SMD Operations Procedures Manual

8.1.1.27 OPERATION OF WEDGE WRAPPER

Text Pages 1 through 11
Attachment(s) 3

Hand Processed Changes

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8.1.1.27 Operation of Wedge Wrapper

1.0 Purpose and Scope

1.1 This Procedure provides instruction in the operation of the Wedge Wrapper located in Building 902.

1.2 This information is meant for any person who will operate the controls of the Wrapper.

The following is not found in this document:

1.3 Detailed instructions for the wrapping of specific items (warm-up heaters, buses...), which are found in the applicable Traveler.

1.4 Instructions for operating the oven section of the Wrapping Machine. The oven has been electrically disconnected and is not operational.

1.5 This document is intended for authorized operators of the Wrapping Machine.

2.0 Responsibilities

2.1 The Cognizant Technical Supervisor shall:

2.2 Ensure that operators have been instructed before operating the Machine.

2.3 The Authorized Operator shall periodically test the safety interlocks.

2.4 The Operator shall complete the following documentation:

2.4.1 Traveler designated by Cognizant Engineer (CE).

3.0 Prerequisites

3.1 Training

3.1.1 Operators shall be instructed by the Cognizant Technical Supervisor or designee before using this Procedure.

3.1.2 Operator shall be an "affected employee" as defined by SBMS Subject Area, "Lockout/Tagout (LOTO)".

3.2 Initial State of Wrapper

3.2.1 Control panel controls shall be set to their "initial" settings (see para. 5.1) before activating the control console.

3.3 Manpower

3.3.1 The Wrapping Machine may be operated by one person.

4.0 Precautions

4.1 The main hazard associated with operating the Wrapping Machine is moving and rotating parts. To minimize the hazard:

CAUTION

Prior to use, ensure interlocks have been tested satisfactory within the past six months.

4.2 Test the safety interlocks every six months and before machine use if it has not been operated in the last six months, and promptly repair any failed interlocks.

4.3 Keep cover panels, chain drive guards, and plexiglass shields in place during operations.

4.4 Ensure that the Outfeed Guide Tube is not impeding the rotation of the wrapping head. Follow the Bushing Oil Schedule (Attachment 2) to ensure that the bronze bushing in the wrapping head assembly is lubricated accordingly.

4.5 Limits of Operation

4.5.1 Minimum and maximum Wedge shapes that can be accommodated on this machine: RD64010615 minimum & RD64010611 maximum.

4.6 The Pusher Assembly cannot travel beyond the Infeed Wedge Guide Tube, as the rails terminate at the Infeed Guide Tube Base. The operator should be mindful as to how much travel the Pusher has remaining before adding more wedges to the trough and resetting the Pusher's position.

4.7 To prevent damage to the feed rate mechanism, do not attempt to turn the PIV crank unless the motor is running and the feed line is moving.

4.8 All appropriate PPE including safety glasses are required when operating safety switches and circuit breakers.

5.0 Procedure

Overview:
The Wedge Wrapping Machine provides a means of wrapping insulation/film around certain magnet parts, primarily Wedges.

Each magnet part that is wrapped on the machine has a written Traveler that describes the sequential activities necessary to wrap the part.

In the wrapping process, insulation/film is wrapped around the magnet part as it is pushed through the wrapping head via a pushing assembly powered by a chain drive.

The chain drive speed and the degree of overlap of the insulation will vary with the requirements of the part being wrapped.

5.1 Initial Settings

5.1.1 Main disconnect switch, located under the wrapping head assembly and labeled "Main Disconnect", in the "OFF" position.

NOTE:

The machine is powered by circuit breaker #18 in panel RP P2-2 located on the Southwest wall of building 902.

5.1.2 Motor Speed Dial set to 0

5.1.3 Head Clutch Dial set to “OFF”

5.1.4 West/East Direction Dial set to Center Position

5.1.5 West/East Power Switch set to “OFF”

5.1.6 West/East Start/Stop toggle Switch set to “STOP”

5.2 Activating Power

5.2.1 Place the main input disconnect switch in the "ON" position.

5.2.2 Depress the green push button labeled "POWER ON".

5.3 Setting the Amount of Overlap

5.3.1 Tilt spool arms the appropriate angle according to the reference material provided by the engineer for each traveler with parts to be wrapped.

5.3.2 Perform the steps in Sections 5.1 and 5.2.

5.3.3 Set the motor "ON/OFF" toggle switch to "ON".

5.3.4 Set the motor "WEST/EAST" Direction Dial to "EAST"

5.3.5 Set the motor "START/STOP" toggle switch to "START" (the switch is a momentary contact switch and will snap back to a neutral position.)

5.3.6 Set the "HEAD CLUTCH" switch to "ON".

5.3.7 Slowly turn the "MOTOR SPEED" dial until the wrapping heads begin rotating and the line begins moving.

5.3.8 Adjust the feed rate by turning the PIV crank.

NOTE:

The wrapping pitch is calculated by dividing the feed rate by the rate of revolution:

$$\text{Pitch (In. Per Rev.)} = \frac{\text{Feed Rate (IPM)}}{\text{Head Revolution Rate (RPM)}}$$

For instance, a desired pitch of 0.5 inches will be obtained by setting the feed rate to 50 IPM and the head rate to 100 RPM.

Once the ratio is set, the PIV crank should not be touched except for minor adjustments as necessary.

The motor speed may be adjusted without changing the ratio.

5.3.9 When the desired ratio is set, turn the "MOTOR SPEED" dial to zero and place the motor "ON/OFF" toggle switch in the "OFF" position.

5.4 Setting Up Material to be Wrapped

5.4.1 Refer to the applicable Traveler for detailed instructions on setting up material to be wrapped.

5.4.2 To facilitate mounting the Kapton spools, a red push button located next to the wrapping heads, inside the Plexi glass shield, may be depressed to release the head clutch. This will allow the head to be manually spun. Before depressing this push button, the steps in Section 5.1 and 5.2 must have been performed. Otherwise, the push button will not be operable.

5.5 Running the Wrapping Machine

5.5.1 Set the motor "ON/OFF" toggle switch to "ON".

5.5.2 Set the motor "WEST/EAST" Direction Dial to "EAST"

5.5.3 Set the motor "START/STOP" toggle switch to "START" (the switch is a momentary contact switch and will snap back to a neutral position.)

5.5.4 Set the "HEAD CLUTCH" switch to "ON".

5.5.5 Slowly turn the "MOTOR SPEED" dial until the wrapping heads begin rotating and the material to be wrapped begins feeding into the Machine, and continue turning the dial until the desired speed is reached.

5.5.6 Slowly turn the motor speed up to "20" and observe the speed the machine is operating at. Using discretion, the operator may increase the speed no faster than "30" if magnet parts are being wrapped to a satisfactory condition with no defects.

5.5.7 If the motor is stopped during wrapping (for instance, to reverse the feed direction), then it will be necessary to push the motor "START/STOP" toggle switch to the "START" position to restart the motor.

5.6 Shutting off the Wrapping Machine

5.6.1 For an emergency shutdown:

5.6.2 Depress the large red push button on the control panel labeled "Emergency Stop".

5.6.3 For a normal shutdown:

5.6.4 Depress the black “POWER OFF” button in section of the control panel labeled “SYSTEM”

5.6.5 In the section of the control panel labeled "MOTOR", set the "MOTOR SPEED" dial to zero, the "ON/OFF" toggle switch to "OFF", the "START/STOP" toggle switch to "STOP”, and the “WEST/EAST” direction dial to it neutral position.

5.6.6 Set the "HEAD CLUTCH" switch to "OFF".

5.7 Testing the Door Safety Interlocks and Emergency Stop Switch

NOTE:

The interlocks shall be tested every six months during operations.

5.7.1 Perform the steps in Sections 5.1 and 5.2.

5.7.2 Set the motor "ON/OFF" toggle switch to "ON".

5.7.3 Set the motor ""WEST/EAST” Direction Dial to “EAST”

5.7.4 Set the motor "START/STOP" toggle switch to "START".

5.7.5 Set the "HEAD CLUTCH" switch to "ON".

5.7.6 Slowly turn the motor "MOTOR SPEED" dial until the wrapping heads begin rotating and the line begins moving.

5.7.7 Trip the interlock by opening the plexiglass shield door. Verify that machine motion stops and the amber light, located above the green "POWER ON" push button, extinguishes.

5.7.8 Close the door and repeat steps 5.5.33 to 5.5.39 except trip the interlock by depressing the emergency stop switch.

5.7.9 Complete the checklist (see Attachment 1) and post the checklist on the Machine.

6.0 Documentation

6.1 Wedge Interlock Test Form

6.2 Bushing Oil Schedule

7.0 References

7.1 Traveler for magnet part being wrapped.

7.2 SBMS Subject Area, "Lockout/Tagout (LOTO)".

8.0 Attachments

8.1 Wedge Interlock Test Form

8.2 Bushing Oil Schedule

8.3 Control Panel Diagram

9.0 Version History Log

Revision	Description of Changes	Reviewers	Effective Date
04	• Implemented Version History Log • Conversion of OPM from beam tube to wedge winder • Removed use of curing oven from procedure as no longer applicable	J. McNaughton A. Marone H. Hocker M. Anerella M. Samms A. Volk	10/23/2024

Attachment 1

Wedge Wrapping Machine: Safety Interlock Test Checklist

Door interlock located on plexiglass shield	Pass. . Fail. .	Pass. . Fail. .	Pass. . Fail. .	Pass. . Fail. .	Pass. . Fail. .	Pass. . Fail. .
Emergency stop switch	Pass. . Fail. .	Pass. . Fail. .	Pass. . Fail. .	Pass. . Fail. .	Pass. . Fail. .	Pass. . Fail. .
Date Tested						
Initials of Tester						
Expiration Date						

Attachment 2

Wedge Wrapping Machine: Bushing Oil Schedule

Apply 4 drops of oil every 4-6 months with Liquid Wrench Super Oil, or similar equivalent. Be sure to spin the wrapping head a few times post-application.

6/27/24									

Attachment 3

Wedge Wrapping Machine: Control Panel Diagram