Claims

1. A subsea in-line tee arrangement configured to be located in a pipeline of a subsea production system, the subsea in-line tee arrangement comprising:
a subsea in-line tee; and
a removable module;
wherein the removable module comprises at least one connector for connecting the module to the in-line tee and an interface for connecting the module to at least one process apparatus;
wherein the removable module defines two distinct flow paths, the two distinct flow paths comprising a flow path for routing production fluid from a subsea well to the interface and a flow path between the interface and the at least one connector for routing the production fluid from the interface to the in-line tee;
wherein the removable module is configured to be assembled with a jumper flowline to receive the production fluid from the subsea well via the jumper flowline and connect the jumper flowline and the subsea in-line tee.

2. The subsea in-line tee arrangement according to claim 1, wherein the interface of the removable module is configured to receive a process apparatus and/or multiple process apparatus.

3. The subsea in-line tee arrangement according to claim 2, wherein the process apparatus comprises a flow loop configured such that production fluid from the subsea well is able to join the in-line tee via the jumper flowline and removable module assembly.

4. The subsea in-line tee arrangement according to any of claims 1 to 3, wherein the in-line tee comprises an isolation valve.

5. The subsea in-line tee arrangement according to any preceding claim, wherein the removable module comprises an isolation valve.

6. The subsea in-line tee arrangement according to any preceding claim, wherein the at least one connector of the removable module is a first connector, wherein the removable module further comprises a second connector, and wherein the flow path

for routing production fluid from a subsea well to the interface is defined between the second connector and the interface.

7. The subsea in-line tee arrangement according to claim 6, wherein the second connector is configured to connect the module to a jumper flowline.

8. The subsea in-line tee arrangement according to any preceding, wherein the interface is a dual bore interface.

9. The subsea in-line tee arrangement according to any preceding claim, wherein the interface is a multi-bore interface.

10. The subsea in-line tee arrangement according to any preceding claim, wherein the removable module comprises one or more control lines selected from the group comprising: hydraulic, electrical and/or fibreoptic control lines.

11. The subsea in-line tee arrangement according to claim 10, wherein the removable module comprises a control interface connected to the one or more control lines and configured to connect to a corresponding control interface of a process apparatus.

12. The subsea in-line tee arrangement according to claim 10 or claim 11, wherein the one or more control lines are connected to and supplied from an umbilical.

13. The subsea in-line tee arrangement according to any of claims 10 to 12, wherein the one or more control lines are integrated internally within the removable module.

14. The subsea in-line tee arrangement according to any preceding claim, wherein the interface of the removable module is configured to be connected to a process apparatus configured to perform one or more functions selected from the group comprising: fluid control, fluid sampling, fluid diversion, fluid recovery, fluid injection, fluid circulation, fluid access, fluid measurement, flow measurement, fluid metering and/or gas lift operations.

15. A subsea in-line tee installation located in a subsea production pipeline of a subsea production system, the installation comprising:
a subsea in-line tee integrated into a subsea production flowline;
a removable module assembled with a jumper flowline; and

at least one process apparatus;
wherein the removable module comprises at least one connector connecting the module to the in-line tee and an interface connecting the module to the at least one process apparatus;
wherein the removable module defines two distinct flow paths, the two distinct flow paths comprising a flow path for routing production fluid from a subsea well to the interface and a flow path between the interface and the at least one connector for routing production fluid from the interface to the in-line tee; and
wherein the removable module is configured to receive production fluid from the subsea well via the jumper flowline and connect the jumper flowline and the subsea in-line tee.

16. The subsea in-line tee installation according to claim 15, wherein the at least one process apparatus is configured to perform one or more functions selected from the group comprising: fluid control, fluid sampling, fluid diversion, fluid recovery, fluid injection, fluid circulation, fluid access, fluid measurement, flow measurement, fluid metering and/or gas lift operations.

17. The subsea in-line tee installation according to claim 15 or claim 16 wherein the process apparatus comprises a choke valve.

18. A method of installing a removable module to a subsea in-line tee pre-installed into a subsea production system and comprising a connector;
wherein the removable module comprises at least one connector and an interface for connecting the module to at least one process apparatus;
wherein the removable module defines two distinct flow paths, the two distinct flow paths comprising a flow path for routing production fluid from a subsea well to the interface and a flow path between the interface and the at least one connector for routing production fluid from the interface to the in-line tee; and
wherein the removable module is assembled with a jumper flowline and is configured to receive production fluid from the subsea well via the jumper flowline and connect the jumper flowline and the subsea in-line tee;
wherein the method comprises:
deploying the removable module subsea; and

coupling the at least one connector of the removable module to the connector of the subsea in-line tee.

19. The method according to claim 18, wherein the connector of the in-line tee is connected to a pre-installed flow component and wherein the method comprises carrying out the step of removing the pre-installed flow component from the connector of the subsea in-line tee before the removable module is coupled to the in-line tee.

20. The method according to claim 19, wherein the pre-installed flow component is a flow cap.

21. The method according to any of claims 18 to 20, wherein the at least one connector is a first connector and the removable module comprises a second connector coupled to a jumper flowline and forming a jumper flowline and removable module assembly.

22. The method according to claim 21, wherein the method comprises coupling the removable module and jumper flowline assembly to the connector of the subsea in-line tee.

23. The method according to any of claims 18 to 22, wherein the method comprises connecting a process apparatus to the interface of the removable module.