Assets Planning and Delivery Group
Engineering

Strategic Product Specification

SPS 240

Hydraulically Operated Automatic Control Valves

VERSION 2
REVISION 2

MAY 2022

FOREWORD

Each Strategic Product Specification has been prepared to inform Water Corporation staff, consultants, contractors and land developers of the requirements for selecting and acquiring a manufactured product to be used in strategic Corporation infrastructure. The definition of 'Product' includes items that comprise assembled components, equipment or plant for mechanical, electrical and civil infrastructure applications.

The objective of a Strategic Product Specification is to specify fit-for-purpose Product which will contribute to the provision of effective water services at least whole-of-life cost and with least risk to service standards and safety. A Strategic Product Specification also provides uniform standards for compatibility of new water infrastructure with existing water assets.

Many Strategic Product Specifications have drawn on the design, asset management and operational experience of Product performance in live service gained by the Corporation over time. Some Strategic Product Specifications have drawn on the experience of the water industry nationally by referencing Australian or WSAA standards.

Strategic Product Specifications are intended for reference and use in the following typical procurement scenarios:

- Capital funded infrastructure design and construction work;
- Private developer funded subdivision infrastructure for takeover by the Corporation;
- Operationally funded infrastructure design and construction work;
- Corporation period contracts for Product purchases;
- Product purchases for stock or for miscellaneous minor work.

A published Strategic Product Specification will, in some cases, comprise technical content that is typical of a range of products of the same type (type specification) but may exclude specific requirements that should apply to a particular project or application. In such cases, the project designer is required to document the supplementary project specific requirements in the appropriate Clause of the 'Project Specific Requirements' Appendix of the Specification.

The text of a published Specification should not be directly modified. In the event that a text variation is considered necessary to accommodate the needs of a particular project or application, the text modification should be documented in the appropriate Clause of a 'Project Specific Requirements' Appendix.

Enquiries relating to the technical content of this Specification should be directed to the Senior Principal Engineer, Mechanical, Engineering to whom all enquiries relating to the technical content of the Specification should be directed. Future Specification changes, if any, will be issued to registered Specification users as and when published.

Head of Engineering

This document is prepared without the assumption of a duty of care by the Water Corporation. The document is not intended to be nor should it be relied on as a substitute for professional engineering design expertise or any other professional advice.

It is the responsibility of the user to ensure they are using the current version of this document.

REVISION STATUS

The revision status of this specification is shown section by section below:

REVISION STATUS						
SECT.	**VER./ REV.**	**DATE**	**PAGES REVISED**	**REVISION DESCRIPTION (Section, Clause, Sub-Clause)**	**RVWD.**	**APRV.**
1	2/0	11.05.09	All	Reformatted, retitled and AS 5081 referenced	SE	AAK
1	**2/2**	**07/05/21**	**7**	**Scope generally revised**	**SE**	**DM**
2	2/0	11.05.09	All	Reformatted, retitled and AS 5081 referenced	SE	AAK
2	2/1	20.04.12	13	Updated Alternative Materials, Control Piping	NL	SE
2	**2/2**	**10.03.20**	**13**	**Ductile iron diaphragm-supporting disc and NAB stem nut now accepted in lieu of stainless steel.**	**BV/SM**	**SE**
3	2/0	11.05.09	All	Reformatted, retitled and AS 5081 referenced	SE	AAK
3	**2/2**	**10.03.20**	**14**	**Reference to Cuno filter element CT101 added. Trialing self-flushing filters.**	**BV/SM**	**SE**
4	2/0	11.05.09	All	Reformatted, retitled and AS 5081 referenced	SE	AAK
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11	2/0	11.05.09	All	Reformatted, retitled and AS 5081 referenced	SE	AAK
11	**2/2**	**10.06.20**	**27**	**Included self-flushing filters in the purchasing schedule**	**SM**	**SE**

REVISION STATUS						
SECT.	**VER./ REV.**	**DATE**	**PAGES REVISED**	**REVISION DESCRIPTION (Section, Clause, Sub-Clause)**	**RVWD.**	**APRV.**
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Strategic Product Specification

SPS 240

Hydraulically Operated Automatic Control Valves

CONTENTS

1 Scope and General

1.1 Scope

This Specification sets out requirements for the manufacture, supply, handling and delivery of hydraulically operated globe style automatic control valves, as further described in the following. Hydraulically operated automatic control valves are purpose-designed valves used in the water industry for various pressure, flow and level control functions and as further detailed in Clause 1.1 of AS 5081. Globe valves may be Tee pattern, with the plane of the seat plane perpendicular to the inflow direction, or Wye Pattern, with the plane of the seat angled to the inflow.

This Specification is not intended for axial control valves which are normally power actuated and are covered by SPS 241.

The Specification details the requirements in lieu of specific clauses, or as clarification for options that exist within, or as additional requirements to AS 5081. Accordingly, unless otherwise specified in this Specification, the valves shall be manufactured, tested and supplied in accordance with the relevant requirements of AS 5081 for hydraulically operated automatic control valves. The Specification also details the means by which product compliance with the Specification shall be demonstrated and the criteria for acceptance.

Control valves have the potential to involve a high degree of complexity during the design and selection process, with numerous options and issues to be considered. The Purchaser/Designer shall not use this Specification without first complying with Clause 3.16.2 and the requirements referenced therein.

The control valves shall be in a new unused condition.

1.2 Referenced Documents

The following documents are referenced in this Specification:

AS

2550.1 Cranes, hoists and winches – Safe use - General

2550.3 Cranes, hoists and winches – Safe use – Bridge, Gantry, Portal (including container cranes), jib and monorail cranes

2550.5 Cranes, hoists and winches – Safe use - Mobile

2550.11 Cranes, hoists and winches – Safe use – Vehicle loading cranes

5081 Hydraulically operated automatic control valves for waterworks purposes

AS ISO

7.1 Pipe threads where pressure-tight joints are made on the threads – Dimensions, tolerances and designation

AS/NZS ISO

9001 Quality management systems – requirements

ISO/IEC

17025 General requirements for the competence of testing and calibration laboratories

Standards Australia Guides

HB 18 Guidelines for third-party certification and accreditation

HB 18.2 Guide 2-General terms and their definitions concerning standardization and related activities

HB 18.22 Guide 22-Information on manufacturer's declaration of conformity with standards and other technical specifications

HB 18.23 Guide 23-Methods of indicating conformity with standards for third-party certification

systems

HB 18.28 Guide 28-General rules for model third-party certification system for products

MP52 Manual of authorization procedures for plumbing and drainage products

Strategic Product Specifications

SPS 252 Metallic Ball Valves for General Purposes

1.3 Definitions and Notation

1.3.1 Cavitation

A condition that occurs within the valve when the fluid pressure drops below the fluid vapour pressure forming vapour bubbles which can cause vibration, noise and severe damage in contact with component surfaces.

1.3.2 Cavitation Index

A dimensionless number below which the performance of the valve is likely to be affected by cavitation. It is expressed as:

$$\sigma = (P_2 - P_v)/ (P_1 - P_2)$$

Where: σ = Cavitation index

P_1 = Inlet pressure; P_2 = Outlet pressure;

P_v = Water vapour pressure relative to atmospheric pressure

1.3.3 Certificate

A formal certificate defined in SAA HB 18.2 and operated in accordance with SAA HB 18.22 that, as an outcome of Product Certification, attests Product conformity with the nominated product and test standards and authorizes the use of a Certification Mark.

1.3.4 Certification Body

An independent (or third party) organisation duly accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) to operate Certification Schemes.

In the case of a non-strategic plumbing Product, a Certification Body means an organisation approved by Standards Australia to administer the National Certification of Plumbing and Drainage Products (NCPDP) Scheme in accordance with SAA MP 52.

1.3.5 Certification Mark

A trademark or other mark of product conformity with a specified standard defined in SAA HB 18.2 and applied in accordance with SAA HB 18.23 that is issued under the rules of a Certification Scheme.

1.3.6 Certification Scheme

A product certification program or system which is operated in accordance with JAS-ANZ Procedure 15 – General requirements for bodies operating product certification systems and in accordance with the general rules of SAA HB 18.28 and System No. 5 as defined in ISO/ITC publication - Certification - Principles and practice. In the case of a non-strategic plumbing Product, a Certification Scheme means the NCPDP Scheme.

NOTE: The effect of this is to require maintenance by the manufacturer of effective production control planning in addition to full type testing from independently sampled production and subsequent verification of conformity with specified standards.

1.3.7 Choked Flow

A condition where the rate of flow through the valve cannot be increased by increasing the pressure differential across the valve. It occurs when cavitation or flashing causes vapour bubbles to form in the vena contracta which disrupts the flow passage to the extent that increased flow is not possible.

1.3.8 Compliant Product

Product that has been assessed, by means of Product Appraisal, as conforming to standards and specifications that are nominated by the Corporation.

1.3.9 Corporation

The Water Corporation of Western Australia.

1.3.10 Allowable Velocity

The maximum flow rate for continuous operation through a fully open valve port.

1.3.11 Maximum Allowable Velocity

The maximum flow rate for intermittent operation through a fully open valve port.

1.3.12 Manufacturer

An entity or combination of entities that are responsible for selection, processing and control of Product constituent materials or compounds and for the processing equipment that collectively result in the manufactured product.

1.3.13 Notation

Statements expressed by use of the word ‘shall’ are mandatory or ‘normative’ requirements of the Specification. Statements expressed by use of the words ‘should’ or ‘may’ are ‘informative’ but not mandatory and are provided only for information and guidance. Notes in Specification text are informative. Notes that form part of Specification Tables are normative. An Appendix to the Specification that is designated ‘normative’ contains mandatory requirements. An Appendix that is designated ‘informative’ is provided for information and guidance only. The term ‘specified’ includes requirements of the Specification and requirements stated or referenced in other project documentation.

1.3.14 Officer

A duly authorised representative or appointed agent of the Corporation.

1.3.15 Operating Envelope

The limits of operating duties (flows and pressure) that a valve is required to operate within as defined in Table 11.2.

1.3.16 Pressure Class (PN)

A classification of pressure by PN number, based on the allowable operating pressure (AOP) expressed in Megapascals (PN = 10 x AOP).

1.3.17 Pressure Differential

Is the difference in pressure across the valve that exists under either static or dynamic flow conditions.

1.3.18 Product

A single unit or multiple units of manufactured end product or an assembly of manufactured component products, materials or equipment. This Specification and accompanying Purchasing Schedule define the nature and details of Product to be supplied. In this Specification the Product shall refer to hydraulically operated automatic control valves.

NOTE 1: An end product is most commonly an output of manufacturing processes that result in finished end products having the same features and characteristics and can be the result of a single or multiple production batches.

NOTE 2: Manufactured equipment and assemblies of Product components or materials are commonly procured for mechanical, electrical and civil infrastructure applications.

1.3.19 Product Appraisal

A formal process whereby Product, including product design, is subjected to systematic engineering assessment to determine Product fitness for prescribed end uses and to evaluate the extent of Product and production systems conformity with nominated standards and specifications. Product Appraisal includes verification of the extent of compliance in accordance with the requirements of a relevant 'Technical Compliance Schedule' Appendix.

1.3.20 Product Assessor

An organization, Officer or other person who, having demonstrated specialist product knowledge and competence acceptable to the Corporation, is nominated by the Corporation, subjects Product to Product Appraisal and issues one or more Product Verification Reports.

1.3.21 Product Certification

A formal process whereby the production and management systems for the manufacture of Product, are assessed by a Certification Body to evaluate compliance of these systems with prescribed product standards and tests, under Certification Scheme rules.

1.3.22 Product Verification Report

A formal report wherein a Product Assessor evaluates the extent of Product compliance with the nominated product standards and specifications.

NOTE: Verification may be on a project-by-project basis or at agreed intervals, as appropriate to the scope of a Purchasing Schedule and Product end use, subject to determination by the Corporation.

1.3.23 Product Warranty

A formal express undertaking by a Supplier or Manufacturer that Product is:

- In conformity with the nominated product specification and referenced standards;
- Fit for the nominated Product end use or application;
- Designed for sustained operation at the nominated service performance levels for the specified design life;
- Adequately packaged for intended transportation, handling and storage conditions;
- Supported by English language installation, operating and servicing instructions;
- Adequately supported by Supplier capacity to provide technical Product support.

NOTE: Where required, a Product Warranty should indemnify the Corporation against claims made or losses suffered as a result of breach of the Warranty by means of Public and Products Liability Insurances as specified in the undertaking.

1.3.24 Purchasing Schedule

A Corporation purchase order, tender, schedule of prices, bill of quantities, or specification that details the nature, quantity and other characteristics of Product to be supplied, purchased or installed.

NOTE: Appendix A of this Specification forms part of the Purchasing Schedule

1.3.25 Quality System

A management system that establishes, documents, implements and maintains organizational structures, resources, responsibilities, processes and procedures for the manufacture of Product and provision of Product related services in accordance with the requirements of AS/NZS ISO 9001.

1.3.26 Radial Valve

A hydraulically operated automatic control valve which comprises four separate hydraulically operated, diaphragm actuated globe valves in the one body

1.3.27 Strategic Product

An essential product whose performance is critical in eliminating risk to the safe and effective provision of water services, which are functions of the Corporation under the Water Corporation Act as licensed under the Water Services Coordination Act.

NOTE 1: Strategic product is most commonly an element of permanent Corporation infrastructure. Ancillary operational and safety equipment, not intended to form part of this infrastructure, may be considered strategic by virtue of enhanced operational performance or personnel safety.

NOTE 2: Plumbing products (end-of-line water service fittings DN 32 or smaller) used in strategic services may, by virtue of statutory and regulatory requirements, be considered strategic in Corporation applications.

1.3.28 Supplier

An entity or combination of entities that is responsible for the supply of Product.

NOTE: A Supplier may be a Product manufacturer, owner, producer, distributor or vendor or an agent, tenderer or contractor for supply of Product or Product related service.

1.3.29 Testing

The determination of Product characteristics by inspection, and by the application of specified test procedures.

1.3.30 Valve

Shall mean hydraulically operated automatic control valve.

1.3.31 WSAA

The Water Services Association of Australia of which the Water Corporation is a corporate member.

1.4 Designation of Size

Hydraulically operated automatic control valve nominal flange sizes shall comply with Clause 1.6 of AS 5081.

NOTE: The sizes referred to in Clause 1.6 of AS 5081 should not be confused with the port size which refers to the diameter of the internal seat port. The internal seat port can be a full diameter or reduced port.

2 Materials and Components

2.1 General

Materials and component for the valves shall comply with the requirements specified in Section 2 of AS 5081 and the requirements outlined below.

Where alternative materials are proposed (excluding AS 5081 Appendix D1) the manufacturer shall prove to the Officer that the materials offered are equivalent or superior to those contained in this Specification.

2.2 Body and Cover

2.2.1 Alternative Materials

Table 2.1 of AS 5081 shall be amended to the extent that use of grey cast iron for the valve body and cover shall be permissible. Grey cast iron shall comply with the alternative material requirements contained in AS 5081 Appendix D, Table D1.

2.2.2 Material Designation

The body and cover material grades referred to in AS 5081 for ductile cast iron shall be amended as shown below:

a) Grade 500-7 shall be replaced by the material designation ISO 1083/JS/500 – 7/U.

b) Grade 400-15 shall be replaced by the material designation ISO 1083/JS/400 – 15/U.

2.3 Valve Trim Materials

For the purpose of this Specification the valve trim includes the seal disc, diaphragm-supporting disc(s), stem(s), stem nut(s), seat ring(s), V-port throttling plug and anti-cavitation trim.

The valve trim components shall be manufactured from stainless steel material complying with a recognized standard grade with a PREN ≥ 22, with the following exceptions:

The diaphragm-supporting disc may be manufactured from ductile cast iron in cases where the relative strength of stainless steel is deemed insufficient. The ductile iron components shall be coated in accordance with the requirements specified in Section 4 of AS 5081.

The stem nut material shall be selected to prevent galling between the stem and stem nut. For this purpose, the Corporation has preference for the use of Nickel Aluminum Bronze as the stem nut material, in accordance with AS 1565 C95810. Stem nut materials of equivalent or superior performance may be acceptable subject to being authorized for use by the Corporation. All copper alloys shall be dezincification resistant in accordance with AS 2345.

2.4 Filter Housing

Filter housings shall be manufactured from corrosion-resistant material as specified in Clause 2.2 of AS 5081. Stainless steel filter housings shall be of minimum grade 316.

2.5 Control Piping

Table 2.1 of AS 5081 shall be amended to the extent that use of stainless steel for the control piping shall be permissible. Stainless steel shall comply with the alternative material requirements contained in AS 5081 Appendix D, Table D1. If welding is involved in the fabrication process of the stainless steel, post-welding manufacturing processes (pickling, passivation) must be utilized.

3 Design

3.1 General

Design of hydraulically operated automatic control valves shall comply with requirements contained in Section 3 of AS 5081 and the following.

3.2 Ball Valves

Where ball valves are supplied in accordance with Clause 3.4.2 of AS 5081 or for any other purpose they shall comply with the requirements of SPS 252.

3.3 Bare Control Valves

Where specified in the Purchasing Schedule (Table 11.3 of this Specification) bare valves shall be supplied.

NOTE: In this instance the Corporation will supply all the hydraulic pilot controls and associated pipework including ancillary equipment such as filters, for mounting in a remote control panel.

3.4 Body and Cover Tapping

Clause 3.3.4 of AS 5081 shall be amended to the extent that body and cover tappings shall be BSPT.

3.5 Cavitation

Valves shall be designed for cavitation free operation over the operating envelope specified in the Purchasing Schedule (Table 11.2 of this Specification). The manufacturer shall provide calculations to prove that the valve will operate free of cavitation and in a stable manner under the specified flow conditions.

3.6 Cavitation Index

The cavitation index for the valve operating under maximum head conditions shall be greater than 1.0.

NOTE: Valves will be subject to incipient cavitation (mild) for values less than 1.0 and severe cavitation for values less than 0.5 which would be associated with a high potential for serious damage.

3.7 Allowable Velocity

The allowable velocity should generally comply with the following:

a) 0 – 2 m/s for ON/OFF service valves.
b) 2 – 6 m/s for regulating service, depending on the application (e.g. PRV, PSV etc.).
c) 0 – 15 m/s for surge anticipation service.

3.8 Maximum Allowable Velocity

The maximum allowable velocity shall be 7 m/s for intermittent operation.

NOTE: Surge anticipation would be regarded as an instantaneous flow condition not intermittent.

3.9 Filters

The water supply upstream of the inlet to the hydraulic pilot pipework shall be filtered utilising a Y-strainer, cartridge filter (Cuno CT101 or equivalent) or a cleanable disc filter (Bermad Large Control Filter or equivalent) as nominated in the Purchasing Schedule (Table 11.3 of this Specification).

NOTE: The Corporation is considering trialing various options of self-flushing filters for the purpose of reducing maintenance costs. Sites chosen for this trial shall be nominated in the Purchasing Schedule by the Designer. Where nominated, Suppliers shall provide the self-flushing filter as an alternative option in their quotation along with submitting the relevant product literature.

3.9.1 Cartridge Filters

Single or downstream (where two filters are fitted in series) cartridge filters shall contain 50 micron reusable filter elements that comply with AS 4020. Cartridge housings shall be manufactured in corrosion-resistant materials in accordance with Clause 2.4 of this Specification.

3.9.2 Number and Configuration

The number and configuration of cartridge filters shall be as nominated in the Purchasing Schedule (Table 11.3 of this Specification) from the following options:

a) A single cartridge filter,
b) Two cartridge filters in series,
c) Two cartridge filters in parallel.

NOTES:

1. Valves installed in the metropolitan area are generally fitted with cartridge-type filters.
2. For two filters in series, the upstream filter is generally coarser than the downstream filter, with the micron passage sized to suit the particular water quality.
3. Two filters in parallel are used where it is necessary for the control valve to remain in service whilst filter maintenance is being carried out.
4. Y-strainers are often used in country regions.

3.10 Flanged End Connections

Clause 3.2 of AS 5081 shall be amended to the extent that flange drilling shall comply with AS 4087.

3.11 Flow Coefficient *(Kv)*

The manufacturer shall provide flow coefficient *Kv* values at various valve openings from 0% to 100%.

3.12 Noise Levels

Noise level may be a critical factor in the selection of a valve depending upon the sensitivity of the location. Accordingly minimal noise performance may be required in accordance with the Purchasing Schedule (Table 11.1 of this Specification). The manufacturer shall provide the maximum sound pressure level generated from the valve (at 1 m from the valve body) as required in Table 12.2 of this Specification.

3.13 Pilots

Pilots shall be configured in master-and-slave arrangements where necessary (e.g. to improve the control responsiveness of valves with large control chambers).

3.14 Solenoids

Solenoids used for pilot controls shall be 24 VDC or 24 VAC unless otherwise nominated in the Purchasing Schedule.

3.15 Threaded End Connections

Clause 3.2 of AS 5081 shall be amended to include the following requirement: “Threaded end connections shall be sealing threads complying with AS ISO 7.1 Series RP for an internal (parallel) thread and Series R for an external (taper) thread.”

3.16 Valve Selection

3.16.1 Parameters

Valve selection shall be based on the following performance indicators:

a) Operating envelope,
b) Cavitation index,

c) Dynamic pressure differential across the valve,
d) Maximum flow velocity (choked flow),

These parameters should not be considered exclusive and the list should be expanded as required to suit the particular application.

3.16.2 Design and Selection

Control valve applications are relatively complex and require a number of options and requirements to be addressed to enable them to be correctly specified. The valve selection shall be based on proper investigation and design after consideration of all the factors and parameters related to the application. Accordingly this Specification shall not be used without first having completed as a minimum, Tables 11.1, 11.2 and 11.3 in Appendix A, which form an integral part of the Purchasing Schedule.

NOTE: Tables 11.1 to 11.3 have been compiled to enable the designer to work through the options and requirements in a structured manner, by ticking or otherwise completing the appropriate boxes.

4 Coatings

4.1 General

Ductile cast iron and grey cast iron components shall be coated with either a fusion-bonded polymeric coating, or a two-pack epoxy coating in accordance with the requirements specified in Section 4 of AS 5081.

NOTE: Section 4 of AS 5081 specifies the following options: a fusion-bonded polymeric coating system in accordance with AS/NZS 4158; or a high-build two-pack epoxy coating system in accordance with Appendix E; or in accordance with the purchaser's requirements.

5 Testing

5.1 General

Product shall be tested in accordance with the test requirements of this Specification. Testing shall be deemed acceptable when test outcomes have been formally verified by a Certification Body or witnessed by a testing Officer. Product for which a test requirement has not been met shall be classified as non-compliant Product.

NOTE 1: Testing should be carried out by an organisation accredited by NATA or in accordance with ISO/IEC 17025.

NOTE 2: A testing Officer should normally be an Officer who has specialist knowledge of or training in product or materials testing appropriate to the Product characteristics to be tested.

5.2 Notification of Testing

The Corporation shall be notified in writing of each formal test proposal at least seven (7) days prior to the preparation of Product for testing except where a specified test has been the subject of a current valid Certificate issued by a Certification Body. This notification is required to enable the Corporation to make all necessary arrangements including appointment of a testing Officer in a timely manner.

5.3 Access to the Place of Manufacture

The testing Officer shall be afforded access, at all reasonable times, to all places of manufacture of Product or product components and shall be authorised to arrange or undertake such testing there as the Corporation deems appropriate to the testing regime specified.

5.4 Place of Manufacture other than WA

Where any Product or product component is being manufactured other than in Western Australia the Corporation may appoint a local inspecting Officer to undertake inspections and witnessed testing as required. The testing Officer shall be provided with all due authority and permits required to carry out testing at the place of manufacture.

NOTE: The cost of witnessed testing arranged by the Corporation will normally be borne by the Corporation unless otherwise negotiated.

5.5 Performance Test Requirements

5.5.1 Production Tests

Each valve shall be tested by the manufacturer in accordance with Clause 5.4 contained in AS 5081 and provided with a test certificate.

5.5.2 Test Certificates

For the purposes of acceptance, each test certificate shall, as a minimum, bear the relevant Product item serial number and shall certify that the Product item has complied with the specified test requirements contained in AS 5081.

6 Marking and Packaging

6.1 Marking

The body of the valve shall be marked in accordance with the requirements of Section 6 of AS 5081.

6.2 Packaging

6.2.1 General

Product shall be packaged with appropriate protection, which shall prevent damage or defects as a result of handling, storage or transportation. Flexible packaging material shall have a minimum expected life in outside storage conditions of 12 months from the date of delivery.

6.2.2 Identification Tag

Wherever requested in the Purchasing Schedule each Product item shall be identified using a weatherproof marking pen on a corrosion resistant metal identification tag securely wired to the Product in a conspicuous position using a galvanized tie wire with the following information:

a) Material Master Record number (MMR)

b) Contract number

c) Purchase order number.

6.2.3 Marking of Packaging

Where requested in the Purchasing Schedule, the Product shall be identified by marking on the outside of any protective packaging with the same information as shown on the identification tag.

7 Manuals

7.1 Format and Language

Where required, Product shall be supplied complete with appropriate installation, operation and maintenance, and safety instructions or manuals, in clear diagrammatic and text format, in English

7.2 Content

The manuals shall contain all the relevant information required to commission and maintain the Product in operational service, including the following:

a) Details of Product features

b) Operational adjustments

c) Installation and commissioning instructions

d) Preventative maintenance requirements and intervals

e) Testing procedures

f) Trouble shooting guidelines

g) Safety procedures

h) Complete list of parts and associated exploded views or sectional diagrams and reference part numbers

8 Spare Parts and Special Tools

8.1 Spare Parts

8.1.1 Interchangeability

All spare parts shall be interchangeable for a manufacturer's Product of the same size and model.

8.1.2 Availability

Spare parts and servicing facilities for the product shall be readily available in Western Australia.

8.2 Special Tools

Any special tools required for service and maintenance of the Product shall be supplied.

9 Transportation, Handling and Storage

9.1 General

Transportation, handling and storage facilities shall be designed to prevent Product damage or defects and to maintain Product free of deleterious matter. Product shall not be dropped off elevated vehicle platforms or sites. Mechanical handling equipment shall be in accordance with AS 2550.1, AS 2550.3, AS 2550.5 and AS 2550.11 and shall be appropriate to the loads to be lifted. Manual handling shall be in accordance with the National Standard for Manual Handling and the National Code of Practice for Manual Handling, published by National Occupational Health and Safety Commission, Australia. Product restraint during transportation shall be in accordance with Load Restraint Guide—Guidelines for Safe Carriage of Loads on Road Vehicles, published jointly by the Federal Office of Road Safety and the National Road Transport Commission, Australia.

NOTE: Where wire ropes or chains are used for loading and unloading, they should not come into direct contact with Product. Lifting elements in direct contact with Product should be of a non-abrasive design e.g. elastomeric or fabric webbing straps. During transportation, Product restraints should be checked for tension at regular intervals of travel and should not be released until the transporting vehicle is resting in a secure stable disposition on level ground.

9.2 Preservation of Product in Storage

Product shall be stored in original Product packaging in accordance with the published requirements of the manufacturer, prior to installation. Sensitive component materials shall be protected from extended exposure to direct sunlight and high temperatures e.g. elastomeric components shall be stored in accordance with the general principles of AS 1646. Designated Product storage areas shall be of sufficient size to accommodate Product deliveries and shall be flat, reasonably level and free of combustible vegetation, sharp stones or projections that could cause Product damage or defects.

10 Quality Assurance

10.1 Certification

10.1.1 Certification of Product

Wherever this Specification requires compliance with nominated Product and test Standards, conformance shall be certified by means of a Certification Scheme, conducted by a Certification Body. Each Certificate shall expressly attest compliance of all Product items with the nominated Standards. Wherever specified, Certificates shall be submitted to the Officer nominated for this purpose. Product shall be marked in accordance with the requirements of the Certification Body.

NOTE: Compliance of Product including related accessories and services with nominated Standards and specified requirements may be verified by means of a Product Verification Report provided by a Product Assessor. The Product Verification Report should identify all relevant Certificates of Product compliance, duly issued in accordance with Certification Scheme rules.

10.1.2 Quality System

The processes for manufacture, testing, supply, transportation, handling, delivery and storage of Product to be supplied in accordance with this Specification shall form part of a documented Quality System. The System shall be certified by a Certification Body as complying with the requirements of AS/NZS ISO 9001 and shall provide for identification and traceability, control of production and delivery to the specified destination, customer verification and control of documents and records.

10.1.3 Product Re-verification

Product compliance with the Specification shall be subject to re-verification by a Product Assessor when, during the agreed Product supply period, there occurs any:

- Substantive change in Product design, material formulation or performance
- Product failure to perform in operational service to the nominated performance specification.

Re-verification shall require the issue of a new or supplementary Product Verification Report. Product components and test outcomes that are not significantly affected by the Product change or failure may be excluded from the scope of re-verification, provided that these outcomes have already been reported in a current valid Product Verification Report that is acceptable to the Corporation.

Wherever the requirements of the Specification apply to a Product supply period in excess of three years, continuing acceptance of Product shall be subject to re-verification. The purpose of re-verification shall be to confirm the continuing compliance of Product quality and production control processes with the requirements of the Specification

10.2 Compliance and Acceptance

10.2.1 Means of Demonstrating Compliance

Compliance with this Specification shall be demonstrated by means of Product Appraisal and issue by a Product Assessor of a Product Verification Report that confirms compliance. Otherwise, Product shall be deemed non-compliant and ineligible for registration as Product authorized for use in Corporation infrastructure.

NOTE 1: Where a project includes design work including Product design, Product Appraisal may form part of the project design review process and the Product Assessor may be a member of the project design review team.

NOTE 2: A Product Verification Report should verify the extent of compliance with the Specification including all relevant 'Technical Compliance Schedule' Appendices and the currency of a Certificate where relevant to the Product.

10.2.2 Acceptance Criteria

For acceptance, Product shall be supplied as specified in the Purchasing Schedule.

Prior to the implementation of any arrangement to supply Product, the Supplier shall, in accordance with specified requirements:

- nominate applicable Product Warranty terms; and
- provide documentary verification in the form of a current valid Certificate or Product Verification Report as appropriate to the Product; and
- detail each element of Product that does not comply with the specified requirements together with the extent of non-compliance.

NOTE: Where the Specification includes Technical Compliance Schedules, the nature and extent of all non-compliances should be provided in accordance with the appropriate Schedules.

10.3 Non-compliant Product

10.3.1 General

Product whose design, workmanship or performance fails to conform to the specified requirements shall be clearly tagged and quarantined by the Supplier as non-compliant and shall be subject to rejection for return to and replacement by the Supplier.

Where the Specification includes a 'Technical Compliance Schedule', Product shall be deemed non-compliant except where a Supplier has demonstrated compliance in accordance with the requirements of the 'Technical Compliance Schedule' Appendices of the Specification.

10.3.2 Manufacturing Repairs (In-process)

Welding, the use of fillers and other repairs shall generally not be permissible on Product which is in the course of production. Repairs to custom-built Products such as axially-split pumps and large valves may be considered only if determined by the Corporation to be minor casting repair work in non-strategic locations. Accordingly, details of any defect which the Manufacturer considers can be repaired; together with details of proposed repair procedures shall be submitted in writing for determination by the Corporation.

The Manufacturer shall make provision in its production Quality System and in the appropriate inspection and testing plans (ITPs) for sufficient hold points whenever casting defects are encountered. Production work on non-compliant components shall cease and repair work shall not commence until the following details have been confirmed by the Corporation in writing:

a. that repair of the non-compliant components in lieu of their replacement is acceptable; and

b. that proposed repair procedures are acceptable; and

c. that any proposal to vary the terms of the original Product Warranty as a consequence of the in-process repair is acceptable.

10.3.3 Product Warranty

The Supplier shall replace non-compliant Product with Product that conforms to the acceptance criteria or shall repair or rectify all faults, damage or losses caused by defective Product. Except as may otherwise be specified, the Product Warranty shall indemnify and keep indemnified the Corporation against all losses suffered by the Corporation as a result of non-compliant Product for a period no less than 24 months after Product delivery or 12 months after Product installation, whichever period elapses first.

10.3.4 Product Repair

All reasonable proposals for repair or remedy of defects will be considered, provided that each such proposal is accompanied by a methodology statement that accords with the performance objectives of this Specification, as determined by the Corporation. For acceptance, a proposal for repair or remedy of Product defects shall not void or otherwise diminish the provisions of the Product Warranty.

11 Appendix A: Project Specific Requirements (Normative)

11.1 General

Project specific information and requirements, not included elsewhere in this Strategic Product Specification shall apply in accordance with the following Tables 11.1, 11.2 and 11.3.

NOTE: The designer should complete all relevant information, requirements and options contained in each table.

11.1.1 Project Requirements

TABLE 11.1: SCHEDULE OF PROJECT REQUIREMENTS

No Off	DN	PN	Special Requirements Refer Notes 1, 2, 3, 4

NOTES:

1. Specify details of the end connections required e.g. screwed or flanged.
2. Specify if valve is to be located in a noise sensitive location.
3. Specify whether identification tags and marking of packaging is required in accordance with Clause 6.2 of this Specification.
4. Whether a spark test certificate for the coating is required (generally for valves >DN 150).

11.1.2 Hydraulic Parameters

TABLE 11.2: SCHEDULE OF VALVE HYDRAULIC PARAMETERS[1]

Item		Requirement/Value
Application[2]	Purpose of valve e.g. ACV etc	
	Functionality required (multi-function e.g. PRV/PSV)	
	Design flow L/s	
Maximum static pressure	Inlet kPa	
	Outlet kPa	
Minimum static pressure	Inlet kPa	
	Outlet kPa	
Maximum dynamic pressure	Inlet kPa	
	Outlet kPa	
Minimum dynamic pressure	Inlet kPa	
	Outlet kPa	
Maximum surge pressure	Inlet kPa	
	Outlet kPa	
Maximum flow at minimum dynamic pressure		

Item	Requirement/Value
differential L/s	
Minimum flow (greater than zero) at maximum dynamic pressure differential L/s	
Duty set-point required for each function	
Duty set-point range required for each function	
Maximum allowable valve closing time required sec	
Minimum allowable valve closing time required sec	

NOTE:

1. Table 11.2 outlines hydraulic parameters which should be specified by the designer where relevant. The list of hydraulic parameters should not be regarded as exclusive and should be expanded as required to suit the particular application.
2. Designer to define the application and range of valve functionality.

11.1.3 Specific Technical Requirements

TABLE 11.3: SCHEDULE OF SPECIFIC TECHNICAL REQUIREMENTS

Ref.	Type			Requirement		
				Yes	No	Comments
1. TYPE OF CONTROL VALVE						
1.1	Type of Port		Full port			
			Reduced port			
1.2	Multi-function/pilot valve		Required			
			Functions[1]			
1.3	Altitude valve	1-way flow	Required			
			Delayed opening			
		2-way flow	Required			
			Delayed opening			
1.4	Float control/pilot		Required			
			On-off			
			Modulating			
			Stilling tube			
1.5	Pressure-reducing (PRV)		Required			
			Fixed-outlet			
			Variable-outlet			
			Remotely controlled variable outlet			
1.6	Pressure-sustaining/relief valve		Required			
			Fixed-outlet			
			Variable-outlet			

		Remotely controlled variable outlet			
1.7	Rate-of-flow valve	Required			
		Fixed-outlet			
		Variable-outlet			
		Remotely controlled variable outlet			
1.8	Orifice plate	Required			
1.9	Solenoid control valve	Required			
		Single, or			
		Multiple			
		Function/s			
1.10	Surge-anticipating valve				
2. HYDRAULIC CONTROL SYSTEM					
2.1	Hydraulic control system is required				
2.2	Factory preset	Required			
		Preset details[2]			
3. OPTIONAL REQUIREMENTS					
3.1	Anti-cavitation trim				
3.2	Double chamber arrangement[3]				
3.3	Double solenoids	Required			
		Power supply[4] Volts			
3.4	Filter type (specify one type only)	Required			
		Y-strainer, or			
		Cartridge, or			
		Cleanable disc filter			
		Self-Flushing Filter[5]			
3.5	Filter – configuration	Single			
		Two filters in series[6] (also refer below)			
		Upstream filter size Microns			……
		Two filters mounted in parallel			
3.6	Valve stem travel limit switches	Required			
		Number off			
		Power supply[4] Volts			
3.7	Manual override valve				
3.8	Non-return functionality required				

3.9	Position indicator[7]				
3.10	Position transmitter	Required			
		Type			
		Power supply[4] Volts			
3.11	Solenoid override for remote control via PLC/SCADA	Required			
		Power supply[4] Volts			
3.12	Speed control valve	Required			
		Hydraulic, or			
		Electric			
		Opening function			
		Closing function			
3.13	V-port throttling plug				
3.14	Low noise[8]	Required			
		Maximum level dB(A)			

NOTES:

1. Indicate all the functions required of the valve e.g. pressure-reducing, pressure- sustaining etc by ticking the appropriate boxes below.
2. Specify the preset requirements such as set points, operating range etc.
3. Where low dynamic pressure differential exists (e.g. <3 m), valves should be double chamber type. Appropriately designed controls will need to be provided to achieve the required functionality. If fitted, valve springs may be removed to assist valve opening under low in-line hydraulic pressure.
4. Specify the power supply voltage e.g. 12 VDC. 24 VAC etc.
5. When nominated, the Supplier shall include as an alternative option in their quotation.
6. Specify the upstream filter cartridge micron size (generally coarser than the downstream cartridge).
7. A position indicator is normally specified for Corporation applications.
8. Specify maximum sound level applicable where noise sensitivity is a factor.

12 Appendix B: Technical Compliance Schedules (Normative)

12.1 Compliance Schedules

Suppliers shall demonstrate Product compliance with the Specification by completing:

a) Technical Compliance Schedule 1A relating to AS 5081 as shown in **TABLE 12.1A** on an item by item basis.

b) Technical Compliance Schedule 1B relating to SPS 240 as shown in **TABLE 12.1B** on an item by item basis.

For acceptance, the extent of scheduled technical item compliance shall be supported by verifiable documentary evidence. Each scheduled item nominates a Specification clause number with which the extent of Product compliance shall be demonstrated.

The Supplier shall denote compliance of an item by ticking the unshaded 'Yes' column appropriate to that item. Where Product does not comply with specified requirements, the Supplier shall tick the 'No' column and shall detail the reasons for non-conformance and any proposed alternatives in the 'Comments' column. The Supplier shall denote acceptance and understanding of a Specification clause by ticking the corresponding 'Noted' column wherever unshaded.

Failure to notify the Corporation of all non-compliant Product components, including the extent of non-compliance, may void an accepted offer to supply or may result in rectification of all non compliant Product elements, at the Supplier's cost.

TABLE 12.1A: AS 5081 TECHNICAL COMPLIANCE SCHEDULE 1A

Hydraulically Operated Automatic Control Valves					
Section/Clause		**Noted**	**Compliance**		**Comments**
			Yes	**No**	
1. SCOPE AND GENERAL					
1.1	Scope				
1.2	Application				
1.3	Normative References				
1.4	Definitions				
1.5	Types and Functions				
1.6	Designation of Size				
1.7	Allowable Pressures				
2. MATERIALS AND COMPONENTS					
2.1	General				
2.2	Corrosion-Resistant Materials				
2.3	Dezincification-Resistant Materials				
2.4	Effect on Water				
2.5	Elastomeric Components				
2.6	Plastic Components				
3. DESIGN					
3.1	General				
3.2	End Connections				
3.3	Main Valve				
3.4	Hydraulic Control System				
4. PROTECTIVE COATINGS					
4.1	General				
4.2	Design				
5. PERFORMANCE TESTS					
5.1	General				
5.2	Type Tests – Static Tests				
5.3	Batch Release Tests				
6. MARKING AND PACKAGING					
6.1	Marking				
6.2	Packaging				

TABLE 12.1B: SPS 240 TECHNICAL COMPLIANCE SCHEDULE 1B

Hydraulically Operated Automatic Control Valves					
Section/Clause		**Noted**	**Compliance**		**Comments**
			Yes	**No**	
1. SCOPE AND GENERAL					
1.1	Scope				
1.2	Referenced Documents				
1.3	Definitions and Notation				
1.4	Designation of Size				
2. MATERIALS AND COMPONENTS					
2.1	General				
2.2	Body and Cover				
2.2.1	Alternative Material				
2.2.2	Material Designation				
2.3	Valve Trim Materials				
2.4	Filter Housing				
2.5	Control Piping				
3. DESIGN					
3.1	General				
3.2	Ball Valves				
3.3	Bare Control Valves				
3.4	Body and Cover Tapping				
3.5	Cavitation				
3.6	Cavitation Index				
3.7	Allowable Velocity				
3.8	Maximum Allowable Velocity				
3.9	Filters				
3.10	Flanged End Connections				
3.11	Flow Coefficient *Kv*				
3.12	Noise Levels				
3.13	Pilots				
3.14	Solenoids				
3.15	Threaded End Connections				
3.16	Valve Selection				
4. COATINGS					
4.1	General				
5. TESTING					
5.1	General				
5.2	Notification of Testing				
5.3	Access to the Place of Manufacture				
5.4	Place of Manufacture other than WA				
5.5	Performance Test Requirements				
5.5.1	Production Tests				
5.5.2	Test Certificates				
6. MARKING AND PACKAGING					
6.1	Marking				
6.2	Packaging				
6.2.1	General				
6.2.2	Identification Tag				
6.2.3	Marking of Packaging				
7. MANUALS					
7.1	Format and Language				
7.2	Content				
8. SPARE PARTS AND SPECIAL TOOLS					
8.1	Spare Parts				
8.1.1	Interchangeability				
8.1.2	Availability				
8.2	Special Tools				
9. TRANSPORTATION, HANDLING AND STORAGE					
9.1	General				
9.2	Preservation of Product in Storage				
10. QUALITY ASSURANCE					

10.1	Certification				
10.1.1	Certification of Product				
10.1.2	Quality System				
10.1.3	Product Re-verification				
10.2	Compliance and Acceptance				
10.2.1	Means of Demonstrating Compliance				
10.2.2	Acceptance Criteria				
10.3	Non-compliant Product				
10.3.1	General				
10.3.2	Manufacturing Repairs (In-process)				
10.3.3	Product Warranty				
10.3.4	Product Repair				

Name of Supplier:

Signature: Date:

When requested by the Corporation, the Supplier shall provide the information required by Technical Compliance Schedule 2 as shown in **TABLE 12.2**.

TABLE 12.2: TECHNICAL COMPLIANCE SCHEDULE 2

Hydraulically Operated Automatic Control Valves				
1.	**SUPPLIER'S REPRESENTATIVE**			
1.1	Full name			
1.2	Postal address			
1.3	Facsimile number			
1.4	Email address			
1.5	Phone number			
1.6	Mobile number			
2.	**QUALITY ASSURANCE**			
2.1	Extent of Third Party Accreditation of Supplier			
2.2	Extent of Third Party Accreditation of Manufacturer			
2.3	Details of Certificates and Verification Reports attached	Yes/No		
2.4	Certification Mark obtained	Yes/No		
2.5	Corporation authorisation received	Yes/No		
3.	**TECHNICAL INFORMATION**			
3.1	Valve detail drawing supplied	Yes/No		
3.2	Details of the manufacturer's ITP's supplied.	Yes/No		
3.3	Details of servicing facilities in Perth supplied.	Yes/No		
3.4	Flow coefficient at various openings from 0% to 100% *Kv*			
3.5	Calculations to prove valve is cavitation free			
3.6	Additional pamphlets and drawings in conjunction with the technical literature supplied.	Yes/No		
4	**MATERIALS**	**MATERIAL**	**STANDARD**	**GRADE**
4.1	Body and cover			
4.2	Seal disc			
4.3	Resilient seal			
4.4	Diaphragm-supporting disc(s)			
4.5	Main valve and pilot valve diaphragms			
4.6	Piston			
4.7	Main valve and pilot valve seat rings			

4.8	Main valve and pilot valve stems				
4.9	Position indicator				
4.10	Guide bushings				
4.11	Main valve and pilot valve springs				
4.12	O-rings				
4.13	Control piping				
4.14	Pilot, solenoid, isolating ball and needle valves				
4.15	V-port throttling plug				
4.16	Anti-cavitation trim				
4.17	Fasteners				
4.18	Protective coating of ductile iron components				
4.19	Orifice plate				
4.20	Filter or strainer body				
4.21	Filter or strainer cartridge or element				
4.22	Coating				
5.	**VALVE DESIGN AND MANUFACTURE**				
5.1	Manufacturer's name				
5.2	Place of manufacture				
5.3	Brand and model				
5.4	Type e.g. hydraulically operated				
5.5	Diaphragm or piston actuated				
5.6	Style of valve e.g. globe etc.				
5.7	Single chamber or double chamber				
5.8	Size (DN) mm				
5.9	Pressure class (PN) kPa				
5.10	Maximum operating temperature ºC				
5.11	Cavitation index				
5.12	Maximum continuous flow rating L/s				
5.13	Choked flow value L/s				
5.14	End connection type – e.g. flanged, screwed etc				
5.15	Threaded end connection standard (threaded valves)				
5.16	Flange end connection standard (flanged valves)				
5.17	Main valve sealing components e.g. resilient seal/seat ring				
5.18	Position indicator fitted		Yes/No		
5.19	Speed-control valve type e.g. needle valve				
5.20	Hydraulic accelerators fitted		Yes/No		
5.21	Adjustment range of hydraulic pilot (if applicable)				
5.22	Spring rate for the preset offered kPa				
5.23	Rate-of-flow valve orifice plate bore size mm				
5.24	Cavitation-control orifice plate bore size mm				
5.25	Maximum noise level (Clause 3.4 of Specification) dBA				
5.26	Solenoid/s – voltage type, voltage and power AC or DC, V, kW	……..……	……	……..	
5.27	Manufacturer's test certificates available		Yes/No		
5.28	Details of sealing of body fastener threads and pilot tappings				
5.29	Field testing and maintenance can be performed in-line		Yes/No		
5.30	Design life (Clause 3.1 of AS 5081) yrs				
6.	**ANCILLARY COMPONENTS**				
6.1	Filter/strainer make				
6.2	Filter/strainer model				
6.3	Filter particle size rating microns	Upstream…….;	Downstream……..		
6.4	Filter type (e.g. Y-strainer, cartridge or manual backwash)				
6.5	Filter end connection size (DN)				
6.6	Number of filters (e.g. single or two filters)				
6.7	Filter configuration (e.g. series or parallel)				

6.8	Ball valve make	
6.9	Ball valve model	
6.10	Ball valve size (DN)	
6.11	Ball valve complies with SPS 252	Yes/No

12.2 Details of Valve Performance

When requested by the Corporation, the Supplier shall provide the information required by Valve Performance Schedule as shown:

Table 12.2C Valve Performance Schedule

Scenario 1 - Valve Make & model: Size: Max. Kv Capacity ($(m^3/hr/bar)$) :

Case (1)	% - working time (2)	Upstream Head (P_1) (3)	Downstream Head (P_2) (4)	Flow Rate (5)	Valve Opening (6)	Cavitation Coefficient Sigma (7)	Sigma Limit Value (8)	Noise from Valve at 1 m (9)	Downstream head at which incipient cavitation occurs (10)	Downstream head at which substantial cavitation occurs (11)	Downstream head at which Choked flow occurs (12)
	% of Year	(m H_2Og)	(m H_2O g)	L/s	%			dBA	(m H_2O g)	(m H_2O g)	(m H_2O g)
1.01											
1.02											
1.03											
1.04											
1.05											
1.06											
1.07											
1.08											

Note

Data in columns 2,3. 4 & 5 of above table are to be completed by designer . Data on columns 6 to 12 shall be completed by the valve supplier

Fluid Temperature = 25 ^{0}C Pv= Vapour Pressure absolute □=$(P_2-P_v)/(P_1-P_2)$ All pressures are in absolute values

Name of Supplier:

Signature: Date:

13 Appendix C: Material Master Records (Informative)

The following Material Master Records (MMR) comprise Corporation catalogue numbers that are unique to the particular products described for the purposes of Corporation activities or work.

NOTE: Allocation of MMR numbers are not proposed for this product.

END OF DOCUMENT