**NZQA**

**Approved**

Achievement standard: 91060 Version 3

Standard title: Demonstrate understanding of basic concepts used to make products from textile materials

Level: 1

Credits: 4

Resource title: Getting to know protective clothing

Resource reference: Construction and Mechanical Technologies VP-1.23 v2

Vocational pathway: Construction and Infrastructure

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| Date version published | February 2015 Version 2To support internal assessment from 2015 |
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Vocational Pathway Assessment Resource

Achievement standard: 91060

Standard title: Demonstrate understanding of basic concepts used to make products from textile materials

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Learner instructions

# Introduction

This assessment activity requires you to demonstrate understanding of basic concepts used to make protective clothing from textile materials.

You are going to be assessed on how comprehensively you demonstrate your understanding of basic concepts used to make products from textile materials. You need to show that you can process and interpret information. You will produce a report that includes how the characteristics of textile materials for protective clothing influence techniques selection, and why techniques and textile materials are combined in different ways to make protective clothing.

The following instructions provide you with a way to structure your work so you can demonstrate what you have learnt and achieve success in this standard.

Assessor/educator note: It is expected that the assessor/educator will read the learner instructions, and modify them if necessary to suit their learners.

# Task

Create a report that demonstrates your understanding of the characteristics of textile materials, the techniques used to manage these characteristics, and why specific combinations of techniques and textile materials would be suitable in specific situations, for example when making protective clothing for workers on construction sites.

Consider a range of textile materials that could be used for making protective clothing.

Report on your understandings by:

* describing characteristics of these materials. Characteristics of textile materials include variables that require managing in different ways during construction. These variable characteristics include:
	+ strength, for example canvas is a much stronger fabric than cotton
	+ weave, for example the type of weave used in the cloth can contribute to the durability of the fabric
	+ thickness, for example denim, canvas, duck, and polar fleece are comparatively thick fabrics while calico, chambray, and t-shirting are comparatively thin fabrics
	+ stretch, for example considerable stretch is found in stretch knits, and in fabrics cut on the bias, while woven fabrics have relatively little stretch.
* explaining techniques used when making protective clothing. The techniques must cover at least one operation from each of the following categories:
	+ measuring, for example adjusting for body size, positioning grain line, measuring hems; or marking out, for example transfer of pattern markings, marking hemlines
	+ sizing, for example working out pattern size, proportions; shaping, for example using darts, gathers, flat fell seams; or forming, for example fitting
	+ joining or assembling, for example creating seams, adding zips
	+ finishing or detailing, for example pressing, top stitching, applying logos/name tags.
* explaining how the characteristics of these materials influence the techniques. Managing textile materials includes:
	+ using techniques that accommodate the characteristics of textile materials, for example using a walking foot when seaming fabrics that are slippery or bulky
	+ using techniques that make the most of, or take advantage of the characteristics of textile materials, for example using eyelets and studs to strengthen pockets on denim as the strength of the fibre and the twill weave will hold the metal features.
* discussing why different materials are used for protective clothing, and how they require (or benefit from) different techniques for their handling and use
* explaining which combination of techniques and materials would be suitable for a situation, for example a high visibility vest used on a construction site, by:
	+ examining two products, for example a high visibility vest and/or a wool Swanndri worn by a construction worker
	+ comparing the materials and techniques used
	+ discussing the suitability of the materials and techniques used for these different situations (for example how the techniques and materials used relate to the purpose of the garments).

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Assessor/Educator guidelines

# Introduction

The following guidelines are supplied to enable assessors/educators to carry out valid and consistent assessment using this internal assessment resource.

As with all assessment resources, education providers will need to follow their own quality control processes. Assessors/educators must manage authenticity for any assessment from a public source, because learners may have access to the assessment schedule or exemplar material. Using this assessment resource without modification may mean that learners' work is not authentic. The assessor/educator may need to change figures, measurements or data sources or set a different context or topic. Assessors/educators need to consider the local context in which learning is taking place and its relevance for learners.

Assessors/educators need to be very familiar with the outcome being assessed by the achievement standard. The achievement criteria and the explanatory notes contain information, definitions, and requirements that are crucial when interpreting the standard and assessing learners against it.

# Context/setting

This activity requires learners to create a report that demonstrates comprehensive understanding of basic concepts used to make protective clothing from textile materials.

# Conditions

Learners need to create their presentation independently, and will be assessed individually.

Designing and making protective clothing is not a requirement of this assessment activity.

Evidence would be expected from activities completed by individual learners over a specified period of time.

Decide on the format of the final report. The material presented could include annotated photographs, flow diagrams, written text, drawings, website links, and functional modelling. You may wish to take learners’ preferences into account when deciding on the format.

# Resource requirements

The assessor/educator will provide learners with:

* a selection of textile materials used for protective clothing
* faulty and well-made products made from textile materials for the analysis and discussion
* examples of protective clothing such as a high visibility vest and outer wear (or alternative products that will enable learners to discover how techniques and textile materials are combined in differing ways, for different situations).

Learners will require access to the internet for research.

# Additional information

Learners should be provided with opportunities to:

* explore the characteristics of a range of textile materials (ensuring that the materials vary in terms of such things as their strength, thickness, weave and stretch)
* learn about a range of techniques used for measuring and marking out, joining and assembling, sizing, shaping and forming, and finishing and detailing
* learn how a technique is selected with consideration of the characteristics of the textiles used
* examine a range of well-made and faulty products made from textile materials with differing characteristics.

Learners should discuss the materials used, their characteristics, and techniques that would be appropriate to work with them safely.

Useful resources include:

* Choosing fabric: weight versus drape

<http://www.colettepatterns.com/blog/fabric-haberdashery/choosing-fabric-weight-vs-drape>

* Tips for sewing on thick fabric

<http://sewing.craftgossip.com/tips-for-sewing-on-thick-fabric/2009/03/31/>

* Sewing through thick layers of fabric

<http://keyka.typepad.com/my_weblog/2008/12/sewing-through-thick-layers-of-fabric.html>

* Betzina, S 2004, *More Fabric Savvy: A Quick Resource Guide to Selecting and Sewing Fabric*, Taunton Press, United States

<http://www.amazon.co.uk>

* Copies of Threads magazine (or 2010 Threads Archive DVD-ROM): [http://www.tauntonstore.com](http://www.tauntonstore.com/)
* Sewing machine manuals.

# Assessment schedule: Construction and Mechanical Technologies 91060 – Getting to know protective clothing

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| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The learner demonstrates understanding of basic concepts used to make protective clothing from textile materials by:* describing characteristics of textile materials used in protective clothing

For example, the learner describes:* + how cotton denim fabric in overalls and jeans is used because of the strength of the fibre and a twill weave. The nature of the twill causes a diagonal interlace of yarn which is the strongest method
	+ how polar fleece (microfibre with nap) may be selected depending on thickness/absorption capabilities.
* explaining techniques used. The learner explains four different techniques

For example, the learner explains:* + measuring/marking out: *Prior to measuring cotton denim fabric, it must be pre-washed as it shrinks 10% on the first wash. Selvedges must be removed as they are usually tight and can cause the cut component to distort. Then accurate measuring and marking out can occur. All pieces must use the straight grain of the fabric (warp yarns) as these have the greatest strength*
	+ sizing/shaping/forming: *Techniques to use when cutting cotton denim include cutting in stages, using a trial layout to make sure that all the pattern pieces fit on the length of cloth before cutting and that allowance is made in the cutting for 15mm seams (to allow adequate material for the joining techniques)*
	+ joining/assembling: Techniques include the variety of seams that can be used on protective wear made from cotton denim. The learner completes samples on cotton denim with annotated notes showing type of seam, needle, thread, stitch and machine types (e.g. sewing, overlocker)
	+ finishing/detailing: Techniques include how different reflective tapes can be applied to fabrics. The learner completes samples on cotton denim with annotated notes determining the best way to apply the tape.
* describing which combinations of techniques and textile materials would be suitable for a situation

For example, the learner describes:* + at least two techniques that would be suitable for using in combination, e.g. cotton denim and parka nylon to create a high visibility vest for a construction site
	+ how garments that are mass-produced, such as high visibility vests, need to be easily constructed and have high life expectancy. When constructing a garment from cotton denim and parka nylon for this type of situation, most will be seamed with a double stitched, taped seam for extra strength and water resistance (as garment is for outer wear).

*The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates in-depth understanding of basic concepts used to make protective clothing from textile materials by:* describing characteristics of textile materials used in protective clothing

For example, the learner describes:* + how cotton denim fabric in overalls and jeans is used because of the strength of the fibre and a twill weave. The nature of the twill causes a diagonal interlace of yarn which is the strongest method
	+ how polar fleece (microfibre with nap) may be selected depending on thickness/absorption capabilities.
* explaining techniques used. The learner explains four different techniques

For example, the learner explains:* + measuring/marking out: *Prior to measuring cotton denim fabric it must be pre-washed as it shrinks 10% on the first wash. Selvedges must be removed as they are usually tight and can cause the cut component to distort. Then accurate measuring and marking out can occur. All pieces must use the straight grain of the fabric (warp yarns) as these have the greatest strength*
	+ sizing/shaping/forming: *Techniques to use when cutting cotton denim include cutting in stages, using a trial layout to make sure that all the pattern pieces fit on the length of cloth before cutting and that allowance is made in the cutting for 15mm seams (to allow adequate material for the joining techniques)*
	+ joining/assembling: Techniques include the variety of seams that can be used on protective wear made from cotton denim.

The learner completes samples on cotton denim with annotated notes showing type of seam, needle, thread, stitch and machine types (e.g. sewing, overlocker)* + finishing/detailing: Techniques include how different reflective tapes can be applied to fabrics. The learner completes samples on cotton denim with annotated notes determining the best way to apply the tape.
* explaining how the characteristics of textile materials influence technique selection

For example, the learner explains:* + how techniques are chosen: *Heavyweight cotton denim used for protective wear has a resistant surface so a fabric pen would be used for marking out as the purple would be visible on the blue. Chalk would sink into the fabric and tailors tacking would be difficult to execute because of the strength of the fabric*
	+ how to manage the strength in the fabric: *Pattern pieces need to be laid out to ensure the maximum strength goes down the wearer’s body and cut with the pieces going down the grain line rather than across as the warp threads are the strongest. Parka nylon can be cut across the warp or weft threads as they are of equal strength.*
* explaining which combinations of techniques and textile materials would be suitable for a situation on a construction site

For example, the learner explains:* + techniques that would be suitable for using in combination with cotton denim and parka nylon such as flat fell seams, or double stitched seam for strength and durability on the cotton denim. *When parka nylon is used to protect the wearer from moisture on the shoulders of the jacket, it is important that the waterproofing is not compromised and therefore tape is used on such joins and a waterproof finish applied*
	+ how garments that are mass-produced such as high visibility vests need to be easily constructed and have high life expectancy. *Garments that are mass produced are constructed with minimum seams so that the durability of the finished garment and/or materials used is not compromised. Minimal seams also contribute to low cost construction and comfort for the wearer.*

*The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates comprehensive understanding of basic concepts used to make protective clothing from textile materials by:* describing characteristics of textile materials used in protective clothing

For example, the learner describes:* + how cotton denim fabric in overalls and jeans is used because of the strength of the fibre and a twill weave. The nature of the twill causes a diagonal interlace of yarn which is the strongest method
	+ how polar fleece (microfibre with nap) may be selected depending on thickness and/or absorption capabilities.
* explaining techniques used. The learner explains four different techniques

For example, the learner explains:* + measuring/marking out: *Prior to measuring cotton denim fabric it must be pre-washed as it shrinks 10% on the first wash. Selvedges must be removed as they are usually tight and can cause the cut component to distort. Then accurate measuring and marking out can occur. All pieces must use the straight grain of the fabric (warp yarns) as these have the greatest strength*
	+ sizing/shaping/forming: *Techniques to use when cutting cotton denim include cutting in stages, using a trial layout to make sure that all the pattern pieces fit on the length of cloth before cutting and that allowance is made in the cutting for 15mm seams (to allow adequate material for the joining techniques)*
	+ joining/assembling: Techniques include the variety of seams that can be used on protective wear made from cotton denim. The learner completes samples on cotton denim with annotated notes showing type of seam, needle, thread, stitch and machine types (e.g. sewing, overlocker)
	+ finishing/detailing: Techniques include how different reflective tapes can be applied to fabrics. The learner completes samples on cotton denim with annotated notes determining the best way to apply the tape.
* discussing why textile materials require particular techniques for their handling and use

For example, the learner discusses:* + *Heavyweight cotton denim is coarse and crisp to handle initially. It is used in protective wear that receives a high level of wear and tear and therefore the construction techniques need to be durable too. Flat fell seams are used on the cotton denim as the finish on the inside of the garment is smooth and non-chafing to the wearer; the bulk of the seam is carried on the outside of the garment; and its double stitching provides strength. A special thread for top stitching and a size 90 denim needle to cope with the thickness of the layers are used*
	+ *The needle and thread would need to be changed to a microtex size 80 needle and a polyester thread when adding the high vis parka nylon.*
* discussing why techniques and textile materials are combined in different ways across two or more situations

For example, the learner:* + discusses and compares techniques that would be suitable for using in combination with cotton denim and parka nylon to create products such as reflective vests and outer wear to be used on construction sites
	+ discusses how mass-produced garments, such as high visibility vests and outer wear, need to have high life expectancy and be able to withstand tough treatment
	+ compares such things as which seam construction (over edge and/or cover stitch) offers the best seam strength and coverage of the fabric’s raw edge
	+ discusses how stabilisers are essential so the fabric is supported to maintain the fabrics structural integrity when the detailing (reflective tape) is applied
	+ discusses how waterproof finishing (seam sealing tape) can be applied to prevent water transfer and air through the stitch holes to ensure the garment’s integrity
	+ produces samples of such things as reflective tape sewn onto thick denim, using a strip of interfacing to stabilise the fabric. Annotations explain how, if a stabiliser is not used, the fabric will stretch as the tape is sewn, and will be uneven and lumpy. On a nylon sample, a seam sealer tape is used to test waterproof qualities needed for construction workers.

*The above expected learner responses are indicative only and relate to just part of what is required.* |

Final grades will be decided using professional judgement based on an examination of the evidence provided against the criteria in the Achievement Standard. Judgements should be holistic, rather than based on a checklist approach.