CLAIMS

I/We claim:

1. A system for connecting an upstream-fluid conduit (102) to a downstream-fluid conduit (119) in fluid communication with a fluid-based heat-transfer device (101), the system comprising:

a hose (302) comprising a first hose end (304) and a second hose end (306) and a hose bore (308); and

a port body (220) having an exterior wall (222), a port-body-hose end (224) with a port-body-hose opening (228), a port-body-connector end (226) with a port-body-connector opening (230), a port-body bore (232) extending between the port-body-hose opening (228) and the port-body-connector opening (230), and a port aperture (238) passing through the exterior wall (222) and in fluid communication with the port-body bore (232), with the port-body-hose opening (228) being sealingly, non-rotatably, and non-removably joined to the first hose end (304), with the port-body bore (232) in fluid communication with the hose bore (308);

a first connector nut (250) rotatably and non-removably coupled to the port-body-connector opening (230);

a second connector nut (250) rotatably and non-removably coupled to the second hose end (306);

an upstream tailpiece (142) having a conduit end (143) configured to be sealingly connected to the upstream-fluid conduit (102) and having a connector end (144) removably connectable to the first connector nut (250);

a downstream tailpiece (122) having a conduit end (123) configured to be sealingly connected to the downstream-fluid conduit (119) and having a connector end (124) removably connectable to the second connector nut (250);

wherein the upstream tailpiece (142) is configured to be removably connectable to the second connector nut (250), and the downstream tailpiece (122) is configured to be removably connectable to the first connector nut (250).

2. The system according to claim 1, wherein the first connector nut (250) has a first state wherein the first connector nut (250) is rotatable with respect to the port body (220), and a

second state wherein the first connector nut (250) is fixed with respect to the port body (220), the second state providing for fixing of an orientation of the port body (220).

3. The system according to claim 1 or 2, wherein the exterior wall (222) has a protrusion (260) protruding exteriorly therefrom and encircling the port-body-connector opening (230), and the protrusion (260) is configured to capture the first connector nut (250) to limit an axial movement thereof.

4. The system according to claim 3, wherein the first connector nut (250) and the port body (220) are configured to engage the connector end (144) (124) of the upstream tailpiece (142) or the downstream tailpiece (122) to prevent rotation of the port body (220).

5. The system according to claim 1, wherein the port aperture (238) is surrounded by a port-aperture wall (240), and the port-aperture wall (240) protrudes from the exterior wall (222) of the port body (220).

6. The system according to claim 1, further comprising:

a valve (600) having a valve body (602) with a first valve-body end (604) with a first valve-body opening, and a second valve-body end (606) with a second valve-body opening;

a third connector nut (5250) rotatably and non-removably coupled to the first valve-body end (604);

wherein at least one of the upstream tailpiece (142) or the downstream tailpiece (122) is removably connectable to the third connector nut (5250), so that the valve (600) may be joined by way of the third connector nut (5250) to least one of the upstream tailpiece (142) or the downstream tailpiece (122).

7. A system for connecting to an upstream-fluid conduit (117) and a downstream-fluid conduit (103) in fluid communication with a fluid-based heat-transfer device (101), the system comprising:

a hose (202) comprising a first hose end (204) and a second hose end (206) and a hose bore (208); and

a first-port body (220) having a first-exterior wall (222), a first-port-body-hose opening (228), a first-port-body-connector opening (230), a first-port-body bore (232) extending between the first-port-body-hose opening (228) and the first-port-body-connector opening (230), and a first-port aperture (238) passing through the first-exterior wall (222) and in fluid communication with the first-port-body bore (232), with the first-port-body-hose opening (228) being sealingly, non-rotatably, and non-removably joined to the first hose end (204), with the first-port-body bore (232) in fluid communication with the hose bore (208);

a first connector nut (250) rotatably and non-removably coupled to the first-port-body-connector opening (230);

a second-port body (1220) having a second-exterior wall (1222), a second-port-body-hose opening (1230), a second-port-body-connector opening (1232), a second-port-body bore (1234) extending between the second-port-body-hose opening (1230) and the second-port-body-connector opening (1232), and a second-port aperture (1238) passing through the second-exterior wall (1222) in in fluid communication with the second-port-body bore (1234), with the second-port-body-hose opening (1230) being sealingly, non-rotatably, and non-removably joined to the second hose end (206), with the second-port-body bore (1234) in fluid communication with the hose bore (208);

a second connector nut (1250) rotatably and non-removably coupled to the second-port-body-connector opening (1232);

an upstream tailpiece (182) having a conduit end (183) sealingly connected to the upstream-fluid conduit (117) and having a connector end (184) removably connectable to the first connector nut (250);

a downstream tailpiece (172) having a conduit end (173) sealingly connected to the downstream-fluid conduit (103) and having a connector end (174) removably connectable to the second connector nut (1250);

wherein the upstream tailpiece (182) is configured to be removably connectable to the second connector nut (1250), and the downstream tailpiece (172) is configured to be removably connectable to the first connector nut (250).

8. The system according to claim 7, wherein the first connector nut (250) has a first state wherein the first connector nut (250) is rotatable with respect to the first-port body (220), and a

second state wherein the first connector nut (250) is fixed with respect to the first-port body (220), the second state providing for fixing of an orientation of the first-port body (220).

9. The system according to claim 7, wherein the first-exterior wall (222) has a protrusion (260) protruding exteriorly therefrom and encircling the first-port-body-connector opening (230), and the protrusion (260) is configured to capture the first connector nut (250) to limit an axial movement thereof; and

wherein the second-exterior wall (1222) has a protrusion (1260) protruding exteriorly therefrom and encircling the second-port-body-connector opening (1232), and the protrusion (1260) is configured to capture the second connector nut (1250) to limit an axial movement thereof.

10. The system according to claim 9, wherein the first connector nut (250) and the first-port body (220) are configured to engage the connector end (184) (174) of the upstream tailpiece (182) or the downstream tailpiece (172) to prevent rotation of the first-port body (220), and the second connector nut (1250) and the second-port body (1220) are configured to engage the connector end (184) (1240 of the upstream tailpiece (182) or the downstream tailpiece (172) to prevent rotation of the second-port body (1220).

11. The system according to claim 7, wherein the first-port aperture (238) is surrounded by a port-aperture wall (240), and the port-aperture wall (240) protrudes from the second-exterior wall (1222) of the second-port body (1220).

12. The system according to claim 7, further comprising:

a valve (600) having a first valve-body end (604) with a first valve-body opening, and a second valve-body end (606) with a second valve-body opening;

a third connector nut (5250) rotatably and non-removably coupled to the first valve-body end (604); and

wherein at least one of the upstream tailpiece (182) or the downstream tailpiece (172) is removably connectable to the third connector nut (5250), so that the valve (600) may be joined

by way of the third connector nut (5250) to least one of the upstream tailpiece (182) or the downstream tailpiece (172).

13. A method for connecting an upstream-fluid conduit (102) to a downstream-fluid conduit (119) in fluid communication with a fluid-based heat-transfer device (101), the method comprising:

sealingly connecting an upstream tailpiece (142) at a conduit end (143) thereof to the upstream-fluid conduit (102), the upstream tailpiece (142) having a connector end (144) removably connectable to a first connector nut (250);

sealingly connecting a downstream tailpiece (122) at a conduit end (123) thereof to the downstream-fluid conduit (119), the downstream tailpiece (122) having a connector end (124) removably connectable to a second connector nut (250);

engaging a connection device (300) with the connector end (144) of the upstream tailpiece (142) and the connector end (124) of the downstream tailpiece (122), the connection device (300) comprising:

a hose (302) comprising a first hose end (304) and a second hose end (306) and a hose bore (308); and

a port body (220) having an exterior wall (222), a port-body-hose end (224) with a port-body-hose opening (228), a port-body-connector end (226) with a port-body-connector opening (230), a port-body bore (232) extending between the port-body-hose opening (228) and the port-body-connector opening (230), and a port aperture (238) passing through the exterior wall (222) and in fluid communication with the port-body bore (232), with the port-body-hose opening (228) being sealingly, non-rotatably, and non-removably joined to the first hose end (304), with the port-body bore (232) in fluid communication with the hose bore (308);

the first connector nut (250) rotatably and non-removably coupled to the port-body-connector opening (230);

the second connector nut (250) rotatably and non-removably coupled to the second hose end (306); and

wherein the upstream tailpiece (142) is configured to be removably connectable to the second connector nut (250), and the downstream tailpiece (122) is configured to be removably connectable to the first connector nut (250);

wherein the engaging the connection device (300) with the connector end (144) of the upstream tailpiece (142) and with the connector end (124) of the downstream tailpiece (122) includes:

tightening the first connector nut (250) with respect to the upstream tailpiece (142); and

tightening the second connector nut (250) with respect to the downstream tailpiece (122).

14. The method of claim 13, further comprising, after completing the method of claim 13:

disengaging the first connector nut (250) from the upstream tailpiece (142);

disengaging the second connector nut (250) from the downstream tailpiece (122);

re-orienting the connection device (300) and re-engaging the connection device (300) with the with the connector end (144) of the upstream tailpiece (142) and the connector end (124) of the downstream tailpiece (122) by:

tightening the first connector nut (250) with respect to the downstream tailpiece (122); and

tightening the second connector nut (250) with respect to the upstream tailpiece (142).

15. A method for connecting an upstream-fluid conduit (117) to a downstream-fluid conduit (103) in fluid communication with a fluid-based heat-transfer device (101), the method comprising:

sealingly connecting an upstream tailpiece (182) at a conduit end (183) thereof to the upstream-fluid conduit (117), the upstream tailpiece (182) having a connector end (184) removably connectable to a first connector nut (250);

sealingly connecting a downstream tailpiece (172) at a conduit end (173) thereof to the downstream-fluid conduit (103), the downstream tailpiece (172) having a connector end (174) removably connectable to a second connector nut (1250);

engaging a connection device (200) with the connector end (184) of the upstream tailpiece (182) and the connector end (174) of the downstream tailpiece (172), the connection device (200) comprising:

a hose (202) comprising a first hose end (204) and a second hose end (206) and a hose bore (208);

a first-port body (220) having a first-exterior wall (222), a first-port-body-hose opening (228), a first-port-body-connector opening (230), a first-port-body bore (232) extending between the first-port-body-hose opening (228) and the first-port-body-connector opening (230), and a first-port aperture (238) passing through the first-exterior wall (222) and in fluid communication with the first-port-body bore (232), with the first-port-body-hose opening (228) being sealingly, non-rotatably, and non-removably joined to the first hose end (204), with the first-port-body bore (232) in fluid communication with the hose bore (208);

the first connector nut (250) rotatably and non-removably coupled to the first-port-body-connector opening (230);

a second-port body (1220) having a second-exterior wall (1222), a second-port-body-hose opening (1230), a second-port-body-connector opening (1232), a second-port-body bore (1234) extending between the second-port-body-hose opening (1230) and the second-port-body-connector opening (1232), and a second-port aperture (1238) passing through the second-exterior wall (1222) in in fluid communication with the second-port-body bore (1234), with the second-port-body-hose opening (1230) being sealingly, non-rotatably, and non-removably joined to the second hose end (206), with the second-port-body bore (1234) in fluid communication with the hose bore (208);

the second connector nut (1250) rotatably and non-removably coupled to the second-port-body-connector opening (1232); and

wherein the upstream tailpiece (182) is configured to be removably connectable to the second connector nut (1250), and the downstream tailpiece (172) is configured to be removably connectable to the first connector nut (250);

wherein the engaging the connection device (200) with the connector end (184) of the upstream tailpiece (182) and with the connector end (174) of the downstream tailpiece (172) includes:

tightening the first connector nut (250) with respect to the upstream tailpiece (182); and

tightening the second connector nut (1250) with respect to the downstream tailpiece (172).

16. The method of claim 15, further comprising, after completing the method of claim 15:

disengaging the first connector nut (250) from the upstream tailpiece (182);

disengaging the second connector nut (1250) from the downstream tailpiece (172);

re-orienting the connection device (200) and re-engaging the connection device (200) with the connector end (184) of the upstream tailpiece (182) and the connector end (174) of the downstream tailpiece (172) by:

tightening the first connector nut (250) with respect to the downstream tailpiece (172); and

tightening the second connector nut (1250) with respect to the upstream tailpiece (182).