

# F8943 - SPS Commissioning CheckSheet Template



Unitywater



# F8943 - SPS Commissioning Check Sheet Template

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## Document Details

This document is only valid on the day it was printed.

Document Owner	Manager Capital Delivery
References	SPS Commissioning Worksheet End to End Test Sheet



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## General

In using this document, due consideration of all other relevant Unitywater Standard Drawings and Unitywater Standard Specifications should be adhered to.



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## Vendor Verification

<b>PROJECT TITLE:</b>		<b>FINANCE NO:</b>	
<b>General</b>		<b>Result / Init. / Date</b>	
<b>Mechanical</b>			
1. Pump test results been reviewed and conform with applicable standards		OK <input type="checkbox"/>	
2. Flowmeter Calibration certificate received		OK <input type="checkbox"/>	
<b>Civil</b>			
3. Check pressure test on rising main has passed		OK <input type="checkbox"/>	
4. Check wet-well leakage test (hydrotest) has passed		OK <input type="checkbox"/>	
<b>CONSTRUCTOR</b>			
<i>Name:</i>	<i>Position:</i>	<i>Signature:</i>	<i>Date:</i>
<b>UNITYWATER SIGNOFF</b>			
<i>Name:</i>	<i>Position:</i>	<i>Signature:</i>	<i>Date:</i>

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<b>PROJECT TITLE:</b>			<b>FINANCE NO:</b>
<b>Factory Acceptance Testing (FAT)</b>			<b>Result / Init. / Date</b>
<b>Electrical, Instruments and Control (E, I &amp; C)</b>			
<b>Switchboards</b>			
1. The switchboard manufacturer has been provided with current Unitywater Standard Switchboard Drawings (OR, if "Design and Construct", the 'For Construction' drawings have been reviewed by Unitywater and provided to the switchboard manufacturer)			OK <input type="checkbox"/>
2. The switchboard manufacturer has undertaken a full point-to-point test on all switchboard wiring			OK <input type="checkbox"/>
3. The switchboard manufacturer has provided evidence of point-to-point testing in the form of marked up wiring drawings (each connection highlighted as tested)			OK <input type="checkbox"/>
4. Any changes, outcomes or additional detail resulting from FAT testing have been marked on the drawings with the highlighted test connections. Mark-ups include all available circuits, inputs, power supply voltages, labels, wire numbers, terminals etc. These marked-up drawings are labeled 'FAT'.			OK <input type="checkbox"/>
5. Cabinet and paintwork have been inspected for any visual damage			OK <input type="checkbox"/>
6. The following is as per current drawings: <ul style="list-style-type: none"> <li>• Incomer arrangements</li> <li>• Cable entry provisions</li> <li>• Interlocking provisions</li> <li>• Incomer protection (Fault current rating) and discrimination</li> </ul>			OK <input type="checkbox"/>
7. Switchboard rating nameplate is attached			OK <input type="checkbox"/>
8. Switchboard Test Certificate has been checked			OK <input type="checkbox"/>
9. Software used during FAT is available			OK <input type="checkbox"/>
10. Any deficiencies have been recorded to a 'FAT punchlist register' and rectified			OK <input type="checkbox"/>
<b>Instrumentation</b>			
11. Calibration certificates have been received for instruments			OK <input type="checkbox"/>
<b>Software</b>			
12. Software for Outstation Type is loaded			OK <input type="checkbox"/>
13. Software blocks have been fat tested (if non standard)			OK <input type="checkbox"/>
<b>CONSTRUCTOR</b>			
Name:	Position:	Signature:	Date:
<b>UNITYWATER SIGNOFF</b>			
Name:	Position:	Signature:	Date:

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## Pre-commissioning

PROJECT TITLE:	FINANCE NO:
<b>Preliminaries Checklist</b>	<b>Result / Init. / Date</b>
1. Check all commissioning personnel have been inducted to site	OK <input type="checkbox"/>
2. Check risk assessments and SWMS have been produced for all Pre-commissioning and Commissioning activities	OK <input type="checkbox"/>
3. The site is safe for commisioning works to commence. Safety requirements include: <ul style="list-style-type: none"> <li>• Covers and grills installed and flush</li> <li>• Davit mounting points certified</li> <li>• Fall arest mounting points certified</li> <li>• Handrails, fencing, gates and chains installed correctly</li> <li>• Emergency procedures available</li> <li>• Safety signage in place (PPE, Elecricity, SWL, Danger etc.)</li> </ul>	OK <input type="checkbox"/>
4. Check “danger electric” marker bricks are installed at ground level and painted yellow where applicable	OK <input type="checkbox"/>
5. Rising Main acceptance testing according to standard and passed	OK <input type="checkbox"/>
6. Gravity Main acceptance testing according to standard and passed	OK <input type="checkbox"/>
7. ‘As Constructed’ survey by licenced surveyor complete	OK <input type="checkbox"/>
8. Changes to any detail as shown on the ‘For Construction’ drawings noted on a set of ‘For Construction’ drawings and marked ‘As Constructed	OK <input type="checkbox"/>
9. Current Unitywater Standard Drawings are on site (OR, if “Design and Construct”, the ‘For Construction’ drawings have been reviewed by Unitywater)	OK <input type="checkbox"/>
10. All required civil works testing (ITPs) completed by Contracts Inspector	OK <input type="checkbox"/>
11. Operation and Maintenance Manuals have been received for Vendor supplied components and the Functional Specification is available	OK <input type="checkbox"/>
12. Electical supply and metering available on site	OK <input type="checkbox"/>
13. Pole / pillar termination method meets all requirements	OK <input type="checkbox"/>
14. Check operation of all locks on switchboards	OK <input type="checkbox"/>
15. Check all cable supports and check for obstructions (e.g. cables not obstructing when lifting pump)	OK <input type="checkbox"/>
16. Selected control equipment is suitable for selected pump manufacturer	OK <input type="checkbox"/>



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17. Test documentation for Mechanical equipment and Instrumentation has been received. These generally include: <ul style="list-style-type: none"> <li>Factory test results</li> <li>Test compliance certificates</li> <li>Instrument calibration certificates</li> <li>Warranty information</li> </ul>	OK <input type="checkbox"/>		
18. FAT completed and critical punchlist items rectified	OK <input type="checkbox"/>		
<b>CONSTRUCTOR</b>			
<i>Name:</i>	<i>Position:</i>	<i>Signature:</i>	<i>Date:</i>
<b>UNITYWATER SIGNOFF</b>			
<i>Name:</i>	<i>Position:</i>	<i>Signature:</i>	<i>Date:</i>





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<b>PROJECT TITLE:</b>	<b>FINANCE NO:</b>									
<b>Pre-commissioning Checklist</b>	<b>Result / Init. / Date</b>									
<b>General</b>										
1. Check Preliminaries Checklist completed and signed off	OK <input type="checkbox"/>									
<b>Network</b>										
1. Check Commissioning Plan has been approved by Unitywater	OK <input type="checkbox"/>									
2. Advise Network Operations and Control Room of commencement of pre-commissioning activities and proposed timing of performance and SAT testing	OK <input type="checkbox"/>									
3. Check Network Operations and Control Room are ready for performance and SAT testing and appropriate resources are available to assist	OK <input type="checkbox"/>									
4. Confirm Network Operations are aware of impact on downstream infrastructure	OK <input type="checkbox"/>									
5. Advise treatment plant operators of proposed timing of performance and SAT testing (fluctuating load)	OK <input type="checkbox"/>									
6. Check sufficient water / recycled water is available for testing	OK <input type="checkbox"/>									
7. Ensure impacts on upstream infrastructure from changes to overflow level have been assessed	OK <input type="checkbox"/>									
<b>Electrical, Instruments and Control (E, I &amp; C)</b>										
<b>Generators</b>										
1. Check generator mains and earth cables are installed and connected	OK <input type="checkbox"/>									
2. Record the cable insulation resistance of the 3 phases	<table style="width: 100%; border: none;"> <tr> <td style="text-align: right;">L1</td> <td style="border-bottom: 1px solid black; width: 50px;"></td> <td style="text-align: right;">MΩ</td> </tr> <tr> <td style="text-align: right;">L2</td> <td style="border-bottom: 1px solid black;"></td> <td style="text-align: right;">MΩ</td> </tr> <tr> <td style="text-align: right;">L3</td> <td style="border-bottom: 1px solid black;"></td> <td style="text-align: right;">MΩ</td> </tr> </table>	L1		MΩ	L2		MΩ	L3		MΩ
L1		MΩ								
L2		MΩ								
L3		MΩ								
3. Record earth loop impedance										
4. Check point-to-point phase continuity	<table style="width: 100%; border: none;"> <tr> <td style="text-align: right;">R to L1</td> <td>OK <input type="checkbox"/></td> </tr> <tr> <td style="text-align: right;">W to L2</td> <td>OK <input type="checkbox"/></td> </tr> <tr> <td style="text-align: right;">B to L3</td> <td>OK <input type="checkbox"/></td> </tr> </table>	R to L1	OK <input type="checkbox"/>	W to L2	OK <input type="checkbox"/>	B to L3	OK <input type="checkbox"/>			
R to L1	OK <input type="checkbox"/>									
W to L2	OK <input type="checkbox"/>									
B to L3	OK <input type="checkbox"/>									
<b>Switchboards</b>										
<b>5. ENSURE SWITCHBOARD IS <u>NOT</u> ENERGISED</b>	OK <input type="checkbox"/>									
6. Check mains and earth cables are installed and connected	OK <input type="checkbox"/>									

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7. Record the cable insulation resistance of the 3 phases	L1 L2 L3	____ MΩ ____ MΩ ____ MΩ
8. Record earth loop impedance		____ Ω
9. Check point-to-point phase continuity	R to L1 W to L2 B to L3	OK <input type="checkbox"/> OK <input type="checkbox"/> OK <input type="checkbox"/>
10. Check Incomer protection set as per design		OK <input type="checkbox"/>
11. Check all CT and other links are in place		OK <input type="checkbox"/>
12. Check correct glands have been utilised for cable entries		OK <input type="checkbox"/>
13. Cable screens and earthing is as per design		OK <input type="checkbox"/>
14. Ensure switchboard main Incomer is turned OFF and tagged		OK <input type="checkbox"/>
15. Check MEN connection		OK <input type="checkbox"/>
16. Turn on mains switch		OK <input type="checkbox"/>
<b>17. ACKNOWLEDGE SWITCHBOARD IS NOW ENERGISED</b>		OK <input type="checkbox"/>
18. Check 3 phase voltages	AB BC CA	____ V ____ V ____ V
<b><i>Lighting and GPOs</i></b>		
19. Check light circuit breaker conforms to electrical drawings		OK <input type="checkbox"/>
20. GPO circuit breaker(s) conform to electrical drawings		OK <input type="checkbox"/>
21. Check earth leakage circuit breaker has been tested and results are available		OK <input type="checkbox"/>
22. Internal and external lights are connected and working		OK <input type="checkbox"/>
23. Internal and external GPOs are connected and working		OK <input type="checkbox"/>
<b><i>Level Transducers</i></b>		
24. Check surge protection barriers are installed (control panel and field). Pay particular attention to earth screen terminators.		OK <input type="checkbox"/>
25. Check connection from hydrostatic level probe No.1 to the transmitter and confirm correct operation		OK <input type="checkbox"/>
26. Check connection from hydrostatic level probe No.2 to the transmitter and confirm correct operation		OK <input type="checkbox"/>
27. Check scaling conforms to wet well design requirements		OK <input type="checkbox"/>

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<b>Flowmeters</b>		
28. Check calibration certificate has been received		OK <input type="checkbox"/>
29. Check mag flow head is connected to flowmeter converter		OK <input type="checkbox"/>
30. Check correct supply voltage available at converter		OK <input type="checkbox"/>
31. Check analogue output is correctly connected to RTU and operating correctly		OK <input type="checkbox"/>
32. Check totaliser output is correctly connected to RTU and operating correctly		OK <input type="checkbox"/>
33. Check mechanical (vandal) and UV protection installed on external cable		OK <input type="checkbox"/>
<b>Field Devices</b>		
34. Check installation of high / overflow level switch		OK <input type="checkbox"/>
35. Check calibration of all analogue signals (including flow and pressure transmitters)		OK <input type="checkbox"/>
36. Check setting of pressure switches		OK <input type="checkbox"/>
37. Verify level controller (hydrostatic probe) calibration		OK <input type="checkbox"/>
<b>Pump Motors</b>		
38. Check pump motor name plate details have been received and applied to asset management form and electrical drawings and a second plate is mounted on the switchboard pump control door		OK <input type="checkbox"/>
39. Check pump motor name plate has been applied to MCC or disconnection box		OK <input type="checkbox"/>
40. Record pump motor winding insulation resistance	R - W @ 1000V _____ MΩ R - B @ 1000V _____ MΩ W - B @ 1000V _____ MΩ  R - E @ 1000V _____ MΩ W - E @ 1000V _____ MΩ B - E @ 1000V _____ MΩ	
41. Record pump motor winding resistance	U - U1 _____ Ω V - V1 _____ Ω W - W1 _____ Ω	
42. Check all motor protection equipment operates as specified (e.g. water in oil sensor, thermistors, vibration sensors, bearing temperatures etc.)		OK <input type="checkbox"/>
43. For variable frequency drive (VFD), check drive settings are setup and settings recorded		OK <input type="checkbox"/>
44. For soft starter, confirm Soft Starter settings are setup and settings recorded		OK <input type="checkbox"/>
45. For direct on-line (DOL) starter, check overload settings correct and recorded on drawing		OK <input type="checkbox"/>
46. Perform bump test to confirm correct rotation direction		OK <input type="checkbox"/>



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47. Tag pump motor "out of service" to indicate readiness for testing	OK <input type="checkbox"/>
<b>Overflow and Emergency Start Circuits</b>	
48. Confirm overflow level RL	_____ m RL
49. Ensure overflow level switch is set up to the correct overflow level ( <i>sufficient distance below overflow to allow for switch activation</i> ) and confirm correct operation	OK <input type="checkbox"/>
50. Check installation and correct operation of emergency start circuit	OK <input type="checkbox"/>
<b>Pump Disconnection Boxes</b>	
51. Check incoming and outgoing cables have been secured correctly	OK <input type="checkbox"/>
52. Check all conduits have been sealed to prevent gassing through conduits	OK <input type="checkbox"/>
<b>Radio</b>	
53. Check radio feeder & antenna installation and cable testing (antenna to radio) have been performed, and results certificate received	OK <input type="checkbox"/>
54. Check surge protection and fly lead is connected between antenna and radio	OK <input type="checkbox"/>
55. Check Communications earthing kits and earthing are installed on feeder and Surge Diverter respectively	OK <input type="checkbox"/>
56. Record radio system information <div style="text-align: right; font-size: small;">Check &amp; Verify Make &amp; Model are correct Record Serial #</div>	OK <input type="checkbox"/> _____
57. Check unit is powered with correct polarity and voltage 12V DC Supply	OK <input type="checkbox"/>
58. Check radio is programmed to the correct channel <div style="text-align: right; font-size: small;">Record frequency</div>	OK <input type="checkbox"/> _____ MHz
59. Check radio configuration including stream id serial paramaters are set correctly for the Outstation and record	OK <input type="checkbox"/> _____ _____ _____ _____
60. Check data radio diagnostics communication working correctly	OK <input type="checkbox"/>
<b>Remote Telemetry Units (RTU)</b>	
61. Check unit is powered with correct polarity and voltage DC Supply(ies)	OK <input type="checkbox"/>
62. Check the UPS battery is connected and charging	OK <input type="checkbox"/>
63. Check communication is working	OK <input type="checkbox"/>
64. Check I/O is operational and conforms with current drawings	OK <input type="checkbox"/>

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<b>Control System</b>	
65. Record type of control system installed (i.e. SCADAPack, MultiSmart, MT2-PC)	_____
66. Record controller information	_____
Manufacturer	_____
Model type	_____
Serial no	_____
Firmware rev	_____
Software rev	_____
<b>End to End Testing</b>	
67. Notify control room of impending end-to-end test (minimum 5 days notice)	OK <input type="checkbox"/>
68. Check end-to-end test sheet has been reviewed and approved by control room	OK <input type="checkbox"/>
69. Complete <b>End-to-End Test Sheet</b> to verify communication to SCADA	OK <input type="checkbox"/>
<b>Mechanical</b>	
<b>General</b>	
70. Check layout conforms with 'For Construction' piping drawings	OK <input type="checkbox"/>
71. Undertake visual examination of installation and finish of all pipework, mechanical devices, valves, fittings and pump units	OK <input type="checkbox"/>
72. Check accuracy of tagging and labelling	OK <input type="checkbox"/>
73. Check RPZD has been installed by appropriately licenced plumber	OK <input type="checkbox"/>
74. Check functionality and accessibility of mobile crane (franna)	OK <input type="checkbox"/>
75. Check for any debris capable of causing damage to mechanical equipment when pumps are started	OK <input type="checkbox"/>
76. Check accessibility of access covers and equipment for operational and maintenance purposes	OK <input type="checkbox"/>
77. Check equipment is guarded appropriately	OK <input type="checkbox"/>
78. Check stairways, landings and access ladders comply with design requirements	OK <input type="checkbox"/>
79. Check that all Device O&M Manuals are available	OK <input type="checkbox"/>
80. Check that manufacturers' requirements have been met (i.e. alignment, lubrication, preparation, priming etc.)	OK <input type="checkbox"/>
81. Check instrumentation nozzles are provided in accordance with design (correct side of equipment e.g. US/DS)	OK <input type="checkbox"/>
82. Check installation and operation of instrument isolation valves	OK <input type="checkbox"/>
83. Check directional requirements (i.e. pump rotation, check valve direction etc.)	OK <input type="checkbox"/>
84. Check commissioning pressure transmitters or gauges on either side of pump are operational	OK <input type="checkbox"/>



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<b>Flowmeter</b>			
85. Flowmeter calibration certificate received			OK <input type="checkbox"/>
86. Check earthing straps are installed accross both flowmeter flanges, earthing rings and to earth as specified by the equipment manufacturer			OK <input type="checkbox"/>
<b>Pumps</b>			
87. Check impeller has a free shaft			OK <input type="checkbox"/>
88. Prime pumps with water			OK <input type="checkbox"/>
89. Check correct pump curves are on site			OK <input type="checkbox"/>
<b>Rising Main</b>			
90. Check pressure test has been undertaken according to relevant standard and passed			OK <input type="checkbox"/>
91. Check pipework connections to UW network have been successfully completed			OK <input type="checkbox"/>
92. Charge the rising main and ensure air is purged			OK <input type="checkbox"/>
<b>CONSTRUCTOR</b>			
Name:	Position:	Signature:	Date:
<b>UNITYWATER SIGNOFF</b>			
Name:	Position:	Signature:	Date:

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## Wet Testing

PROJECT TITLE:		FINANCE NO:	
<b>Commissioning Schedule</b>		Result / Init. / Date	UW Witness / Initials
<b>General</b>			
1. Check Pre-commissioning Checklist completed and signed off		OK <input type="checkbox"/>	
<b>Level Sensor Checks</b>			YES <input type="checkbox"/>
2. Record Top of Slab RL (m) and distance from Top of Slab to each level sensor in <b>Commissioning Worksheet</b>		OK <input type="checkbox"/>	
3. Record well diameter and total depth for volume calculations in <b>Commissioning Worksheet</b>		OK <input type="checkbox"/>	
4. Confirm wet well level indicated by the level probe is reflective of the actual wet well level and record readings in <b>Commissioning Worksheet</b>		OK <input type="checkbox"/>	
5. Confirm functioning of high and high high (overflow) level alarms  <b>Note that the overflow structure may only be brought on-line once 'As Constructed' overflow level has been confirmed (to remain bunged off until level confirmed)</b>		OK <input type="checkbox"/>	
<b>Pump Checks</b>			
<b>Motor Checks</b>			YES <input type="checkbox"/>
6. Ensure correct parameters are set in the VFD or Soft Starter if applicable		OK <input type="checkbox"/>	
7. Start pump with discharge valve closed and ensure the pump is running without undue noise, vibration and temperature		OK <input type="checkbox"/>	
8. To ensure motor load balancing, record:			
	Pump running amps L1	_____ A	
	Pump running amps L2	_____ A	
	Pump running amps L3	_____ A	
9. Stop pump		OK <input type="checkbox"/>	
10. Complete <b>Low Power Tuning</b> (Danfoss VFD) and record values into <b>Commissioning Worksheet</b>		OK <input type="checkbox"/>	
11. Repeat steps 7 to 10 for second pump/drive		OK <input type="checkbox"/>	
<b>Fill and Bleed Rising Main</b>			YES <input type="checkbox"/>
12. Calculate volume of water required to fill rising main		OK <input type="checkbox"/>	



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13. Ensure sufficient water in wet well to fill rising main and perform pump operation test	OK <input type="checkbox"/>	
14. Open pump discharge valve	OK <input type="checkbox"/>	
15. Run pump and bleed air from rising main	OK <input type="checkbox"/>	
16. Operate pump from 35 to 50 Hz in 5 Hz increments (if VFD type), check for abnormal movement or vibration	OK <input type="checkbox"/>	
17. Perform visual inspection of pump, all piping, fittings and flanged joints for leakage	OK <input type="checkbox"/>	
<b>Pump Performance and Flowmeter Accuracy</b>		YES <input type="checkbox"/>
18. Complete Draw Down test and verify flowmeter accuracy	OK <input type="checkbox"/>	
19. Complete Pump Performance test including shutoff head	OK <input type="checkbox"/>	
20. Use <b>Commissioning Worksheet</b> to record and assess results	OK <input type="checkbox"/>	
<b>Pump Control Checks</b>		
<b>Duty Pump Fault Test (2 pumps)</b>		YES <input type="checkbox"/>
21. Select both pumps to "off" position	OK <input type="checkbox"/>	
22. Ensure assist start level > wet well level > duty start level	OK <input type="checkbox"/>	
23. Ensure pump discharge valves are open	OK <input type="checkbox"/>	
24. Confirm both drives have no faults present	OK <input type="checkbox"/>	
25. Select Pump 1 (Duty Pump) to "automatic" position	OK <input type="checkbox"/>	
26. Confirm Duty Pump running	OK <input type="checkbox"/>	
27. Select Pump 2 (Duty Assist) to "automatic" position	OK <input type="checkbox"/>	
28. Fault Duty Pump – i.e. open one c/b feeder for phase failure relay	OK <input type="checkbox"/>	
29. Confirm Duty Assist pump starts	OK <input type="checkbox"/>	
30. Stop system – both pumps to "off" position	OK <input type="checkbox"/>	
31. Select Pump 2 as Duty Pump	OK <input type="checkbox"/>	
32. Select Pump 1 as Duty Assist	OK <input type="checkbox"/>	
33. Repeat Steps 22 to 30	OK <input type="checkbox"/>	
<b>Duty / Assist Test (2 pumps)</b>		YES <input type="checkbox"/>
34. Select both pumps to "off" position	OK <input type="checkbox"/>	
35. Ensure assist start level > wet well level > duty start level	OK <input type="checkbox"/>	
36. Ensure pump discharge valves are open	OK <input type="checkbox"/>	
37. Confirm both drives have no faults present	OK <input type="checkbox"/>	





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38. Select both pumps to "automatic" position	OK <input type="checkbox"/>	
39. Confirm Pump 2 (Duty Pump) running	OK <input type="checkbox"/>	
40. Manually override wet well level > than assist start level	OK <input type="checkbox"/>	
41. Confirm Assist Pump started	OK <input type="checkbox"/>	
42. Manually override wet well level < assist stop level	OK <input type="checkbox"/>	
43. Confirm Duty Assist stopped	OK <input type="checkbox"/>	
44. Manually override wet well level < duty stop level	OK <input type="checkbox"/>	
45. Confirm Duty Pump stopped	OK <input type="checkbox"/>	
46. Select Pump 1 as Duty Pump	OK <input type="checkbox"/>	
47. Select Pump 2 as Duty Assist	OK <input type="checkbox"/>	
48. Repeat Steps 35 to 45	OK <input type="checkbox"/>	
49. Select both pumps to "off" position	OK <input type="checkbox"/>	
<b>Pump Cycling</b>		YES <input type="checkbox"/>
50. Manually override wet well level < duty stop level (pumps are stopped)	OK <input type="checkbox"/>	
51. Ensure wet well level > duty start level	OK <input type="checkbox"/>	
52. Confirm both drives have no faults present	OK <input type="checkbox"/>	
53. Ensure pump discharge valves are open	OK <input type="checkbox"/>	
54. Select both pumps to "automatic" position	OK <input type="checkbox"/>	
55. Record which pump is selected as Duty Pump by controller	_____	
56. Manually override wet well level > duty start level	OK <input type="checkbox"/>	
57. Confirm Duty Pump running	OK <input type="checkbox"/>	
58. Manually override wet well level < duty stop level	OK <input type="checkbox"/>	
59. Confirm Duty Pump stopped	OK <input type="checkbox"/>	
60. Record which pump is selected as Duty Pump by controller	_____	
61. Select both pumps to "off" position	OK <input type="checkbox"/>	
<b>Emergency Start Circuit</b>		YES <input type="checkbox"/>
62. Ensure sufficient water in wet well for test	OK <input type="checkbox"/>	
63. Turn off the RTU	OK <input type="checkbox"/>	
64. Select both pumps to "automatic" position	OK <input type="checkbox"/>	
65. Simulate a wet well high high level (manually lowering the probe is the preferred method)	OK <input type="checkbox"/>	
66. Confirm Pump 1 starts	OK <input type="checkbox"/>	



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67. Confirm Pump 2 starts (after pump 2 start delay)	OK <input type="checkbox"/>		
68. Confirm both pumps stop when water level reaches the lowest probe (stop) on the start/stop three point probe	OK <input type="checkbox"/>		
69. Select both pumps to "off" position	OK <input type="checkbox"/>		
70. Turn on the RTU	OK <input type="checkbox"/>		
<b>Generator Checks</b>		YES <input type="checkbox"/>	
71. Ensure sufficient water in wet well for test	OK <input type="checkbox"/>		
72. Ensure generator main switch is off	OK <input type="checkbox"/>		
73. Select both pumps to "off" position	OK <input type="checkbox"/>		
74. Connect generator and check all connections	OK <input type="checkbox"/>		
75. Start generator and check phase direction and voltages	OK <input type="checkbox"/>		
76. Select changeover switch to generator supply	OK <input type="checkbox"/>		
77. Close main switch and check all voltages	OK <input type="checkbox"/>		
78. Select Pump 1 to "automatic" and confirm correct operation <i>NOTE: If sufficient water available for testing allow system to cycle confirming complete functionality. Otherwise override wet well level to confirm pump operation.</i>	OK <input type="checkbox"/>		
79. Select Pump 2 to "automatic" and confirm correct operation <i>Note due to portable generator size potentially both pumps may not be able to run and shall be decided on an individual site basis.</i>	OK <input type="checkbox"/>		
80. Select both pumps to "off" position	OK <input type="checkbox"/>		
81. Restore mains power and disconnect generator	OK <input type="checkbox"/>		
<b>Wet Testing Signoff</b>			
<b>CONSTRUCTOR</b>			
Name:	Position:	Signature:	Date:
<b>UNITYWATER WITNESS</b>			
Name:	Position:	Signature:	Date:
Name:	Position:	Signature:	Date:
Name:	Position:	Signature:	Date:

# F8943 - SPS Commissioning Check Sheet Template

## SAT / Performance Testing

<b>PROJECT TITLE:</b>	<b>FINANCE NO:</b>
<b>SAT Schedule</b>	<b>Result / Init. / Date</b>
<b>SAT Pre-start Checks</b>	
1. Check Wet Testing Checklist completed and signed off	OK <input type="checkbox"/>
2. Check SAT attendees are inducted to site	OK <input type="checkbox"/>
<b>Level Sensor Checks</b>	
3. Record Top of Slab RL (m) and distance from Top of Slab to each level sensor in <b>Commissioning Worksheet</b>	OK <input type="checkbox"/>
4. Record well diameter and total depth for volume calculations in <b>Commissioning Worksheet</b>	OK <input type="checkbox"/>
5. Confirm wet well level indicated by the level probe is reflective of the actual wet well level and record readings in <b>Commissioning Worksheet</b>	OK <input type="checkbox"/>
6. Confirm functioning of high and high high (overflow) level alarms  <b>Note that the overflow structure may only be brought on-line once 'As Constructed' overflow level has been confirmed (to remain bunged off until level confirmed)</b>	OK <input type="checkbox"/>
<b>Pump Checks</b>	
<b>Pump Performance and Flowmeter Accuracy</b>	
7. Complete Draw Down test and verify flowmeter accuracy	OK <input type="checkbox"/>
8. Complete Pump Performance test including shutoff head	OK <input type="checkbox"/>
9. Transfer readings into <b>Commissioning Worksheet</b> and assess results	OK <input type="checkbox"/>
<b>Pump Control Checks</b>	
<b>Duty Pump Fault Test (2 pumps)</b>	
10. Select both pumps to "off" position	OK <input type="checkbox"/>
11. Ensure assist start level > wet well level > duty start level	OK <input type="checkbox"/>
12. Ensure pump discharge valves are open	OK <input type="checkbox"/>
13. Confirm both drives have no faults present	OK <input type="checkbox"/>
14. Select Pump 1 (Duty Pump) to "automatic" position	OK <input type="checkbox"/>



## F8943 - SPS Commissioning Check Sheet Template

15. Confirm Duty Pump running	OK <input type="checkbox"/>
16. Select Pump 2 (Duty Assist) to "automatic" position	OK <input type="checkbox"/>
17. Fault Duty Pump – i.e. open one c/b feeder for phase failure relay	OK <input type="checkbox"/>
18. Confirm Duty Assist pump starts	OK <input type="checkbox"/>
19. Stop system – both pumps to "off" position	OK <input type="checkbox"/>
20. Select Pump 2 as Duty Pump	OK <input type="checkbox"/>
21. Select Pump 1 as Duty Assist	OK <input type="checkbox"/>
22. Repeat Steps 11 to 19	OK <input type="checkbox"/>
<b>Duty / Assist Test (2 pumps)</b>	
23. Select both pumps to "off" position	OK <input type="checkbox"/>
24. Ensure assist start level > wet well level > duty start level	OK <input type="checkbox"/>
25. Ensure pump discharge valves are open	OK <input type="checkbox"/>
26. Confirm both drives have no faults present	OK <input type="checkbox"/>
27. Select both pumps to "automatic" position	OK <input type="checkbox"/>
28. Confirm Pump 2 (Duty Pump) running	OK <input type="checkbox"/>
29. Manually override wet well level > than assist start level	OK <input type="checkbox"/>
30. Confirm Assist Pump started	OK <input type="checkbox"/>
31. Manually override wet well level < assist stop level	OK <input type="checkbox"/>
32. Confirm Duty Assist stopped	OK <input type="checkbox"/>
33. Manually override wet well level < duty stop level	OK <input type="checkbox"/>
34. Confirm Duty Pump stopped	OK <input type="checkbox"/>
35. Select Pump 1 as Duty Pump	OK <input type="checkbox"/>
36. Select Pump 2 as Duty Assist	OK <input type="checkbox"/>
37. Repeat Steps 24 and 34	OK <input type="checkbox"/>
38. Select both pumps to "off" position	OK <input type="checkbox"/>
<b>Pump Cycling</b>	
39. Manually override wet well level < duty stop level (pumps are stopped)	OK <input type="checkbox"/>
40. Ensure wet well level > duty start level	OK <input type="checkbox"/>
41. Confirm both drives have no faults present	OK <input type="checkbox"/>
42. Ensure pump discharge valves are open	OK <input type="checkbox"/>
43. Select both pumps to "automatic" position	OK <input type="checkbox"/>



# F8943 - SPS Commissioning Check Sheet Template

44. Record which pump is selected as Duty Pump by controller	_____
45. Manually override wet well level > duty start level	OK <input type="checkbox"/>
46. Confirm Duty Pump running	OK <input type="checkbox"/>
47. Manually override wet well level < duty stop level	OK <input type="checkbox"/>
48. Confirm Duty Pump stopped	OK <input type="checkbox"/>
49. Record which pump is selected as Duty Pump by controller	_____
50. Select both pumps to "off" position	OK <input type="checkbox"/>
<b>Emergency Start Circuit</b>	
51. Ensure sufficient water in wet well for test	OK <input type="checkbox"/>
52. Turn off the RTU	OK <input type="checkbox"/>
53. Select both pumps to "automatic" position	OK <input type="checkbox"/>
54. Simulate a wet well high high level (manually lowering the probe is the preferred method)	OK <input type="checkbox"/>
55. Confirm Pump 1 starts	OK <input type="checkbox"/>
56. Wait for several seconds (Pump 2 start delay)	OK <input type="checkbox"/>
57. Confirm Pump 2 starts	OK <input type="checkbox"/>
58. Confirm both pumps stop when water level reaches the lowest probe (stop) on the start/stop three point probe	OK <input type="checkbox"/>
59. Select both pumps to "off" position	OK <input type="checkbox"/>
60. Turn on the RTU	OK <input type="checkbox"/>
<b>Generator Checks</b>	
61. Ensure sufficient water in wet well for test	OK <input type="checkbox"/>
62. Ensure generator main switch is off	OK <input type="checkbox"/>
63. Select both pumps to "off" position	OK <input type="checkbox"/>
64. Connect generator and check all connections	OK <input type="checkbox"/>
65. Start generator and check phase direction and voltages	OK <input type="checkbox"/>
66. Select changeover switch to generator supply	OK <input type="checkbox"/>
67. Close main switch and check all voltages	OK <input type="checkbox"/>
68. Select Pump 1 to "automatic" and confirm correct operation <i>NOTE: If sufficient water available for testing allow system to cycle confirming complete functionality. Otherwise override wet well level to confirm pump operation.</i>	OK <input type="checkbox"/>



# F8943 - SPS Commissioning Check Sheet Template

69. Select Pump 2 to “automatic” and confirm correct operation Note due to portable generator size potentially both pumps may not be able to run and shall be decided on an individual site basis	OK <input type="checkbox"/>
70. Select both pumps to “off” position	OK <input type="checkbox"/>
71. Restore mains power and disconnect generator	OK <input type="checkbox"/>
<b>SAT Signoff</b>	
To verify completion of all SAT items to the satisfaction of Stakeholders.	
<b>CONSTRUCTOR</b>	
Name:	Position:
Signature:	Date:
<b>UNITYWATER WITNESS (Commissioning)</b>	
Name:	Position:
Signature:	Date:
<b>UNITYWATER WITNESS (Operations)</b>	
Name:	Position:
Signature:	Date:
<b>UNITYWATER WITNESS (Electrical)</b>	
Name:	Position:
Signature:	Date:
<b>UNITYWATER WITNESS (SCADA)</b>	
Name:	Position:
Signature:	Date:
<b>UNITYWATER WITNESS (Mechanical)</b>	
Name:	Position:
Signature:	Date: