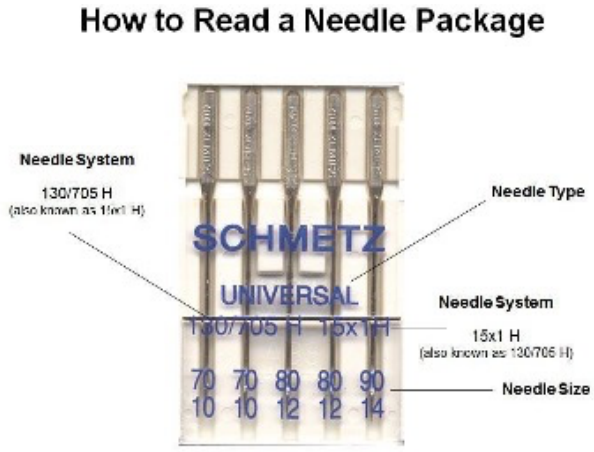
Lesson 2.11: Machine Needles

You must use a needle that is suitable for your machine, the fabric you are working on and the job you are doing. Using the wrong needle can damage or effect the machine, the product, the stitch, and cause difficulties when sewing.

There are different needles for different applications and a wide range of different sizes. It may not be your responsibility as a production sewing machinist to identify the right needle for the job as this may be identified in a product specification or you may be told which need to use. However, it is important and useful to understand the basics of the needle system, needle types and needle sizes.

How to Read a Needle Package

The first thing you will see on a pack of needles is the seemingly random assortment of numbers and letters, typically these are set out as per the image, each line indicates something different as summarised below:



Needle system: The brands own numbering system
Needle type: This can also be the needle point as indicates the material the needle is designed to sew
Needle size: Indicates the thickness of the needle (the second row 10 to 14 are the size terms usually used in the UK)

Needle Brands

There are numerous needle brands, and your company will be supplied by the brand of their choice. The most used brands in the industry are-

SCHMETZ

The SCHMETZ brand is extremely well established in the sewing industry around the world. The range covers unique requirements of over 3,000 product types.

Groz-Beckert

Groz-Beckert produces machine needles, parts, tools and systems for the sewing and textile industry. With about 70,000 product types, for textile production, knitting, weaving and sewing

Knowledge Challenge 2.23

1. Draw a line to match the needle labelling to the descriptors below:

Needle labelling	Descriptor
Needle type	The type of material the needle is designed to sew
Needle size	The thickness of the needle
Needle system	The needle brands numbering system

Needle Types

The needle type refers to the needle point. There are different needle points within each needle system. The different needle types have been developed to accommodate the characteristics, and properties of various materials such as fabric weights, thickness and stretch. You're the needle requirements may change with the introduction of new or specialised fabrics or new processes. The following table shows the industry's most used needle types in a lockstitch machine.

	Needle type/point	**Uses/qualities**
	Sharpe or universal	General purpose. The point is rounded, and the needle size will differ depending on the weight of fabric to be stitched. i.e. light /medium or heavy weight fabric
	Light ball point Medium ball point Heavy ball point	General purpose. The point is rounded, and the needle size will differ depending on the weight of fabric to be stitched. i.e. light/medium or heavy weight fabric
	Wedge or cutting point	Used to sew leather or dense materials such, piercing easily to prevent damage. Points are cut in various ways i.e. lens, triangular, square for effect

To Read a Needle Package

Needles are manufactured for different sewing machines using a "needle system" coding. This is based on the needle specifications needed to match the sewing machine specification

The needle system can be numerical or alpha numerical and these designations are often created by the sewing machine manufacturer in conjunction with the needle manufacturer. Different sewing machine companies may use different system numbers for the same needle! (135×17 and DPX17 are the same needle but used by two different sewing machine manufacturers).

Knowledge Challenge 2.24

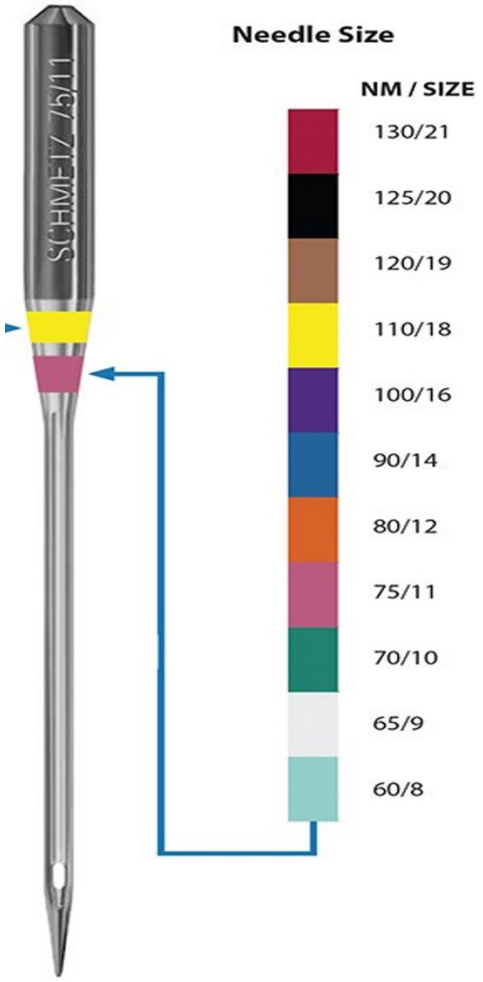
1. Draw a line to match the needle type to the function it is designed for

Needle Type	Function
Light, medium, heavy ball point	To sew fine, woven fabrics
Wedge or cutting point	To sew leather or dense materials
Sharpe or universal	To sew woven/knit fabrics

Needle Size

The size of a needle is determined by its thickness but has no bearing on its length. Thicker needles are better for thicker fabrics, while thinner needles are better for thinner fabrics. The needle size may affect the timing of your machine, as a rule of thumb, you can go up or down by one needle size without compromising the timing on the machine. If you were to jump straight from a size 12 (80) to a size 130 (21) without resetting, the timing would most likely be knocked out. This would result

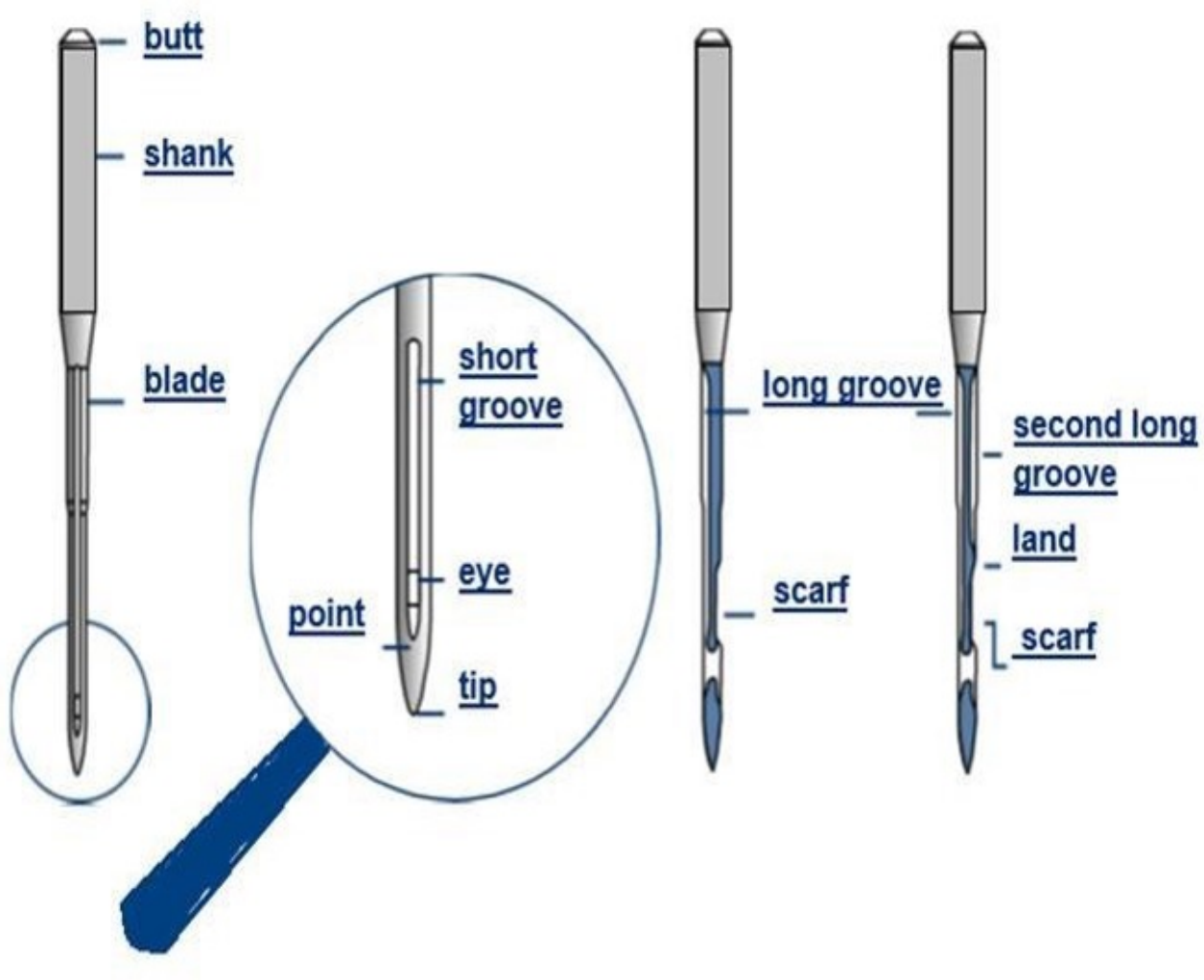
in a dramatic dip in stitch quality and needle breakage. The Schmetz diagram below demonstrates the needle type, material suitability and size.



Knowledge Challenge 2.25

1. You have been given the job to lockstitch side seams on a pair of heavy weight denim jeans. What needle is most suitable?
    - Size 16, Universal
    - Size 10, Light ball point
    - Size 12, Cutting point

Needle Characteristics



All industrial sewing machine needles, regardless of size have the same physical characteristics:

Each part of the needle has a different function, as follows:

Butt: The shaped top end which facilitates insertion into the needle bar/clamp **Shank:** The thicker part of the needle held by the needle clamp. It supports the needle, providing additional strength

Shoulder: The intermediate section between the shank and the blade

Blade: Extends from the shank to the eye. This is subjected to the greatest amount of friction and heat when it passes through the material

Long groove(s): Present on one side of the needle blade for the convenience of the needle thread from the take-up device and provides a protective channel in which the thread is drawn down through the material during stitch formation

Short groove: Formed on the other side of long groove, towards the shuttle and it assists in throwing the loop of needle thread

Eye: Present in the bottom end of the blade. Needle threaded through this eye is taken through the throat plate to form the stitch permit a closer setting of the shuttle to the needle

Point: Shaped to provide the most suitable penetration of the material being sewn per its nature and the desired stitch effect

Tip: The extreme tip shape, in combination with the point defines penetration performance

Other variants Most needles are constructed using these features but there are a few exceptions. Some of which may have been developed to overcome specific seaming issues or simply designed to meet the machine requirements i.e., curved needles

Knowledge Challenge 2.26

1. Draw a line to match the characteristics of a machine needle to its features and function.

Characteristics of a machine needle	Needle features and function
Eye	The thickest part of the needle, that supports the needle and provides additional strength.
Point	On one side, providing a channel in which the thread is drawn down through the material during stitch formation
Shank	Thread threaded through this is taken through the throat plate to form the stitch
Long groove	Specifically, shaped to provide the most suitable penetration of the material being sewn.

Needles: common problems and solutions

Sewing machine needles can cause various problems during sewing, common problems are listed below, along with possible solutions:

Possible reason for needle breakage	**Precautions and Solutions**
Poor quality needle	Use good quality branded needles
Pulling the fabric as you sew	This puts stress on the needle and bends it out of place; so, care should be taken to ensure the cloth isn't pulled
The needle hits the throat plate	Ensure it is inserted properly and not at angle. Slowly turn the balance wheel to check and ensure the needle is straight
The fabric is too heavy for the needle size	Use a heavy gauge needle for sewing heavier fabrics like denim
The presser foot is loose, and the needle hits it	Ensure the presser foot is screwed on tightly and straight and always test before sewing
The needle falls out of the needle bar	Ensure the needle screw is tight, complete a test sew before sewing
The machine will not form stitches properly/ skip stitches	Check the needle is inserted the right way around, it is threaded from left to right and the rest of the machine is threaded correctly Check that it is the correct needle for the task
The needle hits the shuttle	Ensure the spool and spool case are inserted correctly

When inserting a new needle:

- Ensure the needle is the correct needle system for the sewing machine Make sure the needle size / eye fits the thread size being used
- `Make sure the needle is pushed all the way into the needle holder Ensure that the angle of the needle is correct
- After inserting a needle in the machine turn the machine balance wheel manually to make sure the needle isn't contacting any parts

When checking a needle that is already inserted in a Machine:

- Is the needle inserted correctly?
- Is the needle contacting any machine parts? Is the needle bent?
- Is the eye rough or blocked with melted fibre? Is the point damaged?
- When in doubt change the needle!

For specific guidance on how to change your needle see Lesson 2.5 and 2.10

Knowledge Challenge 2.27

1. Identify three key actions you need to make sure the needle is secure and clear of obstructions that may cause breakage
    - Ensure sure the needle is pushed all the way into the needle holder
    - Ensure the needle is threaded properly
    - Ensure the machine is switched on
    - Ensure the needle is the correct size
    - Ensure the new needle is straight and undamaged
    - Lower the needle slowly and check clearance

Broken Needle Procedures

Often companies have a formal broken needle procedure, this is a policy used by manufacturers to ensure finished products are metal free eliminating the risk of damage/injury to customers. There could also be rules that do not allow metal items such as staples, pins, paper clips etc. into the production area. There are many variations of broken needle procedure used across the industry. See an example of a standard policy below:

IN-PROCESS BROKEN NEEDLE CONTROL PROCEDURE

Responsible Persons

- Machine Operators
- Production Supervisor
- Mechanics
- Quality supervisor
- Factory Management

When a needle breaks stop sewing and switch off the machine.

Ensure that all the parts of the broken needle have been found before replacing the needle with a new one.

If the broken parts of the needle can't be located, you must:

- Check the machine for broken fragments of the needle and for damage to the machine
- Check the product for broken fragments of the needle
- Check the area immediately around the sewing machine using a strong magnet
- Notify the production supervisor
- If the broken fragments are still not recovered after completing the search the supervisor should confirm that the product is free from needle fragments

When all fragments of the broken needle are found, tape them onto this form, write a short account of what was being stitched, what caused the needle to break, date and sign.

NEEDLE FRAGMENTS	RRASON FOR BREAKAGE
SIGNATURE	DATE

Knowledge Challenge 2.28

1. Companies have formal broken needle procedure in place to ensure finished products are metal free, identify two reasons why this important
    - To ensure needles are accounted for
    - To ensure needles damage is recorded
    - To ensure injury to customers is eliminated
    - To ensure all products are metal free

GROUNDWORK: Completing this groundwork is an option, it will help you to gain better knowledge of the processes and machines used to make a product. For those undertaking an apprenticeship these activities will help you gather information relevant to the End Point Assessment.

Note: For those learners, who are independent and not yet working as an employed production sewing machinist, alternative recommendations are included.

Needle Procedure

There are various processes and procedures in place across the industry that relate to needle damage, breakage, and disposal. Formal procedures may not be in place in all companies, but larger companies particularly those producing children's and baby wear will have this procedure a part of their process.

To complete this groundwork, check if your company has a needle procedure in place, if yes familiarise yourself with the procedure and put a copy in your file. If there is no procedure in place it is good idea to use the example within this section to ensure the safety of the product.

