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Agenda item 4

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HARMFUL AQUATIC ORGANISMS IN BALLAST WATER

Information regarding procedural aspects that affect modifications to a ballast water management system with an existing type approval

Submitted by BEMA

SUMMARY

Executive summary: This submission provides additional information to that contained in documents MEPC 80/INF.18 and MEPC 81/4/3 regarding modifications to a BWMS with an existing type approval. Information about the level of detail in the documentation required to obtain type approval and the associated implications on the ability to implement BWMS modifications, as well as implications on BWMS performance, is presented.

Strategic direction, if applicable: 1

Output: 1.25

Action to be taken: Paragraph 17

Related documents: MEPC 77/4/3; MEPC 78/4, MEPC 78/4/1, MEPC 78/4/12, MEPC 78/INF.17, MEPC 78/WP.8; MEPC 79/WP.6; MEPC 80/4/10, MEPC 80/4/19, MEPC 80/4/21, MEPC 80/4/22, MEPC 80/INF.18; and resolution MEPC.300(72)

Introduction

1 As previously described in document MEPC 80/INF.18, manufacturers of ballast water management systems (BWMS) encounter a variety of scenarios that require changes to components within a BWMS that has an existing type approval. These scenarios can include a change in component availability, discontinued or obsolete components, an improved component, or an installation-specific required component. Additionally, BWMS manufacturers may seek to improve their equipment based on operational experience gained and/or industry demands, such as ways to address ballast water management in ports with challenging water quality (CWQ) or improving energy efficiency.

2 During the type approval processes associated with the regulations of the IMO (i.e. BWMS Code), the United States Coast Guard (USCG), individual Administrations that are not Party to the BWM Convention, and each classification society, a very detailed and

substantive package of technical documentation is prepared by the BWMS manufacturer. While each of these regulating bodies can have slightly different type approval requirements, BWMS manufacturers strive for consistency and optimization of their type approval testing and technical documentation packages to cover all potential requirements rather than preparing unique packages for each approving entity.

3 While a "bill of materials" (BOM) is not specified within the BWMS Code, this is required for USCG type approval. As such, preparation and submission of a BOM has become standard practice in the type approval process, including BWMS Code type approval. The BOM is a comprehensive list of all components contained in the approved BWMS that have undergone testing and functionality verification. The BOM is therefore directly linked to the type approval certificate that a BWMS manufacturer obtains and to the BWMS installed on board. A BWMS manufacturer supplying or installing a BWMS that deviates from the components listed in the approved BOM would be considered non-compliant with the BWMS type approval.

4 This document is intended to raise awareness of the implications when modifications to a BWMS with an existing type approval are necessary. Experiences gained with post-installation replacement of components that are not included in the BWMS type approval, and the significant potential implications on BWMS performance, are also discussed.

Procedural implications

5 During development of document MEPC 81/4/3, BEMA realized that there may not be widespread awareness about the high level of detail of the components within a BWMS type approval. Examples of BOMs from BEMA members that have been submitted with type approval documentation are provided in the annexes. These examples demonstrate the level of specificity and complexity that a BOM contains for all major and non-major components within an approved BWMS. The examples also help clarify the types of components that are considered major components in accordance with the BWMS Code definition.

6 Under current type approval procedures, when a BWMS manufacturer wants to modify a BWMS with an existing type approval, the associated modification is ultimately reflected in an amended BOM as part of the technical documentation submission. These technical specifications and/or testing data, as may be relevant, are reviewed and approved to receive an amended Type Approval Certificate.

7 For modifications to major components, defined by the BWMS Code (paragraph 3.9) as "those components that directly affect the ability of the system to meet the ballast water performance standard described in regulation D-2", a detailed review by the approving organization is necessary and anticipated. However, issues arise when lengthy and extensive approval procedures are required when a modification to a non-major component is necessary. These issues have been raised at multiple sessions of the Committee and within numerous submissions including documents MEPC 77/4/3, MEPC 78/4, MEPC 78/4/1, MEPC 78/4/12, MEPC 78/INF.17, MEPC 80/4/10, MEPC 80/4/19, MEPC 80/4/21, MEPC 80/4/22 and MEPC 80/INF.18.

8 The BWMS Code type approval process is designed to verify the functionality of BWMS across the range of challenge conditions based upon the system design limitations stated by the manufacturer. The testing of systems (i.e. biological efficacy, environmental risk assessment under Procedure (G9)), particularly testing which covers the suitability for service in the marine environment (i.e. environmental testing) may cover many other components of the system which may have no impact on the disinfection efficiency of the BWMS (e.g. non-major components such as fuses, circuit breakers, valves, cabinetry, etc). This equipment is often listed in detail as part of the BOM submitted for type approval of the equipment and therefore each of these components become an integral part of a BWMS remaining in compliance with its type approval.

9 Manufacturers frequently encounter situations where changing, upgrading or replacing an approved BWMS component that will have no impact on the overall operation of the BWMS or its ability to meet the biological discharge standards is needed due to the potential scenarios noted in paragraph 1. However, the current procedures for amending an existing type approval can be complex, lengthy and costly. The current procedures directly impact the commercial availability of updated or improved BWMS to shipowners.

10 BEMA notes that the BWMS Code specifies that changes should not be made to major components during type approval testing and, since there is no additional guidance for changes to an already type approved system, the mechanism for modifying a component which is not considered a major component is not clear once the type approval has been issued.

11 Paragraph 8 of document MEPC 81/4/3 notes the need to develop streamlined and standardized procedures that will enable BWMS manufacturers to modify an existing type approved system. This is particularly true when such modifications will not directly impact the ability of the BWMS to meet the ballast water performance standards or Final Approval requirements (when applicable). Additionally, BEMA believes that evaluations of modifications to an approved BWMS should be proportional to the function and specifications of the component change under consideration.

BWMS performance implications

12 As noted within document MEPC 81/4/3 and paragraph 1 above, BWMS modifications can support improved functionality and bring the latest innovations to shipowners. As such, the ability to modify a BWMS is essential for manufacturers to supply reliable, high-performing systems that also address industry demands (i.e. increased energy efficiency, challenging water quality).

13 Maintenance of an installed BWMS, in accordance with the type approval, is also critical to ensure performance. Members of BEMA have reported numerous incidents where BWMS components have been installed or replaced which were not supplied by the manufacturer and were not included in type approval testing of the assembled BWMS or listed on the approved BOM. Scenarios reported include:

- .1 replacement of filter baskets with non-OEM components;
- .2 replacement of UV lamps with non-OEM lamps;
- .3 replacement of sensors (i.e. pressure sensors, temperature sensors, UV intensity sensors, TRO sensors) with unapproved sensors or versions of the sensors not calibrated or scaled for the intended use within the BWMS; and
- .4 replacement of electrical control and safety components with “off-the-shelf” spare parts instead of OEM-specified equipment.

14 These practices create a significant problem as manufacturers are held to high standards for component replacements, as well as reliable BWMS operation and performance. Yet once systems are installed, experience is demonstrating that components tested in an approved BWMS configuration are being replaced or removed with little or no consequence despite the significant potential impact to the system's ability to meet the ballast water performance standard described in regulation D-2.

15 There is a need for consistency and streamlining of the procedures for modifications to a BWMS with an existing type approval, as well as ongoing review of BWMS maintenance to ensure the installed BWMS complies with the type approval obtained by the BWMS manufacturer.

16 A BWMS manufacturer is not allowed to change components within a type approved BWMS without adequate review and approval. After installation, components should not be replaced with components that have not been tested and verified, and that are not included in the type approval documentation.

Action requested of the Committee

17 The Committee is invited to take note of the information in this document as well as the example BOMs contained in the annexes.

ANNEX 1

BILL OF MATERIALS EXAMPLE FOR A UV-BASED, TYPE APPROVED BWMS

Note: Component details have been redacted for confidentiality; however, the column headings of the example BOM have been retained to provide information on the BOM details required.

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100000	1	FILTER SIZE A MAKER A VERSION A	Filter maker A	Filter maker model no.	Self-cleaning filter
100001	1	FILTER SIZE B MAKER A VERSION A	Filter maker A	Filter maker model no.	Self-cleaning filter
100002	1	FILTER SIZE C MAKER A VERSION A	Filter maker A	Filter maker model no.	Self-cleaning filter
100003	1	FILTER SIZE D MAKER A VERSION A	Filter maker A	Filter maker model no.	Self-cleaning filter
100004	1	FILTER SIZE E MAKER A VERSION A	Filter maker A	Filter maker model no.	Self-cleaning filter
100005	1	FILTER SIZE F MAKER A VERSION A	Filter maker A	Filter maker model no.	Self-cleaning filter
100006	1	FILTER SIZE G MAKER A VERSION A	Filter maker A	Filter maker model no.	Self-cleaning filter
100007	1	FILTER SIZE H MAKER A VERSION A	Filter maker A	Filter maker model no.	Self-cleaning filter
100008	1	FILTER SIZE J MAKER A VERSION A	Filter maker A	Filter maker model no.	Self-cleaning filter
100009	1	FILTER SIZE K MAKER A VERSION A	Filter maker A	Filter maker model no.	Self-cleaning filter
100010	1	FILTER SIZE A MAKER A VERSION A EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100012	1	FILTER SIZE B MAKER A VERSION A EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100014	1	FILTER SIZE C MAKER A VERSION A EX	Filter maker A	Filter maker model no.	Self-cleaning filter

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100016	1	FILTER SIZE D MAKER A VERSION A EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100018	1	FILTER SIZE E MAKER A VERSION A EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100020	1	FILTER SIZE F MAKER A VERSION A EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100022	1	FILTER SIZE G MAKER A VERSION A EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100024	1	FILTER SIZE H MAKER A VERSION A EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100026	1	FILTER SIZE J MAKER A VERSION A EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100028	1	FILTER SIZE K MAKER A VERSION A EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100036	1	FILTER SIZE A MAKER A VERSION B	Filter maker A	Filter maker model no.	Self-cleaning filter
100037	1	FILTER SIZE B MAKER A VERSION B	Filter maker A	Filter maker model no.	Self-cleaning filter
100038	1	FILTER SIZE C MAKER A VERSION B	Filter maker A	Filter maker model no.	Self-cleaning filter
100039	1	FILTER SIZE D MAKER A VERSION B	Filter maker A	Filter maker model no.	Self-cleaning filter
100040	1	FILTER SIZE E MAKER A VERSION B	Filter maker A	Filter maker model no.	Self-cleaning filter
100041	1	FILTER SIZE F MAKER A VERSION B	Filter maker A	Filter maker model no.	Self-cleaning filter
100042	1	FILTER SIZE G MAKER A VERSION B	Filter maker A	Filter maker model no.	Self-cleaning filter
100043	1	FILTER SIZE H MAKER A VERSION B	Filter maker A	Filter maker model no.	Self-cleaning filter
100044	1	FILTER SIZE J MAKER A VERSION B	Filter maker A	Filter maker model no.	Self-cleaning filter
100045	1	FILTER SIZE A MAKER A VERSION B EX	Filter maker A	Filter maker model no.	Self-cleaning filter

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100046	1	FILTER SIZE B MAKER A VERSION B EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100047	1	FILTER SIZE C MAKER A VERSION B EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100048	1	FILTER SIZE D MAKER A VERSION B EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100049	1	FILTER SIZE E MAKER A VERSION B EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100050	1	FILTER SIZE F MAKER A VERSION B EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100051	1	FILTER SIZE G MAKER A VERSION B EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100052	1	FILTER SIZE H MAKER A VERSION B EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100053	1	FILTER SIZE J MAKER A VERSION B EX	Filter maker A	Filter maker model no.	Self-cleaning filter
100054	1	FILTER SIZE A MAKER B VERSION A	Filter maker B	Filter maker model no.	Self-cleaning filter
100055	1	FILTER SIZE B MAKER B VERSION A	Filter maker B	Filter maker model no.	Self-cleaning filter
100056	1	FILTER SIZE C MAKER B VERSION A	Filter maker B	Filter maker model no.	Self-cleaning filter
100057	1	FILTER SIZE D MAKER B VERSION A	Filter maker B	Filter maker model no.	Self-cleaning filter
100058	1	FILTER SIZE E MAKER B VERSION A	Filter maker B	Filter maker model no.	Self-cleaning filter
100059	1	FILTER SIZE F MAKER B VERSION A	Filter maker B	Filter maker model no.	Self-cleaning filter
100060	1	FILTER SIZE G MAKER B VERSION A	Filter maker B	Filter maker model no.	Self-cleaning filter
100061	1	FILTER SIZE H MAKER B VERSION A	Filter maker B	Filter maker model no.	Self-cleaning filter
100062	1	FILTER SIZE J MAKER B VERSION A	Filter maker B	Filter maker model no.	Self-cleaning filter

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100063	1	FILTER SIZE K MAKER B VERSION A	Filter maker B	Filter maker model no.	Self-cleaning filter
100064	1	FILTER SIZE L MAKER B VERSION A	Filter maker B	Filter maker model no.	Self-cleaning filter
100065	1	FILTER SIZE A MAKER B VERSION A EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100066	1	FILTER SIZE B MAKER B VERSION A EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100067	1	FILTER SIZE C MAKER B VERSION A EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100068	1	FILTER SIZE D MAKER B VERSION A EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100069	1	FILTER SIZE E MAKER B VERSION A EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100070	1	FILTER SIZE F MAKER B VERSION A EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100071	1	FILTER SIZE G MAKER B VERSION A EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100072	1	FILTER SIZE H MAKER B VERSION A EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100073	1	FILTER SIZE J MAKER B VERSION A EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100074	1	FILTER SIZE K MAKER B VERSION A EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100075	1	FILTER SIZE L MAKER B VERSION A EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100076	1	FILTER SIZE A MAKER B VERSION B	Filter maker B	Filter maker model no.	Self-cleaning filter
100077	1	FILTER SIZE B MAKER B VERSION B	Filter maker B	Filter maker model no.	Self-cleaning filter
100078	1	FILTER SIZE C MAKER B VERSION B	Filter maker B	Filter maker model no.	Self-cleaning filter
100079	1	FILTER SIZE D MAKER B VERSION B	Filter maker B	Filter maker model no.	Self-cleaning filter

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100080	1	FILTER SIZE E MAKER B VERSION B	Filter maker B	Filter maker model no.	Self-cleaning filter
100081	1	FILTER SIZE F MAKER B VERSION B	Filter maker B	Filter maker model no.	Self-cleaning filter
100082	1	FILTER SIZE G MAKER B VERSION B	Filter maker B	Filter maker model no.	Self-cleaning filter
100083	1	FILTER SIZE H MAKER B VERSION B	Filter maker B	Filter maker model no.	Self-cleaning filter
100084	1	FILTER SIZE J MAKER B VERSION B	Filter maker B	Filter maker model no.	Self-cleaning filter
100085	1	FILTER SIZE K MAKER B VERSION B	Filter maker B	Filter maker model no.	Self-cleaning filter
100086	1	FILTER SIZE A MAKER B VERSION B EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100087	1	FILTER SIZE B MAKER B VERSION B EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100088	1	FILTER SIZE C MAKER B VERSION B EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100089	1	FILTER SIZE D MAKER B VERSION B EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100090	1	FILTER SIZE E MAKER B VERSION B EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100091	1	FILTER SIZE F MAKER B VERSION B EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100092	1	FILTER SIZE G MAKER B VERSION B EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100093	1	FILTER SIZE H MAKER B VERSION B EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100094	1	FILTER SIZE J MAKER B VERSION B EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100095	1	FILTER SIZE K MAKER B VERSION B EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100096	1	FILTER SIZE A MAKER B VERSION C	Filter maker B	Filter maker model no.	Self-cleaning filter

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100097	1	FILTER SIZE B MAKER B VERSION C	Filter maker B	Filter maker model no.	Self-cleaning filter
100098	1	FILTER SIZE C MAKER B VERSION C	Filter maker B	Filter maker model no.	Self-cleaning filter
100099	1	FILTER SIZE A MAKER B VERSION C EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100100	1	FILTER SIZE B MAKER B VERSION C EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100101	1	FILTER SIZE C MAKER B VERSION C EX	Filter maker B	Filter maker model no.	Self-cleaning filter
100102	1	UV CHAMBER MAKER A VERSION A	UV maker A	UV maker model no.	UV chamber
100103	1	UV CHAMBER MAKER A VERSION A EX	UV maker A	UV maker model no.	UV chamber
100104	1	UV CHAMBER MAKER A VERSION A WELDED	UV maker A	UV maker model no.	UV chamber
100105	1	UV CHAMBER MAKER A VERSION A WELDED EX	UV maker A	UV maker model no.	UV chamber
100106	1	UV CHAMBER MAKER A VERSION B	UV maker A	UV maker model no.	UV chamber
100107	1	UV CHAMBER MAKER A VERSION B EX	UV maker A	UV maker model no.	UV chamber
100108	1	UV CHAMBER MAKER A VERSION B WELDED	UV maker A	UV maker model no.	UV chamber
100109	1	UV CHAMBER MAKER A VERSION B WELDED EX	UV maker A	UV maker model no.	UV chamber
100110	1	UV CHAMBER MAKER A VERSION C	UV maker A	UV maker model no.	UV chamber
100111	1	UV CHAMBER MAKER A VERSION C WELDED	UV maker A	UV maker model no.	UV chamber
100112	1	MANIFOLD SIZE A MAKER A VERSION A	Manifold maker A	Manifold maker model no.	Manifold
100113	1	MANIFOLD SIZE B MAKER A VERSION A	Manifold maker A	Manifold maker model no.	Manifold

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100114	1	MANIFOLD SIZE C MAKER A VERSION A	Manifold maker A	Manifold maker model no.	Manifold
100115	1	MANIFOLD SIZE D MAKER A VERSION A	Manifold maker A	Manifold maker model no.	Manifold
100116	1	MANIFOLD SIZE E MAKER A VERSION A	Manifold maker A	Manifold maker model no.	Manifold
100117	1	MANIFOLD SIZE F MAKER A VERSION A	Manifold maker A	Manifold maker model no.	Manifold
100118	1	MANIFOLD SIZE G MAKER A VERSION A	Manifold maker A	Manifold maker model no.	Manifold
100119	1	MANIFOLD SIZE H MAKER A VERSION A	Manifold maker A	Manifold maker model no.	Manifold
100120	1	MANIFOLD SIZE J MAKER A VERSION A	Manifold maker A	Manifold maker model no.	Manifold
100121	1	MANIFOLD SIZE K MAKER A VERSION A	Manifold maker A	Manifold maker model no.	Manifold
100122	1	MANIFOLD SIZE L MAKER A VERSION A	Manifold maker A	Manifold maker model no.	Manifold
100123	1	MANIFOLD SIZE M MAKER A VERSION A	Manifold maker A	Manifold maker model no.	Manifold
100124	1	MANIFOLD SIZE N MAKER A VERSION A	Manifold maker A	Manifold maker model no.	Manifold
100138	1	MANIFOLD SIZE A MAKER A VERSION B	Manifold maker A	Manifold maker model no.	Manifold
100139	1	MANIFOLD SIZE B MAKER A VERSION B	Manifold maker A	Manifold maker model no.	Manifold
100140	1	MANIFOLD SIZE C MAKER A VERSION B	Manifold maker A	Manifold maker model no.	Manifold
100141	1	MANIFOLD SIZE D MAKER A VERSION B	Manifold maker A	Manifold maker model no.	Manifold
100142	1	MANIFOLD SIZE E MAKER A VERSION B	Manifold maker A	Manifold maker model no.	Manifold
100143	1	MANIFOLD SIZE F MAKER A VERSION B	Manifold maker A	Manifold maker model no.	Manifold

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100144	1	MANIFOLD SIZE G MAKER A VERSION B	Manifold maker A	Manifold maker model no.	Manifold
100145	1	MANIFOLD SIZE H MAKER A VERSION B	Manifold maker A	Manifold maker model no.	Manifold
100146	1	MANIFOLD SIZE J MAKER A VERSION B	Manifold maker A	Manifold maker model no.	Manifold
100147	1	MANIFOLD SIZE K MAKER A VERSION B	Manifold maker A	Manifold maker model no.	Manifold
100148	1	MANIFOLD SIZE L MAKER A VERSION B	Manifold maker A	Manifold maker model no.	Manifold
100149	1	MANIFOLD SIZE M MAKER A VERSION B	Manifold maker A	Manifold maker model no.	Manifold
100150	1	MANIFOLD SIZE N MAKER A VERSION B	Manifold maker A	Manifold maker model no.	Manifold
100175	1	UV LAMP MAKER A VERSION A	UV lamp maker A	UV lamp model no.	UV lamp
100176	1	UV LAMP MAKER A VERSION B	UV lamp maker A	UV lamp model no.	UV lamp
100177	1	UV LAMP MAKER B VERSION A	UV lamp maker B	UV lamp model no.	UV lamp
100178	1	UV LAMP MAKER B VERSION B	UV lamp maker B	UV lamp model no.	UV lamp
100179	1	UV LAMP MAKER C VERSION A	UV lamp maker C	UV lamp model no.	UV lamp
100180	1	UV LAMP MAKER D VERSION A	UV lamp maker D	UV lamp model no.	UV lamp
100181	1	UV LAMP MAKER D VERSION B	UV lamp maker D	UV lamp model no.	UV lamp
100182	1	UV LAMP MAKER D VERSION C	UV lamp maker D	UV lamp model no.	UV lamp
100183	1	UV LAMP MAKER D VERSION D	UV lamp maker D	UV lamp model no.	UV lamp
100184	1	QUARTZ SLEEVE MAKER A	Quartz sleeve maker A	Quartz sleeve model no.	Quartz sleeve
100185	1	QUARTZ SLEEVE MAKER B	Quartz sleeve maker B	Quartz sleeve model no.	Quartz sleeve
100186	1	QUARTZ SLEEVE MAKER C	Quartz sleeve maker C	Quartz sleeve model no.	Quartz sleeve
100187	1	LAMP CABLE PROTECTION KIT MAKER A	Protection maker A	Protection model no.	Protection hose

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100188	1	LAMP CABLE PROTECTION KIT MAKER B	Protection maker A	Protection model no.	Protection hose
100189	1	SPECIAL TOOLS UTILITY STAND VERSION A	Maker A	Utility stand model no.	Stand for special tool for UV system
100190	1	SPECIAL TOOLS UTILITY STAND VERSION B	Maker A	Utility stand model no.	Stand for special tool for UV system
100191	1	QUARTZ SLEEVE TOOL VERSION A	Maker A	Tool model no.	Tool for removal of quartz sleeve
100192	1	QUARTZ SLEEVE TOOL VERSION B	Maker A	Tool model no.	Tool for removal of quartz sleeve
100195	1	SIGN WARNING ULTRAVIOLET RADIATION	Maker A	Sign no.	Safety and information sign
100199	1	SIGN WARNING EXPLOSIVE ATMOSPHERE	Maker A	Sign no.	Safety and information sign
100212	1	UV CHAMBER WARNING SIGN	Maker A	Sign no.	Safety and information sign
100266	1	PUMP SIZE A MAKER A VERSION A	Pump maker A	Pump maker model no.	Centrifugal pump
100267	1	PUMP SIZE B MAKER A VERSION A	Pump maker A	Pump maker model no.	Centrifugal pump
100268	1	PUMP SIZE C MAKER A VERSION A	Pump maker A	Pump maker model no.	Centrifugal pump
100269	1	PUMP SIZE D MAKER A VERSION A	Pump maker A	Pump maker model no.	Centrifugal pump
100270	1	PUMP SIZE E MAKER A VERSION A	Pump maker A	Pump maker model no.	Centrifugal pump
100271	1	PUMP SIZE F MAKER A VERSION A	Pump maker A	Pump maker model no.	Centrifugal pump
100272	1	PUMP SIZE G MAKER A VERSION A	Pump maker A	Pump maker model no.	Centrifugal pump
100273	1	PUMP SIZE H MAKER A VERSION A	Pump maker A	Pump maker model no.	Centrifugal pump
100274	1	PUMP SIZE J MAKER A VERSION A	Pump maker A	Pump maker model no.	Centrifugal pump

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100275	1	PUMP SIZE K MAKER A VERSION A	Pump maker A	Pump maker model no.	Centrifugal pump
100276	1	PUMP SIZE L MAKER A VERSION A	Pump maker A	Pump maker model no.	Centrifugal pump
100277	1	PUMP SIZE A MAKER A VERSION A EX	Pump maker A	Pump maker model no.	Centrifugal pump
100278	1	PUMP SIZE B MAKER A VERSION A EX	Pump maker A	Pump maker model no.	Centrifugal pump
100279	1	PUMP SIZE C MAKER A VERSION A EX	Pump maker A	Pump maker model no.	Centrifugal pump
100280	1	PUMP SIZE D MAKER A VERSION A EX	Pump maker A	Pump maker model no.	Centrifugal pump
100281	1	PUMP SIZE E MAKER A VERSION A EX	Pump maker A	Pump maker model no.	Centrifugal pump
100282	1	PUMP SIZE F MAKER A VERSION A EX	Pump maker A	Pump maker model no.	Centrifugal pump
100283	1	PUMP SIZE G MAKER A VERSION A EX	Pump maker A	Pump maker model no.	Centrifugal pump
100284	1	PUMP SIZE H MAKER A VERSION A EX	Pump maker A	Pump maker model no.	Centrifugal pump
100285	1	PUMP SIZE J MAKER A VERSION A EX	Pump maker A	Pump maker model no.	Centrifugal pump
100286	1	PUMP SIZE K MAKER A VERSION A EX	Pump maker A	Pump maker model no.	Centrifugal pump
100287	1	PUMP SIZE A MAKER A VERSION B EX	Pump maker A	Pump maker model no.	Centrifugal pump
100288	1	PUMP SIZE B MAKER A VERSION B EX	Pump maker A	Pump maker model no.	Centrifugal pump
100289	1	PUMP SIZE C MAKER A VERSION B EX	Pump maker A	Pump maker model no.	Centrifugal pump
100290	1	PUMP SIZE D MAKER A VERSION B EX	Pump maker A	Pump maker model no.	Centrifugal pump
100291	1	PUMP SIZE E MAKER A VERSION B EX	Pump maker A	Pump maker model no.	Centrifugal pump

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100292	1	PUMP SIZE F MAKER A VERSION B EX	Pump maker A	Pump maker model no.	Centrifugal pump
100293	1	PUMP SIZE G MAKER A VERSION B EX	Pump maker A	Pump maker model no.	Centrifugal pump
100294	1	GAUGE BOARD FOR PUMP MAKER A	Pump maker A	Pump maker model no.	Manometer and vacuum meter
100295	1	PUMP SIZE A MAKER A VERSION A	Pump maker B	Pump maker model no.	Centrifugal pump
100296	1	PUMP SIZE B MAKER A VERSION A	Pump maker B	Pump maker model no.	Centrifugal pump
100297	1	PUMP SIZE C MAKER A VERSION A	Pump maker B	Pump maker model no.	Centrifugal pump
100298	1	PUMP SIZE D MAKER A VERSION A	Pump maker B	Pump maker model no.	Centrifugal pump
100299	1	PUMP SIZE E MAKER A VERSION A	Pump maker B	Pump maker model no.	Centrifugal pump
100300	1	PUMP SIZE F MAKER A VERSION A	Pump maker B	Pump maker model no.	Centrifugal pump
100301	1	PUMP SIZE G MAKER A VERSION A	Pump maker B	Pump maker model no.	Centrifugal pump
100302	1	PUMP SIZE H MAKER A VERSION A	Pump maker B	Pump maker model no.	Centrifugal pump
100303	1	PUMP SIZE J MAKER A VERSION A	Pump maker B	Pump maker model no.	Centrifugal pump
100331	1	PUMP SIZE A MAKER A VERSION B	Pump maker B	Pump maker model no.	Centrifugal pump
100332	1	PUMP SIZE B MAKER A VERSION B	Pump maker B	Pump maker model no.	Centrifugal pump
100333	1	PUMP SIZE C MAKER A VERSION B	Pump maker B	Pump maker model no.	Centrifugal pump
100334	1	PUMP SIZE D MAKER A VERSION B	Pump maker B	Pump maker model no.	Centrifugal pump
100335	1	PUMP SIZE E MAKER A VERSION B	Pump maker B	Pump maker model no.	Centrifugal pump

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100336	1	PUMP SIZE F MAKER A VERSION B	Pump maker B	Pump maker model no.	Centrifugal pump
100337	1	PUMP SIZE G MAKER A VERSION B	Pump maker B	Pump maker model no.	Centrifugal pump
100338	1	PUMP SIZE H MAKER A VERSION B	Pump maker B	Pump maker model no.	Centrifugal pump
100363	1	PUMP SIZE B MAKER A VERSION B EX	Pump maker B	Pump maker model no.	Centrifugal pump
100364	1	PUMP SIZE C MAKER A VERSION B EX	Pump maker B	Pump maker model no.	Centrifugal pump
100365	1	PUMP SIZE D MAKER A VERSION B EX	Pump maker B	Pump maker model no.	Centrifugal pump
100366	1	PUMP SIZE E MAKER A VERSION B EX	Pump maker B	Pump maker model no.	Centrifugal pump
100367	1	PUMP SIZE F MAKER A VERSION B EX	Pump maker B	Pump maker model no.	Centrifugal pump
100368	1	PUMP SIZE G MAKER A VERSION B EX	Pump maker B	Pump maker model no.	Centrifugal pump
100369	1	PUMP SIZE H MAKER A VERSION B EX	Pump maker B	Pump maker model no.	Centrifugal pump
100391	1	PUMP SIZE H MAKER A VERSION B EX SH	Pump maker B	Pump maker model no.	Centrifugal pump with space heater
Multiple	N/A	PUMP SIZE <multiple> MAKER A VERSION B EX SH	Pump maker B	Pump maker model no.	Centrifugal pump with space heater (generic)
Multiple	N/A	PUMP SIZE <multiple> MAKER A VERSION B SH	Pump maker B	Pump maker model no.	Centrifugal pump with space heater (generic)
100392	1	GAUGE BOARD FOR PUMP MAKER B	Pump maker B	Pump maker model no.	Manometer and vacuum meter set on plate
100393	1	FLOW CONTROL VALVE SIZE A MAKER A	Valve maker A	Valve model no.	Flow control valve
100394	1	FLOW CONTROL VALVE SIZE B MAKER A	Valve maker A	Valve model no.	Flow control valve
100395	1	FLOW CONTROL VALVE SIZE C MAKER A	Valve maker A	Valve model no.	Flow control valve

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100396	1	FLOW CONTROL VALVE SIZE D MAKER A	Valve maker A	Valve model no.	Flow control valve
100397	1	FLOW CONTROL VALVE SIZE E MAKER A	Valve maker A	Valve model no.	Flow control valve
100398	1	FLOW CONTROL VALVE SIZE F MAKER A	Valve maker A	Valve model no.	Flow control valve
100399	1	FLOW CONTROL VALVE SIZE G MAKER A	Valve maker A	Valve model no.	Flow control valve
100400	1	FLOW CONTROL VALVE SIZE H MAKER A	Valve maker A	Valve model no.	Flow control valve
100401	1	FLOW CONTROL VALVE SIZE J MAKER A	Valve maker A	Valve model no.	Flow control valve
100402	1	FLOW CONTROL VALVE SIZE A MAKER A EX	Valve maker A	Valve model no.	Flow control valve
100403	1	FLOW CONTROL VALVE SIZE B MAKER A EX	Valve maker A	Valve model no.	Flow control valve
100404	1	FLOW CONTROL VALVE SIZE C MAKER A EX	Valve maker A	Valve model no.	Flow control valve
100405	1	FLOW CONTROL VALVE SIZE D MAKER A EX	Valve maker A	Valve model no.	Flow control valve
100406	1	FLOW CONTROL VALVE SIZE E MAKER A EX	Valve maker A	Valve model no.	Flow control valve
100407	1	FLOW CONTROL VALVE SIZE F MAKER A EX	Valve maker A	Valve model no.	Flow control valve
100408	1	FLOW CONTROL VALVE SIZE G MAKER A EX	Valve maker A	Valve model no.	Flow control valve
100409	1	FLOW CONTROL VALVE SIZE H MAKER A EX	Valve maker A	Valve model no.	Flow control valve
100410	1	FLOW CONTROL VALVE SIZE J MAKER A EX	Valve maker A	Valve model no.	Flow control valve
100429	1	FLOW CONTROL VALVE SIZE A MAKER B	Valve maker B	Valve model no.	Flow control valve
100430	1	FLOW CONTROL VALVE SIZE B MAKER B	Valve maker B	Valve model no.	Flow control valve

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100431	1	FLOW CONTROL VALVE SIZE C MAKER B	Valve maker B	Valve model no.	Flow control valve
100432	1	FLOW CONTROL VALVE SIZE D MAKER B	Valve maker B	Valve model no.	Flow control valve
100433	1	FLOW CONTROL VALVE SIZE E MAKER B	Valve maker B	Valve model no.	Flow control valve
100434	1	FLOW CONTROL VALVE SIZE F MAKER B	Valve maker B	Valve model no.	Flow control valve
100435	1	FLOW CONTROL VALVE SIZE G MAKER B	Valve maker B	Valve model no.	Flow control valve
100443	1	FLOW CONTROL VALVE SIZE A MAKER C	Valve maker C	Valve model no.	Flow control valve
100444	1	FLOW CONTROL VALVE SIZE B MAKER C	Valve maker C	Valve model no.	Flow control valve
100445	1	FLOW CONTROL VALVE SIZE C MAKER C	Valve maker C	Valve model no.	Flow control valve
100446	1	FLOW CONTROL VALVE SIZE D MAKER C	Valve maker C	Valve model no.	Flow control valve
100447	1	FLOW CONTROL VALVE SIZE E MAKER C	Valve maker C	Valve model no.	Flow control valve
100448	1	FLOW CONTROL VALVE SIZE F MAKER C	Valve maker C	Valve model no.	Flow control valve
100449	1	FLOW CONTROL VALVE SIZE G MAKER C	Valve maker C	Valve model no.	Flow control valve
100450	1	FLOW CONTROL VALVE SIZE H MAKER C	Valve maker C	Valve model no.	Flow control valve
100451	1	FLOW CONTROL VALVE SIZE A MAKER C EX	Valve maker C	Valve model no.	Flow control valve
100452	1	FLOW CONTROL VALVE SIZE B MAKER C EX	Valve maker C	Valve model no.	Flow control valve
100453	1	FLOW CONTROL VALVE SIZE C MAKER C EX	Valve maker C	Valve model no.	Flow control valve
100454	1	FLOW CONTROL VALVE SIZE D MAKER C EX	Valve maker C	Valve model no.	Flow control valve

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100455	1	FLOW CONTROL VALVE SIZE E MAKER C EX	Valve maker C	Valve model no.	Flow control valve
100456	1	FLOW CONTROL VALVE SIZE F MAKER C EX	Valve maker C	Valve model no.	Flow control valve
100457	1	FLOW CONTROL VALVE SIZE G MAKER C EX	Valve maker C	Valve model no.	Flow control valve
100458	1	FLOW CONTROL VALVE SIZE H MAKER C EX	Valve maker C	Valve model no.	Flow control valve
100492	1	EX CONTROLLER MAKER A	Ex maker A	Controller model no.	Ex controller system
100493	1	EX SOLENOID MAKER A	Ex maker A	Solenoid model no.	Solenoid valve
100494	1	PRESSURE REGULATOR MAKER A	Pressure regulator maker A	Regulator model no.	Pressure regulator
100495	1	PRESSURE REGULATOR MAKER B	Pressure regulator maker B	Regulator model no.	Pressure regulator
100501	1	FLOWMETER SIZE A MAKER A	Flowmeter maker A	Flowmeter model no.	Electromagnetic flowmeter
100502	1	FLOWMETER SIZE B MAKER A	Flowmeter maker A	Flowmeter model no.	Electromagnetic flowmeter
100503	1	FLOWMETER SIZE C MAKER A	Flowmeter maker A	Flowmeter model no.	Electromagnetic flowmeter
100504	1	FLOWMETER SIZE D MAKER A	Flowmeter maker A	Flowmeter model no.	Electromagnetic flowmeter
100505	1	FLOWMETER SIZE E MAKER A	Flowmeter maker A	Flowmeter model no.	Electromagnetic flowmeter
100506	1	FLOWMETER SIZE F MAKER A	Flowmeter maker A	Flowmeter model no.	Electromagnetic flowmeter
100507	1	FLOWMETER SIZE G MAKER A	Flowmeter maker A	Flowmeter model no.	Electromagnetic flowmeter
100508	1	FLOWMETER SIZE H MAKER A	Flowmeter maker A	Flowmeter model no.	Electromagnetic flowmeter
100509	1	FLOWMETER SIZE J MAKER A	Flowmeter maker A	Flowmeter model no.	Electromagnetic flowmeter
100519	1	FLOWMETER SIZE A MAKER B ATEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100520	1	FLOWMETER SIZE B MAKER B ATEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100521	1	FLOWMETER SIZE C MAKER B ATEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100522	1	FLOWMETER SIZE D MAKER B ATEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100523	1	FLOWMETER SIZE E MAKER B ATEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100524	1	FLOWMETER SIZE F MAKER B ATEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100525	1	FLOWMETER SIZE G MAKER B ATEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100526	1	FLOWMETER SIZE H MAKER B ATEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100527	1	FLOWMETER SIZE J MAKER B ATEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100528	1	FLOWMETER SIZE K MAKER B ATEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100529	1	FLOWMETER SIZE A MAKER B IECEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100530	1	FLOWMETER SIZE B MAKER B IECEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100531	1	FLOWMETER SIZE C MAKER B IECEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100532	1	FLOWMETER SIZE D MAKER B IECEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100533	1	FLOWMETER SIZE E MAKER B IECEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100534	1	FLOWMETER SIZE F MAKER B IECEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100535	1	FLOWMETER SIZE G MAKER B IECEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100536	1	FLOWMETER SIZE H MAKER B IECEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100537	1	FLOWMETER SIZE J MAKER B IECEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100538	1	FLOWMETER SIZE K MAKER B IECEX	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100557	1	FLOWMETER SIZE A MAKER B	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100558	1	FLOWMETER SIZE B MAKER B	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100559	1	FLOWMETER SIZE C MAKER B	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100560	1	FLOWMETER SIZE D MAKER B	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100561	1	FLOWMETER SIZE E MAKER B	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100562	1	FLOWMETER SIZE F MAKER B	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100563	1	FLOWMETER SIZE G MAKER B	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100564	1	FLOWMETER SIZE H MAKER B	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100565	1	FLOWMETER SIZE J MAKER B	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100566	1	FLOWMETER SIZE K MAKER B	Flowmeter maker B	Flowmeter model no.	Electromagnetic flowmeter
100576	1	FLOWMETER SIZE A MAKER C	Flowmeter maker C	Flowmeter model no.	Electromagnetic flowmeter
100577	1	FLOWMETER SIZE B MAKER C	Flowmeter maker C	Flowmeter model no.	Electromagnetic flowmeter
100578	1	FLOWMETER SIZE C MAKER C	Flowmeter maker C	Flowmeter model no.	Electromagnetic flowmeter
100579	1	FLOWMETER SIZE D MAKER C	Flowmeter maker C	Flowmeter model no.	Electromagnetic flowmeter
100580	1	FLOWMETER SIZE E MAKER C	Flowmeter maker C	Flowmeter model no.	Electromagnetic flowmeter
100581	1	FLOWMETER SIZE F MAKER C	Flowmeter maker C	Flowmeter model no.	Electromagnetic flowmeter
100582	1	FLOWMETER SIZE G MAKER C	Flowmeter maker C	Flowmeter model no.	Electromagnetic flowmeter
100583	1	FLOWMETER SIZE H MAKER C	Flowmeter maker C	Flowmeter model no.	Electromagnetic flowmeter
100584	1	FLOWMETER SIZE J MAKER C	Flowmeter maker C	Flowmeter model no.	Electromagnetic flowmeter
100585	1	FLOWMETER SIZE A MAKER C	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100586	1	FLOWMETER SIZE B MAKER C	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100587	1	FLOWMETER SIZE C MAKER C	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100588	1	FLOWMETER SIZE D MAKER C	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100589	1	FLOWMETER SIZE E MAKER C	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100590	1	FLOWMETER SIZE F MAKER C	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100591	1	FLOWMETER SIZE G MAKER C	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100592	1	FLOWMETER SIZE H MAKER C	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100593	1	FLOWMETER SIZE J MAKER C	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100594	1	FLOWMETER SIZE K MAKER C	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100605	1	FLOWMETER SIZE A MAKER C EX	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100606	1	FLOWMETER SIZE B MAKER C EX	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100607	1	FLOWMETER SIZE C MAKER C EX	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100608	1	FLOWMETER SIZE D MAKER C EX	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100609	1	FLOWMETER SIZE E MAKER C EX	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100610	1	FLOWMETER SIZE F MAKER C EX	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100611	1	FLOWMETER SIZE G MAKER C EX	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100612	1	FLOWMETER SIZE H MAKER C EX	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100613	1	FLOWMETER SIZE J MAKER C EX	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100614	1	FLOWMETER SIZE K MAKER C EX	Flowmeter maker D	Flowmeter model no.	Electromagnetic flowmeter
100625	1	PRESSURE TRANSMITTER MAKER A	Pressure transmitter maker A	Transmitter model no.	Pressure transmitter
100626	1	PRESSURE TRANSMITTER MAKER B	Pressure transmitter maker B	Transmitter model no.	Pressure transmitter
100627	1	PRESSURE TRANSMITTER MAKER C	Pressure transmitter maker C	Transmitter model no.	Pressure transmitter
100628	1	PRESSURE TRANSMITTER MAKER C EX	Pressure transmitter maker C	Transmitter model no.	Pressure transmitter
100629	1	PRESSURE TRANSMITTER MAKER D EX	Pressure transmitter maker D	Transmitter model no.	Pressure transmitter

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100630	1	PRESSURE TRANSMITTER MAKER E	Pressure transmitter maker E	Transmitter model no.	Pressure transmitter
100631	1	TEMPERATURE TRANSMITTER MAKER A EX	Temperature transmitter maker A	Transmitter model no.	Temperature transmitter
100632	1	TEMPERATURE TRANSMITTER MAKER B	Temperature transmitter maker B	Transmitter model no.	Temperature transmitter
100633	1	TEMPERATURE TRANSMITTER MAKER C	Temperature transmitter maker C	Transmitter model no.	Temperature transmitter
100634	1	TEMPERATURE SWITCH MAKER A	Temperature switch maker A	Switch model no.	Temperature switch
100635	1	TEMPERATURE SWITCH MAKER B EX	Temperature switch maker B	Switch model no.	Temperature switch
100636	1	UV SENSOR MAKER A	UV sensor maker A	Sensor model no.	UV sensor
100637	1	UV SENSOR MAKER A EX	UV sensor maker A	Sensor model no.	UV sensor
100638	1	UV POCKET MAKER A	UV sensor maker A	Pocket model no.	UV pocket
100640	1	WATER SWITCH MAKER A	Water switch maker A	Switch model no.	Vibrating level switch
100641	1	WATER SWITCH MAKER A ATEX	Water switch maker A	Switch model no.	Vibrating level switch
100642	1	WATER SWITCH MAKER A IECEX	Water switch maker A	Switch model no.	Vibrating level switch
100643	1	WATER SWITCH MAKER B	Water switch maker B	Switch model no.	Capacitive level switch
100644	1	WATER SWITCH MAKER B EX	Water switch maker B	Switch model no.	Capacitive level switch
100645	1	WATER SWITCH MAKER C ATEX	Water switch maker C	Switch model no.	Vibrating level switch
100646	1	WATER SWITCH MAKER C IECEX	Water switch maker C	Switch model no.	Vibrating level switch
100647	1	CONTROL PANEL VERSION A GENERATION A	Electric cabinet manufacturer A	Control panel model no.	Control panel
100648	1	CONTROL PANEL VERSION B GENERATION A	Electric cabinet manufacturer A	Control panel model no.	Control panel

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100649	1	CONTROL PANEL VERSION C GENERATION A	Electric cabinet manufacturer A	Control panel model no.	Control panel
100650	1	CONTROL PANEL VERSION D GENERATION A	Electric cabinet manufacturer A	Control panel model no.	Control panel
100651	1	CONTROL PANEL VERSION E GENERATION A	Electric cabinet manufacturer A	Control panel model no.	Control panel
100652	1	CONTROL PANEL VERSION F GENERATION A	Electric cabinet manufacturer A	Control panel model no.	Control panel
100653	1	CONTROL PANEL VERSION G GENERATION A EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100654	1	CONTROL PANEL VERSION H GENERATION A EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100655	1	CONTROL PANEL VERSION J GENERATION A EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100656	1	CONTROL PANEL VERSION K GENERATION A	Electric cabinet manufacturer A	Control panel model no.	Control panel
100657	1	CONTROL PANEL VERSION L GENERATION A	Electric cabinet manufacturer A	Control panel model no.	Control panel
100658	1	CONTROL PANEL VERSION M GENERATION A	Electric cabinet manufacturer A	Control panel model no.	Control panel
100659	1	CONTROL PANEL VERSION N GENERATION A	Electric cabinet manufacturer A	Control panel model no.	Control panel
100660	1	CONTROL PANEL VERSION O GENERATION A EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100661	1	CONTROL PANEL VERSION P GENERATION A EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100662	1	CONTROL PANEL VERSION Q GENERATION A	Electric cabinet manufacturer A	Control panel model no.	Control panel
100663	1	CONTROL PANEL VERSION R GENERATION A	Electric cabinet manufacturer A	Control panel model no.	Control panel
100664	1	CONTROL PANEL VERSION S GENERATION A	Electric cabinet manufacturer A	Control panel model no.	Control panel
100665	1	CONTROL PANEL VERSION T GENERATION A EX	Electric cabinet manufacturer A	Control panel model no.	Control panel

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100666	1	CONTROL PANEL VERSION U GENERATION A EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100667	1	CONTROL PANEL VERSION V GENERATION A	Electric cabinet manufacturer A	Control panel model no.	Control panel
100668	1	CONTROL PANEL VERSION W GENERATION A EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100669	1	CONTROL PANEL VERSION X GENERATION A	Electric cabinet manufacturer A	Control panel model no.	Control panel
100670	1	CONTROL PANEL VERSION Y GENERATION A EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100671	1	CONTROL PANEL VERSION Z GENERATION A	Electric cabinet manufacturer A	Control panel model no.	Control panel
100686	1	CONTROL PANEL VERSION A GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100687	1	CONTROL PANEL VERSION B GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100688	1	CONTROL PANEL VERSION C GENERATION B EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100689	1	CONTROL PANEL VERSION D GENERATION B EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100690	1	CONTROL PANEL VERSION E GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100691	1	CONTROL PANEL VERSION F GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100692	1	CONTROL PANEL VERSION G GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100693	1	CONTROL PANEL VERSION H GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100694	1	CONTROL PANEL VERSION J GENERATION B EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100695	1	CONTROL PANEL VERSION K GENERATION B EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100696	1	CONTROL PANEL VERSION L GENERATION B EX	Electric cabinet manufacturer A	Control panel model no.	Control panel

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100697	1	CONTROL PANEL VERSION M GENERATION B EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100698	1	CONTROL PANEL VERSION N GENERATION B EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100699	1	CONTROL PANEL VERSION O GENERATION B EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100700	1	CONTROL PANEL VERSION P GENERATION B EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100701	1	CONTROL PANEL VERSION Q GENERATION B EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100702	1	CONTROL PANEL VERSION R GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100703	1	CONTROL PANEL VERSION S GENERATION B EX	Electric cabinet manufacturer A	Control panel model no.	Control panel
100704	1	CONTROL PANEL VERSION T GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100705	1	CONTROL PANEL VERSION U GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100706	1	CONTROL PANEL VERSION V GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100707	1	CONTROL PANEL VERSION W GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100708	1	CONTROL PANEL VERSION X GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100709	1	CONTROL PANEL VERSION Y GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100710	1	CONTROL PANEL VERSION Z GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100714	1	CIP CONTROL PANEL VERSION A GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100715	1	CIP CONTROL PANEL VERSION B GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100716	1	CIP CONTROL PANEL VERSION C GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100717	1	CIP CONTROL PANEL VERSION D GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100718	1	CIP CONTROL PANEL VERSION E GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100719	1	CIP CONTROL PANEL VERSION F GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100720	1	CIP CONTROL PANEL VERSION G GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100721	1	CIP CONTROL PANEL VERSION H GENERATION B	Electric cabinet manufacturer A	Control panel model no.	Control panel
100722	1	JUNCTION BOX VERSION A GENERATION B	Electric cabinet manufacturer A	Box model no.	Junction box
100723	1	JUNCTION BOX VERSION B GENERATION B	Electric cabinet manufacturer A	Box model no.	Junction box
100724	1	JUNCTION BOX VERSION C GENERATION B	Electric cabinet manufacturer A	Box model no.	Junction box
100725	1	JUNCTION BOX VERSION D GENERATION B	Electric cabinet manufacturer A	Box model no.	Junction box
100726	1	JUNCTION BOX VERSION E GENERATION B	Electric cabinet manufacturer A	Box model no.	Junction box
100727	1	UV POWER CABINET VERSION A MAKER A	UV Power maker A	UV power model no.	UV Power cabinet
100728	1	UV POWER CABINET VERSION B MAKER A	UV Power maker A	UV power model no.	UV Power cabinet
100729	1	UV POWER CABINET VERSION C MAKER A	UV Power maker A	UV power model no.	UV Power cabinet
100730	1	UV POWER CABINET VERSION A MAKER B	UV Power maker B	UV power model no.	UV Power cabinet
100731	1	UV POWER CABINET VERSION B MAKER B	UV Power maker B	UV power model no.	UV Power cabinet
100732	1	UV POWER CABINET VERSION C MAKER B	UV Power maker B	UV power model no.	UV Power cabinet
100734	1	UV POWER CABINET VERSION A MAKER C	UV Power maker C	UV power model no.	UV Power cabinet

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100735	1	UV POWER CABINET VERSION A MAKER D	UV Power maker D	UV power model no.	UV Power cabinet
100736	1	TOUCH PANEL MAKER A	Touch panel maker A	Touch panel model no.	Standalone Touch Panel
100737	1	TOUCH PANEL MAKER B	Touch panel maker B	Touch panel model no.	Standalone Touch Panel
100738	1	ALARM HORN AND LIGHT MAKER A	Alarm horn maker A	Alarm horn model no.	Combined unit, alarm horn and beakon
100739	1	ALARM HORN AND LIGHT MAKER B	Alarm horn maker B	Alarm horn model no.	Combined unit, alarm horn and beakon
100740	1	TRANSFORMER 690-440 SIZE A MAKER A	Transformer maker A	Transformer model no.	Transformer 690/440VAC
100741	1	TRANSFORMER 690-440 SIZE B MAKER A	Transformer maker A	Transformer model no.	Transformer 690/440VAC
100742	1	TRANSFORMER 690-440 SIZE C MAKER A	Transformer maker A	Transformer model no.	Transformer 690/440VAC
100743	1	TRANSFORMER 480-440 SIZE A MAKER A	Transformer maker A	Transformer model no.	Transformer 480/440VAC
100744	1	TRANSFORMER 480-440 SIZE B MAKER A	Transformer maker A	Transformer model no.	Transformer 480/440VAC
100745	1	TRANSFORMER 480-440 SIZE C MAKER A	Transformer maker A	Transformer model no.	Transformer 480/440VAC
100758	1	TRANSFORMER 690-440 SIZE A MAKER B	Transformer maker B	Transformer model no.	Transformer 690/440VAC
100759	1	TRANSFORMER 690-440 SIZE B MAKER B	Transformer maker B	Transformer model no.	Transformer 690/440VAC
100760	1	TRANSFORMER 690-440 SIZE C MAKER B	Transformer maker B	Transformer model no.	Transformer 690/440VAC
100761	1	TRANSFORMER 480-440 SIZE A MAKER B	Transformer maker B	Transformer model no.	Transformer 480/440VAC
100762	1	TRANSFORMER 480-440 SIZE B MAKER B	Transformer maker B	Transformer model no.	Transformer 480/440VAC
100763	1	TRANSFORMER 480-440 SIZE C MAKER B	Transformer maker B	Transformer model no.	Transformer 480/440VAC
100764	1	CLOUD SERVICE PANEL	Panel maker A	Panel model no.	Cloud service panel

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100765	1	CLOUD SERVICE PANEL 230VAC	Panel maker A	Panel model no.	Cloud service panel
100766	1	CLOUD SERVICE PANEL 4G	Panel maker A	Panel model no.	Cloud service panel
100767	1	CLOUD SERVICE PANEL 4G 230VAC	Panel maker A	Panel model no.	Cloud service panel
Multiple	N/A	BUTTERFLY VALVE MAKER A	Valve maker A	Valve model no.	Butterfly valve
Multiple	N/A	BUTTERFLY VALVE MAKER B	Valve maker B	Valve model no.	Butterfly valve
100802	1	AIR VALVE SIZE A MAKER A	Air valve maker A	Air valve model no.	Air release valve
100803	1	AIR VALVE SIZE B MAKER A	Air valve maker A	Air valve model no.	Air release valve
100804	1	AIR VALVE SIZE A MAKER B	Air valve maker B	Air valve model no.	Air release valve
100805	1	AIR VALVE SIZE B MAKER B	Air valve maker B	Air valve model no.	Air release valve
100808	1	AIR VALVE SIZE A MAKER C	Air valve maker C	Air valve model no.	Air release valve
100809	1	AIR VALVE SIZE B MAKER C	Air valve maker C	Air valve model no.	Air release valve
100812	1	AIR VALVE SIZE C MAKER C	Air valve maker C	Air valve model no.	Air release valve
100813	1	BALL VALVE SIZE A MAKER A	Ball valve maker A	Ball valve model no.	Ball valve
100814	1	BALL VALVE SIZE B MAKER A	Ball valve maker A	Ball valve model no.	Ball valve
100815	1	BALL VALVE SIZE C MAKER A	Ball valve maker A	Ball valve model no.	Ball valve
100822	1	BALL VALVE SIZE D MAKER A EX	Ball valve maker A	Ball valve model no.	Ball valve
100823	1	BALL VALVE SIZE E MAKER A EX	Ball valve maker A	Ball valve model no.	Ball valve
100820	1	BALL VALVE SIZE A MAKER B EX	Ball valve maker B	Ball valve model no.	Ball valve
100821	1	BALL VALVE SIZE B MAKER B EX	Ball valve maker B	Ball valve model no.	Ball valve
100830	1	BALL VALVE SIZE C MAKER B EX	Ball valve maker B	Ball valve model no.	Ball valve
100831	1	BALL VALVE SIZE D MAKER B EX	Ball valve maker B	Ball valve model no.	Ball valve
100834	1	SAMPLING ASSEMBLY SIZE A	Sampling maker A	Sampling model no.	Sampling assembly
100835	1	SAMPLING ASSEMBLY SIZE B	Sampling maker A	Sampling model no.	Sampling assembly
100836	1	SAMPLING ASSEMBLY SIZE C	Sampling maker A	Sampling model no.	Sampling assembly

BWMS maker item no.	Rev. no.	BWMS maker item description	Sub-supplier	Sub-supplier description / model no.	Functionality
100837	1	ELECTRIC ACTUATOR SIZE A MAKER A	Actuator maker A	Actuator model no.	Electrical quarter-turn actuator
100838	1	ELECTRIC ACTUATOR SIZE B MAKER A	Actuator maker A	Actuator model no.	Electrical quarter-turn actuator
100839	1	ELECTRIC ACTUATOR SIZE C MAKER A	Actuator maker A	Actuator model no.	Electrical quarter-turn actuator
100840	1	ELECTRIC ACTUATOR SIZE A MAKER A EX	Actuator maker A	Actuator model no.	Electrical quarter-turn actuator
100841	1	ELECTRIC ACTUATOR SIZE B MAKER A EX	Actuator maker A	Actuator model no.	Electrical quarter-turn actuator
100844	N/A	UV POWER CABLE TYPE A MAKER A	Cable maker A	Cable model no.	High voltage power cable from UV Power cabinet
100845	N/A	UV POWER CABLE TYPE B MAKER A	Cable maker A	Cable model no.	High voltage power cable from UV Power cabinet
100846	N/A	UV POWER CABLE TYPE C MAKER A	Cable maker A	Cable model no.	High voltage power cable from UV Power cabinet
N/A	N/A	GENERAL POWER CABLES	Cable maker A	Power cables	Cables
100847	1	CIP UNIT MODEL A	CIP maker A	CIP unit model no.	Cleaning-in-Place unit
100848	1	CIP UNIT MODEL B	CIP maker A	CIP unit model no.	Cleaning-in-Place unit
100851	1	CIP UNIT MODEL A ATEX	CIP maker A	CIP unit model no.	Cleaning-in-Place unit
100852	1	CIP UNIT MODEL B ATEX	CIP maker A	CIP unit model no.	Cleaning-in-Place unit
100853	1	CIP UNIT MODEL A IECEX	CIP maker A	CIP unit model no.	Cleaning-in-Place unit
100854	1	CIP UNIT MODEL B IECEX	CIP maker A	CIP unit model no.	Cleaning-in-Place unit

ANNEX 2

BILL OF MATERIALS EXAMPLE FOR AN ACTIVE SUBSTANCE-BASED, TYPE APPROVED BWMS

Note: Component details have been redacted for confidentiality; however, the column headings of the example BOM have been retained to provide information on the BOM details required.

INSTRUMENTATION LIST				PREFERRED EQUIPMENT			
ID	DESCRIPTION	SPECIFICATIONS	MATERIAL	MFR	MODEL NO.	APPROVALS	CERTIFICATE NO.
C/T-07	CONDUCTIVITY/TEMPERATURE TRANSMITTER						
C/T-07	CONDUCTIVITY/TEMPERATURE TRANSMITTER						
LSH-07	LEVEL SWITCH HIGH - DPD SAMPLE TANK						
PI-06	PRESSURE INDICATOR - CIRCULATION PUMP INLET						
PI-07	PRESSURE INDICATOR - DPD SAMPLE PUMP						
PT-06	PRESSURE TRANSMITTER CIRCULATION PUMP INLET						
PT-06	PRESSURE TRANSMITTER CIRCULATION PUMP INLET						
PT-06	PRESSURE TRANSMITTER CIRCULATION PUMP INLET						

INSTRUMENTATION LIST				PREFERRED EQUIPMENT			
ID	DESCRIPTION	SPECIFICATIONS	MATERIAL	MFR	MODEL NO.	APPROVALS	CERTIFICATE NO.
PT-06A	PRESSURE TRANSMITTER CIRCULATION PUMP OUTLET (LOOSE SHIPPED)						
PT-06A	PRESSURE TRANSMITTER CIRCULATION PUMP OUTLET (LOOSE SHIPPED)						
PT-06A	PRESSURE TRANSMITTER CIRCULATION PUMP OUTLET (LOOSE SHIPPED)						
XIT-07	RESIDUAL OXIDANT MONITOR - DPD						
XIT-07	RESIDUAL OXIDANT MONITOR - DPD						
P-07	MOTOR						

De-Chlor Module and Bulk Chemical Module Equipment

ID	DESCRIPTION	SPECIFICATIONS	MATERIAL	MFR	MODEL NO.	APPROVALS	CERTIFICATE NO.
XV-04	SHUTOFF VALVE - DC TANK FILL	ELECTRIC, SPRING CLOSED					
XV-04B	SHUTOFF VALVE - FRESH WATER FLUSH	ELECTRIC, SPRING CLOSED					
ME-04	MIXING EDUCTOR - DC TANK						

De-Chlor Module and Bulk Chemical Module Equipment

ID	DESCRIPTION	SPECIFICATIONS	MATERIAL	MFR	MODEL NO.	APPROVALS	CERTIFICATE NO.
TK-04	DC MODULE TANK						
TK-05	BC MODULE TANK						
P-04	PUMP						
	MOTOR						
P-04A	PUMP						
	MOTOR						
P-05A	PUMP						
	MOTOR						
LIT-04	LEVEL INDICATOR TRANSMITTER - DC MODULE						
LIT-05	LEVEL INDICATOR TRANSMITTER - BC MODULE						
PI-04	PRESSURE INDICATOR - DC MIXING						

Electrochlorination Module Equipment

ID	DESCRIPTION	SPECIFICATIONS	MATERIAL	MFR	MODEL NO.	APPROVAL	CERTIFICATE NO.
GD-02X	GAS DETECTOR TRANSMITTER						
GD-02X	GAS DETECTOR SENSOR						
GD-02X	GAS MONITOR SYSTEM						
PS-02	PRESSURE SWITCH						
EC-01	ELECTROCHLORINATION (EC) CELL						

Electrochlorination Module Equipment

ID	DESCRIPTION	SPECIFICATIONS	MATERIAL	MFR	MODEL NO.	APPROVAL	CERTIFICATE NO.
EC-01	ELECTROCHLORINATION (EC) CELL						
EC-01	ELECTROCHLORINATION (EC) CELL						
CO-01	COALESCER						
CO-01	COALESCER						
CO-01	COALESCER						
DG-01	DEGASSER						
GRV-01	GAS RELEASE VALVE						
HE-03	HEAT EXCHANGER - POWER SUPPLY						
TK-03	FW COOLING HEAD TANK - IF INSTALLED						
B-02	DILUTION BLOWER MOTOR						
B-02	DILUTION BLOWER MOTOR						
B-02A	DILUTION BLOWER MOTOR						
B-02A	DILUTION BLOWER MOTOR						
P-03	POWER SUPPLY FW COOLING PUMP - IF INSTALLED						
	MOTOR - IF INSTALLED						

Electrochlorination Module Equipment

ID	DESCRIPTION	SPECIFICATIONS	MATERIAL	MFR	MODEL NO.	APPROVAL	CERTIFICATE NO.
P-03	POWER SUPPLY FW COOLING PUMP - IF INSTALLED						
	MOTOR - IF INSTALLED						
P-08	ACID CIRCULATION PUMP						
	MOTOR						
P-08A	ACID LAYUP PUMP						
	MOTOR						
C/T-01	CONDUCTIVITY/TEMPERATURE TRANSMITTER						
FIT-01	FLOW INDICATOR TRANSMITTER						
GD-02	GAS DETECTOR - H/2 DEGAS LEL						
GD-02	GAS DETECTOR - H/2 DEGAS LEL						
GD-02A	GAS DETECTOR - OVERHEAD H/2 LEL						
GD-02A	GAS DETECTOR - OVERHEAD H/2 LEL						
GD-02B	GAS DETECTOR - H/2 DEGAS HOOD LEL						
LSL-01	LEVEL SWITCH LOW - EC CELL						
LSL-01A	LEVEL SWITCH LOW - EC CELL						

Electrochlorination Module Equipment

ID	DESCRIPTION	SPECIFICATIONS	MATERIAL	MFR	MODEL NO.	APPROVAL	CERTIFICATE NO.
LSH-02	LEVEL SWITCH HIGH - H2 DEGAS						
PI-01	PRESSURE INDICATOR - EC MODULE FEED						
PI-03	PRESSURE INDICATOR - FW COOLING PUMP DISCHARGE						
PS-01	PRESSURE SWITCH - EC CELL						
PS-02	PRESSURE SWITCH - DILUTION AIR						
PT-01	PRESSURE TRANSMITTER - EC MODULE FEED						
PT-01	PRESSURE TRANSMITTER - EC MODULE FEED						
PMK01	TRANSFORMER RECTIFIER - POWER SUPPLY						
PMK02	TRANSFORMER RECTIFIER - POWER SUPPLY						
PMK04	TRANSFORMER RECTIFIER - POWER SUPPLY						
PMK08	TRANSFORMER RECTIFIER - POWER SUPPLY						

Electrochlorination Module Equipment

ID	DESCRIPTION	SPECIFICATIONS	MATERIAL	MFR	MODEL NO.	APPROVAL	CERTIFICATE NO.
PM01	TRANSFORMER RECTIFIER - POWER SUPPLY						
PM02	TRANSFORMER RECTIFIER - POWER SUPPLY						
PM04	TRANSFORMER RECTIFIER - POWER SUPPLY						
PM04	TRANSFORMER RECTIFIER - POWER SUPPLY						
PM08	TRANSFORMER RECTIFIER - POWER SUPPLY						
PM16	TRANSFORMER RECTIFIER - POWER SUPPLY						
PMK12	TRANSFORMER RECTIFIER - POWER SUPPLY						
PMK16	TRANSFORMER RECTIFIER - POWER SUPPLY						
PMKA01	TRANSFORMER RECTIFIER - POWER SUPPLY						

Electrochlorination Module Equipment

ID	DESCRIPTION	SPECIFICATIONS	MATERIAL	MFR	MODEL NO.	APPROVAL	CERTIFICATE NO.
PMKA02	TRANSFORMER RECTIFIER - POWER SUPPLY						
PMKA04	TRANSFORMER RECTIFIER - POWER SUPPLY						
PMKA04	TRANSFORMER RECTIFIER - POWER SUPPLY						
PMKA08	TRANSFORMER RECTIFIER - POWER SUPPLY						
PMKA12	TRANSFORMER RECTIFIER - POWER SUPPLY						
PMKA16	TRANSFORMER RECTIFIER - POWER SUPPLY						