

The HAZTRAIN Hazardous Waste Identification Tool (HWIT)

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EXECUTIVE SUMMARY

This paper outlines the results of the project HAZTRAIN, in particular the Hazardous Waste Identification Tool (HWIT) developed as part of that project. HAZTRAIN was co-funded by the Leonardo da Vinci Programme of the European Commission and comprises partners from Ireland, Austria, Denmark, Finland, Portugal, Slovakia, Slovenia and Spain (The Basque Region). The HWIT builds upon two previously developed identification tools for the classification of waste from the Clean Technology Centre (Ireland) and DAKOFA (Denmark). It is web based in format and takes a step by step approach to the identification of the hazardous components of waste in accordance with EU law. The HWIT, now available at www.haztrain.org, provides a number of online screens whereby the user enters information about their waste and can thus identify if their waste is hazardous, using a 3 stage process.

The first stage is to find the correct code from the **European Waste Catalogue (EWC)** – this alone can help to determine if the waste is hazardous. The user can first eliminate any of the 20 chapters in the EWC which are definitely NOT possible descriptions of the source of waste. As required by the legislation, chapters 1 – 12 are taken first, then 17 – 20, then 13 – 15 and then 16. The user can then choose possible descriptions from the remaining chapters that have been selected (narrowing it down to one or more possible correct six digit codes).

The second possible stage, classifying by the **Composition** of the waste, involves the entry of information about one or more components of the waste (from a searchable database of known substances which is provided) and its percentage content. The tool (in the background) adds the relevant percentages with the same properties (designated by symbols and indications of danger and Risk Phrases/R phrases). It then compares these

totals to the concentration limits for these properties that are laid down in the legislation. If the total is greater than the concentration limit, the waste is hazardous. The tool will also check, however, for the presence (any presence) of components with properties that have no concentration limits. If any of these components are present, the tool will identify them and again notify the user that the waste is hazardous. By means of these calculations, which are programmed into the tool, the waste can be classified.

A third possible step involves using the **Properties** of the waste. The tool offers a list of possible property tests that are required by the legislation. If some of these have been undertaken the user will indicate which ones and enter the results of these tests and the conclusions that can be made based upon these results. The tool will then store these results and conclusions.

Based upon the results of one or more of these 3 steps, the HWIT will then present the user with a complete report, including all relevant information, recording the process(es) used and the results of the identification. This can then be printed and presented by the waste producer or waste management company to the appropriate agency or authority for inspection.

The HAZTRAIN team has also developed detailed guidance on the use of this tool, the legislation upon which it based and other matters relating to hazardous waste management. The tool and training materials have been piloted by a range of relevant stakeholders in each of the partner countries, adapted accordingly, and are due for completion in October 2006.

INTRODUCTION

This paper outlines the results of the project HAZTRAIN, in particular the Hazardous Waste Identification Tool (HWIT) developed as part of that project. The HWIT builds upon two previously developed identification tools. One paper based tool commissioned by the Irish Environmental Protection Agency and developed by the Clean Technology Centre (Ireland) (Clean Technology Centre, 2001) and a web based tool developed by DAKOFA (Denmark). The HWIT is web based in format and takes a step by step approach to the identification of the hazardous components of waste in accordance with EU law. The tool, now available in English (with introductions in all project partner languages) at www.haztrain.org, provides a number of online screens whereby the user enters information about their waste and can thus identify if their waste is hazardous, using a 3 step process described below.

THE HAZTRAIN PROJECT

HAZTRAIN (full title: **Hazardous Waste Management Training Programme (IRL/04/B/F/PP-153.225)**) was co-funded by the Leonardo da Vinci Programme of the European Commission. Leonardo da Vinci II is the European Community's Vocational Training Programme 2000 - 2006. Leonardo's focus is on innovation & transnational co-operation. The programme strongly supports the Lisbon Agenda (2000) and the goals of the Copenhagen Declaration (2002).

The project began in October 2004 and is due for completion by October 2006. The project website (www.haztrain.org) gives further information and access to the HWIT.

Quality control of the processes and products of the project involved the setting up of advisory panels in each region, through which quality, relevance and access issues are often resolved. Once the tool and related training materials were developed by the partners, they underwent a rigorous testing and piloting process by which feedback was received from user groups and stakeholders. This feedback led to further improvements and developments, again ensuring quality control and relevance of the product. The tool and project have been widely disseminated at national and international events to ensure valorization.

THE HWIT AND HOW IT WORKS

The Hazardous Waste Identification Tool (HWIT), now available at www.haztrain.org, provides a number of online screens whereby the user enters information about their waste and can thus identify if their waste is hazardous. It is based upon EU waste legislation and hazardous waste legislation, in particular EU law governing the classification of hazardous waste and the classification, packaging and labelling of dangerous substances and preparations (CEC, 1967; CEC, 1991; CEC, 1994; CEC, 1999; CEC, 2000; CEC, 2001, CEC, 2006). The process involves 3 steps as shown in Figure 1:

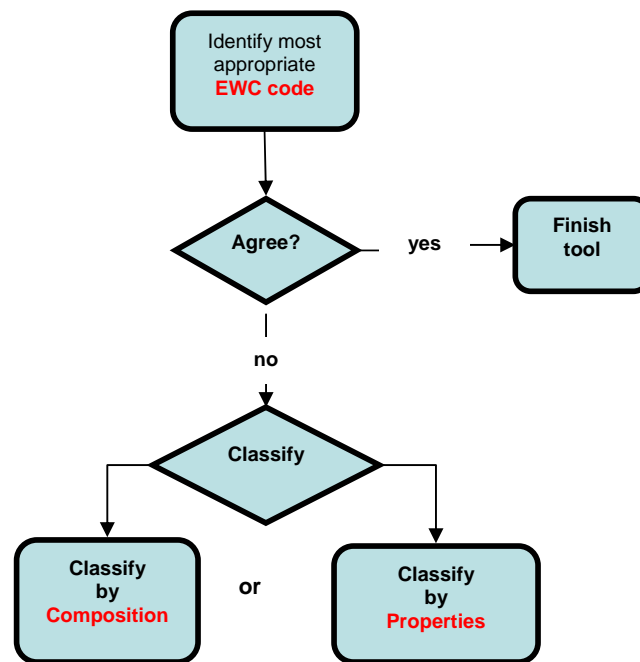


Figure 1: 3 steps of HWIT Classification

EWC code

The first step is to find the correct code from the **European Waste Catalogue (EWC)** (CONSLEG, 2002) – this alone can help to determine if the waste is hazardous. The user can first eliminate all EWC chapters from the 20 chapters in the EWC which are definitely NOT possible descriptions of the source of waste. As required by the legislation, chapters 1 – 12 are taken first, then 17 – 20, then 13 – 15 and then 16. A screen shot of the elimination/selection of EWC chapters 1 - 12 is given in Figure 2.



Figure 2: Selection of possible EWC Chapters

The user can then choose possible more detailed descriptions from the remaining chapters that have been selected. The different types of wastes in the list are defined by a six-digit code: two digits for the chapter, two for the sub-chapter and two for the specific waste in the sub-chapter. All are offered as options in the HWIT so that the user can choose from them by just clicking on the appropriate choice. Selection of the final 6 digit code number is shown in the screen shot in Figure 3.

If, having selected a suitable EWC Code, the user is satisfied with this code, the HWIT will notify the user if the waste is hazardous and the user is finished with the tool, it has done its work. However the user may not agree with this code, or may not find a suitable code, or may be unsure which of several possible codes to choose, or may want to investigate the matter in further detail. The HWIT allows this.



Figure 3: Final selection of 6 digit EWC Code

Composition route

The second possible step, classifying by the **Composition** of the waste, involves the entry of information about one or more components of the waste (from a searchable database of substances contained in Annex I of Directive 67/548/EEC) (ECB, 2005) and their percentage content. The user first enters the approximate name of the substance or the CAS number (or EC or Index number if known). This is shown in the screen shot in Figure 4.

The user then selects the exact components from a list of options provided and enters in the percentage content. This is shown in Figure 5.

According to EU-legislation there are certain properties which render substances dangerous. There are 14 such properties. Each property is understood and described very specifically, and is expressed in 3 possible ways:

1. Words: “Explosive” for instance
2. A classification (single letter(s)): “E” for instance as for “Explosive”
3. “Risk- or R-phrases”.

The HWIT uses Risk or R-phrases to calculate if a waste is hazardous. Some substances are hazardous if a certain **concentration limit is exceeded**. Some may be hazardous if **any of the substance** is present (there is no concentration limit).

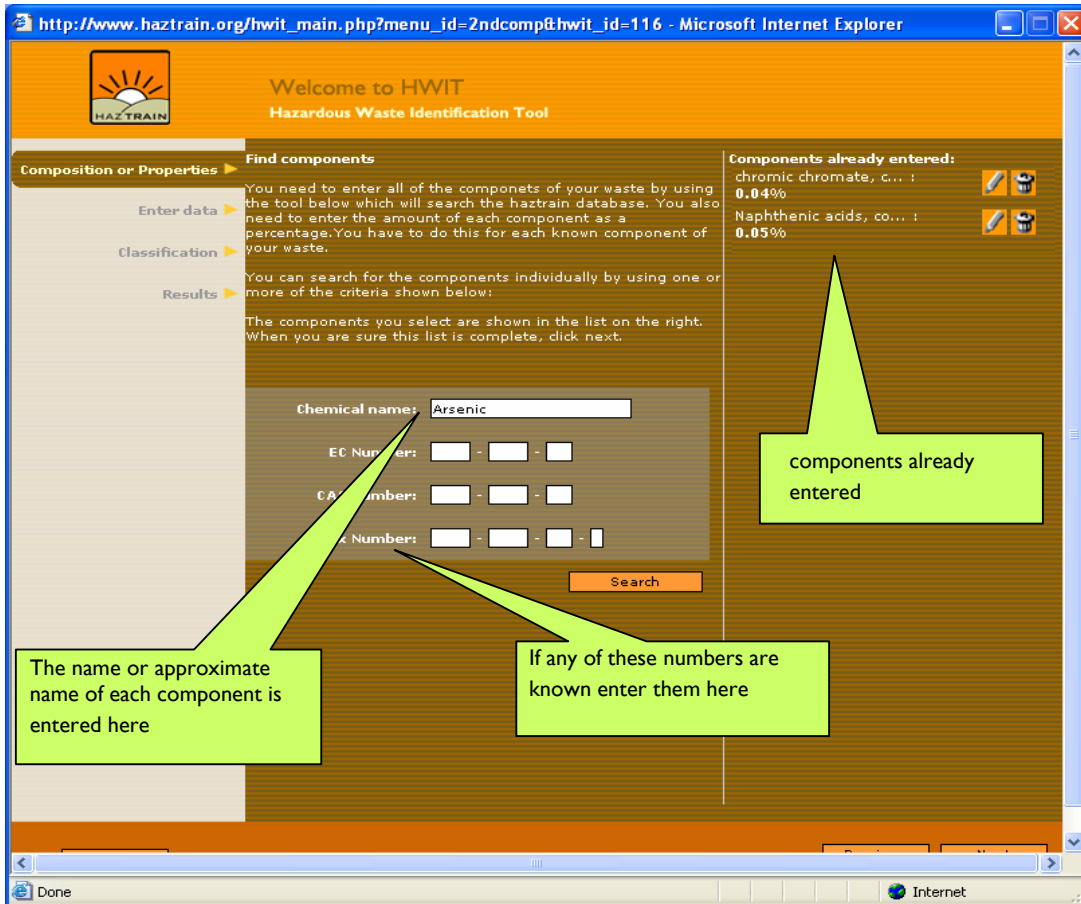


Figure 4: Entry of Component of waste information

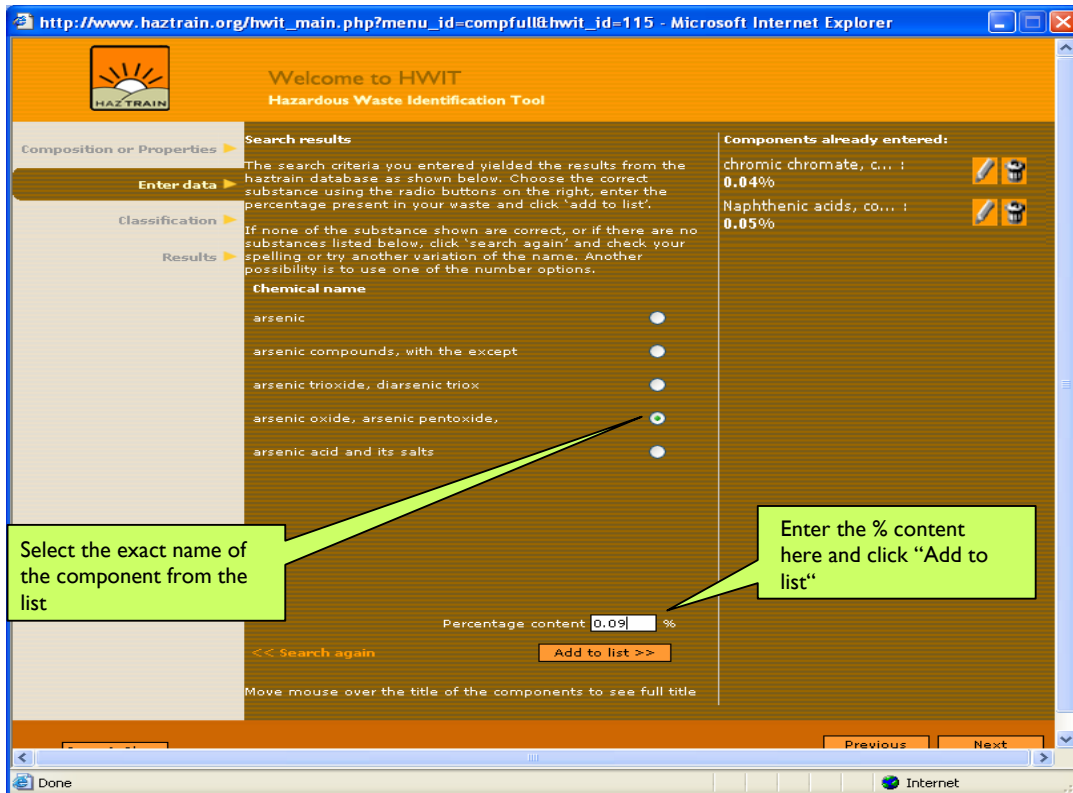


Figure 5: Entry of the exact name of the component and percentage content

Once the exact substances and their percentages are entered, the tool (in the background) adds the relevant percentages of the different components entered with the same properties (risk phrases). It then compares these totals to the thresholds for these properties that are laid down in the legislation. If the total is greater than the concentration limit, the waste is hazardous. The tool will also check, however, for the presence (any presence) of components with properties that have no concentration limits. If any of these components are present, the tool will identify them and again notify the user that the waste may be hazardous. By means of these calculations, which are programmed into the tool, the waste can be classified.

An example of such a process is as follows:

Suppose the following 3 substances contained in a waste were entered at these percentages. The corresponding risk (R) phrases for these substances which are given in the legislation and stored in the HWIT database are shown in Table 1.

Table 1: Possible substances, their percentage in the waste and relevant risk phrases

Substance	Percentage	Risk (R) Phrases
Arsenic Pentoxide	0.09%	R45, R23/25, R50/53
Chromium Chromate	0.04%	R8, R35, R43, R45, R50/53
Copper Naphthenate	0.05%	R10, R22, R50/53

Arsenic Pentoxide has been classified as a carcinogen category 1 and assigned the risk phrase R45 and is present at 0.09%. Chromium Chromate has been classified as a carcinogen category 2 and assigned the risk phrase R45 and is present at 0.04%. Thus the amount of material classified with R45 present is $0.09\% + 0.04\% = 0.13\%$ but the concentration limit is 0.1% so the waste is hazardous. Furthermore all of the three substances have been classified as dangerous for the environment with risk phrases R50/53 for which there is no concentration limit. Copper Naphthenate also has been classified as flammable (R10) for which there is no concentration limit.

For any of these reasons the waste would be also classified as hazardous.

Properties route

A third possible step involves using the **Properties** of the waste. The tool offers the list of possible property tests that are specified in Annex V of Directive 67/548/EEC. Entry of these details is shown in Figure 6 below.

If some of these have been undertaken the user will indicate which ones and enter the results of these tests and the interpretations that can be made based upon these results, in accordance with Annex VI of Directive 67/548/EEC. The tool will then store these results and interpretations. This entry is shown in the screen shot given in Figure 7.

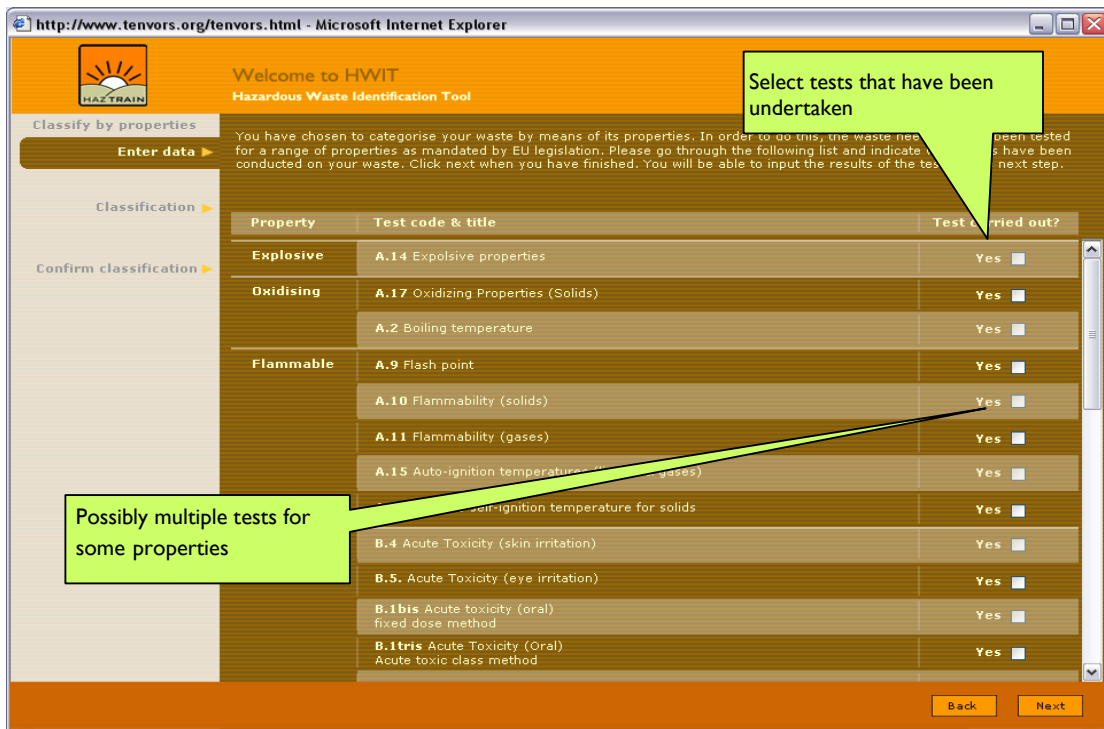


Figure 6: Selection of property tests that have been carried out

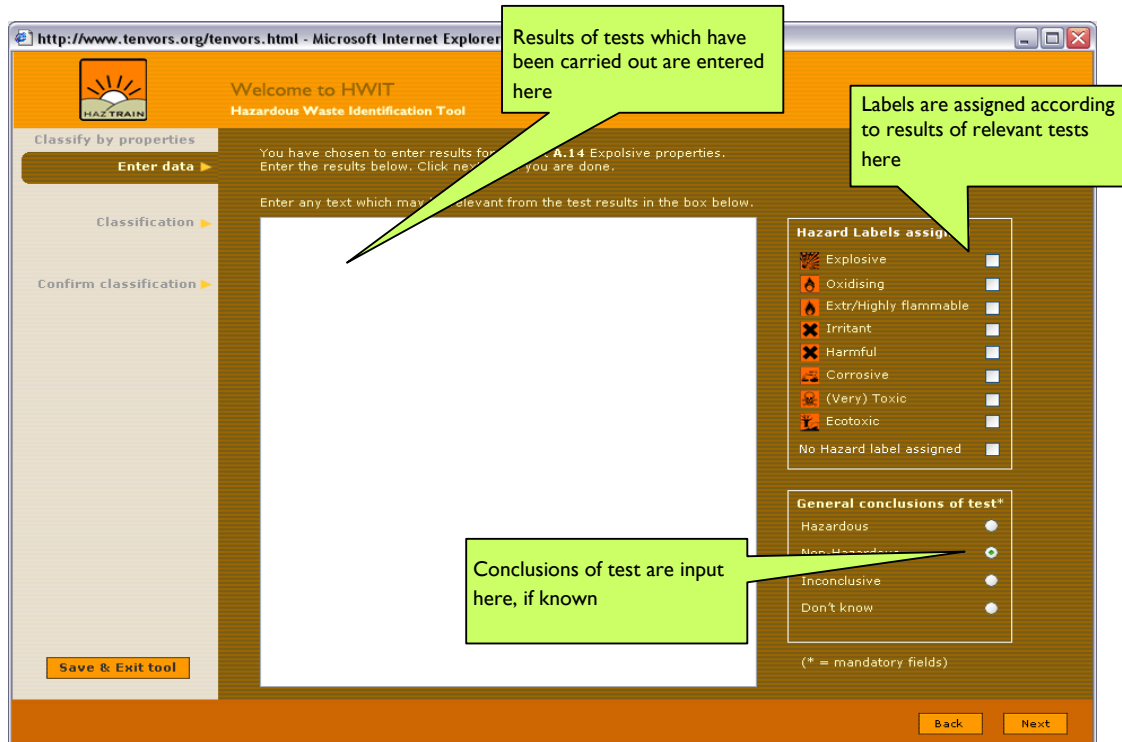


Figure 7: Entry of results of property tests

Report from the HWIT

Based upon the results of one or more of these 3 steps, the HWIT will then present the user with a complete report, including all relevant information, recording the process(es) used and the results of the identification. This can then be printed and presented by the

waste producer or waste management company to the appropriate agency or authority for inspection.

This report can be quite detailed depending on the routes chosen in the tool. The full report comprises 7 sections:

- Introduction
- Disclaimer
- Summary of findings
- Company Details
- European Waste Catalogue/Hazardous Waste List
- Composition Route
- Properties Route

Guidance and Training

The HAZTRAIN team has also developed detailed guidance and a range of training materials on the use of this tool, the legislation upon which it based and other matters relating to hazardous waste management. The tool and training materials have been piloted by a range of relevant stakeholders in each of the partner countries, adapted accordingly, and are due for completion in October 2006.

CONCLUSION

Through this project the HAZTRAIN team has developed a detailed yet user friendly web based hazardous waste identification tool which simplifies the complex and wide ranging EU legislation governing this topic. Using a step by step process involving 3 stages, users can identify the hazardous properties of their waste, both for their own needs and also to show regulatory authorities how their waste was classified. The tool can be used by waste producers, waste management firms, consultants or regulators themselves to simplify and clarify this difficult and complex process. The tool provides an easily verified and detailed report on the choices taken during the process and the information entered into the tool.

DISCLAIMER

The results contained in the report from the Hazardous Waste Identification Tool (HWIT) are based on the information entered into the tool by the user. The developers of the tool do not accept any liability for any change to any classification as a result of any other information on the waste which was not entered in the tool. The developers of the tool do not accept any liability for any incorrect or mistaken usage of the tool by the user, nor the results of such mistakes. In addition to this, the developers of the tool assume no responsibility and disclaim all liability for any injury or damage resulting from the use or effect of any of the information specified. Anyone using this information assumes all liability arising from such use. It should also be noted that it is not within the remit of this tool to state categorically that any waste classified is not hazardous – this can only be decided by the relevant regulatory authority of the region in which it is being used. The tool can only identify when certain criteria are met which may render waste as hazardous.

ACKNOWLEDGEMENTS

HAZTRAIN comprises partners from Ireland (Clean Technology Centre, Cork Institute of Technology), Austria (LKT and ENERGO), Denmark (2.0 LCA Consultants and DAKOFA), Finland (Turku University of Applied Sciences), Portugal (INETI), Slovakia

(e-code), Slovenia (Josef Stefan Institute) and The Basque Region of Spain (Prospektiker). The Clean Technology Centre is the project coordinator.

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REFERENCES

CEC (Commission of the European Communities) (1967) *Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances* [Official Journal 196 , 16/08/1967 P. 0001 – 0098] CEC, Brussels, Belgium [note: this has been amended and adapted to technical progress 29 times – a consolidated version with Annexes is available at http://ec.europa.eu/environment/dansub/main67_548/index_en.htm]

CEC (Commission of the European Communities) (1999) *Council Directive 1999/45/EEC of 30 July 1999 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous preparations* [Official Journal L 200, 30/07/1999 P. 1 – 68] CEC, Brussels, Belgium [note: this has been amended and adapted to technical progress 4 times – a consolidated version with Annexes is available at <http://eur-lex.europa.eu/LexUriServ/site/en/consleg/1999/L/01999L0045-20060213-en.pdf>]

CEC (Commission of the European Communities) (2006) *Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on waste* [Official Journal L 114, 27/04/2006 P. 9 – 21] CEC, Brussels, Belgium [note: codifies the original waste Directive 75/442/EEC and its amendments]

CEC (Commission of the European Communities) (1991) *Council Directive 91/689/EEC of 12 December 1991 on hazardous waste* [Official Journal L 377 of 31.12.1991] CEC, Brussels, Belgium

CEC (Commission of the European Communities) (1994) *Council Directive 94/31/EC of 27 June 1994 amending Directive 91/689/EEC on hazardous waste* [Official Journal L 168 of 02.07.1994] CEC, Brussels, Belgium

CEC (Commission of the European Communities) (2000) *2000/532/EC: Commission Decision of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste, amended by Decision 2001/118/EC, by Decision 2001/119/EC and by Decision 2001/573/EC* CEC, Brussels, Belgium

CEC (Commission of the European Communities) (2001) 2001/573/EC COUNCIL DECISION of 23 July 2001 amending Commission Decision 2000/532/EC as regards the list of wastes CEC, Brussels, Belgium

Clean Technology Centre (2001) *Procedure for the Identification of Hazardous Components of Waste* Environmental Protection Agency, Ireland (available at www.epa.ie)

CONSLEG (2002) *Consolidated TEXT produced by the CONSLEG system of the Office for Official Publications of the European Communities CONSLEG: 2000D0532 — 01/01/2002* Office for Official Publications of the European Communities, Luxembourg [this is a consolidated version of the European Waste Catalogue (EWC) based on Council Decision 2000/532/EC, most recently amended by Council Decision 2001/573/EC and is available at http://www.europa.eu.int/eur-lex/en/consleg/pdf/2000/en_2000D0532_do_001.pdf?lang=e]

ECB (European Chemicals Bureau) (2005) *Classlab Database* ECB, Ispra, Italy [the ECB has developed a database of substances and their classifications based upon the list of harmonised classifications and labellings for substances or groups of substances in Annex I of Directive 67/548/EEC, which are legally binding within the EU. Annex I was last updated by ATP: 29 - OJ L 152 of 30/04/2004. The Classlab database is available at <http://ecb.jrc.it/classification-labelling/>]