


Document Title: MAINTENANCE BULLETIN S-MN-GEN-7353				 Simpsonville, South Carolina
Erema Melt Temperature Probe Bushing Modification v1				
Document Number: S-MN-GEN-7353	Rev No: 01	Date: 05/05/14	Document Owner: Reliability & CI Manager	Approver(s): Maintenance Manager

1. SCOPE

- 1.1. This document describes and details the modification/s and requisite task/s instructions in original equipment manufacturer design in the SC1 Erema melt temperature probe bushing at the Fitesa, Simpsonville plant, SC.

2. DEFINITIONS

- 2.1. OEM (Original Equipment Manufacturer)

3. AFFECTED AREA / MACHINE / EQUIPMENT / PRODUCT / COMPONENT / MATERIAL

- 3.1. SC1 Erema recycling machine 906 T. Commission number P09/193 / ENA 874.
- 3.1.1. Extruder melt temperature probe bushing.

4. FAULT ISOLATION CODE

- 4.1. N/A.

5. AFFECTED DATES RANGE

- 5.1. 06/01/2014 – Indefinite.

6. COMMUNICATION

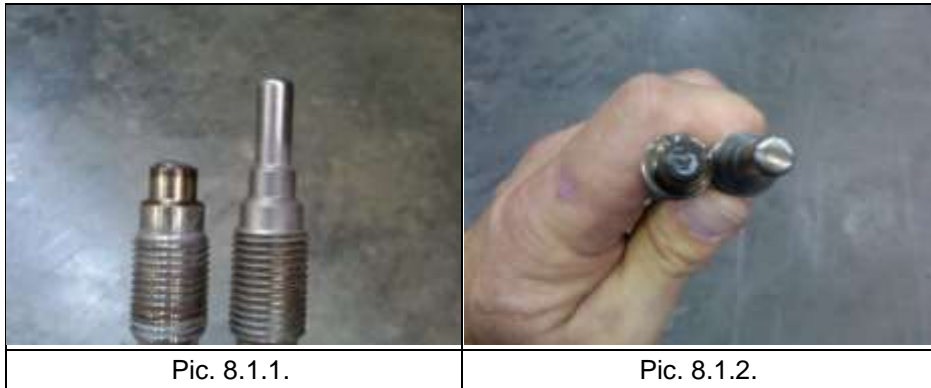
- 6.1. Communication of this Maintenance Bulletin shall be made known to affected parties by electronic mail and internal customer maintenance review meetings maintenance notice boards and training.

7. TRAINING

- 7.1. Change management training of this Maintenance Bulletin shall be made by the author to all affected staff by audio / visual aids and on the job as a single point lesson and trainee and trainer shall fill out and sign completion record of the afore.

8. BACKGROUND DIAGNOSTICS

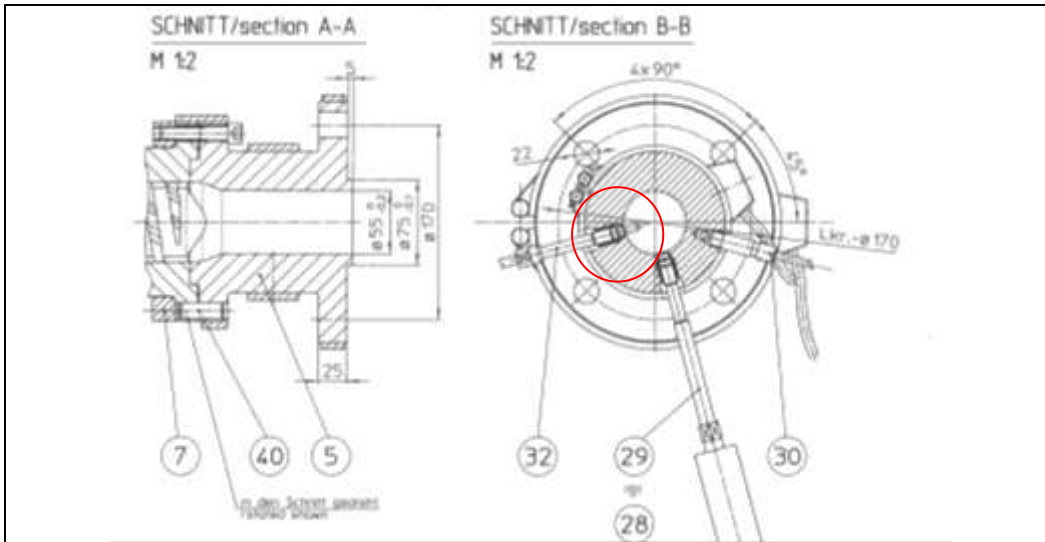
- 8.1. From commission (01/08/2010) The Erema melt temperature probe tip has broken off 8 times from the body of the probe rendering the unit inoperative. (MTBF = 6 months) The main reason is that the extruder is started from a cold or warm start up without ensuring that the plastic resin in the extruder barrel is fully plasticized (Pics. 8.1.1. and 8.1.2).



9. COUNTERMEASURES TAKEN – CHANGE PLANNING

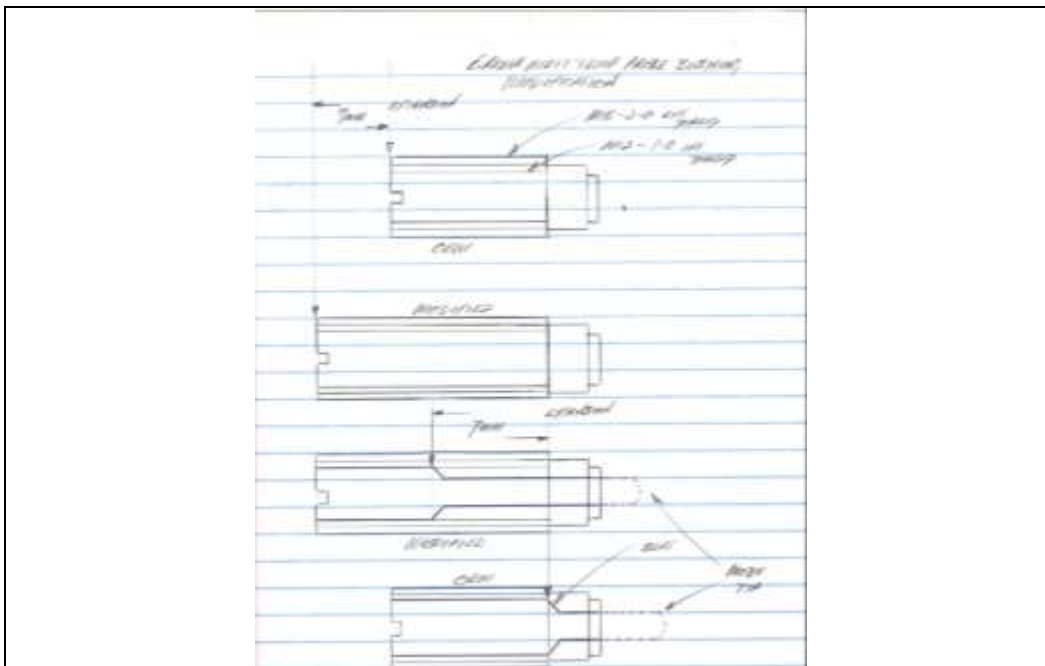
- 9.1. Following a physical analysis it was determined that there was insufficient lateral support of the tip of the probe and that longitudinal forces of the plastic melt flow was greater than the ability of the base of the probe tip to withstand being 'bent' to the point of the metal sleeve and mica fill of the probe would result in breaking down the molecular physical bonds and separate – failed state.
- 9.2. Reducing the moment of the tip of the probe to the base of the probe would negate this moment to the point where the surface contact of the length of the probe with the plastic melt flow to an extent the probe tip could withstand lateral forces of the plastic melt flow against it.
- 9.3. The probe has two parts; the probe itself and the bushing that it inserted to and then inserted into the extruder barrel directly into the plastic melt flow. The bushing has been modified to reduce the distance the probe extends into the plastic melt flow by 50%. Currently the probe extends 14 mm into the extruder barrel. This has now been reduced to 7 mm. This is not expected to affect the ability of the probe to accurately measure the plastic melt temperature. To achieve this modification of the bushing was necessary. The external and internal threaded body of the bushing has been increased by 7 mm. The internal seat of the bushing where the probe seal against the bushing has been moved 7 mm backwards thus is reducing the extension of the probe tip into the barrel by 7 mm. See pic 9.4.

9.1. Note: In making this decision and the subsequent conceptions of re-design it is always has to be balanced with a ratio of action / effort to impact / effect. Completely re-designing the the roller and the end of the incline feed conveyor would be uneconomical. Making countermeasures that satisfies what is 'acceptable' and/or 'tolerable' to the organization without incurring un-recoupable financial impacts and having neither negative safety impacts nor negative environmental impacts is the imperative.



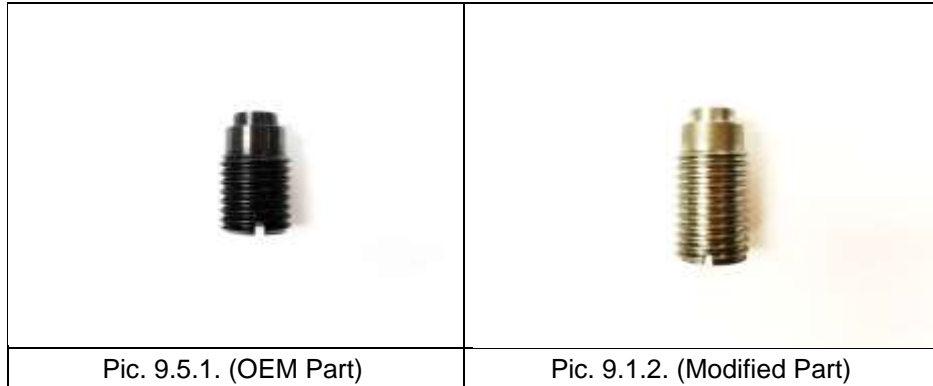
Pic. 9.4 Parts drawing showing position of melt temperature probe in extruder barrel

9.2. Modified part drawing



Pic. 9.4.

- 9.3. The original equipment manufacturer bushing shown in pic 9.5.1. The modified bushing shown in pic. 9.5.2.



10. TESTING AND VALIDATION / PFMEA / PPAD / LOT TRACEABILITY / PROCESS FLOW DIAGRAM

- 10.1. The modified part (bushing) has been manufactured from the pattern of the original equipment manufacturers same grade and composition of materials. The modified bushing was installed and monitored for fit, form and function and its performance is satisfactory.
- 10.2. PFMEA – Author conducted.
- 10.3. PPAD – not required.
- 10.4. Lot Traceability – not required.
- 10.5. Process Flow Diagram – not required.

11. REFERENCES

11.1. Documentation

- 11.1.1. Applicable changes in nomenclature and technical drawings have been made in the OEM equipment manual Erema Mechanical Drawings, part list 3 / page 2/3 item 29 (see remark column) drawing title block.

11.2. Forms

- 11.2.1. S-AD-HR-8104 Training Attendance Record.

11.3. Responsibility

11.3.1. Authorized Fitesa Maintenance Technicians, Maintenance Repairs & Operations Coordinator trained in this work task procedure.

11.4. Frequency

11.4.1. When required replacement by the Maintenance Technician and when required reordering by the Maintenance Repairs and Operations Coordinator.

11.5. Materials

11.5.1. X 1, Anti-seize grease.

11.5.2. X 1, Box of available cotton rags.

11.6. Tools

11.6.1. X 1, 12 mm combination wrench.

11.6.2. X 1, 5 mm Allen wrench.

11.6.3. X 1, 4 mm Allen wrench.

11.6.4. X 1, 10" long flat blade screwdriver.

11.7. Parts Requirements

11.7.1. X 1, Erema melt temperature probe w bushing part number: 34862 (contains OEM bushing which needs to be removed and discarded).

11.7.2. X 1, Modified melt temperature probe bushing part number: 35945 (new modified bushing which is to be used instead of the OEM bushing).

11.8. HS&E Mandates / Concerns / Considerations

11.8.1. No health, safety or environmental mandates, concerns or consideration have been identified with this maintenance bulletin.

11.9. Personal Protective Equipment

11.9.1. Company mandated PPEs in designated areas.

11.9.2. X 1 Hasp clasp lock out/tag out lock per person actually working on the extruder unit attached to the Erema machine extruder.

11.9.3. X 1 Hasp clasp lock out/tag out lock per person actually working on the extruder to be attached to the Vecoplan machine.

11.9.4. Face shield.

11.9.5. Leather gloves.

11.9.6. I pair of heat resistant arm sleeves for each person.



WARNING: Hot materials. Always wear hot work personal protection equipment.

11.10. Guidelines

11.10.1. N/A.

12. ATTACHMENTS

12.1. Modified bushing drawing.

12.2. Modified bushing B&D Machine quotation.

13. APPENDIX

13.1. B&D Machine contact information.

14. ACTIONS REQUIRED BY MAINTENANCE STAFF

14.1. Shut down the machine in the proper procedure and lock out / tag out electrical control panel. If the melt temperature probe requires replacement it is important that it is replaced using the modified bushing and not the OEM bushing.

14.1.1. Don PPEs.

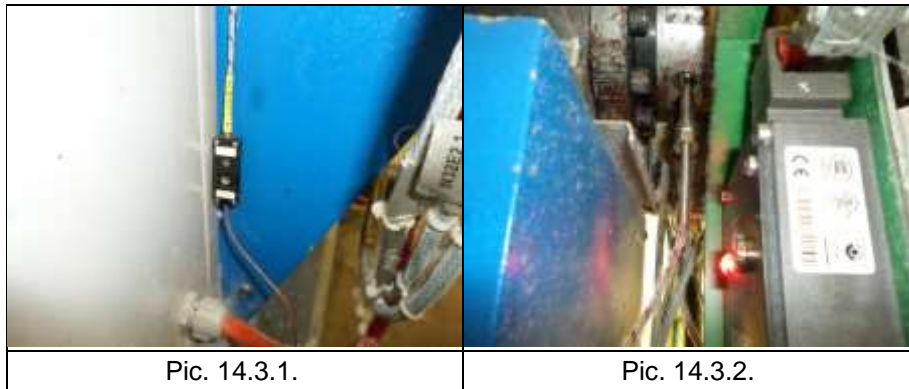
Note: Usually when the temperature is removed – which should be done very shortly after the machine has been purged of material in the extruder barrel while it is still hot – the bushing comes out with the probe and should be discarded and replaced with the new modified bushing. The modified bushing is stocked next to the probe in the spare parts store room (see 8.7.1. and 8.7.2. for parts requirement). **Note:** It is advisable to carry out this while the extruder barrel is still hot for ease of disassembly and assembly.

14.2. Remove the screen changer interlock switch mount plate (Pic. 14.2.) and rest on the floor.



Pic. 14.2.

14.3. Unplug the temperature probe electrical connector plug (Pic. 14.3.1.) and then using the 12 mm combination wrench, unscrew the probe (Pic.14.3.2.).



Pic. 14.3.1.

Pic. 14.3.2.

14.4. Apply a liberal amount of anti-seize grease to the threads of the temperature probe.

14.5. Install the modified bushing on the probe.

14.6. Apply a liberal amount anti seize grease to the external threads of the modified bushing.

14.7. Using a cotton rag and 10" long flat blade screwdriver push the corner end of the rag into the threaded port of the barrel to clean out any residual debris and molten plastic. Do this X 4 times to make sure it is cleaned out.

14.8. Install the probe into the barrel port and screw it all the way home to the port seat – **DO NOT OVER TIGHTEN.**

14.9. Plug the temperature probe electrical connector together.

14.10. Replace the screen changer interlock switch mount plate.

14.11. Remove lock out / tag out and turn power back on to control panel.

14.12. Start line back up and check probe area for leaks.

15. ACTIONS REQUIRED BY MRO COORDINATOR

15.1. When reordering replacement melt temperature probes from the vendor the probe is part of a kit containing a replacement bushing (the OEM bushing) this is to be removed from the packaging and discarded.

15.2. The modified bushing is a manufactured spare part that forms the new modified kit. The manufacturer of the modified bushing is B&D Machine. B&D Machine have this modified bushing saved in their customer data base of manufactured spare parts. The part number that has been assigned to this modified bushing is their origination reference quotation number: Q # 1091 Erema Extruder Melt Bush per Q # 1091.

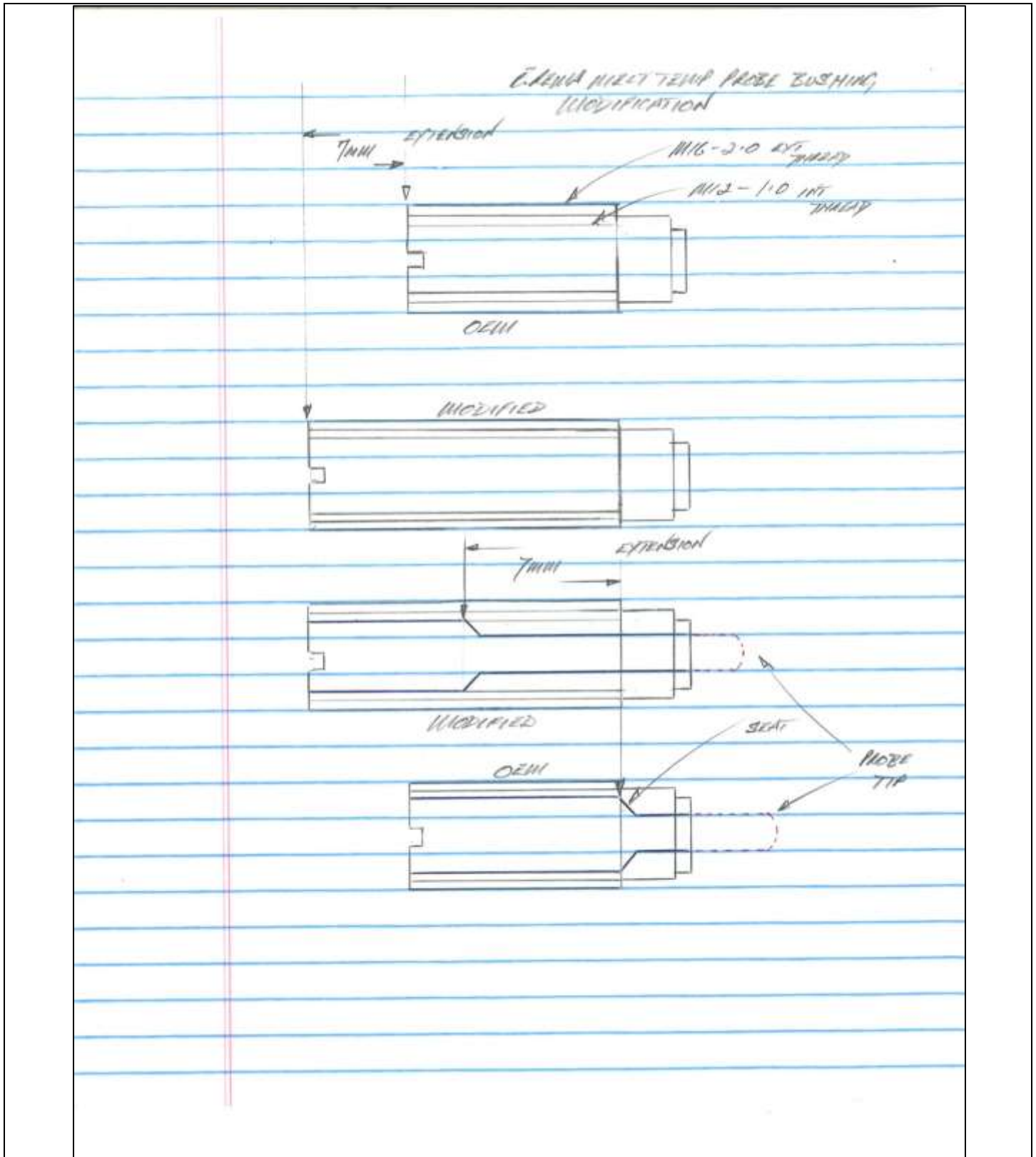
16. LONG TERM EFFECTIVENESS TRACKING

16.1. The author of this maintenance bulletin has conducted a PFMEA and no major long term effects have been identified with the change management.

17. RESPONSES / REACTION PLANS FROM ORIGINAL EQUIPMENT MANUFACTURER

17.1. The original equipment manufacturer was contacted in regard to this problem and their response was considered not congruent with the results of the physical analysis and data collected to the contrary by the author. The changes have been made notwithstanding any warranties in effect in sake of improved reliability resulting in an increase in the mean time between failure and reduction of unplanned downtime.

18. ATTACHMENT 1: Modified bushing drawing.



19. **ATTACHMENT 2:** Modified bushing B&D Machine quotation

QUOTE

B & D Machine

3113 Harris Bridge Road

Woodruff, S.C. 29388

Phone: 864-876-9764

Fax: 864-876-2257

Email: *BandDmachine@gmail.com*

Quote # 1091

R.F.Q.#Email/Fred

Date: 1-24-14

Lead Time: 1 week

F.O.B. Del'd/Add on

Terms: Net 30

To: **Fitesa, Simpsonville Facility**

840 S.E. Main Street

Simpsonville, SC 29681

Attn: Fred Webberking

<u>Qty</u>	<u>Item</u>	<u>Description</u>
4	1	Erema Extruder Melt Bush per Q # 1091 (modified per Fred Webberking instructions) \$95.00 each.

TOTAL: \$380.00

20. **APPENDIX.** New vendor manufacturer's contact information

B & D Machine,
3113 Harris Bridge Road,
Woodruff,
SC 29388.

Tell: 864-876-9764
Fax: 864-876-2257
Email: banddmachine@gmail.com

Revision History:

Effective Date	Revision Number	Description of Change	Reason for Change
06/01/14	01	N/A	First Draft