

1 Claims

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- 3 1. A jumper termination apparatus for a subsea jumper flowline, the jumper termination
4 apparatus comprising:
5 a body;
6 a jumper coupling means configured to couple the body to a jumper flowline;
7 a connector coupling means configured to couple the body to a subsea manifold
8 connector; and
9 an access interface disposed on the body;
10 wherein the body defines a first flow path from a coupled jumper flowline to a
11 coupled subsea manifold connector, and a second flow path from the access
12 interface to the first flow path or the subsea manifold connector; and
13 wherein the access interface is configured to be connected to a second jumper
14 flowline.
15
- 16 2. The jumper termination apparatus according to claim 1, wherein the access interface
17 is vertically oriented to enable access from above.
18
- 19 3. The jumper termination apparatus according to claim 1, wherein the access interface
20 is oriented on an axis inclined to the main axis of the manifold connector.
21
- 22 4. The jumper termination apparatus according to any of claims 1 to 3, wherein the
23 jumper coupling means comprises a gooseneck section configured to be disposed
24 between the body and the coupled jumper flowline.
25
- 26 5. The jumper termination apparatus according to any preceding claim, wherein the
27 access interface is configured to provide access for fluid intervention or mechanical
28 intervention operations on the flow system.
29
- 30 6. A jumper termination apparatus for a subsea jumper flowline, the jumper termination
31 apparatus comprising:
32 a body;
33 a jumper coupling means configured to couple the body to a jumper flowline;
34 an interface coupling means configured to couple the body to an access interface of
35 a jumper flowline termination head of a further jumper flowline.
36

- 1 7. The jumper termination apparatus according to claim 6, comprising a guide funnel
2 with a cut-away or relief configured to accommodate the further jumper flowline.
3
- 4 8. The jumper termination apparatus according to claim 6 or claim 7, comprising a
5 further access interface configured for connection of a jumper termination apparatus.
6
- 7 9. A method of connecting subsea flowlines to a subsea manifold, the method
8 comprising:
9 providing a first jumper flowline having a first jumper termination apparatus
10 connected to a first subsea manifold connector and comprising a first access
11 interface;
12 providing a second jumper flowline having a second jumper termination apparatus;
13 and
14 connecting the second jumper flowline to the subsea manifold via the access
15 interface and the first subsea manifold connector.
16
- 17 10. The method according to claim 9, comprising vertically stacking the second jumper
18 termination apparatus on the first jumper termination apparatus.
19
- 20 11. The method according to claim 9 or 10, wherein the second jumper termination
21 apparatus comprises a guide funnel, and wherein the method comprises orienting a
22 cut-away or relief of the guide funnel to accommodate the first jumper flowline.
23
- 24 12. The method according to any of claims 9 to 11, wherein the second jumper
25 termination apparatus comprises a second access interface, and the method
26 comprises:
27 providing a further jumper flowline having a further jumper termination apparatus;
28 and
29 connecting the further jumper flowline to the subsea manifold via the second access
30 interface, the first jumper termination apparatus, and the first subsea manifold
31 connector.
32
- 33 13. The method according to claim 12, wherein the further jumper termination apparatus
34 comprises a further access interface.
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- 1 14. The method according to claim 12 or claim 13, wherein the further jumper
2 termination apparatus comprises a guide funnel, and the method comprises orienting
3 a cut-away or relief of the guide funnel to accommodate the second jumper flowline.
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- 5 15. The method according to any of claim 9 to 14, wherein the method comprises
6 performing fluid intervention or mechanical intervention operations on the flow
7 system via the first access interface, and/or the second access interface and/or the
8 further access interface.
9
- 10 16. The method according to claim 15, wherein fluid intervention operations are fluid
11 intervention operations from the group comprising: fluid sampling, fluid pumping, fluid
12 diversion, fluid recovery, fluid injection, fluid circulation, fluid measurement fluid
13 metering, artificial/gas lift, and/or well scale squeeze operations.
14
- 15 17. The method according to claim 15, wherein mechanical intervention operations are
16 cleaning and/or pigging operations.
17
- 18 18. A flow system for a subsea hydrocarbon production or injection installation, the flow
19 system comprising:
20 a subsea manifold;
21 a first jumper flowline having a first jumper termination apparatus connected to a first
22 subsea manifold connector and comprising a body and a first access interface;
23 wherein the body defines a first flow path from the first jumper flowline to the subsea
24 manifold connector, and a second flow path from the access interface to the first flow
25 path or the subsea manifold connector;
26 and wherein the first access interface is configured to be connected to a second
27 jumper flowline.
28
- 29 19. The flow system according to claim 18, wherein the subsea manifold is a collection
30 manifold.
31
- 32 20. The flow system according to claim 18 or claim 19, wherein the flow system
33 comprises a second jumper flowline having a second jumper termination apparatus,
34 and wherein the second jumper flowline is connected to the subsea manifold via the
35 first access interface and the subsea manifold connector.
36

- 1 21. The flow system according to claim 20, wherein the first and second jumper
2 termination apparatus are vertically stacked.
3
- 4 22. The flow system according to any of claims 18 to 21, wherein the first jumper flowline
5 and/or the second jumper flowline comprise a composite jumper flowline.
6
- 7 23. The flow system according to any of claims 18 to 22, wherein the first jumper flowline
8 and/or the second jumper flowline are production jumper flowlines which facilitate
9 production flow from respective subsea wells into the subsea manifold.
10
- 11 24. The flow system according to any of claims 18 to 23, wherein the subsea manifold,
12 and the first jumper flowline and/or the second jumper flowline comprise multiple flow
13 lines or flow bores.
14
- 15 25. The flow system according to 24, wherein the first jumper termination apparatus
16 and/or second jumper termination apparatus define a further flow path or flow paths
17 which correspond to the multiple flow lines or flow bores of the subsea manifold and
18 the first and/or second jumper flowlines.
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