.

C. With pilot lit, **turn knob on gas valve to ON.**

D. **Set thermostat control** to 350° and the burners will light. burners are turned on at thermostat by turning black knob to desired temperature, 400° to 440°.

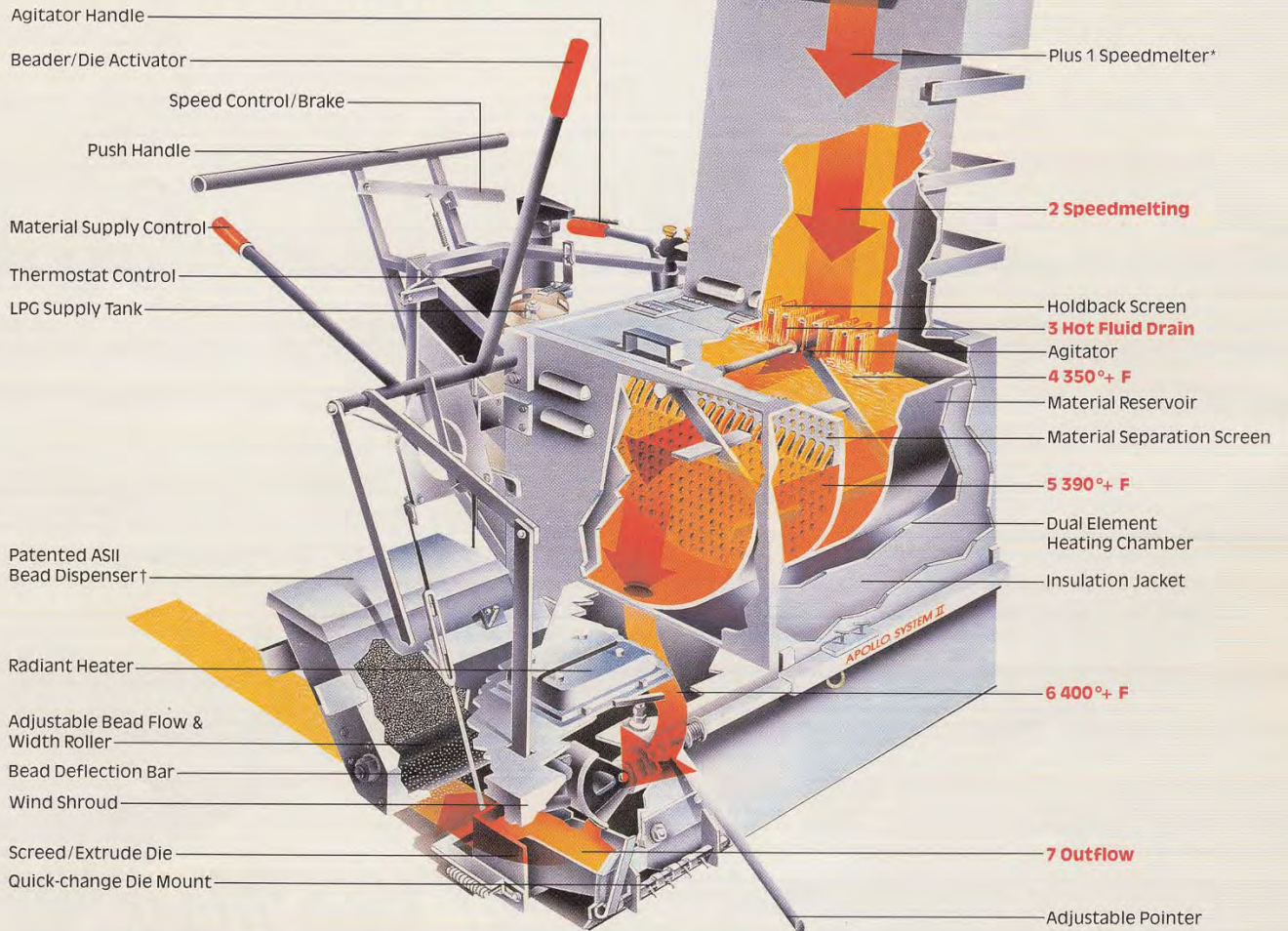
Thermoplastic Line Thickness

1. M-B Companies furnishes one type of die-a Standard Die which has a preset machined mil thickness. When using a preset standard die remember that the material thickness, in accordance with the laws of physics, will become thinner as it cools. So, if you require an 1/8" thick line after the material hardens, your die should have a substantially thicker opening.

Depending on material temperature, weather conditions and application speed, the line can shrink as much as 20%.

2. Material yields vary according to the coarseness of the pavement, specific gravity of the material as well as the required application thickness and method of application. Average thermoplastic materials, required to set and harden to a full 1/8" thick, 4" wide line and applied on a fairly smooth surface, will yield about 4,500 feet per ton (2000 lbs.). Other widths and thicknesses can be calculated proportionately. Remember, you must factor in rough surface material waste.

A True Melt/Apply System with operator convenient controls and maneuverability. Central to the unique, material flow system is the perforated divider screen. As heat is applied, thermoplastic becomes fluid, lowering viscosity as material temperature increases. The screen holes are sized to resist cooler, viscous thermoplastic (350°+ F) thereby preventing material outflow prior to its ideal application temperature (400°+ F).



Material Flow Process
 1-Cold Material; 2-Speed Melting; 3-Hot fluid drain; 4-350°+ F molten thermoplastic; 5-screen-controlled 390°+ F thermoplastic flow; 6-400°+ F ready to apply; 7-Out flow.

†Bead Dispenser U.S. Pat. 4101058
 *Plus 1 Speedmelter U.S. Pat. 4623279

IV. Maintenance of The Apollo Systems

Daily Shut down, Cleaning and Maintenance Procedures:

Shut Down Procedure:

1. Be sure material gate is in the closed position.
2. Turn thermostat off.
3. Turn off main gas valve at propane tank.
4. Turn off valves at die shield burner and pot burner.
5. Complete a visual inspection of machine. Replace broken or worn parts immediately to reduce downtime and injury
6. Lubricate front and rear wheel bearings with high temperature grease.
7. Empty all beads from bead dispenser to reduce moisture contamination.

Remember to refill your propane tanks to eliminate down time.

Cleaning Procedure:

1. To reduce injury, continue to wear your safety equipment.
2. While material is still hot, drain Apollo completely and scrape excessive material both inside the pot and on the external skin.
3. Clean the die by removing excessive material.

Additional die cleaning procedures:

1. Remove die from the die lock assembly located under the die shield.
2. Soak the die overnight in a closed container using a cleaning agent.
3. Remove excessive material from die.
4. Inspect die for worn parts. Die springs, die guide slides, etc. (see parts list on page 17).

**HOT IDEA:
Use a 3 foot length of 3 inch
hydraulic hose to ream clean
hot plastic from drain tube!**

NOTE: Proper maintenance and daily cleaning will decrease downtime and injury.

**ALWAYS KEEP
THE EXTERIOR
CLEAN!**

V. Trouble Shooting the Apollo Systems

My agitator handle is too stiff:

1. **The material is too cold:** Wait until material is thoroughly melted and then try moving the handle again.
2. **The pin lock is loose:** Realign agitation of paddles and handle by tightening with an Allen wrench.
3. **The brass bushing is worn:** Brass bushing needs to be replaced.

The push handle is too high or too high:

1. **The handle is manufactured standard height:** Unbolt, drill new holes and adjust to comfortable height.

The glass bead tank leaks:

1. **The rubber gasket is flipped backwards:** Readjust the gasket forward.
2. **Rubber gasket is worn:** Gasket needs to be replaced.

The glass beads do not flow:

1. **The beads may be wet:** Discard and replace with dry beads.
2. **A foreign object is caught in the bead hopper:** Empty contents and clean with fingers or compressed air.
3. **The beader drive wheel is not engaged:** Inspect beader drive train assembly and adjust turnbuckle.

The die will not close:

1. **Material may be too cold:** Wait until material is melted.
2. **The die may be warped:** Replace die or return for repair.
3. **Die is not level to the rod:** Adjust the die rod turnbuckle and or the die control knob.
4. **The springs are loose or broken:** Reposition or replace springs.
5. **The die rod turnbuckle is not straight:** Align the rod above turnbuckle bar and face toward die.

Thermostat readings are incorrect:

1. **Check to see if the thermostat is calibrated correctly:** Check by inserting high temperature thermometer in pot reservoir for reading.
2. The temperature readings may be wrong: Follow removal instructions carefully and return the thermostat to M-B Companies for repair

The material valve leaks:

1. **The material is running when lever is closed:** Secure lever in down position.
2. **The valve may be broken:** Replace entire valve.

The pilot will not light:

1. **The fuel supply may be low:** Fill the unit.
2. **There is improper gas regulator pressure:** Reset pressure to proper rates. (Call M-B Companies).
3. **There is blockage in fuel lines:** Untighten and remove the blockage.
4. **Last resort- REPLACE PILOT GENERATOR.**

Burners will not stay on:

1. **Check fuel supply:** Fill the unit.
2. **Blockage in fuel line:** Untighten and remove blockage.
3. **There are broken lines:** Replace the broken lines.
4. **The burner is inoperative:** Replace burner.

Material does not flow from valve or is slow:

1. **There is not enough heat:** Wait for die burner to heat tube.
2. **The tube and valve is clogged:** Use a 3/4" hydraulic hose and ream tube out.

V. Trouble Shooting the Apollo Systems

Trouble Shooting the Line

Always stripe on dry, clean swept pavement.

The material is scorched:

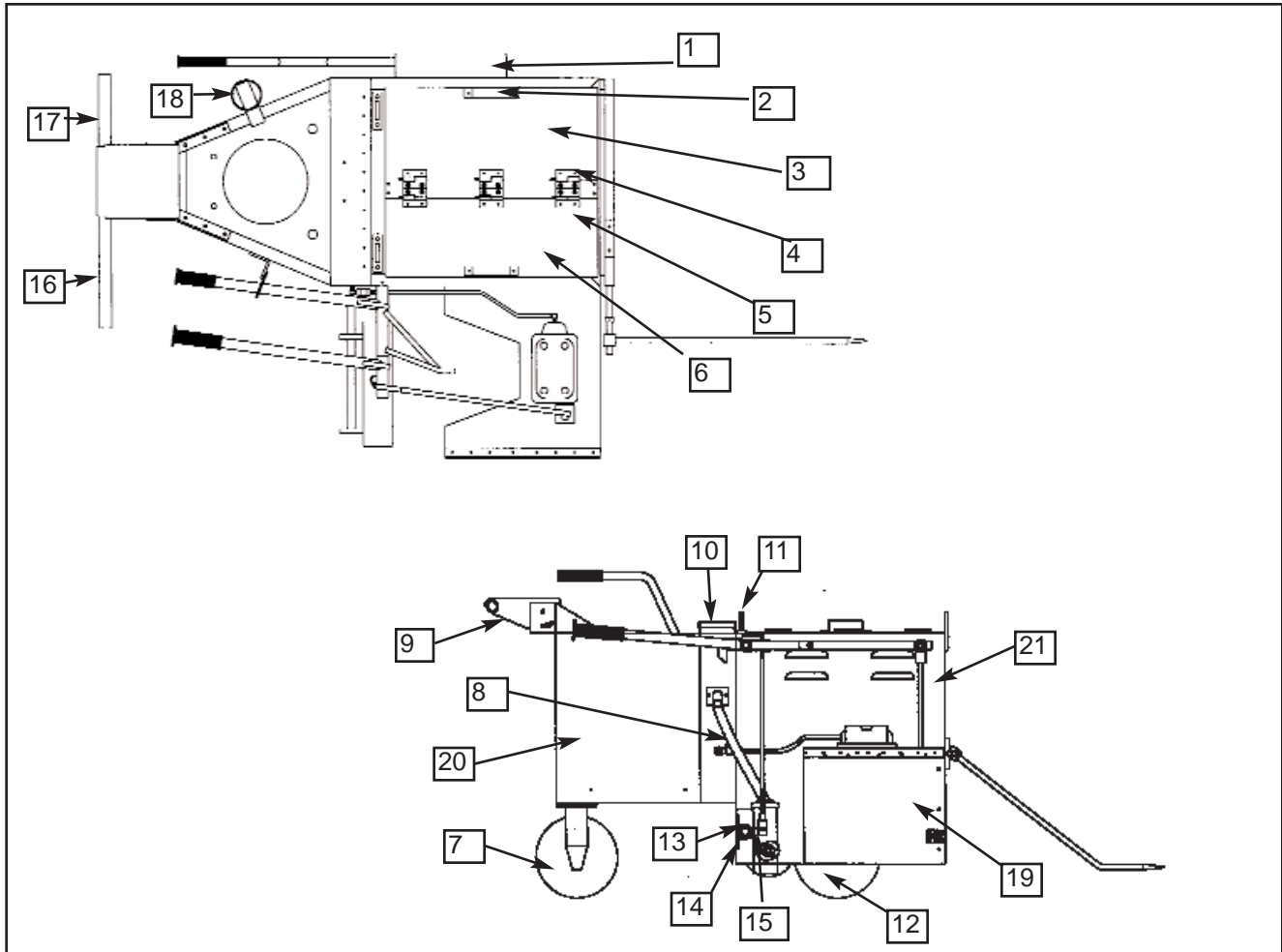
1. If material scorches in die during striping interruption, with gloves on, use long-handled scraper to remove material from the die being used. If material scorches in the unit then empty unit and replace with fresh material.
2. **The gas regulator(s) are not properly set:** Reset to proper pressure. (Call M-B Companies, Inc.)
3. **Check thermostat reading:** Recalibrate or replace thermostat. Occasionally use a dip or infrared thermometer to verify APOLLO [and kettle] temperature.

The thermoplastic line edge is ragged:

1. **The die runners may be too cold:** Wait until they are heated to proper temperatures by the die burner.
2. **The material may be too cold:** Wait until material is at proper application temperature.
3. **The die runner is broken:** Die runner needs to be replaced.
4. **Die leaks are caused by:**
 - [1] bad die springs
 - [2] die runners not level with ground
 - [3] debris in die
 - [4] heat warped abused die
 - [5] over filling die
 - [6] not cleaning dies after each use

VI. The Apollo Systems Parts List

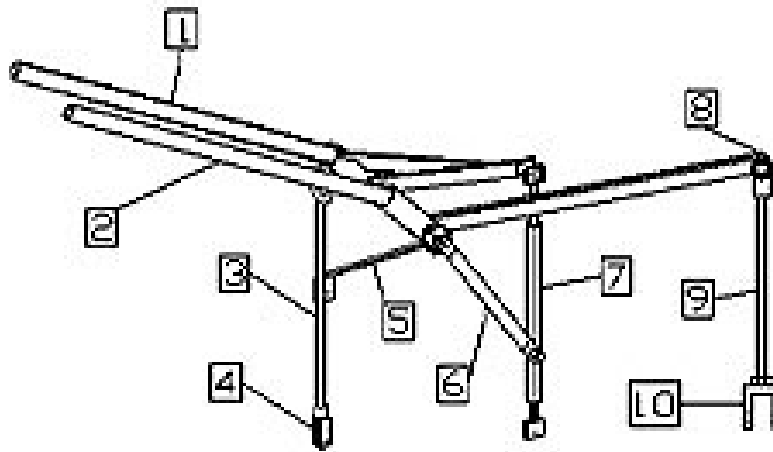
Figure 1. APOLLO Handliner Assembly



ITEM	QTY	PART NO.	DESCRIPTION	ITEM	QTY	PART NO.	DESCRIPTION
1	1	180098	Agitator Chain Cover	13	2	188245	Mounting Bearing UHMW
2	1	186609	4" Stainless Steel Handle	14	1	180748	Beader Support Shaft
3	1	182963	Left Door	15	1	180027	Beader Actuator Rod Con.
4	3	182950	Left Lift-off Hinge	16	1	186584	Handle Grip with 10" Logo
5	3	182954	Right Lift-off Hinge	17	1	186585	Handle Grip with 7" Logo
6	1	182964	Right Door	18	1	192554	Torch Gun Holder
7	1	11-21144	Swivel Wheel W/Brake	19	1	200002	Die Shield Assembly
8	1	192642	16" Clear Tube	20	1	189161	Outer Rear Skin
9	1	190155	Push Handle Assembly	21	1	180404	Front Frame Weldment
10	1	180851	Bead Tank Assembly	22*	1	180822	Lighter Bewzomatic 6Z008
11	2	187684	Rear Lifting Rings	23*	1	187998	Material Transfer Basket
12	2	192425	Front Wheel	24*	1	182726	Die Handle Latch

(*Not Shown)

Figure 2. Die Handle Assembly

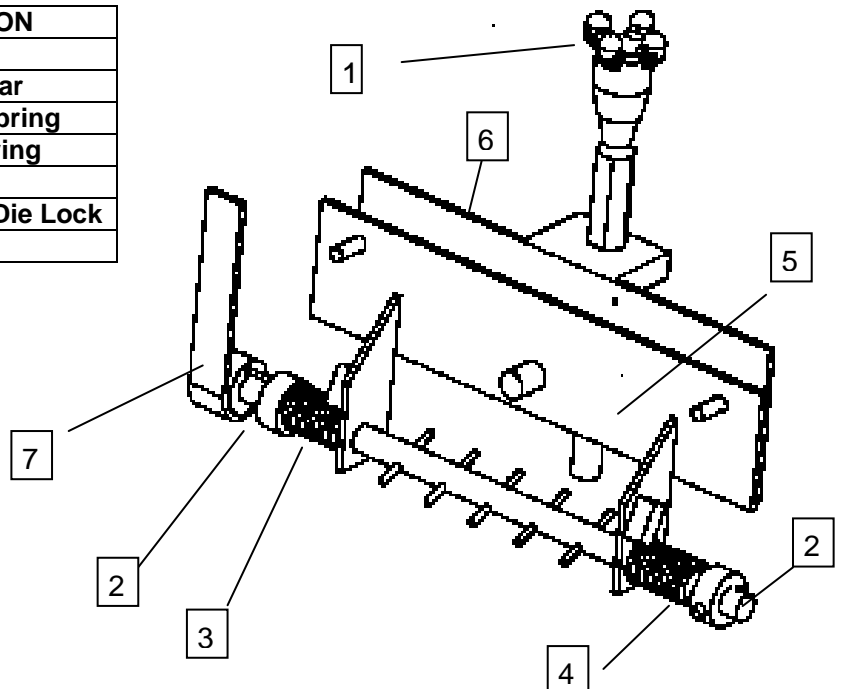


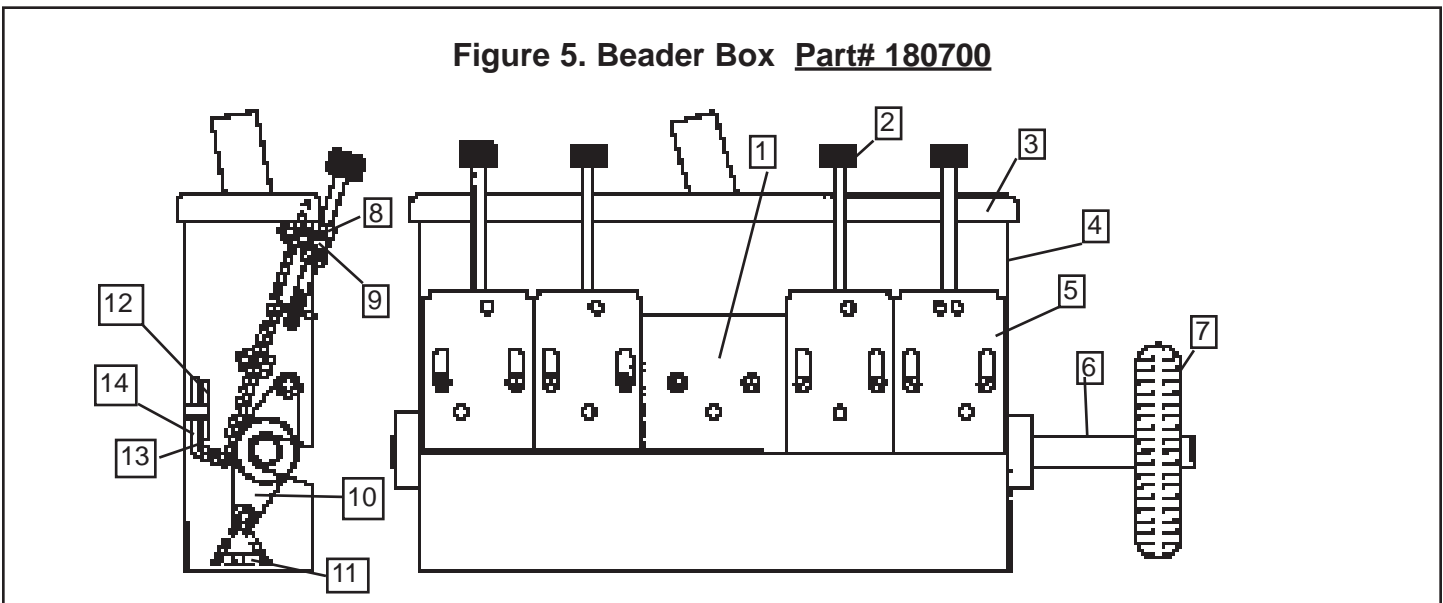
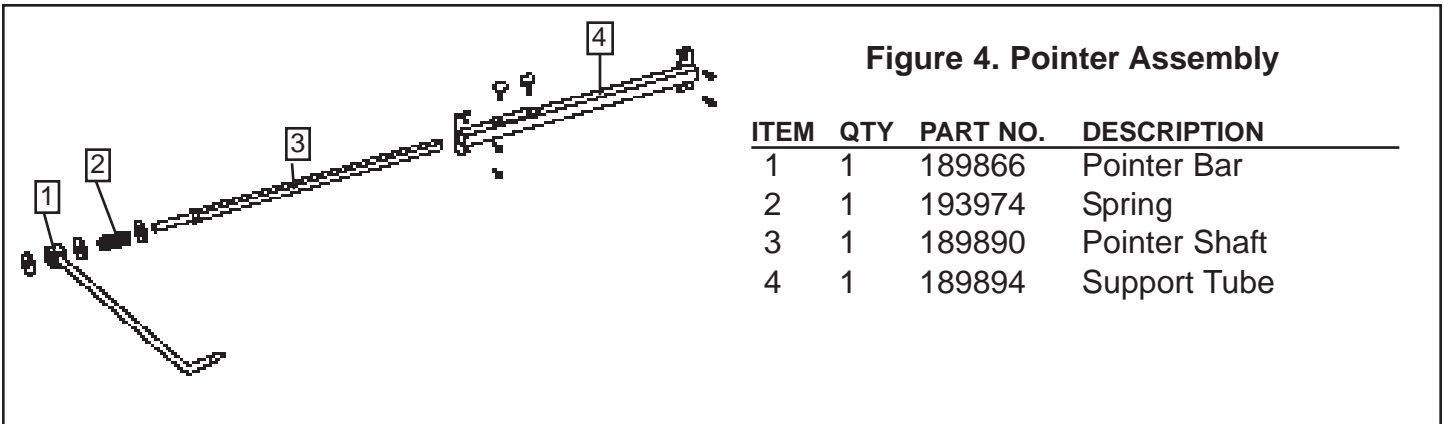
ITEM	QTY	PART NO	DESCRIPTION
1	1	182723	Die Handle Assembly
2	1	188166	Molasses Valve Handle
3	1	180030	Actuator Assembly
4	1	194784	Clevis Yoke 3/8 - 24
5	1	186607	Handle Shaft Support

ITEM	QTY	PART NO	DESCRIPTION
6	1	200001	Die Shield Support-2001
7	1	182714	Die Extrude Turnbuckle
8	1	193741	Yoke End Adj. 9/16 Open
9	1	190835	1/2-20 Threaded Rod
10	1	193740	Yoke End Adj 1/5-32 Open
11	1	188161	Molasses Valve (Not Shown)

Figure 3. Die Lock Assembly 182758

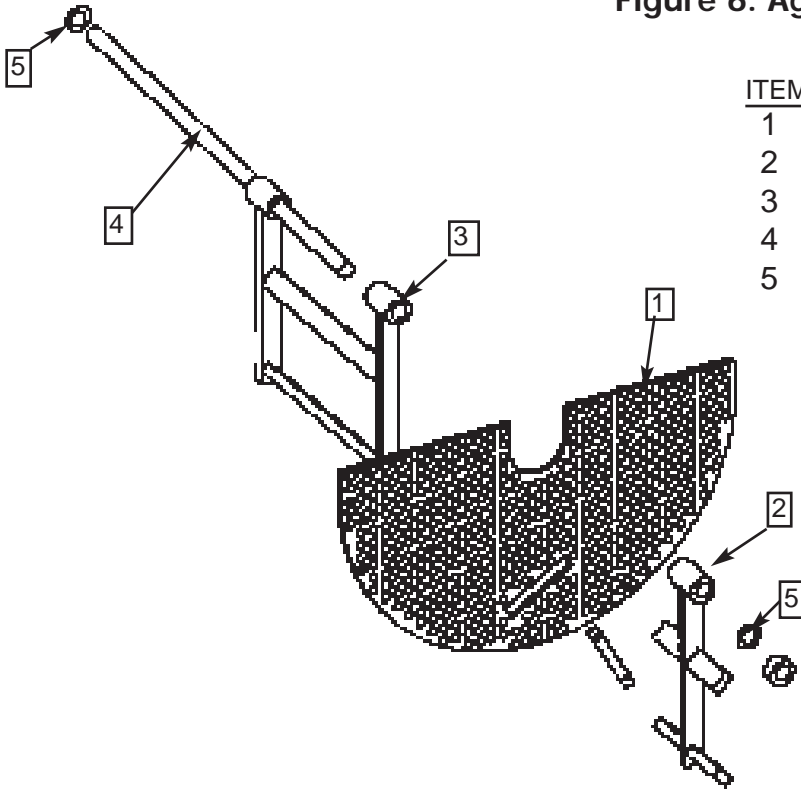
ITEM	QTY	PART NO	DESCRIPTION
1	1	187294	Knob Assembly
2	2	188146	Modified Set Collar
3	1	190662	Right Die Lock Spring
4	1	187530	Left Die Lock Spring
5	1	181022	Die Lock Plate
6	1	188262	Mounting Brace Die Lock
7	1	182762	Die Lock Handle





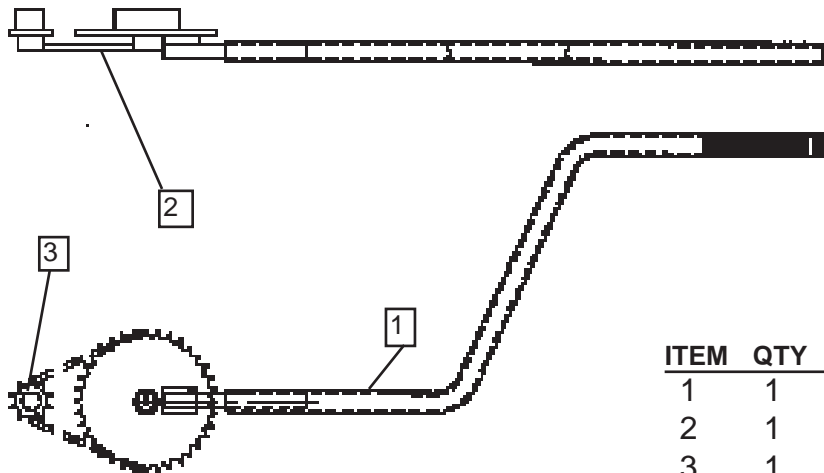
ITEM	QTY	PART NO.	DESCRIPTION	ITEM	QTY	PART NO.	DESCRIPTION
1	1	181622	Center Gate	8	1	181897	1/4 Set Collar
2	4	186403	Gate Control Rod	9	1	190822	Rod End
3	1	180707	Bearer Box Lid	10	1	195326	5/8 Pillow Block
4	1	180705	Bearer Box Weldment	11	1	180682	Bead Deflector
5	4	191186	Side Gate	12	1	193282	Urethane Clamp Bar
6	1	187308	Knurled Roller	13	1	186410	Gate Seal
7	1	190146	Drive Wheel	14	1	193286	Urethane Support Plate

Figure 6. Agitator Assembly



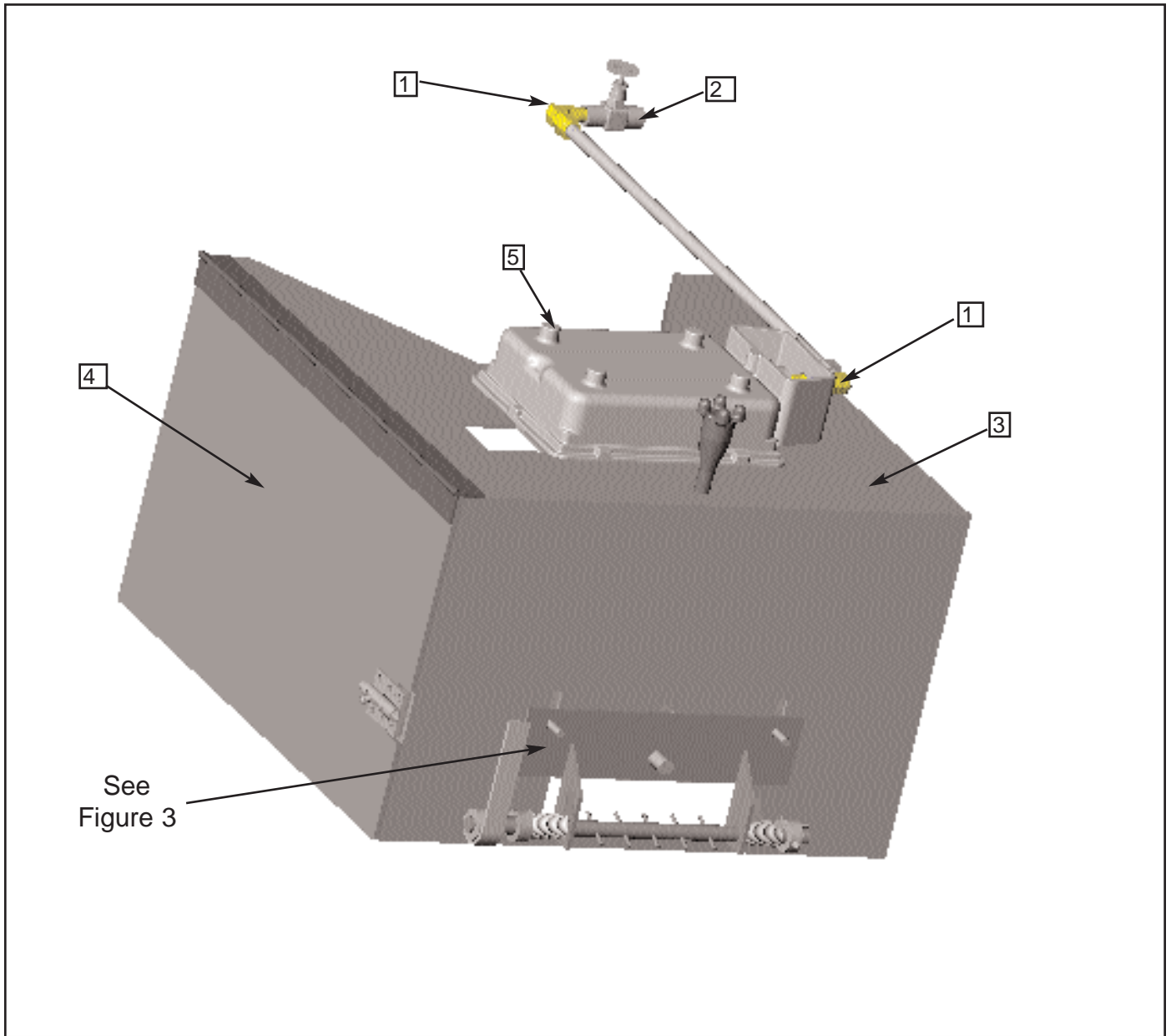
ITEM	QTY	PART NO.	DESCRIPTION
1	1	188018	Melting Pot Strainer
2	1	191338	Small Agitator
3	1	187466	Large Agitator
4	1	180118	Agitator Shaft
5	2	194714	Teflon Washer

Figure 7. Agitator Handle Assembly



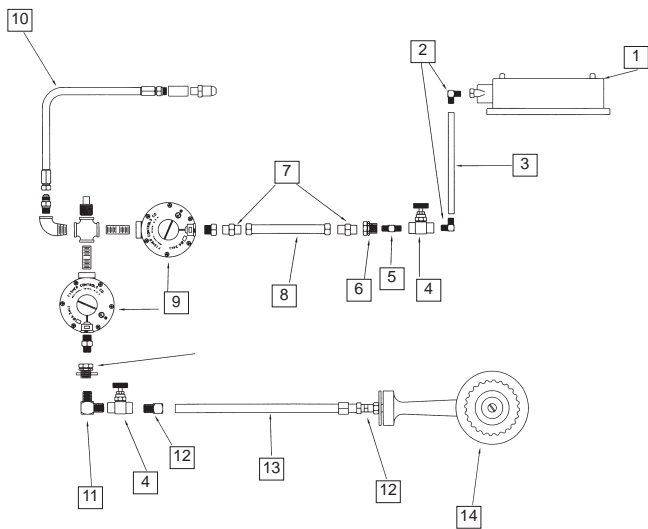
ITEM	QTY	PART NO.	DESCRIPTION
1	1	180102	Agitator Handle
2	1	180122	Agitator Strut
3	1	191538	Sprocket
4	1	181630	Chain 40 RIV

Figure 8. Die Shield Assembly Part# 200002



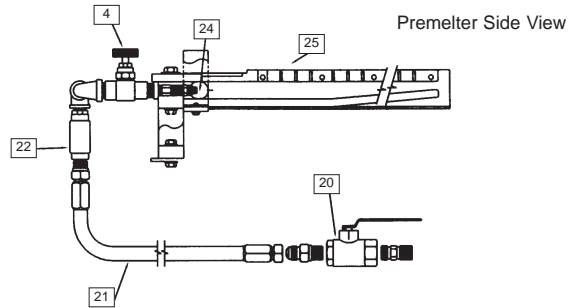
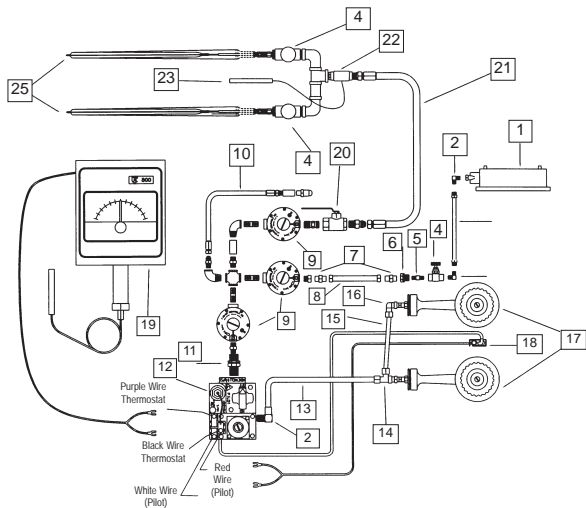
ITEM	QTY	PART NO.	DESCRIPTION
1	2	180514	B600-2-4 Male Elbow
2	1	186450	Generant Valve 3000-4
3	1	182808	Die Shield Frame 2001
4	1	182809	Die Shield Door 2001
5	1	189862	Die Burner Assembly

Figure 9. APOLLO I Gas Assembly



ITEM	QTY	PART NO.	DESCRIPTION
1	1	189862	Burner Assembly
2	2	180514	B-600 Male Elbow
3	1	192622	3/8" Aluminum Tubing - 21"
4	2	186450	Generant Valve 3000-4
5	1	184222	4MP-4MP Fitting
6	2	184441	Fitting 1/4" Bulkhead Coupling
7	2	184162	4MJ-4MP Fitting
8	1	186423	Hose 1/4" LP Gas
9	2	190574	Fisher Regulator 912/101
10	1	186422	19" Hose LP Gas Assembly
11	1	184226	4MP-4MP Fitting 90 deg.
12	2	180506	1/4" Swaglock Straight
13	1	192622	3/8" Aluminum Tubing 9"
14	1	190294	Ransom SU 45 1/2 Burner

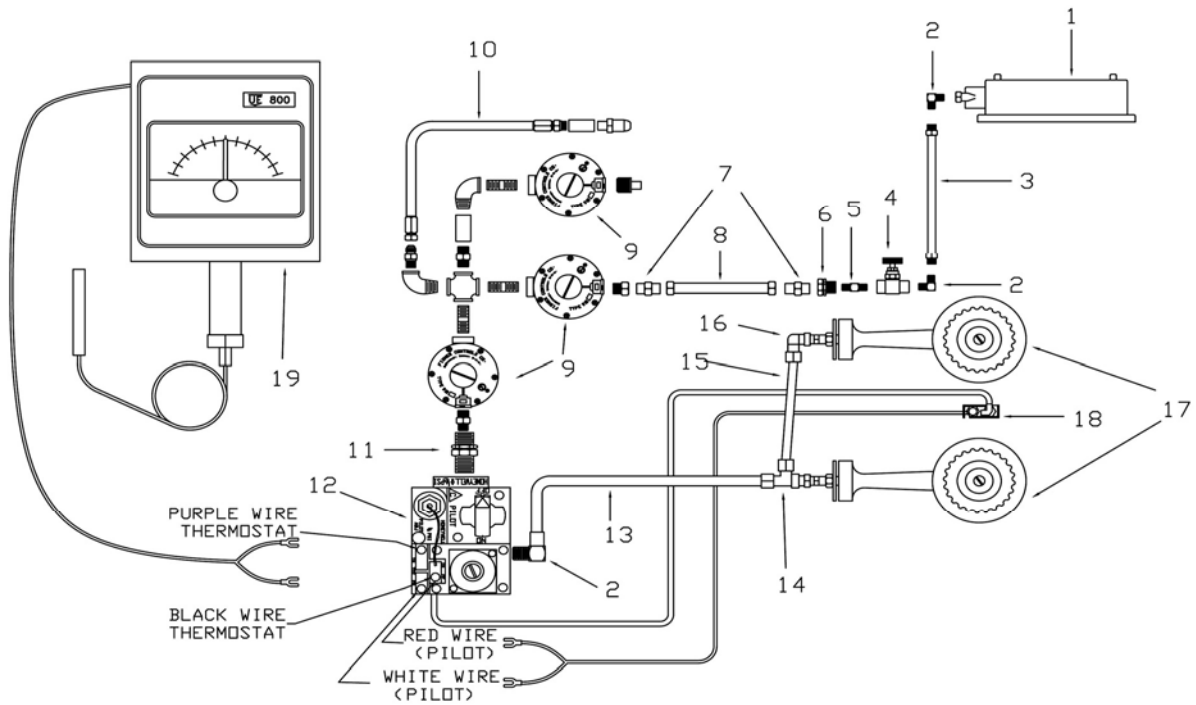
Figure 10. APOLLO III Gas Assembly



ITEM	QTY	PART NO.	DESCRIPTION
18	1	189846	Pilot Assembly
19	1	193218	UE Thermostat Controller
20	1	193331	1/4" Ball Valve
21	1	194506	20" Gas Hose Assembly
22	1	180646	Baso Valve H17BB1
23	1	194550	24" Thermocoupler
24	1	189122	#62 Orifice
25	2	190610	Reznor Burner

ITEM	QTY	PART NO.	DESCRIPTION
1	1	189862	Burner Assembly
2	3	180514	B-600 Male Elbow
3	1	192622	3/8" Aluminum Tubing 21"
4	1	186450	Generant Valve 3000-4
5	1	184222	4MP-4MP Fitting
6	1	184441	Fitting 1/4" Bulkhead Coupling
7	2	184162	4MJ-4MP Fitting
8	1	186423	Hose 1/4" LP Gas
9	3	190574	Fisher Regulator 912/101
10	1	186422	19" Hose LP Gas Assembly
11	1	184443	Fitting 1/2" Bulkhead Coupling
12	1	193398	Honeywell LP Gas Valve
13	1	192622	3/8" Aluminum Tubing 17"
14	1	191918	Swaglock "T"
15	1	192622	3/8" Aluminum Tubing 6"
16	1	191914	Swaglock Female Elbow
17	2	190294	Ransom SU 45 1/2 Burner

Figure 11. APOLLO II Gas Assembly



ITEM	QTY	PART #	DESCRIPTION
1	1	189862	Burner Assembly
2	3	180514	B-600 Male Elbow
3	1	192622	3/8" Aluminum Tubing 21"
4	1	186450	Generant Valve 3000-4
5	1	184222	4MP-4MP Fitting
6	1	184441	Fitting 1/4" Bulkhead Coupling
7	2	184162	4MJ-4MP Fitting
8	1	186423	Hose 1/4" LP Gas
9	3	190574	Fisher Regulator 912/101
10	1	186422	19" Hose LP Gas Assy
11	1	184443	Fitting 1/2" Bulkhead Coupling
12	1	193398	Honeywell LP Gas Valve
13	1	192622	3/8" Aluminum Tubing 17"
14	1	191918	Swaglock "T"
15	1	192622	3/8" Aluminum Tubing 6"
16	1	191914	Swaglock Female Elbow
17	2	190294	Ransom SU 45 1/2 Burner
18	1	189846	Pilot Assembly
19	1	193218	UE Thermostat Controller

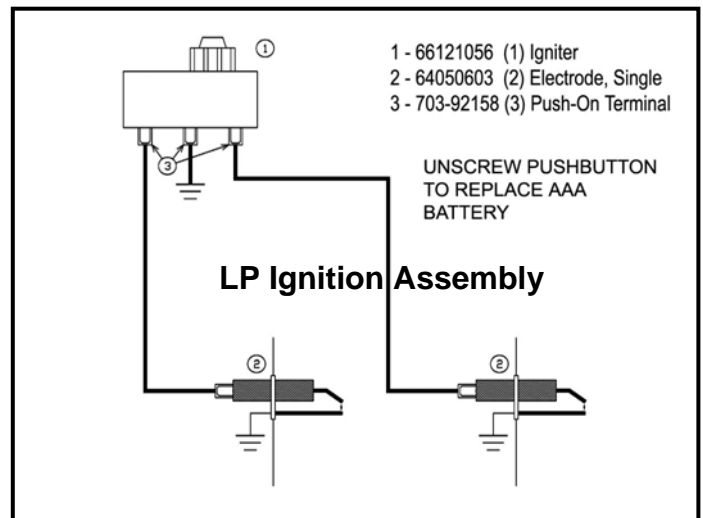
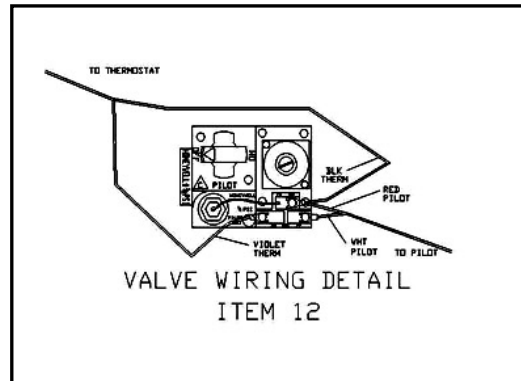
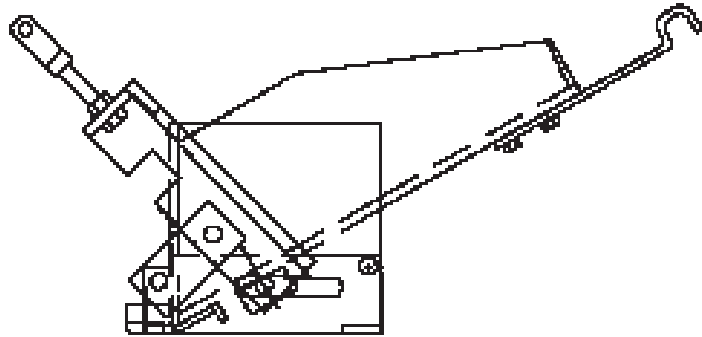
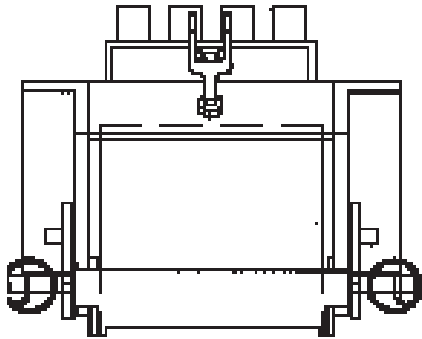


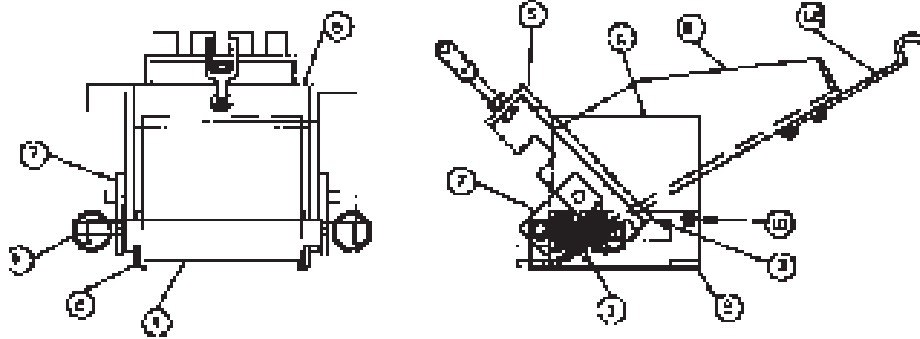
Figure 12. Standard Die



<u>PART NO.</u>	<u>DESCRIPTION</u>
897088	4" 60 Mils Standard Die
897089	4" 90 Mils Standard Die
897105	4" 125 Mils Standard Die
897090	5" 60 Mils Standard Die
897091	5" 90 Mils Standard Die
897092	6" 60 Mils Standard Die
897093	6" 90 Mils Standard Die
897094	8" 60 Mils Standard Die
897095	8" 90 Mils Standard Die

<u>PART NO.</u>	<u>DESCRIPTION</u>
897098	10" 60 Mils Standard Die
897099	10" 90 Mils Standard Die
897100	12" 60 Mils Standard Die
897101	12" 90 Mils Standard Die
897107	5" 125 Mils Standard Die
897109	6" 125 Mils Standard Die
897111	8" 125 Mils Standard Die
897113	10" 125 Mils Standard Die
897115	12" 125 Mils Standard Die

Figure 13. Apollo Extrude Die



ITEM	QTY	PART NO.	DESCRIPTION	ITEM	QTY	PART NO.	DESCRIPTION
1	1	195006	4" Reinforced Angle	5	1	194946	4" Die Yoke Bar
1	1	195258	5" Reinforced Angle	5	1	195210	5" Die Yoke Bar
1	1	195482	6" Reinforced Angle	5	1	195430	6" Die Yoke Bar
1	1	195726	8" Reinforced Angle	5	1	195674	8" Die Yoke Bar
1	1	194062	10" Reinforced Angle	5	1	194030	10" Die Yoke Bar
1	1	194242	12" Reinforced Angle	5	1	194194	12" Die Yoke Bar
2	1	192790	Die Runner	6	1	194954	4" Doctor Gate
3	1	194934	Die Guide Slide - 4"	6	1	195214	5" Doctor Gate
3	1	195198	Die Guide Slide - 5"	6	1	195438	6" Doctor Gate
3	1	195418	Die Guide Slide - 6"	6	1	195682	8" Doctor Gate
3	1	195662	Die Guide Slide - 8"	6	1	194038	10" Doctor Gate
3	1	194018	Die Guide Slide - 10"	6	1	194202	12" Doctor Gate
3	1	194182	Die Guide Slide - 12"	7	2	182750	Die Link Bar
4	1	194926	4" Front Die Bar 60mil	8	1	194938	4" Die Trough
4	1	195190	5" Front Die Bar 60mil	8	1	195202	5" Die Trough
4	1	195410	6" Front Die Bar 60mil	8	1	195422	6" Die Trough
4	1	195654	8" Front Die Bar 60mil	8	1	195666	8" Die Trough
4	1	194931	4" Front Die Bar 90mil	8	1	194022	10" Die Trough
4	1	195192	5" Front Die Bar 90mil	8	1	194186	12" Die Trough
4	1	195415	6" Front Die Bar 90mil	9	2	182706	Closing Spring
4	1	195659	8" Front Die Bar 90mil	10	1	195050	4" Threaded Torsion Bar ^{5/16}
4	1	195015	10" Front Die Bar 90mil	10	1	195050	5" Threaded Torsion Bar ^{5/16}
4	1	194179	12" Front Die Bar 90mil	10	1	195050	6" Threaded Torsion Bar ^{5/16}
4	1	194932	4" Front Die Bar 125mil	10	1	195050	8" Threaded Torsion Bar ^{5/16}
4	1	195193	5" Front Die Bar 125mil	10	1	195050	10" Threaded Torsion Bar ^{5/16}
4	1	195416	6" Front Die Bar 125mil	10	1	195050	12" Threaded Torsion Bar ^{5/16}
4	1	195660	8" Front Die Bar 125mil	*11	2	189370	Pillow Block
4	1	195016	10" Front Die Bar 125mil	*11A	2	897271	Screw for Pillow Block
4	1	194180	12" Front Die Bar 125mil	12	1	182734	Die Hanger Hook

VII. PARTS CONTACT INFORMATION

**Please Contact Your Nearest Regional Sales Manager for all of Your
Equipment and Parts Needs!**

Northeastern Regional Manager:

Robert Bowman
Cell Phone: 443-621-7369

Southeastern Regional Manager:

Lori Burns
Cell Phone: 813-244-1820

Great Lakes Region

Bruce Niemuth
Cell Phone: 920-645-3901

Western Regional Manager:

Chuck Wolf
Cell Phone: 503-510-2024

Pavement Marking Equipment Division

79 Montgomery Street
Montgomery, PA 17752

**PARTS HOTLINE: 800-233-8461
CUSTOMER SERVICE: 888-323-2900
www.m-bco.com**



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Salem, OR 97302
Phone: 800-253-2909
Fax: 503-370-4389

Airport Snow Removal Products
1200 Park Street
Chilton, WI 53014
Phone: 800-558-5800
Fax: 920-849-2629

Limited Warranty

Limited Warranty: Subject to the limitations set forth herein, M-B Companies, Inc. of Wisconsin ("M-B") warrants its products to be free from defects in material and workmanship for a period six (6) months from the date of delivery of the product to its original owner. This warranty is not transferable without the written consent of M-B.

Notice: M-B's obligations under this Limited Warranty are conditioned on M-B receiving, within the warranty period, written notice from Buyer specifying the nature of any alleged defect and requesting corrective action by Seller.

Remedies: M-B, at its option, will repair or replace, or provide a credit to Buyer for, defective warranted items. If requested by M-B, products or parts for which a warranty claim is made shall be returned, transportation prepaid, to M-B's factory. Buyer shall not return any product for repair, replacement or credit without M-B's advance written consent.

Other Manufacturer's Warranty: On products furnished by M-B, but manufactured by any other manufacturer, the warranty of said manufacturer, if any, will be assigned to Buyer, if the said warranty is assignable. However, M-B does not represent or guarantee that such manufacturer will comply with any of the terms of the warranty of such manufacturer.

Exclusions: Any improper use, operation beyond capacity, or substitution of parts not approved by M-B, or alteration or repair by others in such a manner as in M-B's judgment materially and/or adversely affects the product shall void this warranty. This warranty does not apply to defects caused by damage or unreasonable use while in the possession of the owner, including but not limited to: failure to provide reasonable and necessary maintenance, normal wear, routine tune-ups or adjustments, improper handling or accidents, operation at speed or load conditions contrary to published specifications, improper or insufficient lubrication, or improper storage.

Seller manufactures power brooms that mount to many makes and models of equipment. Seller attempts to ensure that the mounting frames fit correctly. However, the large number of tractor models, types and options currently available, compounded by frequent manufacturer design changes, may prevent Seller from supplying a frame that fits every unit correctly. Therefore, unless Buyer supplies drawings which detail the attachment points on the specific unit to which the broom will be mounted, Seller will not be responsible for the fit of the mounting frame.

The batteries, tires, rubber materials, brushes and material normally consumed in operation, and major components such as engines, air compressors, and hydraulic pumps and motors are excluded from this warranty but may be covered to the extent of any warranty received by M-B from its supplier if permitted by the terms of such warranty.

Limitations of liability: M-B shall not be liable for any incidental, consequential, punitive or special damages of any kind, including, but not limited to, consequential labor costs or transportation charges in connection with the repair or replacement of defective parts, or lost time or lost profits or expense which may have accrued because of said defect.

M-B disclaims all other warranties, whether express or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose. This warranty is the exclusive remedy of buyer. This warranty cannot be extended, broadened or changed in any respect except in writing by an authorized officer of M-B.

Notwithstanding anything in this warranty to the contrary, in no event shall M-B's total liability hereunder exceed the purchased price of the particular product.



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Apollo II Thermoplastic Handcart Approximate Material Application Distances Total Unit Capacity 250 Lbs Thermoplastic Material

1 Lb Matl @ .125 Mil Thick			1 Lb Matl @ .090 Mil Thick			1 Lb Matl @ .060 Mil Thick		
4" Line	=	2.200 Ft	4" Line	=	3.050 Ft	4" Line	=	4.580 Ft
5" Line	=	1.760 Ft	5" Line	=	2.440 Ft	5" Line	=	3.660 Ft
6" Line	=	1.460 Ft	6" Line	=	2.030 Ft	6" Line	=	3.055 Ft
8" Line	=	1.100 Ft	8" Line	=	1.527 Ft	8" Line	=	2.290 Ft
9" Line	=	0.970 Ft	9" Line	=	1.358 Ft	9" Line	=	2.037 Ft
10" Line	=	0.880 Ft	10" Line	=	1.220 Ft	10" Line	=	1.830 Ft
12" Line	=	0.733 Ft	12" Line	=	1.010 Ft	12" Line	=	1.527 Ft

TOTAL 250 CAPACITY – APPROXIMATE MATERIAL APPLICATION DISTANCE

250 Lbs Matl. @ .125 Mil Thick			250 Lbs Matl. @ .090 Mil Thick			250 Lbs Matl. @ .060 Mil Thick		
4" Line	=	550 Feet	4" Line	=	762 Feet	4" Line	=	1145 Feet
6" Line	=	365 Feet	6" Line	=	507 Feet	6" Line	=	764 Feet
12" Line	=	183 Feet	12" Line	=	252 Feet	12" Line	=	382 Feet



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