Reflow simulator for vertical X-ray inspection system

1. Product overview
When reflow soldering, various types of soldering defects such as voids, bridging, non-wetting, solder balls and the like may occur. Therefore, if the motion of the molten solder during soldering of the printed circuit board can always be observed by using X-rays, it is possible to know the occurrence status of the defects, cause, etc., and further improvement. Particularly, the bridging has been observed for many times to move with the lapse of time, and the usefulness of this device became very clear. Furthermore, it is possible to monitor the movement of the solder during the vacuum reflowing by installing a small sealed type vacuum reflow oven inside this X-ray reflow simulator.

2. Development issues
Development of this device realized commercialization by overcoming the following technical problems.
① If a metal material or the like which is hard to transmit X rays is used for the reflow soldering apparatus, the molten solder and the metal part overlap so that only the molten solder cannot be detected. Therefore, a special reflow oven for X-ray inspection was developed with a material almost penetrating by X-rays and withstood high temperature of 300 °C or more. As a result, it is possible to observe only the substrate and molten solder.
② In order to increase the X-ray enlargement factor, it was necessary to develop a thinner heating oven, and as a result of research and development, the minimum thickness of about 30 mm or less was achieved. The X-ray observation area of this thin oven has achieved a wide field of view of about 100 mm square.
③ Reproduction of the reflow profile curve by uniform heating up to about 300 °C. (at least about 80 mm square) was achieved.

3. Device Configuration
X-ray vertical penetration special reflow oven and control equipment.

4. Features
① It is possible to install for various X-ray equipment.
② Movie in clear and high magnification.
③ By combining our high-speed response thermocouple (40 μm thin), we achieved the temperature curve close to the set profile.
④ 6 thermocouples can be installed and the temperature of 6 locations can be measured.
⑤ Temperature Profile Up to 16 points can be set for the inflection points.
⑥ It has been evaluated that it is inexpensive as a level of performance with a simple structure and has reached numerous orders.
⑦ X-ray observation during vacuum pressure soldering was realized with a device without a heating source.
⑧ It is possible to observe and record images and temperature profile of the X-ray device on the same screen.