OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

RESTRICTED

DP/ID/SER.A/1266
1 November 1989
ORIGINAL: ENGLISH/ARABIC

17842

HIGH LEVEL CONSULTANCIES AND TRAINING

DP/SYR/86/009

SYRIAN ARAB REPUBLIC

Technical report: Leather industries at Damascus and Aleppo*

Prepared for the Government of the Syrian Arab Republic
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of M. G. Haecker, leather industry expert

Substantive officer: J. Buljan
Agro-based Industries Branch

Backstopping officer: G. Anestis
Section for Integrated Industrial Projects

United Nations Industrial Development Organization

Vienna

30

* The views expressed in this paper are those of the author and do not necessarily reflect the views of the Secretariat of the United Nations Industrial Development Organization (UNIDO). Mention of company names and commercial products does not imply the endorsement of UNIDO. This document has not been edited.

V.89 60828

Explanatory Notes

Abbrevations:

UNDP	United Nations Development Programme (New York)
UNIDO	United Nations Industrial Development Organisation (Vienna)
ITRC	Industry Testing Research Centre, Damascus
H_2SO_4	Sulphuric acid
Cr_2O_3	Chrome Oxide
"wet blue"	Chrome tanned hides/skins in wet condition
RPM	Revolution per Minute
$NaHCO_3$	Sodiumbicarbonate
Na_2S	Sodiumsulphide
NaHS	Sodiumsulphydrate

Leather Factory No. 1	Cattle Hide Production -Damascus	
" " " 2	Cattle Hide Production -Damascus	
" " " 3	Cattle Hide Production -Damascus	
" " " 4	Sheepskin Pickle Lining Nappa Garment	Production in Damascus
Leather Factory Aleppo:	Cattle Hide Sheep-Goatskin pickle Lining Nappa Garment	Production

A B S T R A C T

The Expert has visited 2 Shoe Factories, 4 Tanneries at Damascus and 1 Tanneries at Aleppo.

In the Shoe Factories, all the problems with the Leather Quality have been mentioned and details are under Findings and Visiting Reports mentioned.

Problems in the Production of Leather, according to the Syrian Standard Specification, have been carefully observed and recorded.

Process and Quality Control, Maintenance and Effluent Treatment needs improvement in all the Leather producing Factories.

Recommendations and Suggestions with immediate Trials have been discussed with the responsible technical Persons. Full details are mentioned under Recommendations, page 6 - 33 and visit reports for each Leather producing Factory separate.

The ITRC (Industry Testing and Research Centre) Damascus has been used for physical and analytical testing of Leather and Chromeliquors.

Contents

I N T R O D U C T I O N

The Government of Syria requested Expert assistance for Quality Control in the Tanneries at Damascus and Aleppo.

The United Nations Development Programme (UNDP) in its country programme provides international assistance.

The Expert arrived at the Dutystation Damascus on the 10. May 1989, he returned to Vienna on the 4.July 1989. Completing the 2 month Mission with 2 days briefing and 2 days debriefing at UNIDO, Vienna.

The objectives of the experts mission were to:

- Review the present status of the tanneries at Damascus and Aleppo in terms of production technology, productivity and process and quality control.

- Suggest optimum methods to improve the quality of leathers produced and ensure consistency of the quality level attained.

- Prepare a work plan for the implementation of a quality improvement programme in the tanneries including infrastructural requirements, equipment with cost estimate, manpower and training needs.

- Train local personnel working at the industrial units in carrying out process and quality control analyses and tests.

The expert will also be expected to prepare a technical report setting out findings of the mission and recommendations to the Government on further action which might be taken.

I. R E C O M M E N D A T I O N S

I A. Damascus
I B. Aleppo

I A. 1. Leatherfactories 1. 2. and 3 Damascus:

- This 3 Factories should produce embossed Leather from the Soaking to the Finished Leather in each Factory separate.
- The present plan to toggle all the leathers from Factory No. 2 and 3 at Factory No. I is not successful and in no way resulting a good leather quality. There is unnecessary transportation and the leathers are piling up near the toggle-dryers, getting dry and loose the proper condition for toggling.
- The 3 factories are equiped with nearly all the machines for their independent production. The machines are old and need repair, maintenance and some replacement, which is normal. For details see Annex 6.

  Priority No. I: One toggle dryer for Factory No. 3

  One toggle dryer from Factory No. I should be moved to Factory No. 2.

  Priority No.2: New Fleshing Machines or complete overhauling of the old machines

  One new sam-setting machine for factory No. I.

  Complete overhauling of all the sammying machines before shaving to result the proper moisture of the leathers, which is important for the - Shaving-weight - and the calculation of chemicals.

  Priority No.3: 1 local made waterspraying machine for conditioning before staking, for each factory.
  Renovation of factory No. 2

2. Leatherfactory No.4 Damascus:

- Requirement of new machinery:

  Priority No. 1: 1 new Fleshing machine for skins, complete overhauling of the 2 old machines.

  Overhauling and repairing of all the platform scales and other balances.

For details see Annex 6.

3. Leatherfactory Aleppo:

  Priority No. 1: Repairing and overhauling of all the platform scales and other balances.

For details see Annex 6.

4. Training and lectures:

For 2 days at Aleppo and 3 days at Damascus, the technical staff has been given full information regarding process and quality control, to produce a better standard leather quality which is required by the shoe factories.
Leathers from the trials have been demonstrated and discussed.

5. Syrian Standard Specifications for Leather: (Annex 2)

The specifications have been translated into english for 4 different types of leathers. The english copies arrived only after this report had been completed.

Recommendations have not been possible anymore.

6. Laboratories at Damascus and Aleppo - ITRC Tests

- This 2 Laboratories need some more small testing machines to carry out their own physical and analytical tests. For details see separate Recommendations for Damascus and Aleppo on Page 20 and 33.
- The Laboratories are more important in future to carry out the required tests immediately. One technician should be assigned to the Laboratory for process, quality, maintenance control and development. He should be working with the support of production manager and the Laboratory chemists. Only suitable technicians with a good experience should be appointed. In Damascus, the technician from Factory No. 1 may be suitable, in Aleppo the technician from the finishing department has been recommended.
- Testing at ITRC needs a very long time and the test reports are only available after payments have been made. Leathers given for testing need 5 - 6 weeks with many reminders. It is advisable as mentioned above, to do the tests at the Leatherfactories own Laboratories and the results will be available after 2 -3 days or immediately. ITRC did not return the tested leather samples, which are very important.

7. Shoe Factories Problems:

- This problems have been fully considered and the technicians in the leatherfactories are well informed, to take care and treat the leathers as a valuable product with the necessary improvement of a standard quality.

8. Effluent:

- Less chemicals in the effluent by changing the process in a economical way with full or maximum absorbtion of the calculated chemicals. (see Annex 5)
- The highest chrome content in the effluent has been in the old process 8.8 % Cr_2O_3

  The lowest chrome content in the effluent according to the new process 1.6 % Cr_2O_3
- The 2 Effluent Experts from Jugoslawia got all the informations from Damascus and Aleppo to prepare the "Terms of Reference" for the treatment of effluent at the existing plants and the 3 leatherfactories without any effluent plant.

9. Training of young poeple as technicians for the future:

- The young generation should be trained in time to be available as soon as possible. There is a shortage of trained poeple in the leather industry.
- Young persons who finished their education in chemistry should be selected for further training in leather technology,
  approximately 2-3 years working in tanneries in Syria
  and " " 2-3 years training in Europe, tannery schools.

10. Planning of a New large Tannery, in future/ or renovation:

The Leatherfactory No. 4 at Damascus and the tannery at Aleppo are well established.

Only the 3 old tanneries No. 1.2.and 3 at Damascus need to be changed in future, or renovated step by step during the next years.

- There is plenty of land next to Leatherfactory No. 4 at Damascus for the new construction of one large cattle hide tannery. In a 2 story building the production can be planned for 5 - 7 million sqf. of leather per year under one roof.
- Advantage would be:

1. The existing effluent treatment plant
2. Maintenance for the 2 factories
3. Steam, 2 boilers are already available
4. water supply
5. 1 office with all the administration
6. Combined store for chemicals
7. Location, not too far outside the city with good connection
8. Machines and equipment from the 3 tanneries can be used, only a few new machines may be added. Very old machines should be replaced.

11. Recommendation, separate for each Factory:

- The following pages contain recommendations for each factory separate. Copies have been given to the production managers for immediate action to standardise and improve the leather quality. All the mentioned items have been explained, some by practical demonstrations and trials.

12. Workplan for implementation of quality improvement:

- There is no need for such a workplan as the quality improvement started with immediate effect according to the recommendations handed over to the production managers.

13. Machines and Equipment with cost estimates:

- Addresses of suppliers have been given and the up to date prices can be requested by telex.

Recommendations for Leather Factory No. 1, Damascus

1. New Machinery:

   1 Fleshing Machine for Greenfleshing
   1 conveyer water spraying machine for conditioning before staking

   The fleshing ex lime at the present very old Fleshing machine is insufficient, this machine needs complete overhauling or must also be replaced by a new machine

2. Imported dry Raw Hides

   from Saud Arabia, Jemen or Oman
   are of very low quality, full of butcher cuts and showing many holes. This defects will finally result in heavy losses at the Shoe factories, by additional waste of leather which can not be used for shoes, but showing full cost in sqf.measurment.

3. Improvement of Maintenance:

   The installed machinery is old and needs special care. The tanning drums are still running on transmission drive and belt drive. Overhauling of these drums and to change over to direct drive with gear boxes on each drum should be carried out as soon as possible. Also all the drum doors need repairing. (see Annex 6)

4. Basification of the Chrometanning with Soda ash:

   is not suitable at all. On a process control carried out on the 21.May 1989, the pH of the tanning liquor did show pH 5 . As already recommended, Sodiumbicarbonate should be used and added diluted 1 : 10 during appr. 60', very slowly.

5. Effluent

   This factory has no effluent treatment plant. The Effluent is flowing directly in the outside river. A pre-settlement arrangement in 3-4 pits in the ground and 3 large pits above the ground with Airators and places for chemical addition are planned and will be constructed in the very near future.

6. Vacuum dryer, 2 plates

   Working at 90°C, time 2.5 minutes, but the top filter of the machine is completely blocked, there is no vacuum and after opening of the machine, the water is standing on the leather. The result of this operation is nil, only consuming steam/heat/electricity and labour without any result. This machine is very important and priority should be given for repair/maintenance or order for necessary spare parts.

7. Process and quality control

   To produce a standard leather quality, improved process and quality control is needed from the soaking to the finishing process, otherwise there will be no progress. (see Annex 8)

Recommendations for Leatherfactory No. 1, Damascus

8 . Separation the Lime section from Chrome Section:

Limed hides after splitting have been lying in the chrome liquor and on the chrome tanned hides.

1 separation wall should be build between these 2 sections. as per scetch given.

9 . Chrome tanned hides are piled just in front of the drum, after chrome tanning is completed. The limed hides are loaded into the drum, washed, delimed etc. The washing water which is of high pH is running over these chrome tanned hides.

The Hides, after chrome tanning should be discharged and immediately removed from this area to a safe place, away from the drums. Normally near to the sammying machine, for further processing to the shaving machine.

10 . At present, the chrome tanned stock is going for sawdust and shaving, no sammying. The leathers for shaving are very wet.

The sammying machine is next to the Shaving machine, and should be used to get the leathers in the proper condition for shaving which results the proper Shaving weight, which is needed for the calculation of the Chemicals for

Neutralization
Dying
Retanning
Fatliquoring etc.

11 . After retanning the leathers are bundled up in the drums and there are problems to get them out of the drum. The change of fatliquor which is giving a more slippery effect may help to avoid this problems. If the surface of the leathers is not slippery, the bundling starts.

12 . Sammying-Setting Machine:
is needed before the leathers go for predrying to the vacuum dryer. This machine upstairs is not in working condition and needs overhauling.(old soleleather sam-setting machine)

13 . Finishing: Base coat by padding, drying,
embossing the army grain,
\+ spray coats on the machine, dry
\+ top coat

after the embossing the base coat,there is no ironing again for the spraycoat and top coat.

The base coat should be softer, for good adhesion, a bit sticky
The spray coat " " a bit harder
The top coat giving fixation and gloss, not sticky

Finally the embossing should take place to get by heat and pressure a finishing film with a good resistance/fastness.

Recommendations for the Production of Shoe Upperleather and Embossed Leathers

at the Leather Factory No. 1, Damascus

Trial No. 1

From the present production, start after vacuum drying

- hang dry the leather until completely dry
- pile for 2-3 days in a room with high humidity
- Condition: dipping in 24°C water
  or spray water by Pistol on the grain side

  pile up and cover with plastic, allround, keep over night
- check up and stake (if too dry, adjust moisture, keep over night) until the leather has the correct condition, again) stake.
- immediately toggle on the frames and dry at approx 25-30°C for 1-2 hours only

This process control is very important to avoid hard leather.

Trial No. 2

The following changes in the present process must be made to improve the leather quality, also consider the effluent problem.

- Improve the soaking by mechanical action: Greenfleshing if possible already on the 3rd day morning, resoak again over night for the dry salted hides.
  Wet salted hides, Greenfleshing in the morning, before going for the liming process.
- Liming: Water temp. should be approx. 24°C before bringing the soaked hides in. During the cold season this temp. may be even 28°C. To aim a liming temp. of finally 34°C.
- Chrome tanning: with the maximum absorbtion of chrome:

Chrome tanning of cattle hides, with maximum Chrome absorbtion, economical regarding cost and effluent. Chrome waste liquors to be sent for analyse

Suggestion:

- % calculated on Peltweight-

normal pickle

drain out the pickle float until appr. 50% are left

add	6 - 6.5	% Chrome Salt, 33% basic	60'
add	50	% water	60'
add	25	% water with NaHCO3 slowly	60'
add	25	% water approx. 50°C	60'- 120'

End temp. 45-48°C
pH 4.0

stop over night

Chrome Retanning

- percentage calculated on Shaving weight -

wash 1 x(cold)at normal temp.

50 % water normal temp.

	4-5 %	Chrome Salt, 33 % basic)	30'
	0.3-0.4%	NAHCO3 powder)	
add	2 %	Fatliquor, stable to electrolytes,(anionic) or cationic fatliquor, diss. 1:5	

run 2 - 3 hours
and stop over night

End pH 4.1 - 4.2

further processing as usual

Fatliquor applications with maximum absorbtion, at 3 stages:

1. Prefatliquor 2 % added to the Chrome retanning bath,(as above)

2. Prefatliquor 1 - 2 % before the vegetable/synth. retannage

Final Fatliquor 4 - 3 % Fatliquor combination of 2-3 products
0.5 - 1 % synthetic Oil or raw oil
\+ 1 % cationic fatliquor,after the formic acid fix.

Total pure Fatcontent may be adjusted for different Raw Materials but should be approx. 5 - 7 %

(The present pur fatcontent beeing used is only 3.5 %)

Recommendations:
Leather Factory No. 1, Damascus

- Fatliquor. Combination, after the dyeing

	3 % Sulphonated Neatsfoot Liquor	(75 % pure fat content)
	1 % Fish Oil Liquor	(75 % " " ")
0.6-	1 % Synthetic Oil	(100 % " " ")

after retanning

add 0.5-1 % cationic Fatliquor, after the Formic acid approx. (60 % pure fat content)

Calculation of pure fat content:

2 % Fatliquor in Chrome retanning	(75 %)	1.5 % pure fat content
4 % " combination	(75 %)	3.0 % " " "
0.6-1 % Synth. Oil	(100 %)	1.0 % " " "
0.5-1 % Fatlcationic, on the end	(60 %)	0.3-0.6 % " " "
	Total :	5.8 -6.1 % pure fat content

- Process control: after retanning and adding the 0.5 to 1 % cationic fatliquor on the end, pH should be 4.0 and rinse cold before discharging the material from the drum
- After Vacuum drying: proceed as mentioned under Trial No. 1
- All the details from the process control, pH, water Temp. exhaustion of the bath etc. should be noted correctly for further testing, until the process is set.

Recommendations for Leather Factory No. 2, Damascus

1. Production of a standard leather quality

   The recommendations given for factory No. 1 are also fully valid for this factory, like:

   1. Greenfleshing of the drysalted hides before liming
   2. Chrometanning split up in normal chrome tanning and Rechroming, using fatliquor in the rechroming process
   3. Basificatien in the chrome tanning slowly with Sodiumbicarbonate, and stop Soda Ash which is in use.
   4. Shaving weight should be taken in proper condition
   5. Application of the Fatliquors should be in 3 operations:
      1. Prefatliquor in the chrome retanning/synth veget.retanning
      2. Main Fatliquor
      3. Cationic top fatliquor on the end after the fixation with formic acid
   6. Stop the wet toggling immediately.

2. Improvement of Maintenance
   is very much in need. This old factory needs with all the very old machines, very much improvement.
   The vacuum machines are very much required for quality improvement, but these machines are in a very bad condition even to be stopt immediately, as they consume only a lot of steam-heating but without any result at all.

   The tanning drums are still running on transmission drive and belt drive. Overhauling of these drums and to change over to direct drive with gearboxes on each drum should be carried out as soon as possible. (see Annex 6)

3. Effluent treatment plant

   Up till today there is no effluent treatment at all. All the effluent is flowing directly in the river. Plans are existing in building 3-4 pre-settling pits into the ground and approx. 3 large pits above the ground with Airators and adding chemicals for pH adjustment, floccation etc. The construction may be startet in the near future.

4. Condition of this Factory

   This factory is in very bad condition and requires a complete renovation, cleaning up all over.

5. Process control/ Quality control

   To produce a standard leather quality, improved control is needed from the oaking to the finishing process, otherwise there will be no progress. (see Annex 8)

6. Finished embossed leather

   There is no standard in the quality, some leathers are hard, some soft. Leathers after wet toggling arriving still wet for finishing.

7. In general, this factory has the same problems as mentioned in actory No. 1 and 3.

Recommendations for Leather Factory No. 3, Damascus

1. Production of a standard leather quality

   The recommendations given for factory No. 1 and 2 are also fully valid for this factory, like:

   1. Greenfleshing of dry salted hides before liming
   2. Chromtanning and rechroming as per suggestions
   3. Basification only slowly with Sodiumbicarbonate
   4. Shaving weight should be taken in the correct way, leathers should be in the proper condition and not too wet.
      At present, the water is running down during shaving.
   5. Application of fatliquor during 3 operations for maximum exhaustion
   6. Stop wet toggling, condition the leathers suitable for staking and toggle.
   7. Use 1 % cationic fatliquor as top addition, after the fixation with formic acid.

2. Improvement of Maintenance:
   This factory is fairly old and all the machines/ scales/ vacuumdryer need mor attention from the maintenance. The tanning drums, old ones, are still running on transmission drive by belts. Overhauling and change over to direct drive with gearboxes and V-Belts on each drum should be carried out as soon as possible. (see Annex 6)

3. Room for conditioning: After hang drying the leather should be completely dry, kept in a closed-up room with high humidity and a waterspraying machine with conveyer belt, piled up again with plastic foil covered, before going to the staking machine. There is sufficient space available on the 1.st floor

4. Lay out of this factory: is the best from all the other 2 tanneries

5. Effluent treatment: should be the same as planned for tannery No. 1 and 2.

6. Process and quality control: To produce a standard Quality, improved control is needed from the soaking to the finishing process. Quality control from time to time and especially if changes in the process are made. (see Annex 8)

7. Finished embossed leather:

   There is no standard quality, some leathers are hard, some soft.

8. Old splitting machine: This very old machine should be removed to make space for other machinery.

9. General Problems:

   This factory has the same problems as mentioned for factory No. 1 and 2.

Trial at Factory No. 3, Damascus

Retanning of Embossed leather 2.2 - 2.4 mm
Box sides 1.6 - 1.8 mm

Shaving weight: wet condition as usual
wash

Rechroming: 50% water 35°C
4-5% Chrome Salt (33% basic)) 30'
0.3-0.4% Sodiumbicarbonate powder)
+ 1.5% Synthol SP 120' stop over night
pH 4.0-4.2

wash

Neutralization:
100% water 28-30°C
0.5% sodiumformiate 20'
+ 1.0% Sodiumbicarbonate 30'
pH 5 - 5.5, crosscut 2/3 blue

Prefatliquor/retanning:
100% water 25 - 30°C
dye 20'
+ 1.5% Synthol SP 15'
+ 1.5% Skytan G 37) 30'
1.5% Retanning R 7)
+ 1- 1.5% Mimosa 60'
drain out the bath

Fatliquoring:
100% water 50 - 55°C
dye 15'
+ 2.5% Glycermax 159)
0.5% Fish Oil) 60'
0.6% Synthol O)
+ Formic acid pH 4.0
+ 0.5% Derminol KW 20'

wash, cold

Recommendations: Leatherfactories 1.2.3., Damascus

Retanning of embossed leather, Box-sides and Goatskins

			A. (2.2-2.4 mm)	B. (1.6 mm)	C.
	Shaving weight: wash at 35°C		A.(%)	B.(%)	C.(%)
	Rechroming:				
	Water 35°C		50-100	50-100	50-100
+	Masking agent	30'	-	1 - 2.0	1 - 2.0
+	Chrome salt (33% basic)	30'	5 -4	5 -4	5-4
	Sodiumbicarbonate powder	30'	0.4-0.3	0.4-0.3	0.4-0.3
+	Fatliquor HSP	120'	1.5	1.5	1.5
	stop over night				
	wash	10'			
	Neutralisation:				
	Water 28-30°C		100	100	100
+	Calcium Formiate	20'	1	1	1
+	Sodiumbicarbonate	30'	0.5	0.6	0.6
	pH 5.2 - 5.5	cross cut 2/3 blue, 1/3 yellow			
	wash	20'			
	Dyeing/Prefatliquor/Retanning:				
	Water 25-30°C		100	100	100
	Dye (dissolved)	20'	-	0.5	0.5
+	Fatliquor HSP	15'	1.5	1.5	1.5
+	Basyntan D	20'	1.0	0.5-1	0.5-1
	Neosyn H	20'	2.5	2.0	2.0
+	Drasil 470	60'	2.0	-	-
	Mimosa	60'	1.5 - 2.5	1.5- 2.5	1.5- 2.5
	drain the bath				
	Fatliquoring:				
	water 50- 55°C		100	100	100
	Dye (dissolved)	20'	-	0.5	0.5
+	Rotingan R 7	20'	-	2.0	2.0
+	Fatliquor HSP	mix product add hot water to emulsify 60'	1.0	1.0	1.0
	Grassan PA		1.0	1.0	1.0
	Sulphirol EG 60		0.5	1.0	1.0
	Coripol ICA		1.0	1.0	1.0
+	Formic acid 1:10	20'	pH 4.0	pH 3.8-4	pH 3.8-4
+	Aminox, cationic fatliquor	20'	0.5	0.5	0.5
	the bath should be clear				
	wash cold				

Remarks: The products, application, water temperature and the fatliquoring in 3 additions has been changed.

The fish oil smell is still strong on the finished leather, the quantity should be reduced from 1% to 0.5% only, in the present production.

Chrome tanning of cattle hides, with maximum Chrome absorbtion, economical regarding cost and effluent. Chrome waste liquors to be sent for analyses

Suggestion:

- % calculated on Peltweight-

normal pickle

drain out the pickle float until appr. 50% are left

add	6 - 6.5 %	Chrome Salt, 33% basic	60'
add	50 %	water	60'
add	25 %	water with NaHCO3 slowly	60'
add	25 %	water approx. 50°C	60'- 120'

End temp. 45-48°C
pH 4.0

stop over night

Chrome Retanning

- percentage calculated on Shaving weight -

wash 1 x(cold)at normal temp.

50 % water normal temp.

4-5 %	Chrome Salt, 33 % basic	) 30'
0.3-0.4%	NAHCO3 powder	)

add 2 % Fatliquor, stable to electrolytes,(anionic) or cationic fatliquor, diss. 1:5

run 2 - 3 hours
and stop over night

End pH 4.1 - 4.2

further processing as usual

Fatliquor applications with maximum absorbtion, at 3 stages:

1. Prefatliquor 2 % added to the Chrome retanning bath,(as above)

2. Prefatliquor 1 - 2 % before the vegetable/synth. retannage

Final Fatliquor 4 - 3 % Fatliquor combination of 2-3 products
0.5 - 1 % synthetic Oil or raw oil
+ 1 % cationic fatliquor,after the formic acid fix.

Total puro Fatcontent may be adjusted for different Raw Materials but should be approx. 5 - 7 %

(The present pur fatcontent beeing used is only 3.5 %)

Recommendations for Leather Factory No. 4, Damascus

1. Storing of Pickled skins for Export

The storing place in the tannery, around the machines and approx. 2.5 meters away from the dyeing and tanning drums, 2.5–3.0 m high, with temp. approx. up to 40°C, 45°C in the summer, is resulting damage to the skins and all the other machinery in the tanning section.
The pickled skins for export need a cool storing place outside the tanning section, if possible in a 2 story building, kept in the ground floor

2. Machinery / Maintenance

This factory got all the equipment and a modern Effluent treatment plant, but all need a improved maintenance system.
The 2 Sammying machines, 2 Shaving machines, 2 sam-setting out Machines which are surroundet by the pickled skins, need complete overhauling.
(see Annex 6)

3. Storing of wet blue and pickled skins

This skins should be covered well with plastic, to avoid drying out completely.

4. Process control/ Quality control

Need additional activity to control the process from the beginning to the end, also in handling the skins in the operations. (s.Annex 8)

5. Drying of skins in Dryingtunnel or Toggling-Unit

NappaGarment Leather needs a slow drying process, if possible without any heating. The completely dry skins for toggling do not need any drying temp. of 35°C - 40°C again.

6. Fatliquor for Nappa Garment

Only 10% of one Product being used is not sufficient, the leather fibre is very dry and resulting in a low tensile strength. Recommendations are made in the working instructions to use approx. 13 - 16 % Fatliquor Product to improve the softness and the tensile strength.

7. Conditioning of Nappa Garment before Staking

There would be advantage if the skins could be stored in a closed up room with a humidity of approx 70 % for 2-3 days before the staking operation. No water should be applied to the skins.

8. Cleaning up of the Factory

This not very old factory needs a complete cleaning up, in all the departments.

9. Effluent treatment plant

This modern plant has not been in operation since approx. 1 year. Priority should be given to get this effluent treatment plant back into operation as soon as possible.

Recommendations
Leather Factory No.4

10. Correct weight of pickled skins for further processing

The Scales are not weighing correct, overhauling of these Weighingmachines should be given priority.

One drum load has been checked on the end of chrometanning to collect the chrome waste liquors for analyses on the 23.5.89.

11. Process and quality control

More control is needed that such mistakes as mentioned under item 10 are avoided. Instructions on the paper are appearing reasonable, but the implementation is different.

12. Production of 4500 Sheepskins per Day (during May 1989)

From this 4500 Skins, only approximately 3000 Skins are being selected per day, 1500 Skins are piled up in high piles (see Photo Annex 11) More selectors should be employed to reduce these high piles to select the skins and pack them up in bags for better storing. In future, the dayly production should be selected to avoid such huge piles of 2.5- 3 m high. If some buyers like to select or check the selection themselves the bags can be opened again.

13. Fleshing of 4500 Sheepskins per day

Only 2 Fleshingmachines are operating. There is no machine as spare to repair or carry out maintenance work on these 2 machines. To complete everydays production, these only 2 machines need special attention from the maintenence. Also the skins should be properly fleshed. It is advisable that every morning the maintenence should set, check up and grind the knifecylinder of these machines to assure the proper fleshing for the days production. Grinding of the knifecylinder must be repeated every 2-3 hours, as soon as needed. (see Annex 8)

14. Pickled weight of the skins, before further processing

The avg. weight is taken for further processing.
The skins which should be processed for leather need not a very strong pickle and all the chemicals are calculated on the pelt weight, later on on the shaving weight.

To use only 1 working instruction for both the type of skins, from the pickled stock for export or with less pickle acid, the weight of the skins from the pickled stock should be calculated: pickle weight + 30%

which is approximately the peltweight.

15. Additional equipment for the Laboratory at factory No.4

1 new wet rub- dry rub testing apparat
1 adhesion testing apparate with glue
1 penetrometer testing apparat
1 electronic "Mettler precision balance" 3000 gr.

Recommendations for Leatherfactory No. 4, Damascus

Fleshing of Skins:

Skins are very badly fleshed and trimmed. Some skins are only half fleshed, some not at all. With fat and other parts which can not be used for making leather out of it, are not trimmed. In this condition the skins are going for the deliming operation.
5 skins have been taken to get the avg. weight:
total weight 17.750 Kg, avg. 3.55 Kg

In the production, no weight is being taken, everything is calculated per pieces. The neccessary scales are out of order.

As told, also for further processing, 1 skin has the weight of 1.5 kg. The scales should get priority for repairing/cleaning so that the peltweight is available for chemical calculation.

The fleshing and trimming should be improved. Workers are not sharpening the fleshing cylinder often enough as they have no time. Trimming is not satisfactory.

Process control is needed to have a regular production in fleshing and trimming. Without control no care is being taken.

Weighing of skins from pickled stock for further processing:

No weight is being taken, 500 skins are counted, 1.5kg per 1 skin. Total 750 kg for 1 Lot.
If the skins are larger, the weight is somewhat higher taken for the calculation of chemicals.

Normally, pickled skins should be taken by weight + 30%

If the skins are to dry or to wet, the weight can be adjusted by ± 5 - 10%, to get nearest to the proper weight.

Improvement in the weight taking and calculation is needed to produce a standard quality.

Selection of the pickled skins:

Checking up grade 1.2.3.4.5.6. and rejects
the grading appeared to be according to the european standard.

As the skins are not flat piled without any foldings, also some undissolved salt is giving deep marks on the grain, the selection is difficult and need some time to see the defects properly.

Skin Quality:

90% skins are from the slaughterhouse Damascus, showing many butcher cuts and holes
10% skins are from outside Damascus, where the skin is pulled from the animal in the so called "Envelop", without any knife cutting. These skins are completely free of any cuts, holes ar damages.
Damascus Slaughterhouse has to improve the skinning, to avoid the damages and to produce a better quality of skins, which have a high national value, finally can be sold as a better quality- selection- or give a better leather quality.

Recommendations for the Production of Pickled Skins, Nappa Garment and vegetable tanned lining leather

at the Leather Factory No. 4, Damascus

In trials, the following changes in the present process must be made to improve the leather quality with consideration of the effluent problem.

- Pickle Sheepskins for Export

The process is normal and need no changes. As the pickle is carried out in drums, the recycling of the pickle bath is not possible. To use collecting pits for the pickle water would be to complicated.

- Sheepskins for vegetable tanned lining leather

The degreasing with only 10 % Kerosene is not sufficient, Approx. 1 - 2 % detergent should be added to the Kerosene in the first degreasing and another 1 % detergent in the washing bath.

1.5 % Sulcotine 80 should be added before the tanning with Mimosa(12%) , to run only for 15'- 20'

2-3 % Synth. Bleaching agent should be added before the fatliquoring, after end of the tanning with Mimosa, to result a uniform colour of the lining leather

The fatliquor should be changed. Ansolven RP should be used instead of Sulcotine 80, to use only 1.5 %. Considering the prefatliquor before the Mimosa Tanning. Result should be less fish oil smell on the final lining leather product.

1 % cationic fatliquor may be added on the end as protection against oxydation during drying. Also the cationic top liquor will remain on the surface and keeps the grain flexible.

Above items are to solve problems which have been mentioned by the Shoe Factories.

- Sheep Skins for Nappa Garment

In the degreasing, perchlorethylene should be replaced by detergents. The solvent perchlorethylene will not be allowed to go into the effluent, unless it is completely destroyed before.

Chrome tanning, with the maximum absorbtion of chrome

use shortest possible pickle float		
add 1 % Sandolix VP 72 or Synthol SP	run	20'
add 6 % Chrome Salt, 33% basic	run	60'
add 50% water	run	60'
add 25% water + Sodiumbicarbonat, during		60'
add 25% water, approx 50-60°C	run	60'-120'
End Temp. 45°C		
pH 3.8 - 3.9		
stop over night		
3am, shave, wash		

- Chrome Retanning - % on shaving weight -

  - use shortest possible float -

  50 - 70 % water

  add 5- 4 % Chrome Salt, 33% basic) run 30'
  0.3 % Sodiumbicarbonate powder)

  add 2 % Sandolix VP 72 or Synthol SP run 2-3 hours
  and stop over night
  final pH 4.0

- Neutralization:
  Instead of 1.5 % Sodiumbicarbonate, at 40°C,

  1 % Sodiumformiate 20'
  1 % Sodiumbicarbonate 40' at 30°C should be used
  pH 6.0
  BCG Indikator: fully blue

- Synthetic retanning

  may be reduced from 3 - 3.5 % to only 1.5 - 2 %

- Final Fatliquor:

  10 % Sandolix VP 72
  2-3 % Lipoderm Liquor SAF 60'

- Fixation after the Fatliquor

  with Formic acid to pH 3.8 - 4.0
  diluted during 30', <u>wash</u> with cold water before discharging

- Fixation after discharging from the drum:

  pile for 2 days before starting the sammying/setting out operation

- Drying operation in summer and winter
  should be as slow as possible, without heating or little heating

- Conditioning before Staking
  suitable in a closed room with high humidity for 2-3 days

- Toggling and drying at 40°C in the toggle Plant

  As the skins are already completely dry, only aircirculation and not heat is needed in the toggling plant. Toggling is only for shaping the skins into flat condition.

- Finishing by spraying

  The Pigment/ Water / Binder combination should be in the proportion of <u>approx.</u>

  100 parts Pigment, double of the Pigment
  200 " Binder, " " " Binder
  400 " water

  There might be some variation, but 100 parts Pigment require double the quantity of Binder for proper film covering with the required fastness.

Recommendations for Factory No. 4 Damascus

Production of crusted Sheepskins for Export

Material: Pickled sheep skins
Pickled weight + 30 % (± 5-15%)

Degreasing:
200 - 100 % Salt water of 9°Be, temp. 35-38°C
10 % Kerosene
2 % degreasing agent (detergent) 30'
remove to fleshing machine and reflesh 2/3 of the skin in direction to the neck part, to remove the loose fat
200 % salt water of 9°Be, temp. 35°C
1 - 1.5 % detergent 30'
drain out

Depickling: as usual with Sodiumbicarbonate to pH 3.2 in the bath
pH 2.8-3 in the skin
add 1 % Relugan GTW 1:4 diluted 30'
add 1 % Sandolix VP 72 (dissolved in hot water and cooled down)30'
Salt water of 9°Bé, stop over night, drain out, the next day

Chromtanning: 100 % water
6 % Chrome Salt, 33% basic 60'
add 50 % water 60'
add 25 % water + Sodiumbicarbonate, slowly during 60'
add 25 % water of 50- 0°C run 60'- 120'
stop over night, pH 3.8-4.0
temp. 40-45°C
pile for 2 days, sam, shave to 0.9 mm, wash

Shaving weight:
wash

Rechroming: 100 % water
4 % Chrome Salt, 33 % basic) 30'
0.3 % Sodiumbicarbonate in powder)
add 2 % Sandolix VP 72 or Synthol SP run 2-3 hours
and stop over nicht
pH 4.0
pile for 2-1 day or carry on immediately, wash

Neutralization: 200 % water 30°C
add 0.75- 1 % Sodiumformiate 15-20'
add 0.75- 1 % Sodiumbicarbonate 45'
pH 6- 6.5
BCG Indikator: fully blue
wash

Retanning/Fatliquor:
200 % water 45°C
3 % Sandolix VP 72 (light fast) 45'
add 1.5 % Syntan SG (" ") S+Z) 45'
0.5 % Basyntan DLE (" ") BASF)
add Formic acid
pH 4.0
bath should be clear
wash
pile for 48 hours, sam-set out. dry full .condition, stake, toggle

Trial at Leather Factory No. 4 , Damascus

Small and large Goatskins for Shoe Upper Leather
(without hard grain)

Soaking: 2 -3 days

Pile: 2 - 3 hours

Painting: 100 kg water)
25 kg slaked lime) 25°Be'
6 kg Na_2S)
unhair after 2-4 hours

Liming: water 22°C
5 g/liter slaked lime
3 g/liter Na_2S after 24 hours, flesh and return into the lime liquor
Total liming time: 2 1/2 days

wash - Peltweight-

Deliming: 150 % water 38°C (check up, only 31°C)
\+ 1.5 % Ammoniumsulphate 30'
\+ 1.0 % Bate 300 conc. 180' pH 8 - 9
check bating effect

wash

Pickle: 100 % water, normal) 6 - 7 Bé
8 % salt)
\+ 0.5 % Formic acid) 3 hours + stop over night
\+ 0.6 % Sulphuric acid)
pH 3 - 3.5

Chrome Tanning:
50 % Pickle water
\+ 6 % Chrome Salt (33% basic) 60'
\+ 50 % water 60'
\+ 25 % water + Sodiumbicarbonate in 60' (slowly)
\+ 25 % 50 - 55°C 120'
stop over night pH 3.8 - 4.0

Pile: 1 - 2 days

sam

Shave in proper condition

Shaving weight:

wash

I B. Recommendations for the Leather Factory at Aleppo

Production of cattle hides for shoe upper leathers:

1. Peltweight: to weigh all the hides after the fleshing operation and trimming

2. Chrome tanning of cattle hides, with maximum Chrome absorbtion, economical regarding cost and effluent. Chrome waste liquors to be sent for analys

Suggestion:

- % calculated on Peltweight-

normal pickle

drain out the pickle float until appr. 50% are left

add	6 - 6.5	% Chrome Salt, 33% basic	60'
add	50	% water	60'
add	25	% water with NaHCO3 slowly	60'
add	25	% water approx. 50°C	60'- 120'

End temp. 45-48°C
pH 4.0

stop over night

Chrome Retanning

- percentage calculated on Shaving weight -

wash 1 x(cold)at normal temp.

50 % water normal temp.

4-5 % Chrome Salt, 33 % basic) 30'
0.3-0.4% NaHCO3 powder)

add 2 % Fatliquor, stable to electrolytes,(anionic) or cationic fatliquor, diss. 1:5

run 2 - 3 hours
and stop over night

End pH 4.1 - 4.2

further processing as usual

---

3. Splitting after chrome tanning:
to avoid heavy damage, train the 2 persons feeding the leathers into the machine and reduce the speed of the machine to 17 - 20 meters / min.

4. Trimming after shaving: The persons should be trained to cut only the edges. Approx. 50 % of the trimmings can be reduced and the measurement yield will increase.

5. Shaving weight:

The moisture content is approx. normal, for proper condition 5 - 7 % from the weight may be reduced.

The leathers should be put on 1 scale to prepare the drum lots. To take only 5 sides and calculate the avg. weight is insufficient.

5 sides, 2.2 - 2.4 mm 21.5 Kg, avg. 4.3 kg

6. Application of fatliquors in 3 - 4 stages:

with maximum absorbtion, at 3 stages:

Prefatliquor	2 % added to the Chrome retanning bath,(as above)
Prefatliquor	1 - 2 % before the vegetable/synth. retannage
Final Fatliquor	4 - 3 % Fatliquor combination of 2-3 products 0.5 - 1 % synthetic Oil or raw oil + 1 % cationic fatliquor,after the formic acid fi

Total pure Fatcontent may be adjusted for different Raw Materials but should be approx.4,5 - 7 %

(The present pur fatcontent beeing used is only 3.5 %)

7. Transport from Sammying before shaving up to toggling operation:

The transport on horses is not suitable, leathers dry out. Transporton platforms, approx. 60-70 cm high, are more suitable.

8. Sammying-setting/ Vacuum drying:
Leathers should be more dry after sammying, otherwise more time is needed on the Vacuum dryer for proper pre-setting (3.5 min.) Leathers should be placed on the vacuum dryer, put flat and a heavy setting out by the slicker should follow, to remove all the wrinkles. The leather should not be too wet after Vacuum drying, the condition should be as demonstrated.

9. Drying and Conditioning from Vacuum-predrying to toggling:

After vacuum predrying, hang up in drying tunnel for full drying, pile up on platform transport for 1 - 3 days, condition by water spraying, pile over night, fully covered with plastic foil.

10. Stake in small lots and toggle immediately, dry at 25-30°C approx. 1 1/2 hours

Recommendations: Aleppo

11. Retanning of embossed leather, Box-sides and Goatskins

			A. (2.2-2.4 mm)	B. (1.6 mm)	C.
	Shaving weight:				
	wash at 35°C				
	Rechroming:				
	Water 35°C		50-100	50-100	50-100
+	Masking agent	30'	-	1-2.0	1-2.0
+	Chrome salt (33% basic)	30'	5 -4	5 -4	5 -4
	Sodiumbicarbonate powder		0.4-0.3	0.4-0.3	0.4-0.3
+	Fatliquor HSP	120'	1.5	1.5	1.5
	stop over night				
	wash	10'			
	Neutralization:				
	Water 28-30°C		100	100	100
+	Calcium Formiate	20'	1	1	1
+	Sodiumbicarbonate	30'	0.5	0.6	0.6
	pH 5.2 - 5.5	cross cut 2/3 blue, 1/3 yellow			
	wash	20'			
	Dyeing/Prefatliquor/Retanning:				
	Water 25-30°C		100	100	100
	Dye (dissolved)	20'	-	0.5	0.5
+	Fatliquor HSP	15'	1.5	1.5	1.5
+	Basyntan D	20'	1.0	0.5-1	0.5-1
	Neosyn N		2.5	2.0	2.0
+	Drasil 470	60'	2.0	-	-
	Mimosa		1.5- 2.5	1.5-2.5	1.5-2.5
	drain the bath				
	Fatliquoring:				
	water 50- 55°C		100	100	100
	Dye (dissolved)	2o'	-	0.5	0.5
+	Retingan R 7	20'	-	2.0	2.0
+	Fatliquor HSP	mix product 60'	1.0	1.0	1.0
	Grassan PA	add hot	1.0	1.0	1.0
	Sulphirol EG 60	water to emulsify	0.5	1.0	1.0
	Coripol ICA		1.0	1.0	1.0
+	Formic acid 1:10	20'	pH 4.0	pH 3.8-4	pH 3.8-4
+	Aminex, cationic Fatliquor	20'	0.5	0.5	0.5
	the bath should be clear				
	wash cold				

Remarks: Some products, the application, water temperature and the fatliquoring in 3 additions have been changed.

12. Recommendations for processing Sheep and Goatskins

Material: Wetsalted Sheep and Goatskins

Soaking: According to the condition of the Raw Skins
No time can be fixed.

Greenfleshing: by hand, to remove all the flesh and natural fats that the Lime-paint Chemicals can penetrate evenly all over.

Pile: For dehydration, approx. 2 - 3 hours

Paint: Sodium Sulphide dissolved, 8° - 15° Bé
+ Lime powder to 20° Bé
+ Kaolin or Lime powder to 25-26°Bé
+ Detergent approx. 0.25 kg for 100 Liter paint

Painting: to the fleshside of the skins by hand or machine

the paint should be level all over the skin, especially on the neck parts.

(Remarks: The Sodium Sulphide may be reduced in summer, but increased in the winter month.
Painting by machine: at Aleppo the machine is not working satisfactory, the brushes are very hard and many spots are not painted, many slightly painted only.
Painting by hand, as explained, may be advisable.)

Pile: for 10 - 12 hours , or only 2-4 hours

Dewool: by machine or by hand

Liming: Water Temp. 25°C
+ 2 - 3 % Lime powder)
+ 1.5 % Sodium Sulphide) 48 hours, with running
0.5 % Salt) for 5' every 1 hour at the beginning

Wash: in normal water

Flesh: on machine

Trimming: to cut all the pieces which are not suitable for leather (by 2 persons)

Peltweight: on Platform scale, if required: Lime-Selection.

Deliming: 200 % Water, 35 - 37°C
2 % Ammoniumnitrate 30'
+ 0.05 - 0.1% Bating Agent for Sheepskins 45'
+ 1 - 1.5% Bating Agent for Goatskins 2 - 3 hours

(The quantity depending on the Bating agent, Check up is required especially for the Goatskins. Large and small size Goatskins should be separated for different timing and Bating-Agent quantity, to result a soft grain)

Wash: at 30°C and again at 37°C, drain out

Degreasing: + 10 % Kerosene (Goatskins: at 35°C,45'
Sheepskins: 2 % Detergent 30' - 40' (with 2.0% Detergent or

Remove to a fleshing or scudding machine and squeeze out the loose fat, approx. 2/3 of the skin to the neck part, as discussed, put back into degreasing bath, with:
100 % water, 37°C
1 % Detergent 30'

drain out

(Remarks: Perchlorethylene should be stopt, no solvent should be discharged into the effluent water.)

Wash: with 33°C water, and again with normal water at 25°C

Pickle: 70 % Water)
8 % Salt + Bactericide(Cortimol G) 10') 8-10°Bé
+ 0.5 % Formic acid diluted 20'
+ 0.5 -0.8 % Sulphuric Acid conc. diluted 90'

stop over night

Final pH for pickled skins, for Export, pH 1.0 - 1.2
Final pH for chrome tanning, pH 3.5 - 3.6

Further processing to Garment Nappa and Lining Leather:

Drain out: approx. 50% of the pickle bath

+ 5.5-6.0 % Chromitan MS (1.65 - 1.8 % Cr_2O_3)
or + 6.75-7.25% Chromitan B (1.68 - 1.81% ")
run 60'
+ 50 % water 60'
+ 25 % Water + Sodiumbicarbonate 60'
+ 25 % Water 30'
Final pH 3.8 - 4.0
stop over night

Pile: for 2 - 3 Days

Sam and shave to 0.9 mm

Shaving weight: in proper condition, ± 5 - 15 %

wash: at 25 - 30°C water, drain out

Degrease: + 0.5 % Detergent 20'- 30'

Wash: at 25 - 30°C water

Chromeretanning:
100 % Water 30 - 35°C
6 - 4 % Chromitan B(33% basic)
0.4 -0.3% Sodiumbicarbonate powder) 30'
+ 2 % Derminol HSP 2 - 3 hours (or 1% HSP and 1% Grassan PA)
stop over night
final pH 3.8 - 4.1

Wash: normal water, 25°C

Neutralization:
100 % Water 28 - 30°C
0.75 -1 % Calciumformiate 15'
0.75 -1 % Sodiumbicarbonate 45'
pH float 6 -6.5
cross cut: fully blue

Wash: water 30°C

Prefatliquor/retanning:
100 % Water 28 - 30°C
2 % Fatliquor (1% HSP and 1% Grassan PA) 20'
+ 0.4 % Tanigan PAK or OS 10'
0.4 % Syntan SG (J+Z))
0.4 % Basyntan DL3) 20'

+ hot water to get temp. of 50 - 55°C 10'

Fatliquoring:

+ 4.5 % Grassan PA)
1.5 % Derminol HSP)
3 % Sulphirol EG 60) 60'
1 % Coripol ICA)

+ Formic Acid 1:10 30'- 40' (if penetration dying)

Final pH 3.8 - 4.0

Wash: with cold water, pile for 2 days, sam-setting out, dry slowly

Remarks: 1. Calculation of Produkt Fatliquor/Oil and Pure Fat content:

3.5 % HSP	70% pure fat	2.45 %	Total
6.5 % PA	80% " "	5.20 %	"
3 % EG 60	60% " "	1.80 %	"
1 % ICA	100% " "	1.00 %	"
14 % Product		10.50 %	Pure fat total

This quantity is depending also on the degreasing of the natural fat.

2. Washing at the end of the operation is a must, to wash out all the salt from chemicals and dye to avoid later on any fatty spew development.

3. Dying: Penetration dying at 25°C, after neutralization:
+ Ammonia for pH adjustment 10'
+ Dye in powder, acid dye 30'
check penetration
+ Formic acid (1/3 from the Dye) 5'
+ Direct Dye (dissolved) 30'

13. Recommendations for Retanning of Lining Leathers:

(Low price products are usually used for this leathers)

after chrome tanning, pile 2-3 days, sam, shave to 0.9 mm

Wash:

Shaving weight: ± 5 - 10 %

Rechroming: 100 % water
4 % Chromitan B (33% basic))
0.3% Sodiumbicarbonate, powder) 30'
+ 1- 2 % Derminol HSP run 2-3 hours pH 4
and stop over night

Neutralization: 200 % water 30°C
+ 0.75 -1 % Calciumformiate 15 - 20'
+ 0.75 -1 % Sodiumbicarbonate 45'
pH 6 - 6.5
BCG Indikator: fully blue

wash:

Retanning/ Fatliquor:
200 % Water 45°C
1 % Derminol HSP 20'
+ 1.5% Tanigan PAK 15'
+ 1- 2.0% Basyntan DLE)
1- 2.0% Syntan SG (3+2)) 50'
+ 1- 2 % Tanigan OS 20'

+	2 % Sulphirol SG 60)	
	2 % Derminol HSP or Grassan PA)	50'
	1 % Coripol ICA)	
+	Formic Acid final pH 4.0	
+	0.5 % Cortymol G	20'

Wash:
Hang up for drying, condition, stake, toggle

14. Stocks of Chemicals and Spare Parts: 6 month

The main spare parts for the machines and the equipment should be available for approx. 10 - 12 month.

Chemicals: Tenders requests for 1 year should be on 1 L/C but shipment according the requirement in 2-3 lots.
Urgent requirements of chemicals or spare parts should be possible at any time. Priority at present are spare parts for the platform scales.

In a separate statement the machines are mentioned with information regarding: Repair
Spare parts
Overhauling
Maintenance (see Annax 6)

15. Selection of Raw Hides/Skins according to Size

Many small cattle hides have been found in the embossed leather process of 2.2 - 2.4 mm.
These hides should be used for the leathers of 1.6 - 1.8 mm only to produce a even leather substance. Also the Shoe factories complained about such small hides with a substance of 1 - 2.4 mm,
Raw Hides should be sorted into 2 sizes, small and medium and heavy hides. Sheepskins in 2 sizes are also advisable.

Goatskins need also sizing in 2 kinds, small and large. The small size skins need less liming and bating as the very large skins, to result a soft grain of these skins. Also the Shoe factories like to get them separate.

16. Physical and Analytical Tests carried out at the Laboratory

are includet in a separate report with specification details for comparison. (see Annex 5)

17. Selection Details for pickled skins and finished leathers

are mentioned in a separate statement. (see Annex 7)

18. Water Temperature in Summer and winter
should be adjusted accordingly to have soaking and liming temp. in paddles and drums approx. at 24 - 25°C, but not below 20°C

19. Process and Quality Control:
The foreman from the finishing section is the only person suitable for this job. In connection with the laboratory he should check the work, the processes and also the quality. The No.2 in the finishing section should take over the finishing work slowly with advise from the former foreman.

He also should have close contact to the maintenance section to carry out the neccessary repairs, adjustment of machines, and the maintenance plan for overhauling.

The disoussion with the maintenance did show that they have a plan but there is no control on the implementation.

20. Training Lecture

with all the technical staff,cn the 11. and 12. June 1989. discussion and full explanation of the process and quality control. Priority had been given to their present problems at the factory.

21. Additional Equipment for the Laboratory

To carry out the required physical tests, the following equipment is required:

1 wet-dry rub apparat
1 adhesion tester with special glue
2 thickness gauges of approx. 4", 8" each
1 electronic "Mettler Scale" 3000 gr.

22. The Factory water

The water sample has been given to a laboratory at Damascus. For the test results, see Annex 5.

II -A. F I N D I N G S (Damascus)

1. Visits to the Shoe Factories at Swaidaa and Nabeck for findings regarding the Leather Quality, problems and carrying out quick tests at the leathers available.

These problems have been discussed with all the 5 Leather Factories at Damascus and Aleppo. Many leather samples collected from these 2 Shoe Factories have been demonstrated.

Discussed problems in Shoefactories at Swaidaa and Nabeck

- Many butcher cuts and holes, heavy waste
- Uniform leather substance, 1 hide 1mm - 2.4 mm army leather
- No hard leather also after storing for some time
- Standard Quality Process control in tanneries, more strict
- No sticky finish Leather sticks together in the bandles, damages
- Level colour in hides and skins
- Degreasing of skins - fatty necks, finished lining - fatty spew
- Full skins, not to supply very small pieces
- Smooth leather has to many wrinkels in the belly parts
- Hard and cracky sole leather, uneven colour, damage to tools
- Fish Oil smell in lining leather, veget. tanned
- Chevreaux, grain cracking
- Small and large Goatskins to process separate
- Quality control before sending leather to the Shoe factories
- Workmanship, careless handling
- Syrian specifications for leather

(see also Photos, Annex 11)

2. A. Leather Factory No. 1.2.3. for cattle hide production
B. Leather Factory No. 4 for sheep and goat skins production

A. The 3 Leather Factories at Damascus are very old tanneries with many very old machines and equipment. Only a few machines: Toggling plant, ex chrome splitting machine and some tanning drums have been added to the equipment during the last years.

2.1 Factory No. 2 is the oldest and in very bad condition. A complete renovation plan is needed to improve this factory. All the drums are running on transmission drive.

2.2. Factory No. 1 and 3 are still in better condition and need some renovation only.

These 3 factories are producing only embossed leathers of the same type, in black colour.

2.3. As Raw- Material, only drysalted hides from Saudi Arabia and some wetsalted local hides are available.

The imported dry hides are of low quality, having many butcher cuts and holes. Resulting heavy loss of waste in the Shoe-Factories

The dry hides need a long time for soaking. Pits are available but no Chemicals are added. Mechanical action is possible only in the drums.

The Fleshing Machines are in no good condition to carry out " Greenfleshing " which is very nec essary to get the hides back into the proper soaking condition, before the liming process.

2.4. Leather Production from cattle hides only

Present production, approximately 3 500 000 sqf per year of embossed shoe upper leather for the Army.

Future plans, to produce up to 5 000 000 sqf per year

2.5. Production Capacity per year

Leatherfactory No. 1	1 170 000 sqf
Leatherfactory No. 2	1 125 000 sqf
Leatherfactory No. 3	1 170 000 sqf

Actual production in:	1988	1987
Leatherfactory No. 1	822 344 sqf (70.2%)	1 058 923 sqf (90.5%)
Leatherfactory No. 2	786 187 sqf (69.8%)	939 741 sqf (83.5%)
Leatherfactory No. 3	874 123 sqf (74.7%)	1 052 208 sqf (89.9%)
Total sqf	2 482 664 (71.6%)	3 050 872 (87.96%)

Remarks: The production in 1988 is low due to shortage of raw materials

2.6. Machinery and Equipment

In general, the old equipment is in bad condition and needs spare parts, repairing and overhauling. Only some machines are in fairly good condition. (see machine and equipment list, Annex 6)

Main requirements:

1. New Fleshing Machines
2. Drums with direct drive
3. Scales and Balances
4. Vacuum dryer top filters, rubber sealings
5. Water spraying machines for conditioning
6. 1 new toggle plant
7. many spare parts and improved maintenance
8. 1 sam-setting machine

2.7. Effluent Treatment:

At present, all the effluent is flowing direct into the nearby small river.

These 3 Factories have been visited by the 2 Effluent Experts from Jugoslawia and "Terms of Reference" will be submitted to UNIDO.

2.8. Physical and Analytical Tests

are not possible at these factories. Only ITRC can carry out analytical tests. Physical tests: Only tensile strength and Flexometer tests can be carried out at Factory No. 4, which has a small Laboratory.

Visits to the Leather Factory No. 1, Damascus

Production: Heavy cattle hides for embossed Leather

Raw Material: Drysalted Rawhides from Saudi Arabia and some fresh salted hides from local market or Lebanon.

Soaking: in pits without chemicals or mechanical action tubewell water, in summer 18-20°C

Liming: as per process details (Annex 10) Splitting out of lime

Deliming: " " "
Bating: " " "
Pickle: " " "

Chrometanning: 7 % Chrome Salt at one time,
Basification: with soda ash, too quick, PH control did show pH 5.0

Lime and Chrome Section: are not separated. Limed hides after splitting are lying in the chrome liquor. Chrome tanned leathers near the drums are splashed with lime water from the washing drums

Sammying: with little pressure only. Leathers are still very wet, saw dust is added to be able to shave

Shave: Shaving weight: leathers are to wet, approximately + 15-20% above normal shaving weight

Neutralization: normal

Retanning/Fatliquoring: Total fatliquor is added before the retanning at 50 - 55°C. Heavy bundling in the drum give problems in discharging the goods from the drums and damage with heavy foldings.

Sam-Setting: is not possible, there is no machine. May be the nearby sole leather sammying machine can be used

Vacuum drying: The leathers arrive very wet on the vacuum dryer. Patches of water standing on the top of the leather as the top filters are blocked and the vacuum can not work. There is nearly no change in drying, the operatin is without any result.

Toggling: The still wet leather is being toggled in wet condition at 50-60°C. The sides are toggled one on the top of each other. After the drying, the heavy substance is still wet and the thin parts are very hard and dry. Sometimes the leathers are completely hard and dry, if drying time is longer, the last lot over night.

Staking: is done after toggle drying without any result of the dry and hard leathers. The still wet parts get soft and shrink afterwards during full drying, before finishing.

Toggle dryers: 2 toggle dryers are in this factory and all the leathers from factory No. 2 and 3 arrive here for toggling in the s wet condition.

Finishing: Pad coats, spray coats and top coats are normal. Embossing is done after 1 pad coat, the next coatings don't get any ironing and are showing no good rub fastness

Final Leather Quality: hard, soft, no standard quality without any remaining softness. Using only 3 1/2 % Fatliquor Product approximately, the leathers are drying out during some storing time at the shoe factories.

The leathers are not properly set out and show many wrinkles, even after embossing.

Visits to Leatherfactory No 2, Damascus

Production: Heavy cattle [illegible] for embossed leather

Process from Soaking to Finishing is nearly the same as used in Leatherfactory No. 1, Damascus.

Soaking: in pits with tubewell water of 18-20°C

Liming/ Deliming/ Pickle/ Chrometanning as in Tannery No.1

Splitting: out of lime, only to level the very heavy hides to approx. 5 mm thickness.

out of Chrome, to the final thickness required.

For Chrome splitting, a most modern Splittingmachine which is only a few years old has been in use.

Neutralization/ Retanning / Fatliquoring as in Tannery No. 1

Sam/setting out/ Vacuum drying:

The Vacuum pre-drying operation is carried out at 80 and 90°C for 2 - 3 minutes without any result at all.

The Filters on the top inside of the Vacuumdryer are completely blocked and have to be changed out. There is no Vacuum effect at all, the leather is lying only on the hot plate and after 2-3 minutes wet as before.

One Trial with one side on the Sammying machine did give a better result.

Toggling: These leathers are sent to Factory No. 1 for wet toggling and are returned for finishing.

Inspecting the leathers after wet toggling, the leathers have been still wet received back in the finishing room.

Shaving weight: Saw dust is being used as the leather is still too wet, not in the proper condition for shaving.
To produce a standard Leather Quality, the Shaving weight must be correct as all the Chemicals for Neutralization, Retanning, Dyeing and Fatliquoring are calculated on this weight.
It has been explained that the Process control Person must check up the condition of these leathers while taking the weight.

Result: ± 15 - 10 %

If the leather is too wet, reduce the weight by approx. 5 - 15 %

If the leather is too dry, increase the weight by approx. 5 - 15 %.

Raw Material: The heavy Hides, imported, drysalted, are of very low quality, full of deep butcher cuts and showing many holes. Also the split is of very low quality and is not suitable to be finished with Pigment/Binder for cheep shoe material.

This defects showing up very much at the Shoe Factories, resu a large Quantity of waste. Defected Leather can not be used, but the Shoe Factory finally is getting the Invoice for the measured sqf. of leather.

Visits to Leather Factory No. 3, Damascus

Production: Heavy cattle hides for embossed leather

Process from Soaking to Finishing is nearly the same as used in Leatherfactory No. 1, Damascus.

Soaking: in pits only without Chemicals or mechanical action tubewell water is used at 18–20°C

Liming/ Deliming/Pickle/ Chrometanning as in Tannery No. 1 and 2

Splitting: out of lime only

Shaving: The condition of the leathers are very wet. Saw dust is used to avoid slipping while shaving. To calculate the proper shaving weight, it would be:
taken weight, minus 15 – 20%
The Chemicals at prsent are calculated on the full taken weight, which means that they are using much more produkt as mentioned on the working instruction. The situation is the same as in Tannery No. 1 and 2.

Neutralization/Retanning/ Fatliquoring as in Tannery No. 1 and 2

Sam/Setting out/ Vacuum drying:

The filters on the top inside of the Vacuumdryer need cleaning. The vacuum is not working fully. There is approx. only 50% pre-drying result.

Toggling: All the not proper Vacuum predryed leather are sent to Tannery No. 1 for wet toggling and drying at 40°C – 50°C. As the toggling plant is working for all the 3 tanneries, the plant is insufficient. The frames are not enough.

To scope with the Quantity of leathers, 4 sides are toggled on 1 frame, which means 2 sides over each other.

After 2-3 hours drying time, the leathers are still wet but are removed to make place for the next ones.

Raw Hides: The Hide material is somewhat better regarding butcher cuts and holes compared to the tannery No. 2.

Hang drying: The production of leather has been discussed and hang drying after the vacuum drying suggested in a suitable room upstairs with a suitable conditioning before the staking.

Toggling in condition after staking: The leather should be in proper staking condition and go immediately for toggling, 2 sides on 1 toggle frame only at lower temp., approx. 25–30°C and a much shorter drying time.

Effluent treatment plant: Up till today, all the effluent is going directly into the river. Arrangement with 3-4 pits in the ground and 3 larger pits above the ground for effluent treatment is planned in the near future.

B. Leather Factory No. 4 , Damascus has been build by a French Co. from 1976 till 1978, mainly for the production of Sheep and Goat Skins.

2.9. Raw Material/ Store

Only fresh or wetsalted Sheep and Goatskins are in store for immediately soaking.

The skins from the Damascus Slaughterhouse are lower in Quality as they have many butcher cuts. Skins from outside Damascus arrive in " Envelope" condition, having nearly no butcher cuts.

2.10. Leather Production from Goat and Sheepskins

95 % of the skins are produced to the pickle only, for Export.

5 % of the skins only are produced to:
Nappa Garment Leather
Chrome tanned lining Leather
Vegetable tanned lining Leather

There is no Standard Leather Quality available.

2.11. Production Capacity/ per day

is only planned for 3000 Skins

The present production during the month of May has been 4 500 Skins per day

2.12. Machinery and Equipment

is in bad condition. Scales and Balances are nearly all out of order. (See Photos, Annex 11)
The Maintenance is very poor, the factory is not clean. Machines are used for the operation and left without any cleaning or maintaining. The tannery has been blocked with the storing of huge piles of pickled skins. Strong Sulphuric-acid fumes around kept the machines rusting in addition to the poor maintenance.

As no Scale or Balance is working, all the weights for Peltweight, shaving weight, pickled weight and the Chemicals are taken by average, approximately.

Main requirements: (see also machine list, Annex 6)

1. Platform scales and Balances
2. new Fleshing Machine
3. Drums need gearboxes
4. Transport horses or platforms
5. all machines need complete overhauling and improved maintenance, and main spares.
6. Cleaning up the whole factory

2.13. Effluent treatment Plant

With the tannery, a very big Effluent Treatment Plant has been build by the French Co. (see Annex 4)
This Plant is out of operation since approximately 1 year.
Main reason are the maintenance and shortage of floccing agents.

This Effluent Treatment Plant has been visited by the 2 Effluent Experts from Jugoslawia and the "Terms of Reference" will be submitted to UNIDO.

2.14. Laboratory and Experimental Room

For Physical testing, only

1 tensile strength-Elongation Apparat
1 Flexometer Apparat

are available.

Some Equipment for Analytical testing, but no Chemist for the tests is available.

The Experimental Room has Paddles and some small drums for trials. No person is available to run this place.

3. Main Problems

A. Factories 1.2.3.
B. Factory No. 4.

A. Factories No.1.2.3.

3.1. Soaking the drysalted hides, greenfleshing before the drum soaking asmechanical action is required. The Fleshing machines are not operating as required, too much flesh is still on the hides, even after ex lime fleshing.

3.2. The rawmaterial is of low quality, many butcher cuts and holes result heavy waste at the shoe factories.

3.3. The leather quality is suffering and the measurment yield is below normal.

- the setting out on the vacuumdryer is insufficient, the wrinkles are still remaining. Foldings are just pressed down and theleathers are removed from the vacuum dryer too wet. The grain predrying setting effect is not achieved.
- The leathers are toggled wet and dried at 50-60°C. Toggled one piece on the top of each other, the leathers are still wet removed from the toggle frames. Only the thin parts may be fully dry and very hard. The wet leathers are hang up in the tanneries for full drying, during this time the leathers are shrinking. Staking of dry leathers has no effect or result in gaining more measurment.
- trimming of the leathers may be reduced in cutting only the corner pieces.
- Heavy sam- setting before the vacuumdrying operation is not possible.

3.4. Samying - Shaving - Shaving weight

A proper samying before shaving is not possible, the leathers are very wet, saw dust is being added to enable the shaving operation. Result is also that the proper shaving weight can not be obtained, on which the chemicals for further processing are calculated. The weight is approximately 15-20% heavier as the normal weight on account of excess water.

The Chemicals calculated are much more, like:

Products:	present very wet condition	if in proper shaving condition
	120 kg	100 kg
Fatliquors total approx. 6%	7.2 kg	6 kg
Retanning agents total approx. 5%	6 kg	5 kg
Chrome Salt total approx. 7%	8.4 kg	7 kg

The Shaving weight must be controlled by the responsible person and according to the condition adjustments must be made. If the leathers are too wet or too dry: ± 5-20%, to guaranty a standard leather production.

3.5. Rechroming-Neutralization-Retanning-Fatliquoring

The fatliquoring is carried out before the retanning, the bundling up of the leathers in the drum is happening and the leathers are so heavy disformed that the foldings can not be removed. The vegetable / synthetic tanning agents give a very ruff surface which results the bundling. A slippery surface is required.

3.6. Sam-setting, Vacuumdrying

A heavy sam-setting before the vacuumdrying is not possible, the leathers are put too wet on the vacuum dryer and need a long time to reach the proper predrying-setting of the grain effect. The topfilters of the vacuumdryers are blocked and in 1 case the water has been standing like a patch on the leather after the operation, not removed by the vacuum.
The leathers are removed too wet from the vacuumdryer, the required predrying and grain setting effect is not achieved.

3.7. Full drying-Conditioning-Staking-Toggling and drying at 25-30°C

Instead of operating the normal process, the still too wet Leathers are toggled wet on the toggle frames, dried at 50-60°C. 2 sides are toggled on top of each other and after the drying, the leathers are still wet or very dry and hard, especially in the thin parts. Staking the leather in dry and hard condition has no effect. The still wet leathers are hang up in the tanneries for full drying before finishing, shrinking during this drying operation. The leather quality is not standard and this operations must be carried out properly controlled as mentioned in the headline.

The steam and heating can be reduced by 50% and the final leather quality is much improved and can reach the standard quality required by the Shoe Factories, if the proper way of this operations is taken, without any extra cost.

3.8. Finishing of embossed Leathers

Pad and spray coats are normal, also the top coat. The embossing is done after the first pad coat and no ironing is possible after the spray and top coats are applied. Result is that the fastness of the finish, the spray coats applied after the embossing have no good adhesion.

3.9. Maintenance - Machinery - Equipment

The fairly old Machinery and Equipment needs more attention and spare parts, maintenance, overhauling.

3.10. Separation of Lime section from the chrometanning section

In Factory No.1 the limed hides are in the chromliquors and the chrometanned leathers near the drum getting lime water all over during drum washing.

3.11. The Factories process details

are mentioned in Annex 10, "Findings" A. Damascus

3.12. Effluent Treatment

Up till now, all the effluent is flowing directly into the nearby river.
In all the 3 factories, pits have been arranged in the ground to be used as presettling the heavy slatch before going to the river, but not completed jet.

3.13. 2 Toggle dryers are in Factory No.1. The Factory No. 2 and 3 has to send all the leathers for toggling to Factory No. 1. The handling of the leathers is,piling up before the toggling and little care is being taken, especially after the leathers arrive from the vacuum drying, in very wet condition.

B. Factory No. 4

3.1.1. Fleshing Machines

Only 2 Fleshing Machines are available for fleshing 4500 Sheepskins per day. The skins are still full of flesh and also the trimming needs improvement. Some skins are only half and some not fleshed at all.
As there is no spare machine, these 2 machines can not be overhauled or maintained properly.

3.1.2. Scales and Balances

All are out of order, also Chemicals are taken approximately. Peltweight is calculated by average weight, without weighing.

Checking up the peltweight on a Laboratory balance:

5 Skins Peltweight 17.750 kg, avg. 3.55 kg

If the skins are larger, the weight which is calculated only will be increased a bit more.

3.1.3. Storing of pickled skins

Inside the tannery, between the machines and near the drums the pickled skins are stored in bags or loose, ready for Selection. As 4500 skins are processed dayly and only approximately 3000 selected, a huge quantity is piled up.

Problems are more during the summer month when the temperature is going above 40°C. The tannery is not a suitable storing place. Also the machines and equipment is suffering under the strong acid fumes, rust is plenty and nearly no maintenance.

3.1.4. Leather Production

A very small leather production is possible only as the tannery is blocked with pickled skins.
All the required machines are available but the quality for export of Nappa Garment or crusted leathers is not jet developed.

3.1.5. Quality of Raw Skins

The Sheepskins from the Damascus Slaughterhouse have many holes/ butcher cuts, as the skinning is done by knife.
This damages are reducing the quality and the selection will be much lower.

3.1.6. Effluent Treatment Plant

With the tannery, the Effluent Treatment Plant has been constructed. (see Annex 4)
Since approximately 12 month, this plant is not operating and the effluent is flowing directly into the river. The 2 Effluent Experts from Jugoslawia visited the plant and will issue the "Terms of Reference".

3.1.7. Process and quality control/Maintenance implementation/Developmen

The Foremen in the sections need Experts Advise and 1 person is needed to carry out additional control in connection with the laboratory and planning development work in the Experimental Section of the Laboratory. The Laboratory is not much used.

3.1.8. Selection of pickled skins for export

Contracts are available for mixed quality skins
in the selection grade No. 1.2.3.4.
and in selection grade No. 5.6.
separate are the rejections: grade 7.

The size of 1 pickled skin: avg. 6.5 - 7 sqf

The grading appeared to be according to the European standard.

See also Annex 7, selection plan with approximately details for the grading.

3.1.9. Degreasing of pickled skins for further processing

is being done in cold water without much effect. The shoe factories complain about many spots of natural fat in the lining leathers.

II -B. F I N D I N G S (Aleppo)

1. The Leather Factory at Aleppo has been build by an Italian Company during the years 1976 - 1978. The tannery for hides and skins with a large raw hide/skin store is in 2 large buildings.

1.1. Raw Hide Store: A large hall with low roof has been constructed. Inside this hall 1 cool storage of 1200 m^2 is keeping at 3 - 8°C the raw material for long time storing. During this visit the cooling broke down and all the raw hide/skins had to be removed.

Only wetsalted Raw Hides/ Skins are in store.

1.2. Leather Production from Hides and Skins: (A.Shoe upper from cattle/Goat
(B.Printed army shoe uppers/cat
(C.Lining from goat /sheep

Production Figures from 1988:

32 075	cattle hides,	865 268 sqf. Leather,	avg. 27 sqf. per 1 hide
68 174	sheep/goat skins to finished leather	327 235 sqf. Leather,	avg.4.9 sqf. per 1 skin
350 154	sheep/goat pickled only	2 801 232 sqf. pickled,	avg. 8 sqf. per 1 skin

1.3. Production Capacity/per Day

6 tons cattle hides
8 tons goat/sheep skins.

The present production: 200 cow hides per day
2000 sheep/goat skins per day

approximately 66% of the production capacity

1.4. Machinery and Equipment:

In general, the equipment is in fairly good condition, with some exceptions. (see machine and equipment list, Annex 6)

1. Scales and Balances, spares are urgent required
2. Shortage of toggles for cowhides
3. Spare parts for fleshing machines
4. Chemical mixing tanks, spares are needed
5. Drying tunnel, spares are needed
6. All machines and equipment are "Made in Italy"

Weight for hides and skins can be taken only on 1 small balance of up to 50 kg, weighing only a few pieces and taking the average. The important weights, peltweight and shaving weight, on which many chemicals are calculated,are not correct. Also the weighing of chemicals is different and no standard production is possible.

1.5. Effluent treatment Plant

With the tannery, the Effluent treatment plant has been constructed. (see Annex 4)

This plant has never been in operation from the beginning. At present, all the Effluent is flowing direct into the river, approximately 500 meters away from the tannery.

All available informations have been sent to UNIDO,required by the 2 Effluent Experts from Jugoslawia.

1.6. Laboratory and Experimental Room

For physical tests:

1 Flexometer Apparat (4 clips)
1 Tensile strength/elongation Apparat
1 Penetrometer Apparat
1 Tensometer Apparat
are available.

All Analytical tests can be carried out.

1.7. Present Leather Production

Cattle Hides:
1. Embossed Leather, 100% black colour
2. Box sides, black and brown colour, shoe uppe
3. Splits for lining
4. Splits, finished black, embossed

Goat Skins:
1. Finished shoe upper Leather, black colour
2. Finished lining leathers, black, brown
3. pickled for export

Sheep Skins:
1. Nappa Garment leather, black colour
2. Lining leather, finished, black, brown
3. Pickled for export

2. Main Problems:

2.1. Shortage of workers
The shortage of workers to carry out all the production operations properly have been mentioned.

2.2. The leather quality is suffering and the measurement yield is below normal, in the cattle hide production.

- damage on the splitting machine result heavy trimming, too much waste.
- the setting out on the vacuum dryer is insufficient, the wrinkles are still remaining, the leathers are removed too wet after vacuum drying. The grain pre-drying setting effect is not achieved.
- the sam-setting out before vacuumdrying is done at very low pressure without any affect.
- after tunnel drying the leathers are toggled without staking, some very dry, some little wet or too wet.
- finally the measurement is below normal

2.3. The raw hides and skins are going into the production without sizing.

- small size cattle hides of approximately 16 sqf. are produced to Army leather of 2.2 - 2.4 mm, which is impossible as the substance is 60% only 1-1,2
- the large and heavy hides are used for box side leathe of 1.6 - 1.8 mm.

2.4. Sheep and Goatskins go without Greenfleshing by hand or machine, after the soaking process, for lime painting.

- skins are full of fat and some meat, especially on the neck part
- the lime paint can not penetrate at this places and the result is that the hair/wool is not getting loose. During the dewooling process, still 40 - 50% of wool and hair can not be removed.
- to destroy these left wool and hair, 2.5% Sodiumsulphide are being used in the liming process.
- the lime painting machine has very hard brushes and many spots on the skin are not getting any paint.

2.5. The factories process details

are mentioned in Annex 10, "Findings" B. Aleppo

2.6. Maintenance

There are plans for regular maintenance and Priority repairs, but there is no control regarding implementation of these plans, otherwise the very much needed platform scales and chemical balances would not be out of order.

2.7. Goatskins process for shoe upper leather/lining leather

The leather has a very harsch and hard grain, like Sandpaper. Also the grain is cracking very easy which is confirmed by the Laboratory tests "Tensile Strength"

The Technology for Bating and Retanning needs changes which are mentioned under Recommendations.

2.8. Process and Quality Control /Maintenance implementation/Developm.

The Foreman in the Sections need Experts Advise and 1 person is needed to carry out additional control in connection with the Laboratory and planning Development work in the Experimental Section of the Laboratory.

At present, the Laboratory is not so much used. The physical testing machines have not been used for a long time.

III Aktivities

A. Damascus
B. Aleppo

A. Damascus:

1. Several visits to UNDP
2. 6 visits to the General Establishment for Chemical Ind. Technical Director Mr. Walid Sukker (Counterpart)
3. 1 visit to the Director of 4 Shoefactories Dipl. Engineer Nabil Aoun
4. Visit to Shoefactories at Swaidaa and Habeck
5. 5 visits to the Industry Testing Research Centre (ITRC) Damascus
6. Several visits to the Leatherfactories No. 1.2.3.4. at Damascus, Production Director Mm. Sabah Youssef Quality control: Mr. Imad Barazi
7. Director for the Leather Industry, Mr. Hussain Kiwan
8. Sending Leathers and chrome waste liquors to ITRC
9. Effluent Problems discussed with Dir. Sukker, Dir.Kiwan and 2 Jugoslawia Effluent Experts, visit to 4 tanneries
10. No Scale working at tannery No. 4, Priority for maintenance
11. Checking Peltweight of skins
12. " Fleshing of skins + trimming
13. " Selection of pickled skins 1.2.3.4.5.6.7.
14. Further processing of pickled skins, weight + 30%
15. Checking up chrome tanning of Nappa Sheepskins
16. Discussion of finishing for Nappa Garment
17. Give Instructions for Trials: Skins:
    Degreasing + fleshing or scudding sheepskins(35-37°C)
    Chrometanning + Chromeretanning + Fatliquor
    Crust leathers for export, from selection 1.2.3.4.
    Nappa Garment ex pickle
    Tensile strength-Elongation test at tannery No. 4

    Hides:
    Greenfleshing of drysalted cattle hides (Saudi Arabia)
    Chrome tanning + Rechroming + Fatliquor for max.absorbtion of the chrombath
    Sam-setting/vacuum drying/Hang drying/condition/ stake toggle and dry at low temp. Stop the wet toggling which result very hard leather.
    Embossing of finished leather after the Top coat and not after the base coat
    Basification with Soda Ash, pH control during operation, pH 5. To use Sodiumbicarbonate instead as more safe.
18. Prepare Programm/Discussion paper with Dir. Sukker
19. Prepare Intermediate Report
20. Arrange typing of Final report
21. Meeting with Technical staff from tannery No.1.2.3.4. Discuss Shoe factories problems, process and quality control, Maintenance and repairs of machinery and equipment
22. Separate lime section from chrometanning section by wall at tannery No. 1

Aktivities: A. Damascus

23. Effluent plan and photos from the Aleppo leather factory to UNIDO and UNDP

24. drafting final report before giving for typing, checking and correcting the typing

25. Problems with shortage of Workers

26. Discussing the huge piles of pickled skins in tannery No.4. 4500 skins are processed dayly and only approx. 3000 selected.

27. To employ more selectors and pack up the skins in bags for better storing

28. Starting trials wi. small and large Goatskins, especially the bating process, to produce leather with soft grain.

29. The ITRC needs 4-5 weeks for testing(physical and analytical) and the report is only available if the payment has been received.
In future:to plan the tests to be carried out at the Laboratory in factory No. 4 with some additional persons and equipment, to get test results in a few days or immediately.

30. Discussing the production in the tanneries. Each tannery has the machines to produce leather from Soaking to finishing. Only 1 toggle dryer would be required for factory No. 3., which is far away from Factory No. 1.

31. Discussing the future plan for a large tannery next to Factory No. 4, to get all the 3 old tanneries under 1 roof.

32. Sending water for testing from Aleppo tannery and factory No4 for Analysis.

33. Getting Production Capacity and production details from the years 1987 and 1988 for Leather Factories No. 1.2.3. in Damascus.

34. Meeting the Director of the 4 Leather Factories in Damascus reg. problems, the progress in Factory No. 1 and 2, which is delayed as there is shortage of workers. Same problems have the maintenenace engineers. Factory No. 3 is doing well.

35. Giving Priorities to Factory No. 1 and 2 regarding:
Sammying before shaving, full drying, conditioning, staking, toggling, overhauling of scales and balances, cleaning out the Factory No. 2.

36. Preparing for training seminar on the 26/27/28.Juni 1989 at the Meeting Room at Leather Factory No. 4

37. Meeting the UNDP Representative and Programme Officer

38. Meeting the counterpart, the Dir. Mr. Sukker

39. Meeting the General Director for the Leather Industry

Aktivities:

B. Aleppo:

1. Discussion of Shoefactories problems
2. Shortage of spares, repairs, overhauling
3. All scales are not operating
4. Peltweight- Shaving weight, taken by avg. of 5-10 pieces, weighing on a very small scale
5. Check up the Laboratory equipment, overhauling, repairing, cleaning up the whole place
6. Splitting ex chrome at high speed, to much damage
7. After shaving, trimming very heavy, should be reduced by 50% easily
8. Goatskins, large and small to be separated, bating process insufficient. Skins have very hard grain
9. Stone wheel polishing of Goatskins before finishing
10. Change of retanning-Fatliquor for Goatskins
11. Effluent report to UNIDO/UNDP by telex, blueprint by post
12. Skins are very dry, to change the Fatliquoring
13. Peltweight of skins: 10 skins 40 kg, avg. 4.0Kg
14. Shaving weight, 5 sides, 2.2-2.4 mm, 1 side avg. 4.3 kg
15. Fleshing of skins insufficient, trimming to improve
16. Retanning of shoe uppers, pH 4.0, water clear
17. Sammying-setting out insufficient, hides very wet
18. Vacuum drying: insufficient, leathers still very wet trial with 6 sides with proper vacuum drying
19. After tunnel drying, leathers nearly fully dry, go for toggling immediately without staking or conditioning. Leathers are to dry for toggling. Trial with some sides: proper vacuum drying, full drying in tunnel, conditioning on water spraying machine, pile over night, stake, toggle.
20. Degreasing sheepskins + 2/3 of the skin fleshing or scudding to remove natural fat from the neck part.
21. Chrome tanning with less chrome + Chromeretanning + fat liquor for max. exhaustion of the chrome, for cattle, sheep and goatskins.
22. Physical tests of all the leathers produced, tensile/ elongation and flexometer.
23. Planning 3 day training seminar, on the 10,11,12.June
24. Explaining Fatliquor combination with calculating the pure fat content of the products, surface and penetrating fatliquors
25. Transport from Sammying to splitting, shaving to Shaving weight, sam-setting to vacuum and for hang drying on platform transport approx. 60-70 cm high, to avoid drying out.
26. Conditioning, if properly carried out, the staking operations can be reduced from 4 to 2. 1 x before toggling and 1 x after finishing.
27. Check up of pickle selection of Sheepskins. Advise to take the skins between 1 and 2 or 2 and 3 to the better grading, as the present selection is very strictly carried out. Preparing a separate selection plan for the Syrian Standard specifications.
28. Discussion regarding retanning of embossed -Leathers, to avoid bundles in the drum

28. Planning to take a water sample to the ITRC Damascus for Analysis on the 14.6.89

29. Recommendations for Dyeing-Prefatliquoring-Retanning at low temp., ap lication of fatliquors in 3-4 operations. Planning trials to avoid the grain cracking of the Goat leather.

30. Painting of sheep and goatskins by machine: Checking on the operation in the evening: Paint 35°Bé, Skins full of meet and fat, uneven painting on the old Painting Machine. Wool and Hair on the neckparts are still remaining. Suggesting a paint of 25-26°Bé, application by hand, also a Handfleshing before painting. Details have been discussed.

31. Discussing Blue print of Effluent Plant and flow chart up to the river, taking 2 Photos.

32. Discussing the Tannery Machinery and Equipment which needs repair, overhauling, spares and maintenance. Priority: Scales and Sam-setting machine before the vacuum dryer.

33. Check up tests at Laboratory: Flexometer/Tensile leather conditioning, test operation, Trial with cattle hides in Chrometanning with less chrome and waste liquor Analyses.

34. Discussion Trial for refatliquoring of Nappa Sheep Garment leather which is very dry., milling and dry shaving operation.

35. Checking the finishing operations and the finishing products.

36. Trial at Splitting machine at low speed to avoid damage.

37. Trials at the sam-setting out machine with more pressure and vacuum drying with heavy slicker setting out in 13/4 min.

38. Shortage of toggles for cow hides for proper toggling. Some frames may be kept empty but toggling should be done proper with the mentioned distance from toggle to toggle.

39. Suggesting trial for Sheep Nappa Garment at the Laboratory

40. Suggesting trial for Goatskins bating at the Laboratory with + the new Chromtanning and Rechroming

41. Collecting the production figures from 1988

42. Preparing Selection instructions for pickled skins and finished leathers

43. Giving working instructions for Fur skins
44. " " " for semi anilin and anilin finishing

45. Process and Quality control: suggesting that this job should be carried out by the Foreman from the finishing section, in connection with the Laboratory. He is the only person suitable for this job.

46. Sizing of cattle, Goat and Sheepskins at the Raw Hide/Skin store, in 2 sizes.

UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO

JOB DESCRIPTION

DP|SYR|86|009|11-10

Post title Expert for Quality Control in Tanneries

Duration Two months (1988)

Date required As soon as possible

Duty station Damascus and Aleppo

Purpose of project The project is aiming at assisting the Government to improve the performance of industry at the sectoral level and bring about the optimal utilization of existing capacities. Furthermore the project is aiming to support the country's economic development plan that stresses the need for self-reliance, utilization of national resources and promote exports in order to increase foreign exchange earnings.

Duties The expert will be assigned to the General Establishment for Chemical Industries, GECHI, and delegated to the various production facilities in Damascus and Aleppo in order to make an assessment of the situation in the production facilities in general and the shortcomings in hardware, operational routines and manpower in particular. The expert will work in close co-operation with the appropriate local specialists and his activities related to process and quality control will be performed in close co-operation with the respective national focal point, namely the Industrial Testing & Research Centre (ITRC).

Specifically the expert duties will be as follows:

- Review the present status of the tanneries in Damascus and Aleppo in terms of production technology, productivity and process and quality control.

..../..

- Suggest optimum methods to improve the quality of leathers produced and ensure consistency of the quality level attained.

- Prepare a work plant for the implementation of a quality improvement programme in the tanneries, including infrastructural requirements, equipment with cost estimate, manpower and training needs.

- Train local personnel working at the industrial units in carrying out process and quality control analyses and tests.

The expert will also be expected to prepare a technical report setting out findings of the mission and recommendations to the Government on further action which might be taken.

QUALIFICATIONS: Qualifed leather/tannings technologist with long-standing experience in relation to technical servicing. Experience in quality control/ improvement of products from tanneries.

LANGUAGE: English, knowledge of Arabic an advantage

BACKGROUND INFORMATION: In general, all the thirteen companies (specialized in 10 sub-sectors) managed by the General Establishment for Chemical Industries, suffer from low capacity utilization (reaching in certain cases to 33% of nominal production capacity), high losses (feedstock wastes), high energy consumpiton and low quality products. The only sector which enjoys a good status and which accounts for the overall good performance on this establishment has beenpetroleum fining. Technical problems in most of the other sub-sectors have been noted, and in many cases these problems have beeninherited from inefficeint contracts for the procurement/commisioning of the relevant plants. To improve the situation, a comprehense technical assistance programme, is needed in terms of encompassing such activities as trouble-shooting in specific production lines, propagating improved technologies for processing, by product utilization, pollution and quality control.

Ministry of Industry
Syrian Standard specifications
for the leather Industry

General Properties of shoe.upper Leathers
S.N.S.No.323/1983

1. Scope:

This standard specification covers the leathers used in manufacturing shoe upper leathers.

2. Definition:

Upper Leathers:They are the leathers manufactured mainly of cow hides and used in shoemaking , particularly the upper part of a shoe. It is also possible to manufacture them of sheep or goat skins.

3. Classification:

3/1.The upper cow leathers are classified as follows according to their shape.

3/1/1. Complete leathers

3/1/2. Half leathers : They are split in line with the back bone line.

3/1/3. Fore head leathers

3/1/4. Bellies leathers (side leathers)

3/2. The upper leathers are classified as follows according to the process of their tanning.

3/2/1. Leathers tanned with chrome salts and with synthetic tannings.

3/2/2. Leathers tanned with chrome salts , vegetable and with synthetic tanning.

3/2/3. Leathers tanned vegetably with chrome salts.

3/3. The upper leathers are classified as follows according to the process of their coloration:

3/3/1. Barred pigment leathers with surface coloration.

3/3/2. Leathers of surface coloration.

3/4. The upper leathers are classified as follows according to the process of their

3/4/1. Leathers of full grain.

3/4/2. Leathers of corrected grain.

3/4/3. Leathers processed on the flesh side (suede leathers).

3/4/4. Splite leathers (cow leathers containing no grain layer and resulting from horizontal cutting of cow leathers into two layers).

3/5. The upper leathers are classied as follows according to the form of finishing.

3/5/1. Smooth leathers finishing of which is offected with aniline or with half aniline or with pigments.

3/5/2. printed leathers finished with pigments only.

R e m a r k s :

Smooth leathers comprise the leathers of corrected grain and the fully grain less leathers in which the grain has been replaced by synthetic upper upper side made of various resins and pigments.

3/6/. The upper leathers are classified according to their area into the sets listed in the following table:(Dcm^2 Area):

Set Name	complete Cow Leathers	Fore Head and side cow L e a t h e r s
Leathers of narrow Area	up till 2oo inclusve	up till 1oo inclusive
Leathers of mediums Area	Bigger than 2oo and up till 26o inclusive	Bigger than 100
Leathers of Large Area	Bigger than 26o	

R e m a r k s :

Width of the normal side leathers should not be less than 16omm.

3/7.Width of side leathers is identified by the straight line (SD) crossing the regular point (K) which is considered the point of measuring the side thickness , and the perpendicular line to (GW) (Figure No. (5)). Where the line (GW) is the line which splits the side from the back.

3/8. The upper leathers are classified according to their thickness into the following kinds:

3/8/1. Thin leather

3/8/2. Medium leather

3/8/3. Thick leather

R e m a r k s :

A) A tolerance in thckness of not more than ± 10% of the contracted th thickness is permissible.

B) Thicknesses are determined according to the regular points listed in table No. 2 .

Kind	Thickness/mm from point (K)
Thin leathers	up till 1.5 inclusive
Medium leathers	Bigger than 1.5 up till 2.1 inclusive
Thick leathers	Bigger than 2.1 up till 3

Table No. 3

The regular point (K) for measuring thickness is the point lying on the right half of the complete leather or the half leather on the point of crossing of the straight line (Lm) parallel to the back bone line , 2oo mm away from it , with the straight line (NS) perpendicular to the back line which loes 25o mm away from the straight line tagent at the rear of the leather. (see figure 1)

As regards the side , the regular point (K) lies on the straight line (SD) perpendicular to the line (GW) 3o mm away from it.
(see figure No. 5)

As regards the fore head , the regular point (k) lies on the point of crossing of the straight line (LM) parallel to the back bone line 1oo mm away from it; with the straight line (NS) perpendicular to the back 2oo mm away from the straight line (AB) which separates the fore head from the back and connects the waists of the front legs.
(see figure No. 4)

4. Requisite conditions of shoe upper Leathers:

4/1. upper leathers should be fully tanned and well-trimmed.

4/2. They should maintain the basic leather shape.

4/3. They should be of a consistent thickness.

4/4. They should be of a wet touch and adhesionless.

4/5. Their lower side should be pure of flesh trace , scaling traces or abrasive traces.

4/6. Shoe upper leathers should be flexible, plump when touched and consistent.

4/7. Sandal upper leathers should be flexible, and not hard.

4/8. Abrasive traces should appear on the leathers or corrected grain. Leathers should be smooth and consistent and should have no cracks when folded in four layers.

4/9. Upper leather should be consistent in colour, spotless and resistant to wet and dry friction.

4/10. Leather should tolerate 30,000 flexions under flexing test (flexometer) without being effected.

5. Sampling and preparation for testing

This sampling process is applicable to the light and heavy skins and to all kinds of tanned leathers.

A sample is to be taken randomly from a batch of production representing it as far correctly as possible.

One sample consists of several complete or half leathers within about 1% of the production batch, conforming to the visual inspection conditions provided that this number shall not be less than 3 and not more than 10 samples. Half of a sample is not to be sent to the inspecting party and the other half shall be kept for reinspection if necessary.

5/1. Sampling for chemical analysis:

5/1/1. Complete leathers, half leathers and back leathers: Samples for technical analysis are taken from complete leathers, half leathers and back leathers from the square adjacent to the line (HW) in the direction of the tail starting from the point (H) and at a length which is equal to half length which is equal to half length of the line (HW), Figures 5 and 6.

5/1/2. Shoulder leathers: the square piece of a leather is to be so taken as to be adjacent to the line (AB) in the direction of the head starting from the point (A) and at a length which is equal to half length of the line (AB), Figure 8.

5/1/3. Bellies leathers: two square pieces of a length of about 10 cm are taken along the edge (TY) right and left hand from the centre point (X) in a direction immediately adjacent to the sample taken for the physical trials, Figure 9.

5/2. Sampling for physical tests:

5/2/1. Complete leathers, half leathers and back leathers: A sample is to be taken for physical tests from the square (HWZN)). Another sample is also to be taken from the sique quite opposit to the half leather, Figures 6 and 7.

5/2/2. A sample is to be taken for physical tests from the rectangle (ARGD), Figure 8.

5/2/3. Bellies leather: Samples are to be taken from the bellies leathers 20 mm away from the line (TY) in such a way as the sample contains the column set up from the central point (XX) on the line (TY), Figure 9.

5/3. Conditioning

Samples shall be placed in a conditioning chamber of which the temperature is 20± 2 ° Centigrade with a relative humidity of 65 ± 5 % for 48 hours before conducting the physical tests.

6. General properties of upper leathers:

6/1. Physical and mechanical properties:

No.	Test	Minimum	Maximum	Analysis Method
1	Tensils strength	200 kg/cm^2	-	I.U.P./6
2	% Elongation till cutting	30,000 times	60%	I.U.P./6
3	(Fluxometer)			I.U.P./20
4	Tearing strength	40 kg/cm	-	I.U.P./8

6/2.

No.	Tests	Minimum	Maximum	Analysis Method
1	Moisture	-	18%	I.U.C./5
2	Chrome oxide	2.5	4%	I.U.C./8
3	Fatty materials	3%	8%	I.U.C./4
4	Ash chrome oxide	-	2%	I.U.C./11
5	pH acidity	3.5	-	
6	difference in acidity	-	0.7%	I.U.C./11

MINISTRY OF INDUSTRY
SYRIAN STANDARD SPECIFICATIONS
FOR THE LEATHER INDUSTRY

GENERAL SPECIFICATION OF CLOTHING LEATHER SNS 322/1983

1- Scope:

This standard specification covers the leather used in manufacturing leather clothing and hats.

2- Definition:

Clothing leatherss are the soft chrome-tanned sheep or goat leather which can be sewn to the leather clothes or hats .

3- Classification:

3/1. Leathers are classified as follows according to their areas:
3/1/1. Clothing leathers:
3/1/1/1. Leather of a narrow area of(50) up to (70)dcm 2 inclusive
3/1/1/2. Leather of a mediuw area of more than (70) up to (100) dcm 2 inclusive .
3/1/1/3. Leather of a large area of more than (100) dcm 2.
3/1/2.Hat Leathers :
3/1/2/1. Leather of a narrow area of (20) up to (40) dcm 2 inclusive.
3/1/2/2.Leather of a medium area of more than(40) up to (60)dcm 2 inclusive.
3/1/2/3. Leathers of a large area of more than (60) up to (80) dcm 2 inclusive.

1/2. Leather are classified as follows accoeding to their thickness:
1/2/1.Thin leather of (0.6)mm up to(1.2)mm inclusive
The difference in thickness of leathers between the fore head and the back in one and the same leather should not exceed (10)% .Defects caused by the skinning operation are disregarded.

3/3.Clothing leathersaare classified as follows according to their colour:
3/3/1. Black leathers.
3/3/2. Brown leathers.
3/3/3. Leathers of other coloure.
The colour of the leather should be consistent in all its area, spottess, fixed for hot roming up to (80) C, and resistant to wet and dry friction.

3/4. Leathersàare classified as follows according to the manufacturing process :

3/4/1. Velvet clothing leathers.

3/4/2. Clothihg leathers ( ) divided according to the finishing prosess into :

3/4/2/1. Anilinic Finishing.

3/4/2/2. Semi Anilinic Finishing.

3/4/2/3. Pigmentic finishing.

4-Requisit Properities of clothing leathers:

4/1. Clothing leathers should be completely tahned, well- trimmed and maintaining the normal shape of a leather.

4/2. They should be plump when touched , soft , of suficient flexibility and unstretchable.

4/3. They should be free of natural fats and fatty spots .

4/4. They should be clean of any showing traces.

4/5. They should be smooth and of no glazing or pulling lives.

4/6. They should be free of any wrinkling cr ccacking .

4/7. They should be consistent in thickness with no emptying or loss grain.

5-Sampling and preparation for testing :

This seppling process is applicable to all kinds of light and tanned skins. A sample is to be taken random by from a batch of production or from a consiegnment representing it correctly.

Onr sample consists of several complete leathers not exceeding (1)% of the production batch or consignment conforming to the visual inspection conditions provided that samples shall not be less than (3) and not more than(10) samples. Half of the samples is to be sent to the inspecting party and the other half of it is to be kept for reinspection if necessary.

5/1. Sampling for chemical analysis :

Samples for chemical analysis are taken from complete leathers, half leathers , and back leathers from the square adjacent to the live(HW) in the dárection of the tail statrting from the point /H/ and at a lrngth which is equal to half length of the live /HW/ figure.NO.(1) and(2).

Sampling for physical analysis :

5/2/1.Sampling of the complete leathers, half leathers for physical analysis is effected from the square (HWZN) it is also possible to take a sample from exactly the opposit side of the half of the other leather ;figure NO.: (1) and (2).

B. Conditioning :

Samples are placed in a conditioning chamber of which teppreature is (20 ± 2) C and relative humidity is (65 ± 5) % for 48 hpurs before conducting the physical tests .

6-General Prpperties of clothing leathers :

6/1. Physical Properties :

NO.	TEST	MINIMUM	MAXIMUM	ANALYSIS METHOD
1	Tensile strength Kgkm2	150	-	I.U.P.6
2	A.Leather Elongation Kg /cm2	30 %	45 %	I.U.P./6
	B- % Elongation Till cutting	-	45 %	—
3	Tearing Resistance,kg/cm	15	-	I.U.P./8
4	Tearing resistance with needle,Kg/cm	60	-	I.U.P./8
5	Flexometer	30000 Bendings	-	I.U.P/20

6/2. Chemical Properties :

1	Moisture	-	18 %	I.U.C/5
2	Chrome Oxide	4 %	-	I.U.C./ 8
3	Fatty materials	4 %	10%	I.U.C./4
4	Ash-Chrome Oxide	-	2 %	I.U.C./8
5	PH Acidity	3.5	-	I.U.C.11
6	Differnce in Acidity	-	0.7	I.U.C/11

MINISTRY OF INDUSTRY
SYRIAN STANDARD SPECIFICATIONS
FOR THE LEATHER INDUSTRY

GENERAL SPECIFICATION OF CLOTHING LEATHER
SNS 322/1983

1- Scope:

This standard specification covers the leather used in manufacturing leather clothing and hats.

2- Definition:

Clothing leatherss are the soft chrome-tanned sheep or goat leather which can be sewn to the leather clothes or hats .

3- Classification:

3/1. Leathers are classified as follows according to their areas:
3/1/1. Clothing leathers:
3/1/1/1. Leather of a narrow area of(50) up to (70)dcm 2 inclusive
3/1/1/2. Leather of a mediuw area of more than (70) up to (100) dcm 2 inclusive .
3/1/1/3. Leather of a large area of more than (100) dcm 2.
3/1/2.Hat Leathers :
3/1/2/1. Leather of a narrow area of (20) up to (40) dcm 2 inclusive.
3/1/2/2.Leather of a medium area of more than(40) up to (60)dcm 2 inclusive.
3/1/2/3. Leathers of a large area of more than (60) up to (80) dcm 2 inclusive.

1/2. Leather are classified as follows accoeding to their thickness:
1/2/1.Thin leather of (0.6)mm up to(1.2)mm inclusive
The difference in thickness of leathers between the fore head and the back in one and the same leather should not exceed (10)% .Defects caused by the skinning operation are disregarded.

3/3.Clothing leathersaare classified as follows according to their colour:
3/3/1. Black leathers.
3/3/2. Brown leathers.
3/3/3. Leathers of other colours.
The colour of the leather should be consistent in all its area, spottess, fixed for hot roming up to (80) C, and resistant to wet and dry friction.

3/4. Leathersàare classified as follows according to the manufacturing process :

3/4/1. Velvet clothing leathers.

3/4/2. Clothing leathers ( ) divided according to the finishing process into :

3/4/2/1. Anilinic Finishing.

3/4/2/2. Semi Anilinic Finishing.

3/4/2/3. Pigmentic finishing.

4-Requisit Properities of clothing leathers:

4/1. Clothing leathers should be completely tanned, well- trimmed and maintaining the normal shape of a leather.

4/2. They should be plump when touched , soft , of suficient flexibility and unstretchable.

4/3. They should be free of natural fats and fatty spots .

4/4. They should be clean of any showing traces.

4/5. They should be smooth and of no glazing or pulling lives.

4/6. They should be free of any wrinkling or ccacking .

4/7. They should be consistent in thickness with no emptying or loss grain.

5-Sampling and preparation for testing :

This sappling process is applicable to all kinds of light and tanned skins. A sample is to be taken random by from a batch of production or from a consiegnment representing it correctly.

Our sample consists of several complete leathers not exceeding (1)% of the production batch or consignment conforming to the visual inspection conditions provided that samples shall not be less than (3) and not more than(10) samples.Half of the samples is to be sent to the inspecting party and the other half of it is to be kept for reinspection if necessary.

5/1. Sampling for chemical analysis :

Samples for chemical analysis are taken from complete leathers, half leathers , and back leathers from the square adjacent to the live(HW) in the dirrection of the tail statrting from the point /H/ and at a lrngth which is equal to half length of the live /HW/ figure.NO.(1) and(2).

Sampling for physical analysis :

5/2/1.Sampling of the complete leathers, half leathers for physical analysis is effected from the square (HWZN) it is also possible to take a sample from exactly the opposit side of the half of the other leather ;figure NO.: (1) and (2).

B. Conditioning :

Samples are placed in a conditioning chamber of which temperature is (20 ± 2) C and relative humidity is (65 ± 5) % for 48 hours before conducting the physical tests .

6-General Properties of clothing leathers :

6/1. Physical Properties :

NO.	TEST	MINIMUM	MAXIMUM	ANALYSIS METHOD
1	Tensile strength Kgkm2	150	-	I.U.P.6
2	A.Leather Elongation Kg /cm2	30 %	45 %	I.U.P./6
	B- % Elongation Till cutting	-	45 %	—
3	Tearing Resistance,kg/cm	15	-	I.U.P./8
4	Tearing resistance with needle,Kg/cm	60	-	I.U.P./8
5	Flexometer	30000 Bendings	-	I.U.P/20

6/2. Chemical Properties :

1	Moisture	-	18 %	I.U.C/5
2	Chrome Oxide	4 %	-	I.U.C./ 8
3	Fatty materials	4 %	10%	I.U.C./4
4	Ash-Chrome Oxide	-	2 %	I.U.C./8
5	PH Acidity	3.5	-	I.U.C.11
6	Differnce in Acidity	-	0.7	I.U.C/11

Ministry of Industry
Syrian standard specifications
for the leather Industry

General Properties of Insole and Sole Leather

S N S : 324 / 1985

1- Scope:

This Specification applies to the sole and insole leather (unregenerated) used in processing of the lower parts of shoes and made of cow hides.

2- Definition:

2/1. Complete Leather = They are the animal tanned leather the shanks, tail and head of which have undergone cutting.

2/2. Half Leather = They are the compete Leathers which have been cut in line with the back bone line.

2/3.* Back Leather = They are the complete Leathers of which the shoulders and bellies have been splitted.

2/4.** Half back Leathers = They are the half back leather which have been cut in line with the back bone line.

---

* The back Leather is that part of leather defined in rectangle (ABGD) of the figure No. (1).

**The half back leather is that part of leather defined in rectangle (ADY' X') of the figure No. (1) .

3- Classification:

3/1.The lower leather of shoes are classified as follows according to their shapes.

3/1/1. Complete Leather.

3/1/2. Sides.

3/1/3. Back Leathers.

3/1/4. Half Back Leathers.

3/2. The lower leathers of shoes are classified as follows according to their process of tanning;

3/2/1. Vegetable tanned leathers with synthetic tanning.

3/2/2. Vegetable and minerally tanned leathers with tanning chrome salts.

3/3. The lower Leathers of shoes are classified as follows according to their thickness inpoint (T) and point (K) defined in the figure No.(1).

Kind	Thickness in point (K) mm	Thickness in point (G)mm Minimum
Back - used in sole Leathers	Exceeding 4.5	4
Inside Lining- used in Insole Leathers and in Fillers	Exceeding 2.1	1.8

4. Requisite Condition of sole Leathers=

4/1. They should be consistent in colour.
4/2. They should keep the original well- trimmed leather as far as possible.
4/3. They should be plump in all parts and uncrakable during bending.
4/4. The flesh side should be clean of any flesh remains (from this side the trace of the blood vessels and arteies should be visible) .
4/5. Their thickness should correspond with the thickness described in contract so that its average does not exceed ($\pm$ 10)% .
4/6. They should be in conformity with the physical and chemical specifications and with any other remarks listed in the subseqent table of item (6).

5. Sampling and preparation for testing:

This sampling process is applicable to the light and heavy skins and to all kinds of tanned leathers.
A Sample is to be taken randomly from a bath of production representing it as far correctly as possible.One sample consists of several complete or half leathers within about (1)% of the production batgh conforming to the visual inspection conditions provided that this number shall not be less than (3) and not more than (10) samples. Half of a sample is to be sent to the inspecting party and the other half shall be kept for reinspection if necessary.

5/1. Sampling for chemical Analyses.

5/1/1. Complete leathers , half leathers and back leathers:
Samples for chemical analyses are taken from compete leathers , half leathers and back leathers from the square adjacent to the line (HW) in the direction of the tail starting from the point (H) and at a length which is equal to half length of the line (HW) , figure No.(2) and (3).

5/1/2. Shoulder Leathers:
The square piece of a leather is to be so taken as to be adjacent to the line (AB) in the direction of the head starting from the point (A) and at a length which is equal to half length of the line (AB) Figure No. (4).

5/1/3. Bellies Leathers:

Two square pieces of a length of about(1o) Cm are taken along the edge (TY) right and left hand from the centre point (X) in a direction immediatly adjacent to the sample taken for the physical trials.Figure No. (5).

5/2. Sampling for physical tests

5/2/1. Complete leathers , half leathers and back leathers:

A Sampe is to be taken for physical tests from the square (HWZN). Another sample is also to be taken from the side quite opposite to the half leather. Figure No.(2) and (3).

5/2/2. Shoulder Leathers:

A sample is to be taken for physical tests from the rectangle (ABGD) , Figure No.(4).

5/2/3. Bellies Leathers:

Sampling shall be made of the bellies leathers (2o) mm away from the line (TY) in such a way as the sample contains the column set up from the central point (X) on the line (TY) as illu trated in the figure No. (5) .

5/3. Conditioning:

Samples shall be placed in a conditioning chamber of which temprature is (2o ± 2) ° C and relative humidity is (65 ± 5) % for 48 hours before conduting the physical tests.

6. General Properties

6/1. The Physical and mechnical properties:

No.	Test	Sole Leather	Insole Leather	Analysis Method
1	Water Absorption for (2) hours	4o% Minimum	25% Minimum	I.U.P/7
	for 24 hours	35%- 5o% Minimum	-	I.U.P./7
2	Tearing Resistance KG/Cm , Minimum	3	-	I.U.P./8

6/2. Chemical Properties:

6/2/1. Chemical Properties of the Sole Leathers:

No.	T e s t	Minimum	Maximum	Analysis Method
1	Moisture	-	16%	I.U.C./5
2	Ash	-	2%	I.U.C./7
3	Fatty Materials	-	3%	I.U.C./4
4	Water soluble Materials	-	20%	I.U.C./6
5	Tanning Number	60%	-	I.U.C./10
6	pH Acidity	3.5	-	I.U.C./11
7	Difference in Acidity	-	0.7	=

6/2/2. Chemical Properties of Insole Leathers:

No.	T e s t	Minimum	Maximum	Analysis Method
1	Moisture	-	16%	I.U.C./5
	Ash	-	2%	I.U.C./7
	Fatty Materials	-	3.5%	I.U.C./4
	Water soluble Materials	-	20%	I.U.C./6
	Tanning Number	60%	-	I.U.C./8
	pH Acidity	3.5	-	I.U.C./11
	Difference in Acidity	-	0.7	I.U.C./11

7. R e m a r k s :

7/1. The average value of the results of testing of each batch is the value to be compared with the standard number.

7/2. The figures of the chemical analyses from (2-v) in the above tables are given for the 100% dry leather.

7/3. The standard figures in trading are given on basis that moisture is 16 % .

7/4. The following defects are not permissible on leathers.

7/4/1. Spread bad tanning.

7/4/2. More than 50% emptying and loss grain in the back.

7/4/3. More than 50% shrinkage on the back.

7/4/4. Spread cracking.

ANNEX III

Visit Report: to Shoe Industry

13. May 1989 Meeting the General Director for the 4 Shoe Factories in Syria, Mr. Dipl. Eng. Nabil Aoun

Production Director Mr. Dipl.Eng.Mahmoud Mezher

14. May 1989 Visit to the Shoe Factory at Swaidaa
with the Production Director Mr. Mezher

Meeting the Shoe Factory Dir. Mr. Hussain Kiwan

Problems discussed:

1. differences in Leathercharacter from too soft to very hard, no flexibility
2. Leather substance on 1 hide from 1.4 – 2 mm for heavy duty shoes uneven substance, many butcher cuts and holes in addition
3. Sticky finish: The leathers in bundles stick together and the finish is getting damaged while separating the leathers
4. Chevreaux Leather: small middle and large size skins are mixed together. Especially the large skins show a very harsh and hard grain.
   The grain is cracking easy with the key test
5. Skins which are actual waste are included in the supplies,
6. Sheepskins for lining, waste pieces and badly degreased quality which can not be used, uneven colour, Fishoil smell.
7. The Shoe Factory must take the offered Leather Quality from the tanneries, otherwise the Shoe Factory can not run.
8. A strict Quality control should be at the tanneries to avoid such low quality leathers.
9. Syrien Standard Specifications are existing for leather but the Quality received by the Shoe Factories is completely different. Only a few Leather Items may be near to the Standard Specifications
10. Some Leathers are stored in the Shoe Factories for 2 – 6 month, some may be even longer. During this time the leather is changing in getting harder and harder.
11. Sole Leather from Damascus: uneven colour, very dry and grain cracking, some pieces very hard, damaging the tools.
12. Finished Sheep lining leather: showing fatty spew from insufficient degreasing

17 samples have been collected to show to the Tanneries for discussion and improvement in the future. Some samples have been sent to ITRC for Analyses.

Visit Report

16. May 1989 Visit to the Shoe Factory at Nabeck
with the Production Director Mr. Nezher

Meeting the Shoe Factory Dir. Samir Kabur

Problems discussed:

1. No level substance. In 1 hide of 12.25 sqf size the leather thickness from 1 mm to 2.4 mm.
2. Some leathers are very hard, and getting harder during storing for some time. No clean production
3. Many damages of tools/ repairs are required on the equipment as the leathers are very hard.
4. Heavy waste on a/c of deep butcher cuts, holes or other defects on hides
5. Sticky leather in the supplied bundles. Heavy damage while separating the leathers. Some leathers are bundled grain to grain, some grain to flesh side. Dust from the flesh side is sticking on the grain side as well.
6. Leathers for heavy duty Shoes are supplied to 80% from Aleppo
7. Leathers from Damascus are harder and lower in Quality
8. Lining leathers include many not usable small pieces, discoloured and natural fat showing in the neck parts
9. Sole Leather from Aleppo is better in Quality, level colour, more flexible and no grain cracking

11 samples have been collected for demonstration at the Training Seminar at Aleppo and Damascus and discussions with the tanners to improve the quality. Some samples have been sent to ITRC for testing.

Visit Report

13. May 1989
17. May 1989

Visit to the Industry Testing Research Centre, Damascus

The Director of these Institute is leaving for another assignment very shortly. The Institute will have no Director for some time.

Laboratory Equipment available: Physical tests:

1 "Instron" tensile strength/ elongation testing Machine
1 "Bally" Flexometer (12 clips)
1 Penetrometer
1 Permeometer
3 muffle ovens

Analytical tests:

They are able to carry out any analytical test for the leather industry.

It may be advisable, to use this institute in future for all the tests required as a neutral place.

Additional equipment which is required are:

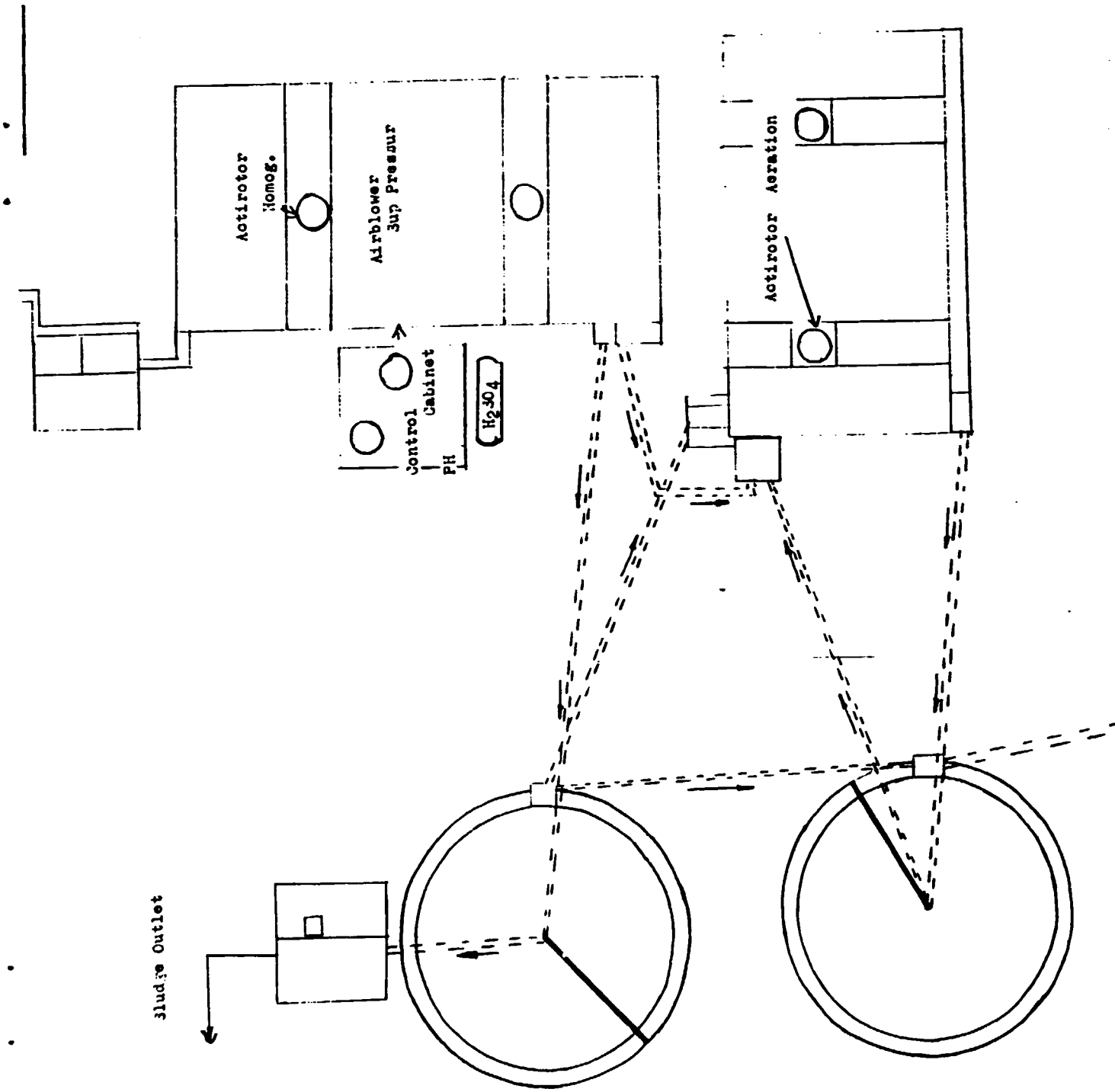
1 wet/dry rub testing machine
1 adhesion tester with glue
1 Bally Tensometer

Leathers for Testing: (from the Shoe factories)

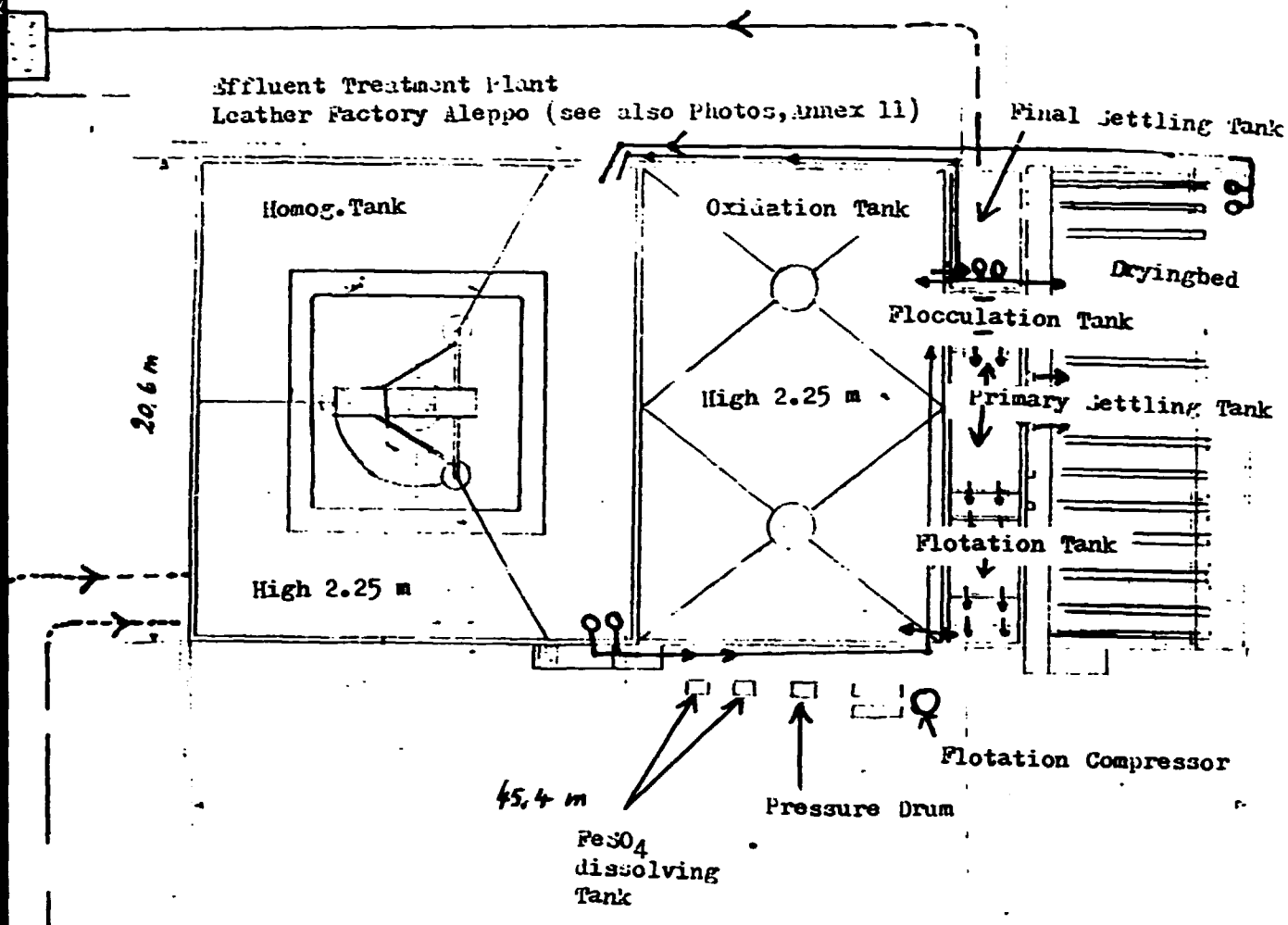
6 leather samples have been given for testing (18.5.89)

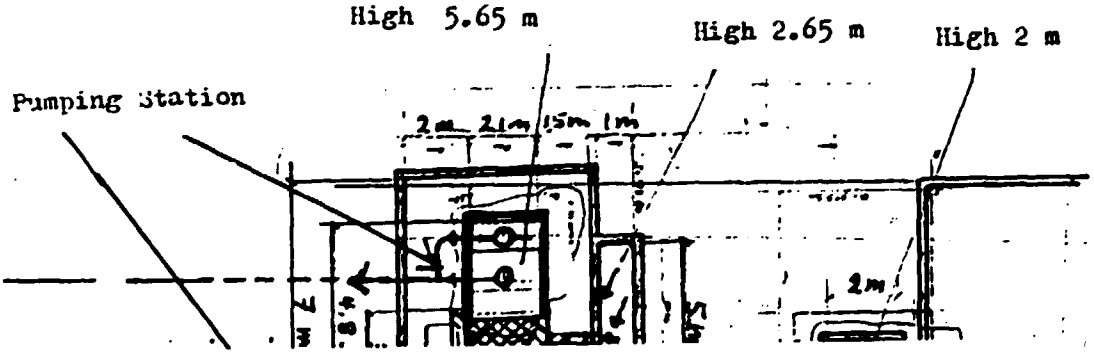
tensile strength / elongation
flexometer test
fat content
pH in the leather

Samples of chrome wasteliquors from all the 4 tanneries in Damascus have been sent for analysis. (24.5.89)


Actirotor
Homog.
Airblower
Sup Pressur
Actirotor Aeration
Control Cabinet
PH
H_2SO_4
Sludge Outlet

ANNEX IV


Effluent Treatment Plant
Leather Factory Aleppo (see also Photos, Annex 11)
Final Settling Tank
Homog. Tank
Oxidation Tank
Drying bed
Flocculation Tank
20.6 m
High 2.25 m
Primary Settling Tank
Flotation Tank
High 2.25 m
Flotation Compressor
45.4 m
Pressure Drum
FeSO4 dissolving Tank


High 5.65 m
High 2.65 m
High 2 m
Pumping Station
2m 2.1m 1.5m 1m
2m

06/06/89 11:
947135612+
135612A UNO
ALEPPO/SYRIA
TLX NO 76/6
ATTN. MR JAKOV BULJAN
REF.EFFLUENT ALEPPO LEATHER FACTORY
MEETING MR GORJANOVIC
MR.SELANEC AT DAMASCUS
REQUESTED DETAILS:
FACTORY BUILT 1976-78 BY ITALIAN COMPANY(IPEC)
CAPACITY:6 TONS RAW HIDES
8 TONS GOAT/SHEEP SKINS
PROCESS:CHROME TANNING
SYNTH./VEGET. RETANING
WASTE WATER:16-18 M3 FOR 1 TON
LIMING 3 PCT
NA2S 2,5-3 PCT
NAHS -,5 PCT
CHROME 7-8 PCT
SYNTH. 4 PCT
RESINE 2 PCT
DISTANCE TO RIVER 500 M APPROX.
EFFLUENT PLANT EXISTING SINCE 1978 EXCUTED BY ITALIAN WHICH
NEVER HAVE BEEN PUT INTO OPERATION
BLUE PRINT COPY WILL BE POSTED SOONEST ,ALSO 2 PHOTOS
RGDS
MAX HAECKER
C
331492 COPLAS SY+
135612A UNO A......
992.4 MIN
0

المنتجات المطاطية والبلاستيكية والجلدية
رقم الصادرة: ١١٥٢/ف
تاريخ: ٧/٦/١٩٨٩

THE ARAB COMPANY FOR RUBBER, PLASTIC, & LEATHER PRODUCT S ALEPPO
ADMINISTRATION OF NEW TANNERY IN ALEPPO/SYRIA

Technical conditions book relevant to the call for offers for a technical study for executing and putting into run the water treatment center in the tannery which is out of work now

According to the fructification Plan of 1983, the Arab Co. for rubber plastic and leather products (Administration of Aleppo New tannery) calls for offers for a technical study for revamping, executing and putting into run the waste water treatment center. Since the equipments available in the said Center do not work properly, therefor, the call for offers for a study to revamp and to put into run the water treatment center is made, minding that the quantity of the waste water resulted from the tannery is 1000 cu. Mt. of which 650 cu.Mt is resulted within the first three hours, and, the present principle of the Center is the Biological-Chemibals one.

The required is:

1-To offer a complete consulting study including drawings, new system for the treatment, this after looking over the whole parts of the center for what concerning the efficiency, work, and suitability, and must be complete and perfect study, containing (drawings, general and technical conditions, detailed and estimated prices)

2-Executing exactly the offered study for modifications, drawings and installations, with equipments.

3-Making the treatment system reachs the optimum capacity.

4-arranging the time schedule for the works execution.

5-Training and qualifying the Technicians for managing the revamped center

6-The treated water must be suitable for agriculture usage as per Int. specifications.

7-The Successful Offerer has to undertake the commissioning of the center up to the optimum capacity without any technical obstacle for six months, this to prove the good running of the Center.

8-The Arab Co. is ready to put under the disposal of the Offerers, all the available documents and drawings relevant to the water treatment Center

ANNEX V

SYRIAN ARAB REPUBLIC
MINISTRY OF INDUSTRY
Industrial Testing & Research Center
DAMASCUS P. O. B. 845
Tel : 664073 - 662438
Cable : INTEST

...رية العربية السورية
...رة الصناعة
...بارات والابحاث الصناعية
...شق — ص.ب ٨٤٥
هاتف ٦٦٢٤٢٨ — ٦٦٤٠٧٢
برقيا : انتست

تقرير مخبري

الجهة المرسلة : الشركة العامة لصناعة الاحذية
رقم وتاريخ الارسال : ٩١٠/٩٠ تاريخ ٨٩/٥/٢٢
رقم وتاريخ الورود : ٢٢٩٦/ب تاريخ ٨٩/٦/١٢
العينة : خمسة عينات جلود
الاختبارات المطلوبة : ... ..

Shoe Factory. samples

نتائج التحليل :

(تعود النتائج المبينة في هذا التقرير الى العينة المستلمة) .

رقم العينة	الرطوبة %	الدسم %	قوة الشد kg/cm²			الاستطالة %		
N° of Sample	Humidity	Fatcont %	Tensile strenght kg/cm²		PH	length %		
			طولي lenghth	عرضي square		طولي length		عرضي square
13 ١٣	١٢,٢٠ ١٢,٢	٧,٧٤٨ ٧,٧٤٩	٢١٠ 210	١٧٨ 178	٤,٣٤٣	٦٠ 60		٦٥ 65
14 ١٤	١٢,٠٩ ١٢,٠٩	١١,٥٨٧ ١١,٥٨٧	٢٦٦ 266	١٧٨ 178	٤٤	٤٢ 42		٥٥ 55
15 ١٥	١٢,٨٢ ١٢,٨٢	٥,٣٨٨ ٥,٣٨٨	١٣٤ 134	١٢٣ 123	٤٤	٤١ 41		٤٩ 49
17 ١٧	١٢,٩٤ ١٢,٩٤	١١,٧٢٤ ١١,٧٨٤	٣١١ 311	٢٣١ 231	٣,٨٣٩	٦٥ 65		٩٠ 90
25 ٢٥	—	—	٣٢٥ 325	٢٠٠ 200	—	٥٣ 53		٩٢ 92

Elongation

أما التي فقد ثبت العينات حتى ١٥٠ ٠٠٠ دورة ولم يلاحظ اى تغيير في المظهر
Flexometre until 150 000 unchanged.

المحلل

رئيس الدائرة

مصدق مدير الصناعات المتخصصة

SYRIAN ARAB REPUBLIC
MINISTRY OF INDUSTRY
Industrial Testing & Research Center
DAMASCUS P. O. B. 845
Tel : 664073 - 662438
Cable : INTEST

الجمهورية العربية السورية
وزارة الصناعة
مركز الاختبارات والابحاث الصناعية
دمشق ــ ص.ب ٨٤٥
هاتف ٦٦٢٤٣٨ ــ ٦٦٤٠٧٣
برقيا : انتست

تقرير مخبري

الجهة المرسلة : الشركة العامة للدباغة ــ دمشق General Tanning Comp.
رقم وتاريخ الارسال : ٧٦٠/ص تاريخ ١٨/٩/١٩٨٩ رقم وتاريخ الورود : ٢٣٥٣/د تاريخ ١٨/٦/١٩٨٩
العينة : مياه
الاختبارات المطلوبة : الجهدة DAMASCUS

نتائج التحليل :

(تعود النتائج المبينة في هذا التقرير الى العينة المسلمة) .

القساوة العامة محسوبة كغ حمات الكلسيوم = ٥٨٥ مغ/ل French Hardness 58,5°
الكلسيوم = ٢١٠ مغ/ل Ca 210 mg/l
الحديد = لا يوجد Fe — —

==========

المحلل

رئيس مخابر الكيمياء اللاعضوية

مصدق: رئيس قسم الكيمياء

58.5° French Hardness are approx. 33° German Hardness

28. JUNE 1989

SYRIAN ARAB REPUBLIC
MINISTRY OF INDUSTRY
Industrial Testing & Research Center
DAMASCUS P. O. B. 845
Tel. : 664073 - 662436
Cable : INTEST

الجمهورية العربية السورية
وزارة الصناعة
مركز الاختبارات والابحاث الصناعية
دمشق — ص.ب ٨٤٥
هاتف ٦٦٢٤٣٨ — ٦٦٤٠٧٣
برقياً : انتست

تقرير مخبري

الجهة المرسلة : الشركة العامة للدباغة General Tanning Comp. Damascus
رقم وتاريخ الارسال : ٦٥٧/ر تاريخ ١٩٨٩/٥/٢٤
رقم وتاريخ الورود : ١٩٧٨/د تاريخ ١٩٨٩/٥/٢٥
العينة : ٤ محلول كروم
الاختبارات المطلوبة : التحليل Vaste chrome liquezs before Discharging faom Tanning chrome. 25-5-89

نتائج التحليل :

(تعود النتائج المبينة في هذا التقرير الى العينة المرسلة)

رقم العينة Tannery N°	النسبة المئوية لأكسيد الكروم Cr_2O_3 %
١ 1	٤٫٨ 4.8
٢ 2	٤٫٨ 4.8
٣ 3	٧٫٠ 7.0
٤ 4	٢٫٠ 2.0

المحلل

رئيس قسم الكيمياء اللاعضوية

مدقق : رئيس قسم الكيمياء

Tensile strenght of Embossed leather

VOTRE REF
NOTRE REF
DATE 26. JUNE 1989

Factory Nº	Thickness	Elongation at 1st grain cracking	Elongation at Break	Tensile strenght	AVERAGE
1	2.3	43	50	315 Kg/cm²	
	2.4	42	45	216 "	304 Kg/cm²
	2.6	45	48	384 "	
2	3.0	—	37	366 Kg/cm²	
	2.7	—	46	285 "	344 Kg/cm²
	2.5	—	46	382 "	
3	3.4	50	62	226 Kg/cm²	
	2.6	46	54	267 "	275 Kg/cm²
	3.0	43	59	333 "	

Remarks: 1. specifications.

UNIDO Tensile strength Min. 200 - 250 Kg/cm².
UNIDO Elongation Max 80 %
syrian standard Elongation Max 60 %

2. No grain cracking

Flexometer Teste.

VOTRE REF _____
NOTRE REF _____
DATE 28. JUNE 1989

Factory N°		N° of Flex 1st crack		
1	A	8000		
	B	—	100 820	unchanged
	C	—	100 820	"
2	A	—	100 820	"
	B	—	"	"
	C	—	"	"
3	A	—	"	"
	B	—	"	"
	C	—	"	"

SYRIAN ARAB REPUBLIC
MINISTRY OF INDUSTRY
Industrial Testing & Research Center
DAMASCUS P. O. B. 845
Tel : 664073 - 662438
Cable : INTEST

الجمهورية العربية السورية
وزارة الصناعة
مركز الاختبارات والابحاث الصناعية
دمشق ــ ص.ب ٨٤٥
هاتف ٦٦٢٤٣٨ ــ ٦٦٤٠٧٣
برقيا : انتست

ARABA Tanning and Rubber Co.
ALEPPO

تقرير مخبري

الجهة المرسلة : الشركة العربية للمنتجات المطاطية والبلاستيكية والجلدية ــ حلب

رقم وتاريخ الارسال : ١٢٠٨ /ص تاريخ ١٣/٦/١٩٨٩ رقم وتاريخ الورود : ٢٣٥٤/د تاريخ ١٨/٦/١٩٨٩

العينة : مياه

الاختبارات المطلوبة : المعدنية

نتائج التحليل :

(تعود النتائج المبينة في هذا التقرير الى العينة المسلمة) .

القساوة العامة محسوبة كفحمات الكلسيوم	= ٧٢٨ مغ/ل	French HARDNESS 72,8
كلسيوم	= ٢٨٠ مغ/ل	Ca^{++} : 280 mg/l
حديد	لا يوجد	Fe^{+} — —

المحلل

رئيس مخابر الكيمياء اللاعضوية

مصدق : رئيس قسم الكيمياء

72.8° French Hardness are approx. 40° German Hardness

28. JUNE 1989

Testing of Chrome in the Effluent Leatherfactory Aleppo

(percentage of chrome oxide)

Chrome waste Liquors, while discharging from the tanning Drum:

Chrome tanning of cow hides, present production 4.66 %

Chrome tanning Sheep/Goat skins: 5.6 %

Trials carried out at the Laboratory Experimental Section in changing the Chrome tanning to less chrome at the beginning and more in the Rechroming:

Chrome tanning	Hides	3.03 %
Rechroming	Hides	1.09 %
Chrome Tanning	Goat/Sheep skins	1.4 %
Rechroming	" " "	1.6 %

Remarks:

1. As in the normal process only the avg. weight can be taken, the weight of the Skins (Peltweight, Shaving weight) and Hides is not correct, also the Chemicals calculated show differences.
2. To reduce the Chrome in the Effluent, the results of the above Analyses confirm that the application of chrome, less at the beginning and more in the Rechroming show a much better absorbtion of the chrome, which is in addition depending at the final pH and the temperature on the end of the chrome tanning process.
3. Only available Chrome tanning Salts, 33% basic and Chromitan MS have been used. In future other Selfbasifying Products may be introduced.

المؤسسة العامة للصناعات الكيميائية

Leather Factory Aleppo

الشركة العربية للمنتجات المطاطية والبلاستيكية والبلدية بحلب

Leather Factory Aleppo

Physical testing of Leather

Box Sides for Shoe Upper Leather (from cattle hide

1.8 mm

رقم الوجبه /

12.June 1989 التسلسل ·

اجهاد التمزق كغ / سم Specification: UNIDO	نسبة التطاول عند الانقطاع Syrian Standard max. 60% / Elongation max 80%	اجهاد الانقطاع Tensile kg/cm² كغ / سم² min. 200 kg/cm²	السماكه mm م٠م	رقم Sample No. العينه
	43	250	2.3	length 1 Siede N°1
	51	240	2.5	Squar 1
	56	244	2.5	Squar 1
some cracks at the grain side		Crack 230		
	50	224	2,5	length 1 Sicel N°2
	62	218	2.2	Squar
	64	222	2.3	Squar
	44	187	1.9	Siede N°3
	54	181	2.1	
	58	200	2.0	
		Crack 163		

Flexometer Tests: at 103 000 Flexings unchanged

Specifications: 100 000 Flexings (UNIDO)

درجة الرطوبة

نسبة اكسيد الكروم

نسبة الدهون

مقاومة الثلي / الفلينكو ميتر

ANNEX IV

The Leather Factory Aleppo

المؤسسة العامة للصناعات الكيميائية

الشركة العربية للمنتجات الجلدية والبلاستيكية والبلدية بحلب

Leather Factory Aleppo

Physical Testing of Leather

Goatskins for Shoe upper Leather

appr. 1.0 - 1.3 mm

رقم الوجبه :

12. June 1989 التـــــاريخ :

اجهاد التمزق كغ / سم	نسبة التطاول عند الانقطاع Syrian Standard, max. 60% % elongation of Brake	اجهاد الانقطاع Kg / Cm² كغ / سم² Tensile Strength	السماكة m.m م.م Thickness	رقم العينه
Specification: (UNIDO)	max. 80%	min. 200 kg/cm²		Siede Nº 1
The grain is cracking already at 77 kg/cm²	56	192 Crack 77	1,3	1 length
	72	173 Crack 159	1.1	1 Square
	71	Crack 129 / 121	1.2	1 Square
	53	Crack 190 / 120	1,5	Siede Nº 2 2 length
	76	Crack 84 / 75	1.6	2 Square
	65	107 Crack 83	1,5	2 Square
	64	Crack 154 / 88	1.3	Siede Nº 3 3 length
	74	Crack 122 / 78	0.9	3 Square
	68	Crack 55 / 50	1.-	3 Square

FLEXOMETER TESTS: at 103 000 flexings unchanged

Specifications: 100 000 Flexings (UNIDO)

درجة الرطوبة

نسبة اكسيد الكروم

نسبة الدهون

مقاومة الثني : الفليكومتر

المؤسسة العامة للصناعات الكيميائية

Leather Factory Aleppo

الشركة العربية للمنتجات المطاطية والبلاستيكية والجلدية بحلب

Physical testing of Leather

Leather Factory Aleppo

Physical Testing of embossed leather
(from cattle hides)

2.2. - 2.4 mm

رقم :

التـــــ 12. June 1989

اجهاد التمزق كغ / سم Specification (UNIDO)	نسبة انتطاول عند الانقطاع Syrian Standard, max. 60% % Elongation max. 80%	اجهاد الانقطاع Tensile kg/cm² كغ / سم² min. 200 kg/cm²	السماكـــه mm م٠م	رقـم Sample No. العينه
	40	3-10	2	length Siede №1
	65	2-10	2	Squar
	63	2.3-1	2,-1	Squar
	44	207	2.3	length Siede №2
	51	171	1.9	Squar
	53	143	2.0	Squar
	53	217	1.8	length Siede №3
	63	138	1.7	
some cracks at the grain side	52	116 Cracks 87	1.9	

Flexometer Tests: at 103 000 Flexings unchanged
Specifications: 100 000 Flexings (UNIDO)

درجة الرطوبة
نسبة اتساع الكروم
نسبة الدبغ
متانة التلم (الفليكومتر)

Requirement of New machines-Equipment-Overhauling-Maintenance for the Leather Factories 1.2.3. at Damascus

	Factory No.	1	2	3
1. Fleshing Machines:				
New machine		1	1	1
2. Splitting Machine:		-	-	-
3. Drums: direkt drive/V-Belts		14	11	8
new drum doors		16	16	14
4. Sammying before shaving:				
New Machine		-	1	1
Repair of old Machine		1	-	-
5. Shaving Machines:		-	-	-
6. Scales:				
New platform scales		1	1	1
Repair of old scales/overhauling incl. Chemical weighing scales/balances		3	3	3
7. Sam-Setting out Machines: (after Retanning/Fatliquoring)				
New Machines		1	1	-
Repairing/Overhauling		-	-	1
8. Vacuum dryer:				
Repair/Overhauling New top filter, New rubber sealing		1	1	1
9. Conditioning Room:				
Water Spraying Machine with Conveyer: (made local)				
Conditioning Room		1	1	1
Water Spraying Machine		1	1	1
10. Staking Machines:		-	-	-
11. Toggle Plant:				
New Plant with 60 Frames		-	-	1
1 Plant from No. 1 should be moved to Factory No. 2		-	1	-
12. Pad coat Finishing:				
By Hand in all the 3 Factories		-	-	-

Factory No. 1 2 3

13. Hydraulic Presses:

1 Presses are in Factory No.1 and 3 - - -
Only Maintenance is needed

14. Spray Coat finishing/Top Coat:

on Spraying Machine in Factory No. 1 - - -
or in each tannery by Hand Pistol - - -

15. Measuring Machine:

Pin wheel Machines are in all Tanneries
one electronic Measuring Machine in No.4- - -

Remarks:

Every Tannery has equipment to produce the leather from Soaking to Finishing. Some very old Machines need replacement and arrangements are needed to improve the Leatherquality to the required standard.

All the Machinery and Equipment needs a turnus maintenance programm and overhauling.

The shortage of spares is the result that many machines are not operating, but are required for the production of a standard leather Quality.

Requirement of New machines-Equipment-Overhauling-Maintenance for the Leather Factory No. 4 at Damascus

1. 2 Wool-Shering machines, not in operation, cover for protection
2. 2 Skin Lime/Sodium painting machines: Overhauling
3. 1 Dewool Machine: spare parts required
4. 29 Paddles: need overhauling, some need gearboxes
5. 2 Fleshing Machines: need overhauling, spares
   1 new Fleshing Machine is required
6. 2 Scudding Machines: need overhauling, spares
7. Drums: overhauling, some need gearboxes and electr. frames
8. Scales: 3 Platform Scales need overhauling/ repairing
   3 Balances: need overhauling/ repairing
   1 New Platform Scale is required
9. 2 Sammying machines: need overhauling
10. 2 Shaving machines (wet) need overhauling
11. 2 Samm-Setting out Machines: need overhauling
12. Tunnel Dryer (Kiefer) needs transportation repairing
13. 2 Roller Staking machines: Maintenance
    1 Vibration Staking Machine: " "
    2 Vertical "Schoedel" Staking Machines: Maintenance
14. Condition Room: with high humidity for skins before staking is required. 1 water Spraying Machine needs overhauling. (local made)
15. Toggle Plant: Maintenance only, cleaning up
16. 2 Plate Vacuum dryer: Exchange heater needs to be replaced
17. 2 Dry-Shaving Machines: Maintenance
18. 2 Buffing Machines: Maintenance
19. 2 Dedusting Machines: 1 Machine needs overhauling
    1 Machine needs Maintenance
20. 1 small size milling drum: Maintenance
21. 2 Spraying machines: 2 new programm control and 1 exchange heater are required
22. 2 Finiflex Throughfeed Ironing Machines: control heater/maintenance
23. 1 Hydraulic press, med. size, Maintenance
24. 1 Electronic Measuring Machine: Maintenance
    1 Pin Wheel " " : standby- spare
25. 2 Glazing Machines: Maintenance
26. 2 Plush polishing wheel - drums: Maintenance
27. Equipment for the Laboratory
    1 new wet rub/ dry rub testing Machine
    1 adhesion testing Apparate + Glue
    1 penetrometer testing Apparat
    1 electronic precision balance, up to 3000 gr.

Remarks: Details regarding the spare parts are available from the Maintenance department.

Requirement of New Machines-Equipment-Overhauling-Maintenance for the Leather Factory at Aleppo

A. Machines for Hide processing:

1.	23 Tanning Drums	o.k.
2.	2 Toggle Dryer	1000 toggles urgent required
3.	2 Shaving Machines	o.k.
4.	2 Samying Machine	o.k.
5.	2 Splitting Machines	o.k.
6.	1 Drying Tunnel	o.k.
7.	2 Sam-Setting Machines	o.k.
8.	1 Water Spraying Machine	o.k.
9.	1 Staking Machine	o.k.
10.	1 Dedusting Machine	o.k.
11.	2 Vertical Staking Machines	not used jet
12.	2 Fleshing Machines	need spareparts and maintenance
13.	2 Vacuum dryer	1 o.k., 1 needs maintenance
14.	2 Shaving Machines	1 o.k., 1 needs maintenance
15.2	Buffing Machines	not used jet
15.	Many Chemical mixing tanks	need spare parts
16.	2 Pin- Measuring Machines	o.k.
17.	1 Electronic Measuring Machine	o.k.
18.	2 Rotopress	o.k.
19.	2 Hydraulic Ironing Press	o.k.
20.	2 Spraying Machines	o.k.
21.	2 Padding Machines	o.k.
22.	1 Handspray Cabin	o.k.
23.	2 Stone Polishing Wheels	o.k.
24.	4 Platform Scales	3 need spares, repair, 1 maintenance
25.	4 Chemical weighing Balances,	1 o.k., 3 overhauling

B. Machines for Skin processing

1.	9 Paddles	o.k.
2.	11 Tanning Drums	o.k.
3.	3 Toggla plants	o.k.
4.	2 Sam-Setting Machines	o.k.
5.	2 Shaving Machines	o.k.
6.	1 Centrifuge	o.k.
7.	1 Drying Tunnel	needs spare parts, repair
8.	2 Wool Washing Machines	o.k.
9.	1 Wool Baling Press	o.k.
10.	1 Dedusting Machine	o.k.

Machines Aleppo

11.	1 Shaving Machine	o.k.
12.	1 Air Compressor	o.k.
13.	5 Buffing Machines	4 o.k., 1 needs maintenance
14.	6 big scales	3 need spares, repairing, 3 are o.k. at Wool section
15.	3 small scales	o.k.
16.	3 Fleshing Machines	need spare parts, repairing
17.	1 Painting Machine	need spare parts
18.	1 Unhairing Machine	need spare parts
19.	1 Wool drying unit	need spare parts
20.	1 Washing Machine	not operating
21.	1 Solvent degreasing Machine	not operating
22.	1 Staking Machine	not used
23.	1 Roller Staking Machine	not used
24.	1 Skin-Woolshering Machine	not used
25.	1 Wool Combing Machine	not used
26.	1 Fur skin Ironing Machine	not used
27.	1 Buffing Roller Machine	not used
28.	1 Buffing Wheel	not used
29.	2 Roller Staking Mach.	1 o.k., 1 not used

ANNEX VII

Selection of pickled Sheep skins for Export

Grade 1 : (0 - 1.6)	1 - 2 defects on the edge, no butcher cuts	
Grade 2: (1.7-2.6)	2 - 3 defects,	2 on edge, 1 in centre, 1 - 2 butcher cuts
Grade 3: (2.7-3.6)	3 - 4 defects,	2 on centre, 2 on the edge, 2 - 3 butcher cuts ,centrel,edge 2
Grade 4: (3.7-4.6)	4 - 5 defects,	3 on centre, 3 on edge, butcher cuts 1-2 centre, 3 on edge
Grade 5: (4.7-5.6)	5 - 6 defects,	3-4 on centre, 3-4 on edge, butcher cuts 2-3 centre, 4 on edge
Grade 6: (5.7-6.6)	more defects as Grade 5	
Grade 7: (6.7-)	more defects as Grade 6	

Remarks:

1. The Grading is very correct. Problems are the Skins between the Grade. The Selector has to decide finally the Grading.

2. Above details can be given only approximately. The Selectors have to decide on each skin and have to keep a standard.

3. Important is the light for selecting. Some Selectors prefere a Glas table with day light Tube light underneath to see the butcher cuts or other damages easier.

ANNEX VIII

Process Control

for cow hides/yak hides/ Goat and sheepskins to guaranty a standard leather production

1. Soaking	A. proper sizing of soaking lots
	B. Presoaking in pits, for dry hides(Airdry or drysalted)
	C. As soon as possible, Greenfleshing
	D. Soaking weight as base for the calculation of Chemicals for liming
	E. Addition of Chemicals, pH control, according to the
	F. Resoaking after Greenfleshing in Drum, with mechanical movement.
	G. Don't fix any soaking time, climate and water temp./ the condition of the raw material must be considered.
	F. Final check up if soaking is completed. Hides should be soft as after the slaughtering, the flesh side should be as clean as possible for level penetration of the liming chemicals, to avoid any wrinkles on the finished leather.
	G. Trimming, to remove all the parts which are not suitable for leather processing.
	H. Dehydration for approx. 1-2 hours before the soaked material is going into the lime/sodium liquor.
2. Liming	A. Speed of drum 3-4 RPM, water Temp. approx 24°C finally
	B. Short float in the beginning/ Chemicals should be dissolved.
	C. Chemicals should be adjusted according to the climate/ water temp. in Paddle or drum.
	D. To avoid excess plumping and loose grain, use 1/3 NAHS and 2/3 NA2S and approx. 3-4 % lime powder.
	E. Fleshing ex lime, don't leave out the centre part unfleshed. Knife cylinder should be sharpened from time to time.
	F. Scudding on machine, by hand after fleshing or also possible after the bating process. (Goatskins)
	G. Splitting out of lime is economical. The waste can be used for making lime or gelantine.
	H. Ex lime selection is possible for different types of leather or report for hide quality/costing.
	I. Pelt weight, as base for the calculation of Chemicals for Deliming/bating/pickle and chrome tanning, as well as for yield calculation(degreasing for sheep skins)
3. Deliming	A. Water temp. / float control after washing
	B. Check up full deliming with indicator phenolphtalein
	C. pH control PH 7.5 - 8.5
	D. scudding after bating for goat skins
	E. Speed of drum 3 - 6 RPM
	F. Degreasing of sheep skins, followed by removing the loose fat by refleshing 2/3 of the skins in the direction to the neck.

2nd degreasing with only detergent in salt water, if pickled skins are used.

G. Liming / deliming process should be separated from the chrome tanning section.

4. Pickle

A. Water and salt, dissolve fully, check Bé before adding the acid. Should be above 6°Bé for hides/skins, but 9-10°Bé for skins to be pickled. Consider the quantity of wet salt, which is heavier if taken by weight.

B. Add formic / Sulphuric acid diluted, slowly and run for 2-3 hours and stop over nicht. The final pH is depending on the substance of the hides and the Chrome-tanning agent to be used.(Selfbasifying chrome) Normal pH 3 - 3.5, for pickled skins 1-1.5.

C. Speed of the drum 8 - 15 RPM

D. Pickle bleaching to get a light colour pelt, use Sodiumchlorite or some Sodiumbisulphite.

C. Fatliquors, which are stable to electrolytes can be added to the pickle bath for very soft leathers (Glove)

5. Chrome-tanning

A. Check pickle pH again

B. Reduce pickle bath by approx. 50 %

C. Use short float at the beginning

D. To get max. exhaustion of the chrome, offer only approx 6% Chrome salt (33% basic) basify slowly to pH 3.9 - 4.0. The reduced pickle water should be replaced by water added after approx. 60' tanning time.

E. Speed of drum, 8- 15 RPM

F. On the end of chrometanning, temp. approx. 45-48°C

G. Boiling test as quick test

H. Pile the chrome tanned material for a few days for additional fixation of the chrome

I. "Wet blue" stocks for export selection should be properly piled on palets and covered to avoid getting dry. Chrome content to be calculated according to the Contract. Bactericides may be added for long storing.

6. Sammying Splitting Shaving

A. Sammying with proper pressure to get the proper condition for splitting and shaving, as well as for a standard weight of the <u>shaving weight</u>.

B. The shaving weight should be controlled and if needed, adjusted ± 5-20%

C. Control after shaving, the substance should be all over the same.

D. For splitting: speed only 17-20 m/min to be able to avoid damages by foldings. Careful feeding into the machine is required.

E. Trimming: only corner cleaning

7. Rechroming

A. Chrome retanning, using approx 4-6% Chrome salt is advisable for max. chrome exhasution. Run 2-3 hours and stop over nicht. Fatliquors which are stable to electrolytes may be added (anionic) or also cationic fatliquors. Next day the process will be carried on as usual.

B. The chrome tanning with 6 % chrome salt and the Chrome retanning with 4-6 % chrome salt are for maximum fixation of the chrome and to reduce the chrome content in the waste liquors, which goes into the effluent.

8. Neutralization
Dyeing
Fatliquor
Retanning
fixation
washing

A. Neutralization for shoe uppers, check with BCG approx. 2/3 blue, 1/3 yellow, float pH 4.8- 5.2

B. If Sodiumbicarbonate is being used, the temp. should not be higher than 30°C.

C. Drum speed 8 -15 RPM

D. Nappa Garment skins need full penetration, BCG control: fully blue pH control

F. Wash after neutralization

G. Lying: for penetration, use 25°C water
for surface dying, " 55°C water

H. Prefatliquor is suitable before retanning, appr. 2% prod.

I. Retanning for shoe uppers, a combination of synth. tanning agent, Resin filler, veget. tannins

J. Fatliquoring at 55°C

K. Final fixation with formis acid to pH 3.8-4.0

L. Cationic fatliquor may be added

M. Washing in cold water is important to wash out all the salt.

N. Nappa garment, with penetration dying needs more fixation, more time and a good washing to avoid fatty spew on the finished leather after storing.

O. In all operations, the bath should be completely exhausted before discharging.

9. Sam-setting
vacuum pre-
drying,
full drying

A. Leathers are piled for 1-2 days for fixation of all the used products

B. Sam-setting out with heavy pressure is followed by vacuum Predrying at 80°C, 2-2.5 minutes.

C. Afterwards the leathers are carefully hang up for full drying. The setting effect from the vacuumdryer should not be destroyed.

10. Conditioning
Waterspraying
Conditioning
Staking
Toggling

A. After full drying, the leathers are piled in a room with high humidity for 2-3 days

B. Water spraying with Air pressure on a conveyor belt Machine.

C. Piling up again for over night, covered with plastic foil.

D. Staking on the Vibration staking machine will follow

E. Control the proper conditioning/moisture before staking

F. Immediately after staking put the le thers on the toggle Frames and dry approx. at 25-30°C, 2 h There may be some difference in summer and winter.

G. Avoid piling up of too many leathers before toggling in summer from getting dry on the edges.

H. Trimm edges and send for Base-Coat finishing

11. Finishing

A. During finishing, pile grain to grain after proper drying

B. Finishing Chemicals should be taken by weight and not by volume

C. Foundation for Finishing:

100 parts Pigment,
200 " Binder, (double from the Pigment)
400 " Water (double from the Binder)

There may be some variation for pad and spray solutions. Auxiliaries like waxes, oils and Casein type products may be added to get

soft base coats applied by padding
spray coats, a bit harder
Top coats for fixation and gloss

D. Ironing: Sealing the base coats with smooth plate, 70- 80°C, 230 ATM.(Hair cell grain)

E. Embossing: The same temp. and pressure for 2.5 - 3 seconds as last operation.

F. If high gloss is required:

Nitrocellulose Solution may be sprayed after the final Ironing.

Remarks:

1. Physical and analytical tests may be carried out before the leathers are produced in bulk production, also if the Chemicals are changed to other products.
2. All the Chemicals calculated should be absorbed by the Hide/Skin Material as much as possible and should not go into the effluent.
3. Process Control should be directed from the Laboratory and should be carried out strictly to result finally a standard leather product which the Shoe Factories require.

ANNEX IX

Discussion Programm for the planned

Meeting on the 30. May 1989 with Dir. Ir. Sukker at Factory No. 4

Discussed problems in Shoefactories at Swaidaa and Habeck

1. Many butcher cuts and holes, heayvy waste embossed
2. Uniform leather substance, 1 hide 1mm - 2.4 mm leather
3. No hard leather also after storing for some time
4. Standard Quality Process control in tanneries, more strict
5. No sticky finish Leather sticks together in the bandles, damages
6. Level colour in hides and skins
7. Degreasing of skins fatty necks, finished lining fatty spew
8. Full skins, not to supply very small pieces
9. Smooth leather has to many wrinkels in the belly parts
10. Hard and cracky sole leather, uneven colour, damage to tools
11. Fish Oil smell in lining leather, veget. tanned
12. Chevreaux, grain cracking
13. Small and large Goatskins to process separate
14. Quality control before sending leather to the Shoe factories
15. Workmanship, careless handling
16. Syrian specifications for leather

Factory No. 1.2. and 3 Production of shoe leathers

Present production: 3 500 000 sqf per year
in future 5 000 000 " " "

1. Raw hide quality, airdry, wet salted, drysalted from saudi arabia and other places
2. Greenfleshing + resoaking over night Soaking weight
3. Chrome tanning + Chromeretanning with Fatliquor max.exhaustion on pelt weight on shaving weight
4. Basification with Sodiumbicarbonate and not Soda Ash
5. temp. on the end of tanning, pH
6. Fatliquor in 3 stages, for max exhaustion
7. Reduce fish Oil, to avoid fishoil smell
8. Fatliquors, stable to electrolytes should be used
9. Fixation to pH 3.8 - 4 on the end of the wet process
10. washing with cold water " " " " " " ", before discharging
11. Pile for 24 - 48 hours before sammying/setting out
12. Shaving weight condition ± 10 - 20,- (at present very wet leathers)
13. Full drying after vacuum pre drying - stop wet toggling 40°C
2 sides above each other
14. Condition appr. 48 hours, water spraying on H/C, pile 24 hours
15. Toggling in proper staking condition, immediately, dry at 25-30°C only
16. Pad base coat and sprayfinishing, top coat
17. Strict process control by Experienced persons /Standard Quality
18. Quality control from time to time, especially while changing products
19. Development - Trials - with new Products
20. Selection 1. 2. 3. Rej
21. Effluent - cleaning of Factory Dept./ Foreman responsible
22. Training now and the young generation for the future

New Machines- Equipment/ Overhauling / Maintenance

23. Maintenance programm 30.3 30 3 priority,
24. Spare parts - main items in time to be ordered
25. New machine for Green and lime fleshing 1800 mm
26. Scales should weigh correct / maintenance
27. Direct drum drive with V-Belt stop transmission drive
28. Vacuum dryer in very bad condition, top filter, water patches
29. Overhauling of all the machines turnus check up
30. Toggling plant also in Factory No. 2 and 3 ?
31. Leather production in each tannery up to crust after toggling
32. Factory No. 2 New plan for complete renovation
33. Improve Workmanship - handling
34. Drum Doors replacement
35. Liming section should be separated from the chrome tanning section by a small wall.

Factory No. 4 Sheepskins Pickle, Nappa Garment , Lining Production

1. Storing of pickled skins, outside the tannery in a cool place
2. Rawskins from Damascus, many butcher cuts (Envelopetype better)
3. Weight taking in Lime Peltweight,and pickle stocks + 30%
4. Improving fleshing and trimming (3 M/C for fleshing ?)
5. " degreasing (avoiding perchlorethylene) on fleshing M/C after + 2nd degreasing " to remove the loose fat on the neck, 2/3 skin fleshing
6. Pickle Salt dissolving to avoid marks on the pickle stock
7. Chrome Tanning + Chromeretanning with fatliquor, max. Exhaustion
8. Basification with Sodiumbicarbonate only, final temp.
9. Fatliquor in 3 stages for max. exhaustion
10. Fixation with formic acid and washing with cold water (pH 3.8–4.0)
11. Milling after finishing + Ironing
12. Dry shaving after finishing
13. conditioning before toggling , less trimming
14. Polishing before finishing
15. Marketing, pickled skins, crusted skins, finished skins
16. Working instructions datas different from actual work of process
17. strict process control
18. Quality control from time to t me, especially while changing products
19. Development work- technology- new products
20. Effluent Plant to put in operation as soon as possible
21. Training now - young generation for the future
22. Shaving weight for Nappa and veget. lining
23. Cleaning out the whole Factory
24. Improve workmanship - handling

New Machines - Equipment / Overhauling / Maintenance

25. No scale is operating
26. Scudding, Fleshing / Shaving / samying / sam-setting Machines : overhauling
27. All machines in Maintenance programm: 303 30 3 priority
28. Stop heating the toggling plant, as skins are fully dry
29. Condition room before toggling, dry at 25°C only, slowly
30. Recommendations for Crust Production,for expert as next step
31. Main spare parts to be in store
32. Selection: 1.2.3.4.5.6. and Rejections

1 - 4 for crust export
5 - 6 for garments
or 6 + Rejects for lining

ANNEX X

Visit to the Leather Factory No. 1 Damascus

Discussion of Production details as per present Process:

Raw Materials:

Dry Salted and wet salted Hides

A. Approx. 10% wet salted Hides, local
B. " 90% dry " " , imported

Soaking: A. over night, without any Chemical addition, in pits only
B. 3-4 days, " " " " or mechanical action, in pits
no greenfleshing no process control

Liming: 150 % water from Tubewell directly, 18-20°C
2.5-3 % Sodium Sulphide
3.5 % slaked lime 20 - 24 hours

wash

Reliming: 4 - 6 hours

wash

Fleshing:

Splitting: shoe uppers 2.5 - 3 mm
army leathers 3 - 4 mm

Peltweight:

wash

Deliming: 100 % water temp. 37-38°C
1.5 % Ammoniumnitrate (local) or Ammonium Sulphate(imported) 30'
+ 0.5 % Bate, Pancreol PB W 1500 30'
fully delimed

wash

Pickle: 100 % water, cold) 6-7 Bé
10 % salt)
+ 0.25 % Formic acid 10'
+ 1.25 % Sulphuric acid (60-66° Bé 120' + over night
next morning pH 3.5

Chrome tanning:
+ 9 % Chrome Salt, 33% basic run 3 hours
+ 1 % Soda ash during 1 hour, stop over night
next morning pH 3.8 - 4.0
Boiling test: no shrinkage
Waste Chromliquor test, last result 4.8 % Chrome-oxide
Pile for 3 days to 1 month, wet blue stock

wash

Sam

Shave: Shoe upper 2.0 mm Army leathers 2.8 mm- 2.7 mm

Shaving weight:

wash

Neutralization:	Shoe uppers	Army leathers	
Sodiumformiate	1 %	0.5 %	15'
+ Sodiumbicarbonate	0.5 %	1.0 %	45'

final pH 5.5
BCG test, cut 2/3 blue
1/3 yellow

wash

Dye: 100 % water 55°C
+ 0.4-0.5 % Acid dye 15'

Fatliquor: + (3 % Sulphonated Neatsfoot Liquor (75% Pure fat)
4.25% pure fat (2 % Fish Oil liquor (" " ")
(0.5 % Synthetic Oil (100% " ")
45 - 60'

add 1.5 % Skytan G 7 (GDR) Synthetic tanning agent
1.5 % Retingan R 7 (Bayer)
1.5 % Mimosa 45 - 60 '
add 0.25 % formic acid 10'

no top fatliquor pH: no control, may be around pH 6.-

No rinse or wash

Pile for 2 days
sam/ set out
Vacuum dry at 80°C for approx. 2 ', pile over night
immediately toggle in wet condition, dry at 50°C - 40°C on the end for 3-4 hours

Pile: over night
stake: in this dry and hard condition

Finishing:

Basecoat: 100 parts Pigment (Earnshaw deep black)
200 " water
150 " Binder (Enoryl FN from Earnshaw)
40 " Luronbinder UW or U (BASF)
40 " Wax FF (Earnshaw)
4 spray coats on the machine, dry, emboss at 60-70°C, 250 ATM

2.Coat: 100 parts Pigment (Earnshaw deep and bright black)
200 " water
150 " Binder
40 " Luronbinder UW or U
- " wax
2 spray coats on the machine, dry

Top coat:
100 parts Corial EM finish Black (BASF)
100 " water
1 spray coat on the machine, dry, plate at 60-70°C, smooth plate

Trimm
Measure
Select to grade 1, 2 or 3

Remarks:
The Process in Leatherfactory No. 2. and 3 are the same as mentioned above.

Visit to Leatherfactory No. 4, Damascus

Discussion of Production details as per present process:

1. Pickle Sheepskins for Export

Soaking/Washing 30' - 120' (fresh skins)

Handfleshing, drain

Paint: 100 Liter water)
25 kg slaked lime) 25°Bé
6 kg Na_2S)

pile for 2 - 4 hours,

Dewool, by hand

Liming in paddle: (5 g/liter slaked lime
water 22°C (3 g/ " Na_2S run for 5' every hour, 48 hours
(1 g/ " Detergent

wash
trimm
Flesh on machine
Peltweight:

Deliming: 150 % water 25°C
1-1.5 % Ammoniumsulphate 60 - 90'
wash
water for bating: 30-35°C
add 0.01 % bating agent 10 000 L.V. 45'
pH 8 - 8.5

Pickle: 100 - 150% water 25°C
in drum + salt to 10° Bé
+ 0.5 % formic acid)
+ 1- 1.5 % Sulphuric acid) 3 hours.
+ Antiseptic/Antimould over night
next day run 30'
final pH 1 - 1.2
pile, select pickle water pH 0.59 No recycling of picklewater

2. Sheepskins for vegetable tanned lining leather

Further processing after the above pickle:
Degreasing: 10 % Kerosene
5 % salt, water 100 % 30'
drain

Tanning: 6 % Mimosa
7 % salt 16 hours
sam 100 % water
shave in wet condition
wash 50'
Tanning: 12 % Mimosa 6 hours stop over night
Fatliquor: 3 % synthetic Fatliquor 30' (Sulcodine 80)
(Fish Oil)
sam
dry
stake

Leather Fac'ory No. 4

3. Sheepskins for Nappa Garment

Further processing after the above Pickle:

Degreasing: Salt water 9 - 10° Bé 30'
10 % Kerosene)
6% Perchlorethylene) 90'
drain out
Salt water 9 °Bé
+ 1 - 1.5 % Detergent 30'
drain out

Salt water 9° Bé drain out, stop over night, next day

Depickling: after degreasing

add Sodiumbicarbonate until pH 3.2 in the Bath
pH 2.8-3 in the skins

add 1 % Relugan GTW 1 : 4 diluted 30'
add 1 % Lipodermliquor 1C (Diss.in hot water, cool down) 30'

Salt water 9 °Bé stop over night, drain out the next day

Tannage: 200 % water
8-9 % Chrome salt 33% basic 2 hours
+ 2.5 % Sodiumbicarbonate add) 7 hours
during 2.5 hours)
final pH 3.8

sam
Shave
Shaving weight:

Neutralization: 300 % water 40°C
1.5 % Sodiumbicarbonate 45'
full penetration
BCG indikator: fully blue
wash

Re-tanning/Dyeing: 300 % water 50 - 60°C
3- 3.5 % synth. retanning agent 60' XX
+ 1.5-2.0 % dye 45'
+ 2.0 % formic acid 30'
pH
+ 10.0 % synthetic sulphonated Fatliquor 90'
(Sandolix VP 72)
wash, pile

(XX Sellasol CR Liquid, or Syntan SC S+Z,and Retanning GN,Bayer, 50:50)

Sam- setting out

Drying: in Dryingtunnel at 40°C in winter
outside in the shade,in summer

Conditioning: no
Staking on Molissa type Machine
Dry shaving
trimming
Toggle dryer, 40°C

Finishing:

18 kg Pigment (Lepton)
45 kg water
25 kg Binder (Acryl EM and Corialbinder CHN)
1.5 kg Wax
1.5 kg Luronbinder U
0.2 kg Corial EM Finish G

2 - 3 spray coats on the spraying machine

100 kg Corial EM Finish G
100 kg water

1 spray coat, dry

Iron on Finiflex throughfeed Ironing Machine

Measuring on electronic Measuring Machine

Remarks:

For Nappa Garment, only Skins from the Selection 4,5 and 6 are finished. Selection 1,2 and 3 goes in Pickle Export.

Visit to the Aleppo Leather Factory, Aleppo

Meeting: Mm. Siham, Commercial Manager
Mr. Sabouh Issa, Production Manager

The General Manager, Mr. Fath Aldin Shehne has been in Germany

Production Capacity: per day
300 - 400 Hides approx. 6 Tons
3000 -4000 Skins " 8 Tons (Goat and Sheep)

Present Production:
(1 hide 20-25Kg) 200 Hides, wetsalted -No dry raw materials-
(1 skin 4 kg) 2000 Skins, "

Process for Shoe Upper leather from cattle hides:

Soaking: Water to cover, 20 - 25°C,
run 10 - 15 '
wash

200% water 20 - 25°C
0.4% detergent 20'
wash

200 % water 20 - 25°C
0.04 % Cortimol G (bactericide)
0.1 % Degreasing agent 20' + 10 hours, run every 1 hour for 5'

wash at 25°C

Liming: 100 % water
0.1 % degreasing agent)
0.5 % NAHS) 20'
+ 100 % water
+ 3 % lime powder)
1 % NA2S) 30'
+ 1.5 % NA2S. 30' + 24 hours
run every 1 hour for 5'

wash

Fleshing: Peltweight: a few hides are weight on a small scale to find a average weight per hide
The platform Scales are not operating

Deliming: wash at 35 - 37°C 15'
water to cover
+ 0.3 % sodiumbisulphite 10'

water 37°C wash 10'

water to cover
+ 4.0 % Ammonium Nitrate
0.025 % Bating agent (7500 units) 60'

wash

Pickle: water to cover (approx. 50 - 80 %)
+ 5.5 % Salt 20' check: 7°Bé
+ 0.5 % Formic acid 30'
+ 1.1 - 2.0 % sulphuric acid conc.,3 x diluted
run for 2 1/2 hours, stop over night
Final pH 2.9 - 3.0
+ 7 % Chrome MS/Chromitan 33%bas. 2 hours
+ 1 % Soda Ash diluted in 3 parts 40' each
+ 0.3 % Sodiumbicarbonate 30'
final pH 3.8 stop over night
+ 0.25 % Surface Oil (Aminox -123) 10'
+0.025 % Cortimol G (bactericide) 20'

Remarks: Chrome MS 30% Cr2O3, 50% basic

Chromitan B, Chromosal B, 33% basic, 25% Cr2O3
Salchromo

After sammying - Splitting - Shaving - Shaving weight:
further processing to:

A. Embossed leather, 2.2 - 2.4 mm
B. Box sides 1.6 mm
C. Goatskins Shoe uppers

Washing: Rechroming		A.(%)	B.(%)	C.(%)
Water 35 - 40°C		100	100	100
Glutaraldehyde	60'	2	-	-
Masking agent	30'	-	2	2
Chrome salt (33% basic)	60'	2	2	2
wash	10			
Water 35 - 40°C		100	100	100
Calcium Formiate	20'	1	1	1
Sodiumbicarbonate	20- 30'	0.5	0.6	0.6
pH		5.2-5.5	5.5	5.5
crosscut yelow		1/3	1/3	1/3
wash				
Retanning (Dye)				
Water 45 - 50°C		100	100	100
Dye	30'	-	0.5	0.5
Neosyn N)		2	-	-
Mimosa))	20'	3.5	3.5	3.5
Retingan R 7)		-	2.0	2.0
Drasil 470))	40'	2.5	2.0	2.0
Basyntan D))		1.0	0.5	0.5
check up exhaustion				
drain the bath				
Fatliquor:				
Water 50 - 55°C		100	100	100
Dye	30'	-	0.5	0.5
Derminol HSP)		2	2.5	2.5
Grassan PA)	60'	2.5	2.0	2.0
Sulphirol EG 60)		0.5	1.5	1.5
Coripol ICA)		1.0	1.0	1.0
Formic Acid	20'	0.5	0.5	0.5
Aminex cationic fatliquor	15-20'	0.5	0.5	0.5
pH 3.8 - 4.0				
wash cold				

Pile over night, sam-setting at low pressure, vacuum drying, leathers are still wet removed, after 2' drying, hang up in drying tunnel for nearly full drying, toggle, stake. To make the leather soft, 4 x staking is required.

Finishing:

A. Embossed Leather

Colour Spray:	250	parts	Bukesolar black RL
	250	"	Ethylglycol
	500	"	water
			1 spray coat, dry
Pigment Coat:	125	"	Black Pigment No.6
	150	"	Corialbinder AM
	100	"	Binder-emulsion S 3
	50	"	Luronbinder U
	50	"	Penetrator
	20	"	Impregnationbinder CDC
	50	"	Filler AQ
	400	"	Water
			1 spray coat, dry
	above spray mixture		
+	10	parts	Tuerkish Red Oil
	50	"	Wax Cerol 123
			1 spray coat
Top Coat:	100	"	Fast Black Laquer
	100	"	Ethylglycol
	200	"	Puthylacatate
	30	"	Wax Cerol 123
			1 spray coat, dry
			Emboss at 80°C, 250 ATM,
			6 seconds

B. Box sides and Goat Shoe Upper leather

Spray Coat:	125	parts	Black Pigment No.6
	200	"	Corial Binder AM
	100	"	Binder-emulsion S 3
	70	"	Luronbinder U
	50	"	Penetrator
	20	"	Impregnationbinder CDC
	50	"	Filler AQ
	350	"	Water
	50	"	Corial EM Finish G
			2 spray coats, dry
			plate at 70°C, 70 ATM
		+	1 spray coat, dry
Top Coat:	800	"	Corial EM Finish G
	200	"	Water
			1 spray coat, dry
			plate at 90°C, 70 ATM

C. Splits for embossing

Base Coat:

125	parts	Black Pigment No. 6
300	"	Euderm Resin 40 B Binder
50	"	Matting Agent S
100	"	Eukanol Binder FA
25	"	Filler FI 1261
100	"	Impregnationbinder CDC
50	"	Penetrator
50	"	Filler AQ
350	"	Water

1 pad coat, dry, emboss at 80°C
250 ATM, 6 sec.

Spray coat:

125	"	Black Pigment No.6
150	"	Corialbinder AM
100	"	Binder-emulsion S 3
50	"	Luronbinder U
50	"	Penetrator
20	"	Impregnationbinder CDC
50	"	Filler AQ
400	"	Water

1 spray coat, dry

Top Coat:

50	"	Emulsion Laquor Black
50	"	Water

1 spray coat, dry, plate at 70°C, 50 ATM

D. Sheep Garment Nappa

Spray Coat:

125	parts	Black Pigment No. 6
400	"	Corialbinder AM
3	"	Liquor of Ammonia
50	"	Binder-emulsion S 3
30	"	Wax Cerol 123
60	"	Filler FI 1261
40	"	Corial EM Finish G
300	"	Water

2-3 spray coats, dry

Top Coat:

200	"	Water
20	"	Corial Cire EG (Silicon)
800	"	Corial EM Finish G

1 spray coat, dry
Iron on Finiflex or any
through feed Ironing Machine

B. Sheepskin Lining Leather

Spray Coats:

145	Parts	Pigment
230	"	Corial Binder AM
70	"	Binder-emulsion S 3
50	"	Penetrator
20	"	Impregnationbinder CDC
50	"	Filler AQ
350	"	Water

3 spray coats, dry

Top Coat:

500	"	Corial EM Finish G
500	"	Water

1 spray coat, dry
plate at 75°C, 65 ATM

Process for Sheep and Goatskins:

Material: wet salted or fresh rawskins

Soaking: approx. 5 - 6 hours in paddle

Pile: 3-4 hours

Paint: 15 - 16°Bé Sodiumsulphide
15 - 16°Bé Lime Solution (from Lime powder)

final 30 - 35°Bé
apply to the flesh side by Machine or by hand

Pile: 10 - 12 hours

Dewool: By Machine or by hand

Liming: Water Temp. 25°C
2 % Lime powder
2.5% Sodiumsulphida
0.5% Salt Total time 48 hours

Wash well:
Fleshing: on Mac ine
Trimming: by hand (2 Persons)

Deliming: 200 % water 35 -37°C
2 % Ammoniumnitrate 30'
+ 0.02 % Enzyme (50000 Units) 45'(Goatskins: same)

drain out
Wash well: at 30°C
drain out
Degreasing: + 5 - 7 % Perchlorethylen 45' (Goatskins only)
+ 1 % Detergent 30' (2% Detergent, 45')
(35°C)
Wash well: with cold water

Pickle: 70 % Water
8 % Salt 10'
+ 0.04 % Cortymol G (Bactericide) 10'
+ 0.5 % Formic acid 20'
+ 0.8 % Sulphuric Acid conc. 90'

for pickle Skins, export, final pH 1 - 1.2
for Chrome tanning skins, " " 3.5 - 3.6

stop over night

Chrome tanning:
drain cut 50 % of pickle bath
+ 7 % Chromitan MS 8 hours
Pile: final pH 3.9 - 4.0

Sam, shave

Wash: at 25 - 30°C

Degrease: 100 - 70 % water 25 -30°C
+ 0.5 % Detergent 20'
Wash: at 25 - 30°C

Retanning: 100 % Water 30 - 35°C
+ 2 % Sindial (Glutaraldehyde) 60'
+ 2 % Chromesalt 33% basic) 60'

Wash:

Neutralization:	100 %	Water 35°C	
+	1 %	Calciumformiate	20'
+	0.3 %	Sodiumbicarbonate	30'

Float pH 5.6 - 5.8

Wash: at 40°C

Retanning II:

	100 %	water 40°C	
+	1 %	Mimosa	20'
+	1.5 %	Basyntan DLE	20'
+	2.5 %	Drasil 470	40'

drain out

Fatliquoring:	100 %	Water 50°C	
+	5 %	Grassan PA	)
	2.5 %	Derminol HSP	) 60'
	1.5 %	Coripol ICA	)
	4 %	Sulphirol EG 60	)
+	0.5 %	Formic Acid	

final pH 4.0

Process for the Retanning of Lining leather

(from Soeking to Chrometanning, as above)

Wash: normal Water

Retanning:	100 %	Water 25°C	
+	2 %	Syntan VB	40'

Wash:

	100 %	Water 25°C	
+	7 %	Basyntan CD	120'

stop over night

Wash:

Neutralization:	100 %	Water 30°C	
+	2 %	Sodiumbicarbonate	20'

Float pH 5

Wash:

Dye/Fatliquor:	100 %	Water 45°C	
+	0.5 %	Baykanol 3L	15'
+	0.5 %	Dye (dissolved)	20'
+	2 %	Derminol HSP	)
	1 %	Coripol ICA	) 40'
	1.5 %	Sulphirol EG 60	)
+	0.5 %	Formic Acid 1:10	20'
+	1.0 %	Cortimol G (Bactericide)	30'

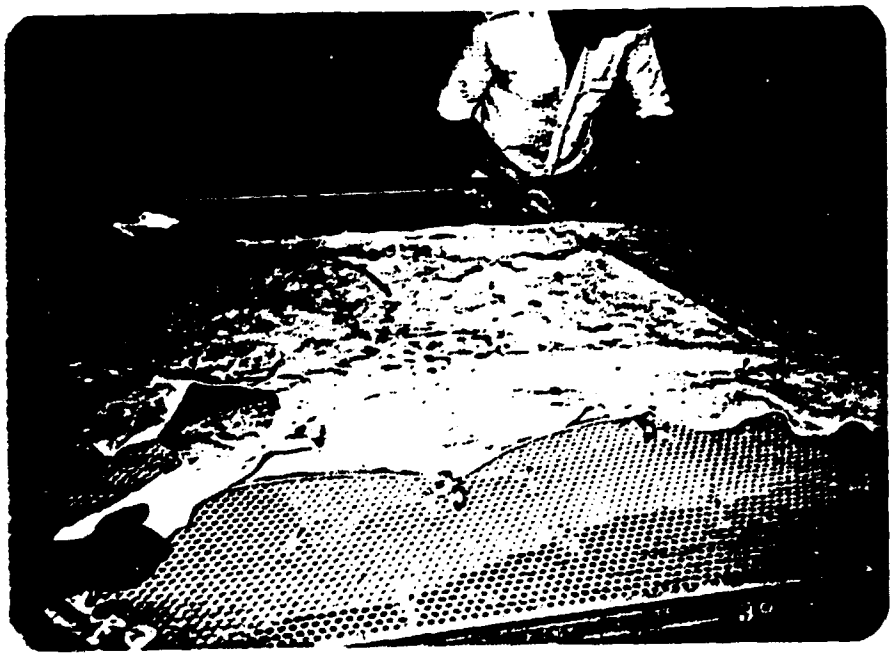
Final pH 4.0

Wash: normal Water

Visits to Shoe Factories at Kwai Hing and Kwai Chung:

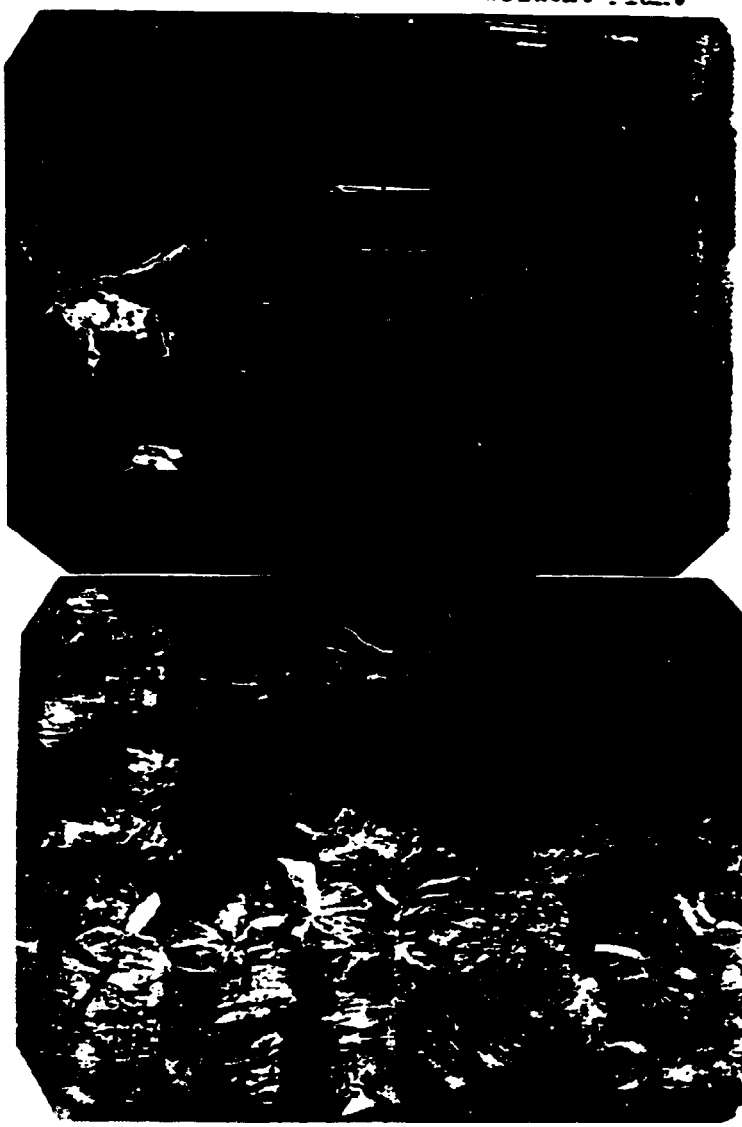
Visit to Leather Factory No. 1, Jamaica

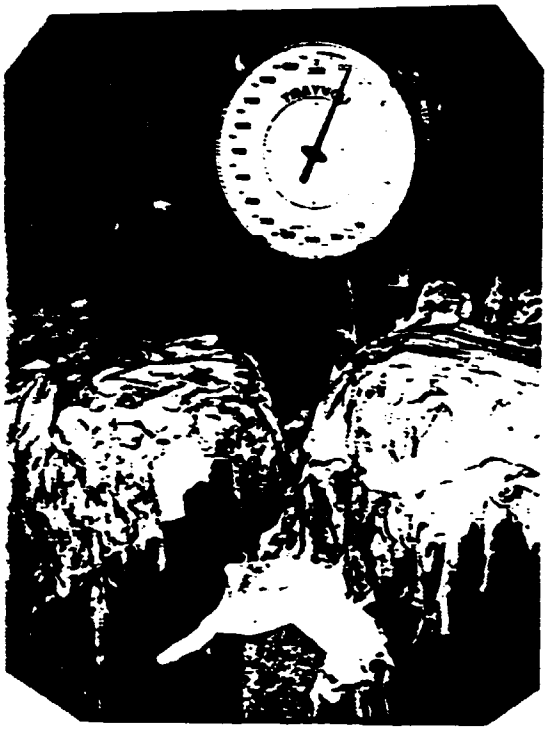
Vacuum drying : Double toggling



Visit to Leather Factory No. 4 Damascus

Machines
Scales
Storing pickled skins
Effluent Plant





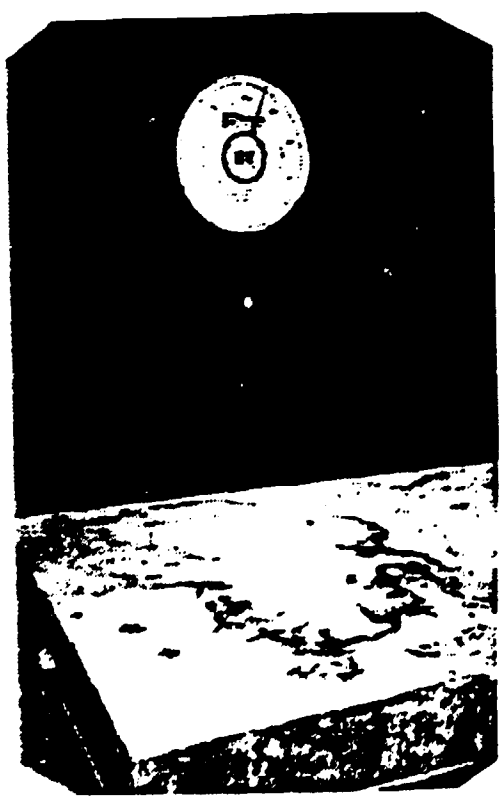
Visit to the Leather Factory at Aleppo

Training Lecture

Technical Staff

Toggling in dry condition

Scales out of order



Balance in order

Effluent treatment plant