relatively fine v-shaped threads (such as Unified or metric screw threads). The threads are designed to create a substantial amount of contact between screw cap and filter fitting through multiple rotations of the screw cap. Buttress threads and the like are avoided because such threads have less surface contact compared to a Unified screw thread or a metric screw thread (for example) of the same relative size and pitch and, therefore, are more likely to loosen.

[0006] Traditional threaded fittings have several other shortcomings. As one example, traditional threaded fittings do not provide a quick connect mechanism to simultaneously seal multiple ports. Each fitting must be connected separately. This leads to another problem in that a user must have adequate room to manipulate the individual fittings. Another deficiency is that such fittings often use o-rings, which increase the likelihood of contamination. Another shortcoming is that the fittings are not easily manipulated by robots.

SUMMARY

[0007] Embodiments of a connection system that can be used in a variety of applications, including in semiconductor manufacturing applications, are described. One embodiment provides a connection system comprising a connection housing, a first fitting and a connection nut. The connection housing can define a connection housing first opening having a first set of connection housing inner threads. The connection nut can be disposed in the connection housing first opening and be rotatable around the first fitting.

[0007a] According to a first aspect of the present invention, there is provided a connection system, the connection system comprising: a connection housing defining a connection housing first opening; a first fitting defining a first fitting flow passage; and a first connection nut disposed in the connection housing first opening and rotatable relative to the connection having around the first fitting, the first connection nut comprising a set of first connection nut internal threads, wherein the set of first connection nut internal threads are multi-start threads configured to engage a set of second fitting external threads on a second fitting to seal the first fitting to the second fitting with less than 360 degrees of rotation of the first connection nut.

[0008] The connection nut can comprise a set of first connection nut external threads and a set of first connection nut internal threads. The set of first connection nut internal threads are multi-start threads configured to engage a set of second fitting external threads on a second fitting. The connection nut internal threads can be configured to create a seal between the first fitting and second fitting with less than 360 degrees of rotation. In some embodiments,

less than 360 degrees of rotation may result in at least 360 degrees or more of thread engagement and in other embodiments may result in less than the 360 degrees of thread engagement. The thread engagement may provide a circumferential axial sealing force (e.g., an axial sealing force of at least 360 degrees or, in some cases, less than 360 degrees).

[0009] The set of first connection nut external threads engage the first set of connection housing inner threads. The set of first connection nut external threads and the first set of connection housing inner threads may be single start threads configured to create a friction force that prevents counter rotation of the first connection nut under the axial sealing force. According to another embodiment, the connection nut does not include external nut threads, but is