European Union Network for
the Implementation and Enforcement
of Environmental Law

INSPECTAN: ENVIRONMENTAL INSPECTION GUIDELINES FOR THE TANNING INDUSTRY

BASIC PRINCIPLES FOR UNDERSTANDING POTENTIAL ENVIRONMENTAL THREATS CAUSED BY THE TANNING INDUSTRY

FOREWORD

The European Union Network for the Implementation and Enforcement of Environmental Law is an informal network of the environmental authorities of EU Member States, acceding and candidate countries, and Norway. The European Commission is also a member of IMPEL and shares the chairmanship in its Plenary Meetings.

The network is commonly known as the IMPEL Network

The expertise and experience of the participants within IMPEL make the network uniquely qualified to work on certain of the technical and regulatory aspects of EU environmental legislation. The Network's objective is to create the necessary impetus in the European Community to make progress on ensuring a more effective application of environmental legislation. It promotes the exchange of information and experience and the development of greater consistency of approach in the implementation, application and enforcement of environmental legislation, with special emphasis on Community environmental legislation. It provides a framework for policy makers, environmental inspectors and enforcement officers to exchange ideas, and encourages the development of enforcement structures and best practices.

Information on the IMPEL Network is also available through its web site at: http://europa.eu.int/comm/environment/impel

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Executive Summary

The present report originates from the results of a questionnaire, discussed in meetings held over the interval October 2004 – June 2005. The discussion concentrated on the economics; the production processes; laws and regulations; inspection procedures.
The report is conceived as a tool for the public bodies involved in controls and in monitoring activities on the tanning industry. To this end it collates the experiences of several European contexts of the leather and tanning industry.

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0. Summary

Environmental inspections are a key activity in the implementation and enforcement of environmental law, and are essential to secure a high level of environmental protection.
IMPEL attaches great importance to environmental inspections. A paper on *Minimum Criteria for Inspections* was presented to the Commission at the end of 1997, and published in June 1998, in response to the invitation contained in the *Commission Communication on Implementing Communitiy Environmental Law.* IMPEL is further developing the work in this area by considering in more detail different aspects of inspections following the recommendations in the paper.

The main objective of INSPECTAN is to provide a set of inspection guidelines based on the knowledge of the industrial cycle and of the environmental impacts of the tanning industry.

The project manager are the regional environmental protection agency of Veneto (ARPAV) and Tuscany (ARPAT) and APAT, the project team is composed by representatives from France, Germany, Italy, Latvia, Poland, Spain and Sweden, the Italian Tanning Industrial Associations (for Industries and for craftsmanship), members of ARPAV, ARPAT and from Venetian and Tuscany environmental authorities.

A questionnaire was sent to the participants before the first meeting, with the objective to gather information from the participating countries on:

- the specific industrial sector
- the permitting system
- inspections and controls

The results of the questionnaire were discussed in three meetings held over the period October 2004 – May 2005. The meetings also detailed several aspects of the leather and tanning industry in individual member States. Among these were: the economics; the production processes; laws and regulations; inspection procedures. The review of the different national contexts allowed for the definition of guidelines relative to control and inspection on tanning activities.

This report is conceived as a tool for the public bodies involved in control and monitoring activities on the tanning industry in The European Union. To this end it gathers the experiences of several European countries having leather and tanning industries.

At the beginning of each chapter and sub-chapter a comparison table provides an overview of the differences and/or similarities among the participating countries, as to the issues treated in the chapter.

In the effort to compare methods and approaches used in the participating countries, some difficulties arose due to:

- different units of measurements used in the transposition of the Directives into national legislations;
- different ways to express the utilization and consumption of raw materials, products used for tanning (for example, some countries reported to total quantity of solvents used, while others reported the amount of solvents in tons per hide/skin);
- different environmental impacts;
- different approach in data collection on tanning industries due to different types of environmental inspections/controls;
- for some countries data on environmental balance are not available for the whole territory but only for some tanning activities, and in some cases, only for plants inspected by the participants to the project.

Finally differences between IPPC and non IPPC plants were not taken into account because:

- many national legislations ignore differences in control activities for the two types of installations;
- annex I of Directive 61/96/EC defines the IPPC tannery as one that produces a certain daily weight of finished hides and skins. But only vegetable tanning industry quantify leather production in weight, while the chromium tanning industry, in some participating countries, quantifies the finished product in terms of surface. In conclusion, only in the first case is it possible to specify if a tannery is an IPPC plant or not. Moreover tanneries products frequently leave the installation in wet form ("wet blue"), and consequently weigh considerably more than the final product. A conversion factor is needed to convert wet blue into leather for tanneries producing wet blue only.

1. ECONOMIC AND PRODUCTIVE ASPECTS

1.1 NUMBER AND SIZE OF TANNING ACTIVITIES

The following table tries to give a confrontation on the number and types of tanning activities between the participating countries.

The available data evinces that there are few IPPC plants, the reason to this is that the threshold to become an IPPC plant is 12 tons/skin/hide tanned daily. Another reason is that annex I of Directive 61/96/EC defines the IPPC tannery as one that produces a certain daily weight of finished hides and skins. But only vegetable tanning industry quantify leather production in weight, while the chromium tanning industry quantifies the finished product in terms of surface. In conclusion, only in the first case it is possible to specify if a tannery is an IPPC plant or not.

COUNTRY	NUMBER OF PLANTS	IPPC PLANTS	COMPLETE CYCLE	FINISHING OPERATIONS	TANNING OPERATIONS HIDE & SKIN	WET BLUE	OTHER
FRANCE	78	3	Almost all hide tanning operations		25 & 53	2	
GERMANY	41	none	25	12	4		Not known number of plants with less than 20 employees
ITALY Vicenza Santa Croce Solofra	 2.330 910 368	n. a.[1] n. a. n. a.	 67 193 chromium 166 vegetable	 90 45	 176 30	 56	 Remainders activities with no impact on environment 476 auxiliary activities
LATVIA	3	none	2		1		
POLAND	3000	n. a.	Most of them				
SPAIN	221	n. a.					
SWEDEN	6	1	all				

The next paragraphs give a more detailed explanation to the above mentioned table.

[1] N. a. not available data

FRANCE
In the year 2002 78 tanneries -3 of them IPPC- were in operation employing 2.400 people. Hide tanning consisted of 25 activities employing 1.454 workers, while 53 skin tanneries (*megisseries*: bovine, caprine, wild/exotics) employed 946 workers.
Almost all of the hide tanneries operate on a complete cycle, while two of them concentrate on wet blue only. Three of the largest *megisseries* operate complete cycles, while three *megisseries* operate complete cycles on wild/exotics only.

GERMANY
The tanning sector consists of 41 plants with 20 to 350 employees. Only 25 of these operate the complete cycle While 12 are limited to finishing operations, and 4 are limited to tanning.
There are no IPPC-plants in Germany, as none exceeds the threshold of 12 tons of skins/hides tanned daily.
The number of plants with less than 20 employees is not known.

ITALY
In the year 2002 2.330 tanneries employing approximately 36.000 people were in operation.
The Vicenza district consists of 720 tanneries employing approximately 11.610 workers. Sixty seven tanneries operate with complete cycles; 56 operate on the wet segment only (tanning and dyeing); 90 finish only; 176 concentrate on other tanning operations; the remainder are activities which do not generate impacts on the environment.
The Santa Croce district consists of 910 tanneries employing approximately 8.460 workers. 193 tanneries operate complete chromium cycles while 166 operate complete vegetable tannins cycles; 30 concentrate on tanning only; 45 concentrate on finishing operations; 476 operate on auxiliary activities.
The Solofra district consists of 368 tanneries employing 4.676 workers.

LATVIA
Three tanneries are in operation. Two operate complete cycles, while one concentrates on tanning only.

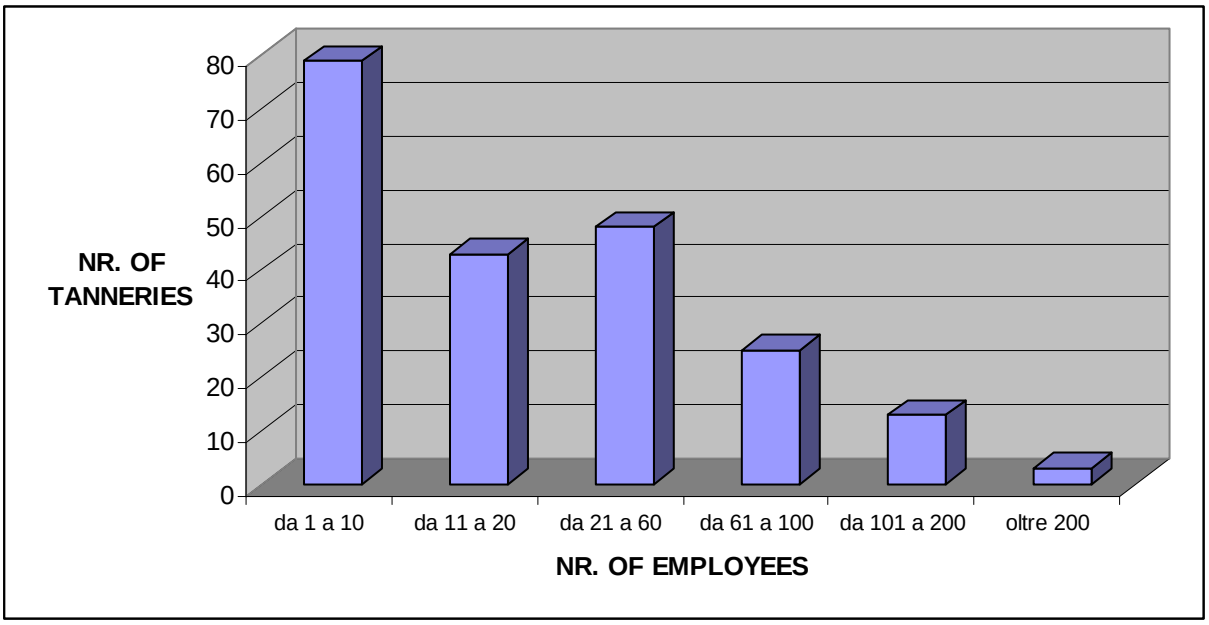
POLAND
The tanning sector consists of 3.000 activities, most of which operate the complete cycle. Workforce inventories are not available.

SPAIN
A slight decrease of the number of tanneries over the interval 1998 – 2001, is apparent for the Spanish leather and tanning industry. In the year 2001 221 tanneries were in operation employing 7.122 people.

	NR. OF TANNERIES				**NR. OF EMPLOYEES**			
CC.AA.	**1998**	**1999**	**2000**	**2001**	**1998**	**1999**	**2000**	**2001**
Catalunya	110	105	91	87	3700	3250	3362	3256
C. Valenciana	70	64	62	61	2098	1900	1870	1845
Murcia	27	25	25	25	1000	980	968	985
Madrid	17	16	16	12	322	230	230	156
Others	31	31	29	26	880	930	968	880
TOTAL	**255**	**241**	**223**	**211**	**8000**	**7290**	**7399**	**7122**

The graph below distributes the Spanish tanning activities of the year 2001 according to their workforce size.

The present trend is a decrement of the number of tanneries and general increase of the workforce. Yet, small or medium sized activities with workforce ranging 1 to 10, are still very relevant (38%) in Spain.



The average concentration of the sector –i.e. number of employees / number of activities- is the following: Murcia 39,4 - Catalunya 37,4 – Valencia 30,2 – Madrid 13,0.

SWEDEN

Six tanneries are in operation: a large one (in the IPPC class), three medium sized, two modest. The large IPPC tannery employs 300 people. All tanneries operate complete cycles.

1.2 LOCALIZATION OF TANNERIES

This table shows the localization and distribution, where available, of the tanning activities in the participating countries. All activities lie near water courses (big or small rivers), from where they gather water for the process, and into which they emit treated waste waters.
Only Italy has tanning districts, while other countries have their tanneries dislocated and scattered over the countryside.

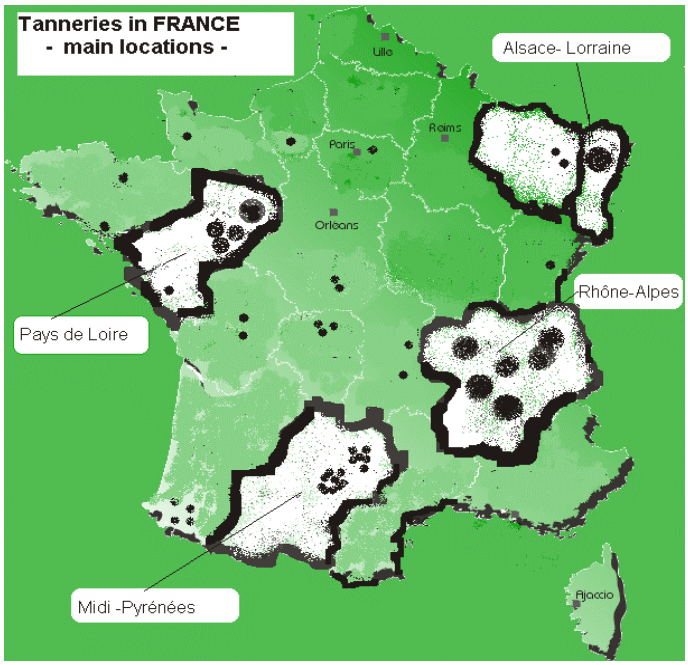
COUNTRY	NEAR WATER RESOURCE	NEAR URBAN AREAS	NEAR LIVE-STOCK RRESOURCES	INDUSTRIAL ZONES	ISOLATED	SCATTERED	DISTRICTS
FRANCE	X	X	X		n. a.	n. a.	n. a.
GERMANY	X	X		X	X	X	
ITALY Vicenza Santa Croce Solofra	 X X	 X X		 X X			 X X X
LATVIA	X	X		x	n. a.	n. a.	
LATVIA	n. a.	X			n. a.	n. a.	n. a.
POLAND	X				X	X	
SPAIN	X	X	X	X	n. a.	n. a.	n. a.
SWEDEN	X	X			X		

The next paragraphs give a more detailed explanation to the above mentioned table.

FRANCE

Most of the existing tanneries were active on the same location early in the 900's. They are located typically near live-stock sources, and in major hydrogeological areas. Major tanneries are not far from urban centres. 66% of the *megisseries* are located in the Midi-Pyrenees region, where the cities of Graulhet and Mazamet alone represent 33% of this sector.

The region Rhone-Alpes represents 28% of the hide tanning sector. Regions Alsace-Lorraine and Pays de Loire represent respectively 25% and 8%.



GERMANY

Tanneries are isolated and scattered. Most of them are in Bavaria, Baden-Wuerttemberg and North Rhine Westphalia. Rivers are usually present where tanneries are located. Tanneries are located in residential as well as industrial areas.

ITALY

Tanning activities are mainly concentrated in three districts near Vicenza (Veneto), Santa Croce sull'Arno (Tuscany), Solofra (Campania).

DISTRICT OF VICENZA

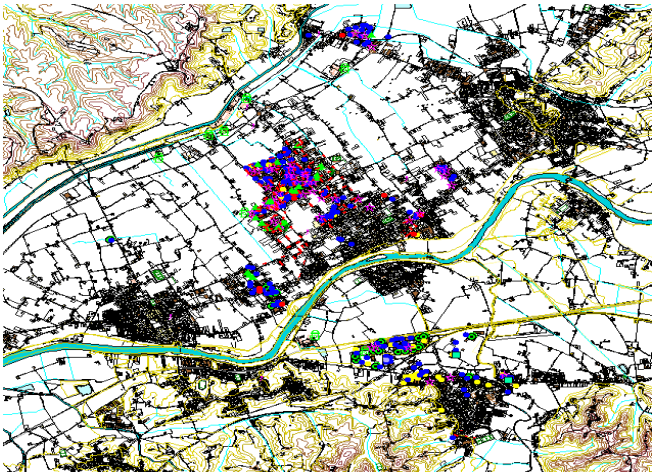
Tanneries are located in residential or industrial areas of municipalities extending west of Vicenza.

The area is relevant for the underground catchment of drinking water. Following pollution caused by tanneries, a large waste water collector pipe, built in the '90's, discharges the treated tanning districts waste waters, in a water canal allowing for increased dilution of the pollutants. Previous to this, treated water was released in streams which due to their low water volumes built up high pollutants' concentrations.

VICENZA TANNING DISTRICT

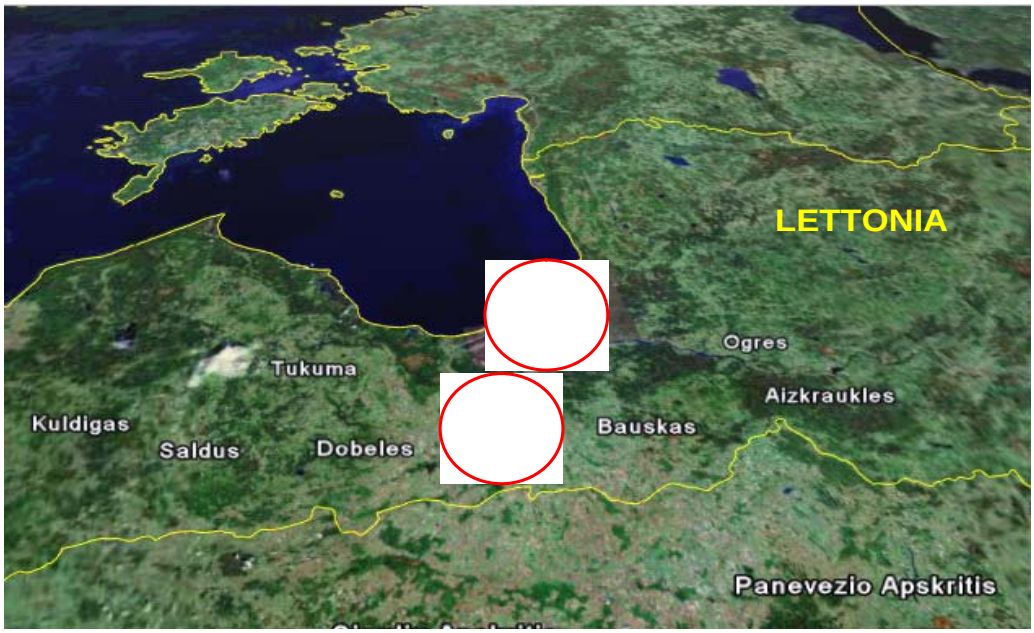
DISTRICT OF SANTA CROCE

The growth of tanneries and related activities led here to a compact texture of tanneries, water treatment consortium and residential areas. Environmental problems caused by pollutants released by tanneries and waste water treatment plants, are a major concern of the inhabitants and the relevant institutions as well. The River Arno, a major water body crossing the district, allows for intense dilution of the pollutants' concentrations relevant for the tanning activity.



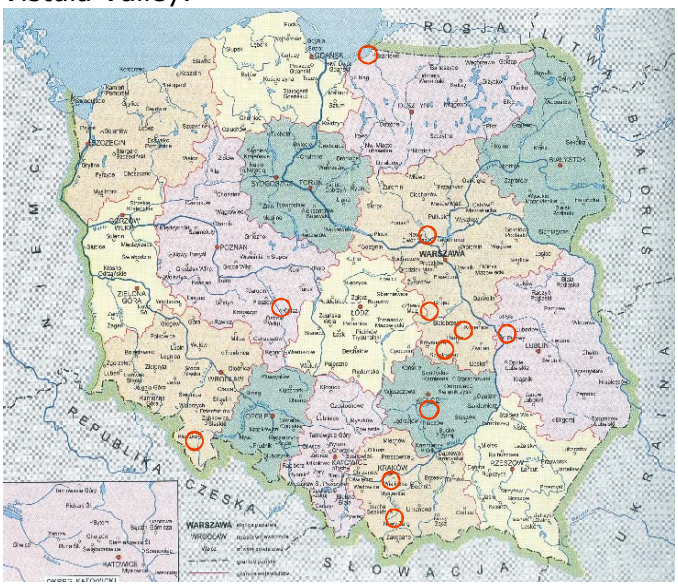
LATVIA

Two tanneries lie in a residential area of Jelgava, a city of 66.000 inhabitants. The third tannery lies within the city limits of Riga, 1.000.000 inhabitants.



POLAND

Tanneries are to be found isolated and scattered. Most of them are located along the River Vistula Valley.



SPAIN

Tanning is concentrated on the Mediterranean and particularly in Catalunya and Valencia (see map below).

Tanneries are found in residential, rural, or industrial areas.

Rivers, typically associated to tanneries, provide water to the tanning processes. Process waters are treated in waste water treatment plants.

SWEDEN
Great distances separate each tannery from the remainder. Each tannery lies near a river or stream.
Major tanneries are not far from residential areas. Schools are found at 150m from such activity.

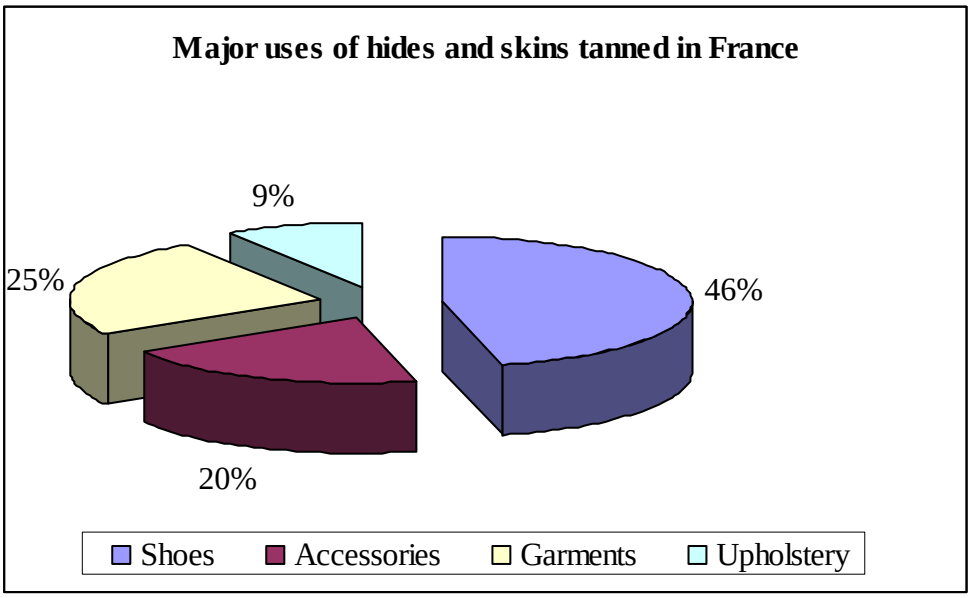
1.3 FINISHED SKINS AND HIDES

The table below shows the finished products of the tanning industry in the participating countries, most of the finished hides/skins are used for the production of shoes, upholstery, accessories (small articles) and garments. The X represents the final use, but the % is unknown.

COUNTRY	SHOES %	ACCESSORIES %	GARMENTS %	UPHOLSTERY %	OTHER %
FRANCE	46	20	25	9	
GERMANY	20	10		70	
ITALY	49	11	10	26	4
LATVIA		X	X	X	
POLAND	40	45			
SPAIN					
SWEDEN	X	X	X	X	X

The next paragraphs give a more detailed explanation to the above mentioned table.

FRANCE
In the year 2002 hides and skins finished in France amounted to 10 million m^2. The graph below measures the chief uses.

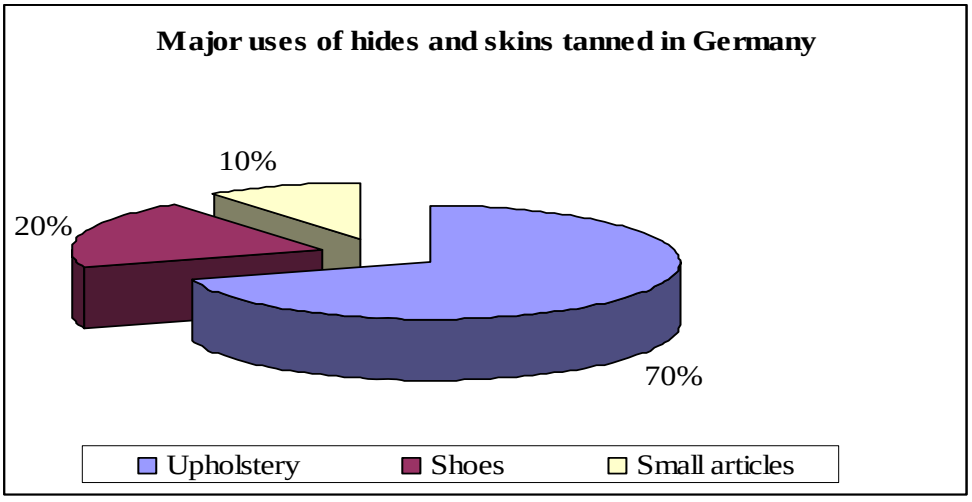


Export of hides and skins finished in France, and regions of destination					
Region of destination	**European Union**	**Other European countries**	**Africa**	**Asia**	**America**
Exported amounts as percentage	51	5	22	16	6

The table shows approximately 50% of the hides and skins tanned in France is exported outside the European Union, and particularly to Africa and Asia.

GERMANY

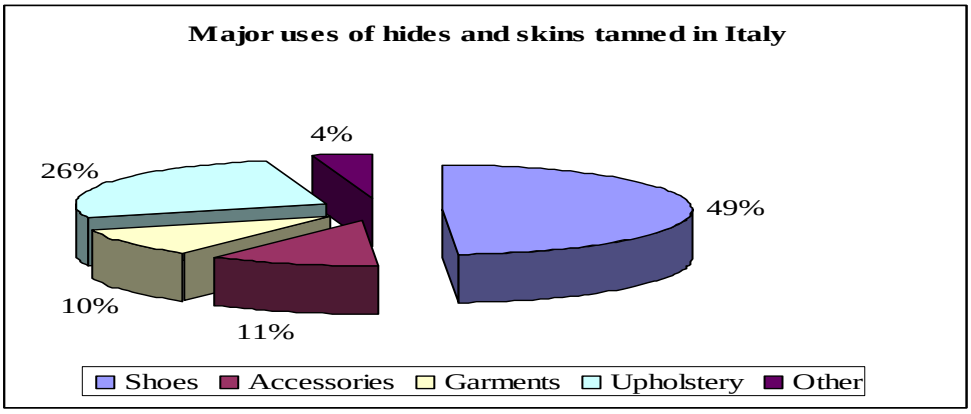
The annual production of finished hides and skins in 2003 was 15 million m^2. The graph reports major uses of the tanned material. Export represents 45% of the turn over.



ITALY

In the year 2002 the Vicenza tanneries' district produced 168 million m^2 of finished hides and skins. In the same year the Santa Croce tanneries' district produced 65 million m^2 of chrome-finished hides and skins and 53.000 tons of vegetable tanning-finished hides and skins.

Although both the Vicenza and Santa Croce productions are largely absorbed in upholstery and shoes, the second one mainly turns out sole leather. The graph below measures the chief uses of hides and skins tanned in Italy.



Export represents approximately 70% of the turn over in the districts of Vicenza and Santa Croce.
Export made up approximately 50% of the Vicenza district 2001 production.

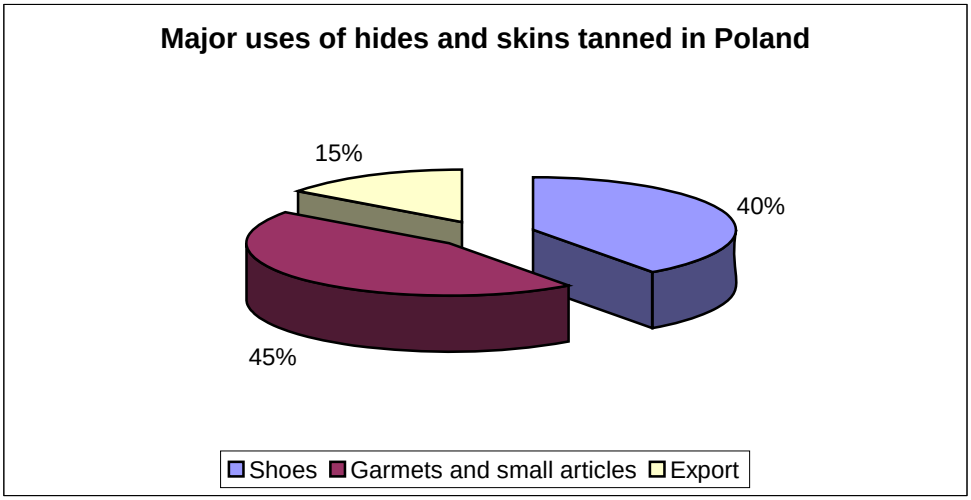
LATVIA
The 3 existing tanneries produce 36 tons of finished hides/skins, annually. The tanned material is chiefly used for garments, upholstery, small articles.

POLAND
In Poland, tanneries with more than 50 employees turn out 6 million m^2 of finished hides and skins.

The table below quantifies inputs (square metres of raw hides/skins) and outputs (tons of tanned hides/skins) of tanneries in Poland, over the interval 1998-2003.

	YEAR					
	1998	**1999**	**2000**	**2001**	**2002**	**2003**
Hides and skins tanned (thousands sqm)	11.600	8.900	8.700	6.800	6.100	6.000
Raw hides and skins (tons)	57.200	46.500	45.800	37.000	33.200	31.850

Tanned hides and skins are used for shoes (40%), garments and small articles (45%), or exported (15%) as shown in the graphic below.



SPAIN

The tables below list the chief regions of export of the tanned skins' and hides' and the relative size of the exports; the animal origin of the tanned material with relative values and quantities. 39 million m^2 of raw hides and skins were tanned in the year 2003 in Spain.

Export regions and relative export estimates of hides and skins tanned in Spain

	YEAR				
DESTINATION (thousand of €)	**1997**	**1998**	**1999**	**2000**	**2001**
EUROPE	295.932	283.263	246.048	332.155	396.926
ASIA	159.310	50.437	65.516	75.818	71.136
AMERICA	29.870	34.871	30.267	41.891	39.198
AFRICA	5.836	4.417	4.291	6.497	17.568
OCEANIA	295	331	307	643	475
TOTAL	**491.243**	**373.319**	**346.429**	**457.461**	**525.303**
EUROPEAN UNION	240.789	230.789	215.866	277.031	325.208
EAST EUROPE	10.530	10.878	10.626	16.293	20.759
OTHER EUROPEAN COUNTRY	44.601	41.590	18.283	37.485	49.758

Animal origin and relative estimates in euros of raw hides and skins imported in Spain

	YEAR				
ANIMAL ORIGIN (thousand of €)	**1999**	**2000**	**2001**	**2002**	**2003**
BOVIN	194.926	246.415	272.072	202.052	209.416
SHEEP	29.275	37.720	51.092	29.950	26.484
GOAT	31.637	46.134	62.932	43.643	41.549
PIG	35.922	43.612	62.908	47.699	40.400
OTHER	6.076	8.835	6.060	7.333	7.789
TOTAL	**297.836**	**382.725**	**457.064**	**330.677**	**325.638**
DOUBLE FACE	5.908	50.97	6.725	9.819	7.266
TOTAL EXPORT	**303.744**	**387.822**	**463.789**	**340.496**	**332.904**

Animal origin and relative estimates in square metres of raw hides and skins imported in Spain

	YEAR				
ANIMAL ORIGIN (thousand of sq m)	**1999**	**2000**	**2001**	**2002**	**2003**
BOVIN	27.200	28.300	27.700	24.099	22.653
SHEEP	11.600	14.000	14.300	11.154	9.927
GOAT	2.330	3.350	3.750	3.825	3.369
PIG	-	-	-	-	-
DOUBLE FACE	3.100	3.500	3.300	3.828	3.369
TOTAL EXPORT	**44.230**	**49.150**	**49.050**	**42.906**	**39.318**
SOLE LEATHER	5.700	5.500	5.500	5.800	4.820

SWEDEN

Ignoring one very small tannery, the total national production reaches approximately 2,3 million m^2 of finished hides and skins. The table below lists data relative to the largest tanneries in Sweden.

	Plant A	Plant B	Plant C	Plant D
Finished	2.2 millions	13.69 tons	110 000 m²	?
Raw hide	10 488			315
Type of	Bovine	Reindeer,	Bovine	Sheep, elk, ostrich, bovine
Kind of	Furniture, leather to automotive	Shoes, bags, backpackers	Furniture, harnesses, bags,	Sheepskins, tanning manufacture
Market	Both inner market and export	Inner market	Inner market, some export	Inner market
Kind of	Chrome and chrome	Vegetable	Vegetable	Chrome and chrome

1.4 ORIGIN OF RAW HIDES/SKINS

The table below shows the origin of raw hides and skins used in the different MS, the X represents the type of skin/hide used in the production cycle, but the origin is unknown.

COUNTRY	BOVINE	SHEEP/ LAMB	GOAT	PELTRY	PIG	GENERAL RAW HIDE/SKINS
FRANCE	X	Australia and New Zealand	X			
GERMANY	German origin					
ITALY Vincenza Santa Croce						Australia, Latin America, South Africa Italian and EU Countries slaughterhouses
LATVIA	X			X	X	Mainly Latvian and Baltic origin
POLAND						25 % imported, the rest is of polish origin
SPAIN	X	X	X		X	
SWEDEN						Swedish and Norwegian origin

The next paragraphs give a more detailed explanation to the above mentioned table.

FRANCE

38% of raw bovine hides (calf included) is imported. 48% of raw sheep/lamb skins is imported (Australia and New Zealand). 72% of raw goatskins is also imported.

GERMANY

Mainly fresh bovine hides from German origin are used.

ITALY

Raw hides/skins tanned in the Vicenza district mainly originate from Latin America, Australia, South Africa. Raw hides/skins tanned in the Santa Croce district originate from Italian

slaughterhouses (20%), from slaughterhouses in other member States of the European Union (50%), or from other countries.

LATVIA
Raw hides/skins tanned in Latvia are mostly calf, pig, peltry. Data on the countries of origin are not available.

POLAND
25% of raw hides/skins tanned in Poland is imported, while the rest has Polish origin.

SPAIN
Data on countries of origin of the raw material was not available. The table below lists estimates of square metres of raw hides/skins processed.

	YEAR				
	1999	**2000**	**2001**	**2002**	**2003**
Cattle	27.200.000	28.300.000	27.700.000	24.099.000	22.653.000
Sheepskin	11.600.000	14.000.000	14.300.000	11.154.000	9.927.000
Goatskin	2.330.000	3.350.000	3.750.000	3.825.000	3.369.000
Pigskin					
Double face	3.100.000	3.500.000	3.300.000	3.828.000	3.369.000
Total	44.230.000	49.150.000	49.050.000	42.906.000	39.318.000

SWEDEN
Raw hides/skins tanned in Sweden have Swedish or Norwegian origin.

Short comments

There is a trend of decrement of the number of tanneries over the years in the member States. The data reported highlight Italy and Poland having the highest number of tanning activities. Spain, France, Germany, Sweden, Latvia follow in order of importance.

The number of activities inventoried in Italy as tanning activities, include tanneries as well as operations concentrated on finishing the tanned material only.

Most tanning activities in Italy and Spain are small operations, employing from one to 10 people.

Tanning concentrates in general on hides or skins from bovines, sheep, goats. While France has relevant activities on skins of exotic/wild species, Sweden processes a small quantity of reindeer hides.

Tanneries appear invariably associated to rivers or streams, providing water for the various operations of the tanning cycle and to provide as receiving water body for the treated waste water. In France the sites of tanneries appear also associated to the presence of slaughterhouses and/or livestock.

Alternatives for the direct discharge of treated waste water are used if only a very small water body is nearby. The treated waste water of the tanning district of Vicenza for example is

released by a large pipe into a more distant larger water body in order to avoid an impact to the small water body.

On a geographical basis tanning activities appear scattered and isolated with the exception of Italy. Here, the concentration of tanning activities developed into districts compacting tanneries together with consortia specialized on waste treatment and waste water treatment operations. The different situations require different inspection approaches. For example, in isolated plants direct inspections are appropriate, while monitoring of immissions related to the tanning processes is useful in tanning districts to get a general idea of the environmental performance of the various plants in the district.

When the amounts of finished hides/skins are considered, it is immediately apparent that the quantity produced by the tanneries' district of Vicenza exceeds all others combined, by one or two orders of magnitude.

Inventories are heterogeneous and do not allow for calculations of the amounts of finished hides/skins, or to ascertain final uses. Extreme examples are Poland, where the known quantity of finished hides/skins is that produced by tanneries with more than 50 employees, or Latvia where finished hides/skins are inventoried by weight only.

Especially Germany, Sweden, Poland appear to concentrate on indigenous raw hides/skins.

The raw material tanned in Italy predominantly originates in Latin America, Australia, South Africa.

There are no data on the countries of origin of raw hides/skins finished in Spain and Latvia.

2. ENVIRONMENTAL ASPECTS

2.1 SOLVENTS ANNUAL CONSUMPTION

The following table shows the annual consumption of solvents, as can be noticed, it is difficult to make some confrontation due to the differences and lack of information provided by the MS

COUNTRY	YEAR	QUANTITY	TYPES OF SOLVENTS
FRANCE	No recent data		Acetone, butylacetate, ethylacetate, methylethylketone (MEK), methylisobutylketone (MIBK)
GERMANY	2003	600-700 tons	
ITALY Vincenza Santa Croce	2003 2002	9700 tons 5000 tons	
LATVIA		580 tons	salt, sodium Carbonate, sodium carbonate, hydrogen sulphide and sodium hydroxide
POLAND		Aggregate data not available	average consumption per tonne of raw hide/skin: pastes 12 kg/ton, varnishes 5 kg/ton, colours 12 kg/ton, waxes 16 kg/ton.
SPAIN		3000 tons	
SWEDEN	2003	47 tons	of which 7 tons were trichloroethylene. Alcohols, esthers, ethers are the most common solvents in the industry

The next paragraphs give a more detailed explanation to the above mentioned table.

FRANCE
The Ministry does not have recent data on the relevant consumption in the tanning industry. Acetone, butylacetate, ethylacetate, methylethylketone (MEK), methylisobutylketone (MIBK), were among the most common solvents in the industry.

GERMANY
The annual consumption in 2003 reached 600-700 tons.

ITALY
In the year 2003 9700 tons were used in the Vicenza district. In the year 2002 5000 tons were used in the Santa Croce district (Agenda 21: environmental report 2002 – local action plan). Data are not available for the district of Solofra (near Naples).

LATVIA
Total consumption reaches 580 tons. Most widely used were: salt, sodium Carbonate, sodium carbonate, hydrogen sulphide and sodium hydroxide.

POLAND
Aggregate statistics are not available. There are however information on average consumption per tonne of raw hide/skin: pastes 12 kg/ton, varnishes 5 kg/ton, colours 12 kg/ton, waxes 16 kg/ton.

SPAIN
The available information suggest 3000 tons/year are used in the tanning industry nationwide.

SWEDEN
Consumption in the year 2003 reached 47 tons of which 7 were trichloroethylene. Alcohols, ethers, ethers are the most common solvents in the industry.

2.2 CHEMICALS ANNUAL CONSUMPTION

The following table shows the quantity of the same chemicals used in different countries, but it is not possible to confront the information as the years of references are different and the size and number of the plants differ from each country.

CHEMICALS USED	ITALY Santa Croce 2003	ITALY Vicenza	FRANCE 2002	POLAND
sodium sulphide	7.262 tons		40 kg/t hide	6 kg/tons hide
hydrated lime	1.3736 tons	X	50 kg/t hide	
sulfuric acid	1.876 tons		30 kg/t hide	6 kg/tons hide
chrome salts	6.077 tons	X	100 kg/t hide	
Finishing agents			40 kg/t hide	
natural tannins	2.6413 tons	X	300 kg/t hide	
various re-tanning agents	348 tons		40 kg/t hide	
Colouring agents			40 kg/t hide	
Fat liquoring agents			120 kg/t hide	
Organic solvents			200 kg/t hide	

The next paragraphs give a more detailed explanation to the above mentioned table and incorporates the information with the countries not mentioned in the table.

FRANCE

Chemical substances	Max.quantity (kg/t of hide)	Quantity (t) of hide put into water Year 2002	Annual quantity used (t) Year 2002
Sodium chloride	400	59126 *	23,650
Sodium Sulphide	40		2,365
Lime	50		2,656
Sulphuric acid	30		1,773
Chromium salt	100		5,912
Organic solvents	200		11,825
Vegetable tannins	300		17,737
Fat liquoring agents	120		7,095
Finishing agents	40		2,365
Retanning agents	40		2,365
Colouring agents	40		2,365

*** calculated with an average weight of a sheepskin about 4 kg, and an average weight of a goatskin about 2 kg**

The annual aggregate consumption of chemicals according to the product column2 x column3, is 80,000 tons.

GERMANY
Available data are only qualitative and relative to the various tanning phases.

Operation	Chemicals and auxiliaries used
Soaking	Alkali, wetting agents, biocides, enzymes
Liming/drum painting	Lime, alkali sulphides, thioalcohols, enzymes
Deliming/bating	Organic and inorganic acids and salts thereof, e.g. ammonium salts; carbon dioxide, enzymes
Pickling/chrome tanning	Organic and inorganic acids, pickling salt (NaCl), Cr(III) salt, fat, basifying agents e.g. magnesium oxide, acid sodium carbonate, fungicides
Neutralisation	Organic and inorganic acids, alkali salts, neutralising tanning agents
Dyeing, fatliquoring filling, retanning	Dyes, ammonia, fat, fillers, Cr(III)-, Zr- and Al-salts, vegetable and synthetic tanning agents
Finishing	lacquer polymers, solvents, colour pigments, coagulants

ITALY
Most used chemicals in the Vicenza district were:
tanning agents, chrome salts and tannins, lime based reagents, ammines and acids, pigments, resins, polyesters, varnishes, anilines.

Most used chemicals in the Santa Croce district are:
sodium sulphide, tanning agents, chrome salts, natural and synthetic tannins, lime based reagents, acids and amines, resins, varnishes, anilines.
In 2003 114,000 tons of chemicals were used in the Santa Croce district. The following list specifies quantities of the most relevant chemicals.

CHEMICAL SUBSTANCES	ANNUAL QUANTITY IN 2003 (TONS)
sodium sulphide	7262
hydrated lime	13736
deliming agents (sodium bisulphide, ecc)	3704
various enzymes – based bates	1278
sulphuric acid	1876
chrome salts	6077
liquid chrome	2274
various tanning agents	2050
natural tannins	26413
synthetic tannins	7302
various re-tanning agents	348
anilines	2872
oils	6694
greases	693
caseins	817

resins	2463
ethyl alcohol	1277
ethyl glycol	382
butyl glycol	45
aniline into alcohol	325
polyurethanic mix	8
solvent mixes	457
Colouring agents water based	194

LATVIA
The annual total consumption estimate indicates 600 tons.

POLAND
The following chemicals are used per 1 ton of raw hide/skin processed:

CHEMICAL SUBSTANCES	QUANTITY
caustic soda	34 kg/tons.
Sulphuric acid	6 kg/tons.
sodium sulphide	6 kg/tons.
carboxylic acid	16 kg/tons.
acid sodium sulphide	6 kg/tons

SPAIN
The available data estimate the consumption of typical hide tannery: 400-600 tons/year.

SWEDEN
Chemicals consumption reaches 6,000 tons overall. The total consumption of chemicals at the largest plant is about 520 kg/ton raw hide.

OPERATION	QUANTITYOF CHEMICALS USED
Drum operations consume	3.350 tons
post-tanning operations	1.410 tons
finishing	550 tons
spraying	200 tons

2.3 WATER CONSUMPTION

The following table intends to give a brief overview of the annual water consumption and the origins of the different water sources used by the participating countries.

COUNTRY	YEAR	GENERAL ANNUAL CONSUMPTION	UNDER-GROUNDWATER	ACQUEDUCT	SURFACE WATER
FRANCE		An estimate on the average consumption at three tanneries suggests 40 m^3 of water are consumed for each tonne of hide/skin processed			
GERMANY		Consumption estimates are available for individual tanneries			

COUNTRY	YEAR	GENERAL ANNUAL CONSUMPTION	UNDER-GROUNDWATER	ACQUEDUCT	SURFACE WATER
ITALY Vincenza Santa Croce	2000 2003	10,000,000 m^3 5,800,000 m^3	69 % mostly	29 %	2 %
LATVIA	2002	66,235 m^3	X	X	
POLAND		typical tannery suggesting 12-15 m^3 of water are consumed for each ton of raw hide/skin	In the south of Mazowieckie province		
SPAIN		Consumption is estimated at 20-40 m^3 per ton of raw hide/skin processed			
SWEDEN		For each ton of raw hide/skin 22 m^3 of water are consumed	39,000 m^3		300,000 m^3 (river)

The next paragraphs give a more detailed explanation to the above mentioned table.

FRANCE
Statistics on water consumption in the tanning industry are not available. An estimate on the average consumption at three tanneries suggests 40 m^3 of water are consumed for each tonne of hide/skin processed (range: 12-100 m^3/ton). If this result is applied to the quantity of hide/skins tanned in France, then 2,435,000 m^3 of water were used nationwide in the year 2002.

ITALY
A total of 10,000,000 m^3 were consumed in the year 2000 by the Vicenza district: 69% underground water, 29% aqueduct, 2% surface water.

A total of 5,800,000 m^3 were consumed in the year 2003 by the Santa Croce district, mostly underground water. The following are other recent data on water (mostly underground) consumptions in the same district:

2000	6,4 mio m^3.
2001	6,1 mio m^3.
2002	6,1 mio m^3.

GERMANY
The aggregate consumption is not available. Consumption estimates are available for individual tanneries. Data on the origin of water are not available.

Tannery (anonymous)	Annual water consumption [m³/a]	Specific water consumption [m³/t raw hide]
1	40.000 – 60.000	
2	8.000	
3	400.000 – 750.000	20 - 30
4	50.000	25
5		20 - 30
6	5.000	30
7	70.000	
8	65.000	30
9	150.000	30
10		20 - 25
11	36.000	15
12	15.000	
13		15-20
14	36.000	9

LATVIA

The annual consumption of the industry is at 66,235 m^3. The table reports the individual performances of three plants.

	Plant Nr.1	Plant Nr.2	Plant Nr.3
Water consumption per year (m^2/year)	61000	735	4500
The provenience	Ground water (drill hole)	aqueduct	aqueduct
Use	0,04 m^3/1m^2 skin	50-60 m^3/ton skin	0,24 m^3/1m^2 skin

POLAND

Statistics for the tanning industry are not available. The available figure refers to a typical tannery suggesting 12-15 m^3 of water are consumed for each ton of raw hide/skin. In the southern section of Mazowieckie province, water is mainly extracted underground.

SPAIN

The origin of waters used in the tanning industry are not specified. Consumption is estimated at 20-40 m^3 per ton of raw hide/skin processed.

SWEDEN

The annual consumption of the large tannery consists of 29,000 m^3 from the underground, and 300,000 m^3 from the river. For each ton of raw hide/skin 22 m^3 of water are consumed. Another tannery consumes approximately 10,000 m^3/year.

2.4 ENERGY CONSUMPTION

The following table tries to compare the energy consumption and type of origin for each MS.

COUNTRY	YEAR	ENERGY CONSUMPTION	TYPE OF ENERGY USED
FRANCE	2001	870 KW/h per ton of raw hides/skins processed	
GERMANY		data given for each plant/type of Energy/type of process	Electric, natural gas, combustible oil
ITALY Vincenza Santa Croce		 electricity consumption 380,000 MW/h heat generation consumes 847.2 MW/h electricity consumption 175,000 MW/h heat generation consumes 5,000,000 m^3	61 % methane; 32 % fossil oil; 7 % fossil diesel oil of methane, and 3,500 tons of fossil oil.
LATVIA		Data are provided for the existing individual tanneries	
POLAND		per square metre of raw hide/skin, ranges from 5 to 9 KWh	coal and wood (75%), fossil oil (15%), methane (10%).
SPAIN		9 to 42 GJ are consumed annually per ton of raw hides/skins processed	
SWEDEN	2003	 Plant A use 3,266 kWh/ton raw hide or 12 GJ/ton raw hide	12,300 MWh/year electric energy, 24,000 MWh/year are provided by biofuels. The remaining energy/heat is provided by 120 m^3 of fossil oils

The next paragraphs give a more detailed explanation to the above mentioned table.

FRANCE

The available figure -870 KW/h- is limited to electricity consumption per ton of raw hides/skins processed in 2001.

GERMANY

Tannery (anonymous)	Type of energy used	Specific energy consumption	Processes with high energy demand
1	Electric energy, natural gas		Fleshing, tanning, shaving, staking
2	natural gas	300 m³/t split	
3	Electric energy, natural gas		Drying
4	Electric energy, natural gas	4.300 KWh/t raw hide	Drying, liming
5	Electric energy, combustible oil, coal		Drying, wet finishing
6	Electric energy, natural gas	230 m³ / t raw hide	
7	Electric energy	800 KWh / t raw hide	
8	Electric energy, combustible oil		Shaving, wet finishing, drying
9	Electric energy, natural gas, combustible oil	4.300 KWh / t raw hide	Drying, waste water treatment, water /air supply
10	Electric energy, combustible oil		Drying
11	Electric energy, natural gas, combustible oil		Drying, waste water treatment
12	Electric energy, combustible oil	1.500 KWh / t raw hide 0,4 m³ oil / t raw hide	Drying
13	Electric energy, natural gas, combustible oil		Drying, tanning, liming, dying
14	Electric energy, combustible oil	235 KWh / t raw hide 0,07 m³ oil / t raw hide	Drying, heating, spray coating

ITALY

The annual electricity consumption of the Vicenza district reaches 380,000 MW/h. In the same district heat generation consumes 847.2 MW/h, of which 61 % methane; 32 % fossil oil; 7 % fossil diesel oil.

The annual electricity consumption of the Santa Croce district reaches 175,000 MW/h. In the same district heat generation consumes 25,000,000 m^3 of methane, and 3,500 tons of fossil oil.

The following data details the district's energy consumption over the years 2002 and 2003:

	2002	**2003**
electricity	175 GWh	169 GWh
methane	25 mio Nm^3	21 mio Nm^3
fossil diesel oil	2.600.000 Kg	2.200.000 Kg
low sulphur fossil oil	200.000 Kg	150.000 Kg

LATVIA

Figures are provided for the existing individual tanneries. Tannery N° 3 consumes 6kWh/m^2 of raw hide/skin.

PLANTS	PRODUCTION TONS/Y	ENERGY CONSUMPTION
N°.1	2400 tons/y	340 MWh annual total.
N°.2	15 tons/y	58 MWh annual total.
N°.3	19,000 sqm/y	107 MWh/y (88%) for production processes 15 MWh/y (12%) lighting, 122 MWh/y Total consumption.

POLAND
The average, annual electricity consumption per square metre of raw hide/skin, ranges from 5 to 9 KWh. Heat generation is ensured by coal and wood (75%), fossil oil (15%), methane (10%).

SPAIN
The available figure indicates 9 to 42 GJ per ton of raw hides/skins processed are consumed annually by the entire tanning industry nationwide.

SWEDEN
InElectricity consumption reaches 12,300 MW/h (2003). 24,000 MW/h (2003) are provided by biofuels. The remaining energy/heat is provided by 120 m^3 of fossil oils. Plan A use 3,266 kWh/ton raw hide or 12 GJ/ton raw hide.

2.5 RELEASES TO THE AIR

The following table gives an overview on the principal air emissions coming from the tanning industry in the participating MS.

COUNTRY	YEAR	PARAMETERS	AMOUNT
FRANCE	1996	VOC	130 g/m^2 of raw hide/skin
GERMANY	Data on dusts, particulate, hydrogen sulphide released to the air by the tanning industry, are not available.		
ITALY Vincenza		VOC	67 g/m^2
	2002	hydrogen sulphide	5-18 mgr/m^2
		average spot measurement at drums	30 kg/h
			6 tons/y
		Hydrogen sulphide	5,000 tons/y
Santa Croce	2003	VOC Particulate	410 tons/y
LATVIA	Tanning industry use vegetable tanning agent. For dyeing apply paints on water base.		
POLAND			10 tons/day of raw hides/skins.
		Sulphurous acid	0,8 kg/day
		VOC	1,2 kg/day
		Particulate	0,8 kg/day
SPAIN	N. A.		
SWEDEN	2003	Sulfurous acid	6.000 kg/year
		VOC	28.000 kg/year
		Particulate	Aprox. 10 tons/year
	2004	VOC	largest plant was 6.7 gr /m^2 of finished product.
		NH3	0.2 kg/ton raw hide
		H2S	0.06 kg/ton raw hide

The next paragraphs give a more detailed explanation to the above mentioned table.

FRANCE
Recent data are not available. Total VOCs emitted by four tanneries in the year 1996 reached 130 gr/m^2 of raw hide/skin.

GERMANY
Data on dusts, particulate, hydrogen sulphide released to the air by the tanning industry, are not available.

ITALY
There was a decrease of VOC in the Vicenza district over the interval 1996-2003 due to narrower limits imposed by the Provincial Government, and by the growing use of water-based solvents.

Thresholds imposed by the Ministerial Decree 44 of January 16th 2004 (75-85 g/sqm in upholstery; 150 g/sqm in small articles) are not neared.
The annual average release of hydrogen sulphide ranged between 5 and 18 mgr/m^2 in 2002. The average spot measurement at drums was 30 kg per hour.

Particulate released by spraying cabins reached 40 kg/h and 10 kg/h elsewhere (for example shaving operations).

PARAMETERS	**YEAR 2002**
hydrogen sulphide	5 and 18 mg/m^2
VOC	67 g/m^2
Particulate	40 kg/h released by spraying cabins 10 kg/h elsewhere

The following are aggregate totals of the emissions to the air of the district of Santa Croce in the year 2003.

PARAMETERS	**YEAR 2003**
Hydrogen sulphide	6 tons
VOC	5.000 tons
Particulate	410 tons

The released hydrogen sulphide reaches an average environmental concentration of 1 μgr per normal cubic metre of air. This measurement was made possible by the cooperation between tanneries, local governments, Tuscany's agency for environmental protection (ARPAT) and the aerial emissions remote control Centre.

LATVIA
Information on releases to the air are not available.

POLAND
The available data on releases to the air are relative to a tannery permitted to process 10 tons/day of raw hides/skins.

Parameters	**Amount a day**
Sulfurous acid (kg)	0,8
VOC (kg)	1,2
Particulate (kg)	0,8

SPAIN
Data on air contaminants and the relevant sources in the tanning industry, are not available.

SWEDEN
Total emissions to the air.

Parameters	Amount and Year
Sulfurous acid (kg) H_2S	*6,000 kg 2003*
VOC (kg)	*28,000 kg 2003*
Particulate (kg)	*Approx. 10 tonnes*

Emission in the year 2004 from the largest plant was 6.7 gr VOC/m^2 of finished product. The emissions of NH3 was 0.2 kg/ton raw hide and the emission of H2S was 0.006 kg/ton raw hide.

2.6 BIOLOGICAL AND CHEMICAL PARAMETERS OF WASTE WATERS

The confrontation of the parameter's data is difficult; as shown in the following table, some countries have data on the waste waters of some specific plants, others of the total annual quantity of discharge.

PARAMETERS	FRANCE 2002	GERMANY 1998-1999	ITALY 2000	LATVIA	POLAND	SPAIN	SWEDEN 2003
COD kg	Data of 1 tannery	in discharge waters of 7 tanneries	in discharge waters/year	n. a.	Data of tanneries own treatment plant	in discharge waters	in discharge waters (in tons) of 4 tanneries
SS kg	Data of 1 tannery	in discharge waters of 7 tanneries	in discharge waters/year	n. a.	Data of tanneries own treatment plant	in discharge waters	in discharge waters of 4 tanneries
BOD kg	Data of 1 tannery	in discharge waters of 7 tanneries	in discharge waters/year	n. a.	n. a.	in discharge waters	n. a.
Chlorides kg	Data of 1 tannery	in discharge waters of 7 tanneries	in discharge waters/year	n. a.	Data of tanneries own treatment plant	n. a.	in discharge waters of 4 tanneries
Sulphide kg	Data of 1 tannery	in discharge waters of 7 tanneries	in discharge waters/year	n. a.	Data of tanneries own clearing plant	in discharge waters	in discharge waters of 4 tanneries
Sulphate kg	Data of 1 tannery	in discharge waters of 7 tanneries	in discharge waters/year	n. a.	Data of tanneries own treatment plant	n. a.	in discharge waters of 4 tanneries
Total chrome kg	Data of 1 tannery	in discharge waters of 7 tanneries	in discharge waters/year	n. a.	Data of tanneries own clearing plant	in discharge waters (chromium III)	in discharge waters of 4 tanneries
TKN kg	Data of 1 tannery	in discharge waters of 7 tanneries	n. a.	n. a.	Data of tanneries own treatment plant	n. a.	

PARAMETERS	FRANCE 2002	GERMANY 1998-1999	ITALY 2000	LATVIA	POLAND	SPAIN	SWEDEN 2003
Flow m^3	Data of 1 tannery	in discharge waters of 7 tanneries	n. a.	n. a.	Data of tanneries own treatment plant	n. a.	in discharge waters of 4 tanneries
Total nitrogen kg							in discharge waters of 4 tanneries
Zink kg							in discharge waters of 4 tanneries
Copper kg							in discharge waters of 4 tanneries

The next paragraphs give a more detailed explanation to the above mentioned table.

FRANCE

French statistics on contaminants in waters are not available. The following concentrations were measured in 2002, in a tannery permitted to process 8 tons/day of raw hides/skins.

Parameters	Amount and Year
COD (kg)	110,000
SS (kg)	20,600
BOD(kg)	56,900
Chlorides (kg)	
Sulphide (kg)	665
Sulphate (kg)	
Total chrome (kg)	74
TKN (kg)	14
Flow (m^3)	83,427

GERMANY

5 plants discharge directly into water bodies, while 24 plants discharge their waste waters directly into a municipal waste water treatment plant. The table below presents the composition of the discharge water of 7 tanneries in the years 1998 and 1999

Parameters	Tannery						
	1	2	3	4	5	6	7
COD (kg/a)		44.200		14.400		1.500	
SS (kg/a)							
Chlorides (kg/a)							
Sulphide (kg/a)	<30	<3,2	400 – 1875	< 300	39	0,75	41
Sulphate (kg/a)							
Total chrome (kg/a)	<35	2,4	200 - 750	< 150	17	13,5	15,5
TKN (kg/a)							
Flow (m^3/a)	50.000	8.000	400.000 – 750.000	150.000	36.000	15.000	36.000

ITALY

Waste waters of the Vicenza tanning district are piped to clearing consortia. The latter discharge in the black water collector of the Chiampo Valley, a duct designed for the cleared waste waters of the local tanneries. The average release of the collector in the receiving stream is approximately 100,000 cubic metres per day.

Parameter	*Concentration at exit of WWT (mg/l)*	*Quantity of annual discharge (ton/y)*
COD	110	4.015
Chlorides	1000	36.500
Sulfates	900	32.850

In the Santa Croce district, the maximum allowed concentrations for cleared waste waters released into the Arno River, take into account the combined concentrations at the releases of all waste water treatment plants operating in the district, as well as the legal threshold limits.

Parameter	*Concentration at Exit of WWT (mg/l)*	*Quantity of annual discharge (ton/y)*
COD	125	1.300
Chlorides	5000	52.000
Sulfates	1800	18.720

The following are average pollutant load in waste waters generated by an individual tannery in the Vicenza district, in the year 2000.

Parameter	**Quantity (kg)**
Chlorides	439.975
Sulfates	202.057
COD	165.766
SST	214.729
Total Chromium	5 .948
Sulfurs	4.224

LATVIA

There is no full information about wastewater quantities. Usually plants have local chemical pre-treatment plants (50 m^3/day), pre-treated wastewaters are collected in central systems and industrial wastewaters mixed up with municipal wastewaters and treated at biological treatment plants (BTP).

POLAND

Of the approximately 100 tanneries operating in the southern part of the Province of Mazowieckie, only two are equipped with an own waste water treatment plant (capacity: 450 and 150 m^3). The table below refers to the larger waste water treatment plant.

Parameters	Amount a day
COD (kg)	33
SS (kg)	11
Chlorides (kg)	1320
Sulphide (kg)	-
Sulphate (kg)	-
Total chrome (kg)	0,02
TKN (kg)	6,6
Flow (m^3)	450

SPAIN

These are the principal pollutants in water discharge, per ton of raw hide/skin treated:

Hide/skin 200 – 250 kg

Water 20 – 40 m^3	COD	230 – 250 kg
	BOD	≈ 100 kg
	SS	≈ 150 kg
	Chromium III	5 – 6 kg
	Sulphate	≈ 10 kg

SWEDEN

Major contaminants in waste waters of existing tanneries, discharged to municipal treatment plants in the year 2003.

Parameters	Plant A	Plant B	Plant C	Plant D
COD (tons)	2,446	9.5	-	-
Flow (m^3)	231,105	18,534	10,382	9,463
Sulphide (kg)	<100	-	-	-
Sulphate (kg)	-	-	-	-
Chlorides (tons)	1,248			
Total chrome (kg)	1,960	7	- (No chrome-tanning)	1.3
Total nitrogen (kg)	91,000			-
SS (kg)	-	2,023	-	3,700
Zink (kg)	65			
Copper (kg)	77			

In chapter 3.2.2. you can find specific emission factors expressed as emission/ton raw hide and total emissions from plant A to the municipal treatment plant.

2.7 WASTE WATER TREATMENTS

The following information describes the different waste water treatments (wwt) used in the participating countries.

COUNTRY	TANNERY WITH OWN WWTP			TREATMENT IN MUNICIPAL/EXTERNAL WWTP	DIRECT DISCHARGE	INDIRECT DISCHARGE
	biological	chemical	physical			
FRANCE	2	ALL	ALL	X	STREAMS	
GERMANY	ALL	ALL	ALL	X	X	

COUNTRY	TANNERY WITH OWN WWTP			TREATMENT IN MUNICIPAL/EXTERNAL WWTP	DIRECT DISCHARGE	INDIRECT DISCHARGE
	biological	**chemical**	**physical**			
ITALY Vincenza Santa Croce	consortia	consortia	consortia	TO CONSORTIA TO CONSORTIA	RIVERS OR STREAMS	
LATVIA	All tanneries have local physical or chemical pre-treatment plant. Final treatment in municipal WWTP					
POLAND	2	2	2	Remaining tanneries		
SPAIN	oxidation of sulphurs and sulphates, and precipitation of Chromium, precedes a subsequent biological treatment					
SWEDEN	1	1	1	5 Merged with	STREAMS	

The next paragraphs give a more detailed explanation to the above mentioned table.

FRANCE

Two tanneries clear the waste waters with biological, chemical and physical treatments, and subsequently release the cleared waste waters into a stream. Most of the remaining existing tanneries ensure chemical and physical pre-treatments and subsequently pipe the pre-treated effluents to municipal waste water treatment plants.

Chrome contaminated waste waters of tanneries in the Midi - Pyrenes, are trucked to waste water treatment plants.

GERMANY

All tanneries are equipped with own waste water treatment plants. These ensure the following:

- mechanical treatment (extraction of fibrous and gross material);
- physical-chemical treatment (sulphurs oxidation, chrome precipitation, sedimentation);
- biological treatments (activated sludge process, nitrification de-nitrification);
- clearing operations (sedimentation of activated sludge);
- sludge treatment (conditioning, drying).

The biological treatment step is primarily used by direct dischargers. Separate treatment of chromium containing effluents is mainly used in plants with indirect discharge.

ITALY

Waste water treatment consortia in the districts of Vicenza and Santa Croce ensure the biological and physical treatment of waste waters released by the local tanneries as well as of local municipal waste waters.

The oxidation of sulphurs and sulphates is among the preliminary treatments ensured by these treatment plants. The waste water treatment consortia of the Vicenza district, also collect the salt which is shaked off the raw hides/skins.

The water clearing consortia release the cleared waste water into a stream or river, thus favouring the dilution of the contaminants and avoiding the contamination of the basin providing the original underground water.

Three waste water treatment consortia, large, centralized, technically advanced plants, operate in the Santa Croce district. Their overall capacity of 5.3 mio inhabitants (Regional environmental report – 2000) also ensures the treatment of local municipal waste waters, usually a modest portion of the current total organic load.

The facilities developed an overall biological treatment which allows for reduced chemical and physical treatments thus ensuring substantial savings in terms of chemical agents, and sludge treatment and disposal.

The Santa Croce district presently produces between 650-800 m^3 of sludge depending on quantity of finished products. The waste water treatment consortia are

- Aquarno;

- Cuoiodepur;
- Ponte a Cappiano – Fucecchio.

LATVIA
Data on waste water treatment are not available

POLAND
Only two of the approximately 100 tanneries operating in the south of Mazowieckie Province, are equipped with own biological, chemical and physical treatments. The remaining tanneries truck the chromium laden waste waters to 2 municipal waste water treatment plants using neutralization systems. Other waste waters are either discharged directly (22 tanneries), or trucked to waste water treatment plants.

SPAIN
Specific treatments are absent. Typically, oxidation of sulphurs and sulphates, and precipitation of Chromium, precedes a subsequent biological treatment.

SWEDEN
The municipal treatment plants have mechanical, biological and chemical treatment.
Two plants recover chrome from waste waters and recycle it. In one plant sulphurs are oxidized. Waste waters are subsequently merged with municipal waste waters.
The larger Elmo Leather AB tannery operates an own biological treatment plant, with aerobic and anaerobic phases. It is an EU-LIFE project and the overall objective of the project is to improve water quality in Europe by reduction of the nitrogen discharge (by nitrification and denitrification processes) from the leather industry. The expected reduction of the nitrogen discharge is 80%, in comparison to 30% which is expected to be achieved by traditional technologies.

2.8 SOLID WASTES

This table tries to give a general overview on the different waste productions in the different MS. It is not easy or even possible to make some confrontation as the information available is not homogeneous.

COUNTRY	YEAR	TOTAL PRODUCTION	SLUDGE	CHROMIUM CONTAINING WASTE	NON-TANNED WASTE	TANNED WASTE
FRANCE	2002	48.000 tons	22.000 tons		19.000 tons	7.000 tons
GERMANY			10.00 tons chromium free	20.500 tons		
ITALY Vincenza Santa Croce	 1999 2003	 302.000 tons (solid) 297.783 tons (solid and sludge)	 22896 tons	 82.932 tons 123.932 tons		 1.851 tons
LATVIA	2004	161 tons (solid and sludge)	5 tons/year	8.2 tons	76 tons	
POLAND				220-240 tons solid waste		
SPAIN	A percent list of solid wastes released by an average tannery is available					
SWEDEN	2004		2.470 tons	2,480 tons and 674 m^3	7,750 m^3	1,630 tons

The next paragraphs give a more detailed explanation to the above mentioned table.

FRANCE
48,000 tons of solid wastes were produced in the year 2002; of which 19,000 tons of non-tanned wastes (fleshing 12,000 tons; splitting 7,000 tons), 7,000 tons of tanned wastes and 22,000 tons of sludge from waste water treatments.

GERMANY
Annually 20.500 tons of sludge containing chromium is produced by the wastewater treatment from the German tanneries. Landfill of organic waste is banned since June 2005 in Germany. Therefore thermal or biological treatment of sludge is required before land filling.
Ca. 10 000 tons of sludge is annually produced by the treatment of the chromium free effluent. This sludge is composted.
Before disposal the sludge will be conditioned (e.g. with lime) and drained up to 35% dry matter.

ITALY
In the year 1999 the district of Vicenza produced 302,000 tons of solid waste with the following origins in average:

TYPE OF WASTE	QUANTITY tons/day
salt	20
hair	40
grid	10
fleshing	350
trimmings	70
splitting	100
shaving	350
smoothing and contouring	15

Facilities render fleshing waste into bio proteins and fertilizers in both the Santa Croce and Vicenza districts.

In 2003 the tanneries in the Santa Croce district released a total of 297,783 tons of solid and fluid wastes. The following list details the general figure using specifications of the European Waste List.

TYPE OF WASTE	LER CODE	QUANTITY tons
waste from finishing and packaging	(040109)	1.851
all kinds of tanned remnants containing chrome	(040108)	41.000
tanning fluids containing chrome	(040104)	75.229
tanning fluids not containing chrome	(040105)	202
waste water sludge -produced locally- containing chrome	(040106)	7.703
waste water sludge –produced locally- not containing chrome	(040107)	15.193
wastes not otherwise specified	(040199)	44.600
sludge from biological treatments of industrial waste waters	(190812)	112.005

LATVIA
Chrome containing sludge reach 5 tons per year.

POLAND
Waste water treatment plants treating waste waters produced by tanneries in the south of Mazowieckie Province, produce each year 220-240 tons of chrome containing solid waste.

SPAIN
The following table shows the percentage of different types of solid wastes released by an average tannery.

TYPE OF WASTE	%
Raw hide trimmings	2 – 5
Fleshings	25 – 35
Splits	10 – 20
Chromed shavings, trimmings and splits	10 – 20
Dust	0,2 – 10
Dyestuffs (pigments), lacquers and other products	0,5
Sludge from waste water treatment plant	40 – 50
Packaging	1,5
Reference: data of the Spanish industry	

SWEDEN
Example of special tannery wastes 2004. The amount of sludge from the processes (not waste water treatment) is 674 m^3 to landfill, hairwastes 2,544 m^3 used as in agriculture as fertiliser, limed fleshings 5,200 m^3 to anaerobic digestion and biogas-production. Splitting, shavings and trimmings 1,624 tons to incineration with energy use.

The lager tannery landfills 2,470 tons of solid waste each year. One of the remaining tanneries disposes each year 9.7 tons of chrome containing solid waste, in an apt landfill, following drying.

2.9 RECYCLING, RECOVERY, REUSE OF WASTES

The following table gives a brief overview on the different recycling and reuse activities implemented by the participating MS.

COUNTRY	FOOD	FUEL/BIO GAS	CLOTHING	COMPOST FERTILIZERS	RECOVERY OF CHROMIUM
FRANCE	X	X	X		
GERMANY	X	X	X	X	
ITALY Vincenza				X	X
Santa Croce	X	X		X	X
LATVIA				X	none
POLAND	X			X	
SPAIN	N. A.				
SWEDEN		X		X	2

The next paragraphs give a more detailed explanation to the above mentioned table.

FRANCE
Approximately half of the non-tanned wastes is transformed in meal and incinerated following more or less prolonged stacking. Another 40% of these wastes is transformed in gelatines near Limoges (France) or in the Netherlands.

One tannery recently developed a conversion of certain wastes into a fuel technically named "fat fuel". The same tannery produces safety gloves.

A number of procedures, including enzyme- or acid action, were applied to decrease weight of fleshing waste. Heating at 60°C and then compressing proved the best procedure, attaining a 60% weight reduction.

Tanned wastes from shaving and fleshing operations, are land filled following compression. Splitting residues are used in shoe manufacture.

Sludge from water clearing operations are reduced with mechanical treatments and exsiccation, and then disposed of in apt (2nd class) landfills.

GERMANY

The following table shows the final products of the reuse of waste from tanning industry.

Waste	**Final product**
Limed fleshing and splits	Gelatine and collagen production
Tanned splits and shavings	Leather fibre board production
Fleshing	Anaerobic digestion in biogas plants
Chromium free wastes	Composting

ITALY

Facilities in the districts of Vicenza and Santa Croce recover chrome and render fleshing waste into bio proteins and fertilizers. These facilities –with a potential of 300-400 tons/day- need constant monitoring as they often cause odour emissions and water contamination.

A chrome3-retrieving consortium facility in the district of Santa Croce, connected to approximately 250 tanneries, recovers chromium basic sulphate and ensures:

- energy savings;
- reduction of expenses: recovered chrome is less expensive than virgin chrome;
- reduction of contamination: chrome is eliminated from waste water sludge.

A facility in the district of Santa Croce renders fleshing waste and other hide/skin waste into fats, meal and hydrolysed proteins. The facility processes 300-400 tons of fleshing waste each day. The following are additional annual data:

- fleshing waste: 75,000 tons
- animal fats for technical use only: 6,000 tons
- hydrolysed proteins: 4,500 tons.

Three additional facilities in the district of Santa Croce, recover and recycle shaving waste and hair:

- 2 plants produce fertilizers in the form of dry cubes;
- 1 plant produces fat, meal, hydrolysed proteins.

A consortium allowing for the recycling of trivalent chromium, initiated and supervised by the association of the tanneries in Santa Croce sull'Arno (Associazione conciatori di Santa Croce sull'Arno), representing approximately 250 tanning-related activities. Because chromium basic sulphate is the tanning agent of choice for most of the local tanneries, there is scope for its recovery and recycling into the same productive process. The recovery and recycle plant, allows for:

- energy savings;
- lower expenditures, as the virgin material is more expensive than the recycled;
- enhanced environmental compatibility as waste water treatment plants produce chromium free sludge.

Chrome is recovered in situ by approximately 10 tanneries in the Vicenza district.

LATVIA
Information on solid waste disposals or recovery treatments are absent.

POLAND
A plant in Alwernia recovers chrome from chrome-containing wastes. Fleshing waste is used to produce agriculture compost and animal food.

SPAIN
Data on waste conditioning and recycling is not available.

SWEDEN
Hair from the larger tannery is used as fertilizer.
Raw trimmings and fleshings are used in biological gas production (anaerobic digestion).
Shavings and trimmings are incinerated with energy use in special waste combustion plants.

2.10 WASTE DISPOSALS

The following paragraphs describe the different waste disposal activities used in the different countries.

FRANCE
Almost all sludge are land filled and subjected to centralized, ministerial control procedures. A tannery in Alsace incinerates the sludge, while two additional tanneries dry the sludge in order to reduce their weight and land filling costs.

GERMANY
There are four plants producing collagen and gelatine from limed fleshing and splits. Three facilities produce leather fibre board from tanned splits and shavings. The number of digestors receiving fleshing wastes is unknown.

ITALY
Solid wastes are land filled and in part used in agriculture.

There are 2 relevant facilities for sludge treatment in the Santa Croce district:

- Ecoespanso almost eliminates the land filling of sludge. Sludge from the waste water treatment consortia of Acquario and Ponte a Cappiano, are transformed into an inert granulate which is added with calcium carbonate and flying ashes and then used as filler in the production of cement and concrete conglomerates. Ecoespanso is a unique facility of recent existence: permits date from 2002, following tests conducted in 2001.
- a section of the waste water treatment consortium Cuoiodepur in Ponte a Egola, dries the clearing sludge.

LATVIA
Wastes are now sorted in hazardous and non-hazardous. Apt landfills have to be built to dispose of hazardous wastes: these wastes are presently stacked at the producers' sites. Non hazardous wastes are land filled.

Facilities for specific sludge treatments are absent with the exception of an incinerator, which is presently without permit following citizens' protests.

POLAND
Wastes are treated into the municipal facilities of Radom and Mogielnica where chrome is neutralized. Two tanneries in Zwolen and Oronsko operate with own mechanical, chemical, biological treatments.

SPAIN
Tanneries in Galicia landfill sludge produced by waste water treatments.

SWEDEN
Sludge from the Tranås plant (9.7 tons chromium sludge) is dewatered and disposed at special landfills for dangerous waste. 2,470 tons sludge from the larger tannery were dewatered and disposed at a landfill in 2003. From 2006 it's not allowed to dispose sludge at landfills in Sweden. At the moment the sludge are stored before the tannery find a final solution for waste disposal.

2.11 ABATEMENT METHODS FOR ODOUR EMISSIONS

The following paragraphs give brief descriptions on the abatement methods for odour emissions used by the different MS.

FRANCE
Special techniques for odour abatement are absent. The good practice keeps at a minimum the stack interval of non-tanned wastes, thus avoiding odorous nuisances.

Sulphur-containing releases are oxidized with catalysts (for example manganese). Sulphite are subsequently oxidized into sulphates. In fact some tanneries have problems with the elimination of sulphite, which produce sulphydric acid.

GERMANY
Bio filters abate odours released by the oxidation of sulphurs into sulphates.

ITALY
Tanneries are equipped with hydrogen sulphide detectors.
Critical areas (pickling, drain grid) in the tanneries of the Santa Croce district, are equipped with gas-aspirating devices connected to gas-abating towers loaded with water-soda solutions. Automatic dispensers of the latter solution are used in several large tanneries.

LATVIA
Data on odorous nuisances are absent.

POLAND
Regulations or standards on odours do not exist in Poland, although the Environment Ministry is at work to update limits for emissions to the air. Most of the tanning industry ignores actions which reduce these inconveniences.

SPAIN
The good practice typically segregates sulphur- and acid-containing discharges. Catalysts eliminate the hydrogen sulphide released to the air, while minimal stack interval of non-tanned wastes ensures the same.

SWEDEN
The segregation of waste waters with low pH values, is a practice specifically undertaken to contain odorous nuisances

2.12 COMPLAINTS FOR ODOROUS NUISANCES

For most countries this kind of information is unknown at a national level, the complaints made are more on the local level. The following paragraphs describe briefly the country's actual situation.

FRANCE
Data on the matter is not available. Because tanneries are normally located in residential areas, most complaints are probably made to the authorities in charge of problems such as odours, noise, emissions to the air.

GERMANY
The number of complaints is unknown.

ITALY
An olfactometric centre under the supervision of the environmental protection agency of Region Veneto, operates since February 2005 to locate odour sources and map odorous fall-outs in the tanning district of Vicenza.

Concentrations of hydrogen sulphide in the environment adjacent to tanneries in the Santa Croce district, appear well below the air-quality limits specified by the relevant state laws, and the average concentrations obtained for Toscana. Complaints from citizens against hydrogen sulphide in the environment, have drastically diminished.

LATVIA
Complaints against odour nuisances are not known to date. The recently established Environment Ministry is responsible for the matter.

POLAND
Data on complaints for odour nuisances are not available. Three tanneries store fleshing waste in refrigerated compartments.

SPAIN
In Galicia the last registered complaint dates February 5, 2003.

SWEDEN
Complaints for odour nuisances are infrequent.

Short comments

10,000 tons of solvents are consumed annually (2003), alone by tanneries near Vicenza, Italy. The nationwide solvents' consumptions of Spain, Germany, Latvia, Sweden (3,000- 700- 580- 47 tons, respectively) are small fractions when compared to the figure from Vicenza.

The figure for Poland is limited to the consumption of solvents per ton of raw hides/skins processed.

The reduction of solvent consumption in Italy dates from the 90's and largely the consequence of substitutions with water-based solvents.

The chemicals used in the various countries are much the same. The standardized procedures chiefly employ chrome salts, tannins, resins, colouring agents, pigments, varnishes.

Data from Sweden measure the consumption of chemicals by the different segments of the tanning cycle. Half of the overall chemical consumption is used in drums in the early beam-house stages. An additional thirty per cent of the chemicals used, is consumed by post-tanning operations, while the rest is used by spraying and finishing operations.

The average water consumption, as estimated in each individual tannery in member states participating IMPEL, ranges from 10 to 100 m^3/tons raw hide.

Process water in Italy is largely extracted from underground. Aqueduct use is relatively modest and use of surface water is marginal. On the contrary, in Sweden water is mainly extracted from streams, rivers, lakes.

National data bases relative to energy consumption are not comparable due to the differing measurement parameters.

Some countries estimate energy consumption relative to the weight of hides/skins processed.

Methane provides most of the heat generation in Italy, while fossil oil ranks second as a heat source.

In the Vicenza district, concentration limits for each cleared waste water discharge are established according to the quality and flow of the original waste waters. A single duct collects all cleared waste waters, discharging them in a single site.

Substitution of chemical-based solvents with water-based solvents contributed to decrease the relevant emission parameter.

Water treatment operations, i.e. mechanical- biological- chemical and physical treatments, are similar throughout IMPEL countries. Some tanneries pre-treat their waste waters.

Most of the solid waste is land-filled.
Some of the waste provides meals, gelatines, collagen, compost for agriculture.
In Italy large facilities render fleshing waste into bio proteins and fertilizers. Other facilities recover and recycle chrome.
A facility in France transforms recovered wastes into fuel.

The consumption and emission levels could help to find weak points of the process. Benchmarks of consumption and emission levels are set in the BREF "Tanning of Hides and Skins"

3. LEGISLATION

3.1 THE PERMITTING SYSTEM FOR IPPC PLANTS

FRANCE	There is no difference about the permitting system between IPPC tanneries and non IPPC, except in requiring review of the permits of IPPC all the 10 years.
GERMANY	Permissions are granted on the basis of the Federal Immission Control Act. For new or substantially changed industrial installations (e.g. tanneries according to Annex 1 of the IPPC Directive) a formal procedure of permission with public participation takes place. An environmental impact assessment is integral part of the formal procedure. For nonessential changes an informal procedure of permission without public participation takes place. Permits according to the Federal Immission Control Act include all decisions from regulatory authorities concerning the installation, except permits for the usage of a body of water (e.g. to discharge waste water into the water body) Therefore tanneries, discharging directly into a body of water, need an additional permit according to the Federal Water Act.
ITALY	Permitting system is based on law 59/2005: there are 2 authorities for permits, Environment Ministry and Regions, that are competent on some class of industrial installation included in the Annex 1 of the Directive. Tanneries integrated permits are released by Regions, or Provincial administration if Regions have decided to give them competence with a specific regional law. Integrated Permit includes all decisions from regulatory authorities concerning the installation.
LATVIA	There are no special codes or standards for tanneries. Every tannery got their individual permit with certain conditions. For IPPC plants the competent authority issued IPPC permit (polluting activity of category A) according requirements of IPPC directive 96/61/EEC (taking into account requirements of directives 75/442/EEC, 80/681/EEC, 91/271/EEC, 91/689/EEC, 99/31/EC, 2000/76/EC, 2003/35/EC. There is no tannery which need for IPPC permit in Latvia at present.
POLAND	In Poland there are 8 tanneries that can produce 12 tones of final product a day, so these which are subject to job control statement IPPC. These plants are obliged to get integrated permission till 31.12.2007r. It can be said that integrated permission contains all the sector permission. Moreover in the permission the rate of production, the consumption of raw material and consumption of water, energy, fuel etc. The plants applying for an integrated permission should meet environment protection requirements resulting from the best available techniques (BAT).
SPAIN	The law 16/2002 transposes the Directive 96/61/CE to the Spanish legal system. It is based in a integrated environmental authorization that is granted on a coordinated way when in the procedure are involved several competent authorities. The limit values are established taking into account the BAT´s for the particular technical characteristics of the installation and its geographical location. The activities affected are defined in the Section 8.1 of Annex I of the Law 16/2002 as "Plants for tanning hides and skins where the treatment capacity exceeds 12 tons of finished products per day". The application for the integrated authorization must be submitted before January the first of 2007 as it is established in the regulation for existing installations.
SWEDEN	There are no difference between IPPC plants or non IPPC plants in the permitting system. When a tannery have a production based on more then 100 tons raw hide per year they must have a permit. It is always the Environmental Licensing Authority (ELA) at the County Administrations who gives the permit for a tannery. It is an regional authority.

3.1.1 THE PERMITTING SYSTEM FOR NON IPPC PLANTS

FRANCE	Non IPPC plants are submitted to sectorial permitting system, which competent authority is generally public administration
GERMANY	For tanneries there are no strong distinctions between the permission of IPPC and non IPPC plants. For non IPPC plants an informal procedure of permission will take place. An environmental impact assessment is carried out only if there is a special environmental risk e.g. for local environmental conditions.
ITALY	Non IPPC plants are submitted to sectorial permitting system, which competent authority is generally Provincial administration
LATVIA	For non IPPC plants the competent authority issued environmental permit of different kind according polluting activity (polluting activity category B and C) or use of resource (water resources use permits etc.). Industrial pollution legislation Law on Pollution (in forces since 01.07.2001) Regulations of the Cabinet of Ministers No. 294 "On application of category A, B and C Polluting activities and permitting of Category A and B Polluting Activities" (09.07.2002)
POLAND	Permitting system for non IPPC plants:: sector permissions, that is to say distinct permissions: - for carrying of gases or dust into the air , - water consumption, - waste disposal, - waste producing, - noise emission,
SPAIN	When the activities are not affected by the law 16/2002, companies must process their applications with the different competent institutions of the Administration. The aim of the law is facilitating and making agile the relationships of citizens with the Administration. Companies not affected by the law are supposed to have less facilities and delay with the transaction of their applications because they must deal with several expedients in different institutions, but as they are not complex activities the difference will not be significant.
SWEDEN	Conditions in the permit are based on the rules of consideration and may be of many types. Permits must in some cases contain some specified types of conditions, e.g. emission limit values and conditions on how to monitor emissions. This is for instance the case for activities regulated under the IPPC-directive adopted by the European Community. Activities or operations for which permits are compulsory are specified directly in the Environmental Code or in Ordinances. Approximately 6,500 "environmental

SWEDEN	hazardous activities" must have a permit in Sweden. Such activities are conducted on a real estate and result or may result in discharges or other disturbances to the environment, e.g. water and air pollution or noise. The above number includes activities regulated in EC-directives, e.g. under the IPPC (96/61/EG) and Seveso (96/82/EC) directives. Licensing authorities are the Environmental Licensing Authority (ELA) at the County Administrations or Environmental Courts. There are 21 ELAs, one in each county, and five Environmental Courts. The allocation of licensing tasks between the ELAs and the Courts is regulated in an Ordinance where environmentally hazardous activities are listed based on severity from an environmental point of view. For activities that entail a significant environmental impact (A-activities totally less than 500), the applicant must apply for a permit to a Court. For activities with less impact on the environment (B-activities totally 5,500), the applicant must apply for a permit to a CAB. Approximately 1,000 of the A- and B-activities are defined as activities under the IPPC-directive and about 130 as activities under the Seveso II-directive. About 2,000 activities require a permit according to different EC-directives.Activities with limited impact or causing only local disturbances (C-activities totally about 15,000) are not subject to licensing, but the operator must notify the local Environmental and Public Health Committee (EPHC) who may decide on precautions.

3.2 EMISSION LIMITS

3.2.1 AIR EMISSION LIMITS

3.2.1.1. COMPARISON BETWEEN THE PARTICIPATING COUNTRIES ON AIR EMISSION LIMIT VALUES ACCORDING TO NATIONAL LEGISLATION

As shown in the below table, not all countries reported all air pollutants according to the national laws. Some countries reported air ELV in general, while others reported specifically for the tanning industry, some combined general and tanning ELV.
The units of measurement differ among the participating countries. Some examples are:

- France, Germany, Italy and Spain reported the total emissions for VOC for the installations for leather coating
- Poland reported on the criteria for permits and qualitative data of specific ELV , according to the production capacity, for substances released into air from a tannery localized in the Radom region. The unit of measurement is in mg/year and kg/h
- Sweden reported the permit criteria and some air emissions of 2004 in "kg/ton of raw hide" from plant A
- Spain reported some ELV in mg/N.m^3 and ppm.

	FRANCE	GERMANY	ITALY	LATVIA	POLAND	SPAIN	SWEDEN
VOC	**Concentration Flow** 20 mg/m3 if oxydation is used to eliminate VOC 50 mg/m3 Return > 98% 20 mg/m3 > 0.1 kg/h for Some specific substances as phenols 2 mg/m3 > 10 g/h for R 45, R 46, R60, R 61 20 mg/m3 > 100 g/h for R40		Italy is now implementing new European Directive on solvents, which fixes new limits for solvent consumption and total emission At present, the Provincial Administration of Vicenza has established a total emission threshold of 9.700 ton/year for the Arzignano tanning district; thus new installations have to buy emission quotes from existent plants.	There is no complete information about air emission from technological devices (volatile organic compounds (VOC), acid vapour etc.). Requirements regarding accounting VOC mass balance should be implemented until the end of 2005. There are permits of air emission for boiler houses.	Permissible amount of substances emitted into the air depend on the source of emission (technological process), work time, fuel used and total nominal power. Every permission that is given, is formulated individually for the plant.	The releases limits are expressed in g of solvent released per m2 of product produced VOC release limit does not exist for companies with a consumption less than 10 tons of solvent per year	The permit for plant A regulates the emission of VOC to maximum 24 tons per year.

	FRANCE	GERMANY	ITALY	LATVIA	POLAND	SPAIN	SWEDEN
Solvent consumption threshold (t/a) **Total emission (g VOC/m² of leather produced)**	< 25 — 85 > 25 — 75	10 – 25 85 > 25 75 > 10[b1] 150	10 - 25 85 > 25 75 > 10 150			10 - 25 85 > 25 75 > 10 150	In 2004: 6,7 g/m² finished product Total emission 18.6 t/VOC
PARTICULATES	Concentration Flow 100 mg/m3 < 1 kg/h 40 mg/m3 > 1 kg/h	Concentration Mass flow Threshold = 200 g/h 50 mg/m³				150 mg/Nm³	The condition of the permit regulates the particles at maximum 10 mg/Nm³ and 3 tons/year
Isobutyl alcohol		50 mg/l indicated as total carbon			a tannery in Radom with production capacity 2 Mg per day 0,115 mg/y 0,18 kg/h 0,043 mg/y 0,067 kg/h		
Butyl acetate		50 mg/l indicated as total carbon					
SO_2 (mg/N.m³)		350				4300	
CO (ppm)						500	
NO_x (ppm)		350				300	
HCl (mg/N.m³)		30				460	
H_2S (mg/N.m³)		3				10	Emissions of H_2S and NH_3 are not regulated. The plant measure the emissions and report them in the annual environmental report. The emissions 2004 was 9.5 ppm NH_3 or 0,2 kg NH_3/ton rawhide and 1,3 ppm H_2S or 0.06 kg H_2S/ton rawhide.
NH_3		30					

3.2.1.2. AIR EMISSION LIMITS ACCORDING TO NATIONAL LEGISLATION

<table>
<tr><td>FRANCE</td><td>
• VOC: total emissions of volatile organic compounds with the exception of the methane

Work on leather: if the solvents' consumption is less than 25 tons per year
85 g/m2 of produced leather

Work on leather: if the solvents' consumption is more than 25 tons per year
75 g/m2 of produced leather

Concentration Flow
20 mg/m3 if oxydation is used to eliminate VOC
50 mg/m3 Return > 98%

20 mg/m3 > 0.1 kg/h for some specific substances as phenols
2 mg/m3 > 10 g/h for R 45, R 46, R 49, R 60 or R 61
20 mg/m3 > 100 g/h for R40

• Particulate
Concentration Flow

100 mg/m3 < 1 kg/h
40 mg/m3 > 1 kg/h
</td></tr>
<tr><td>GERMANY</td><td>
The basic law for air pollution control is the Federal Immission Control Act [Bundes-Immissionsschutzgesetz BImSchG]. The BImSchG is specified by several ordinances and the Technical Instructions on Air Quality [TA Luft].

The requirements for the emissions of VOC from the leather manufacturing to air are regulated in the 31st Ordinance for the Implementation of the Federal Immission Control Act
Emission limits for installations for leather coating:

<table>
<tr><th>Solvent consumption threshold (t/a)</th><th>Total emissions (g VOC/ m² of leather produced)</th></tr>
<tr><td>10-25</td><td>85</td></tr>
<tr><td>>25</td><td>75</td></tr>
<tr><td>>10*</td><td>150</td></tr>
</table>
*for leather used in furnishing or small products like bags, belts, wallets etc.

The Technical Instruction on Air Quality specifies the requirements of the BImSchG to be met by installations subject to licensing. Therefore, it prescribes limit values for virtually all air pollutants:
</td></tr>
</table>

GERMANY

Emitted substance (TA Luft section)	Class	Substances		Mass flow threshold [g/h]	Concentration limit [mg/m³]
Total dust	-			= 200	150
				> 200	20
Inorganic dust	I	(e.g. Hg, Tl)	sum of substances	0,25	0,05
particles	II	(e.g. Pb, Co, Ni, Te, Se)	- " -	2,5	0,5
	III	(e.g. Sb, -, Cr, CN, F, Cu, Mn, V, Sn, substances wich are strongly suspected to cause cancer)	- " -	5	1
	I+II		- " -		0,5
	I+III, II+III, I+II+III		- " -		1
Vaporous or	I	(e.g. AsH_3)	per substances	2,5	0,5
gaseous inorganic	II	(e.g. HF, Cl_2, H_2S)	- " -	15	3
substances	III	(e.g. Cl-compounds as HCl)	- " -	150	30
	IV	(e.g. $SO_2 + SO_3$ as SO_2, $NO + NO_2$ as NO_2)	- " -	1.800	350
Organic substances		Total organic substances (except for dust)		500	50
	I	(e.g. Chlormethane)	Classification	100	20
	II	(e.g. Chlorbenzene)	according to	500	100
	I+II		Annex 4 of TA Luft	500	100
Carcinogens	I	(e.g. Cd[1)], As[1)], benzo(a)pyren), chromium VI - sum of substances -		0.15	0,05
	II	(e.g. Ni,acrylamide, acrynitrile) - " -		1,5	0,5
	III	(e.g. benzene, trichloroethene, vinyl chloride)	- " -	2,5	1
	Fibres	Asbestos			$1*10^4$ Fibres/m³
		Biopersistent ceramic fibres			$1,5*10^4$ Fibres/m³
		Biopersistent mineral fibres			$5*10^4$ Fibres/m³
Toxic persistent organic substances		Dioxins and furans according annex 5 of TA Luft		$0,25*10^{-6}$	$0,1*10^{-6}$

[1)] Based on the decision adopted by the Conference of the Federal Government/Federal States Ministers for the Environment on 21/22November 1991, an emission limit of 0.1 mg/m³ has been stipulated for Cd and its compounds, given as Cd, as well as for As and its compounds, given as As.

ITALY

Italy is now implementing new European Directive on solvents, which fixes new limits for solvent consumption and total emission :

Solvent consumption threshold (t/a)	Total emissions (g VOC/ m² of leather produced)
10-25	85
>25	75
>10*	150

Presently Provincial Administration of Vicenza has fixed for Arzignano tanning district a total emission threshold of 9.700 ton/year; so new installations are possible only buying emission quotes from existent plants.

<table>
<tr><td>LATVIA</td><td>There is no complete information about air emission from technological devices (volatile organic compounds (VOC), acid vapour etc.). Requirements regarding accounting VOC mass balance should be implemented until the end of 2005. There are permits of air emission for boiler houses.</td></tr>
<tr><td>POLAND</td><td>Permissible amount of substances emitted into the air depend on the source of emission (technological process), work time, fuel used and total nominal power. Every permission that is given, is formulated individually for the plant.
In this table there are presented permissible amounts of substances that can be carried out into the air from a tannery in Radom with production capacity 2 Mg per day.
<table>
<tr><th>Name</th><th colspan="2">Amount</th></tr>
<tr><td>Isobutyl alcohol</td><td>0,115 Mg/year</td><td>0,18 kg/h</td></tr>
<tr><td>Butyl acetate</td><td>0,043 Mg/year</td><td>0,067 kg/h</td></tr>
</table></td></tr>
<tr><td>SPAIN</td><td>Atmospheric releases limits are established for the main potential polluting industrial activities in the annexe IV of the regulation D 833/1975 that develops the law 38/1972 for atmospheric environmental protection.
In this annexe the tanning industry is appeared and hence the applicable limits will be the established in the item 27 as "diverse industrial activities not specified in this annexe":
The use of solvents in the tanning industry cause VOC releases to atmosphere that can be harmful for human health and environment. These releases are regulated by R.D. 117/2003. In the item 13 of annexe II of this regulation is specified the limit values for skin processes.
<table>
<tr><th>POLLUTION</th><th>RELEASES LIMITS</th></tr>
<tr><td>Solids Particulates (mg/N.m3)</td><td>150</td></tr>
<tr><td>SO2 (mg/N.m3)</td><td>4300</td></tr>
<tr><td>CO (ppm)</td><td>500</td></tr>
<tr><td>NO_x (ppm)</td><td>300</td></tr>
<tr><td>HCl (mg/N.m3)</td><td>460</td></tr>
<tr><td>H2S (mg/N.m3)</td><td>10</td></tr>
</table>
<table>
<tr><th>POLLUTANT</th><th>Threshold solvent consumption in t/year</th><th>Limit Values of total emission</th><th>Especial dispositions</th></tr>
<tr><td>VOC</td><td>10-25
>25

>10 (1)</td><td>85 g/m2
75 g/m2

150 g/m2</td><td>The releases limits are expressed in g of solvent released per m2 of product produced
(1) For covering processes of skins in furniture and special leather goods used as small consume products (bags, belts, wallets, etc)</td></tr>
<tr><td colspan="4">Note: VOC release limit does not exist for companies with a consumption less than 10 tons of solvent per year</td></tr>
</table></td></tr>
<tr><td>SWEDEN</td><td>Plant A has a new permit from 2004. It includes 9 conditions concerning investigations for example about emissions to air and water. The permit includes 24 conditions.
The permit also includes:</td></tr>
</table>

SWEDEN	- Conditions concerning the handling of chemical products. - Conditions concerning recycling, handling and disposal of waste. - Conditions concerning energy effectiveness. - Conditions concerning control. - Conditions concerning noise, emissions to air and water. The permit regulate the emission of VOC to maximum 24 tons per year. In 2004 the specific emission was 6,7 g/m^2 finished product. The total emission was 18.6 tons VOC. There is also a condition which regulates the emission of solid particulates to maximum 10 mg/Nm^3 and 3 tons/year. Emissions of H_2S and NH_3 are not regulated. The plant measures the emissions and reports them in the annual environmental report. The emissions 2004 was 9.5 ppm NH_3 or 0,2 kg NH_3/ton rawhide and 1,3 ppm H_2S or 0.06 kg H_2S/ton rawhide.

3. 2.2 WASTE WATER EMISSION LIMITS

3.2.2.1 COMPARISON BETWEEN THE PARTICIPATING COUNTRIES ON WASTE WATER EMISSION LIMIT VALUES ACCORDING TO NATIONAL LEGISLATION

It is not possible to make a coherent comparison among the participating countries for ELV's for the waste waters coming from tanneries due to:

- The information given by the participating countries is not homogeneous, for example:
  - Spain reported ELV's of national law for: public river beds, for waste water emissions previous treatment and for direct releases
  - Sweden reported the requirements needed for new permits for waste water emissions from tanneries and the data of waste water effluents of tannery A in 2004
  - Poland reported the basic standards needed for waste water emissions
  - Germany reported specific data for the tanning industries and national hazardous limits also used for the tanning sector
  - Italy reported the ELV of waste waters according to the different months of the year (for the Vicenza district) and for the Santa Croce district the waste water ELV is regulated by the local authority
  - France reported the main national ELV divided for public and non public waste water treatment plants, giving comparisons among them for concentrations and flows.
  - Latvia reported the reference of national law on regulation on surface and groundwater quality and on emissions of pollutants into the aquatic environment.

- The units of measurement are not homogeneous, some example:

  - France reported, for public and non public wwtp, concentrations in mg/l according to the flow kg/d
  - Germany reported for the waste water from tanneries at the point of discharge, for qualified random sample or 2-hour composite sample in mg/l, while for the hazardous substances the ELV are divided in 3 columns: units of measurement

(relating to a unit of hazard) in kg; threshold values divided in concentrations in mg/l and annual freights in kg
- Sweden reported the permit requirement for the main compounds in m^3/day and in m^3/t of raw hide
- Poland reported in mg/dm^3
- Italy reported in mg/l

3.2.2.2 COMPARISON OF WASTE WATER PER PRODUCTION (so called "Specific Emission Limit Values")

Only three countries, France, Spain and Sweden expressed the ELV's per production on raw hides/skins, using different criteria and units of measurement. The following information is taken from chapter 2.6 and from the respective national legislation on waste water limits.

FRANCE

French statistics on contaminants in waters are not available. The following concentrations were measured in 2002, **in a tannery permitted to process 8 tons/day of raw hides/skins**.

Parameters	Amount and Year
COD (kg)	110,000
SS (kg)	20,600
BOD(kg)	56,900
Chlorides (kg)	
Sulphide (kg)	665
Sulphate (kg)	
Total chrome (kg)	74
TKN (kg)	14
Flow (m^3)	83,427

SPAIN

These are the principal pollutants in water discharge, per ton of raw hide/skin treated:

Hide/skin 200 – 250 kg

Water 20 – 40 m^3	COD	230 – 250 kg
	BOD	≈ 100 kg
	SS	≈ 150 kg
	Chromium III	5 – 6 kg
	Sulphate	≈ 10 kg

SWEDEN

"When the new waste water treatment plant are built they have to follow these emission limits:

Calculated emission limits in mg/l

Flow	**1 750 m3/day**	**35 m^3/ton raw hide**
Nitrogen	150 kg/day	86
COD Cr	500 kg/day	286
BOD7	25 kg/day	14
Ammonium	40 kg/day (may-august)	23
Chrome	0,2 kg/day	0.11
Suspended particles	35 kg/day	20

Phosphorus	0,52 kg/day	0,3
pH	6-8. "	

The new waste water treatment plant is now built and they have to start to use it.
Until now the waste water have been treated in the public waste water treatment plant. The emissions for 2004 are shown in the following table. The emissions were below their limit values:

	Average concentration mg/l, 2004	**Total emission 2004**	**Specific emission/ton raw hide, 2004**
Water flow		238,437 m^3	21 m^3/ton
BOD_7	5264	1,195 ton	105 kg/ton
COD	10964	2,489 ton	219 kg/ton
Total nitrogen	439	100 ton	8.8 kg/ton
NH_4-N	146	33 ton	2.9 kg/ton
Total phosphorus	23	5.3 ton	0.47 kg/ton
Chloride	6627	1,504 ton	132 kg/ton
Chrome	5,1	1.2 ton	0,11 kg/ton

3.2.2.3. WASTE WATER EMISSIONS ACCORDING TO NATIONAL LEGISLATION

A specific comparison table of the different emission parameters of waste waters according to national limits is found at the end of this chapter on emission limits on page 71.

FRANCE

Without public waste water treatment plants			With public waste water treatment plants	
PH	[5.5 – 8.5 or 9.5 with an Alkaline neutralization]			
	Concentration	Flow	Concentration	Flow
SS	100 mg/l 35 mg/l	< 15 kg/d > 15 kg/d	600mg/l	> 15kg/d
COD	300 mg/l 125 mg/l	< 100 kg/d > 100kg/d	2000 mg/l	> 45kg/d
BOD5	100 mg/l 30 mg/l	< 30kg/d > 30kg/d	800 mg/l	>15 kg/d
Nitrogen	30 mg/l	>50 kg/d	150 mg/l	
Total phosphor	10 mg/l	> 15 kg/d	50 mg/l	
Chromium	1.5 mg/l		1.5 mg/l	

GERMANY

The legal framework for water management is the Federal Water Act [Wasserhaushaltsgesetz - WHG]. The WHG applies to waste water generated by various industrial processes. The use of surface, coastal, and ground waters requires the approval of the competent authority.

The requirements for the effluents from the leather industry are regulated in the Waste Water Ordinance, Appendix 25 "Leather production, fur processing leather fibre board manufacturing". The main requirements of the waste water at the point of discharge into the water body are listed in the table below.

	Qualified random sample or 2-hour composite sample
Chemical oxygen demand (COD)	250 mg/l
5-day biochemical oxygen demand (BOD5)	25 mg/l
Ammonia nitrogen (NH4-N)	10 mg/l
Total phosphorous	2 mg/l
Adsorbable organic halogens (AOX)	0.5 mg/l
Fish toxicity (TF)	2

GERMANY

Requirements for waste water prior blending:

Waste water from soaking, liming and deliming (each process including rinsing) must not exceed a level of 2 mg/l sulphide in a qualified random sample or a 2-hour composite sample. Waste water from tanning (including dewatering) and from wet finishing (neutralising, re-tanning, dyeing, stuffing) (each process including rinsing) or from leather fibreboard manufacturing, must not exceed a level of 1 mg/l of total chromium in a qualified random sample or a 2-hour composite sample.
The WHG is complemented by the discharge levy act [Abwasserabgabengesetz - AbwAG]. The fees are related to the mass and possible hazard of the discharged waste water according to the table below. For the discharge of sewage, that exceeds the mentioned threshold values for concentrations or annual freights, the discharging party has to pay a fee related to the given units of measurement.

Hazardous Substances	**Units of measurement (relating to a unit of hazard)**	**Threshold values**	
		Concentrations	**Annual freights**
Oxydizable substances (given as COD)	50 kg Oxygen	20 mg/l	250 kg
Phosphor	3 kg	0.1 mg/l	15 kg
Nitrogen	25 kg	5 mg/l	125 kg
Organic Halogen compounds as AOX	2 kg Halogen, calculated as Cl	100 µg/l	10 kg
Mercury & compounds.	20 g	1 µg/l	0.1 kg
Cadmium & compounds	100 g	5 µg/l	0.5 kg
Chromium & compounds	500 g	50 µg/l	2.5 kg
Nickel & compounds	500 g	50 µg/l	2.5 kg
Lead & compounds	500 g	50 µg/l	2.5 kg
Copper & compounds	1000 g	100 µg/l	5 kg
Fish toxicity	3,000 m^3 discharges divided by T_F	T_F =2 (dilution factor for non-lethal quantity for fish from the discharge)	

ITALY

In Vicenza, the individual waste water treatment plant sets the limits for the tanning waste-waters it receives. The various waste water treatment plants receiving tanning waste-waters, are in their turn imposed with limits by the consortium A..RI.C.A. , the authority representing the sewage collector af the Chiampo and Agno Valleys. The limits A.RI.C.A. need take into account, are finally set by the Province itself, according to the criteria listed in the table below.

Period	Parameter	Measure unit	value
dal 27/04/2000	chlorides	mg/l	2.000
dal 04/04/2003			1.600
dal 04/04/2004			1.500
dal 27/04/2000	Sulfate	mg/l	1.500
dal 04/04/2003			1.300
dal 27/04/2000	COD	mg/l	160
dal 28/12/2000			125
dal 27/04/2000	Suspended particles	mg/l	80
dal 28/12/2000			35
dal 27/04/2000	Ammonium	mg/l	15
dal 27/04/2000	Azoto Nitroso	mg/l	0,6
dal 27/04/2000	Azoto Nitrico	mg/l	20
dal 27/04/2000	T Phosphorous	mg/l	12
dal 27/04/2000	T Chrome	mg/l	2
dal 27/04/2000	T coliforms	UFC/100ml	20.000
Dal 27/04/2000	Fecal coliforms	UFC/100ml	12.000
Dal 27/04/2000	Fecal streptococcus	UFC/100ml	2.000
Dal 27/04/2000	Escherichia Coli	UFC/100ml	5.000

ITALY

In Santa Croce each municipality refers to the "rules for industrial waste waters in public sewage ducts" (*regolamento di accettabilita' degli scarichi degli insediamenti industriali in pubblica fognatura*) a piece of legislation qualifying the various industrial waste-waters before they reach the centralized municipal water-clearing plant.

The following example refers to the municipality of San Miniato:

- category A : waste waters which can be assimilated to the waste waters of tanneries operating full cycle with chromium as single or partial tanning agent;
- category B : waste waters which can be assimilated to the waste waters of tanneries operating full cycle with vegetable tannage;
- category C : waste waters which can be assimilated to the waste waters of tanneries processing wet-blue skins/hides;
- category C1: waste waters which can be assimilated to the waste waters of tanneries operating full cycle to produce skins/hides with hair;
- category C2: waste waters which can be assimilated to the waste waters of tanneries operating partial cycle with vegetable tannage;
- category D : waste waters which can be assimilated to the waste waters of tanneries operating with the wet-work exclusively, and producing pelts or wet-blue skins/hides;
- category Third Party (*Contoterzi*): the qualities of the waste water refer to limits for the original activity.

The chief limits in force in San Miniato are the following:

	Cat A	Cat. B	Cat C	Cat. C1	Cat. C2	Cat. D
pH	4-13	4-13	4-13	4-13	4-13	4-13
gross material	abs.	abs.	abs.	abs.	abs.	abs.
Sedimentable solids (mg/l)	400	500	300	300	300	500
Suspended solids (mg/l)	7000	10000	2000	2000	2000	13000
COD (mg/l)	8000	13000	6000	6000	10000	15000
Chromium III (mg/l)	100	25	100	100	100	25
sulphide (mg/l)	300	400	20	20	20	600
sulphate (mg/l)	2300	2300	2700	2000	2700	2200
chloride (mg/l)	8000	10000	8000	10000	2000	17000
surfactants and wetting agents (mg/l)	60	70	40	70	40	70
ammonia - nitrogen (mg/l)	400	400	200	200	200	800

LATVIA	Law on Water management (in force since 12.09.2002)

<table>
<tr><td>LATVIA</td><td>Regulations of the Cabinet of Ministers No. 118"Reguations on surface and ground water quality" (12.03.2002)
Regulations of the Cabinet of Ministers No. 34 "On emissions of pollutants into the aquatic environment" (22.01.2002)</td></tr>
<tr><td>POLAND</td><td>The offices giving sector permissions and integrated permission determine permissible emission on the basis of standards included in Polish legislation.
This table contains permissible amounts of some substances that can be lead into water or soil.

<table>
<tr><td>pH</td><td>6,5 – 9</td></tr>
<tr><td>COD</td><td>125 mg O_2/dm^3</td></tr>
<tr><td>Suspended soils</td><td>35 mg/ dm^3</td></tr>
<tr><td>Chlorides</td><td>1000 mg Cl/ dm^3</td></tr>
<tr><td>Sulfate</td><td>500 mg SO_4/ dm^3</td></tr>
<tr><td>Total chrome</td><td>1 mg Cr/ dm^3</td></tr>
<tr><td>Total of nitrogen</td><td>30 mg N/ dm^3</td></tr>
<tr><td>Phosphorus</td><td>3 mg P/ dm^3</td></tr>
<tr><td>Total chlorine</td><td>0,4 mg Cl_2/ dm^3</td></tr>
</table></td></tr>
<tr><td>SPAIN</td><td>The "Regulation of hydraulic public dominion" from Urbanism and Public construction works Ministry, R.D. 849/1986, is applied in the case of releases to the public riverbed. Characteristic parameters must be taken in account in the assessment of the treatment of a release, described in tables 1,2 and 3 in the annex of this regulation.
In the case of releases are not direct to the public riverbed, parameters depends on the depuration capacity of the waste water treatment plant and the owner of the manifold or the organism that manages the treatment system.
As much as waste water releases limits it is important to know if the releases are directly to the public riverbed or to a manifold for a previous treatment.

<table>
<tr><th>PARAMETERS</th><th>TABLE 1</th><th>TABLE 2</th><th>TABLE 3</th></tr>
<tr><td>pH</td><td>5,5 – 9,5</td><td>5,5 – 9,5</td><td>5,5 – 9,5</td></tr>
<tr><td>Suspended solids (mg/L)</td><td>300</td><td>150</td><td>80</td></tr>
<tr><td>Sedimentary solids (mg/L)</td><td>2</td><td>1</td><td>0,5</td></tr>
<tr><td>Big solids</td><td>absent</td><td>absent</td><td>absents</td></tr>
<tr><td>BOD5 (mg/L)</td><td>300</td><td>60</td><td>40</td></tr>
<tr><td>QOD (mg/L)</td><td>500</td><td>200</td><td>160</td></tr>
<tr><td>Temperature (ºC)</td><td colspan="3">Less than de 3ºC of increase</td></tr>
<tr><td>Colour (mg/L Pt-Co)</td><td colspan="3">Inappreciable due to dilution</td></tr>
<tr><td>Aluminium (mg/L)</td><td>2</td><td>1</td><td>1</td></tr>
<tr><td>Arsenic (mg/L)</td><td>1,0</td><td>0,5</td><td>0,5</td></tr>
<tr><td>Barium (mg/L)</td><td>20</td><td>20</td><td>20</td></tr>
<tr><td>Boro (mg/L)</td><td>10</td><td>5</td><td>2</td></tr>
<tr><td>Cadmium (mg/L)</td><td>0,5</td><td>0,2</td><td>0,1</td></tr>
<tr><td>Chromium III (mg/L)</td><td>4</td><td>3</td><td>2</td></tr>
<tr><td>Chromium VI (mg/L)</td><td>0,5</td><td>0,2</td><td>0,2</td></tr>
<tr><td>Iron (mg/L)</td><td>10</td><td>3</td><td>2</td></tr>
<tr><td>Manganese (mg/L)</td><td>10</td><td>3</td><td>2</td></tr>
<tr><td>Nickel (mg/L)</td><td>10</td><td>3</td><td>2</td></tr>
<tr><td>Mercury (mg/L)</td><td>0,1</td><td>0,05</td><td>0,05</td></tr>
<tr><td>Lead (mg/L)</td><td>0,5</td><td>0,2</td><td>0,2</td></tr>
<tr><td>Selenium (mg/L)</td><td>0,1</td><td>0,03</td><td>0,03</td></tr>
<tr><td>Tin (mg/L)</td><td>10</td><td>10</td><td>10</td></tr>
<tr><td>Copper (mg/L)</td><td>10</td><td>0,5</td><td>0,2</td></tr>
</table></td></tr>
</table>

SPAIN

Copper (mg/L)	10	0,5	0,2
Zinc (mg/L)	20	10	3
Cyanide(mg/L)	1	0,5	0,5
Chlorides (mg/L)	2000	2000	2000
Sulphurs (mg/L)	2	1	1
Sulphide (mg/L)	2	1	1
Sulphate (mg/L)	2000	2000	2000
Phosphorus (mg/L)	12	8	6
Total phosphorus (mg/L)	20	20	10
Ammonium (mg/L)	50	50	15
Ammonium - N (mg/L)	20	12	10
Oils and fats (mg/L)	40	25	20
Phenols (mg/L)	1	0,5	0,5
Aldehyde (mg/L)	2	1	1
Detergents (mg/L)	6	3	2

These parameters are usually used as emission limits by authorities that authorize emissions, according to the characteristic in the receptor ambience. The correspondent watershed authority/institution established the table to apply in each hydrographical watershed. The table 3 is usually applied for direct releases in Spain.

SWEDEN

~~Sweden have no general standards for different environmental emission limits.~~ The limits are individual and depend on, for example, localisation and aquatic recipient.
Plant A has a new permit from 2004. It includes 9 conditions concerning investigations for example about emissions to air and water. The permit includes 24 conditions. An example (discharge to a river).
"When the new waste water treatment plant will be built they have to follow these ~~emission limits:~~

Calculated emission limits in mg/l

Flow	1 750 m3/day	35 m^3/ton raw hide
Nitrogen	150 kg/day	86
COD Cr	500 kg/day	286
BOD7	25 kg/day	14
Ammonium	40 kg/day (may-	23
Chrome	0,2 kg/day	0.11
Suspended	35 kg/day	20
Phosphorus	0,52 kg/day	0,3
pH	6-8. "	

The new waste water treatment plant is now built and they have to start and use it. Until now the waste water have been treated in the public waste water treatment plant. The emissions for 2004 are shown in the following table. The emissions were below their limit values:

SWEDEN	Total nitrogen	439	100 ton	8.8 kg/ton	
	NH_4-N	146	33 ton	2.9 kg/ton	
	Total phosphorus	23	5.3 ton	0.47 kg/ton	
	Chloride	6627	1,504 ton	132 kg/ton	
	Chrome	5,1	1.2 ton	0,11 kg/ton	

3.2.3 WASTE EMISSION LIMITS

3.2.3.1. COMPARISON BETWEEN THE PARTICIPATING COUNTRIES ON WASTE EMISSION LIMIT VALUES OF NATIONAL LEGISLATION

It is not possible to make a coherent comparison among the participating countries for ELV's for waste coming from tanneries due to:

- Each country reported different substances and information:
  - France reported the composition in chromium of sludge when put on the soil and pH value
  - Germany reported the principal national criteria for waste disposal in landfills
  - Italy reported the PH value and correction factor in case the threshold is surpassed
  - Latvia reported the reference of the national law on waste management
  - Spain reported national regulation on hazardous and non hazardous waste disposal, on LER codes for the tanning industry. A quantitative information of the ELV for concentrations of heavy metals in sludge for agricultural use is also mentioned in the text.
  - Sweden reports emissions of different types of waste of plant A in 2004; the national permits require a reduction and recycling of waste.

- The units of measurement are different, not allowing to make a representative comparison among France, Germany and Spain, countries which reported few same substances:
  - France reported in mg/kg
  - Germany reported in % by weight and mg/l
  - Spain reported in ppm
  - Sweden reported in m^3 of the different types of waste

3.2.3.2. WASTE EMISSION LIMITS ACCORDING TO NATIONAL LEGISLATION

FRANCE	PH [6.5 ; 8.5] SLUDGE put on grounds Chromium < 1000 mg/kg MS (Dry materials)
GERMANY	Regulations concerning the waste management and disposal of hazardous materials are laid down in the Federal Recycling and Waste Management Act (Kreislaufwirtschafts- und Abfallgesetz - KrW-/AbfG). According to these, an operator of a waste generating installation is obliged to avoid waste production or to make sure that the waste is environmentally soundly recovered. If that is technically or economically not reasonable, the waste has to be disposed of without any harmful effects. The KrW/AbfG states that installations generating more than 2 tons of hazardous waste or more than 2.000 tons of non-hazardous waste (per waste key), must produce a waste management concept and yearly waste balances.

<table>
<tr><td>GERMANY</td><td>The treatment of waste is regulated by the Ordinance on Environmentally Compatible Storage of Waste from Human Settlements and on Biological Waste-Treatment Facilities (Abfallablagerungsverordnung). This Ordinance prohibits the landfill of untreated waste from households and industrial installations. The following allocation criteria for landfills are required:
<table>
<tr><th>Parameter</th><th colspan="2">Allocation Values</th></tr>
<tr><th></th><th>Landfill class I</th><th>Landfill class II</th></tr>
<tr><td>Vane shear strength</td><td>25KN/m^2</td><td>25KN/m^2</td></tr>
<tr><td>Axial deformation</td><td>20 %</td><td>20%</td></tr>
<tr><td>Uniaxial compressive strength</td><td>50 kN/m^2</td><td>50 kN/m^2</td></tr>
<tr><td colspan="3">Organic component of dry residue in original substance</td></tr>
<tr><td>Determined as ignition loss</td><td>3 % by weight</td><td>5 % by weight</td></tr>
<tr><td>Determined as TOC</td><td>1 % by weight</td><td>3 % by weight</td></tr>
<tr><td>Extractable lipophile substances in original substance</td><td>0,4 % by weight</td><td>0,4 % by weight</td></tr>
<tr><td colspan="3">Eluate criteria</td></tr>
<tr><td>PH value</td><td>5.5 – 13.0</td><td>5.5 – 13.0</td></tr>
<tr><td>Conductance</td><td>10000 microS/cm</td><td>50000 microS/cm</td></tr>
<tr><td>TOC</td><td>20 mg/l</td><td>100 mg/l</td></tr>
<tr><td>Phenols</td><td>0.2 mg/l</td><td>50 mg/l</td></tr>
<tr><td>Arsenic</td><td>0.2 mg/l</td><td>0.5 mg/l</td></tr>
<tr><td>Lead</td><td>0.2 mg/l</td><td>1 mg/l</td></tr>
<tr><td>Cadmium</td><td>0.05 mg/l</td><td>0.1 mg/l</td></tr>
<tr><td>Chromium VI</td><td>0.05 mg/l</td><td>0.1 mg/l</td></tr>
<tr><td>Copper</td><td>1 mg/l</td><td>5 mg/l</td></tr>
<tr><td>Nickel</td><td>0.2 mg/l</td><td>1 mg/l</td></tr>
<tr><td>Mercury</td><td>0.005 mg/l</td><td>0.02 mg/l</td></tr>
<tr><td>Zinc</td><td>2 mg/l</td><td>5 mg/l</td></tr>
<tr><td>Fluoride</td><td>5 mg/l</td><td>25 mg/l</td></tr>
<tr><td>Ammonium - N</td><td>4 mg/l</td><td>200 mg/l</td></tr>
<tr><td>Cyanide, easily released</td><td>0.1 mg/l</td><td>0.5 mg/l</td></tr>
<tr><td>AOX</td><td>0.3 mg/l</td><td>1.5 mg/l</td></tr>
<tr><td>Water – soluble component (dry matter)</td><td>3 % by weight</td><td>6 % by weight</td></tr>
</table></td></tr>
<tr><td>ITALY</td><td>Systems for pH measurement and possible alarm, are mandatory for tanneries in the Vicenza district. If the threshold limit is surpassed, the solution is corrected. Hydrogen sulphide measurements are taken directly by the consortium in tanneries operating in Montebello Vicentino.</td></tr>
<tr><td>LATVIA</td><td>Law “On waste management” (in force since 01.03.2001)</td></tr>
<tr><td>SPAIN</td><td>The law 10/98 is applicable to all kind of waste except radioactive waste and releases to air and water. The aim is to prevent the waste production and establish a juridical regimen for production and management and to encourage the reduction, reusing, recycling and valorisation as well as regulating contaminated grounds.
The R.D. 833/88 is a regulation that develops the law 10/98. It regulates the production and management of hazardous waste to achieve a good defence of the human wealth and environment.
The Orden MAM/304/2002 publishes the valorisation and elimination operations and the European waste list. LER includes ten wastes from tanning industries (code 0401). Nine of them are classified as not hazardous waste and only the degreasing waste that contains</td></tr>
</table>

SPAIN

solvents (code 040103) are classified as hazardous waste.

There are some regulations to characterize by analytic survey the wastes: Orden de 13/10/89 where are determined the methods to characterize hazardous waste; and Annexe V of R.D. 363/1995 in order to approve the regulation over notification of new substances and classification, package and labelled of hazardous wastes.

The sludge will be treated for the translation to a landfill or using them as fertilizer if they are adapted to the regulation (R.D. 1310/90) that regulates the use of depuration sludge in the agrarian sector.

Limit values of heavy metals concentration in soils for use in agriculture
(mg/kg de materia seca)

	Limit Values (ppm)	
	Soil with pH<7	Soil with pH>7
Cadmium (Cd)	1	3
Copper(Cu)	50	210
Nickel (Ni)	30	112
Lead (Pb)	50	300
Zinc (Zn)	150	450
Mercury (Hg)	1	1,5
Chromium (Cr)	100	150

Limit Values of heavy metals in sludge as fertilizer
(mg/kg de materia seca)

	Limit Values (ppm)	
	Soil with pH<7	Soil with pH>7
Cadmium (Cd)	20	40
Copper (Cu)	1000	1750
Nickel (Ni)	300	400
Lead (Pb)	750	1200
Zinc (Zn)	2500	4000
Mercury (Hg)	16	25
Chromium (Cr)	1000	1500

Limit Values of heavy metals amounts per year added to the soils based in an average of ten years
(kg- Ha/year)

	Limit Values
Cadmium(Cd)	0,15
Copper (Cu)	12
Nickel (Ni)	3
Lead (Pb)	15
Zinc (Zn)	30
Mercury (Hg)	0,1
Chromium (Cr)	3

SWEDEN

The permit also includes:
Conditions concerning recycling, handling and disposal of waste

SWEDEN	The permit regulates that the plant A has to prevent and reduce the production of wastes. They have to reduce and recycle as much as possible. In the annual environmental report they have to report the waste quantities, were and how they treated the wastes. At the moment plant A separate wastes in about 20 fractions. Example of special tannery wastes 2004. The amount of sludge from the processes (not waste water treatment) is 674 m^3 to landfill, hair waste 2,544 m^3 used in agriculture as fertiliser, limed fleshings 5,200 m^3 to anaerobic digestion and biogas-production. Splitting, shavings and trimmings 1,624 tons to incineration with energy use.

3.3 LIMITS OF CHEMICALS AND SOLVENTS USED IN THE TANNING INDUSTRY

3.3.1.COMPARISON BETWEEN THE PARTICIPATING COUNTRIES ON SOLVENT AND CHEMICAL CONSUMPTION AND ELV's ACCORDING TO NATIONAL LEGISLATION

The information to elaborate the following table is taken from chapters 1.1, 1.3, 2.1 and the emission limits given by the national legislation of the participating countries.
As can be noticed in the following table, it is not possible to make a comparison among the different countries mainly due to:

- For almost all countries the consumption data of solvents and chemicals is given in annual total consumption
  - only Poland has given information on the consumption of solvents and chemicals "per raw hide/skin" produced
  - Sweden reported the consumption of chemicals "per raw hide/skin"
- The total amounts for solvents and chemicals consumed cannot be compared due to the different sizes and numbers of the tanning industries in the participating countries
- The information of national laws of Germany, Italy and Spain on ELV's are homogeneous as they transposed and implement the ELV's of the Solvent Directive, while the other participating countries reported the qualitative data of the types of compounds which can or cannot be used in the tanning industry.

<table>
<tr><th>COUNTRY</th><th>N° OF PLANTS</th><th>YEAR</th><th>PRODUCTION OF FINISHED HIDES AND SKINS</th><th>SOLVENTS CONSUMPTION (annual aggregate)</th><th>CHEMICALS CONSUMPTION (annual aggregate)</th><th>ELV of CHEMICALS AND SOLVENTS</th></tr>
<tr><td>FRANCE</td><td>78</td><td>2002</td><td>10 million m^2</td><td>No recent data available</td><td>80.000 t</td><td></td></tr>
<tr><td>GERMANY</td><td>41</td><td>2003</td><td>15 million m^2</td><td>600-700 t</td><td>Qualitative data available</td><td>bans and usage restrictions for:
Pentachlorophenol (PCP)
Azodyes
Nonylphenol and Nonylphenolethoxylate
Short chain Chloroparaffin

Emission limits for installations for leather coating:
<table><tr><td>Solvent consumption threshold (t/a)</td><td>Total emissions (g VOC/ m² of leather produced)</td></tr><tr><td>10-25</td><td>85</td></tr><tr><td>>25</td><td>75</td></tr><tr><td>>10*</td><td>150</td></tr></table>for leather used in furnishing or small products like bags, belts, wallets etc</td></tr>
</table>

<table>
<tr><th>COUNTRY</th><th>N° OF PLANTS</th><th>YEAR</th><th>PRODUCTION OF FINISHED HIDES AND SKINS</th><th>SOLVENTS CONSUMPTION (annual aggregate)</th><th>CHEMICALS CONSUMPTION (annual aggregate)</th><th>ELV of CHEMICALS AND SOLVENTS</th></tr>
<tr><td>ITALY
Vicenza

Santa Croce</td><td>2.330

910</td><td>2002

2002</td><td>168 million m^2

65 million m^2 (chrome finished)
53.000 t (vegetable tannin finished)</td><td>9700 t

5000 t</td><td>Qualitative data available

114.000 t (in 2003)</td><td>Italy is now implementing new European Directive on solvents, which fixes new limits for solvent consumption and total emission
<table>
<tr><th>Solvent consumption threshold (t/a)</th><th>Total emissions (g VOC/ m² of leather produced)</th></tr>
<tr><td>10-25</td><td>85</td></tr>
<tr><td>>25</td><td>75</td></tr>
<tr><td>>10*</td><td>150</td></tr>
</table>
for leather used in furnishing or small products like bags, belts, wallets etc</td></tr>
<tr><td>LATVIA</td><td>3</td><td>n. a.</td><td>36 t</td><td>580 t/year</td><td>600 t (estimated)</td><td>Avoid halogenated organic compounds, phthalates and nonylphenolethoxylates.</td></tr>
<tr><td>POLAND</td><td>3.000</td><td></td><td>Plants with more than 50 empleyees:
6 million m^2</td><td>average consumption per tonne of raw hide/skin:
pastes 12 kg/t
varnishes 5 kg/t
colours 12 kg/t
waxes 16 kg/t</td><td>For 1 t of raw hide/skin:
caustic soda 34 kg/t
Sulphuric acid 6kg/t
sodium sulphide 6 kg/t
carboxylic acid 16 kg/t
acid sodium sulphide 6 kg/t</td><td>Substances which can’t be used in tanning industry:
toxic and caustic chemicals (R 35),
methanol (CAS 67-56-1)
substance which contain more then 3% methanol,
substance which contain cadmium,
azo dye,
nonyl phenol $C_6H_4(OH)C_9H_{19}$ (CAS 104-40-5);
nonylphenolethoxylate $(C_2H_2O)_nC_{15}H_{24}O$ and substance which contain $C_6H_4(OH)C_9H_{19}$; $(C_2H_2O)_nC_{15}H_{24}O$ more then 0,1%,
hydrocarbons chloride C_{10} – C_{13} and substance which contain more then 1%,
pentachlorophenol,
benzidine, p-diaminodiphenyl.

Nowadays, Polish Law does not include permissible limits of chemicals/solvents used in tanning industry.</td></tr>
</table>

<table>
<tr><th>COUNTRY</th><th>N° OF PLANTS</th><th>YEAR</th><th>PRODUCTION OF FINISHED HIDES AND SKINS</th><th>SOLVENTS CONSUMPTION (annual aggregate)</th><th>CHEMICALS CONSUMPTION (annual aggregate)</th><th>ELV of CHEMICALS AND SOLVENTS</th></tr>
<tr><td>SPAIN</td><td>221</td><td>2003</td><td>39 million m^2</td><td>3000 t</td><td>400 – 600 t (estimated)</td><td>
<table>
<tr><th>POLLUTANT</th><th>Threshold solvent consumption in t/year</th><th>Limit Values of total emission</th><th>Special dispositions</th></tr>
<tr><td>VOC</td><td>10-25
>25

>10*</td><td>85 g/m2
75 g/m2

150 g/m2</td><td>The releases limits are expressed in g of solvent released per m2 of product produced</td></tr>
</table>
for leather used in furnishing or small products like bags, belts, wallets etc
</td></tr>
<tr><td>SWEDEN</td><td>6</td><td>2003</td><td>2,3 million m^2 (ignoring data of one very small tannery)</td><td>47 t</td><td>6.000 t

At largest plant:
520 kg/t of raw hide</td><td>Avoid halogenated organic compounds, phthalates and nonylphenolethoxylates.
If they want to use a new chemical compound, which they not have used before, they have to inform the supervision authority. The information have to inform about environmental aspects as toxicity, biodegradability, mutagenicity

The amount of used chemicals is not regulated but they have to report the chemical use every year in the environmental report with product names, chemical content and used quantity</td></tr>
</table>

3.3.2 LIMITS OF CHEMICALS AND SOLVENTS USED IN THE TANNING INDUSTRY ACCORDING TO NATIONAL LEGISLATION

<table>
<tr><td>GERMANY

GERMANY</td><td>
Chemicals:
In the Prohibition of chemicals ordinance bans and usage restrictions for the substances below are laid down.

Pentachlorophenol (PCP)
Azodyes
Nonylphenol and Nonylphenolethoxylate
Short chain Chloroparaffin

Emission limits for installations for leather coating:
<table>
<tr><td>Solvent consumption threshold (t/a)</td><td>Total emissions (g VOC/ m² of leather produced)</td></tr>
<tr><td>10-25</td><td>85</td></tr>
<tr><td>>25</td><td>75</td></tr>
<tr><td>>10*</td><td>150</td></tr>
</table>
*for leather used in furnishing or small products like bags, belts, wallets etc.
</td></tr>
<tr><td>ITALY</td><td>The limits for solvents can be found in Ministerial Decree "D.M. 44 del 16 January 2004"</td></tr>
<tr><td>LATVIA</td><td>"Law on Chemical Substances and Chemical Products" (in force since 01.01.1999)
Regulations of the Cabinet of Ministers No. 105 "Procedure for Compilation and Submitting Safety Data Sheets on Chemical Substances and Chemical Products" (revised in 2004)

Chemicals have to be stored in a safe way in areas were spillages can be captured.
They have to substitute harmful chemicals to less harmful. They should avoid halogenated organic compounds, phthalates and nonylphenolethoxylates.</td></tr>
<tr><td>POLAND</td><td>Chemicals which can't be used are included in decree of Ministry (passed on the 5th of July 2004).
Chemicals and substance which can't be used in tanning industry:

toxic and caustic chemicals (R 35),
methanol (CAS 67-56-1)
substance which contain more then 3% methanol,
substance which contain cadmium,
azo dye,
nonyl phenol $C_6H_4(OH)C_9H_{19}$ (CAS 104-40-5); nonylphenolethoxylate $(C_2H_2O)_nC_{15}H_{24}O$ and substance which contain $C_6H_4(OH)C_9H_{19}$; $(C_2H_2O)_nC_{15}H_{24}O$ more then 0,1%,
hydrocarbons chloride C_{10} – C_{13} and substance which contain more then 1%,
pentachlorophenol,
benzidine, p-diaminodiphenyl.

Nowadays, Polish Law does not include permissible limits of chemicals/solvents</td></tr>
</table>

<table>
<tr><td>POLAND</td><td>used in tanning industry.
The use of raw material per year (including chemicals) is determined in the permission.
The quantity of chemicals containing organic solvents cannot cause the exceed permissible standards determined in the permission for the emission of impurities into air.</td></tr>
<tr><td>SPAIN</td><td>The use of solvents in the tanning industry cause VOC releases to atmosphere that can be harmful for human health and environment. In my country these releases are regulated by R.D. 117/2003. In the item 13 of annexe II of this regulation is specified the limit values for skin processes.

<table>
<tr><th>POLLUTANT</th><th>Threshold solvent consumption in t/year</th><th>Limit Values of total emission</th><th>Special dispositions</th></tr>
<tr><td>VOC</td><td>10-25
>25

>10 (1)</td><td>85 g/m2
75 g/m2

150 g/m2</td><td>The releases limits are expressed in g of solvent released per m2 of product produced
(1) For covering processes of skins in furniture and special leather goods used as small consume products (bags, belts, wallets, etc)</td></tr>
<tr><td colspan="4">Note: VOC release limit does not exist for companies with a consumption less than 10 tons of solvent per year</td></tr>
</table></td></tr>
<tr><td>SWEDEN</td><td>The permit also includes:
Conditions concerning the handling of chemical products.

Chemicals have to be stored in a safe way in areas were spillages can be captured.
Harmful chemicals have to be substituted to less harmful ones. Halogenated organic compounds should be avoided, phthalates and nonylphenolethoxylates. If operators want to use a new chemical compound, which they not have used before, they have to inform the supervision authority. The information has to inform about environmental aspects as toxicity, biodegradability, mutagenicity.

The amount of used chemicals is not regulated but they have to report the chemical use every year in the environmental report with product names, chemical content and used quantity. 2004 plant A used almost 6,000 tons chemicals or 521 kg/ton raw hide.</td></tr>
</table>

3.4. COMPARISON BETWEEN THE PARTICIPATING COUNTRIES ON WASTE WATER EMISSION LIMITS GIVEN BY NATIONAL LEGILATION

PARAMETERS	FRANCE				GERMANY Specific for tanning industry		ITALY		LATVIA	POLAND	SPAIN		SWEDEN Specific for the waste water treatment plant for Plant A	
	With public wwtp		Without public wwtp								General ELV for waste waters			
	Concentration mg/l	Flow Kg/d	Concentration mg/l	Flow Kg/d	Concentration mg/l	Annual freight in kg	Vicenza	San Miniato			Indirect discharge	Direct discharge	per day	m^3/ t of raw hide
Flow	n. a.		n. a.		n. a.		n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	1.750 m^3	35 m^3/ t of raw hide
pH	5.5 – 8.5 9.5 with alkaline neutralization				n. a.		n. a.	4 - 13	n. a.	6,5-9	5,5-9,5	5,5-9,5	6-8	n. a.
Suspended solids (mg/L)	600 mg/l	>15	100 35	<15 >15	n. a.		35 – 80 mg/l	300 – 500 mg/l	n. a.	35 mg/dm^3	150-300 mg/l	80 mg/l	35 kg	20 mg/l
Sedimentary solids (mg/L)	n. a.	n. a	n. a.	n. a.	n. a.		n. a.	2.000 – 13.000 mg/l	n. a.	n. a.	1-2 mg/l	0,5 mg/l	n. a.	n. a.
BOD5 (mg/L)	800 mg/l	> 15	100 30	< 30 > 30	25 mg/l		n. a.		n. a.	n. a.	60-300 mg/l	40 mg/l	BOD 7 25 kg	BOD 7 14 mg/l
COD (mg/L)	2000 mg/l	> 45	300 125	< 100 >100	250 mg/l		125 – 160 mg/l	6.000 – 13.000 mg/l	n. a.	125 mhO_2/dm^3	200-500 mg/l	160 mg/l	500 kg	286 mg/l
Temperature (ºC)	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.	n. a.	n. a.	Less than 3° of increase		n. a.	n. a.
Colour (mg/L Pt-Co)	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.	n. a.	n. a.	Inappreciable due to dilution		n. a.	n. a.
Aluminium (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.	n. a.	n. a.	1-2 mg/l	n. a.	n. a.	
Arsenic (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.	n. a.	n. a.	0,5-1 mg/l	n. a.	n. a.	
Barium (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.	n. a.	n. a.	20 mg/l	n. a.	n. a.	
Boro (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.	n. a.	n. a.	5-10 mg/l	n. a.	n. a.	
Cadmium (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.	n. a.	n. a.	0,2-0,5 mg/l	n. a.	n. a.	

Chromium III (mg/L)	1.5 mg/l	n. a	1.5	n. a.	Prior blending: Waste water from tanning (including dewatering) and from wet finishing (neutralising, re-tanning, dyeing, stuffing) (each process including rinsing) or from leather fibreboard manufacturing , must not exceed a level of 1 mg/l of total chromium in a qualified random sample or a 2-hour composite sample.	2 mg/l of total chromium	25 – 100 mg/l		Total Cr 1 mg/dm^3	3-4 mg/l	2 mg/l	0,2 kg	0,11 mg/l
Chromium VI (mg/L)							n. a.	n. a.		0,2-0,5 mg/l	0,2 mg/l		
Chromium & compounds according to	n. a.	n. a.	n. a.	n. a.	50µg/l	2.5 kg	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.
Iron (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.	n. a.	n. a.	3-10 mg/l	2 mg/l	n. a.	n. a.
Manganese (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.	n. a.	n. a.	3-10 mg/l	2 mg/l	n. a.	n. a.
Nickel (mg/L)	n. a.	n. a.	n. a.	n. a.	50 µg/l	n. a.	n. a.	n. a.	n. a.		3-10 mg/l	n. a.	n. a.	
Mercury (mg/L)	n. a.	n. a.	n. a.	n. a.			n. a.	n. a.	n. a.	n. a.	0,05-0,1 mg/l	0,05 mg/l	n. a.	n. a.
Lead (mg/L)	n. a.	n. a.	n. a.	n. a.	50 µg/l	n. a.	n. a.	n. a.	n. a.		0,2-0,5 mg/l	n. a.	n. a.	
Selenium (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.	n. a.	n. a.	0,03-0,1 mg/l	0,03 mg/l	n. a.	n. a.
Tin (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.	n. a.	n. a.	10 mg/l	10 mg/l	n. a.	n. a.
Copper (mg/L)	n. a.	n. a.	n. a.	n. a.	100 µg/l	n. a.	n. a.	n. a.	n. a.		0,5-10 mg/l	n. a.	n. a.	

Zinc (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	10-20 mg/l	3 mg/l	n. a.	n. a.
Cyanide(mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	0,5-1 mg/l	0,5 mg/l	n. a.	n. a.
Chlorides (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.	2000 mg/l	2000 – 17.000 mg/l		1000 $mgCl/dm^3$	2000 mg/l	2000 mg/l	n. a.	n. a.
Chlorine	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.	Total 0,4 mg/dm^3	n. a.	n. a.	n. a.	n. a.
Sulphurs (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.	1300 – 1500 mg/l	n. a.	n. a.	n. a.	1-2 mg/l	1 mg/l	n. a.	n. a.
Sulphide (mg/L)	n. a.	n. a.	n. a.	n. a.	Prior blending: Waste water from soaking, liming and deliming (each process including rinsing) must not exceed a level of 2 mg/l sulphide in a qualified random sample or a 2-hour composite sample		20 – 600 mg/l	n. a.	n. a.	1-2 mg/l	1 mg/l	n. a.	n. a.
Sulphate (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	2000 – 2700 mg/l	n. a.	500 mg SO_4/dm^3	2000 mg/l	2000 mg/l	n. a.	n. a.
Phosphorus (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.		8-12	6	n. a.	n. a.
Total phosphorus (mg/L)	50 mg/l		10	> 15	2 mg/l	12 mg/l		n. a.	3 mg/dm^3	20	10	0,52 kg	0,3 mg/l
Ammonium (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	50	15	40 kg (may – august)	23 mg/l
Ammonium - N (mg/L)	n. a.	n. a.	n. a.	n. a.	10 mg/l	15 mg/l	200– 800 mg/l	n. a.	n. a.	12-20	10	n. a.	n. a.
Oils and fats (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	25-40	20	n. a.	n. a.
Phenols (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	0,5-1	0,5	n. a.	n. a.
Aldehyde	n. a.	n.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	1-2	1	n. a.	n. a.

(mg/L)		a.											
Detergents (mg/L)	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	3-6	2	n. a.	n. a.
Nitrogen	150 mg/l		30	> 50	n. a.	n. a.	n. a.	n. a.	Total N 30 mg/dm^3	n. a.		150 kg	86 mg/l
Adsorbable organic Halogens (AOX) mg/l	n. a.	n. a.	n. a.	n. a.	0,5 mg/l	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.
Surfactants and wetting agents	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	40 – 70 mg/l	n. a.	n. a.	n. a.		n. a.	n. a.
Fish toxicity (TF)	n. a.	n. a.	n. a.	n. a.	2	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.
Total coliforms	n. a.	n. a.	n. a.	n. a.	20.000 UFC/100ml	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.
Faecal coliforum	n. a.	n. a.	n. a.	n. a.	12.000 UFC/100ml	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.
Fecal streptococcus	n. a.	n. a.	n. a.	n. a.	2.000 UFC/100ml	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.
Escherichia coli	n. a.	n. a.	n. a.	n. a.	5.000 UFC/100ml	n. a.	n. a.	n. a.	n. a.	n. a.		n. a.	n. a.

4. GUIDELINES FOR THE TANNING INDUSTRY

4.1 INTRODUCTION

The IMPEL report on Minimum Criteria for Inspections published in June 1998 defines minimum criteria for various elements of the inspections such as planning, enforcement, analysis and reporting. It includes terms of reference for further tasks to be undertaken by IMPEL. In this respect the INSPECTAN project idea was proposed during the 22nd Plenary meeting held in Rome 2003. The Cluster 1 had a review role and the report was adopted during the IMPEL plenary meeting of 31 May to 2 June 2006.

The purpose task of this report is to provide inspectors with some useful elements to plan and perform an environmental inspection on a tannery, in accord with the national legislation and the IMPEL recommendations.

4.2 DIFFERENT APPROACHES TO ENVIRONMENTAL CONTROLS

Tanning consists of 3 distinct phases: wet phase (beamhouse and tanning), dry phase (mechanical operations) and refining. The possibility of separating the single phases and the need for specific raw materials for each phase has, in some countries, prompted the tanning enterprises to concentrate facilities in areas that subsequently developed into industrial districts.

This is also due to the necessity to keep the problem of smell under control that has afflicted tanning activity for a long time and has only recently been solved.

Where space allows or due to historical development, mid- to large sized plants perform the complete tanning cycle, from the raw material to the finished product. But not necessarily, there are also single plants with an incomplete cycle.

Such differing situations require specific approaches in terms of environmental controls.

The development of the economy during the past years has almost everywhere multiplied activities with environmental impacts, so that the gap between the need for environmental control and controls really made by competent authorities has greatly increased.

Thus, the traditional site-specific control eventually gave way to an indirect control allowing for a higher level of environmental protection.

An indirect approach for clusters of tanneries in a district essentially considers the district as a single tannery impacting the nearby environment.

Following the evaluation of every single aspect, the control authority produces a list of priorities which reflects the local environmental emergencies. This ranking helps the set up of a programme of controls and actions, whose effects are measured by continuous environmental monitoring.

The programme aims to reduce the district's general environmental impact to an acceptable level. Besides, there have to be site specific environmental controls occasionally.

The site specific approach of control allows for a comprehensive evaluation of the performance of each plant, and for a higher level of cooperation between inspectors and plant managers. The intent is to check the application of best available techniques, to select the best possible improvements, specific for the plant and the environmental performances it has to reach.

Site specific controls are in fact integrated controls. They evaluate the plant's overall performance without separating controls from environmental aspects.
The following tables detail the possible control type.

Indirect approach	**Site specific approach**
Many plants in district area	Few or isolated plants and occasionally in plants of a tanning district
Incomplete cycle plants	Complete cycle plants and incomplete cycle plants
Monitoring quality of each environmental aspect	Monitoring environmental performance of the single plant
Single environmental aspect inspections	Integrated inspections
Face environmental emergencies and routine activities	Face routine control activities

The authority responsible for environmental inspections has to opt for one of the two possible approaches, considering the number of plants; their concentration or spacing; the probability of emergencies; the resources at hand.
An exclusively site-specific programme is certainly best and is essential for checking the application of best available techniques. An indirect approach however is more apt to optimize limited resources when specific problems such as odours or specific pollutants are released to the air by clusters of facilities.

4.3 DEFINITION OF THE INSPECTION.

Art.II, 2 of Recommendation 331/2001/EC reads that an "**environmental inspection**" may include:

"a) checking and promoting the compliance of controlled installations with relevant environmental requirements set out in Community legislation as transposed into national legislation or applied in the national legal order (referred to hereinafter as "EC legal requirements"):

b) monitoring the impact of controlled installations on the environment to determine whether further inspection or enforcement action (including issuing notification or revocation of any authorisation, permit or licence) is required to secure compliance with EC legal requirements;

c) the carrying out of activities for the above purposes including:

- *site visits,*
- *monitoring achievement of environmental quality standards,*
- *consideration of environmental audit reports and statements,*
- *consideration and verification of any self monitoring carried out by or on behalf of operators of controlled installations,*
- *assessing the activities and operations carried out at the controlled installation,*
- *checking the premises and the relevant equipment (including the adequacy with which it is maintained) and the adequacy of the environmental management at the site,*
- *checking the relevant records kept by the operators of controlled installations."*

Thus, a check or control consists of appropriate actions to prove that there is compliance with legal and regulatory requirements. Control should not be intended as a "stand alone" activity, its aim is to be a direct assessment of activities, operations and behaviours likely to have an environmental impact.

The BREF on general principles of environmental monitoring (one of the reference texts produced by the EIPPCB- European Integrated Pollution Prevention and Control Bureau) provides the following definition for "monitoring": *"systematic surveillance of the variations of a certain chemical or physical characteristic of an emission, discharge, consumption, equivalent parameter or technical measure etc. This is based on repeated measurements or observations, at an appropriate frequency in accordance with documented and agreed procedures, and is done to provide useful information."* The concept of control is therefore inclusive of that of monitoring, but also includes additional specific activities. A single mandate for example, can generate a considerably long checklist to be verified in the inspection.

In our example, control activities on tanneries include both monitoring of emission, discharges and waste produced by the plant but also some controls on technical aspects and operational procedures that are specific for this production cycle (i.e. the management of discharge water coming from beamhouse and from tanning;)

Given the above clarifications, we can now give a precise definition of the meaning of environmental inspection, as well as of the controls it includes.

Environmental inspection:
A check of the requirements specified by the environmental permit, and of the application of best available techniques for pollution prevention and reduction. The check, carried out within the framework of the existing environmental laws, consists of one or more of the following controls:

Administrative control: a documental check exclusively. It omits measurements, sampling, analyses. Its purpose is:

- checking compliance with the relevant environmental legislation in force;
- checking and promote the compliance with the relevant environmental requirements specified by construction and operation permits;
- checking the relevant records kept by the operators of the controlled installations.

Technical control: check on site the compliance of the building and contained installations, with the relevant environmental standards. Such spot checks measure and assess the functioning and safety of the components of the installation. The control in question is a check on the structural conditions of the installation.

Operational control: check and assess on site the compliance of self monitoring (and connected activities) with the relevant operation- and safety master plans. The Community law has recently highlighted the importance of continuous monitoring and in particular of self monitoring carried out by or on behalf of operators of controlled installations. The control in question is a check of performance of the installations .

The Bref on general principles in environmental monitoring defines self control as "monitoring of industrial emissions by the operator of an industrial installation, according to an appropriate, defined and agreed sampling programme and according to recognised measurement protocols (norms or demonstrated analytical methods or calculation/estimation methods). Operators may also contract an appropriate external body to perform the self-monitoring on their behalf"

Analytical control: actual monitoring of the environmental impact of the installation, to guarantee its compliance with the relevant environmental requirements. Such controls almost always include sampling and subsequent analyses or calculations.

Being precise about the variety of controls is particularly important where tanneries are concerned. We have already noted that plants are frequently specialized on sections of the full tanning cycle (i.e. beamhouse and tanning, mechanical operations or finishing).

We advise to adjust the "integrated environmental inspection" to one specific segment of the complete tanning cycle, and to its specific environmental aspect. The inspector will then consider the actual cycle of the plant and inspect.

TYPE OF PLANT	ENVIRONMENTAL ASPECTS
Complete cycle	Air emissions and odours Water cycle (consumption, treatment and discharge) Solid and liquid waste Energy consumption (reuse of waste heat) Chemicals (use and storage) Environmental Risks Noise Raw materials
Tanning plant	Air emissions and odours Water cycle (consumption, treatment and discharge) Solid and liquid waste Energy consumption Chemicals (use and storage) Environmental Risks Noise Raw materials
Mechanical operation plant	Air emissions (dust) Solid waste Energy consumption Noise
Finishing plant	Air emissions and odours (solvents) Solid and liquid waste Energy consumption Chemicals (use and storage) Env. Risks

4.4 PLANNING AN INSPECTION

The inspection plan can be carried out according to the IMPEL guidelines (IMPEL Reference Book for Environmental Inspections, 1999) in terms of competences, resources and frequency.

The chief inspector will first decide whether the inspection will be integrated or specific. This should certainly be included in the authorities plan of inspections, together with instructions on how to perform inspections and a list of the plants subject to controls.

The next step is collecting general information on both the plant and the surrounding environment:

- results of previous inspections, requirements, results of analytical controls,..
- integrated or single aspect permits, project of the plant, possible recent changes in the activity, technical description of air and water treatment,…
- self-monitoring reports, risk assessment
- surrounding environment (soil, surface and ground water, towns and vulnerable points)
- results from environmental monitoring: air quality (VOC, H2S, NH3, odours), water quality (surface water where plant discharges), level of noise,…
- results from audits of E.M.S.
- complaints, environmental accidents

If the control of specific environmental aspects is the object of the inspection, the data examined have to be consistently specific (for example, data on noise do not help in measuring air emissions). If an integrated inspection is the case, data on various aspects will instead help understand the critical aspects of the plant and surrounding environment, and allow for an appropriate inspection.

The following tables will describe some items that can help inspectors when planning an inspection:

- a table to highlight the critical aspects of the plant. This should detail the production cycle and the environmentally sensitive aspects of the neighbourhood;
- some tables giving details of the inspection activities which are adequate for the inspection of the existing production cycle and relevant environmental aspects;
- advice on the specific checks to be realized during the inspections.

4.5 IDENTIFICATION OF CRITICAL ASPECTS OF THE PRODUCT AND PROCESS OF THE TANNING CYCLE

The table below lists the relevant components of the complete tanning cycle. It is a help for the inspector planning the identification of critical aspects in a tanning plant. Source: adapted from the BREF "Tanning of hides and skins".

Process Unit	Waste water	Waste	Air emission	Energy consumption	Chemicals	Environmental Risks	Noise
HIDE AND SKIN STORAGE AND BEAMHOUSE OPERATIONS							
Trimming		• parts of the raw hidcs (trimmings)		For cooling systems of the storage drums			not particularly relevant
Curing & Storing		• salt brine				ground and surface water pollution, soil pollution	
Soaking	• BOD, COD, SS, DS from soluble proteins • salts • org -N • AOX • emulsificants. surfactants. biocides				relevant for use of hazardous chemicals (surfactants, biocides)	Soil pollution; Ground and surface water pollution	
Fleshing	BOD. COD. SS. DS from fat, grease	• fat, connective tissue, lime					
Liming & Unhairing	• sulphides, • BOD, COD, SS, DS• lime • high pH • org.-N, NH4-N, biocides	• hair • sludge from liming effluents (waste water treatment)	• sulphides • odour		relevant for use of hazardous chemicals (sulphides, Aliphatic thioles		
Rinsing after Unhairing							
Splitting		• lime split • trimmings					

Process Unit	Waste water	Waste	Air emission	Energy consumption	Chemicals	Environmental Risks	Noise
Deliming / Bating	BOD, COD. DS • NH4.-N • sulphides, calcium salts		• NH3 • H2S • dust	energy consumption for all processes in drums reuse of waste heat for the heating of process water or elsewhere	relevant for use of hazardous chemicals (Ammonium salts)	ground and surface water pollution	relevant for use of drums
Rinsing							
Degreasing	• BOD. COD, DS, • organic solvents	• distillation residues • waste water treatment residues	Organic solvents		Organic solvents, surfactants		
Pickling	• BOD. COD, SS, DS • Salt • low pH, fungicides		• H2S ☐ acid fumes		relevant for use of hazardous chemicals (salt, acids, fungicides)		
Tanning	• contents according to tanning process - SS, DS. BOD. COD. low pH	• hides due to operating errors • tanning liquors • waste water treatment sludge			relevant for use of hazardous chemicals (e.g. chromium salts, polyphenolic compounds)		
Rinsing							
Draining. Samming & Setting							

Process Unit	Waste water	Waste	Air emission	Energy consumption	Chemicals	Environmental Risks	Noise
Splitting & Shaving		• split and shavings • trimmings	☐ dust				
Rinsing	• leather fibres from shaving						
Neutralisation	DS, SS; BOD. COD						
Rinsing							
Retanning	COD, formaldehyde, phenole, chromium				relevant for use of hazardous chemicals (e.g. mineral tanning agents, vegetable tanning agents)	ground and surface water pollution,	
Bleaching	• organic load		• SO2				
Dyeing	• high colour ☐ organic solvents • dyeing agents	• residues of chemicals • dyeing agents	• NH3 • phenols • formaldehyde		relevant for use of hazardous chemicals (dyestuff)		
Rinsing							
Fatliquoring	• high oil • chlorinated organic compounds (AOX), surfactants				relevant for use of hazardous chemicals (chlorinated fat liquors)		
Process Unit	**Waste water**	**Waste**	**Air emission**	**Energy consumption**	**Chemicals**	**Environmental Risks**	**Noise**

FINISHING							
Staking / other mechanical operations		• dust		Drying is the most energy intensive process		use and storage of flammable substances	relevant
Drying			• acid fumes				relevant
Milling / Buffing		• dust	• dust				
Coating	• finishing agents in water or in aqueous solutions (organic solvents, heavy metals)	• residues from chemicals • sludges from finishing agents (over-spray, etc.)	• organic solvent • formaldehyde as fixing agent		Organic solvents, formaldehydes		
Trimming		• final trimmings					
ABATEMENT							
Air abatement	• waste water from wet-scrubbers	• sludges from waste water from wet-scrubbers • filter matrices • dust	• not abated emissions				relevant
Waste water abatement		• sludges • coarse material • filters (e.g. from special treatment)	• according to waste water stream and process (e g. sulphides, ammonia. odour)	Reuse of waste heat			
Waste treatment	• according to waste fraction and process	• according to waste fraction and process	• according to waste fraction and process (particularly for beamhouse wastes: flesh, hair, fat,…)				

4.6 DEFINITION OF THE SPECIFIC CONTROL ACTIVITIES.

The tables below list the possible controls ranked in accordance with the existing regulations, i.e. the control requirements of the Community law; the existing specific laws and technical considerations; the consolidated procedures.

Differences between IPPC- or non-IPCC installations are not taken into account, for the following reasons:

- many national legislations ignore differences in control activities when the two installations are concerned;
- annex1 of 61/96/EC defines the IPPC tannery as one that produces a certain daily weight of finished hides and skins. But the chromium tanning industry in some member states quantifies the finished product in terms of surface. In conclusion in this case it is not possible to specify if a tannery is an IPPC plant or not. Moreover tanneries products frequently leave the installation in wet form ("wet blue"), and consequently weigh considerably more than the final product. A conversion factor is needed to convert wet blue into leather for tanneries producing wet blue only.

Analyses of emissions of sections finishing leather with VOCs, include controls of exhaust air as well as of raw materials so as to assess their VOCs' content and define the solvents mass balance. Controls on raw materials may be requested by specific requirements.

Where most or all of the discharge waters are piped to municipal sewers, controls largely concentrate on the municipal waste water-treatment plants (wwtp). But some substances which can't be treated by the wwtp have to be treated on-site. These substances have to be monitored at the plant according to the requirements of legislation. In tanneries that do not pipe discharge water to municipal sewage facilities –and thus may heavily impact the aquatic environment- the frequency and peculiarity of controls is decided by the inspection authority on the basis of specific national legislation.

TECHNICAL OR OPERATIONAL CONTROLS (Specify if BAT has to be in operation, i.e. tannery is in the IPPC class)						
	Water discharge	**Waste**	**Air emission**	**Energy consumption**	**Reagents**	**Environmental Risks**
General aspects	Global annual amount (one annual measurement) of water input and output Check the documentation of the self-monitoring	Indication of the annual quantity for each type of waste/byproduct chemicals, specifying if destined to recover/digestion. Check if containers, pallets, plastic or cardboard trunks, packagings, are recycled/re-used	Check existence and updating of logbook of self monitoring of relevant air emissions, and its compliance with prescriptions of the authorization.	Record consumption of electricity and heat (by measuring consumption of vapor, methane, diesel, oil, other sources). Identify indexes for the energy performance. Monitor the energy efficiency, inclusive alarms signalling malfunctions.	Indicate the annual quantity of raw hides and skins treated (full cycle). List countries of origin of raw hides and skins. Indicate quantity of half-finished hides or skins (wet-blue) treated, when coming from other plants. Indicate quantity of skins ended chemicals (expressed in sqm for the cycle to the chrome and in tons for the production of leather). Indicate annual quantity of every chemical used	

	Water discharge	Waste	Air emission	Energy consumption	Reagents	Environmental Risks
Beamhouse	Check devices for the prevention of formation of H_2S in the S-containing waste water flow	Indicate final destination (recovery or disposal) of each waste or chemical by product produced in this phase (skin, salt, etc). Detail if flesh is recovered in gelatine, glue, hydrolysed proteins, fertilizers.	Check devices for the prevention of formation of H_2S		Check the use for utilization of chemicals with low environmental and toxicological impact. Check reductions of sulphurs by substitutes compatible with the product. Check reduction of salt used and its recovery. Check substitution of biocides with less impacting alternatives	Check presence of drains and of devices to contain spillages from drums, tanks and trunks containing chemical substances.
Tanyard	Check segregation of discharge flows containing chrome from other discharges, and their fitting with chrome recover devices	Indicate final destination (recovery or disposal) of each waste or chemical by product produced in this phase (skin clips, sludge, leather, etc). Check crusts chemicals, clips, shaves are recovered/re-used for the production of leather, fertilizers. Check if fats, mix -non organic solvents, oils, are treated thermally.	Comparison between emissions authorized with measured emissions. Compare existing abatement device with described plan. Check characteristics of chimneys. Presence on drum aspiration line of water traps, abatement tower. If the abatement is wet, to verify procedures for self monitoring of pH and potential		check substitution of ammonium salts with alternatives, and of virgin chrome with recycled. Centralized Installations for the Recover, ammonia with auxiliary like the penetrating for the colour. Check enhancement of exhaustion of post-tanning treatment agents for colouring and weight gain. Utilization of chemicals to low	Check presence of devices for drainage and containment of spills from drums, tanks and trunks containing chemical substances. Check fire devices in proximity of storage areas

			Redox of the solution of abatement (Environmental System Management).		inorganic utilization of salts, colouring liquid to high exhaustion with little quantity of salts. Increase exhaustion of the bath of gain weight.	
	Water discharge	**Waste**	**Air emission**	**Energy consumption**	**Reagents**	**Environmental Risks**
Mechanical operations	Check correct destination of waste water	Indicate final destination (recovery or disposal) of each waste or chemical by product produced in this phase (skin clips, flesh, shaves, etc). To verify if crusts not tanned, clips, pluck are recovered/re-used for the production of leather, fertilizers. Check pluck, wool are recovered to produce furniture, fertilizers.	Compare real emissions with authorized emissions. Compare existing abatement device with described plan. characteristic chimney.			

	Water discharge	Waste	Air emission	Energy consumption	Reagents	Environmental Risks
Finishing	Check correct destination of waste water	Indicate final destination (recovery or disposal) of each waste or chemical by product produced in this phase (skin clips, sludge, etc). Check if organic solvents are treated for recovery. Check if carbon filters are treated for regeneration.	Compare measured emissions with authorized emissions. Check list of machinery used in finishing (sprayers, flatteners, smootherers, benches plugging, etc). Check existing abatement device with description (wet, dry, etc), characteristic chimney.		Check use of bindings based on low monomer content emulsions. systemize finish that use free pigments from cadmium/lead, solvents free, colouring liquid to high exhaustion with little quantity of salts, cylinder finishing, guns HVLP, systems to spray with veil of water and soda . Substitute halogen containing colouring agents with reactive vinyl sulphonates.	Check presence of devices for drainage and containment of spills from drums, tanks and trunks containing chemical substances. Check fire devices in proximity of storage areas for resins, solvents etc.
Self monitoring	Check procedure of self monitoring of pH, Redox potential of the abatement solution (Environmental System Management).		Check presence of logbook of maintenances on abatement devices for significant emissions, and its compliance with prescriptions in the authorization. The logbook has to report each interruption of operation and each intervention on the abatement device, specifying the		Check the use of soda/oxygenated water solutions in abatements.	

			cause (ordinary/extraordinary maintenance, ruin accidental, shut down of production, etc). Check			
	Water discharge	**Waste**	**Air emission**	**Energy consumption**	**Reagents**	**Environmental Risks**
Waste water treatment	Check description of waste water treatment plant , receptor body, final destination. Check self monitoring procedures (Environmental System Management) of pH, l Redox potential, oxygen concentration (if oxidation bath exists). Check drainages of meteoric waters and water supplies (wells, waterworks, surface waters). Check systems for water reductions and reuse; segregation of beamhouse discharge flow from the tanning one (low pH)	Indicate final destination (recovery or disposal) of each waste or chemical by product produced in this phase (sludge etc). Check if cleansing sludge are treated for anaerobic digestion, production of fertilizers, sprayed in agriculture	Check foreclosing, put in aspiration and gas abatement presence inhaled from the final grill Drains. If the abatement is at damp, check to verify procedure self controls, pH, Redox potential of the solution of abatement (Environmental System Management).			Check use of agents of clear-flocculation

	Water discharge	Waste	Air emission	Energy consumption	Reagents	Environmental Risks
Waste management		Indicate final destination (recovery or disposal) of each waste or chemical by product produced in this phase (packagings, pallets, etc).			Check use of press on moisturizes in the flesh stocking	Check presence of spills and their management. If positive, check presence of containment devices avoiding contaminations of soil , layer, waters
ANALYTICAL CONTROLS						
	Water discharge	**Waste**	**Air emission**	**Noise**		
General aspects				Measure the noise level (dBA) in the plant site square and immediately to the outside one of the plant, being derived from the activity of the same one, confronting the values pointed out with the limits of law. To want to identify the noisier sources to the inside of the business perimeter.		
Beamhouse						

	Water discharge	Waste	Air emission	Noise
Tanyard			If abatement device is absent, measure the concentration of compounds containing sulphur (hydrogen sulphur, sulphur dioxide, etc) at the chimney and compare them with the authorized emission limits.	
Mechanical operations				
Finishing			If abatement device is absent, measure the VOC concentration at the chimney, particulate and compare it with the authorized emission limits	
Air abatement			Measure the hydrogen–sulphide concentration at the chimney, VOC, dust and compare with the authorized emission limits. Measure pH, Redox potential of the abating solution	measure the noise level (dBA) of aspiration-, compression-, pumping- devices etc.

	Water discharge	**Waste**	**Air emission**	**Noise**
Waste water treatment	Measure concentration of pollutants; pH; Redox potential in water discharge; oxygen concentration (if oxidation bath exists). Check if limits fixed by national laws (BOD, COD, SS, organic nitrogen, sulphur, AOX, ammonia, etc) for industrial discharge waters, are attained.		Measure the hydrogen-sulphide concentration at the chimney and compare with authorized emission limits. Measure pH, Redox potential of the abating solution	
Waste management		Analyse sludge samples if destined for agricultural use		

4.7 REPORTING OF INSPECTIONS.

In accordance with art. VI 2. of the Recommendation 331/2001/EC, inspection activities should be reported to the Authority who releases the environmental permits who can decide, on the basis of the report conclusions, to apply fines, sanctions or changes to the permit conditions. Report contents can be determined following the advices of IMPEL report on "Planning and reporting of inspections"; reports have also to be collected in a database and be made available to the public.

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QUESTIONNAIRE INSPECTAN **ANNEX I I**

INFORMATIONS ON THE PRODUCTION COMPARTMENT PROCESS

1) Define the number and dimension of the tannery industries in your country, distinguishing, if possible in:
   a) Number of *plants* with a complete cycle (from raw material to finishing);
   b) Number of *plants* with only tanning operations;
   c) Number of *plants* with only finishing operations;
   d) Number of *plants* with only auxiliary activities (third party mechanical operations);

2) Describe the geographical dislocation, whether single plant or cluster plants in districts.

3) Define the annual quantity of the finishing skins in m^2 . Give some statistical indication on the principal sectors of destination of the final products (clothing, shoes, furniture, etc.).

4) Indicate the type and provenience of skins used.

5) Indicate the annual consumption of solvents used in the entire production cycle of the finishing operations.

6) Indicate the annual consumption (type and quantity, expressed in kg) of the principal chemical substances used in the skin treatments/processes.

7) Define the water consumption (per year in m^3 for each tannery), specifying the provenience (well, ground water, aqueducts, etc).

8) Indicate the energy consumption used in the tanning process, describing the different types used (methane, combustible oil, electric energy).

9) Define the annual quantity (and the year of reference) of the organic and chemical parameters present in the waste water effluents:

Parameters	**Amount and Year**
COD (kg)	
SS (kg)	
Chlorides (kg)	
Sulphide (kg)	
Sulphate (kg)	
Total chrome (kg)	
TKN (kg)	
Flow (m^3)	

10) Define the quantities of air emission substances:

Parameters	Amount and Year
Sulfurous acid (kg)	
VOC (kg)	
Particulate (kg)	

Annex -1 was TOR and has been removed(Ş.A)

11) Give an indication (number and localization) and description (treatment capacity and technology used) of the waste water treatment plants; indicate if the waste water from tanneries is treated apart or mixed with civil waste water.

12) Indicate the annual amount of sludge produced by the waste water treatment from tanneries and it's final destination.

13) Describe the eventual treatment and/or recovering plants of the by-products (ex. *Carniccio*).

14) Indicate the waste treatment plants from the tanning process (numbers, localization, type of waste treated, type of treatment).

15) Indicate the technology used for the abatement of odours.

16) Indicate the number of claims for odour nuisance.

INFORMATIONS ON LEGISALTIONS

1) Describe the national codes and standards on tannery
2) Define the permitting system, for IPPC plants non IPPC plants.
3) Describe the codes and standards for the different environmental emission limits and treatment procedures (water, air, waste, sludge, etc)

INFORMATIONS ON INSPECTIONS

1) Indicate the responsible authorities for inspections
2) Define the types of inspection (technical, management of the plants, administrative…) and eventually the numbers of controls/inspections (latest date available).
3) Define the schedules of inspections
4) Define the fines and sanctions applied in case of violation of the legislations.

Annex III

Example of an electronic DATA-SHEET given by ARPA Toscana

Finestra iniziale - [Concerie]

File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?

ARPAT

Agenzia Regionale per la Protezione Ambientale della Toscana

Dipartimento Provinciale di Pisa
Servizio Locale del
Comprensorio del Cuoio

OK

Record: 1 di 133

Visualizzazione Maschera

NUM

Finestra iniziale

File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?

Arial 8 G C S

Preferiti Vai \\Monja\SCHEDA CONCERIE\Data-sheet for tannery.mdb

Concerie

COMPANY IDENTIFICATION

Denomination A 13/01/05

N° of operators 60

Location

Esempio.apr

Industrial zone ☑

Residential zone ☐

Rural zone ☐

Raw hide or skin origin country Europa

Hide or skin typology Bovino

Authorization for working

Air emissions authorization terms according to the DPR 203/88 - Det. Prov. n° 185/1999

Water waste authorization terms according to the Lgs.D. 152/99 and similar Rif. prat. N° 198/AS-SR/02

Solid waste authorization terms according to the Lgs.D. 22/97 -

Particular law prescriptions noticeable from authorizations

Emas ☐

Iso 14001 ☑

CONTROLS

Record: 129 di 133

Visualizzazione Maschera

NUM

Indice - [INDICE : Maschera]

File Modifica Visualizza Inserisci Formato Strumenti Finestra ?

Corpo

Intestazione maschera

Corpo

		AIR EMISSIONS	BAT FOR AIR EMISSION	ENVIRONMENTAL BALANCE
		WATER CYCLE	BAT FOR WATER CYCLE	ENVIRONMENTAL BALANCE
	CHROME TANNAGE	SOLID WASTE	BAT FOR SOLID WASTE	ENVIRONMENTAL BALANCE
	VEGETABLE TANNAGE (SOLE LEATHER)		BAT FOR ENERGY	ENVIRONMENTAL BALANCE
CATEGORY AND KIND OF CONTROL				
	VEGETABLE TANNAGE		BAT FOR PROCESS	
	HAIRED SKINS TANNAGE		BAT FOR CHEMICALS	

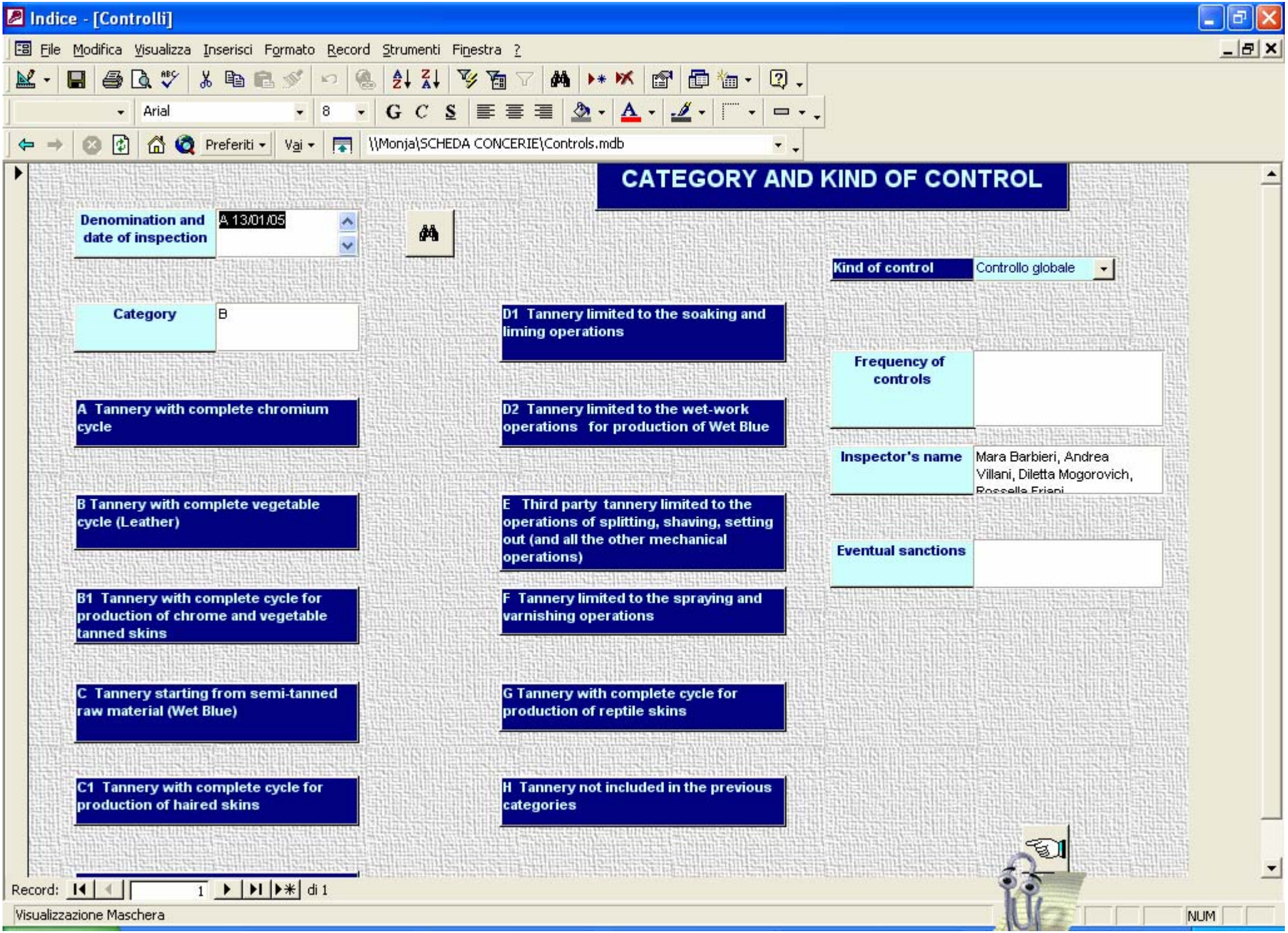
Schema

Schema

Foto rifiuti

Visualizzazione Struttura

NUM


Indice - [Controlli]
File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?
Arial
8
Preferiti
Vai
\\Monja\SCHEDA CONCERIE\Controls.mdb
CATEGORY AND KIND OF CONTROL
Denomination and date of inspection
A 13/01/05
Kind of control
Controllo globale
Category
B
D1 Tannery limited to the soaking and liming operations
Frequency of controls
A Tannery with complete chromium cycle
D2 Tannery limited to the wet-work operations for production of Wet Blue
Inspector's name
Mara Barbieri, Andrea Villani, Diletta Mogorovich,
B Tannery with complete vegetable cycle (Leather)
E Third party tannery limited to the operations of splitting, shaving, setting out (and all the other mechanical operations)
Eventual sanctions
B1 Tannery with complete cycle for production of chrome and vegetable tanned skins
F Tannery limited to the spraying and varnishing operations
C Tannery starting from semi-tanned raw material (Wet Blue)
G Tannery with complete cycle for production of reptile skins
C1 Tannery with complete cycle for production of haired skins
H Tannery not included in the previous categories
Record: 1 di 1
Visualizzazione Maschera
NUM

Indice - [INDICE : Maschera]

File Modifica Visualizza Inserisci Formato Strumenti Finestra ?

Corpo

Intestazione maschera

Corpo

		AIR EMISSIONS	BAT FOR AIR EMISSION	ENVIRONMENTAL BALANCE
		WATER CYCLE	BAT FOR WATER CYCLE	ENVIRONMENTAL BALANCE
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	VEGETABLE TANNAGE (SOLE LEATHER)		BAT FOR ENERGY	ENVIRONMENTAL BALANCE
CATEGORY AND KIND OF CONTROL				
	VEGETABLE TANNAGE		BAT FOR PROCESS	
	HAIRED SKINS TANNAGE		BAT FOR CHEMICALS	

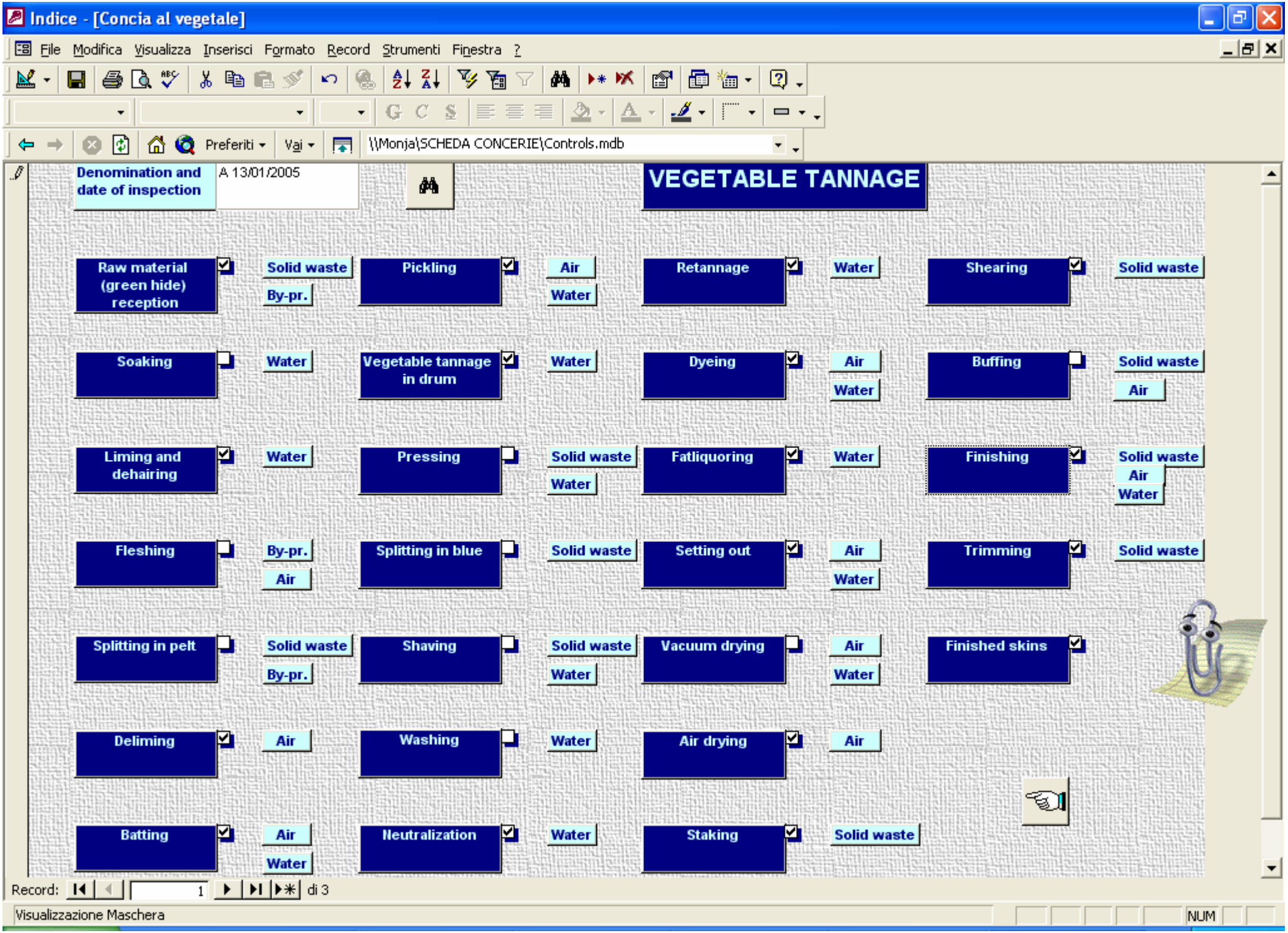
Schema

Schema

Foto rifiuti

Visualizzazione Struttura

NUM


Indice - [Concia al vegetale]
File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?
Preferiti Vai \\Monja\SCHEDA CONCERIE\Controls.mdb
Denomination and date of inspection
A 13/01/2005
VEGETABLE TANNAGE
Raw material (green hide) reception
Solid waste
By-pr.
Pickling
Air
Water
Retannage
Water
Shearing
Solid waste
Soaking
Water
Vegetable tannage in drum
Water
Dyeing
Air
Water
Buffing
Solid waste
Air
Liming and dehairing
Water
Pressing
Solid waste
Water
Fatliquoring
Water
Finishing
Solid waste
Air
Water
Fleshing
By-pr.
Air
Splitting in blue
Solid waste
Setting out
Air
Water
Trimming
Solid waste
Splitting in pelt
Solid waste
By-pr.
Shaving
Solid waste
Water
Vacuum drying
Air
Water
Finished skins
Deliming
Air
Washing
Water
Air drying
Air
Batting
Air
Water
Neutralization
Water
Staking
Solid waste
Record: 1 di 3
Visualizzazione Maschera
NUM

Indice - [INDICE : Maschera]

File Modifica Visualizza Inserisci Formato Strumenti Finestra ?

Corpo

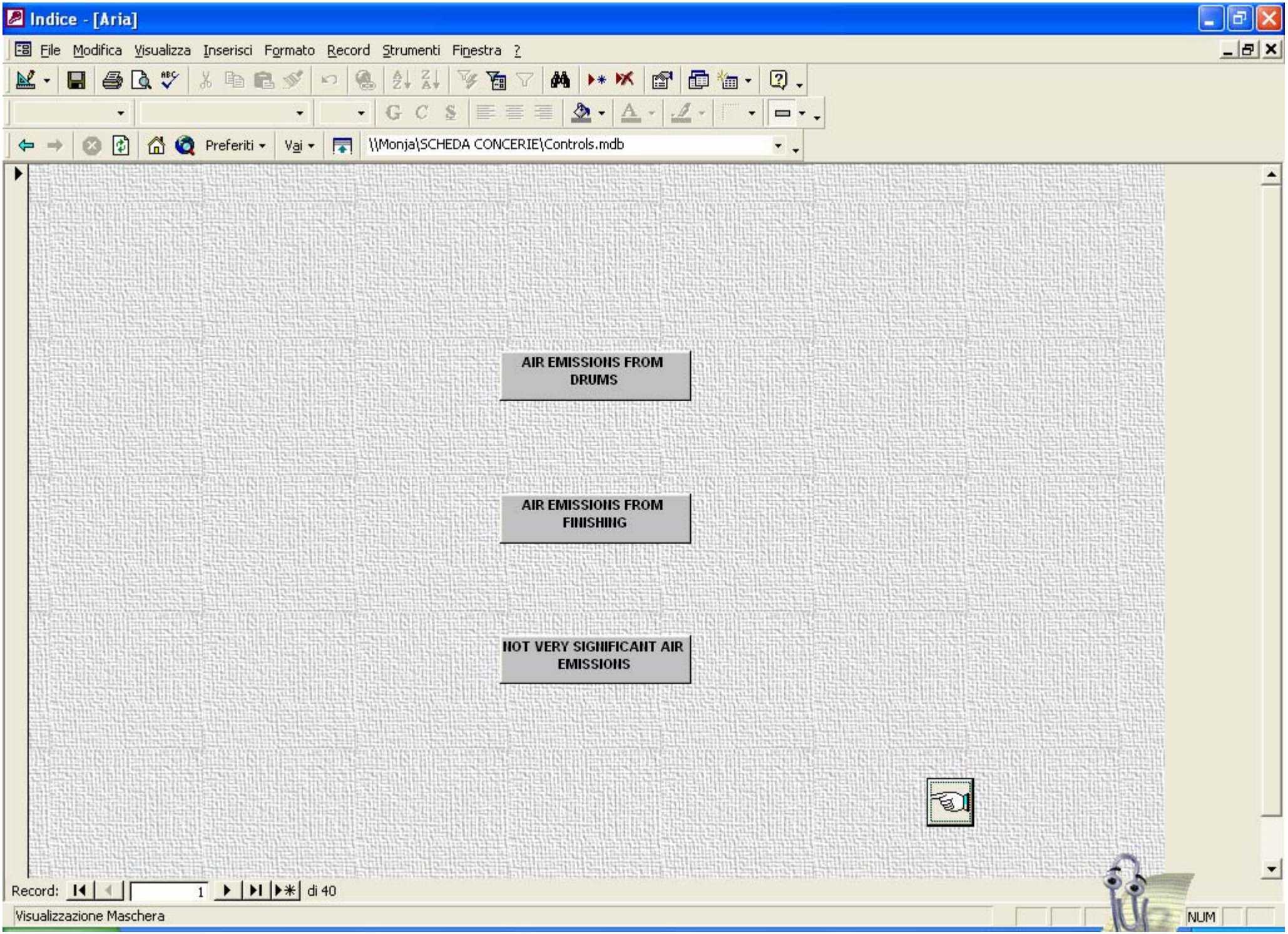
Intestazione maschera

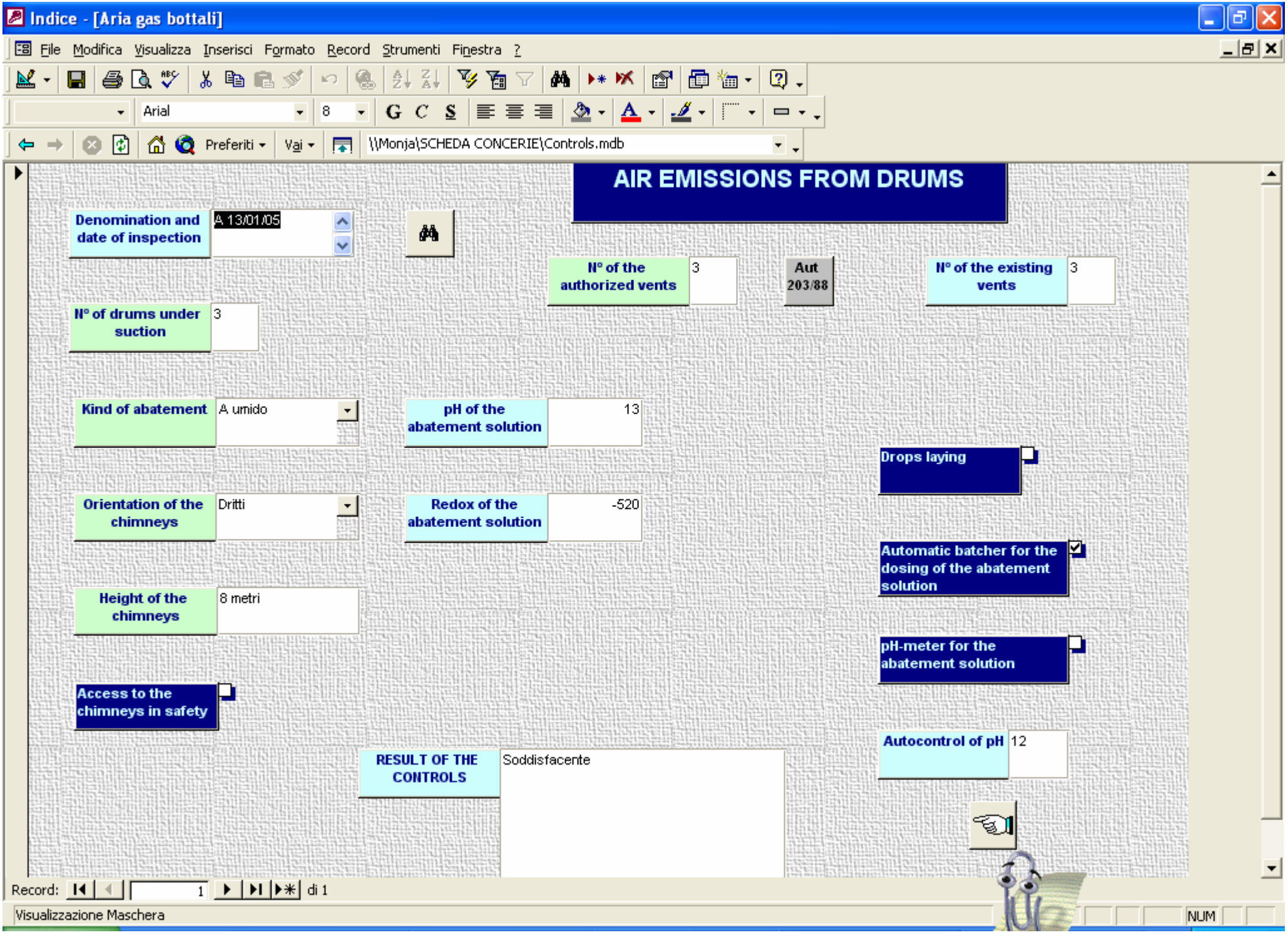
Corpo

		AIR EMISSIONS	BAT FOR AIR EMISSION	ENVIRONMENTAL BALANCE	Schema
		WATER CYCLE	BAT FOR WATER CYCLE	ENVIRONMENTAL BALANCE	Schema
	CHROME TANNAGE	SOLID WASTE	BAT FOR SOLID WASTE	ENVIRONMENTAL BALANCE	Foto rifiuti
	VEGETABLE TANNAGE (SOLE LEATHER)		BAT FOR ENERGY	ENVIRONMENTAL BALANCE	
CATEGORY AND KIND OF CONTROL					
	VEGETABLE TANNAGE		BAT FOR PROCESS		
	HAIRED SKINS TANNAGE		BAT FOR CHEMICALS		

Visualizzazione Struttura

NUM


Indice - [Aria]
File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?
Preferiti Vai
\\Monja\SCHEDA CONCERIE\Controls.mdb
AIR EMISSIONS FROM DRUMS
AIR EMISSIONS FROM FINISHING
NOT VERY SIGNIFICANT AIR EMISSIONS
Record: 1 di 40
Visualizzazione Maschera
NUM


Indice - [Aria gas bottali]
File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?
Arial
8
Preferiti
Vai
\\Monja\SCHEDA CONCERIE\Controls.mdb
AIR EMISSIONS FROM DRUMS
Denomination and date of inspection
A 13/01/05
N° of the authorized vents
3
Aut 203/88
N° of the existing vents
3
N° of drums under suction
3
Kind of abatement
A umido
pH of the abatement solution
13
Drops laying
Orientation of the chimneys
Dritti
Redox of the abatement solution
-520
Automatic batcher for the dosing of the abatement solution
Height of the chimneys
8 metri
pH-meter for the abatement solution
Access to the chimneys in safety
Autocontrol of pH
12
RESULT OF THE CONTROLS
Soddisfacente
Record:
1
di 1
Visualizzazione Maschera
NUM

Indice - [Aria rifinizione]

File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?

Arial 8

Preferiti Vai \\Monja\SCHEDA CONCERIE\Controls.mdb

AIR EMISSIONS FROM FINISHING

Denomination and date of inspection A 13/01/05

FINISHING SPRAYING

N° of the authorized vents 4 **Aut 203/88** **N° of the existing vents** 4

N° of spraying lines for one booth 1 **N° of spraying lines for two booths** 1

N° of the spraying booths 1 **Kind of abatement** A umido

Orientation of the chimneys Dritti

Height of the chimneys 8 m

Access to the chimneys in safety ☑

RESULT OF THE CONTROLS

Soddisfacente

PADDING IMPREGNATION

N° of the authorized vents 1 **Aut 203/88** **N° of the existing vents** 1

N° of rolling coating unit 2 **N° of units for padding**

N° of rolling impregnation units **N° of blooming units**

Kind of abatement A secco

Orientation of the chimneys Dritti

Height of the chimneys 8 m

Access to the chimneys in safety ☑

Record: 1 di 1

Visualizzazione Maschera NUM

Indice - [Aria emissioni poco significative]

File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?

Preferiti Vai \\Monja\SCHEDA CONCERIE\Controls.mdb

NOT VERY SIGNIFICANT AIR EMISSIONS

Denomination and date of inspection	A 13/01/05				
N° of the authorized points of emission	3	Aut 203/88	N° of the existing vents	3	
N° of the vents of the boilers		Kind of abatement		Other	
N° of the vents of the drying tunnel		Kind of abatement			
N° of the vents for air replacements	1	Kind of abatement	A secco		
N° of the vents of the grate wells		Kind of abatement			
N° of the vents from the weighing units of chemicals and products	2	Kind of abatement	A secco		

RESULT OF THE CONTROLS

Record: 1 di 1

Visualizzazione Maschera

NUM

Indice - [BAT EMISSIONI]

File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?

Arial 8 G C S

Preferiti Vai \\Monja\SCHEDA CONCERIE\Controls.mdb

BAT FOR AIR EMISSION

Denomination and date of inspection A 13/01/05

Prevention of the generation of odours through process control, good housekeeping, proper handling and storage of raw hides and wastes, in some cases requiring the installation of filters, e.g. in the waste water pre-treatment plants ☐

Wet scrubbing or bio-filters to abate ammonia and hydrogen sulphide from deliming, pickling and dyeing. ☐

Wet scrubbing or bio-filters to abate VOC from degreasing, drying and finishing; incineration if economically convenient because of the very high concentration of solvents (e.g. drying of varnished skin) ☐

Wet scrubbing, absorption or bio-filters to abate various air emissions from waste water pre-treatment plant ☑

Suction of gas from drums (pickling) sent to the drop laying, tower of abatement with control of pH >12, Rx and automatic batcher of the abatement solution, final demister. Automatic control of the pollutant gases, if the sucked gases flowrate is more than 4000 - 5000 Nmc/hr ☐

Covering and/or suction of the grate wells and final abatement of the sucked gases, with the maintaining of the pH of the abatement solution more than 12 (no carbonatation effect). Avoid creation of closed areas, accessible to people. ☑

Record: 2 di 2

Visualizzazione Maschera NUM

Indice - [INDICE : Maschera]

File Modifica Visualizza Inserisci Formato Strumenti Finestra ?

Corpo

Intestazione maschera

Corpo

		AIR EMISSIONS	BAT FOR AIR EMISSION	ENVIRONMENTAL BALANCE	Schema
		WATER CYCLE	BAT FOR WATER CYCLE	ENVIRONMENTAL BALANCE	Schema
	CHROME TANNAGE	SOLID WASTE	BAT FOR SOLID WASTE	ENVIRONMENTAL BALANCE	Foto rifiuti
	VEGETABLE TANNAGE (SOLE LEATHER)		BAT FOR ENERGY	ENVIRONMENTAL BALANCE	
CATEGORY AND KIND OF CONTROL					
	VEGETABLE TANNAGE		BAT FOR PROCESS		
	HAIRED SKINS TANNAGE		BAT FOR CHEMICALS		

Visualizzazione Struttura

NUM

Indice - [Acqua]

File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?

Arial 8 G C S

Preferiti Vai \\Monja\SCHEDA CONCERIE\Controls.mdb

WATER CYCLE

Denomination and date of inspection A 13/01/05

Accumulation tanks volume 190 mc

Accumulation tanks suction ☑

Grate Presente

Inspection well sealed ☑

Final destination CUOIODEPUR

WASTE WATER

Partial waste water and discharge origin

Receiver body Fognatura nera

N° of wells 1

RESULT OF THE CONTROLS Molto soddisfacente. Nel 9/2004 in uscita dalle vasche di accumulo sono stati installati strumenti di pH, Redox al Servizio

PRE-TREATING PLANT

Plant typology Vasche accumulo, chimico-fisico, sedimentatore

Control instruments installed and their Strumenti pH, Redox installati sulla linea di invio

Control of pH 7,7

Autocontrol of pH

Control of Redox potential -15

Autocontrol of Redox potential

Control of O2 concentration

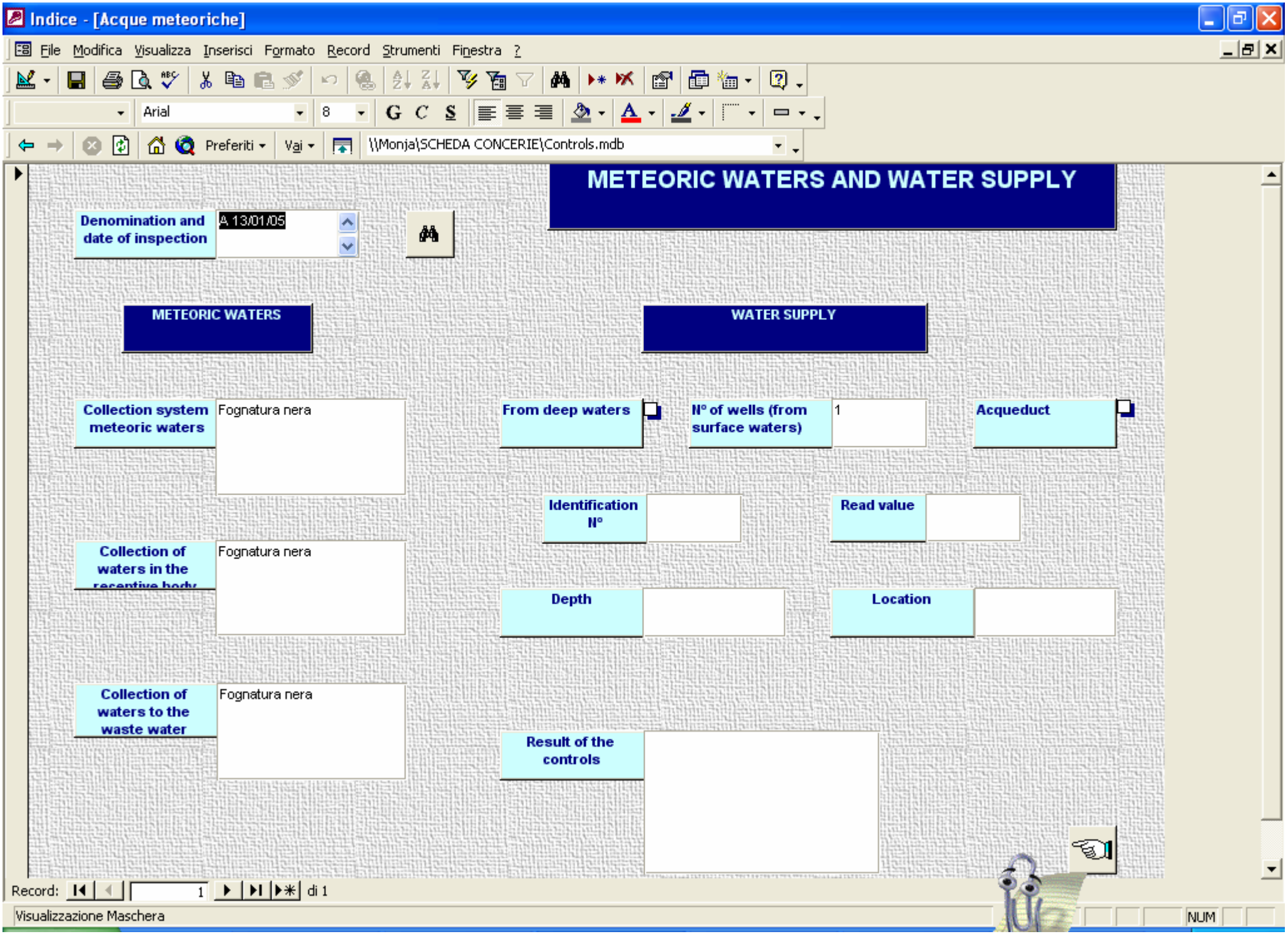
Autocontrol of O2 concentration

METEORIC WATERS AND WATER SUPPLY

Record: 1 di 1

Visualizzazione Maschera

NUM


Indice - [Acque meteoriche]
File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?
Arial
8
Preferiti
Vai
\\Monja\SCHEDA CONCERIE\Controls.mdb
METEORIC WATERS AND WATER SUPPLY
Denomination and date of inspection
A 13/01/05
METEORIC WATERS
WATER SUPPLY
Collection system meteoric waters
Fognatura nera
From deep waters
N° of wells (from surface waters)
1
Acqueduct
Identification N°
Read value
Collection of waters in the receptive body
Fognatura nera
Depth
Location
Collection of waters to the waste water
Fognatura nera
Result of the controls
Record:
1
di 1
Visualizzazione Maschera
NUM

Indice - [BAT ACQUA]

File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?

Arial 8

Preferiti Vai \\Monja\SCHEDA CONCERIE\Controls.mdb

BAT FOR WATER CYCLE

Denomination and date of inspection A 13/01/05

- [ ] To improve the matching of water flow to the requirements of the process
- [ ] To use batch versus running water washes
- [ ] To recycle or re-use process liquors where possible
- [x] To keep sulphide-containing effluent from the beamhouse separate from all the other effluents and at high pH until the sulphide is removed
- [ ] To collect chromium-containing partial effluent with a concentration of Crtotal > 1g/lseparately and send it to the Consorzio Recupero Cromo for chrome recovery
- [ ] To treat (on or off site) chromium-containing effluent with a concentration of Crtotal < 1g/l in combination with other effluents
- [ ] To recycle or re-use in the tannery process the waters from the centralized waste water treatment plant

Record: 1 di 1

Visualizzazione Maschera NUM

Indice - [INDICE : Maschera]

File Modifica Visualizza Inserisci Formato Strumenti Finestra ?

Corpo

Intestazione maschera

Corpo

		AIR EMISSIONS	BAT FOR AIR EMISSION	ENVIRONMENTAL BALANCE	Schema
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	VEGETABLE TANNAGE (SOLE LEATHER)		BAT FOR ENERGY	ENVIRONMENTAL BALANCE	
CATEGORY AND KIND OF CONTROL					
	VEGETABLE TANNAGE		BAT FOR PROCESS		
	HAIRED SKINS TANNAGE		BAT FOR CHEMICALS		

Visualizzazione Struttura

NUM

Indice - [Rifiuti]

File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?

Arial 8 G C S

Preferiti Vai \\Monja\SCHEDA CONCERIE\Controls.mdb

SOLID WASTE AND BY-PRODUCTS

Denomination and date of inspection A 13/01/05

	KIND OF STORAGE	DESTINATION		KIND OF STORAGE	DESTINATION
(CER: 040101 Fleshing and lime scraps)	Container	SGS	CER: 040108 Cutting and shaving residuals containing chromium	Container Differenziazione tra tipi	ECOLEVANTE, WASTE RECYCLING
CER: 040102 Liming wastes			CER: 040109 Cutting and shaving residuals not containing chromium		
CER: 040103 Exhausted degreasing floats containing solvents without liquid phase			CER: 040199 Not specified wastes	Container	ECOLEVANTE, WASTE RECYCLING
CER: 040104 Tanning liquid containing chromium					
CER: 040105 Tanning liquid not containing chromium					
CER: 040106 Sludges, from the pre-treating plant, containing chromium					
CER: 040107 Sludges, from the	Container	CUOIODEPUR			

RIFIUTI 2

RESULT OF THE CONTROLS Soddisfacente

Record: 1 di 1

Visualizzazione Maschera

MA NUM

Indice - [Rifiuti 2]

File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?

Arial 8 G C S

Preferiti Vai \\Monja\SCHEDA CONCERIE\Controls.mdb

Denominazione e data sopralluogo	A 13/01/05

	KIND OF STORAGE	DESTINATION		KIND OF STORAGE	DESTINATION
CER: 130208 Oils for engines, gears and lubrification	Container	ECOMAR Collesalvetti	CER: 150106 Miscellaneous packings	Container	WASTE RECYCLING
CER: 150102 Plastic packings	Raccolta differenzi		CER: 150110 Packings containing residuals of dangerous substances or contaminated from these	Container	WASTE RECYCLING
CER: 150103 Wooden packings	Altro Riutilizzo				
CER: 150104 Metallic packings	Container	WASTE RECYCLING	CER:		

RESULT OF THE CONTROLS	Soddisfacente per il livello di differenziazione e per la copertura delle zone di stoccaggio da acqua piovana

Record: 1 di 1

Visualizzazione Maschera

NUM

Indice - [BAT RIFIUTI]

File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?

Arial 8

Preferiti Vai \\Monja\SCHEDA CONCERIE\Controls.mdb

Denomination and date of inspection A 13/01/05

BAT FOR SOLID WASTE

Type of waste	Re-use, recycling, recovery, thermal treatment	Type of waste	Re-use, recycling, recovery, thermal treatment	Type of waste	Re-use, recycling, recovery, thermal treatment
Splits	Leather and fertilizers production ☑	Raw trimmings, green and limed fleshing	Proteic hydrolyzate, fertilizers ☐	Hair, raw trimmings, green and limed fleshings, green and limed splits, fats, grease and oils; sludges from waste water treatment plant	Anaerobic digestion, fertilizers ☐
Tanned wastes in general (e.g. splits, shavings, trimmings)	Leather fibre board and fertilizers production ☑	Raw and limed trimmings	Collagen, fertilizers ☑		
				Fats, grease, mixtures of not-halogenated organic solvents and oil	Thermal treatment ☐
Splits and tanned trimmings	Small leather goods and fertilizers ☑	Hair (for the nitrogen content), residuals from composting and anaerobic digestion, sludges from waste water treatment. The national legal requirements for the application of waste to land must be respected.	Agriculture and fertilizers ☑		
				Organic solvents (no mixtures)	Recycling of organic solvents ☐
Hair and wool	Filling material, wool and fertilizers ☐				
				Activated carbon filters	Regeneration of air abatement filters ☐
Raw trimmings, green and limed fleshings and splits	Gelatine, hide glue and fertilizers ☑				
		Hair, green and limed fleshings, limed and tanned splits and shavings, fats, grease and oils; sludges from waste water treatment	Composting ☐	Containers, pallets, plastic, cardboard	Re-use and recycling of packaging material ☑
Untanned splits	Fertilizers ☑				

Record: 1 di 1

Visualizzazione Maschera NUM

Indice - [INDICE : Maschera]

File Modifica Visualizza Inserisci Formato Strumenti Finestra ?

Corpo

Intestazione maschera

Corpo

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CATEGORY AND KIND OF CONTROL					
	VEGETABLE TANNAGE		BAT FOR PROCESS		
	HAIRED SKINS TANNAGE		BAT FOR CHEMICALS		

Visualizzazione Struttura

NUM

Indice - [BAT ENERGIA]

File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?

Arial 8

Preferiti Vai \\Monja\SCHEDA CONCERIE\Controls.mdb

BAT FOR ENERGY

Denomination and date of inspection A 13/01/05

Recording of the actual energy usage, split by energy type and major end-uses, on a specified and appropriate regular basis (e.g. hourly, daily, weekly, etc.)

Setting, reviewing and revising of performance targets

Elaboration of energy performance indicators (historical energy performance or normalised to an indicator of production/external temperature/building occupancy etc.)

Monitoring of energy performance, including mechanisms to alert the operator to significant variations from predicted energy performance

Adoption of investigative and corrective actions, in response to variations

Delivering of concise, appropriate and timely energy performance information to all the individuals who are responsible for energy management

Record: 1 di 1

Visualizzazione Maschera NUM

Indice - [BAT PROCESSO]

File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?

Arial 8

Preferiti Vai \\Monja\SCHEDA CONCERIE\Controls.mdb

BAT FOR PROCESS

Denomination and date of inspection A 13/01/05

Curing and soaking

- To reduce the amount of used salt as far as possible ☑
- To recover the amount of used salt as far as possible ☐

Unhairing and liming

- To reduce the sulphide consumption as much as possible, replacing it with other alternative chemicals (compatible with the articles). ☐

Splitting

- To use the splitting in pelt, where it is possible. ☐
- To maximise the use of split ☐

Deliming and batting

- To replace partially or completely the ammonium salts with alternative chemicals ☐

Sheepskin degreasing

- To optimize wet degreasing using surfactants, with or without organic solvents ☐
- Closed-circuit machines with air abatement when organic solvents are used to degrease skins in dry state ☐

Pickling

- To use baths with absent or low-content chlorides, where it is possible ☑

Tanning

- To increase the efficiency of the chrome tanning process through a careful control of pH, float , temperature, time and drumspeed ☑
- To recover chrome through

Retanning, chrome fixation and neutralization

- To use high-exhaustion chrome tanning method with the exception of the production of high quality hides ☐
- To maximize exhaustion of the vegetable tanning liquor using counter-current (tank tanning) or recycling (drum tanning) systems ☐
- To enhance exhaustion of post-tanning treatment agents and fixation of tanning agents in the leather ☑
- To use chemicals with low-content of inorganic salts ☐

Dyeing

- To enhance exhaustion of dyestuffs ☑

Fatliquoring

- To enhance exhaustion of fatliquors ☐

Drying

- To optimize mechanical dewatering prior to drying where possible ☑

Finishing

- To use roller coating ☐
- To use HVLP spray guns ☑
- To use airless spray guns ☑
- Exceptions for three finishing techniques above:
  * when very thin finishes are applied (e.g. skins with aniline)
  *high quality leather production ☐
- In the spraying systems, to minimize the finishing chemicals consumption using batcher with photocell ☑
- To use spraying systems with water and soda veiling, maintaining pH >10 ☑

Record: 1 di 1

Visualizzazione Maschera NUM

Indice - [BAT PRODOTTI]

File Modifica Visualizza Inserisci Formato Record Strumenti Finestra ?

Arial 8

Preferiti Vai \\Monja\SCHEDA CONCERIE\Controls.mdb

BAT FOR CHEMICALS

Denomination and date of inspection A 13/01/05

Biocides

Products with the lowest environmental and toxicological impact, used at the lowest level possible

Halogenated organic compounds

Substitution for soaking, degreasing, fatliquoring, dyeing and special post-tanning agents, with the exception of the cleaning of the merinos sheepskins

Organic solvents (not-halogenated)

Finishing:
* acqueos-based finishing systems. Exception: if very high standards of topcoat resistance to wet-rubbing, wet-flexing and perspiration are required
* to use finishing systems with low-organic solvents and aromatic content

Sheepskins degreasing: the use of one organic solvent and not mixtures, to facilitate possible re-

Surfactants APE and NPE

e.g. alcohol ethoxylates, where possible

Complexing agents EDTA and NTA

EDDS and MGDA where possible

Tanning agents Chromium Syntans and resins

20-35% of the fresh chromium input can be substituted by recovered chrome

Chemicals with low formaldehyde, low phenol and low acrylic acid monomer, with the exception of the high quality hides production

Dyestuffs

De-dusted or liquid dyestuffs

High-exhausting dyes containing low amounts of salts

Substitution of ammonia by auxiliares such as dye penetrators

Substitution of halogenated dyestuffs by vinyl-sulphonated reactive dyes

Fatliquoring agents (fatliquoring emulsions)

Free of agents building up AOX, with the exception of the waterproof leather production

Applied in organic solvent-free mixtures or, when not possible, low organic solvent mixtures

High-exhausting to reduce the COD as much as possible

Finishing agents for topcoats binders (resins) and cross-linking agents

Binders based on polymeric

Finishing systems that use cadmium and lead-free pigments

Other

Water-repellent agents free of agents building up AOX, with the exception of the waterproof leather production

Water-repellent agents applied in organic solvent-free mixtures or, when not possible, low organic solvent mixtures

Water-repellent agents free of metal salts, with the exception of the waterproof leather production

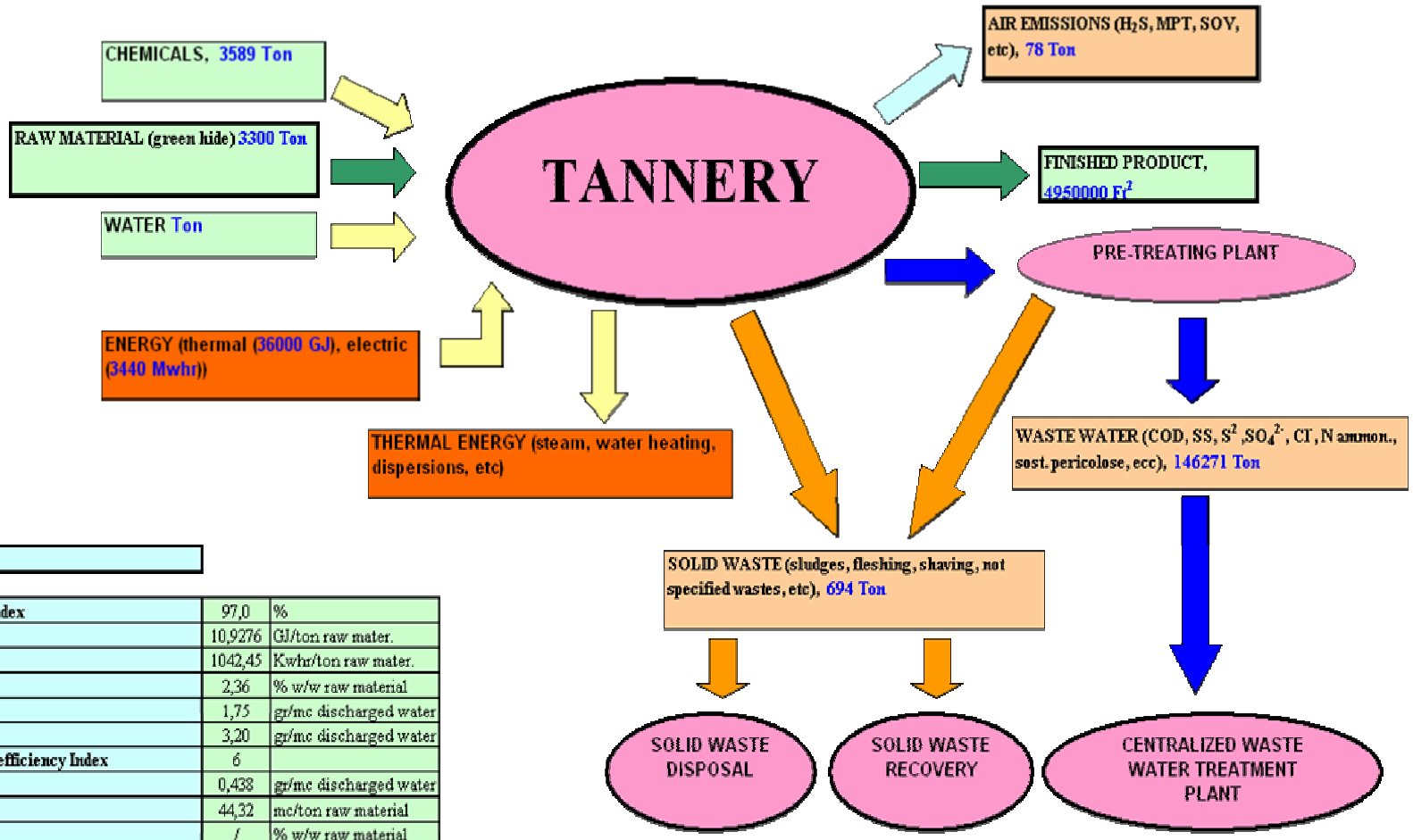
Phosphate-based flame retardants

Record: 1 di 1

Visualizzazione Maschera NUM

TANNERY ENVIRONMENTAL BALANCE

Tannery: B
TOWN COUNCIL: FUCECCHIO
CATEGORY: A

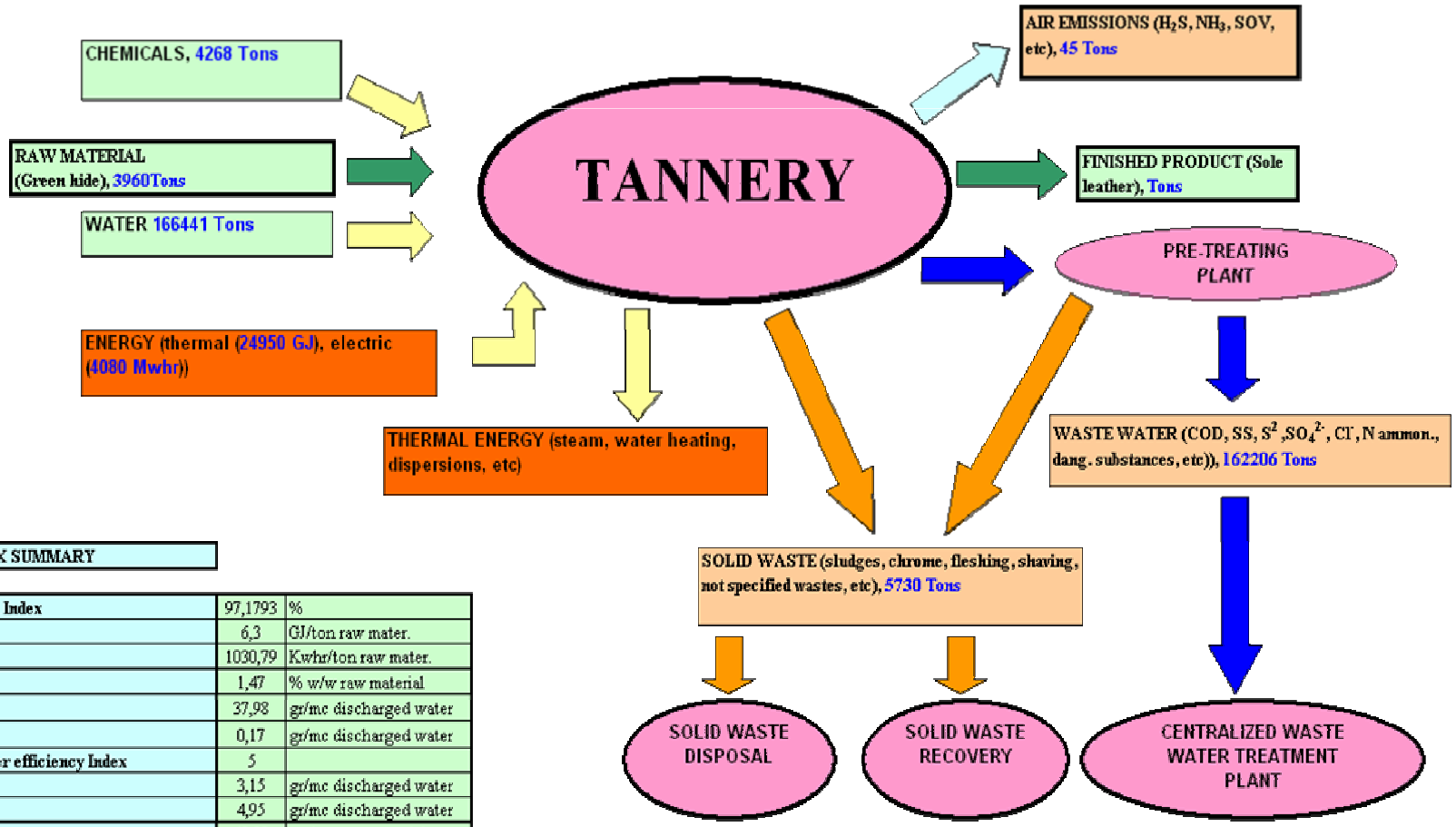


YEAR ENVIRONMENTAL INDEX

Methane/cogeneration utilization Index	97,0	%
Heat energy Index	10,9276	GJ/ton raw mater.
Electric energy Index	1042,45	Kwhr/ton raw mater.
Overall air emission Index	2,36	% w/w raw material
MPT emission Index	1,75	gr/mc discharged water
H2S emission Index	3,20	gr/mc discharged water
Pickle drums gas absorption tower efficiency Index	6	
SOV emission Index	0,438	gr/mc discharged water
Water consumption Index	44,32	mc/ton raw material
Bactericide use Index	/	% w/w raw material
Surfactant use Index	/	% w/w raw material
Anti-wrinkle chemicals use Index	/	% w/w raw material
Sodium sulphide use Index	16,67	% w/w raw material
Chromium use Index	11,18	% w/w raw material
Solvent use Index	2,66	% w/w raw material
Overall waste production Index	21,02	% w/w raw material
Sludge production Index	11,72	% w/w overall waste
Waste for recovery production Index	35,98	% w/w overall waste
Waste for disposal production Index	64,02	% w/w overall waste

TANNERY ENVIRONMENTAL BALANCE

TANNERY NAME: A
TOWN COUNCIL: S. MINIATO
CATEGORY: B



YEAR ENVIRONMENTAL INDEX SUMMARY

Methane/cogeneration utilization Index	97,1793	%
Heat energy Index	6,3	GJ/ton raw mater.
Electric energy Index	1030,79	Kwhr/ton raw mater.
Overall air emission Index	1,47	% w/w raw material
SO_2 emission Index	37,98	gr/mc discharged water
H_2S emission Index	0,17	gr/mc discharged water
Pickle drums gas absorption tower efficiency Index	5	
MPT emission Index	3,15	gr/mc discharged water
SOV emission Index	4,95	gr/mc discharged water
Water consumption Index	42,03	mc/ton raw material
Bactericide use Index	/	% w/w raw material
Surfactant use Index	/	% w/w raw material
Anti-wrinkle chemicals use Index	/	% w/w raw material
Sodium sulphide use Index	2,73	% w/w raw material
Chromium use Index	/	% w/w raw material
Solvent use Index	0,06	% w/w raw material
Overall waste production Index	144,70	% w/w raw material
Sludge production Index	5,46	% w/w overall waste
Waste for recovery production Index	79,08	% w/w overall waste
Waste for disposal production Index	20,92	% w/w overall waste