(Version: 2024)

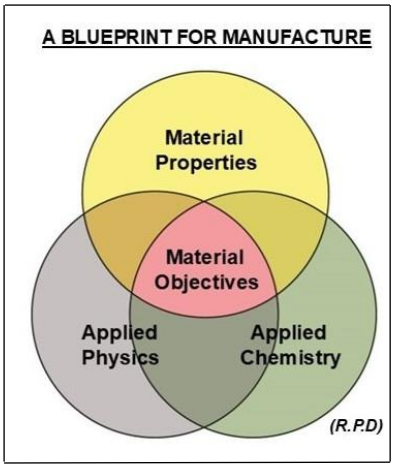
Leather:
AN OVERVIEW OF MANUFACTURE

Annex

Content

Leather: THE TECHNOLOGY OF MANUFACTURE

This study is designed for the Leather Technologist, and builds upon the leather-making information presented in "Overview". It also includes a structure to best understand the requirements of this complex technology.
Here, the three basic components involved in manufacture - "Material Properties", "Applied Physics", and "Applied Chemistry" - are expressed diagrammatically:



In turn, these components are sub-divided into a series of factors, then presented as three inter-related models. The role of each factor is then described in a series of essays, with contributions by specialists in their sectors.
This is a blueprint for the technologist to control, manage, and manipulate procedures to advantage. With supportive information, this is a base for good leather manufacture, and the creation of leathers to specification.

Manufacture: Stages and Procedures

BOVINE HIDES: CHROME TANNAGE: FOOTWEAR LEATHERS

Schematic 1(a) — **Procedures** — *"Overview" ©R.P.Daniels*

Mechanical operations
Chemical processes
Requirements
Additional information

Process vessels. (many configurations) All chemical processes - Drums, mixer-type, tri- - compartmental vessels. (also pits and paddles)

v

v

1st Soak - Accurate in-put weights. Specific wight ranges.

v

Stage 1

Removal of unwanted components from structure

and

Extension of the structure

Green flesh

v

2nd Soak

v

Unhair + lime

v

Lime flesh

v

+/- Lime split -

+/- Lime splitting
Defines grain substance for further processing. Offers high extension of structure throughout all procedures until the completion of tannage. Gives maximum choice for use of the flesh split.

v

Delime
Bate - Structural relaxation, and release inter-fibre waste.

v

Stage 2

Introduction of new products into the structure

and

Extension of the structure

Pickle
Chrome tannage - Creation of a versatile multi-purpose tannage.

v

+/- Blue sorting/gradings -

+/- Wet sort (pre-samm).
Absence of compression and samm indents for clear identification of grain defects.

v

Samm

v

Side

v

Selection: Blue sort -

+/- Blue Sort (after samm)
Accurate assessment for area and substance. Easier handling and enables rationalisation.

v

+/- Blue Split

v

Shave -

+/- Blue Splitting
To maximise substance potential from selections made at blue sorting.

v

Trim

v

Neutralise
Dye + fixation
Retan
Fatliquor/lubricate - Development of a wide range of properties to customer specifications.

v

Details set down for broad information only. Variations in procedures required according to materials classification, plant and equipment, and end-specifications.

Manufacture: Stages and Procedures

BOVINE HIDES: CHROME TANNAGE: FOOTWEAR LEATHERS.

Schematic 1(b) continued

"Overview" ©R.P.Daniels

	Procedures	
Stage 3 Removal of water and Reconfiguration Into a flattened form with specific properties	Samm/set	Preparation for drying.
	v	
	+/- Side	(very occasional practice)
	v	
	+/- wet stretch/stake	Extension and relaxation of structure. May be used before drying, and within some drying operations.
	v	
	Vacuum dry in conjunction with suspension dry (tension free)	Many permutations both In preparation and drying. Heavy compression, and high strain / tensions in drying develop strong increases in firmness. Significant influences in properties of final leather.
	(or)	
	Toggle dry (High strain and tension)	
	(or)	
	Dehumidification dry (light tension)	
	v	
	+/- Conditioning	Moisture content adjust. May avoid if drying via relative humidity control.
	v	
	Vibration staking (may be multiple)	Soften to specification.
	v	
	Second time drying. (tension free)	Lowering of water content from staking requirement.
	v	
	+/- Milling	Soften/texture if required.
	v	
	Crust inspection (assessment/evaluation)	Quality, technical and aesthetic to specification
	v	
Stage 4 Application of finish + Structural amendment	Finishing operations (multi-permutations) To specification/end-use	Formation of new hybrid grain/finish structure. Grain wetting/drying + compression under heat and pressure. Changes in appearance, structure and properties.

Details set down for broad information only. Variations in procedures required according to materials classification, plant and equipment, and end-specifications.

Panel 1 *"Overview" © R.P.Daniels*

Characteristics of different tannages

Tannage	Properties of dried leathers (tanned only)	Shrinkage temperature (saturated) and Charge	Dyeing, retanning and fatliquoring. (anionic products)	Properties of final leathers and End uses
Chrome	Blue-green colour. Hard and thin.	100C. Cationic	Good dye properties. High uptake of retanning agents and fatliquors.	Very versatile. Very soft to firm. Footwear, auto, furniture, bags, leather goods etc.
Glutaraldehyde	Light yellow brown colour. Soft to medium. Thin with poor retention of shape unless heavily supported by syntans/resins.	Approx 75C. Anionic	Poor dye properties. Poor uptake of retanning agents and fatliquors.	Very soft to firm. Good aging properties. Auto use – mouldings and seats if heavily retanned. Footwear, upholstery.
Other tannages (Many options)	White to pastel colours range. Moderately soft / firm handle.	75C – 85C. Anionic	Poor dye properties. In general, similar uptake of retanning agents / fatliquors as "Glutaraldehyde".	Soft to firm. Many variations, with mainly glutaraldehyde – type properties.
Light vegetable	Cream to light brown colour. Moderately soft.	Approx. 85C. Anionic	Poor dye properties. Low requirement for retanning agents and fatliquors.	Soft to firm with good shape retention. Well filled leather suited for shoe linings and leather goods. Anti-bacterial properties and warm handle.
Heavy vegetable	Light to red-brown. Firm, with dense structure.	Approx. 85C. Anionic	Dyeing and retannage mainly not required.	Offers excellent shape retention. Suited for soling, harness, belts, moulding and carving.

Note:

- Information for general guidance only.

Panel 2 *"Overview" ©P. Evans*

Finish variations

Structure	Category		
Full grain	Aniline	Semi-aniline	Pigmented
Corrected	Aniline	Semi-aniline	Pigmented