Device: Fisher Scientific Isotemp Oven
Model Number: 825F
Serial Number: 901N0001
Location: FCC 375
Incident Date: June 3, 2009

Incident Description:
At approximately 2:30 p.m. on June 3rd, 2009, an engineer was using the oven to re-ball a Ball Grid Array (BGA). This is a process by which solder balls are attached to an integrated circuit as part of a repair process. This requires the solder balls and the package to be placed in contact at an elevated temperature for a period of time.

For this activity, the normal procedure is to operate the oven at 270 C for 30 minutes. This temperature is well within the operating range of the device (max = 325 C). During this procedure, the operator made visits to the area to check on the status of the oven at 10 minute intervals (10 minutes and 20 minutes from the start of the process). At each of these intervals, there were no signs of anything unusual. The operator entered the area again slightly before the 30 minute mark. At this time, he noticed a stronger odor than expected and immediately turned the oven off. The operator did not notice any smoke until the oven was opened and the parts being re-balled were removed. These parts did not appear to be damaged or contaminated.

The procedure described above had been successfully performed in the past. The instruction manual for the device includes an explicit programming example for operating the oven at a temperature of 325 C for a period of two hours. The operation described above (270 C for 30 minutes) is well within those limits and should pose no problem for a properly functioning device. The procedure for reballing the BGA is that recommended by the vendor of the reballing kit.

The factory defaults for the oven include a 5 C “over temperature” limit alarm. If the measured temperature exceeds the set point temperature by more than this limit, an alarm indicator will light and the set display will flash the text "HI". Neither of these conditions was observed. The operator feels that the device may have not maintained this temperature but increased in temperature instead. However, the display on the oven read 270 C as it was set to operate.

Numerous individuals on FCC3 noticed the smell from the device. Some individuals were affected more than others. The surface of the oven was uncomfortably hot to the touch. The device was unplugged from electrical service. Fans in FCC 375 were turned on to evacuate the vapors.

The device shows evidence of heat damage and vapor escape (see photos below).

Immediate Resolution:
Some employees were sufficiently disturbed by the smell on the 3rd floor to leave the building earlier than normal. Others chose to work from locations other than the 3rd floor

of FCC. Apparently, no one was sufficiently disturbed to feel the need to seek medical attention.

The fire department was not called. The device had been turned off and unplugged and did not appear to be producing additional smoke beyond that which had escaped when the oven was opened.

Subsequent Resolution:
On the morning of June 4th, the device was moved from FCC 375 to the third floor machine shop where fans were operated to remove the odor that it was producing.

The manufacturer has been contacted and a service representative requested more details (such as those documented here). ESE has received an estimate for an overhaul of the unit by the manufacturer ($815.10 plus shipping). A request has been made for information on a local service technician so that a similar estimate can be obtained for on-site evaluation.

Recommended Action:
The device could be tested with the assistance of the Fermilab Fire Department. Fire Chief Jack Steinhoff was contacted about this. He said that the department would be willing to work with us to perform a test to determine if the device is experiencing an uncontrolled rise in temperature. The test could be performed at the fire station with safety measures in place. The department has thermal imaging cameras to look for indications of heat loss.

However, even if the device checks out normally under such a test, it is recommended that the oven be serviced before it is used again.

Lessons Learned:
Fire Chief Steinhoff stressed that the description of the event justifies a call to the Fire Department. He pointed out that they get false alarms from time to time but that they are here to serve the lab and it is better to err on the side of caution. This should be communicated to the division.

Photos:

The following photos were taken on June 11, 2009. However, it is not known if the damage indicated was definitely produced during the incident on June 3.

Fisher Scientific Isotemp Programmable Oven

See slide 2

Model 825F
Serial Number 901N0001

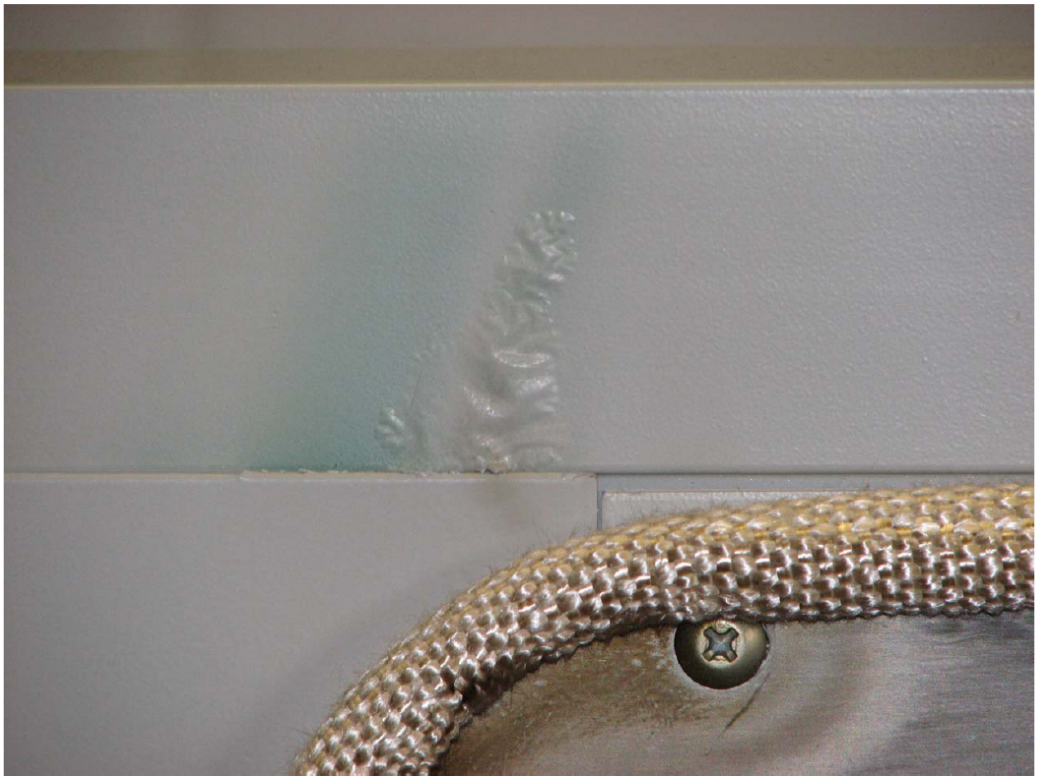
Fisher Scientific Isotemp Programmable Oven Closeup

Fisher Scientific Isotemp Programmable Oven - Door

Fisher Scientific Isotemp Programmable Oven – Door Detail

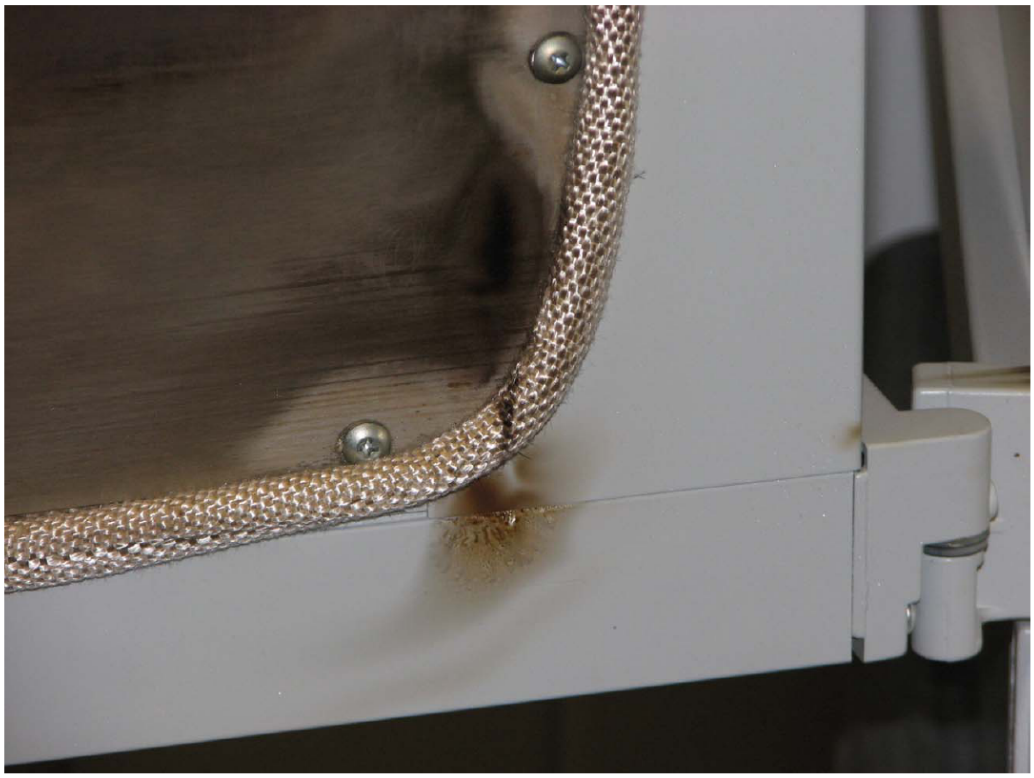
Charred surface, blistering

Fisher Scientific Isotemp Programmable Oven – Door Detail



Blistering

Fisher Scientific Isotemp Programmable Oven – Door Detail



Charred surface, blistering