Assuring Product Quality and Performance through Specification

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Topics

- What is specification
- Why specification matters
- Steps for writing specifications
- Components of specification
- Types of specification
- Case
- KSF for a good specification

What is specification

A specification is:

- what do I want to buy?
- a detailed description of physical or functional characteristics of goods or services for purchasing
- explaining the material requirements, qualities, construction and installation details, acceptance, measurement, performance, delivery and usage
- the language to be incorporated into a legally binding contract.

Why specification matters

- Purpose:
  - communicate what you require {right the first time}
  - what are your future receiving criteria
  - provide guidance to potential suppliers
  - basics for contract

- Goal:
  - make your requirement clear such that no misunderstandings that require clarification
  - ensure level playing field and wide competition

All problems cost money!

Steps for writing specification

1) Determine stakeholder need and function required
2) Check availability of internal resources
3) Market research…risks and opportunities?
   - Conduct Expression of Interest (EOI) to explore innovation or source
4) Identify potential suppliers
5) Consider acquisition and delivery lead time
6) Estimate cost
7) Check budget
8) Draft specification and evaluation criteria
9) Approval

What are components/ layout of Specification?

1) Title of this purchase and invitation reference number

2) Table of contents, if complex and lengthy

3) Introduction
   - brief introduction of organization including business, value and mission.
   - responsible party and its functions

4) Background
   - information to help bidders understand the requirements in context (e.g. supply, development, installation, maintenance]
   - purpose and expected outcome
   - supporting documentation for background as a web link or as an annex to the specification.

Product/service	Traditional Title	Sustainable Title
IT equipment PCs, notebooks and monitors, printers, copiers, scanners and MFDs	Purchase of [PCs, notebooks, monitors, printers, copiers, scanners and MFDs]	Purchase of energy efficient and socially-responsible produced [PCs, notebooks, monitors, printers, copiers, scanners and MFDs] with a reduced content of hazardous substances OR Purchase of energy efficient and socially-responsible produced [PCs, notebooks and monitors, printers, copiers, scanners and MFDs] with low environmental and social impacts throughout the life cycle
Cleaning Products	Provision of cleaning products	Provision of sustainable cleaning products
Office Furniture	Provision of office furniture	Provision of office furniture made in an environmentally and socially responsible way

Giving **a sustainable title** (i.e. the subject matter) conveys to the market the intention of procuring with sustainability considerations in mind. Clearly labelling a contract with a green title makes it easier for prospective bidders to promptly recognize the requirements of the procurer.

What are components/ layout of Specification?

5) Scope
what is included; what is excluded; what is optional;
E.g. It is applicable to pipes for carrying gas for use at pressure not greater than 4 bar

6) Detailed requirements
all requirements that the bidder is required to provide and to deliver the right goods and/or services (“product”) at the right time, in the right place, in the right quantity and at the right price.

Approaches:

- Input-based (defines every activity, standard, delivery method etc. on how to meet an outcome) – prescriptive or *conformance specification*

What are components/ layout of Specification?

- Output-based (say what measurable services or activities delivered, concentrate on the end results) – *functional or performance*
- Mandatory requirements (fundamental or essential that suppliers must meet) e.g. hours of service, data security, virgin materials etc.
  - ➢ will render tender non-conforming
- Desirable requirements that whilst bringing benefits are not essential e.g. eco-labelling
  - ➢ more technical scores if better than specified level
- EHS performance requirements, e.g. VOC, safety
- Production processes and methods at any stage of the life cycle of the supply product or service, e.g. meet ethical, social or environmental objectives
- Packaging requirement that detail required packaging, marking and labelling

Example of EPD Green Specification

D02	LCD & LED monitor	**Mandatory Requirement**
		• For LCD monitor, the equipment shall comply with power saving standard stipulated in Energy Star or shall have obtained a Recognition Type Energy Label under the Energy Efficiency Labelling Scheme of Electrical and Mechanical Services Department (EMSD).
		• The energy consumption of the product shall not be greater than 2W and 1W during sleep mode and off mode respectively.
		• Product components (circuit boards, electrical, electronic and plastic components) shall comply with RoHS. Maximum Concentration Values of the RoHS restricted substances are: i. Lead: 0.1% by weight ii. Cadmium: 0.01% by weight iii. Mercury: 0.1% by weight iv. Hexavalent chromium: 0.1% by weight v. PBBs: 0.1% by weight vi. PBDEs: 0.1% by weight
		Desirable Requirement
		• The background illumination for the product should not contain more than 3 mg of mercury per lamp.
		• Any plastic parts should be manufactured without chlorinated paraffins flame retardants.
		• Component parts should not contain halogenated substances.

What are components/ layout of Specification?

7) Service Level or Key Performance Indicators
   - To measure and monitor the contractor's performance delivery.
   - To define data/information of any service levels and/or KPIs for measuring on-going performance
   - To define frequency of measurement and monitoring
   - To outline required quality levels
8) Criteria and method for tender evaluation
9) Define testing and test methods including any type-testing, sample board or certification required
10) Acceptance Testing: user vs supplier
11) Licensing requirements that a supplier must have to operate in an industry/sector e.g. grade of Registered Electrical Worker (REW)
12) Training requirements: manual, onsite
13) Maintenance requirements: warranty, spares supply,
14) Reporting requirements: as-built drawing? what reports? how frequent?

Criteria for Tender Evaluation

QUICKFIRE GUIDE

Price/Quality Ratios

You may find it useful to refer back to the Strategic Positioning Action Plans to help decide the appropriate price/quality ratio to apply.

The table below provides some suggested criteria and ratios depending on the nature of the commodity/service being procured:

Commodity Type	Description	Suggested Price/Quality Ratio
Routine	• Low Value/High Volume • Many Existing Alternatives	80:20
Leverage	• High spend area • Many Sources of Supply • Commercial involvement can influence price	60:40
Strategic	• Strategic to Operations • Few Sources of Supply • Large Spend Area • Specification may be complex	60:40, 50:50, 40:60
Bottleneck	• Few Sources of Supply and alternatives available • Complex specifications • If supply fails, impact on organisation could be significant	40:60, 10:90

In accordance with regulation 76(10) of The Public Contracts (Scotland) Regulations, contracts must be awarded on the basis of both quality and price.

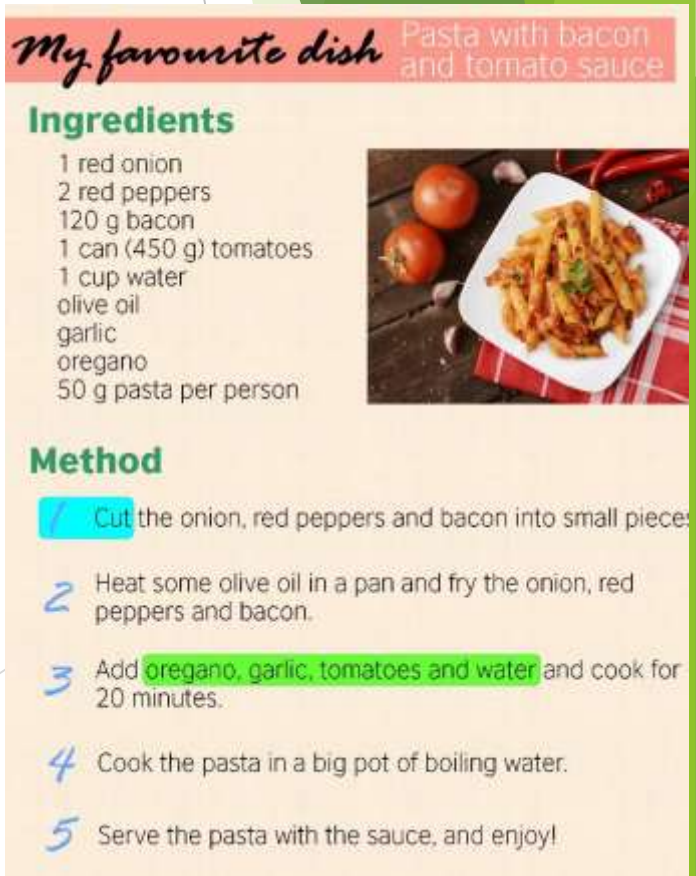
https://www.procurementjourney.scot/route/route-3?page=10

Types of Specifications/ Methods of Specifying

Prescriptive Approach focuses on the ***required MEANS*** of achieving ***end results***; procedures and materials are defined by specifier.

(1) Descriptive method

- Describing the way it is to be achieved
- Exact properties and qualities of materials, products or equipment by stating the salient features
- Details of assembly and installation
- Advantage
  - Indicate exactly what the design intend
  - Permit free competition
  - Clear e.g. dimensions, weight, drawings



Types of Specifications/ Methods of Specifying

- Disadvantage
  - Specifier [well-experienced?] to take care in describing the design intent to achieve intended results
  - Bulk up and time-consuming to produce
  - More QC for each attribute
  - Risk with buyer, if products fail but comply with spec., responsibility falls with buyer
  - May not be “best” option in the market
  - Over-prescription inhibits competition
- Common Uses
  - Product with no standard exist
  - Specifier has expertise
  - Safety critical items

(2) Reference Standard

- Adopt standard published by other parties e.g. trade associations, government, institutions

Types of Specifications/ Methods of Specifying

Reference Standard

- Type of Standard
  - Product: ISO 3873, EN397 Industrial safety helmets
  - Services: ISO/IEC 17025 testing and calibration laboratories
  - Process: ISO/IEC/IEEE 29119 Software Testing
  - System: ISO9001 QMS, ISO/IEC 27001 ISMS
  - International, national, industry

- Advantage
  - Widely known and accepted
  - Materials and methods readily recognized
  - Competition not limited
  - Shorten

Types of Specifications/ Methods of Specifying

Reference Standard

- Disadvantage
  - Only for commonly used products
  - Not to latest technology
  - Require research and care in use
  - Many standards include choices built into
  - Minimum not optimal

- Common Uses
  - Commodity products in marketplace

Types of Specifications/ Methods of Specifying

Functional

- Define the task, role or desired result (even outcome) by focusing on what is to be achieved
- Let supplier to determine how to achieve and has flexibility as in ”MEANS” of achieving
- Requirements in terms of ENDS

Performance

- Define performance required of the solution by setting out details of inputs and outputs
- Let supplier to determine how to achieve and has flexibility as in ”MEANS” of achieving
- Requirements in terms of ENDS and to
- Tell how the functions will be done – how well, how often, how much, how many, what capacity, throughput, accuracy, availability etc.

Types of Specifications/ Methods of Specifying

- Advantage
  - Foster supplier new technology and innovation
  - Encourage the development of better systems and methods
  - Shorten and easier to draft
  - Increased competition
  - Delegate technical responsibility to supplier, i.e. risk shifted to supplier
  - Support sustainable procurement

- Disadvantage
  - All input and output criteria must be clearly defined and how the performance will be verified.
  - Special care in needs analyses and describe design intend to achieve intended results

- Common Uses: when expertise is in market place e.g. lighting, HVAC systems

Case

A school is required to arrange a vehicle for transportation of their students between school and home.

Your headmaster would like you to write 3 specifications based on prescriptive, functional and performance requirements for his consideration.

Your school has recently published a EHS policy and committed to achieve carbon neutrality by 2035.

Prescriptive	
Vehicle	❑ *Meeting ISO XXXX standard* ❑ *Roof installed with solar panel with at least 80% coverage.*
Engine	❑ *Electric powered meeting XXX standard*
Battery	❑ *350 kWh of capacity*
Seat Capacity	❑ *40 passengers + 1 driver*
Body Colour	❑ *Painted with baked enamel finish in Yellow with Black for all markings and words*
Safety	❑ *All seats with safety belts, conforming to ISO XXXX* ❑ *Built-in First-Aid kits and Fire Extinguisher conforming to ISOXXXX*
Air-conditioning	❑ *Air-conditioner required.*
Disability	❑ *Have low floor ramp for access of wheelchair* ❑ *Fixed accommodation area/space to accommodate the wheelchair*

Functional	*An accessible device capable of conveying students between their school and their homes*
Performance	*An accessible device is required to convey students between their school to their homes capable of* ❑ *transporting at least 40 students* ❑ *working in a safe manner* ❑ *within a radius of the school of 30 kilometres* ❑ *completion within 1 hour* ❑ *maintaining a comfortable environment at an average temperature of 23-25 degrees Celsius in summer and 18-20 degrees Celsius in winter* ❑ *equitable access to transportation* ❑ *net zero emission* ❑ *harvesting of renewable energy*

The Steel Company of Canada Limited v Willand Management Limited [1966] SCR 746

A contractor agreed to carry out roof works in accordance with the employer's specification and it also furnished a guarantee that the roof would be weather tight for five years. The roof was constructed in accordance with the employer's specifications but failed during the 5 year period because one of the materials specified by the employer proved unsuitable.

Should the contractor be liable?

The Steel Company of Canada Limited v Willand Management Limited [1966] SCR 746

Court of Appeal

"no matter how experienced a contractor may be in a particular field, he nevertheless bears no responsibility for the employment of defective material in the work which he has undertaken, provided that it is a material which has been selected by the owner and included in the specifications."

The Steel Company of Canada Limited v Willand Management Limited [1966] SCR 746

Supreme Court

The evidence disclosed “that both parties were fully alerted to any limitations which may have attached to the use of the defective material. This may have been the reason why the [employer] required the contractors who were tendering on the work to provide the guarantee in question, but whatever the reason may have been, it appears to me that any risk involved in the undertaking was accepted by those who were prepared to tender in accordance with specifications which included the requirement of providing a written guarantee that all material employed in the work was first class and without defect, and that “all work…specified” would remain weather tight for a period of five years.”

Lesson Learned for buyer

1. Do not agree to assume liability for product design if you did not do the design;

2. Let supplier assume liability for the fitness of the product unless such fitness is uncertain;

3. If you assume design liability, ensure that it is restricted to only the design you performed;

4. If you assume design or fitness liability, ensure the design and fitness comprehensively reviewed by an independent and insured designer before manufacture; and

5. If you become aware of design or fitness problems during the contract period, immediately notify the supplier/contractor, cease work, require a remedial direction and confirm that if it is required to proceed based on the suspect design, all design warranties will be voided if subsequent problems prove to be the result of a design flaw.

KSF for a good specification

- Engagement of stakeholders to understand need and function
- Market research for exploring latest technology, innovation & supply sources
- Adopt functional and performance based specifications and supplement with prescriptive specification
- Simple and right languages and avoid multi-authors.
- Ensure purpose and expected outcome are clear and consistent in specification and tie in with subsequent contract document.
- Learning by Doing

Feedback Survey

Thank You for your listening !