

Numeracy In Practice

Building Workplace Numeracy Proficiency
and Training Skills of VET Practitioners



This Snapshot relates to Question 7a from the Numeracy Proficiency Assessment Tool – Process Manufacturing Industry. It is designed to be read in conjunction with explanatory information provided in the Guide.

Reading Specifications

Many jobs require workers to read specifications, for example:

- Automotive mechanics checking vehicle performance
- Divers checking air pressures
- Electrical contractors checking electrical safety
- Postal workers checking parcel weights

This example is the reading of a material specification. Examples of specifications in the workplace include:

- Process specifications
- Finished product specifications
- Performance specifications

- Technical specifications
- Material specifications
- Building specifications

Workers responsible for reading specifications require complementary skills, for example skills to:

- Work safely
- Follow workplace instructions
- Meet quality requirements
- Work cooperatively
- Meet deadlines
- Identify and report problems
- Explain specifications to other workers, supervisors or customers

THE QUESTION

The following Certificate of Conformance was received with the shipment of a part.

ABC Metals P/L			
Certificate of Conformance			
Job number:	672836		
Part number:	BELT8973		
Date of manufacture:	15/1/2011		
Test	Unit	Specification	Result
Tensile strength	MPa	15 minimum	16.1
Elongation at break	%	350 minimum	502
Abrasion	mm ³	250 maximum	198

What is the specification for tensile strength?

ACSF NUMERACY LEVEL

This question requires skills associated with locating and recognising key mathematical information in a simple text. This skill is described as part of indicator .09 at level 1.

The question also requires level 1 indicator .11 skills to communicate the answer.

This question maps to ACSF numeracy level 1.

Note that at level 1 of the ACSF a learner may work with an expert/mentor where support is available, if requested.

WHAT THE QUESTION IS ASKING

The mathematical information embedded in the question must be identified and interpreted before the problem can be solved.

The first paragraph gives context. It does not contain mathematical information. It is not needed to solve the problem.

The table contains mathematical information about specifications. It describes the tests conducted and the results against the specification. Knowledge of reading specifications is needed to interpret this table.

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Specification

Unit of measurement

The last paragraph contains mathematical information about the problem to be solved. It asks for the tensile strength specification. Knowledge of reading specifications is needed to interpret this information.

HOW TO SOLVE THE PROBLEM

Identify the term 'Tensile strength' in the table – it is the first item in the first column under the heading 'Test'.

Identify the word 'Specification' in the table – it is the heading of the third column.

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Read the contents of the cell where 'Tensile strength' and 'Specification' intersect – it reads '15 minimum'.

Include the unit of measurement in the answer: 15 MPa minimum.

HOW TO CHECK THE ANSWER

Recheck the row is labelled 'Tensile strength' and the column is labelled 'Specification'.

HOW TO COMMUNICATE THE ANSWER

Record the answer providing the result and the unit of measurement. The technically correct answer is 15 MPa minimum.

An example of a correct answer

15 MPa Minimum.

ACSF ASSESSMENT DECISIONS

A Credit is applied to the following responses:

1. 15 MPa minimum
2. 15 minimum (the question provided the unit of measurement and therefore the answer can stand alone without a unit of measurement)
3. 15 MPA minimum (an unconventional unit abbreviation for MPa, but the specification is correct)
4. 15+ (a formal mathematical representation indicating a more sophisticated understanding of mathematics)
5. >15 (a formal mathematical representation indicating a more sophisticated understanding of mathematics)

MEETING WORKPLACE EXPECTATIONS

In most workplaces the worker is expected to record the correct answer in accordance with workplace requirements. This is consistent with the first response above.

Response 2 may be acceptable depending on workplace requirements. For example, if the table used for recording workplace data included MPa in the column heading then it may not be necessary to record the unit of measurement.

Response 3 may be acceptable depending on workplace requirements. The standard international abbreviation for megapascal is MPa. Alternative representations can lead to confusion and errors if not understood by others in the workplace.

Response 4 may be acceptable depending on workplace requirements. Using different symbols even if they are correctly applied can lead to confusion and errors if not understood by others in the workplace.

Response 5 is unacceptable in the workplace because it is incorrect. 15 MPa minimum means 15 MPa or more. The '>' symbol means more than 15 MPa but not 15 MPa. This is a very different specification.

Incorrect answers may cause problems that impact productivity, quality and safety. This is unacceptable in the workplace.

ANALYSING RESPONSES TO IDENTIFY SKILL GAPS

Incorrect Response	Analysis	Skill Gaps
>15	<p>Specification incorrectly represented</p> <p>Specification not interpreted correctly or meaning of symbol not understood</p>	<p>Level 1 indicator .09 skills to interpret specification</p> <p>Level 4 indicator .11 skills in relation to using the '>' symbol</p>
15	<p>Specification incorrectly represented</p> <p>Specification not interpreted correctly or not represented correctly</p>	<p>Level 1 indicator .09 skills to interpret specification</p> <p>Level 1 indicator .11 skills to represent the answer</p>

IMPLICATIONS FOR TRAINING DELIVERY

Encourage the learner to talk about specifications at home and at work.

Talk about:

- Specifications they must read
- What they are used for
- Why they are important
- How they are used
- How and where the outcome is reported
- How and where it is recorded

Working through this PD resource places you in the role of the learner.

Check learner performance against workplace requirements to identify learner needs. The learner may:

- Need support in one or more of the numeracy indicators
- Be suffering from maths anxiety

- Lack the complementary skills needed to perform the task, such as a correct understanding of the workplace requirements for reading specifications

Use a range of teaching strategies, such as:

- Ask the learner to show their work and explain the answer
- Draw on what the learner already knows and challenge them
- Sequence the material according to the learners' individual needs. For example, they may need support to read simple tables
- Incorporate a range of specifications and workplace conditions. Include examples for different shipments of different materials
- Ask questions to extend the learner, such as:
 - How would you explain to someone else what a specification is?
 - Why are specifications important?
- Mix up different specifications from different sources and in different formats for additional challenge
- Provide opportunities for practice without fear of failure and with time for reflection
- During training use data gathered from the workplace and discuss the results
- Observe a test being performed to provide meaning
- Outside training encourage the learner to remove avoidance strategies, such as relying on another team member to read specifications
- Assign a workplace buddy or mentor
- Ask learners to reflect on what they have learnt, the challenges encountered and how they were overcome

PROFESSIONAL DEVELOPMENT LEARNING STRATEGIES

Build your own skills:

- Identify examples of typical specifications found in the workplace
- Take a tour of the workplace and talk to people about specifications, including:
 - What they are used for
 - Why they are important
 - Who uses them
 - How they are used

- How and where the results are reported
- How and where they are recorded
- Find examples of typical specifications found in the home, such as selecting the correct light bulb or preheating an oven following a recipe
- Practise reading specifications found in the workplace, home or on the internet
- Check your answers with a trusted peer or mentor
- Ask a trusted peer or mentor to challenge you to extend your skills

ABOUT THIS RESOURCE

Numeracy in Practice is a professional development resource to support the development of VET practitioner numeracy proficiency skills and numeracy training skills.

It has been developed in response to a National Centre for Vocational Education and Research (NCVER) report titled [Seeking the N in LLN](#). This report found that there may be a need to increase the capacity of the VET workforce to meet the numeracy skills needs of existing workers. A copy of the full report is available for download at www.ncver.edu.au.

[Numeracy in Practice: Building Workplace Numeracy Proficiency and Training Skills of VET Practitioners](#) includes:

- A Guide with professional development activities
- A Numeracy Professional Assessment Tool – Process Manufacturing Industry
- Six Snapshots exploring different workplace numeracy skills

Topics covered in the Snapshots include:

- Reading instruments
- Using ratios and metric conversions
- Using rates and performing time calculations
- Measuring lengths
- Calculating quantities
- Reading specifications

Working through this PD resource will support you to confirm and strengthen your numeracy teaching skills.

VET practitioners interested in increasing their awareness of numeracy skills in the workplace may also like to access the companion resource [*Numeracy in Focus: Building VET Practitioner Awareness of Numeracy in the Workplace*](#).

Numeracy in Practice and *Numeracy in Focus* are available for download from the WELL practitioners' website at www.wellpractitioners.com.au.

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