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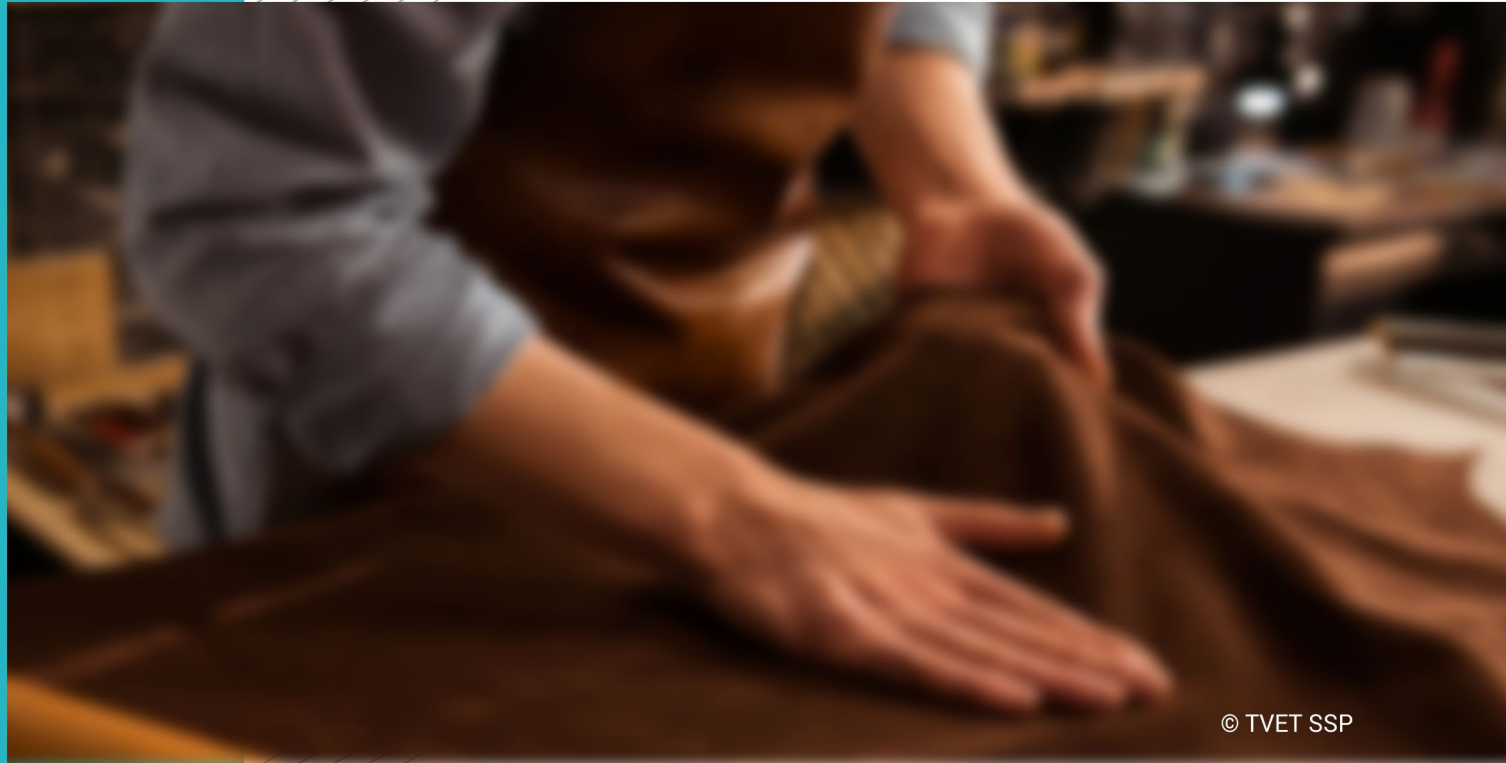
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# LEATHER PROCESSING TECHNOLOGIST



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## LEARNER GUIDE

National Vocational Certificate Level 4

Version 1 - September, 2019



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## Introduction

The Leather industry is a highly labour intensive industry; labour is extensively employed in the initial stages of the Leather tanning process while greater skills are required at the finishing stage. This Course is designed to focus the need, importance and understanding of Leather tanning & processing industry as per the current competitive environment. Companies can maintain a strategic competitive advantage and produce more valued goods after better processing of leather. Increasing demand for skilled, efficient and effective employees has created demand for this course.

This course will enable functional and technical skills for leather processing technologist. The material is taught as leather processing mechanical operator, tanning technician, leather processing & finishing and quality perspective with an emphasis on where and how specific tools can be used to improve the overall performance in the leather processing.

The main elements of your learner's guide are:

- **Introduction:**
  - This includes a brief description of your guide and guidelines for you to use it effectively
- **Modules:**
  - The modules form the sections in your learner's guide
- **Learning Units:**
  - Learning Units are the main sections within each module
- **Learning outcomes:**
  - Learning outcomes of each learning units are taken from the curriculum document
- **Learning Elements:**
  - This is the main content of your learner's guide with detail of the knowledge and skills (practical activities, projects, assignments, practices etc.) you will require to achieve learning outcomes stated in the curriculum
  - This section will include examples, photographs and illustrations relating to each learning outcome
- **Summary of modules:**
  - This contains the summary of the modules that make up your learner's guide
- **Frequently asked questions:**
  - These have been added to provide further explanation and clarity on some of the difficult concepts and areas. This further helps you in preparing for your assessment.
- **Multiple choice questions for self-test:**
  - These are provided as an exercise at the end of your learner's guide to help you in preparing for your assessment.

# LEATHER PROCESSING TECHNOLOGIST



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Module-7  
LEARNER GUIDE  
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## Modules

### Module 7: Carryout Post-Tanning

**Objective of the module:** The aim of this module to develop advanced knowledge, skills and understanding to carryout post tanning

**Duration:** 120 Hours      **Theory:** 24 Hours      **Practical:** 96 Hours

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
<b>LU1: Prepare Post Tanning recipe</b>	<p><b>The trainee will be able to:</b></p> <p>Assess Tanned leather condition as per requirement</p> <p>Weigh Tanned leather</p> <p>Develop Post tanning recipe as per requirement</p>	<p>Define parameters of leather conditions</p> <p>Define types of Chemicals used in post tanning operation</p> <p>Define uses of chemicals used in post tanning operation</p> <p>Explain properties of chemical used post tanning operation</p> <p>Explain method of preparing post tanning recipe</p> <p>Define compositions of post tanning recipe</p>	<p>Computer with Multimedia</p> <p>Leather</p> <p>Digital Weight Balance</p> <p>Pen</p> <p>Paper</p> <p>Recipe sheet</p> <p>Calculator</p>
<b>LU2: Perform Neutralization</b>	<p><b>The trainee will be able to:</b></p> <p>Perform washing as per Post Tanning recipe</p> <p>Arrange Neutralizing agents &amp; auxiliaries as per Post-Tanning recipe</p> <p>Execute Neutralization as per post-tanning recipe</p> <p>Examine Neutralization by pH value &amp; cross section as per post-tanning recipe</p>	<p>Explain neutralization</p> <p>Define purpose of neutralization</p> <p>Explain procedure of neutralization</p> <p>Explain assessment methods of neutralization</p>	<p>Leather</p> <p>Drum</p> <p>Digital Weight Balance</p> <p>Calculator</p> <p>Neutralization Chemicals and auxiliaries</p>
<b>LU3: Perform Re-tanning</b>	<p><b>The trainee will be able to:</b></p> <p>Arrange Re-tanning agents &amp; auxiliaries</p>	<p>Explain re-tanning</p> <p>Define purpose of re-tanning</p>	<p>Leather</p> <p>Drum</p>

	as per Post-Tanning recipe Execute Re-tanning as per recipe	Explain types of re-tanning Explain procedure of re-tanning Explain precautionary & remedial measures of re-tanning	Digital Weight Balance Calculator Retanning Chemicals and auxiliaries
<b>LU4: Perform Fat-liquoring</b>	<b>The trainee will be able to:</b> Arrange Fat-liquoring agent & auxiliaries as per post Tanning recipe Execute Fat-liquoring as per post-Tanning recipe	Define fat liquoring Purpose of liquoring Types of fat-liquor Fat liquoring process and methods Explain precautionary & remedial measures of fat-liquoring Explain assessment method of fat liquoring	Leather Drum Digital Weight Balance Calculator Fatliquoring Chemicals and auxiliaries
<b>LU5: Perform Fixation for Crust</b>	<b>The trainee will be able to:</b> Arrange Fixing agents as per post-tanning recipe Execute Fixation as per post tanning recipe Examine Fixation by pH value as per Post-Tanning recipe Pile Crust leather	Define fixation Define purpose of fixation Explain procedure of fixation Explain precautionary & remedial measures of fixation Explain assessment method of fixation	Leather Drum Digital Weight Balance Calculator Fixation Chemicals and auxiliaries
<b>LU6: Maintain post tanning register</b>	<b>The trainee will be able to:</b> Record Post Tanning operation entries in register Record damages during Post Tanning	Introduction to machine register Define procedure of recording entries in register Importance of register	Computer Multimedia Record Registers

## **LU1**

### **Post Tanning**

After tanning the leather should be further process in order to achieve Desire leather requirements like garment leather or shoe upper leather or upholstery e.t.c... Post Tanning is carried out for enhancing the leather properties like softness, fullness the empty areas of leather. Post tanning operation is done and two types of leather can be created one is crust leather and other is dyed crust leather which is called as direct dyed leather.

### **Natural Crust Leather**





### Leather Initial conditions:

Initial condition of leather would be wet blue tanned leather which came from grading after sorting of Leather, either is damaged from mechanical operations or other damages. Further recipe will be created according to the initial conditions and also the type of pelts will be used according to articles.

### Parameters of Dyed Leather conditions:

Parameters of leather condition depends on:

- Type of leather to be processed.
- Notice down if any defects occurs during Preprocesses.

### Chemicals used in Post Tanning Operations:

There are following processes involve in Post Tanning processes like: Wet Back, Neutralization, Re-tanning and fat-liquoring and fixations

So different chemicals are use for different processes:

#### Wet Back

Use of detergent for removing the dust which were effects during piling and shaving.

The chemicals are adding into the drums by the initial weight of leather.

Post Tanning Process					
Process	Chemicals	%	Time	pH	Remarks
Wet Back	Water	150-200			
	Detergent	0.5-1	15-20 min		Leather should be proper wetback,

					drain and Wash Well
<b>Neutralization</b>	Water	150-200			
	Sodium Formate	0.5-1.0			
	Sodium bi Carbonate	1-1.5	50-60 mins	5-6.5	Check by cross section by dropping BCG (Bromo cresol Green) indicator and then Drain and Wash Well
<b>Retaining</b>	Water	100-150			
	Phenolic Syntan	3-5			
	Resin	2-4			
	Polymers and others retanning e.g vegetables etc)	5-8	45-60 mins		For further process add water at same float
<b>Fat liquoring</b>	Water	100			Adjust temperature of float at 65°C
	Synthetic Oils	4-5			
	Fish Oils	2-3			
	Different combination of oils	4-6			
	Blended Oils	2-4	60 mins		
<b>Fixation</b>	Formic Acid	1-1.5	30 mins		pH should be around 3.8 to 4.2, Check Float it

					should be clear Drain the float and pile the leather.
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## LU2

### Neutralization:

- a. Weak Alkali e.g. sodium formate is use as a buffer
- b. Strong alkali e.g. sodium bi carbonate for making pH high and bring the leather to the iso-electric-point in neutralization to open up the fibers of leather for penetration of retaining agents.
- c. Other auxiliaries like neutralizing syntan for covering maximum area of leather.

## LU3

### Retanning:

Retaining process is done for overcome the deficiencies of main tanning to maintain the leather more firm tigh and full according to the article. Many types of retanning are used in leather processing mainly types are given below

### Syntan:

These are very fine particles also available as micro and nano sizes to tightness of grain and improve the smoothness basic types of syntans are:

- Phenolic Syntan
- Naphthalene Syntan
- Condensation Syntan etc.

### Resin:

These are relatively large particle size and specially used for filling up the leather from loose areas e.g. bellies basic types of resins are:

- Melamine Resin
- Dicynamide Resin etc.

**Vegetable Retanning agents:**

In past mostly tanning are occurs with vegetable tanning materials. Its increases the area of leather and improves the fullness of leather. In recent times vegetable tanning materials mostly used as a retanning of chrome tanned leather to improves the properties of leather according to their requirement. Some major vegetable tanning materials are:

- Mimosa
- Quebracho
- Chesnut etc.

**LU4****Fatliquoring**

Leather, at the time of completion of the tannage does not contain sufficient lubricants to prevent it from drying into a hard mass. Almost all light leathers need a greater softness and flexibility than is imparted by tannage. This is attained in the fatliquoring process by introducing oil into the leather, so that the individual fibres are uniformly coated. The percentage of oil on the weight of leather is quite small, from 3-10 %. The precise manner in which this small quantity of oil is distributed throughout the leather materially affects the subsequent finishing operations and the character of the leather. Proper lubrication or fatliquoring greatly affects the physical properties of break, stretch, stitch tear, tensile strength, and comfort of leather. Over lubrication will result in excessive softness and raggy leather in the bellies and flanks. Under lubrication, or improper penetration, results in hard bony leather that may crack in use.

**Mineral Oils and Waxes:**

Simplest type is mineral oil, obtained from crude oil from oil wells. They are mixtures of many substances which are separated by distillation. They are relatively cheap and chemically stable and are not affected by mould or bacteria. Can be obtained in pale color. Mineral oils do not mix with water therefore give waterproof properties and can be obtained at any viscosity. Despite the advantages they have only limited use in leather manufacture. Relative to other oils:

a) they are more difficult to incorporate thoroughly without giving a slightly oily or waterproof surface, which is a disadvantage for many leathers which are to be dyed or finished  
b) they have a poor “feeding action”, and used alone they give leathers which feel thin or empty but may be quite flexible  
c) if the resultant leather is heated, the oil may migrate to the surface, which becomes oily or discoloured. These oils do not appear to be as firmly held by the leather fibres as other oils; they are saturated hydrocarbons (unsaponifiable). Paraffin wax(mp 35-36 C), Montan wax(mp 76-84 C), Ceresine wax(mp 60-85 C).

### **Natural oils and fats:**

Most of the oils and fats in animals, fish and plants are fatty acid glycerides. When boiled with caustic soda, they decompose to give soap and glycerine (saponification). By adding acid to the soap the free acid is formed. These fatty acids are water insoluble and range from very fluid oily liquids to greasy pastes and hard waxy materials.

Saturated fatty acids are usually more viscous or solid, do not darken with sunlight, unaffected by damp, warm air, do not combine with sulphur or iodine, difficult to sulphate. Unsaturated fatty acids are more fluid, darken with sunlight, become sticky or gummy on oxidation by air, readily combine with sulphur or iodine, easily sulphated.

Thus highly unsaturated oils may cause trouble on aging of the leather. In the paint trade they are classified as semi-drying (ie. castor oil) because they become gummy on exposure to air, and drying oils (ie. linseed oil) which on exposure “dry” to a hard, non-oily or non-tacky varnish.

Typical natural oils used :

#### **1) Animal oils and fats:**

Beef tallow (mp 35-38 C)  
Mutton tallow (mp 40-45 C)  
Wool fat and grease  
Stearine (mp 49-55 C)  
Stearic acid (mp 71 C)  
Neatsfoot oil (I value=85)

#### **2) Vegetable oils:**

Coconut oil. (I value=10)  
olive oil, palm oil, palm kernel oil (I value=53)  
castor oil-contains large quantity of C-18 ricinoleic acid, has OH groups that render it water soluble and is easily sulfonated.

linseed oil  
soybean oil (I value=135)

### **3)Fish oils:**

cod oil-(I value=150)high degree of unsaturation, drying properties, may be sulfated

Newfoundland Cod Liver Oil

Coast Cod, British Cod, etc.

Degras or Moellon- oxidized raw cod-liver oil

Herring oil, Salmon oil, Sardine oil, jap fish oil, menhaden oil

Whale oil

Sperm oil- rich in fatty alcohols and upon sulfonation becomes a very strong emulsifier.

### **Waxes:**

Carnauba wax (mp 78-81 C)

Candelilla wax (mp 68 C)

Beeswax (mp 60-63 C)

Spermaceti-sperm oil (mp 42-49 C)

### **Procedure:**

Leather is Processed only in drums in with the required amount of water in the drum and appropriate amount of chemicals and fatliquors or lubricants is added in the float. Following recipe present the overview of the post tanning process:

## **LU5**

### **Fixation**

After Completing of retaining and fatliquoring process should be fixed into the leather by adding mostly weak acid particularly in synthetic and other tanning agents.

## LU6

### Introduction to register:

After Completion of every process their records should be maintained in registered for further enquires and processes.

### Procedure of recording entries in register:

The Record Entries should normally be carried out by writing number of skins/hides is processed and number of damaged skins/hides if any occurs should be maintained. who has done the process and how much time has spent for completion of process.




**Note:** For further recipes and detailed procedures and mechanism of post tanning is provided through handouts and searched from the hand book sharp house & light leather and also from internet resources.

For more detailed information, please visit: Link: <https://www.leather-dictionary.com/index.php/Neutralising>

Also Visit: <http://www.chemicalsforleather.com/fatliquoring.html>

### VIDEOS:

	Video Link
	<b>Perform Neutralization</b> <a href="https://youtu.be/R9oul2P7Fqc">https://youtu.be/R9oul2P7Fqc</a> <a href="https://www.youtube.com/watch?v=jx0WwBAsVSw&amp;t=2s">https://www.youtube.com/watch?v=jx0WwBAsVSw&amp;t=2s</a> <a href="https://www.youtube.com/watch?v=jx0WwBAsVSw&amp;t=2s">https://www.youtube.com/watch?v=jx0WwBAsVSw&amp;t=2s</a>

	
	<p><b>Perform Fat-liquoring</b></p> <p><a href="https://www.youtube.com/watch?v=OeWascAiT8I">https://www.youtube.com/watch?v=OeWascAiT8I</a>  <a href="https://www.youtube.com/watch?v=E-pn8kYL5eE">youtube.com/watch?v=E-pn8kYL5eE</a>  <a href="https://www.youtube.com/watch?v=e1s3bHGPhSU">https://www.youtube.com/watch?v=e1s3bHGPhSU</a></p>
	<p><b>Perform Fixation for Crust</b></p> <p><a href="https://www.youtube.com/watch?v=M-vScJGq3bA">https://www.youtube.com/watch?v=M-vScJGq3bA</a>  <a href="https://www.youtube.com/watch?v=E-pn8kYL5eE&amp;t=23s">https://www.youtube.com/watch?v=E-pn8kYL5eE&amp;t=23s</a>  <a href="https://www.youtube.com/watch?v=UAqVhO70Q3o&amp;t=1s">https://www.youtube.com/watch?v=UAqVhO70Q3o&amp;t=1s</a>  <a href="https://www.youtube.com/watch?v=KX8g0Yt0Zml">https://www.youtube.com/watch?v=KX8g0Yt0Zml</a>  <a href="https://www.youtube.com/watch?v=yoSpu6HZsKE">https://www.youtube.com/watch?v=yoSpu6HZsKE</a></p>



# LEATHER PROCESSING TECHNOLOGIST



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Module-8

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## Module 8: Carryout Dyeing

**Objective of the module:** The aim of this module to develop advanced knowledge, skills and understanding to carryout Dyeing.

**Duration:** 100 Hours      **Theory:** 20 Hours      **Practical:** 80 Hours

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
<b>LU1: Prepare Dyeing recipe</b>	<p><b>The trainee will be able to:</b></p> <p>Assess Crust leather condition as per requirement</p> <p>Weigh the Crust leather</p> <p>Develop Dyeing recipe as per requirement</p>	<p>Define dyeing</p> <p>Define parameters of crust conditions</p> <p>Define types of Chemicals used in dyeing operation</p> <p>Define uses of chemicals used in dyeing operation</p> <p>Explain properties of chemical used dyeing operation</p> <p>Define types of dyes used in dyeing operation</p> <p>Explain method of preparing dyeing recipe</p> <p>Define compositions of dyeing recipe</p>	<p>Computer with Multimedia</p> <p>Leather</p> <p>Digital Weight Balance</p> <p>Pen</p> <p>Paper</p> <p>Recipe sheet</p> <p>Calculator</p>
<b>LU2: Perform Wetback</b>	<p><b>The trainee will be able to:</b></p> <p>Arrange wetback agent as per dyeing recipe</p> <p>Execute wetback as per dyeing recipe</p> <p>Perform washing as per dyeing recipe</p>	<p>Explain wetback</p> <p>Purpose of wetback</p> <p>Methods of wetback</p> <p>Procedure of wetback</p>	<p>Leather</p> <p>Drum</p> <p>Digital Weight Balance</p> <p>Calculator</p> <p>Wetback Chemicals and auxiliaries</p>
<b>LU3: Perform Dyeing</b>	<p><b>The trainee will be able to:</b></p> <p>Arrange dye and their auxiliaries as per dyeing recipe</p> <p>Execute Dyeing as per dyeing</p>	<p>Define dyeing</p> <p>Define purpose of dyeing</p> <p>Explain dyes and its auxiliaries</p> <p>Explain procedure of dyeing</p>	<p>Leather</p> <p>Drum</p> <p>Digital Weight Balance</p> <p>Calculator</p>

	<p>recipe</p> <p>Examine dye penetration by cross section</p>	<p>Explain penetration of dye</p> <p>Explain top dye process</p> <p>Explain precautionary &amp; remedial measures of dyeing</p> <p>Explain assessment method of dyeing</p>	<p>dyes and auxiliaries</p>
<p><b>LU4:Perform Lubrication</b></p>	<p><b>The trainee will be able to:</b></p> <p>Arrange Lubricant &amp; their auxiliaries as per dyeing recipe</p> <p>Execute Lubrication as per dyeing recipe</p>	<p>Define lubrication</p> <p>Define purpose of lubrication</p> <p>Types of lubricants</p> <p>Procedure of lubrication</p> <p>Explain precautionary &amp; remedial measures of lubrication</p>	<p>Leather Drum Digital Balance Calculator Lubrication Chemicals and auxiliaries</p> <p>Weight</p>
<p><b>LU5: Perform Fixation for dyed crust</b></p>	<p><b>The trainee will be able to:</b></p> <p>Arrange Fixing agents as per dyeing recipe</p> <p>Execute Fixation as per dyeing recipe</p> <p>Examine Fixation pH value</p>	<p>Define fixation</p> <p>Define purpose of fixation</p> <p>Procedure of fixation</p> <p>Explain precautionary &amp; remedial measures of fixation</p> <p>Explain assessment method of fixation</p>	<p>Leather Drum Digital Balance Calculator Fixation Chemicals and auxiliaries</p> <p>Weight</p>
<p><b>LU6: Maintain Dyeing Register</b></p>	<p><b>The trainee will be able to:</b></p> <p>Record Dyeing operation entries in register</p> <p>Record damages during Dyeing</p>	<p>Introduction to machine register</p> <p>Define procedure of recording entries in register</p> <p>Importance of register</p>	<p>Computer Multimedia Record Registers</p>

## LU1

### Dyeing

After tanning the leather should be color according to desire fashion requirements. Dyeing is carried out in different shades which is according to demand and fashion

The initial weight, the chemicals are adding into the drums by the initial weight of leather.

Process	Chemicals	%	Time	Remarks
Wet Back	Water	150-200		
	Detergent	1	45 mins	Leather should be proper wetback
Dyeing	Ammonia	0.5	10 mins	Check pH : 5.5- 6.0
	Dye leveler / penetrator	1-2	20 mins	Evenly distribution of dye & help its proper penetration
	Powder Dye (Mix in hot water well)	3-5	45 mins	Check penetration
Fat liquoring	Water	200		At temperature 65°C (Warm water)
	Synthetic Oils	3-5		
	Fish Oils	2-4		
	Blended Oils	2-4	60 mins	
Fixation	Formic Acid	1	30 mins	pH should be around 3.8 to 4.2, Check Float it should be clear

	(Or) Dye Fixer	1	30 mins	Fix the dye and fatliquor properly
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**Leather Initial conditions:**

Initial condition of leather would be either natural crust or wet blue tanned leather which came from grading after sorting of Leather, either is damaged from mechanical operations or other damages. further recipe will be created according to the initial conditions and also the type of pelts will be used according to articles.

**LU2.**

**Wet Back**

Use of detergent for removing the dust which were effects during piling and shaving.

**LU3**

**Parameters of Dyed Leather conditions:**

Parameters of leather condition depends on:

- Type of leather to be processed.
- Notice down if any defects occurs during Preprocesses.

**Types of Dyes:**

Following are the types of dyes used in Dyeing:

- Acid dyes
- Mordant dyes
- Direct dyes
- Basic Dyes, its use is also limited.
- Pre-metallic dyes
- Solubilised sulphur dyes
- Reactive dyes although a part of the anionic group of dyes but use limited to a certain extent



*Note: The most commonly used dye is acid dye in dyeing penetrations and basic dye in topping dyes*

### **Chemicals used in Dyeing operations:**

There are almost 4 to processes involve in Dyeing processes like: Wet Back, Dyeing, lubrications and fixations

So different chemicals are use for different processes it includes:

- Ammonia-for adjustment of pH for dyeing
- Dye- to color the leather (e.g. Acid Dye or Basic Dye etc.)
- Dye penetrator/ leveler- to evenly penetrate and level the dye and avoiding the patches.
- Formic Acid -for making Fixation of dyeing
- Lubrication- for making leather soft.

### **Procedure:**

Leather is dyed only in drums in with the required amount of water in the drum and appropriate amount of dye and fatliquors or lubricants is added in the float. Following recipe present the overview of the dyeing process:



#### **LU4 SAME AS POST TANNING MODULE**

#### **LU5**

##### **Fixation**

After Completing of dyeing and fat liquoring process should be fixed into the leather by adding mostly weak acid particularly in synthetic and other tanning agents.

## LU6

### Introduction to register:

After Completion of every process their records should be maintained in registered for further enquires and processes.

### Procedure of recording entries in register:

The Record Entries should normally be carried out by writing number of skins/hides is processed and number of damaged skins/hides if any occurs should be maintained. who has done the process and how much time has spent for completion of process.

**Note: For further recipes and detailed procedures and mechanism of post tanning is provided through handouts and searched from the hand book sharp house & light leather and also from internet resources.**

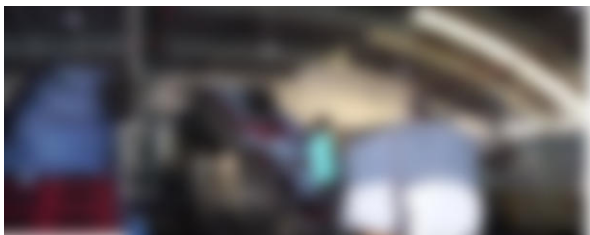
For more detailed information, please visit: Link: [http://www.swystemlogic.com/swystem/leather\\_dyeing.htm](http://www.swystemlogic.com/swystem/leather_dyeing.htm)

Also Visit: [https://www.leather-dictionary.com/index.php/Leather\\_dye\\_-\\_Leather\\_color\\_-\\_Leather\\_colour](https://www.leather-dictionary.com/index.php/Leather_dye_-_Leather_color_-_Leather_colour)


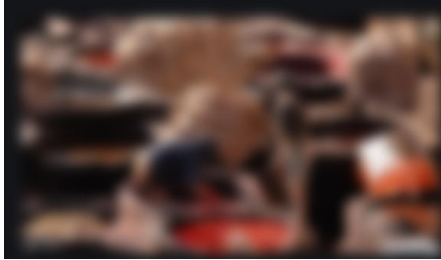
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[https://www.researchgate.net/publication/288674385\\_Lubrication\\_of\\_leather\\_with\\_mixtures\\_of\\_polyethylene\\_glycol\\_and\\_oil](https://www.researchgate.net/publication/288674385_Lubrication_of_leather_with_mixtures_of_polyethylene_glycol_and_oil)

### VIDEOS:

	Video Link
	<b>Perform Wetback</b> <a href="https://youtu.be/R9oul2P7Fqc">https://youtu.be/R9oul2P7Fqc</a> <a href="https://www.youtube.com/watch?v=bwHeFDS9YfI">https://www.youtube.com/watch?v=bwHeFDS9YfI</a> <a href="https://www.youtube.com/watch?v=22tDbopR-uo">https://www.youtube.com/watch?v=22tDbopR-uo</a>



	<p><b>Perform Dyeing</b></p> <p><a href="https://www.youtube.com/watch?v=UMozDDv-ILU">https://www.youtube.com/watch?v=UMozDDv-ILU</a> <a href="https://www.youtube.com/watch?v=PwI9toRr7IM">https://www.youtube.com/watch?v=PwI9toRr7IM</a> <a href="https://www.youtube.com/watch?v=8R4IAladUj0">https://www.youtube.com/watch?v=8R4IAladUj0</a> <a href="https://www.youtube.com/watch?v=Cu6wGtT-ISo">https://www.youtube.com/watch?v=Cu6wGtT-ISo</a></p>
	<p><b>Perform Lubrication</b></p> <p><a href="https://youtu.be/fow2V_iUtrw">https://youtu.be/fow2V_iUtrw</a> <a href="https://www.youtube.com/watch?v=qkdSR2m8vzs">https://www.youtube.com/watch?v=qkdSR2m8vzs</a> <a href="https://www.youtube.com/watch?v=xIhrnMf_zhs">https://www.youtube.com/watch?v=xIhrnMf_zhs</a></p>

# LEATHER PROCESSING TECHNOLOGIST



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Module-9  
LEARNER GUIDE  
National Vocational Certificate Level 4

Version 1 - September, 2019

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## Module 9: Carryout Finishing

**Objective of the module:** The aim of this module to develop advanced knowledge, skills and understanding to carryout finishing

**Duration:** 100 Hours      **Theory:** 20 Hours      **Practical:** 80 Hours

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
<b>LU1: Prepare Finishing recipe</b>	<p><b>The trainee will be able to:</b></p> <p>Receive dyed crust from dyed mechanical operation (DMO)</p> <p>Assess dyed crust condition according to sample</p> <p>Develop Finishing recipe as per requirement</p>	<p>Define finishing</p> <p>Define purpose of finishing</p> <p>Define parameters of dyed crust conditions</p> <p>Define types of Chemicals used in finishing operation</p> <p>Define uses of chemicals used in finishing operation</p> <p>Explain properties of chemical used finishing operation</p> <p>Explain types of finishing agents used in finishing operation</p> <p>Explain procedure of preparing finishing recipe</p> <p>Define compositions of finishing recipe</p>	<p>Computer with Multimedia</p> <p>Leather Measurement tool</p> <p>Digital Weight Balance</p> <p>Pen</p> <p>Paper</p> <p>Recipe sheet</p> <p>Calculator</p>
<b>LU2: Perform Staining</b>	<p><b>The trainee will be able to:</b></p> <p>Select Staining procedure as per requirement</p> <p>Prepare Staining mixture as per Finishing recipe</p> <p>Set Staining plant as per Finishing recipe</p> <p>Apply Staining mixture as per Finishing recipe</p> <p>Match color as per sample</p> <p>Pile stained leather</p>	<p>Define staining</p> <p>Explain purpose of staining</p> <p>Explain liquid dyes &amp; its types</p> <p>Describe staining plant</p> <p>Explain procedure of staining</p> <p>Explain procedure of color matching</p>	<p>Leather</p> <p>Spray plant or spraying unit with gun</p> <p>Digital Weight Balance</p> <p>Calculator</p> <p>Staining Chemicals and auxiliaries</p>
<b>LU3: Apply Base coat</b>	<p><b>The trainee will be able to:</b></p>	<p>Define base coat</p>	<p>Leather</p> <p>Spray plant or</p>

	<p>Set machine for Base coat as per requirement</p> <p>Prepare Base coat mixture as per Finishing recipe</p> <p>Pad up Base coat on leather as per Finishing recipe</p> <p>Pile leather</p>	<p>Explain purpose of base coat</p> <p>Explain pigments &amp; its types</p> <p>Explain waxes &amp; its types</p> <p>Explain binders &amp; its types</p> <p>Explain methods of base coat</p> <p>Explain procedure of base coat</p>	<p>spraying unit with gun</p> <p>Digital Weight Balance</p> <p>Calculator</p> <p>Base coat Chemicals and auxiliaries</p>
<b>LU4: Apply Middle coat</b>	<p><b>The trainee will be able to:</b></p> <p>Set machine for Middle coat as per requirement</p> <p>Prepare Middle coat mixture as per Finishing recipe</p> <p>Spray Middle coat mixture on leather as per Finishing recipe</p> <p>Pile leather</p>	<p>Define middle coat</p> <p>Explain purpose of middle coat</p> <p>Explain procedure of middle coat</p> <p>Explain spray plant</p>	<p>Leather</p> <p>Spray plant or spraying unit with gun</p> <p>Digital Weight Balance</p> <p>Calculator</p> <p>Middle coat Chemicals and auxiliaries</p>
<b>LU5: Apply Final Coat</b>	<p><b>The trainee will be able to:</b></p> <p>Set machine for Final coat as per requirement</p> <p>Prepare Final coat mixture as per recipe</p> <p>Spray Final coat mixture on leather as per recipe</p> <p>Pile Finished leather</p>	<p>Define final coat</p> <p>Explain purpose of final coat</p> <p>Explain lacquer &amp; its types</p> <p>Explain procedure of final coat</p>	<p>Leather</p> <p>Spray plant or spraying unit with gun</p> <p>Digital Weight Balance</p> <p>Calculator</p> <p>Final coat Chemicals and auxiliaries</p>
<b>LU6: Maintain Finishing</b>	<p><b>The trainee will be able to:</b></p> <p>Record Finishing operation entries in</p>	<p>Introduction to finishing register</p> <p>Define procedure of recording entries in finishing register</p>	<p>Computer</p> <p>Multimedia</p> <p>Record</p>

<b>Register</b>	register Record damages during Finishing	Importance of finishing register	Registers
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LU1 TO LU5

## Finishing

The term finishing is applied in the leather industries to help enhance the properties and the appearance of the final piece of the leather its gives the leather more enhanced color and remove defaults that could be caused through the leather operation or a nature defect. The piece of leather is enhanced by treating it with dyestuff solutions, pigments, preparations, top coating then it enters he mechanical treatment in terms of plating.

The basic rule in the leather finishing is the fewer blemishes on the raw hide. The less finish has to be applied. The more grain layers is damaged layer is damaged, the more coats the leather required to replace. The natural grain also the purpose of finishing is to provide different types of leather with special characteristics satisfy the requirement markets, the processes of finishing the leather give the leather upgrading of the following characteristics such as Colour, brightness, matting, feel, softness, print pattern, water resistance and more.

The process of leather finishing, is, generally speaking, applying a coating to the leather. This is done for many reasons including: to give a more uniform appearance and hide any surface imperfections, to colour or decorate the surface for fashion purposes, or to provide a durable 'coat' that increases resistance to water and enables easier cleaning and maintenance. A huge range of leather finishes and techniques are available to the tanner today.



## Types of finishes

Aniline leather is natural or dyed leather, finished by the application of a transparent surface coating. This can be clear or coloured with dye, but not pigment, is usually full grain and is less widely available and more expensive than other leathers - the intention is to show the original grain of the leather and, usually, only the better quality selections that are free from flaws are acceptable.

Semi-aniline leather has been coated with a finish containing a small amount of pigment, so that the natural grain is clearly visible.

Pigmented finished leather has a grain surface finish containing fine pigment particles in a binder that has been applied.

Rub-off leathers are produced by finishing with a pigmented base, followed by a darker top-finish, which is then polished off in the factory to give interesting two-tone results

Corrected grain leather is produced by buffing away the top of the grain surface and then building up a new surface using various finishes. This is the most common type of leather and is widely used for leather goods, luggage and furniture. Frequently, the resin finish is embossed with a 'grain' pattern.

Nappa is a soft, full grain leather made from hide grain split leather. Dry drumming or 'milling' machines are used to soften it.

## Finishing agents

### Dyes and pigments

Both dyes and pigments are powerful colorants material used to color other substances

#### Pigments

Pigments are the special type of dyeing material for wet processing technology. Pigment can also be define as a water insoluble coloring material and a coloring substance that makes the color of the product look different because of its absorption of certain wavelengths.

#### Dyes

Dyes are substances found naturally and also made synthetically too. Dyes have the ability to change the color of the leather and material which they are applied. In earlier times, most of the dyes were obtained from plant sources, roots, wood, stem bark and plants leaves also in the 19<sup>th</sup> century synthetic dyes were produced and since then many of synthetic dyes have been produced. Special needs for the dyes in the surface coating where a high level of transparency is required

Dyes	Pigments
Usually the dyes are organic (i.e carbon based compound) and contain auxo chrome in their chemical structure	Pigments are normally inorganic compound and often involving heavy toxic metals and no auxo chrome contains in pigments.
They are soluble	They are completely insoluble in water and most of the solvent
Its application method is very easy because of its electrostatic charges serve as a method of attaching the dye to the surface	Need binders for application for gluing
Dyes molecules are comparatively very small	Pigment particle are about 1 – 2 micron in size
During the application process there is a temporary alteration	During application, pigments have the capacity to retain particulate or crystalline structure.

in the structure of the dyes	Pigments have no attraction for fibers.
Dyes have attraction for fibers	
The dye based do not last as long as pigmented based	The pigmented based lasts longer the dye based
Lights destroy colored objects by breaking open electronic bonding within the molecule	Color fastness is range from average to good
Dyes are expensive than pigments	Pigments are generally inexpensive than dyes.

Different types of waxes are used in leather processing. In modern techniques of finishes the use of waxes are increased. All waxes are modified with different features.

Binders are forms a film on the surface of leather to modify the appearance of leather. There are several types of binder commonly two main types are natural & synthetic.

Natural binder: Casein binder

Synthetic binder: acrylic, polyurethane, butadiene etc.

Lacquers are used as a fixing agent of all finishing agents and form a film to cover all the finishing agents commonly types are NC,PU, CAB etc.

Finishing auxiliaries are different kind of material like fillers, cross linker, solvents, penetrators, feel modifiers etc.

### **Finishing steps**

Finishing is based on article requirement and its steps are also based on required articles. There are commonly 4 steps but all steps are not necessary.

Staining: to match the colour of leather according to the article with aniline liquid dye

Base coat: to coat the leather by pad or spray for the covering of surface defects using different types of binders, waxes & fillers.



Middle coat: Further requirement of coating to achieve the required property according to the article in middle coat

Final coat: To fix the all coats on the surface of leather by lacquers and modify the touch by feel modifiers according to the required articles.

**Two basic types of finishes:**

**a – Aniline finish (full grain aniline leather finish)**



Aniline leather is the most natural looking leather with the unique surface characteristics of the hide remaining visible. To get such aniline leather you need to apply what's called "aniline finish" Leather with an aniline finish is colored with dyestuffs only which means no opaque finish i.e. transparent finish so that the original grain surface can be seen through. Another transparent top coat can be applied to give bright finish and water repellent surface. Aniline finished leather has excellent tooling, polishing, and redyeing properties.

**B – Pigment leather finish (full grain pigmented leather finish)**



Such pigmented finish contains no aniline dyestuffs. the dyestuffs are all replaced with an opaque inorganic pigment , such mixture is bound together using a small amount of casein and a use of a binder (mostly is thermoplastics type ) to form a continuous film , resulting in a more level finish and better coverage of the finish skin .

The presence of such small amount of casein contained in the finish ensures the leather does not become sticky.

After the leather is finally coated with a matt or bright water based lacquer emulsion to enable sealing the finish to give certain amount of resistance to wet, dry rubbing.

#### Full grain aniline finish vs full grain pigmented finish

Point of study	of Full grain aniline leather finish	Full grain pigmented leather finish
Results of the leather grain	Too many faults and uneven grain to be produce with a very thin film coat Usually we use dyestuff only	Very less faults and good uniform grain to be produced with rather a high film coat Mainly inorganic pigment to be used
Colorant used	Natural casein is used to give the natural feel of the leather	Thermoplastic binder and a very less casein is used to give uniform coating
Binder	Range from poor to good	Range from good to excellent
Mechanical properties of the film	All coats are transparent Leather retains its natural look but at the same time	All coatings are opaque Leather gain a feel of artificial syntactic leather looks and at

<b>Coating</b>	achieves a less degree of uniformity in color	the same time achieves a high uniform in color
<b>Looks and uniformity</b>		
<b>Machining operation</b>	Very less machining applied to get such finish	More machines are applied to gain such thick pigmented coat from spraying, coating, plating, roll coating etc.

<b>Material used</b>	<b>Full grain aniline leather finish</b>	<b>Full grain pigmented leather finish</b>
<b>Dyes</b>	Usually used as a colorant	Usually not used
<b>Pigment</b>	Not used	Usually used
<b>Protein binder</b>	Used mainly	Used slightly
<b>Thermoplastic binder</b>	Not used	Usually used
<b>Cross linkers</b>	Not used	Can be applied to achieve special characteristics
<b>Matting agent</b>	Can be applied	Can be applied
<b>Fillers</b>	Not used	Can be applied
<b>Thickening agent</b>	Not used	Can be applied
<b>Nitrocellulose lacquers and emulsions</b>	Emulsions transparent can be used	Both nitro cellulose and emulsions can be applied
<b>Fluoring derivatives</b>	Can be used to provide water or oil repellent	Can be used to provide water or oil repellent
<b>Silicon</b>	Can be applied to give feel touch to the leather	Can be applied to give a feel touch to the leather

The details of each finishing agents and more different types of finishing are search from the leather hand book sharpouse and light leather also search from google according to their articles.

## **LU6**

### **Introduction to register:**

After Completion of every process their records should be maintained in registered for further enquires and processes.


### **Procedure of recording entries in register:**

The Record Entries should normally be carried out by writing number of skins/hides is processed and number of damaged skins/hides if any occurs should be maintained. who has done the process and how much time has spent for completion of process.

For more detailed information, please visit: Link:

Also Visit: [https://www.stahl.com/leather?gclid=Cj0KCQjw2K3rBRDiARIsAOFSW\\_7KO3D\\_cxiL\\_6XSVmO7-64zdwDzz8TxkoDgMwunvWOOzKj5LlbEaArlmEALw\\_wcB](https://www.stahl.com/leather?gclid=Cj0KCQjw2K3rBRDiARIsAOFSW_7KO3D_cxiL_6XSVmO7-64zdwDzz8TxkoDgMwunvWOOzKj5LlbEaArlmEALw_wcB)

**VIDEOS:**

	Video Link
	<p><b>Carryout Finishing</b></p> <p><a href="https://www.youtube.com/watch?v=JNpd8jDfC68">https://www.youtube.com/watch?v=JNpd8jDfC68</a></p> <p><a href="https://www.youtube.com/watch?v=SB9ww863pdU">https://www.youtube.com/watch?v=SB9ww863pdU</a></p> <p><a href="https://www.youtube.com/watch?v=IT4HaFch0-Y&amp;t=1s">https://www.youtube.com/watch?v=IT4HaFch0-Y&amp;t=1s</a></p> <p><a href="https://www.youtube.com/watch?v=SuG0AvYLMZg">https://www.youtube.com/watch?v=SuG0AvYLMZg</a></p> <p><a href="https://player.vimeo.com/external/334673925.hd.mp4?s=58d4ac350c54b277a43dc6042f01331f14bb8e1c&amp;profile_id=175">https://player.vimeo.com/external/334673925.hd.mp4?s=58d4ac350c54b277a43dc6042f01331f14bb8e1c&amp;profile_id=175</a></p>

# LEATHER PROCESSING TECHNOLOGIST



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Module-10

LEARNER GUIDE

National Vocational Certificate Level 4

Version 1 - September, 2019

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## Module 10: Manage Quality Control

**Objective of the module:** The aim of this module to develop advanced knowledge, skills and understanding to manage quality control

**Duration:** 100 Hours    **Theory:** 20 Hours    **Practical:** 80 Hours

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
<b>LU1: Carryout Physical Testing</b>	<p><b>The trainee will be able to:</b></p> <p>Perform Tensile &amp; elongation test of leather</p> <p>Perform Tear strength test of leather</p> <p>Perform Rub fastness test (Dry and Wet)</p> <p>Perform Finish adhesion test</p> <p>Evaluate the physical testing results</p>	<p>Define physical test</p> <p>Define Purpose of physical test</p> <p>Explain Types of physical test</p> <p>Explain Methods of physical test</p> <p>Describe environmental condition for physical testing and its importance</p> <p>Describe equipment of physical test</p> <p>Describe procedure of physical tests</p>	<p>Computer with Multimedia</p> <p>Leather</p> <p>Press Cutter</p> <p>Set of cutting Dies for physical test specimen</p> <p>Rub Fastness Tester with accessories (Crock, veslie, circular)</p> <p>Gray Scales Set</p> <p>Tensile Tester with accessories</p> <p>Tear strength tester with accessories</p> <p>Finish Adhesion Tester with accessories</p> <p>Digital Weight Balance</p> <p>Pen</p> <p>Test calculation sheets</p>

<b>LU2: Carryout Chemical Testing</b>	<b>The trainee will be able to:</b> Perform shrinkage temperature test Perform Fat Content test Perform Chrome Content test in leather Perform Chrome VI test in leather Perform pH value test Evaluate the chemical testing results	Define chemical test Define Purpose of chemical test Explain Types of chemical test Explain Methods of chemical test Describe environmental condition for chemical testing lab and its importance Describe equipment, apparatus & glassware of chemical test Describe procedure of chemical tests	Computer & multimedia Leather Temperature & humidity Control Chamber Shrinkage temperature Kit Digital pH meter Soxhlet apparatus and related glassware Heating mental Chrome Testing apparatus & glassware Oven (0-250C) Desiccator Digital Weight Balance Fuming Chamber Pen Test calculation sheets
<b>LU3: Carryout Environment Test</b>	<b>The trainee will be able to:</b> Perform total dissolve solid (TDS) test Perform oil & grease content test Perform chrome content test	Define environmental issues Define environmental test Purpose of environmental test Types of environmental test Methods of environmental test Describe environmental condition for environmental testing lab and its importance	Computer & multimedia Leather Temperature & humidity Control Chamber Digital TDS Meter Heating mental Chrome Testing



	<p>in effluent</p> <p>Evaluate the Environmental testing results</p>	<p>Describe equipment, apparatus &amp; glassware of environmental test</p> <p>Describe procedure of environmental tests</p>	<p>apparatus &amp; glassware</p> <p>Oven (0-250C)</p> <p>Desiccator</p> <p>Digital Weight Balance</p> <p>Fuming Chamber</p> <p>Pen</p> <p>Test calculation sheets</p>
<p><b>LU4:</b></p> <p><b>Maintain Test record</b></p>	<p><b>The trainee will be able to:</b></p> <p>Record Physical test results</p> <p>Record Chemical test results</p> <p>Record Environment test results</p>	<p>Introduction to test records</p> <p>Define procedure of recording test results</p> <p>Importance of presentation and maintaining test records</p>	<p>Computer with Multimedia</p> <p>Printer</p> <p>Pen</p> <p>Paper</p> <p>Test record register</p>

LU1

## **Manage Quality Control**

Depending on the end-use and types of leather, a wide spectrum of tests based on visual, physical and chemical and instrumental techniques have to be carried out in a testing laboratory. With leather being a non-homogeneous commodity, performance tests have an important role to play in assessing its quality. To obtain a standard leather of required quality for a specific end-use it is necessary to use selected raw materials, chemicals and leather auxiliaries. To maintain high quality standards in leather, it is necessary that the quality of raw stock as well auxiliaries such as general-purpose chemicals like sodium sulfide, lime, sulfuric acid etc, agents like vegetable and chrome tanning extracts and performance chemicals including syntans, dyes, fatliquors and finishing aids, be tested periodically for their quality. Recently there has been a growing awareness among the public regarding the quality of consumer goods and this is coupled with international systems such as ISO 9000/14000 and Environmental and Pollution Control aspects. This is possible only when the concepts of proper testing for quality are introduced in the raw materials and chemical inputs in processing industries such as tanning. Hence, an effective physical and chemical testing laboratory and technical services centre for quality control, developing suitable recipes and carrying out practical evaluation and performance trials is essential in the modern competitive environment. The ultimate aim is to introduce high quality innovative, eco-friendly and cost effective concepts into the leather industry.

There are many different methods for testing and evaluating leather properties. For a layman, only rough and basic testing options are available when purchasing a good and beautiful leather item. Some of the criteria can be checked directly as an end customer, but when certain criteria cannot be tested, don't be afraid to ask the vendor the right questions. Below we list some basic checks that can be carried out.

Look of the leather: A beautiful top quality leather looks very natural and does not contain markings on the surface.

The leather finish: To protect the leather, it is often useful to apply a binder-based finish to the surface. The more layers of leather paint are applied, the more unnatural it feels. If the grain texture is sanded before the finish, the leather feels even more unnatural.

So too does film-coated leather, usually considered to be inferior to natural leather and therefore relatively inexpensive. On the other hand, the effect is an accepted feature of patent leather.

Breathability of leather: An advantage of leather over alternative materials is its breathability. But the more a leather is coated with leather colour or a film, the lower the breathability.

Tear strength and stability of the leather: Good leather is stable and resistant to tearing, whereas suede, nubuck or extremely soft lambskin will not have the same stability as, for example, a belt leather.



Physical test criteria for the leather quality include (and is regulated in many national and international standards):

- Breathability: The ability to absorb sweat through to the opposite side.
- Weight: Important e.g. for aircraft leather, because it should weigh as little as possible to reduce fuel costs.
- Thickness of leather: The thickness has an influence on the stability of leather.
- Tensile strength - : If the leather is drawn (for example, more than 200 N per 5 cm).
- Tear strength: Leather should not easily tear further (for example, desirable: more than 20 N).
- Adhesiveness of the finish: The colour layers on the surface should not come off (for example, desirable: more than 25 N per 5 cm).
- Rub fastness: Dry, wet, alkaline. The surface should not change in friction or wear zones.
- Light fastness: Leather should not fade.
- Flexibility: Desirable: robustness in more than 100,000 cycles. Leather should be extensible, but not baggy.
- Water permeability: Leather should be waterproof.





## LU2

### Chemical testing

Chemical testing of leather can form part of a good production control system to ensure that performance requirements are met. Testing can also be used to indicate possible causes of problems and/or faults in the finished article.

There is wide range of chemical testing but some major and common tests are as follows:

pH: is a measure of the acidity or alkalinity of a solution or material. The pH scale measures this value on a logarithmic scale from 0-14, with 0 being the most acidic and 14 the most alkaline. The majority of leather produced today is chromium-tanned, and will have a pH value in the range of 3.2-5.5. Therefore, it is considered acidic.

Shrinkage temperature of leather: is a very essential property of leather which may increase the durability of leather in different environmental conditions. Chrome is the only tanning material to stable the leather in very high to very low temperature is about 120°C to -10°C other tanning materials are relatively low than basic chromium sulphate. In recent development many synthetic and combination materials are available in market to get more than 100°C shrinkage temperature due to the risk of chrome hazards specially for children wear.

**Fat content:** Oils and fats give suppleness and softness to leather. The level of fatliquor (often referred to as the 'fat content') present in leather is controlled during the fatliquoring process. The final characteristics and performance of leather will be determined to some degree by the amount and type of fatliquors used. Poor control during this part of the production process may result in leather that is harder or softer than desired, or a leather that feels greasy. Another problem that can be attributed to the fatliquors is the possible formation of a fatty acid spew on the surface of the leather. This is caused by migration of fatty acids (predominately steric and palmitic acids) to the surface where they solidify, resulting in a white waxy or greasy substance on the surface. The fat content should not more than 4% in wet blue and 12-16% in finished leather (depends on the use of fatliquor types)

**Chrome content:** The tanning process, which is the conversion of hides and skins into leather, commonly uses chromium salts. When determining the level of chromium present, the result is expressed as chromic oxide ( $\text{Cr}_2\text{O}_3$ ). Knowledge of the chromic oxide content is a useful quality control technique, and a reduction in thermal stability (poor heat resistance) could be attributed to a lower than required chromic oxide content. Chrome content should be more than 2.5% of the leather.

**Moisture content:** Moisture content is an important characteristic of leather and will change depending on the temperature and relative humidity of its surrounding environment. Moisture and small amounts of volatile oils or solvents are included in a determination of volatile matter. As the oils and solvents are only a comparatively small part of the total weight lost during this test, the amount of volatile matter determined can be considered as a good estimation of the moisture present. Ideal moisture content is often considered as being 12 to 14 per cent.

**Ash Content:** The level of water-soluble matter present in leather can indicate the degree of unbound tans and non-tans, salts and other substances present. The tanning process and chemicals/substances used will result in a proportion of the tannins being bound to the skin collagen structure via hydrogen bonding. However, there will always be a proportion that will remain unbound and these, along with water soluble salts and unfixed dyes, can be quantified.

**Properties of chemicals used in leather processing:** to obtain desire results the properties of chemicals used in leather processing should be adequate as per standard required. Therefore all chemicals should test according to their properties.

**Banned item testing:** according to REACH Compliance, OSHA, RSL, OKEO TEX, etc.

LU3

**Environmental issues:**



Tannery effluent contains large amounts of pollutants, such as salt, lime sludge, sulfides, and acids. The process of tanning stabilizes the collagen or protein fibers in skins so that they actually stop biodegrading—otherwise, the leather would rot right in



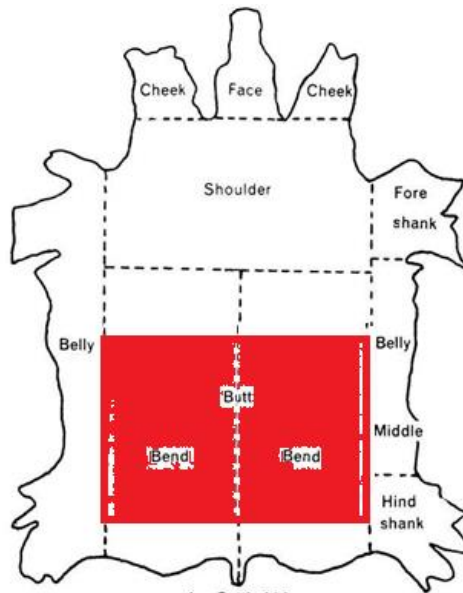
your closet. In this connection the major environmental testing in effluent are e.g Total dissolve solid, chrome content, oil and grease etc.

### **Methods of testing**

There are several methods used for leather testing according to the standards some major tests standards are ISO, ASTM, EN, DIN IUP/C SLP/F/C etc. each standards are own methods and procedure of testing. The limits and units are also varying from standard to standard and according to the regulation authorities. Some testing lab have own methods which have little differences of standard method and these are called lab developed method. These methods are develops through deep study and its only a alternative replacement of special equipments which are used in the standard test method.

### **Sample cutting:**

Sample cutting in testing part a major role of testing results specially on physical testing of leather. So ensure it to cut the sample from appropriate area of the skin or hide given picture show the appropriate are of sample cutting in red color.



Environmental condition is different in any region and its effects on the results of leather testing. To maintain the environmental condition of lab International Standards follows the specific temperature and humidity of testing lab to avoid the differences of results and every lab in any region of the world follows the condition to maintain the results of the tests.

The standard environmental condition of lab: Temperature = 23°C and Humidity = 50%

### **Procedure of Testing**

Procedures of physical, chemical and environmental testing according to their standards and related standards are available in standards books and from internet resources.

## **LU4**

### **Introduction to register:**

After Completion of every process their records should be maintained in registered for further enquires and processes.

### **Procedure of recording entries in register:**

The Record Entries should normally be carried out by writing number of skins/hides is processed and number of damaged skins/hides if any occurs should be maintained. who has done the process and how much time has spent for completion of process.


**Note: Testing methods of different standards may provide through handouts.**

For more detailed information, please visit: Link: <http://goatsheep Leather.com/about-us/quality-control/>

Also Visit: <https://leathergoodsmanufacturer.wordpress.com/>

And: <http://www.jindalcoaters.com/syntheticleatherqualitycontrol.aspx>

**VIDEOS:**

	Video Link
	<p><b>Manage Quality Control</b></p> <p><a href="https://www.youtube.com/watch?v=Jfx0ITTPfw">https://www.youtube.com/watch?v=Jfx0ITTPfw</a> <a href="https://www.youtube.com/watch?v=98lwHgRQ_f0">https://www.youtube.com/watch?v=98lwHgRQ_f0</a> <a href="https://www.youtube.com/watch?v=SNFLEWB7yEw">https://www.youtube.com/watch?v=SNFLEWB7yEw</a> <a href="https://www.youtube.com/watch?v=TaozMnMNcE4">https://www.youtube.com/watch?v=TaozMnMNcE4</a></p>

## Module Summary

Following is the sequence of the modules for Leather Tanning Technician (NVQF Level 4).

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<p><b>Module 1:</b> Contribute to Work Related Health and Safety (WHS) Initiatives <b>Aim:</b> This unit describes the skills and knowledge required to manage the identification, review, development, implementation and evaluation of effective participation and consultation processes as an integral part of managing work health and safety (WHS).</p>	<p><b>LU1.</b> Contribute to initiate work-related health and safety measures</p> <p><b>LU2.</b> Contribute to establish work-related health and safety measures</p> <p><b>LU3.</b> Contribute to ensure legal requirements of WHS measures</p> <p><b>LU4.</b> Contribute to review WHS measures</p> <p><b>LU5.</b> Evaluate the organization's WHS system</p>	6	24	30

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<p><b>Module 2:</b> Comply with Workplace Policy and Procedures</p> <p><b>Aim:</b> This unit describes the skills and knowledge required to implement a workplace policy &amp; procedures and to modify the policy to suit changed circumstances. It applies to individuals with managerial responsibilities who undertake work developing approaches to create, monitor and improve strategies and policies within workplaces and engage with a range of relevant stakeholders and specialists.</p>	<p><b>LU1.</b> Manage work timeframes</p> <p><b>LU2.</b> Manage to convene meeting</p> <p><b>LU3.</b> Decision making at workplace</p> <p><b>LU4.</b> Set and meet own work priorities at instant</p> <p><b>LU5.</b> Develop and maintain professional competence</p> <p><b>LU6.</b> Follow and implement work safety requirements</p>	6	24	30

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<p><b>Module 3:</b> Perform Advanced Communication <b>Aim:</b> This unit describes the performance outcomes, skills and knowledge required to develop communication skills used professionally. It covers plan and organise work and conduct trainings at workplace, along with demonstrating professional skills independently</p>	<p><b>LU1.</b> Demonstrate professional skills  <b>LU2.</b> Plan and Organize work            Provide trainings at workplace</p>	6	24	30

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<p><b>Module 4:</b> Develop Advance Computer Application Skills</p> <p><b>Aim:</b> This unit provides an overview of Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards, i.e. Data Entry, Power Point Presentation and managing data base and graphics for Design</p> <p>It applies to individuals employed in a range of work environments who need to be able to present a set range of data in a simple and direct forms</p>	<p><b>LU1.</b> Manage Information System to complete a task</p> <p><b>LU2.</b> Prepare Presentation using computers</p> <p><b>LU3.</b> Use Microsoft Access to manage database</p> <p><b>LU4.</b> Develop graphics for Design</p>	8	32	40



Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<p><b>Module 5:</b> Manage Human Resource Services</p> <p><b>Aim:</b> This unit describes the skills and knowledge required to plan, manage and evaluate delivery of human resource services, integrating business ethics. It applies to individuals with responsibility for coordinating a range of human resource services across an organization. They may have staff reporting to them..</p>	<p><b>LU1.</b> Determine strategies for delivery of human resource services</p> <p><b>LU2.</b> Manage the delivery of human resource services</p> <p><b>LU3.</b></p> <p><b>LU4.</b> Evaluate human resource service delivery</p> <p>Manage integration of business ethics in human resource practices</p>	4	16	20

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<p><b>Module 6:</b> Develop Entrepreneurial Skills</p> <p><b>Aim:</b> This Competency Standard identifies the competencies required to develop entrepreneurial skills, in accordance with the organization's approved guidelines and procedures. You will be expected to develop a business plan, collect information regarding funding sources, develop a marketing plan and develop basic business communication skills. Your underpinning knowledge regarding entrepreneurial skills will be sufficient to provide you the basis for your work.</p>	<p><b>LU1.</b> Develop a business plan</p> <p><b>LU2.</b> Collect information regarding funding sources</p> <p><b>LU3.</b> Develop a marketing plan</p> <p><b>LU4.</b> Develop basic business communication skills</p>	6	24	30
<p><b>Module 7:</b> Carryout Post Tanning Operation</p> <p><b>Aim:</b> After successful completion of this module, the student is competent in performing post tanning operation according to professional standards and by respecting safety and health regulations</p>	<p>LU1: Prepare Post Tanning recipe</p> <p>LU2: Perform Neutralization</p> <p>LU3: Perform Re-tanning</p> <p>LU4: Perform Fat-Liquoring</p> <p>LU5: Perform Fixation for crust</p> <p>LU6: Maintain Post Tanning Register</p>	24	96	120

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<p><b>Module 8:</b> Carryout Dyeing</p> <p><b>Aim:</b> After successful completion of this module, the student is competent in performing dyeing operation according to professional standards and by respecting safety and health regulations</p>	LU1: Prepare Dyeing recipe LU2: Perform Wetback LU3: Perform Dyeing LU4: Perform Lubrication LU5: Perform Fixation for dyed crust LU6: Maintain Dyeing Register	20	80	100
<p><b>Module 9:</b> Carryout Finishing Operation</p> <p><b>Aim:</b> After successful completion of this module, the student is competent in performing finishing operation according to professional standards and by respecting safety and health regulations</p>	LU1: Prepare finishing recipe LU2: Perform staining LU3: Apply Base coat LU4: Apply Middle coat LU5: Apply Final coat LU6: Maintain finishing register	20	80	100
<p><b>Module 10:</b> Manage Quality Control</p> <p><b>Aim:</b> After successful completion of this module, the student is competent in managing quality according to professional standards and by respecting safety and health regulations</p>	LU1: Carryout Physical Testing LU2: Carryout Chemical Testing LU3: Carryout Environment Testing LU4: Maintain Test Record	20	80	100
	<b>Total</b>	<b>120</b>	<b>480</b>	<b>600</b>

## Frequently Asked Questions

<p>1. What is Competency Based Training (CBT) and how is it different from currently offered trainings in institutes?</p>	<p>Competency-based training (CBT) is an approach to vocational education and training that places emphasis on what a person can do in the workplace as a result of completing a program of training. Compared to conventional programs, the competency-based training is not primarily content based; it rather focuses on the competence requirement of the envisaged job role. The whole qualification refers to certain industry standard criterion and is modularized in nature rather than being course oriented.</p>
<p>2. What is the passing criterion for CBT certificate?</p>	<p>You shall be required to be declared “Competent” in the summative assessment to attain the certificate.</p>
<p>3. What are the entry requirements for this course?</p>	<p>The entry requirement for this course is 8th Grade or equivalent.</p>
<p>4. How can I progress in my educational career after attaining this certificate?</p>	<p>You shall be eligible to take admission in the National Vocational Certificate Level-3 in Leather Products Development Technician (Pattern Maker). You shall be able to progress further to National Vocational Certificate Level-4 in Leather Products Development Technician (Computerized Pattern Designer); and take admission in a level-5, DAE or equivalent course. In certain case, you may be required to attain an equivalence certificate from The Inter Board Committee of Chairmen (IBCC).</p>
<p>5. If I have the experience and skills mentioned in the competency standards, do I still need to attend the course to attain this certificate?</p>	<p>You can opt to take part in the Recognition of Prior Learning (RPL) program by contacting the relevant training institute and getting assessed by providing the required evidences.</p>
<p>6. What is the entry requirement for Recognition of Prior Learning program (RPL)?</p>	<p>There is no general entry requirement. The institute shall assess you, identify your competence gaps and offer you courses to cover the gaps; after which you can take up the final assessment.</p>
<p>7. Is there any age restriction for entry in this course or Recognition of Prior Learning program (RPL)?</p>	<p>There are no age restrictions to enter this course or take up the Recognition of Prior Learning program</p>

8. What is the duration of this course?	The duration of the course work is 1,510 hrs. (11 months)
9. What are the class timings?	The classes are normally offered 25 days a month from 08:00am to 01:30pm. These may vary according to the practices of certain institutes.
10. What is equivalence of this certificate with other qualifications?	As per the national vocational qualification's framework, the level-4 certificate is equivalent to Matriculation. The equivalence certificate can be obtained from The Inter Board Committee of Chairmen (IBCC).
11. What is the importance of this certificate in National and International job market?	This certificate is based on the nationally standardized and notified competency standards by National Vocational and Technical Training Commission (NAVTTTC). These standards are also recognized worldwide as all the standards are coded using international methodology and are accessible to the employers worldwide through NAVTTTC website.
12. Which jobs can I get after attaining this certificate? Are there job for this certificate in public sector as well?	You shall be able to take up jobs in the leather products making companies in the functions of cutting, stitching and finishing of leather gloves and garments.
13. What are possible career progressions in industry after attaining this certificate?	You shall be able to progress up to the level of supervisor after attaining sufficient experience, knowledge and skills during the job. Attaining additional relevant qualifications may aid your career advancement to even higher levels.
14. Is this certificate recognized by any competent authority in Pakistan?	This certificate is based on the nationally standardized and notified competency standards by National Vocational and Technical Training Commission (NAVTTTC). The official certificates shall be awarded by the relevant certificate awarding body.
15. Is on-the-job training mandatory for this certificate? If yes, what is the duration of on-the-job training?	On-the-job training is not a requirement for final / summative assessment of this certificate. However, taking up on-the-job training after or during the course work may add your chances to get a job afterwards.
16. How much salary can I get on job after attaining this certificate?	The minimum wages announced by the Government of Pakistan in 2019 are PKR 17,500. This may vary in subsequent years and different regions of the country. Progressive employers may pay more than the mentioned amount.
17. Are there any alternative certificates	There are some short courses offered by some training institutes on this subject.

which I can take up?	Some institutes may still be offering conventional certificate courses in the field.
18.What is the teaching language of this course?	The teaching language of this course is Urdu and English.
19.Is it possible to switch to other certificate programs during the course?	There are some short courses offered by some training institutes on this subject. Some institutes may still be offering conventional certificate courses in the field.
20.What is the examination / assessment system in this program?	Competency based assessments are organized by training institutes during the course which serve the purpose of assessing the progress and preparedness of each student. Final / summative assessments are organized by the relevant qualification awarding bodies at the end of the certificate program. You shall be required to be declared “Competent” in the summative assessment to attain the certificate.
21.Does this certificate enable me to work as freelancer?	You can start your small business of stitching leather garments, gloves of other products. You may need additional skills on entrepreneurship to support your initiative.

## Test Yourself

### Module 7

1. What is purpose of liming?
2. Amonia sulphat is used in de-liming process.
  - a. True
  - b. False
3. What are the types of un-hairing?
4. Chemical used for un-hairing is?
  - a. Sodium Sulphate
  - b. Sodium Sulphide
  - c. Sodium Sulphite
  - d. Sodium Metabisulphide
5. Ideal Temperature for bacterial activity is.
  - a. 25C
  - b. 30C
  - c. 38C
  - d. 28C

6. What are the types of vessels used in pre pelt operations?
  
7. Completion of de-liming process in leather is check through phenolphthalein indictor
  - a. True
  - b. False
  
8. Liming can be performed in paddle only.
  - a. True
  - b. False
  
9. Liming only removes unwanted skin after un-hairing?
  - a. True
  - b. False

## **Module 8**

1. Why we performed batting in post pelt operations?
  
  
  
  
  
  
  
  
  
  
2. \_\_\_\_\_ is used as strong acid in pickling
  - a. HCL acid
  - b. Sulfuric acid
  - c. Nitric Acid
  - d. Oxalic Acid



3. What will be the pH value for chrome tanning in pickling?
  - a. 1.8
  - b. 2.8
  - c. 3.8
  - d. 4.8
  
4. What are the types of degreasing?
  
  
  
  
  
  
  
  
  
  
5. State types of enzymes used in bating process
  
  
  
  
  
  
  
  
  
  
6. What are the types of vessels used in Post pelt operations?
  
  
  
  
  
  
  
  
  
  
7. Completion of de-liming process in leather is check through phenolphthalein indictor
  - a. True
  - b. False
  
8. Liming can be performed in paddle only.
  - a. True
  - b. False
  
9. How many types of chemicals are used in degreasing?
  - a. 2
  - b. 3

- c. 4
- d. 5

## Module 9

1. What is the suitable pH of pickled pelt for chrome tanning?
  - a. 1.5-2.0
  - b. 2.5-3.0 (Correct Answer)
  - c. 4.0-4.5
  - d. 5.5-6.0
  
2. Formic acid is used in which process of Leather Processing?
  - a. Batting
  - b. Neutralization
  - c. Tanning
  - d. Pickling (Correct Answer)
  
3. Which of these are strong acid?
  - a. Acetic acid
  - b. Oxalic acid
  - c. Formic acid
  - d. Sulfuric acid (Correct Answer)
  
4. What is the basicity of chrome required for tanning?
  - a. 25%
  - b. 33% (Correct Answer)
  - c. 40%
  - d. 60%

5. Which chemical is commonly used for masking of chrome tanning?
  - a. Hydrochloric acid
  - b. Chromium Oxide
  - c. Sodium formate (Correct Answer)
  - d. None of these
  
6. What is the purpose of pickling?
  
  
  
  
  
  
  
  
  
  
7. Write down four types of tanning?
  
  
  
  
  
  
  
  
  
  
8. What is the final pH of wet blue leather?
  
  
  
  
  
  
  
  
  
  
9. Why ageing is essential after tanning?

## Module 10

1. What is the objective of fat-liquoring?
2. Which type of oil is suitable for making soft leather in?
  - a. Sulphateel Oil
  - b. Sulphited Oil
  - c. None of Above
  - d. All of Above
3. The final pH for post tanning is 4.8?
  - a. True
  - b. False
4. What are the parameters of fat-liquoring?
5. What is pH value of neutralization process for garments?
  - a. 2.8
  - b. 3.8
  - c. 4.8
  - d. 5.8
6. The objective of wetback is
  - a. Rehydration
  - b. Dehydration
  - c. None of above
  - d. All of above

7. Retanning is done to over deficiencies in tanning?
  - a. True
  - b. False
8. What are the factors affects re-tanning?

