Reflow Cost of Ownership calculations must be more than just hot air

That means realistically calculating energy efficiency. Consumption values have to be as expressed under routine conditions, and not as the lowest achievable figures – or does your oven bake in the stand-by mode as well?

According to the International Energy Agency, Germany belongs to the most advanced group of industrialized nations who attain extensive economic output with relatively little energy. This is possible because Germany, as a whole, possesses a great deal of know-how in the field of energy efficiency. And this is also the case with high quality products made by Rehm Thermal Systems.

In developing the VisionXP reflow system, special attention has been paid to minimal energy and nitrogen consumption, as well as minimal environmental pollution caused by waste heat and exhaust air. This is your guarantee of reliable soldering with lowest cost of ownership – ascertained under realistic production conditions.

Energy Efficient Heat Transfer for Perfect Profiling
Energy efficient soldering requires optimized heat transfer and precise profiling, so each heat zone is equipped with its own fan. Homogenous heat input is achieved with short heat zones (350 mm), which also allow for precision adjustable temperature profiles. In order to reduce the differential temperature on the PCB, 2 to 3 peak zones are integrated depending upon the length of the system.

Uninterrupted bottom side heating ensures delivery to both sides of the PCBs, a basic prerequisite for current lead-free requirements with higher soldering temperatures. Heating both top and bottom allows for lower temperature settings, saving additional energy. One-sided overheating of the PCBs is avoided, because the BGAs are heated up from the bottom as well in order to melt the solder and assures a stress-free soldering process for the PCBs. Using a type 523 Rehm VXP system with 14 heat zones (heating at top and bottom) and a heating chamber capacity of 900 liters, only 7 kW total power (including 2.2 kW heating power and 2.7 kW heating fan power) are necessary in order to achieve these results. And this is accomplished in running production with temperatures of over 250° C. In comparison to this, a commercially available convection oven with a capacity of only 48 liters requires 1 kW for a temperature of roughly 180° C.

Innovative Conveyor System
In addition to being returned outside of the process zone, the center support is “thermally invisible”, i.e. no heat is carried over from one heat zone to the next. The temperature profile is insensitive to interference, and heat input is always homogenous.

Top Quality Insulation Minimizes Heat Loss
The use of high quality insulating materials in order to efficiently insulate the entire process chamber assures that very little heat is released to the environment. Energy used for the soldering process remains in the oven and not wasted.

Constant Nitrogen Consumption
Cost savings for ancillary materials and operating fluids are high priority in every industrial business and Rehm has developed systems for monitoring and reducing nitrogen consumption. Two possibilities are offered for regulating nitrogen consumption to the desired level: air doping and nitrogen control. In the case of air doping, nitrogen is constantly fed to the process chamber. The nitrogen is contaminated with oxygen from the air in a targeted fashion. This doesn’t effect the reflow system’s nitrogen consumption, which always remains at a constant value and is aligned to the requirements of the process. As an alternative, nitrogen control the desired ppm level is held constant by continuously measuring the residual oxygen value. This is accomplished by feeding nitrogen to the process chamber in a targeted fashion. This results in variable nitrogen consumption, enabling savings by setting the corresponding parameters.

50% Less Maintenance with Pyrolysis

New standards of residue management have been established that reduce maintenance expenses by as much as 50%.

By combining pyrolysis in the preheating and peak zones with cold condensation in the cooling zone, the amount of liquid residue (droplets) as well as crystalline residue is drastically reduced. This highly efficient separation system extends maintenance intervals to 6 months or longer and reduces related expenses.

Very little energy is required to purify the process gas, because the gas which is heated up to 500° C during pyrolysis is returned directly to the process without energy intensive cooling. In comparison with cleaning systems based on condensation, pyrolysis thus saves additional energy, and the short distance from process gas purification to injection into the process chamber results in minimal heat loss, further improving energy efficiency.

Every system manufacturer promises low COO values. In most cases, manufacturer-specific data can’t be compared from one oven to the next, because they’re calculated under less than realistic process to make the system look good. Energy consumption data from Rehm Thermal Systems are measured under production conditions. COO with no BS.