CLAIMS

1. An instrument (100) comprising:

a reagent management system (104), the reagent management system (104) comprising a plurality of reagent wells (132), each reagent well (132) operable to contain a reagent of a plurality of reagents positioned therein, the reagent management system (104) operable to select a flow of reagent from one of the plurality of reagent wells (132);

a flexible connection (106) comprised of a laminate stack, the flexible connection (106) comprising a first flexible channel (136) in fluid communication with the reagent management system (104), the first flexible channel (136) operable to route the flow of reagent therethrough; and

a flow cell (102), operable to be positioned in the instrument (100), the flow cell (102) comprising a flow channel (124) in fluid communication with the first flexible channel (136), the flow channel (124) operable to route the flow of reagent over analytes positioned in the flow channel (124); and

a detection module (126);

wherein the flow cell (102) is moveable by the instrument (100) relative to a fixed reference point (128) in the instrument (100),

wherein the flexible connection (106) comprises:

a top layer (210) defining a top of the first flexible channel (136);

a bottom layer (212) defining a bottom of the first flexible channel (136); and

an intermediate layer (214) defining a wall width and a channel width of the first flexible channel (136);

wherein a ratio of the wall width to the channel width is greater than about 2.5.

2. The instrument (100) of claim 1, wherein the flow cell (102) is moveable relative to the fixed reference point (128) in the instrument (100) while the detection module (126) is held stationary relative to the reference point (128).

3. The instrument (100) of claim 1, further comprising

a cartridge (130), the cartridge (130) comprising the reagent management system (104), the flow cell (102) and the flexible connection (106),

wherein, when the cartridge (130) is engaged with the instrument (100) and the flow cell (102) is engaged with the cartridge (130), the reagent management system (104) is fixed relative to the reference point (128) of the instrument (100) while the flow cell (102) is movable relative to the reference point (128) of the instrument (100).

4. The instrument (100) of claim 1, wherein the flexible connection (106) comprises a second flexible channel (138) in fluid communication with the flow channel (124) of the flow cell (102), the second flexible channel (138) operable to route the flow of reagent from the flow cell (102) to the reagent management system (104) after the flow of reagent has passed through the flow channel (124).

5. The instrument (100) of claim 4, wherein the flexible connection (106) comprises a slit (268) positioned between the first flexible channel (136) and the second flexible channel (138).

6. The instrument (100) of claim 1, wherein the flexible connection (106) comprises a sinuous shape.

7. The instrument (100) of claim 1, wherein the intermediate layer (214) is a plurality of sublayers.

8. The instrument (100) of claim 1, wherein the top layer (210), intermediate layer (214) and bottom layer (212) are bonded together utilizing one of an adhesive bonding process, a thermal bonding process or a direct laser bonding process.

9. The instrument (100) of claim 1, wherein, as the flow of reagent is routed through the flow channel (124), a chemical reaction is performed between the flow of reagent and the analytes, the chemical reaction inducing the analytes to affect detectable properties related to the analytes; and

wherein the detection module (126) is operable to detect the detectable properties.

10. The instrument (100) of claim 1, comprising a mechanical strain relief element (400) fixedly coupled to the flexible connection (106).

11. The instrument of claim 10 wherein the mechanical strain relief element (400) is one of:

an epoxy bead (402),

a trough (410), or

a solid piece (430) having a first adhesive and a second adhesive bonded thereon.