[0005] The next generation of thermal cyclers adopted a markedly different approach. Rather than a single gradient block, these new thermal cyclers embodied a plurality of blocks or reaction vessel receiving elements that are isothermal where each reaction vessel receiving element is independently controlled and can be programmed with different protocols, while having the proximity to be arranged in a pattern to receive the reaction vessels of a single vessel array of a standard format as described in, for example, U.S. Pub. No. 2006-0228268. Different but predetermined temperatures are set for each of the reaction vessel receiving elements. After completion of the cycles it is possible to determine, with the aid of the reaction products, those temperatures at which the PCR reaction will give the user the optimal result. Here the result may be optimized e.g. in respect of product volume or also product quality. The present invention is an improvement to such a thermal cycler, by providing a different means for thermal isolation of the reaction vessel receiving elements and a seal to reduce the ability of liquids and moisture from penetrating between the reaction vessel receiving elements.

SUMMARY OF THE INVENTION

[0006] According to various embodiments, the present teachings describe a thermal cycler for processing biological or chemical samples with a plurality of reaction vessel receiving elements configured to receive one standard microtiter plate, a plurality of thermoelectric cooling devices (TEC) disposed to correspond to each of the plurality of reaction vessel receiving elements, wherein the TEC provides heating and cooling, a drip pan positioned above the TECs and framing the plurality of reaction vessel receiving elements,

and a compressible gasket to form an airtight seal between each of the plurality of reaction vessel receiving elements, wherein the gasket is composed of non-thermally conducting material and separates adjacent reaction vessel receiving elements to provide thermal isolation between adjacent reaction vessel receiving elements.

[0007] According to various embodiments, the present teachings describe a method for processing biological or chemical samples including positioning a single standard microtiter plate on a plurality of reaction vessel receiving elements of a thermal cycler, independently heating and cooling the plurality of reaction vessel receiving elements with a plurality of thermoelectric cooling devices (TEC), compressing a gasket between the reaction vessel receiving elements to form an airtight seal between each of the plurality of reaction vessel receiving elements, and thermally isolating adjacent reaction vessel receiving elements by constructing the gasket from a non-thermally conducting material.

[0008] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as claimed.