Troubleshooting Guide

Identifying Source of Rejects

In the event that the first time through output of a brazing line drops below average for that particular line, this troubleshooting guide should enable the engineers and supervisors to narrow down and perhaps even pinpoint the source of the problem. The guide will lead you through obvious sources of problems contributing to higher rejects and not so obvious sources that are often overlooked in NOCOLOK® Flux brazing.

The guide is set up as a list of questions on various topics. There may be some overlap in the questions, but by asking the same question from different points of view, a better picture may evolve. For example, one question often asked in troubleshooting is whether the flux slurry concentration has changed. The answer is very often NO because there is no knowledge otherwise. However by asking other questions such as whether the flux slurry concentration measurement method has changed addresses the possibility that the flux slurry concentration unknowingly changed due to some indirect influence.

Note also that the guide is not meant to improve the current process (although it could). It is meant to identify some sudden or not so sudden change that has a negative impact on the first time through quality.

Finally, a YES answer to any of the following questions deserves to be scrutinized. What may appear insignificant in the grand scheme may just be what is responsible for the increase in rejects.

1. Has the nitrogen flow rate/output changed? **YES / NO**

2. Has the ratio of nitrogen flowing to the exit and entrance of the furnace changed? **YES / NO**

3. Does the problem go away or is the problem minimized when the nitrogen output is increased? **YES / NO**

4. Have there been any changes to the dew point or oxygen concentration in the critical brazing zone of the furnace? **YES / NO**

5. Have there been any changes to the furnace atmosphere back-pressure (i.e. degradation or deterioration of the curtains)? **YES / NO**

6. Have there been any changes to the curtains at the exit or entrance end of the furnace? **YES / NO**

7. Are there any holes in the muffle? **YES / NO**

8. Has the humidity in the plant where the brazing furnace is located recently increased? **YES / NO**

9. Has the airflow in the plant changed significantly recently? **YES / NO**

10. Have any of the components of the heat exchanger changed suppliers recently? **YES / NO**

11. Has the chemical composition of any of the components of the heat exchanger changed, paying particular attention to the Mg content? **YES / NO**

12. Were there any changes made to the cladding thickness of any of the components? **YES / NO**

13. Have there been any changes to the oxide thickness of any of the components to be brazed? **YES / NO**

14. Have the component gap clearances changed? **YES / NO**

15. Have the tolerances to the stamping/piercing/forming presses changed even though no adjustments were made? **YES / NO**

16. Have any adjustments been made to the stamping/piercing/forming presses? **YES / NO**

17. Have there been any changes made to the lubricants or stamping oils? **YES / NO**

18. Has there been any cross-contamination of lubricants? **YES / NO**

19. If aqueous cleaning is used, have there been any changes in the cleaner chemistry? **YES / NO**

20. If aqueous cleaning is used, has there been a change in the pH of the cleaning solution bath? **YES / NO**

21. In aqueous cleaning is used, has there been a change in the conductivity of the final rinse solution? **YES / NO**

22. In the case of thermal degreasing, have there been any changes to the time-temperature profile of the de-oiling cycle? **YES / NO**

23. Has the belt speed changed through the thermal degreaser, dryer or fluxer? **YES / NO**

24. Are there any changes in the temperature of the dry-off section? **YES / NO**

25. Has the flux slurry concentration changed? **YES / NO**

26. Have there been any changes to the flux slurry concentration measurement method? **YES / NO**

27. Are there any noticeable changes to the color of the slurry? **YES / NO**

28. Are there any clogged nozzles in the fluxing station? **YES / NO**

29. If surfactants are used, is there (1) too little surfactant resulting in loss of wettability? Is there too much surfactant resulting in foam build-up? **YES / NO**

30. Has the source of the make-up water for the flux slurry changed? **YES / NO**

31. Have there been any changes to the air blow-off in the fluxing station in terms of pressure, volume etc? **YES / NO**

32. Are there any changes in the flux loading? **YES / NO**

33. Are there any visual changes in the uniformity of flux deposition? **YES / NO**

34. Have there been any dimensional changes to the fixtured heat exchanger? **YES / NO**

35. Has the heat exchanger been handled differently (manually or otherwise) than before, either before fluxing or after fluxing? **YES / NO**

36. Are there any changes to the component temperature profile (DATAPAK)? **YES / NO**

37. Are there any changes in the component temperature uniformity? **YES / NO**

38. Are there any changes in the maximum peak brazing temperature? **YES / NO**

39. Are there any changes in the dwell time at brazing temperature? **YES / NO**

40. Are there any changes in the cooling rate? **YES / NO**

41. On the brazed component, are there any obvious signs of erosion? **YES / NO**

42. Do the fins nearest the header appear to be eaten away? **YES / NO**

43. Is the failure on the heat exchanger location specific (i.e., is the failure always on the third or fourth tube from the left, for example)? **YES / NO**

44. Is the failure always in the same general area (i.e., is the failure always in the upper half or lower half of the heat exchanger, for example)? **YES / NO**

45. Have there been any changes in the flux chemistry, particle size, sedimentation rate or melting point? **YES / NO**