CLAIMS:

1. A reed valve module, comprising:

a body including a seating surface, one or more sealing faces, and one or more fluid conduits leading from the seating surface to the sealing faces;

a single or plurality of reed petals positioned over the sealing face of the module body; and

one or more walls opposite the body from the single or plurality of reed petals.

2. The reed valve module of claim 1, wherein the one or more sealing faces on the module body are each at an angle substantially perpendicular to the seating surface so that the flow of a fluid through the reed valve module experiences minimal turning.

3. The reed valve module of claim 1, wherein a cavity within the body is reinforced by ribs that may also divide the cavity into separate independent flow passages.

4. The reed valve module of claim 1, wherein the cavity within the body is reinforced by ribs, the end surfaces of which are flush with the sealing surface, the ribs providing reinforcement to the module body and the end surfaces providing support to the single or plurality of reed petals in a closed state.

5. The reed valve module of claim 1, wherein the one or more walls are contoured so as to produce a clamping force on the single or plurality of reed petals when the reed valve module is secured by a seat plate.

6. The reed valve module of claim 1, wherein each of the one or more walls act as a petal guard, an inner surface of which reduces impact forces on one or more of the single or plurality of petals when opening, and wherein an initial part is contoured to co-operate with the body to clamp the single or plurality of reed petals against the one or more sealing faces of the body.

7. The reed valve module of claim 6, wherein the petal guard has material removed from a lower portion of an inner surface in a predetermined way to prevent sticktion of any of the one or plurality of reed petals.

8. The reed valve module of claim 1, wherein the wall includes a protrusion sized to fit into a groove to secure the reed valve module when inserted into a respective receiving recess

9. A reed valve assembly, comprising:

a seat plate including one or more fluid conduits;

one or more receiving recesses, each proximate a respective fluid conduit of the one or more fluid conduits in the seat plate;

a retainer plate including one or more fluid conduits; and

one or more reed valve modules, sized to fit either individually or collectively within one of the one or more receiving recesses.

10. The reed valve assembly of claim 9, wherein each of the one or more reed valve modules is held pressed into one of the one or more receiving recesses by the seat plate and the retainer plate by a fastener.

11. The reed valve assembly of claim 9, wherein the one or more receiving recesses are located within the seat plate.

12. The reed valve assembly of claim 9, wherein the one or more reed valve modules includes a petal, and wherein walls of the one or more receiving recesses include a contour that receives a top portion of the petal to secure the one or more reed valve modules in the one or more receiving recesses.

13. The reed valve assembly of claim 9, further comprising:

a separate receiving recess plate including the one or more receiving recesses, wherein the separate receiving recess plate is sandwiched between the seat plate and the retainer plate.

14. The reed valve assembly of claim 9, wherein the one or more reed valve modules comprises a plurality of reed valve modules, wherein the plurality of reed valve modules include one or more first reed valve modules having a first set of dimensions, and wherein the plurality of reed valve modules include one or more second reed valve modules having a second set of dimensions different from the first set of dimensions.

15. A reed valve module, comprising:

a modular valve body having a plurality of faces and one or more ports;

one or more reed petals each sized to substantially cover one or more of the one or more ports of the modular valve body; and

a modular housing sized for a frictional fit when disposed within a receiving recess with the modular valve body and the one or more reed petals within and secured by a seat plate.

16. The reed valve module of claim 15, wherein at least one port of the one or more ports is reinforced by one or more ribs that may also divide the at least one port.

17. The reed valve module of claim 16, wherein the one or more ribs reinforce the modular valve body and support the one or more reed petals in a closed position.

18. The reed valve module of claim 15, further comprising:

one or more petal guards positioned next to the one or more reed petals.

19. The reed valve module of claim 18, wherein the modular housing includes the one or more petal guards as one or more inner walls of the modular housing.

20. The reed valve module of claim 15, wherein the modular housing includes a fluid conduit having one or more capture bars to help capture debris.

21. The reed valve module of claim 15, wherein the one or more reed petals comprise a contiguous single petal that covers a plurality of the one or more ports.

22. The reed valve module of claim 15, wherein the modular housing includes a protrusion sized to fit into a groove to secure the reed valve module when the modular housing is inserted into a respective receiving recess.

23. A reed valve module, comprising:

a modular valve body having a plurality of faces and one or more ports;

one or more reed petals each sized to substantially cover one or more of the one or more ports of the modular valve body;

wherein the modular valve body and the one or more reed petals are collectively sized for a frictional fit when disposed within a receiving recess with the modular valve body and the one or more reed petals within.

24. A reed valve assembly, comprising:

a seat plate including one or more fluid conduits and one or more receiving recesses, each proximate a respective fluid conduit of the one or more fluid conduits in the seat plate, wherein each of the one or more receiving recesses includes a groove; and

one or more reed valve modules, each comprising:

a modular housing including a protrusion sized to fit into the groove to secure the reed valve module when the modular housing is inserted into a respective one of the one or more receiving recesses.

25. A method of assembling a reed valve module, the method comprising:

obtaining a modular reed valve body including a seating surface, one or more sealing faces, and one or more fluid conduits leading from the seating surface to the sealing faces;

obtaining at least one reed petal, sized for one or more of the one or more sealing faces;

obtaining a modular housing;

placing the at least one reed petal over the one or more of the one or more sealing faces;

placing the modular reed valve body and the at least one reed petal into the modular housing.

26. A method of assembling a reed valve assembly, the method comprising:

obtaining one or more reed valve modules;

obtaining a seat plate including one or more fluid conduits and one or more receiving recesses, each of the one or more receiving recesses proximate a respective fluid conduit of the one or more fluid conduits in the seat plate; and

inserting one of the one or more reed valve modules into a respective receiving recess of the one or more receiving recesses.

27. The method of claim 26, wherein at least one of the one or more reed valve modules includes a modular housing having a protrusion, and wherein at least one of the one or more receiving recesses in the seat plate includes a groove, the method further comprising:

fitting the protrusion into the groove to secure the at least one of the one or more reed valve modules.

28. The method of claim 26, further comprising:

attaching a retaining plate over the seat plate.

29. The method of claim 26, further comprising:

removing a retaining plate from the seat plate;

emptying the respective receiving recess of the one or more receiving recesses.

30. A compressor, comprising:

a frame;

a plurality of mechanical components disposed with the frame that compress a working fluid; and

at least one modular reed valve assembly coupled to the frame and the plurality of mechanical components to control the flow of fluid through at least one modular reed valve.

CLAIMS:

1. A reed valve module, comprising:

a body including a seating surface, one or more sealing faces, and one or more fluid conduits leading from the seating surface to the sealing faces; and

a single or plurality of reed petals positioned over the sealing face of the module body;

wherein a cavity within the valve body is reinforced by ribs, the end surfaces of the ribs are flush with the sealing face(s) and spaced to enable the reed petal(s) to withstand a differential pressure acting on reed petal(s).

2. The reed valve module of claim 1, wherein the one or more sealing faces on the module body are each at an angle substantially perpendicular to the seating surface so that the flow of a fluid through the reed valve module experiences minimal turning.

3. The reed valve module of claim 1, wherein the reinforcing ribs in the module body divide the cavity into separate independent flow passages.

4. The reed valve module of claim 1, further comprising one or more walls opposite the module body from the single or plurality of reed petals, the wall(s) formed by a modular housing and holding the single or plurality of reeds to the valve body to comprise a subcomponent of a functional valve.

5. The reed valve module of claim 4, wherein the inner surface(s) of the one or more walls of the modular housing act as a petal guard for the reeds.

6. The reed valve module of claim 5, wherein the petal guard surface is contoured to reduce impact forces on one or more of the single or plurality of petals when opening the petals.

7. The reed valve module of claim 6, wherein material is removed from a lower portion of an inner surface of the petal guard in a predetermined way to prevent sticking of any of the one or plurality of reed petals.

8. The reed valve module of claim 4, wherein the modular housing includes a protrusion sized to fit into a groove to secure the reed valve module when inserted into a receiving recess.

9. The reed valve module of claim 4, wherein the modular housing includes a mechanism that snap fits into a receiving recess to secure the reed valve module in a valve assembly.

10. The reed valve module of claim 4, wherein the upper surface of the walls of the modular housing is contoured and sized for frictional clamping of the single or plurality of the reeds to the corresponding surface of the module body when the module is disposed within a receiving recess and is secured by a seat plate within a valve assembly.

11. The reed valve module of claim 1, wherein the one or more reed petals comprise a contiguous single petal that covers a plurality of ports provided in the module body.

12. The reed valve module of claim 1, wherein a portion of the reed petals is shaped to positively engage the module body when the module is disposed within a receiving recess and is secured by a seat plate within a valve assembly.

13. The reed valve module of claim 4, wherein the reed petals in the module, the walls of the modular housing, and the sealing face of the module body have juxtaposed cut outs and projections that positively engage each other when the module is assembled and hold the one or more reeds positively against the module body by the walls of the modular housing.

14. A method of assembling a reed valve module according to claim 1, the method comprising:

obtaining a modular reed valve body including a seating surface, one or more sealing faces, and one or more fluid conduits leading from the seating surface to the sealing faces, the body including a cavity reinforced by ribs, the end surfaces of the ribs are flush with the sealing face(s);

obtaining at least one reed petal, sized for one or more of the one or more sealing faces; and

placing the at least one reed petal over the one or more of the one or more sealing faces, wherein the ribs of the body are spaced to enable the reed petal(s) to withstand the differential pressure acting on reed petal(s).

15. A method of assembling a reed valve module of claim 14, further comprising obtaining a modular housing and placing the modular reed valve body and the at least one reed petal into the modular housing.

16. A reed valve assembly, comprising:

a seat plate including one or more fluid conduits;

one or more receiving recesses, each proximate a respective fluid conduit of the one or more fluid conduits in the seat plate; and

one or more reed valve modules, sized to fit either individually or collectively within one of the one or more receiving recesses.

17. The reed valve assembly of claim 16, wherein each of the one or more reed valve modules is held into one of the one or more receiving recesses by the seat plate and secured by one or more fasteners.

18. The reed valve assembly of claim 16, wherein the one or more receiving recesses are located within the seat plate, which seat plate may be an integral part of a structure, and the modules are held in the recesses by a snap fit mechanism.

19. The reed valve assembly of claim 16, wherein the one or more receiving recesses are located within the seat plate, which seat plate may be an integral part of a structure, and a retainer plate secures the modules in the valve assembly by the use of one or more fasteners.

20. The reed valve assembly of claim 16, wherein the one or more receiving recesses are located within a retainer plate, which retainer plate may be an integral part of a structure, and the seat plate secures the modules in the valve assembly by the use of one or more fasteners.

21. The reed valve assembly of claim 16, wherein the one or more receiving recesses are located within a separate structure, which separate structure may be an integral part of a second structure, and is sandwiched between the seat plate and a retainer plate and held together by one or more fasteners.

22. The reed valve assembly of claims 16, 17, 19, or 21, wherein the walls of the one or more receiving recesses include a contour that secures the single or plurality of reeds to the module body, when the module is disposed within the recess and secured in the valve assembly.

23. The reed valve assembly of claim 16, further comprising one or more sets of reed valve modules wherein each set of reed valve modules has a different set of dimensions.

24. A method of assembling a reed valve assembly according to claim 16, the method comprising:

obtaining one or more reed valve modules;

obtaining a seat plate including one or more fluid conduits and one or more receiving recesses, each of the one or more receiving recesses proximate a respective fluid conduit of the one or more fluid conduits in the seat plate; and

inserting one of the one or more reed valve modules into a respective receiving recess of the one or more receiving recesses.

25. The method of claim 24, wherein at least one of the one or more reed valve modules and at least one of the one or more receiving recesses in the seat plate include a mating surface for a snap fit mechanism, the method further comprising:

fitting the reed valve module into the respective recess to secure at least one of the one or more reed valve modules.

26. The method of claim 24, further comprising attaching a retaining plate over the seat plate.

27. A method of disassembling a reed valve assembly according to claim 19, 20 or 21,

comprising:

removing the retainer plate from the seat plate, and

emptying the respective receiving recesses of the one or more receiving recesses.

28. A compressor, comprising:

a frame;

a plurality of mechanical components disposed with the frame that compress a working fluid; and

one or more reed valve modules connected to the frame and the plurality of mechanical components to control the flow of the working fluid through the one or more reed valve modules.

29. The compressor of claim 28, further comprising:

at least one modular reed valve assembly having one or more receiving recesses for insertion of the one or more reed valve modules, wherein the at least one modular reed valve assembly is coupled to the frame and the plurality of mechanical components to control the flow of the working fluid through at least one modular reed valve assembly.

30. A mechanical device, comprising:

a frame comprising at least two fluid chambers; and

one or more reed valve modules connected to the frame to control the flow of a fluid between the chambers through the one or more reed valve modules.

31. The mechanical device of claim 30, further comprising:

at least one modular reed valve assembly having one or more receiving recesses for insertion of the one or more reed valve modules, wherein the at least one modular reed valve assembly is coupled to the frame and the plurality of mechanical components to control the flow of the fluid through at least one modular reed valve assembly.