



# **Parts & Instructions For HBM-4 Handliner**

**FOR:**

**PURCHASE DATE:**

**MODEL #**

**SERIAL #**

**REMEMBER SAFETY AT ALL TIMES**

REMEMBER SAFETY AT ALL TIMES

## **INTRODUCTION**

ALL OF US AT S.T.E. LLC. WOULD LIKE TO THANK YOU FOR PURCHASING ONE OF OUR PAVEMENT MARKING APPLICATION SYSTEMS. WE HOPE YOU WILL APPRECIATE OUR EFFORT IN MAKING THIS UNIT AS USER FRIENDLY AS POSSIBLE. WE HAVE SPENT A GREAT DEAL OF TIME ENGINEERING THE SYSTEM TO PROVIDE THE END USER WITH A HIGHLY PRODUCTIVE TOOL, WHICH WILL GIVE YEARS OF SAFE RELIABLE OPERATION. PLEASE READ THIS MANUAL CAREFULLY AND GIVE YOUR UNIT THE CARE AS OUTLINED IN THE FOLLOWING PAGES AND THE SYSTEM WILL RESPOND ACCORDINGLY.

THIS MANUAL WILL PROVIDE YOU WITH THE NECESSARY INFORMATION TO OPERATE AND MAINTAIN YOUR S.T.E. LLC. HBM-4 T OR M HAND APPLICATOR.

THE HBM-4 APPLICATOR IS DESIGNED TO INSTALL ALL TYPES OF HOT APPLIED THERMOPLASTIC ROAD MARKINGS, INCLUDING CROSSWALKS, LEGENDS, MESSAGES, SYMBOLS, CENTER LINES, AND EDGE LINES.

THE HBM-4 HAS BEEN ENGINEERED TO MEET THE RIDGED DEMANDS OF THE CONTRACTING INDUSTRY, AND WITH A SMALL AMOUNT OF CARE AND MAINTENANCE IT WILL PROVIDE YEARS OF SERVICE WITH MINIMAL REPAIRS.

THE CONSTRUCTION OF THIS APPLICATOR IS PRIMARILY LIGHTWEIGHT ALUMINUM, AND IS BALANCED TO ENABLE THE OPERATOR TO MANEUVER THE UNIT WITH MINIMAL EFFORT. THIS MANEUVERABILITY ENABLES THE OPERATOR TO MAKE VERY SHARP TURNS AND ULTIMATELY PROVIDES A GREAT DEAL OF FLEXIBILITY TO INSTALL MANY DIFFERENT TYPES OF ROAD MARKINGS.

THIS APPLICATOR WAS DESIGNED PRIMARILY TO INSTALL HOT THERMOPLASTIC THAT HAS BEEN TRANSFERRED INTO THE HOLDING TANK FROM A LARGER PREMELTER. THE UNIT WAS NOT DESIGNED TO MELT LARGE QUANTITIES OF THERMOPLASTIC IN THE HOLDING TANK.

THE HBM-4 UNIT BY ITSELF HAS VERY LIMITED CAPABILITIES WITH REGARD TO MELTING ENOUGH THERMOPLASTIC TO MAKE IT PRODUCTIVE IN ANY SENSE OF THE TERM.

THIS EQUIPMENT CONTAINS A HEATING SYSTEM TO KEEP THE THERMOPLASTIC IN THE HOLDING TANK AT OPERATING TEMPERATURE. AN ADDITIONAL RADIANT GAS HEATING SYSTEM KEEPS PERIPHERAL COMPONENTS AT PROPER TEMPERATURES.

**WE ALL THANK YOU FOR YOUR PURCHASE.**

**REMEMBER SAFETY AT ALL TIMES**

## **BASIC PRINCIPLE OF OPERATION**

HOT THERMOPLASTIC (400-420 DEG. F) IS TRANSFERRED BY GRAVITY INTO THE HBM-4 HOLDING TANK (CAPACITY 250 LBS.OF MOLTEN PLASTIC). THE OPERATOR THEN OPENS A VALVE BY REMOTE LEVER TO TRANSFER THE HOT THERMOPLASTIC, BY GRAVITY, INTO A SCREED TYPE SHAPING DIE. UPON FILLING THE DIE, THE VALVE IS CLOSED AND THE DIE IS LOWERED TO CONTACT THE ROAD SURFACE. A SEPARATE REMOTE LEVER THEN OPENS THE DIE ALLOWING THE THERMOPLASTIC IN THE DIE TO CONTACT THE ROAD. THE OPERATOR THEN BEGINS PUSHING THE APPLICATOR CAUSING THE THERMOPLASTIC TO BE FORMED ON TO THE ROAD SURFACE. THE RESULT MARKING IS BASED ON THE WIDTH AND THE HEIGHT OF THE OPENING IN THE APPLICATION DIE BEING USED. STANDARD DIES ARE 4", 6", 8" & 12" IN WIDTH. EACH DIE IS AVAILABLE IN A VARIETY OF FIXED MIL THICKNESS, FROM 0 MIL TO 250 MIL. APPLICATION IS ACHIEVED ONLY WHEN THE HBM-4 IS MOVING. THE OPERATOR THEN CLOSES THE DIE AND RAISES IT FROM THE ROAD SURFACE.

THE FOLLOWING TEXT WILL DESCRIBE IN MORE DETAIL CERTAIN TECHNIQUES AND OTHER RELATED PROCEDURES FOR INSTALLING THERMOPLASTIC MARKINGS WITH THIS EQUIPMENT, INCLUDING USE OF THE AUTOMATIC DROP-ON BEAD SYSTEM.

## **GETTING STARTED**

### **INITIAL ADJUSTMENTS**

ADJUSTMENTS FOR THE APPLICATION DIE SHOULD BE MADE PRIOR TO HEATING THE UNIT. THE APPLICATOR IS EQUIPPED WITH TWO ADJUSTMENTS FOR THE APPLICATION DIES. TO MAKE THE ADJUSTMENTS YOU SHOULD START WITH A CLEAN DIE IN THE CLOSED POSITION. INSTALL THE DIE BY HOOKING THE DIE CLAW ONTO THE TORSION SPRING DIE RETAINER LOCATED ON THE FRONT SIDE OF THE HBM-4 DIE HOUSING. THE DIE CLAW SHOULD FIT BETWEEN THE PINS ON THE RETAINER SHAFT. WHEN PROPERLY ATTACHED THE DIE RETAINER SHOULD BE APPLYING DOWN PRESSURE ON THE DIE FROM THE TORSION SPRINGS. RAISE THE DIE ON THE HINGE AND CHECK FOR CLEARANCE AROUND THE MATERIAL VALVE.

### **WAIT TO CONNECT THE DIE LINKAGE.**

AT THIS POINT, WITH THE HBM-4 ON THE SMOOTH LEVEL SURFACE, INSPECT THE CLEARANCE OF THE CARBIDE DIE RUNNERS IN RELATION TO THE ROAD SURFACE. ALL FOUR CORNERS OF THE APPLICATION DIE SHOULD BE CONTACTING THE ROAD. IF THE FORWARD CARBIDES ARE NOT CONTACTING, ADJUST THE DIE RETAINER DOWN SO THAT THEY ARE. CONVERSELY, IF THE REAR CARBIDES ARE NOT CONTACTING, ADJUST THE DIE RETAINER UP. THIS ADJUSTMENT CAN BE MADE BY LOOSENING THE TWO 9/16" HEX NUTS ON THE ENDS OF THE DIE RETAINER AND SLIDING THE ASSEMBLY IN THE SLOTTED BOLT HOLES. AFTER PROPER ADJUSTMENT TIGHTEN THE 9/16" NUTS.

**NOTE: DO NOT LOOSEN THE 3/4" HEX NUTS ON THE CENTER STUD .**

### **HELPFUL HINTS**

SINCE ROAD SURFACE RELATION CONSTANTLY CHANGES, OPTIMAL DIE RUNNER ADJUSTMENT PROVIDES FOR 1/64" CLEARANCE ON THE LEADING CARBIDES. THIS SMALL GAP WILL HELP THE DIE GLIDE OVER PROJECTIONS AND VARIATIONS IN THE ROAD SURFACE WITHOUT DIGGING IN. HOWEVER, IF THE GAP IS TOO LARGE THE DIE WILL NOT CLOSE PROPERLY AND WILL CREATE A LEAKING PROBLEM.

IF YOU ARE HAVING DIFFICULTY WITH THE DIE RETAINER PIVOTING FROM SIDE-TO-SIDE, YOU MAY NEED TO RE-ADJUST THE 3/4" JAM NUTS ON THE DIE RETAINER PIVOT STUD (CENTER) LOCATED ON THE DIE SHROUD OF THE HBM-4.

**REMEMBER SAFETY AT ALL TIMES**

REMOVE THE DIE FROM THE RETAINER. USING TWO 3/4" OPEN END WRENCHES LOOSEN THE TWO NUTS AND REMOVE ONE. TIGHTEN THE REMAINING NUT TO A POINT WHERE THE DIE RETAINER CAN STILL PIVOT, BUT WITH SLIGHT RESISTANCE. RE-INSTALL THE OTHER NUT AND JAM THE TWO TOGETHER WITHOUT CHANGING POSITION OF THE FIRST.

## **INITIAL DIE ADJUSTMENTS CONTINUED**

UPON COMPLETING THE DIE RUNNER ADJUSTMENT, CONNECT THE LINKAGE TO THE DIE USING THE FOLLOWING STEPS.

1. OPEN THE DIE, AVOIDING THE "CLAMSHELL" EFFECT, BY KEEPING ALL FOUR CARBIDES ON THE ROAD.
2. WITH THE DIE IN THE OPEN POSITION MOVE THE DIE LINKAGE HANDLE TO THE FULL UP POSITION, LOWERING THE TURNBUCKLE LINKAGE DOWN NEAR THE CLEVIS ATTACHMENT ON THE DIE.
3. ADJUST THE TURNBUCKLE LINK SO THAT THE PIN HOLE ON THE END ALIGNS WITH THE HOLE ON THE DIE CLEVIS.

**NOTE:** IF THE TURNBUCKLE IS ADJUSTED TOO LONG, IT WILL PUT THE DIE INTO A BIND AND CAUSE THE MOLTEN THERMOPLASTIC TO LEAK. THEREFORE, AN ADJUSTMENT THAT IS SLIGHTLY SHORT IS BETTER THAT AN ADJUSTMENT THAT IS TOO LONG.

4. INSTALL THE "LYNCH" PIN AND FLIP THE RING TO THE REAR OF THE HOLE, MAKING SURE THE PIN IS FIRMLY LATCHED AND CAN'T SLIDE OUT.
5. LOCK THE TURNBUCKLE USING THE NUT WITH THE WELDED PIN LEVER ON THE TOP END OF THE BODY.

**NOTE:** THIS KEEPS THE TURNBUCKLE FROM GETTING OUT OF ADJUSTMENT DURING TRANSPORT, KEEP A DIE INSTALLED AT ALL TIMES.

## **BEAD DISPENSER ADJUSTMENT AND OPERATION**

THE AUTOMATIC BEAD DISPENSER IS INFINITELY ADJUSTABLE FROM 4" WIDTH TO 12" WIDTH. SIMPLY MOVE THE 4" LEVER ON THE SIDE OF THE BEAD DISPENSER SHAFT TO THE DESIRED LINE WIDTH LOCATION. THE APPLICATION RATE IS PRESET AT THE FACTORY TO 11 LBS. PER 100 SQ. FT. PROPULSION SPEED OF THE APPLICATOR.

ENGAGEMENT OF THE BEAD DISPENSER IS ACCOMPLISHED BY RAISING THE DIE LINKAGE LEVER TO THE FULL VERTICAL POSITION. THIS ACTION ALLOWS THE WHEEL ON THE BEAD DISPENSER TO CONTACT THE WHEEL ON THE APPLICATOR. THIS SIMPLE DESIGN ALSO INCORPORATES A FEATURE WHEREBY THE BEAD DISPENSER ENGAGEMENT CAN BE FINELY ADJUSTED TO APPLY BEADS WITH THE APPLICATION DIE ON THE ROAD SURFACE IN THE CLOSED POSITION. THIS FEATURE ALLOWS THE OPERATOR TO CONTINUE BEAD APPLICATION AT THE END OF THE MARKING.

**REMEMBER SAFETY AT ALL TIMES**

## **FINE ADJUSTMENT**

1. INSTALLS A CLEAN DIE AND CONNECT ALL LINKAGE AS STATED IN THE INITIAL ADJUSTMENTS SECTION OF THIS MANUAL. THE DIE IS PREFERRED TO BE NEW. BUT MORE IMPORTANTLY MUST OPEN AND CLOSE FREELY AND COMPLETELY.
2. OPEN THE DIE BY POSITIONING THE DIE LEVER TO THE COMPLETE VERTICAL POSITION.
3. NOW, SLOWLY PULL THE LEVER DOWN UNTIL THE DIE CLOSSES, BUT DO NOT RAISE IT FROM THE ROAD SURFACE.
4. IN THIS POSITION ADJUST THE THREADED LINKAGE ROD TO THE BEAD DISPENSER SO THAT THE RESULTING CONTACT ON APPLICATOR WHEEL CREATES JUST ENOUGH FRICTION TO TURN THE BEADER WHEEL WITHOUT SKIPPING.
5. TEST TO SEE THAT WHEN THE DIE LEVER IS COMPLETELY LOWERED AND HOOKED THAT THE BEAD DISPENSER IS COMPLETELY DISENGAGED.
6. TEST BEAD APPLICATION WITH THE DIE CLOSED AND ON THE ROAD SURFACE. DURING PROPULSION THE BEAD DISPENSER SHOULD APPLY BEADS WITH THE DIE ON THE ROAD AND IN THE CLOSED POSITION, PROVIDING FOR COMPLETE BEAD COVERAGE AT THE END OF THE LINE.
7. CHECK FOR SMOOTH SLIDING OF THE BEAD ADJUSTMENT ROD THROUGH THE HOLE IN THE BRACKET ON THE SIDE OF THE BEADER.

HINT: IN THE CIRCUMSTANCES WHEN YOU DON'T WANT DROP ON BEADS TO OPERATE AT ALL SIMPLY INSTALL A CHAIN TO THE SIDE OF THE BEADER AND HOOK TO THE WALL OF THE APPLICATOR SO THAT THE UNIT DOES NOT MOVE DOWN WHEN OPERATING THE DIE LEVER.

## **GETTING COMFORTABLE**

WITH A NEW HBM-4 APPLICATOR THE MATERIAL VALVE CAN BE OPENED AND CLOSED FREELY SINCE NO THERMOPLASTIC HAS BEEN INTRODUCED TO THE VALVE.

INSTALL A CLEAN DIE THAT CAN BE OPENED AND CLOSED FREELY AND PRACTICE THE FOLLOWING STEPS.

1. USING THE DIE LEVER, LOWER THE DIE TO THE ROAD SURFACE. THEN FULLY ENGAGE THE LEVER TO THE VERTICAL POSITION THEREBY OPENING THE DIE.
2. BEGIN PUSHING THE APPLICATOR TAKING NOTE THAT THE BEAD DISPENSER DRIVE WHEEL IS TURNING, AND THAT THE DIE IS GLIDING FREELY ON THE ROAD SURFACE.
3. RETRACT THE DIE LEVER UNTIL THE DIE CLOSSES, BUT LEAVE IT ON THE ROAD. CONTINUE PUSHING THE APPLICATOR TAKING NOTE THAT THE BEAD DISPENSER IS STILL TURNING. UPON VERIFYING BEAD DISPENSER ACTION, STOP, RETRACT AND LATCH THE DIE LEVER.
4. NEXT, FILL THE BEAD DISPENSER WITH CLEAN DRY BEADS AND REPEAT THE ABOVE STEPS, APPLYING BEADS ONLY.
5. WHILE PUSHING THE HBM-4 PRACTICE OPENING AND CLOSING THE MATERIAL VALVE WITH THE VALVE OPEN FOR 3 TO 4 SECONDS. REPEAT AT 15 SECOND INTERVALS, AS IF YOU WERE APPLYING THERMOPLASTICS ON THE ROAD AND FILLING THE DEPLETING DIE WITH THERMOPLASTIC FROM THE MATERIAL POT.

**REMEMBER SAFETY AT ALL TIMES**

6. AFTER COMPLETING THIS EXERCISE, LOWER AND POSITION THE POINTER TO A COMFORTABLE LOCATION. SNAP A STRAIGHT CHALK-LINE, ABOUT 20 FT. LONG & WITH THE POINTER TRY TO FOLLOW THE LINE AS CLOSELY AS POSSIBLE USING ONLY YOUR HIP TO PUSH THE APPLICATOR, AND YOUR HANDS ON THE CONTROL LEVERS.
7. WHEN YOU FIRST LEARN TO OPERATE THE HBM-4 IT IS A GOOD IDEA TO HAVE A HELPER. IT TAKES A LITTLE PRACTICE TO COORDINATE OPENING AND CLOSING OF BOTH THE MATERIAL VALVE AND DIE WHILE PUSHING THE APPLICATOR AND FOLLOWING A CHALK-LINE. THE HELPER CAN OPEN AND CLOSE THE MATERIAL VALVE WHILE THE MAIN OPERATOR CAN CONCENTRATE ON THE REMAINING TASKS. ONE PERSON CAN OPERATE THIS MACHINE VERY COMFORTABLY.

**REMEMBER,** IT TAKES PRACTICE AND IS EASY ONCE YOU GAIN CONFIDENCE.

8. YOU ARE NOW READY TO TRY THESE EXERCISES WITH HOT THERMOPLASTIC, BUT FIRST READ AHEAD TO FAMILIARIZE YOURSELF WITH OTHER PROCEDURES RELATED TO THE OPERATION OF THIS EQUIPMENT.

### **CAUTION:**

WHEN PERFORMING THE ABOVE OPERATIONS WITH HOT THERMOPLASTIC, BE AWARE THAT THE MARKING WILL REMAIN HOT FOR AT LEAST 30 SECONDS AFTER APPLICATION.  
**DO NOT STEP ON THE LINE.**

## **LIGHTING THE APPLICATOR**

**MAIN BURNER** **NEVER NEVER USE A TORCH TO LIGHT BURNERS**

### **THERMOSTATIC CONTROLLED BURNER**

1. REMOVE PROTECTIVE COVER & CONNECT A 20 LB. FUEL TANK TO THE POL FITTING ON THE GAS HOSE REGULATOR. (THE POL FITTING HAS L/H THREADS KEEP COVER ON WHEN NOT IN USE)
2. CHECK TO SEE THAT ALL VALVES ARE IN THE OFF POSITION. **DO NOT ADJUST THE REGULATOR IT IS PRESET AT THE FACTORY.**
3. TURN ON TANK FUEL VALVE BY ROTATING COUNTER CLOCKWISE.
4. IMMEDIATELY CHECK FOR AUDIBLE LEAKS. CHECK FURTHER FOR OTHER LEAKS BY WETTING FITTINGS WITH A SOAP AND WATER SOLUTION, LOOKING FOR BUBBLES.
5. CHECK THERMOSTAT AND SET TO LOWEST SETTING (COUNTER-CLOCKWISE).
6. FOLLOW THE INSTRUCTIONS ON THE MOUNTING PLATE WHERE THERMOSTATIC CONTROLS ARE MOUNTED. OPEN THE FRONT DOOR ON THE HBM-4. **NEVER NEVER USE A TORCH**
7. A) SET THERMOSTAT CONTROLS TO OFF  
B) PUSH PILOT RED BUTTON IN & HOLD FOR 50 SECONDS.  
C) PUSH RED IGNITOR BUTTON & CONTINUE TO HOLD PILOT BUTTON FOR AN ADDITIONAL 10 SECONDS

**REMEMBER SAFETY AT ALL TIMES**

- D) TURN THERMOSTAT KNOB TO ON POSITION & CHECK TO SEE THAT BURNER IS LIT.
8. IF PILOT FAILED TO LIGHT REPEAT THE ABOVE STEPS.
  9. CONSTANTLY CHECK THE MATERIAL TEMPERATURE & DOUBLE CHECK WITH AN INFRARED THERMOMETER.
  10. **NEVER LEAVE THE LIGHTED APPLICATOR UNATTENDED .**
  11. **DO NOT ALLOW THE BURNER TO OPERATE WITH AN EMPTY MATERIAL TANK .**

**HELPFUL HINTS:**

MONITOR THE BURNER FLAME TO SEE IF IT SHUTS DOWN PRIOR TO THE MATERIAL REACHING PROPER OPERATING TEMPERATURE. THIS PHENOMENON IS NOT UNCOMMON AND OCCURS DUE TO THE FACT THAT THE SENSING PROBE IS INSTALLED ON THE TANK WALL WHERE THE TEMPERATURE IS HIGHER THAN THE MATERIAL TEMPERATURE; ESPECIALLY DURING START-UP. ADJUST THE THERMOSTAT TO COMPENSATE FOR THIS DEVIATION. BUT KEEP IN MIND THAT UNDER THIS CIRCUMSTANCE THE BURNER MAY NOT CYCLE DOWN AT THE PROPER TEMPERATURE. WHEN THE DESIRED MATERIAL TEMPERATURE IS ACHIEVED, RE-ADJUST THE THERMOSTAT UNTIL THE BURNER FLAME GOES OUT. NO FURTHER ADJUSTMENT ON THE THERMOSTAT SHOULD BE REQUIRED.  
(Note: Actual setting may vary from machine to machine)

**LIGHTING THE MANUAL BURNERS**

**MAIN BURNER      NEVER NEVER USE A TORCH TO LIGHT BURNERS**

1. REMOVE PROTECTIVE COVER & CONNECT A 20 LB. FUEL TANK TO THE POL FITTING ON THE GAS HOSE REGULATOR. (THE POL FITTING HAS L/H THREADS KEEP COVER WHEN NOT IN USE)
2. CHECK TO SEE THAT ALL VALVES ARE IN THE OFF POSITION. DO NOT ADJUST THE REGULATOR IT IS PRESET AT THE FACTORY.
3. TURN ON TANK FUEL VALVE BY ROTATING COUNTER CLOCKWISE.
4. IMMEDIATELY CHECK FOR AUDIBLE LEAKS. CHECK FURTHER FOR OTHER LEAKS BY WETTING FITTINGS WITH A SOAP AND WATER SOLUTION, LOOKING FOR BUBBLES.
5. OPEN FRONT DOOR OF MACHINE
6. LOCATE IGNITER ON RIGHT HAND LOWER SIDE OF MACHINE.
7. LOCATE & OPEN GAS VALVE ON UPPER LEFT HAND SIDE OF MACHINE.
8. PUSH IGNITER BUTTON TILL BURNER LIGHTS.
9. SET VALVE TO DESIRED FLAME. CLOSE & LATCH FRONT DO

**REMEMBER SAFETY AT ALL TIMES**

## LIGHTING THE APPLICATOR CONTINUED

### **RADIANT GAS BURNERS NEVER NEVER USE A TORCH TO LIGHT BURNERS**

THE GAS LINE FEEDING THE RADIANT GAS BURNER SYSTEM IS EQUIPPED WITH ONE 1/4" GAS COCK VALVE THIS IS YOUR OFF & ON VALVE. ATTACHED PLATE SHOW ON & OFF POSITION

#### **LIGHTING PROCEDURES**

HEAT RESISTANT GLOVES AND A SUITABLE FACE SHIELD MUST BE WORN FOR THIS OPERATION SINCE BACK-FLASHES ARE COMMONLY ASSOCIATED WITH LIGHTING BURNERS.

1. TURN GAS COCK VALVES SO THAT THE HANDLE IS PARALLEL WITH THE FUEL LINE.
2. IMMEDIATELY LIGHT THE RADIANT GAS BURNERS WITH A LONG BAR-B-QUE FLAME TYPE LIGHTER.
3. IF LESS HEAT IS DESIRED MOVE HANDLE TOWARD THE CLOSE POSITION AS NECESSARY.

**HELPFUL TIP:** AFTER LIGHTING THE RADIANT GAS BURNERS IT MAY TAKE SEVERAL MINUTES FOR THE FACE OF THE BURNER TO GLOW RED.

AFTER SUCCESSFULLY LIGHTING THE HBM-4 FOLLOW THESE STEPS:

1. CHECK TO SEE THAT THE HBM-4 MATERIAL VALVE IS COMPLETELY CLOSED.
2. TRANSFER ONLY THE AMOUNT OF THERMOPLASTIC INTO THE HBM-3 YOU INTEND TO USE. MAKE THE TRANSFER WITHIN 15 MINUTES TO LIGHTING THE BURNERS.
3. WHEN USING THE HBM-4 TO MELT THERMOPLASTIC BE PATIENT. WAIT FOR THE PRODUCT TO REACH 410 DEGREES F. BEFORE ATTEMPTING TO CONTINUE.
4. ALWAYS SCREEN MOLTEN THERMOPLASTIC WHEN TRANSFERRING.
5. NEVER OVER FILL THE APPLICATOR AND KEEP THE TOP OF THE HBM-4, SCRAPPED AND CLEAN OF INADVERTENT SPILLAGE.
6. AFTER FILLING ALWAYS CLOSE AND LATCH THE MATERIAL TANK DOORS.
7. WHEN FILLING THE APPLICATION DIE WITH THE MATERIAL VALVE ON THE HBM-4 NEVER ALLOW THE DIE TO OVERFLOW.

**TIP:** WHEN FILLING AN OPEN DIE WHILE APPLYING LINE REMEMBER THAT WHEN THE DIE CLOSES, IT REDUCES THE HOLDING SPACE FOR THE THERMOPLASTIC.

8. AGITATE YOUR MATERIAL OFTEN. THERMOPLASTIC BEADS CAN SETTLE TO THE BOTTOM OF THE MATERIAL TANK CAUSING A LAYER OF INSULATION RESULTING IN INEFFICIENT HEATING. THERMOPLASTIC DOES NOT NEED ANY AGITATION UNDER 300 DEGREES F. HOWEVER, AGITATION REQUIREMENTS BEGIN AT 325 DEGREES F. AND INCREASE IN FREQUENCY TO ABOUT EVERY 5 MINUTES AT 420 DEGREES F.

**REMEMBER SAFETY AT ALL TIMES**



9. ALWAYS USE THE HOT THERMOPLASTIC IN THIS EQUIPMENT WITHIN 30 MINUTES OR DRAIN IT AND RECYCLE IT INTO A LARGER MELTER.
10. NEVER ALLOW THIS UNIT TO COOL WITH A FULL TANK OF MATERIAL. TRY TO DRAIN AS MUCH PLASTIC FROM THE TANK AS POSSIBLE PRIOR TO SHUTTING DOWN. IT IS ALSO A GOOD IDEA TO CLEAN OUT THE MATERIAL PIPE WITH A PIECE OF HYDRAULIC HOSE.
11. NEVER LEAVE THE FLAME ON WITH AN EMPTY MATERIAL TANK. IT IS UNDER THIS CIRCUMSTANCE THAT OVERHEATING AND MATERIAL FLASH IS MOST POSSIBLE.

## **SHUT DOWN, CLEANING, AND MAINTENANCE**

1. WITH THE DAYS WORK COMPLETED, TURN OFF THE TANK VALVE THEN TURN OFF ALL OTHER VALVES. DO NOT ADJUST THE REGULATORS.
2. CHECK YOUR GAS SUPPLY FOR THE FOLLOWING DAYS WORK. ALWAYS KEEP A SPARE TANK OF GAS AVAILABLE.
3. COMPLETELY DRAIN THE HBM-4 AND SCRAPE TOP SIDES CLEAN OF ANY SPILLAGE.
4. REMOVE THE DIE WHILE IT IS STILL HOT AND SCRAPE AS MUCH THERMOPLASTIC FROM IT AS POSSIBLE. THIS LEVEL OF CLEANING PROVIDES FOR A SMOOTH START-UP THE FOLLOWING DAY, AS LONG AS THE DIE DOES NOT HAVE ANY HEAVY CLUMPS OF THERMOPLASTIC. THE DIE SHOULD ALWAYS BE STORED IN THE FULLY CLOSED POSITION.
5. LUBRICATE THE AXLE BEARINGS EVERY 40 HOURS OF OPERATION WITH HIGH TEMPERATURE GREASE. THIS PROCEDURE SHOULD NOT LEAVE ANY EXCESS GREASE ON THE BEARING.

THIS EQUIPMENT PRODUCES VERY LITTLE LOAD OR SPEED DEMAND ON THE BEARINGS, SO IT IS IMPORTANT TO UNDERSTAND THE THEORY OF LUBRICATION. THE GREASE SIMPLY ACTS AS A FILTER WITHIN THE BEARING HOUSING SO AS TO KEEP GLASS BEADS AND OTHER FOREIGN MATTER FROM CONTACTING THE BEARING SURFACE. EXCESS AMOUNTS OF GREASE SIMPLY COLLECT THIS FOREIGN MATTER. THEREFORE, A SMALL SHOT OF GREASE DAILY TO PUSH OUT ANY POSSIBLE CONTAMINATION IS BETTER THAN HEAVY LUBRICATION WEEKLY.

6. IF THE UNIT IS GOING TO SIT IDLE LONGER THEN OVER NIGHT, EMPTY ALL BEADS FROM THE BEAD DISPENSER TO PREVENT CONTAMINATION FROM MOISTURE.
7. FREQUENTLY SCRAPE THE INSIDE OF THE MATERIAL TANK WHILE IT IS HOT TO PREVENT ANY BUILD UP OF RESINS IN AREAS WHERE THE AGITATOR DOES NOT CONTACT THE TANK WALL.
8. CLEANLINESS IS THE #1 MAINTENANCE ITEM ON THE HBM-4.

**REMEMBER** - WHENEVER YOU ARE PERFORMING TASKS THAT INVOLVE HOT EQUIPMENT, WEAR YOUR PROTECTIVE GLOVES AND CLOTHING!

## **CARE AND MAINTENANCE OF APPLICATION DIES**

STE-1 DIES ARE VERY FRAGILE DUE TO THE CARBIDE RUNNERS AND THE ALUMINUM CONSTRUCTION. HOWEVER, THE DIES WILL PROVIDE A LONG SERVICE LIFE WITH SOME BASIC CARE AND DAILY MAINTENANCE.

**REMEMBER SAFETY AT ALL TIMES**

STE-1 DIES ARE FIXED MIL APPLICATION PROVIDING A SPECIFIC LINE THICKNESS FOR A GIVEN DIE. MIL THICKNESS IS STAMPED ON THE FACE OF THE EXTRUSION BAR. THIS IS A THEORETICAL APPLICATION THICKNESS, SINCE THERMOPLASTIC IS BY THE LAWS OF PHYSICS A PRODUCT THAT SHRINKS UPON COOLING. COOLING RATES CAN VARY DRAMATICALLY WITH VARIATIONS IN THE THERMOPLASTIC FORMULA, AMBIENT TEMPERATURE AND ROAD SURFACE TEXTURE.

ALL STE-1 DIES ARE MANUFACTURED WITH A 10% OVERSIZE EXTRUSION GATE, I.E. A 100 MIL DIE IS CUT TO .110" DEPTH. IT MUST BE NOTED AT THIS POINT THAT THERMOPLASTIC UNDER THE RIGHT CONDITIONS CAN SHRINK AS MUCH AS 30% UPON COOLING.

1. KEEP YOUR DIE AS CLEAN AS POSSIBLE BETWEEN USES.
2. ALWAYS STORE YOUR DIE IN THE FULLY CLOSED POSITION, WHEREBY THE INSIDE SHOE LIP GOES UNDER THE EXTRUSION BAR GATE.
3. HANDLE THE DIE WITH CARE SO AS NOT TO DAMAGE THE CARBIDE RUNNERS.
4. PRIOR TO USE, INSPECT THE DIE FOR VISIBLE WARPING, BENT ALUMINUM AND CHIPPED OR WORN CARBIDE RUNNERS. IF THE DIE IS WARPED OR BENT IT MUST BE REWORKED TO PROVIDE OPTIMAL PERFORMANCE.
5. CHECK THE EXTRUSION BAR GATE DEPTH WITH A DEPTH GAGE. THE MEASUREMENT OBTAINED IS ABOUT 10% GREATER THAN THE LINE THE GATE WILL PRODUCE. IF THE THICKNESS IS TOO SHALLOW, THE EXTRUSION BAR MUST BE REPLACED.
6. IT IS ACCEPTABLE PRACTICE TO HEAT THE DIE WITH A TORCH BUT USE CARE IN DOING SO. WHEN HEATING A DIE WITH A TORCH USE CAUTION SO AS NOT TO OVERHEAT ANY OF THE ALUMINUM SURFACES. KEEP HEAT OFF SPRINGS UNDER ALL CIRCUMSTANCES. USE A TORCH WITH A SPREAD FLAME AND KEEP THE FLAME MOVING AT ALL TIMES. STEEL COMPONENTS SUCH AS THE DIE RUNNERS AND THE EXTRUSION BAR WILL REQUIRE MORE HEAT THAN THE ALUMINUM COMPONENTS. REMEMBER ALL YOU ARE TRYING TO DO IS WARM THE DIE TO ABOUT 300 DEGREES F. DON'T GET IN A HURRY!
7. NEVER TRY TO FORCE OPEN A DIE WHEN IT IS COLD. USE MINIMAL EFFORT AFTER IT IS HEATED.

**REMEMBER SAFETY AT ALL TIMES**

<b>STIFF AGITATION</b>	<b>*MATERIAL TOO COLD</b>	<b>*WAIT UNTIL MATERIAL IS MELTED</b>
	<b>*FOREIGN OBJECT IN BOTTOM OF TANK</b>	<b>*DRAIN THERMOPLASTIC &amp; INSPECT AGITATOR</b>
<b>RAGGED LINE EDGE</b>	<b>*MATERIAL TOO HOT OR TOO COLD</b>	<b>*CHECK THERMOPLASTIC TEMP WITH A DIFFERENT THERMOMETER</b>
	<b>*DIE RUNNERS TOO COLD</b>	<b>*WAIT UNTIL THE ENTIRE DIE IS HEATED UNTIL THERMOPLASTIC HEATS DIE FURTHER</b>
	<b>*ROUGH ASPHALT SURFACE</b>	<b>*EXPERIMENT WITH THERMO- PLASTIC TEMP.</b>
<b>GLASS BEADS DO NOT</b>	<b>*WET BEADS</b>	<b>*DISCARD &amp; REPLACE WITH FRESH FLOW BEADS</b>
	<b>*DRIVE WHEEL NOT TURNING</b>	<b>*MAKE PROPER ADJUSTMENT</b>
	<b>*FOREIGN MATTER IN HOPPER</b>	<b>*CLEAN THOROUGHLY</b>
<b>APPLICATOR DOES NOT ROLL EASILY</b>	<b>*BEARINGS BOUND UP</b>	<b>*INSPECT &amp; REPLACE AS NEEDED</b>
	<b>*BEAD DISPENSER BINDING</b>	<b>*READJUST BEADER LINKAGE ON WHEEL</b>
	<b>*WORN OR BROKEN WHEELS</b>	<b>*CLEAN OR REPLACE AS NEEDED</b>
<b>MATERIAL VALVE FAILURE</b>	<b>*LINKAGE PIN LOOSE OR MISSING</b>	<b>*TIGHTEN OR REPLACE AS NEEDED</b>
	<b>*FAILED VALVE SPRING</b>	<b>*REPLACE VALVE</b>
<b>PILOT WILL NOT LIGHT OR STAY LIGHTED</b>	<b>*FUEL SUPPLY LOW</b>	<b>*REFILL</b>
	<b>*AIR IN LINES</b>	<b>*HOLD BUTTON UNTIL LINE CLEARS</b>
	<b>*BLOCKED FUEL LINE</b>	<b>*INSPECT ORIFICE &amp; CLEAN AS NECESSARY</b>
	<b>*CAPILLARY BULB NOT GETTING HOT ENOUGH</b>	<b>*REALIGN BULB INTO PILOT FLAME</b>
	<b>*DAMAGED CAPILLARY TUBE</b>	<b>*REPLACE ENTIRE SAFETY VALVE</b>

**REMEMBER SAFETY AT ALL TIMES**

**BURNER WILL NOT LIGHT  
OR WILL NOT STAY  
LIGHTED**

**\*LOW FUEL SUPPLY  
\*BLOCKED FUEL LINE  
\*PILOT CAPILLARY BULB NOT**

**\*REFILL  
\*INSPECT & CLEAN AS NEEDED  
\*REALIGN BULB INTO PILOT**

**GETTING HOT ENOUGH  
FLAME**

**\*DEFECTIVE THERMOSTAT**

**\*REPLACE AS NEEDED**

**RADIANT BURNERS  
NOT HOT ENOUGH**

**\*RESTRICTOR VALVE  
PERPENDICULAR TO FUEL LINE**

**\*TURN VALVE 90 DEGREES FOR  
FULL FLOW**

**\*REGULATOR OUT OF ADJUSTMENT**

**\*CONTACT FACTORY FOR**

**PROPER ADJUSTMENT**

**\*DAMAGED OR BROKEN CERAMIC  
PROCESSOR**

**\*REPLACE ENTIRE BURNER  
UNIT**

**RADIANT BURNERS  
FLARING**

**\*BURNER HOUSINGS TOO HOT  
CAUSING PREIGNITION**

**\*SHUT DOWN BURNERS &  
REIGNITE WITH RESTRICTOR  
VALVE PERPENDICULAR TO  
FUEL LINE**

**RADIANT BURNERS  
WILL NOT LIGHT**

**\*ORIFICE CLOGGED**

**\*DISASSEMBLE AND CLEAN  
AS NECESSARY**

**MATERIAL DOES NOT  
FLOW FROM DISCHARGE**

**\*MATERIAL IS TOO COLD  
\*BEADS SETTLED IN TRANSFER PIPE**

**\*WAIT FOR DIE BURNER TO  
HEAT TRANSFER PIPE  
\*CLEAN TRANSFER PIPE**

**HAND BRAKE INOPERATIVE**

**\*HANDLE WAS ROTATED PAST PIVOT  
BOLT ON PUSH HANDLE**

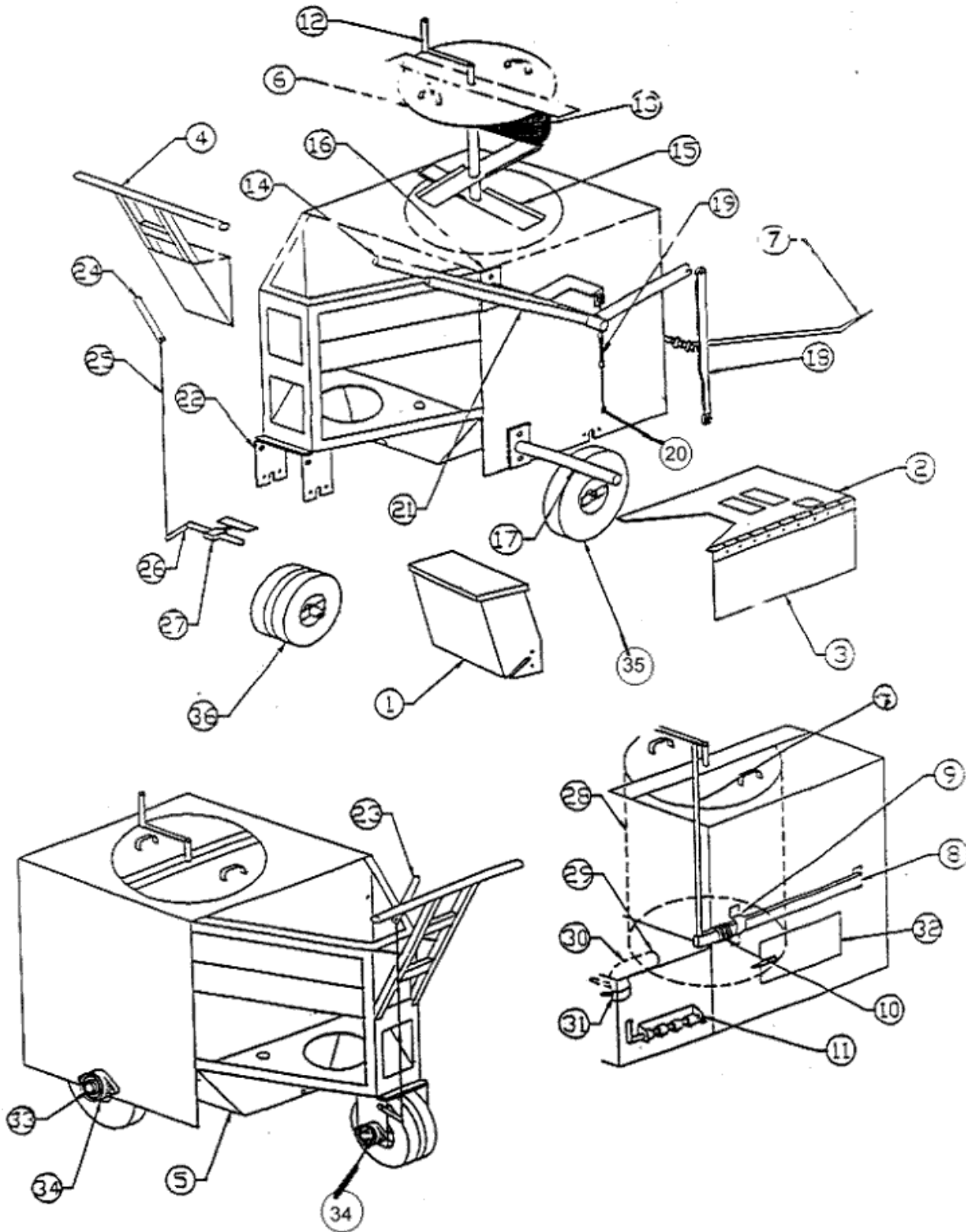
**\*ROTATE TO LEFT SIDE OF  
PIVOT BOLT**

**\*WORN WHEEL CAUSING INEFFECTIVE  
BRAKING ACTION**

**\*ADJUST NUT ON LOWER END  
OF BRAKE LINKAGE FOR  
MORE TENSION**

**REMEMBER SAFETY AT ALL TIMES**

# HBM-4 Handliner



REMEMBER SAFETY AT ALL TIMES

		Handliner	
#	Part #	Parts List	Qty
1	HBM-001	Adjustable Width Glass Bead Dispenser	1
2/3	HBM-002A	Die Shroud Assembly With Door Installed	1
2	HBM-002	Die Shroud Body	1
3	HBM-003	Die Shroud Door With Hinge	1
4	HBM-004	Push Handle Assembly	1
5	HBM-005	Main Burner Shroud	1
6	HBM-006A	Material Pot Lid / Door Assembly	1
	HBM-006	2" Stainless Lid Hinge	1
7	HBM-007A	Pointer Assembly Complete With All Related Parts	1
	HBM-007B	Pointer Shaft (Pointed Shaft)	1
8	HBM-007D	Pointer Slide Tube (Bolts To Machine)	1
9	HBM-007C	Pointer Adjusting Shaft (Threaded Steel)	1
10	HBM-007F	Pointer Spring	1
11	HBM-011A	Die Retainer Assembly	1
	HBM-011L	Left-Hand Die Retainer Spring	1
	HBM-011R	Right-Hand Die Retainer Spring	1
12	HBM-012	Paddle Shaft Handle	1
13	HBM-013	Strainer Basket	1
14	HBM-014	Die Actuator Lever	1
15	HBM-015	Paddle Shaft Assembly	1
16	HBM-016	Die/Material Valve Lever Pivot Shaft	1
17	HBM-017	Beader Mount Pivot Shaft	1
18	HBM-018	Valve Linkage	1
19	HBM-019	Adjustable Die Linkage	1
20	HBM-020	Hitch Pin	1
21	HBM-021	Valve Actuator Lever	1
22	HBM-022	Rear Axle Mounting Bracket	1
	HBM-022S	Swivel Wheel with Brake & Mounting Plate (Optional)	1
23	HBM-023AN	Brake Assembly	1
24	HBM-023A	Brake Handle with Spacer Bolt	1
25	HBM-023B	Cable with spring and Eye Bolt	1
26	HBM-023C	Brake Pivot	1
27	HBM-023D	Brake Arm	1
28	HBM-028	Aluminum Material Tank W/O Elbow (Hole Drilled, Pivot In)	1
29	HBM-029	2" Aluminum 90 Degree Elbow	1
30	HBM-030	2" Material Pipe	1
	HBM-030C	2" Material Pipe Coupling	1
31	HBM-031	2" Long Handle Gate Valve	1
32	HBM-032	Main Burner Door Assembly	1
33	HBM-033A	Complete Front Axle Assembly (Inc Wheels, Axle & Bearings)	1
	HBM-033	Front Main Axle	1
34	HBM-034	2 Bolt Axle Bearing	2

REMEMBER SAFETY AT ALL TIMES

Handliner (cont)			
#	Part #	Parts List	Qty
36	HBM-036A	Rear Axle Assembly (Consist Of Two Wheels On Axle)	1
	HBM-036	Rear Axle	1
37	HBM-037	8" Rear Handliner Wheel	2
	HBM-039S	Set Of Handle Grips (2 Large & 2 Small)	1
	HBM-039	1" Handle Grips	2
	HBM-040	1-1/4" Handle Grips	2
	HBM-041	Die Housing Support	1
	HBM-042	Die Handle Latch With Bracket And Bolts	1
	HBM-043	Safety Decal (Set)	1
	HBM-044	Thermometer Guard	1
	HBM-045	Material Pot Door Safety Latch (All Door Latches)	2

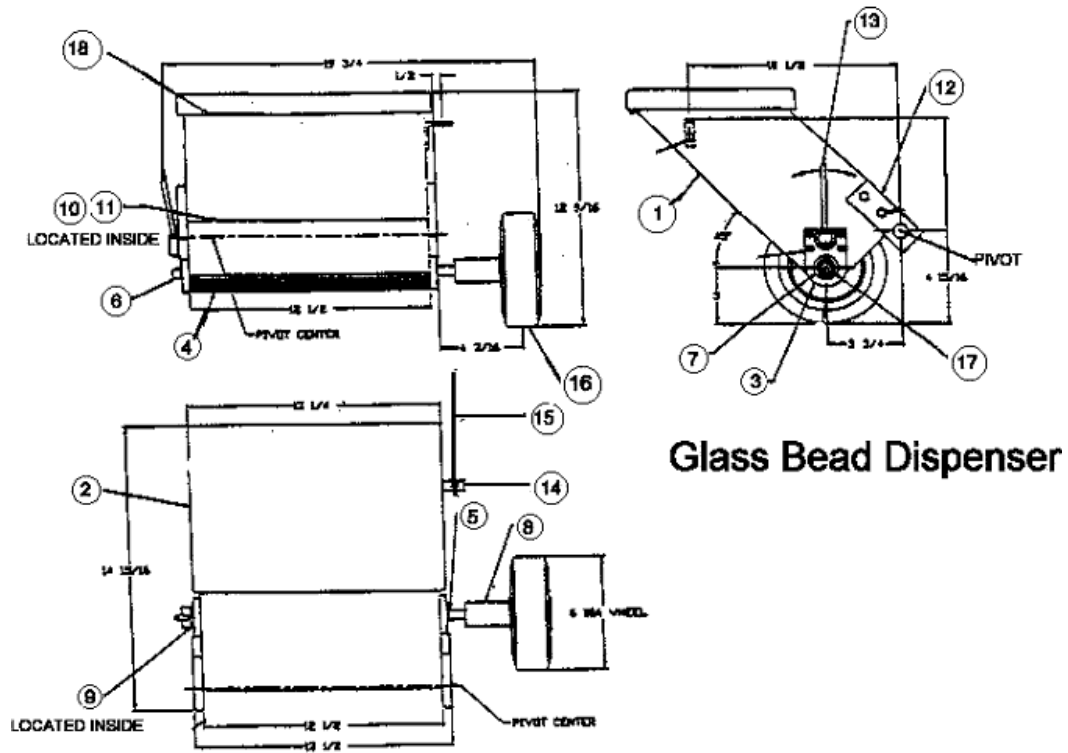
**REMEMBER SAFETY AT ALL TIMES**

		Handliner	
#	Part #	LP Gas Parts List	Qty
1	NEC-001M	High Pressure LP Gas Hose For Manual Machine	1
2	NEC-001T	High Pressure LP Gas Hose For Thermostatic Machine	1
3	NEC-002	Main Burner Copper Tube Supply To Valve	1
4	NEC-003	Main Burner Copper Tube Valve to Burner	1
5	NEC-004	Die Burner Copper Tube	1
6	NEC-005	Manual Pot Burner With LPG Orifice & Inspirator	1
7	NEC-006	Main Pot Burner For Thermostatically Controlled Machine	2
8	NEC-006J	#638-72 LPG Gas Burner Jets	12
10	NEC-008A	Radiant Gas Burner Assembly ( Complete W/Manifold)	1
11	NEC-010A	Radiant Gas Burner Assembly	2
12	NEC-05	1 Rebuilt Radiant Gas Burner Assembly	1
16	NEC-008	Radiant Gas Manifold	1
17	NEC-009-V	Atmospheric Inspirator W/Orifice For Use W/LPG	1
18	NEC-009-0	#77 Orifice Only For Atmospheric Inspirator	1
19	NEC-019L	3" Adjustable Angle Thermometer W/18" Stem	1
20	NEC-020	H/L Insulation Replacement Kit	1
21	NEC021K	Radiant Valve Kit (contains all parts to update/install burners)	1
22	NEC-021	1/4" Female/Female Brass Cock Valve	1
23	NEC-022	1/4" Female/Female Brass Cock Valve Drilled	1
24	NEC-023	1/4" Brass Needle Valve	1
25	NEC-024	1/4" MPT x 3/8" OD Flare Adapter	1
26	NEC-025	3/8" MPT x 3/8" Flare Adapter	1
27	NEC-026	1/2 " MPT x 3/8" OD Flare Adapter	1
28	NEC-027	1/4" MPT x 3/8" OD Flare Adapter 90 Degree	1
29	NEC-028	3/8" x 3/8" OD Flare Adapter 90 Degree	1
30	NEC-029	3/8" OD Flare Nut	1
31	NEC-034A	1/4" Aluminum Tube W/Fitting (Pilot to Pilot Safety)	1
32	NEC-035	Pilot Burner (Kit)	1
33	NEC-036	Pilot Safety Valve (drilled at factory for R/L hand application)	1
34	NEC-037	Y-200 Regulator (On Thermostatic Applicator Only)	1
35	NEC-038-2020	Thermostatic Control With Knob	1

REMEMBER SAFETY AT ALL TIMES



# Handliner Bead Dispenser HBM-001

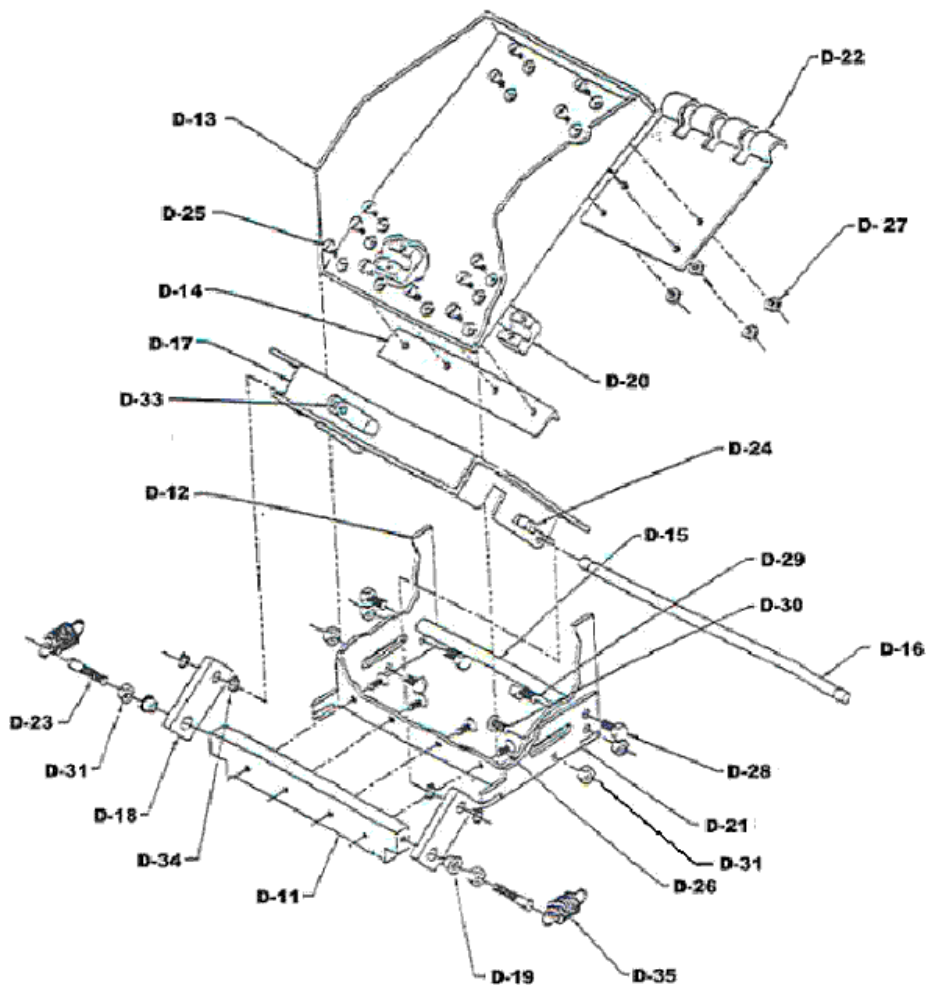


REMEMBER SAFETY AT ALL TIMES

Bead Dispenser			
#	Part #	Parts List	Qty
1	DAT-001	Main Bead Box ( Bead Box Housing Only)	1
2	DAT-002	Bead Box Lid	1
3	DAT-003	Bead Box Bearing Block	2
4	DAT-004	Bead Feed Roller	1
5	DAT-005	Bead Box Long Axle	1
6	DAT-006	Bead Box Short Axle	1
7	DAT-007	Bead Box Roller Washer	2
8	DAT-008	Bead Box Wheel Adapter (Sold As Part Of # 16)	1
9	DAT-009	Bead Box Adjustment Shaft Assembly**	1
10	DAT-010	Bead Box Urethane Flap Retainer	2
11	DAT-011K	Bead Box Urethane Flap Kit (2 Flaps & 2 Ends) Specify 12"-13"	1
12	DAT-012	Bead Box Mounting Tab	2
13	DAT-013	Bead Box Adjustment Handle	1
14	DAT-014	Bead Box "L" Bracket	1
15	DAT-015	Bead Box Actuating Rod	1
16	DAT-016	6" Plain Bore Wheel (Sold W/DAT-008 Adapter Installed)	1
17	DAT-017	Feed Roller Bearing	1
18	DAT-018	Stainless Steel Piano Hinge 2" x 12" (Per Foot)	1
		Items 19 Through 24 Can Be Purchased Locally	
19	DAT-019	Roll Pin 1/8" x 1-1/4" Long	1
20	DAT-020	6-32 x 3/8" Flat Head Screws & Nut	12
21	DAT-021	10-32 x 3/8" Round Head Screw	2
22	DAT-022	10-32 x 1/2" Round Head Screw	20
23	DAT-023	1/4"-20 x 1" Hex Head Cap Screw	4
24	DAT-024	1/4"-20 x 3/4" Hex Head Cap Screw	1
25	DAT-025	O-Ring Adjustment Shaft	2
		Note: ** Denotes Assembled At Factory	

REMEMBER SAFETY AT ALL TIMES

# Handliner Die



REMEMBER SAFETY AT ALL TIMES

Die Parts List		
Part #	Width	Description
D11-04	4"	Screed Millage Bar
D11-05	5"	Screed Millage Bar
D11-06	6"	Screed Millage Bar
D11-08	8"	Screed Millage Bar
D11-09	9"	Screed Millage Bar
D11-10	10"	Screed Millage Bar
D11-12	12"	Screed Millage Bar
D12-04	4"	Outer Shoe
D12-05	5"	Outer Shoe
D12-06	6"	Outer Shoe
D12-08	8"	Outer Shoe
D12-09	9"	Outer Shoe
D12-10	10"	Outer Shoe
D12-12	12"	Outer Shoe
D13-04	4"	Inner Shoe
D13-05	5"	Inner Shoe
D13-06	6"	Inner Shoe
D13-08	8"	Inner Shoe
D13-09	9"	Inner Shoe
D13-10	10"	Inner Shoe
D13-12	12"	Inner Shoe
D14-04	4"	Inner Shoe Support Angle
D14-05	5"	Inner Shoe Support Angle
D14-06	6"	Inner Shoe Support Angle
D14-08	8"	Inner Shoe Support Angle
D14-09	9"	Inner Shoe Support Angle
D14-10	10"	Inner Shoe Support Angle
D14-12	12"	Inner Shoe Support Angle
D15-04	4"	Outer Shoe Spacer
D15-05	5"	Outer Shoe Spacer
D15-06	6"	Outer Shoe Spacer
D15-08	8"	Outer Shoe Spacer
D15-09	9"	Outer Shoe Spacer
D15-10	10"	Outer Shoe Spacer
D15-12	12"	Outer Shoe Spacer

REMEMBER SAFETY AT ALL TIMES

Die Parts List (cont)		
Part #	Width	Description
D16-04	4"	Die Spring Rod
D16-05	5"	Die Spring Rod
D16-06	6"	Die Spring Rod
D16-08	8"	Die Spring Rod
D16-09	9"	Die Spring Rod
D16-10	10"	Die Spring Rod
D16-12	12"	Die Spring Rod
D17-04	4"	Main Linkage Assembly
D17-05	5"	Main Linkage Assembly
D17-06	6"	Main Linkage Assembly
D17-08	8"	Main Linkage Assembly
D17-09	9"	Main Linkage Assembly
D17-10	10"	Main Linkage Assembly
D17-12	12"	Main Linkage Assembly
D18		Side Center Linkage
D19		Die Bushing (2 Per Die)
D20		Spring Rod Clamp (2 Per Die)
D21		Side Runner Plate (2 Per Die)
D22		Die Claw
D23		Spring Pin
D24		Side Link Snap Ring Shaft (Part Of Assembly D17)

REMEMBER SAFETY AT ALL TIMES

Die Parts List (cont)		
Part #	Width	Description
		Note: Items D25 – D32 Can Be Purchased From Your Local Supplier
D25		10-32 x 1/4" Flat Head Screw
D26		10-32 x 1/2" Flat Head Screw
D27		10-32 Nuts (Box Of 100)
D28		1/4-20 x 5/8 Hex Head Screw
D29		1/4-20 x 1/2 Hex Head Screw
D30		1/4-20 1/2 Round Head Screw
D31		1/4-20 Hex Nuts (Box Of 100)
D32		1/4-28 x 1/2 Hex Head Screw
D33		Clevis
D34		C-Clip
D35		Die Springs (2 Per Die)

REMEMBER SAFETY AT ALL TIMES