



LIFE EcotexNano - Technical and end-user's manuals of the help desk plugins

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nano

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1. INTRODUCTION

1.1. OBJECTIVE

This end-user manual is designed to give assistance in the use of the help desk plugins developed under the scope of the EcotexNano project. It is intended to enable any end-user to learn how to use the help desk plugins without having to refer to any training material related with the application. It also serves as complete reference manual for all EcotexNano Help Desk plugins features.

In fulfilling these purposes this manual is provided both as Portable Document Format (PDF) document which can be printed or downloaded from the EcotexNano Help Desk web site.

1.2. USE OF THE GUIDANCE DOCUMENT

This manual is organized into several parts and chapters aimed at supporting the user in the use of the tool, and including a thorough description of the functionalities of each of the plugins developed.

The manual is structured into the following main parts:

- Part A. Purpose and General Structure: This part provides an overview of the plugins, its purpose, basic information on the software behind the plugins, the type of information that can be managed with the system in terms of company-related information and substance-related information, scope and domain of application of the risk assessment plugin, and functionalities of the information sharing add-on.
- Part B. Help Desk Features: This is the central part of the manual. It covers the essentials of the Help Desk including all features, functions and options. The different interfaces of the plugins developed are explained and, based on screenshots and examples.

The content and structure of this manual will be periodically updated by the project coordinator. New versions of the tool will be available on line under the “document and links”; or “manual” sections of the EcotexNano web site.

2. CONCEPT AND OBJECTIVES OF THE ECOTEXNANO TOOL

2.1. OVERALL VIEW OF THE TOOL

The EcotexNano toolkit is a software application system for managing data on intrinsic and hazard properties of relevant materials in textile sector, estimating the exposure potential to nanomaterials in workplaces, and predicting release of nanomaterials from the occupational settings to target ecosystems. The whole system is designed to support the chemical safety assessment of nanomaterials under the framework of the EC regulation on Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).

The tool has been developed on the basis of the requirements defined by members of the EcotexNano consortium.

The tool has been developed in cooperation with an external software provider, Nunsys, S.L, a medium sized company with accredited experience in cloud computing and software applications. The programming language and development environment selected to develop the tool were C # and Microsoft Visual Studio respectively.

C# is a modern object-oriented, general-purpose programming language, created and developed by Microsoft together with the .NET platform. C# is one of the most popular programming languages. It is used by millions of developers worldwide. The language is widely spread among companies, organizations and individual developers. For its part, Microsoft Visual Studio is an integrated development environment (IDE) used for the development and execution of programs, written in C# or some other language.

The EcotexNano help desk plugin interface was developed by means of the ASP.NET MVC, which is an open source web application framework commonly used to build and test web site applications.

2.2. STRUCTURE OF THE TOOL

The plugins developed, together with a repository of documents conform the EcotexNano Toolkit. The plugins developed include an interactive database containing reliable information on the physicochemical, toxicological and ecotoxicological properties of a compendium of nanomaterials related with important textile properties, a risk assessment application based on exposure estimation models, an evaluation tool of environmental release, as well as an information sharing application to support the communication and information exchange among stakeholders, including public authorities, national and international standard bodies, small and medium sized enterprises, large companies and industrial associations.

The following figure shows the interface created to access the tool plugins presented previously (figure 1).

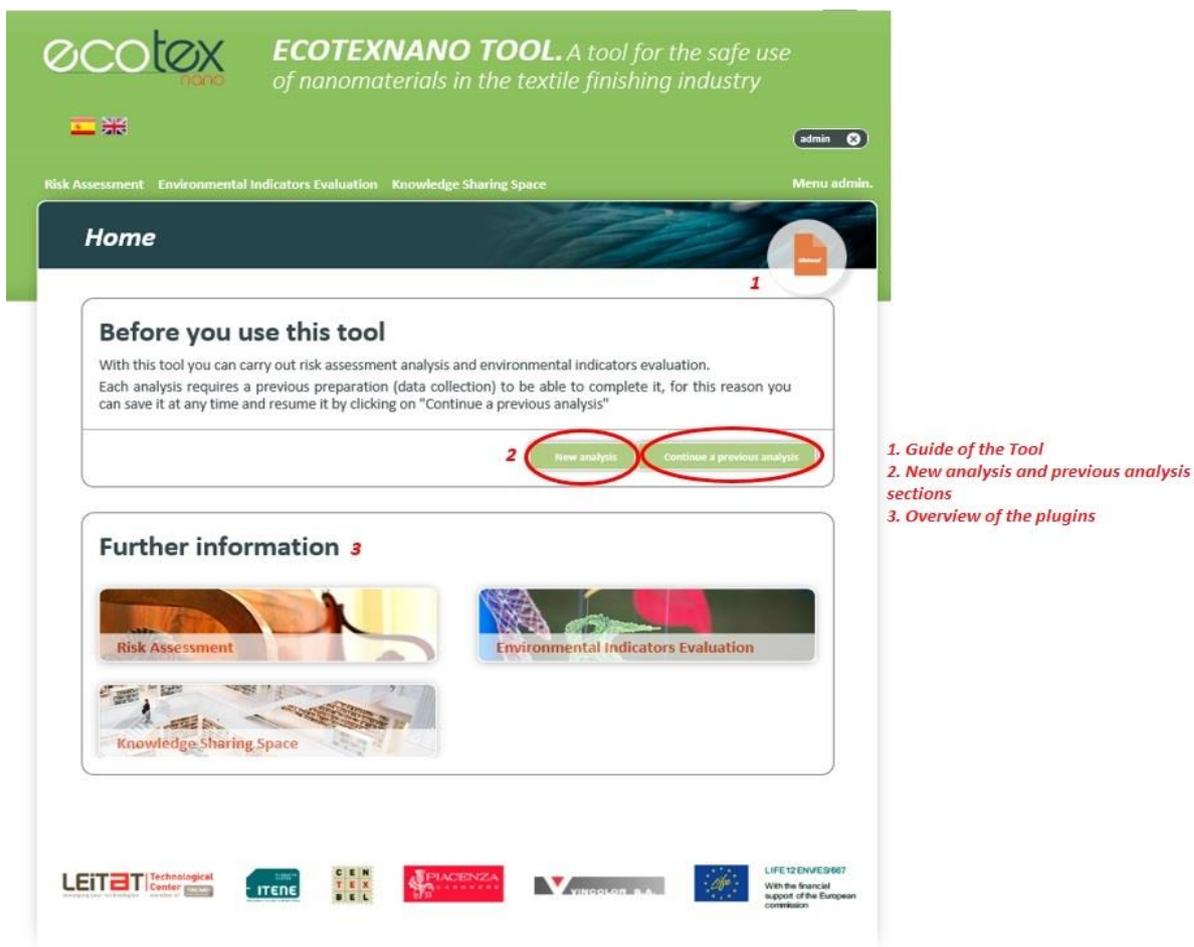


Figure. 1 Home screen of the application and its functionalities

2.3. OBJECTIVES AND SCOPE OF THE ECOTEXNANO HELP DESK PLUGINS

The plugins developed are aimed at supporting the textile industry on the chemical safety assessment of nanomaterials. Each plugin covers a strategic area to support the chemical safety assessment of nanomaterials, including:

- Risk Assessment plugin: this module is designed to support the calculation of the levels of exposure to nanomaterials in occupational environments, and the prediction of the amount of nanomaterials released from a specific process involving nanomaterials as such, in mixture or as a part of articles. The occupational risk assessment tool is based on a combination of control banding approaches, exposure estimation tools used in REACH, and new templates to be used for developing exposure scenarios in the case of nanomaterials. Users may estimate the exposure depending on the operative conditions and applied risk management measures. Once all the necessary data is introduced, the model estimates if one (or more) scenarios can be dangerous for the worker.
- Environmental indicators evaluation: This module includes four environmental indicators: Carbon footprint (g CO₂ eq.), Waste production (g), Water consumption (L) and Energy consumption (MJ).
 - Carbon footprint calculates the total greenhouse gases emissions of the different materials and processes involved in the finishing of textiles using the characterization factors of global

warming potential proposed by the IPCC (Intergovernmental Panel on Climate Change) in the year 2007, over a period of 100 years.

- Resource depletion calculates the amount of resource that it is lost during the finishing textile process.
- Water consumption calculates the water consumption during the finishing production of the functional textile, that is, the amount of water consumed as a resource during the elaboration of the materials used and in the fulfilled processes. It includes fresh water obtained from different natural sources. The Water depletion indicator from the impact assessment method, Swiss Ecoscarcity 2006, has been the one used.
- Energy consumption calculates the total accumulated demand of energy provided by different primary sources, both renewable and non-renewable included. It has been used the European Cumulative Energy Demand (CED) indicator from the method published by Ecoinvent.
- Knowledge sharing space: this module is intended to support the exchange of information on issues concerning the environmental, health and safety (EHS) assessment of nanomaterials used in textile industry. To this end, a specific module is available to allow the user to introduce comments and new information to populate the inventory. In addition, registered users may share documents with relevant information or data measured on different properties of nanomaterials in the inventory.

The comments uploaded in the help desk are only published upon validation by the management team. Once validated, the information is made available in the specific section of the database where the comment was initially uploaded.

3. NEW ANALYSIS

This chapter provides specific guidance on the content of all functionality and substances sections and subsections, which includes guidance on all data entry fields. The endpoint study records are completely based on the data to be provided for risk assessment purposes under REACH

3.1 STEP 1: GENERAL INFORMATION ABOUT THE NEW SCENARIO

In the first step, the tool will ask us for different information about the scenarios we want to evaluate. The information requested by the program is as follows:

- **Module 1:** This module requires information about the type of scenario.
 - **Analysis Name:** In this field, which is mandatory, we are asked for the title of the analysis. This is the title under which all the information generated in the analysis will be stored.
 - **I am interested in:** In this section you must select one of the four properties for which the tool is designed. These properties are “UV protection”, “Fire resistance”, “Antibacterial” and “Soil release”. In this section, in addition, you can include other properties in which you are interested as a proposal to include it in the future in the tool.
 - **The substance that I use are:** In this section you can choose one of the substances for which the tool has been designed. These substances have been chosen to be related to the above properties. Each analysis is designed for a single substance and property, so if you want to test various substances, you must create a new analysis for each.
 - **I want to:** In this section you are given the choice of any possible analysis that the tool can perform. The analyzes, which will be explained in detail below, are "Environmental indicators", "Environmental risk assessment" and "Worker risk assessment". Unlike in the previous sections, you can select one, two or all three analyzes. If more than one is chosen, they will be presented one after another.
- **Module 2:** Reference values.
 - **Environmental indicators:** The reference value needed to calculate the environmental indicators is the square meters (m²) of fabric produced during the process to be evaluated. It is a mandatory field if environmental indicators are to be evaluated.
 - **Environmental risk assessment:** Reference values for air, water and soil and limit values for the orange, red and black categories are requested.
 - **Worker risk assessment:** In this last section, reference values are requested for the dermal and inhalation toxicity that are defined by the legislation for the selected substance.

Risk Assessment Environmental Indicators Evaluation Knowledge Sharing Space

Analysis - Step 1

Analysis Name *(Mandatory)

I am interested in

UV protection

I am interested in future inputs regarding

The substance that i use are

Aluminium Oxide Nanomaterial

I want to

Check about environmental indicators

Check about risk assessment environmental

Check about risk assessment worker

Reference Values: Environmental indicators

Reference Values: Risk Assessment Environment

Reference Values: Risk Assessment Occupation

[Return](#) [Send comments](#) [Continue](#) [Save and continue later](#)










Figure. 2 Capture: Step 1 with the sections explained above

3.2 STEP 2: ENVIRONMENTAL INDICATORS

In the second step of the analysis, the environmental indicators will be evaluated. If you have not selected this analysis, the tool will go directly to step 3 or 4, depending on the analysis you have selected. This step has four different modules, which will be explained below.

- Section 1: General information about the analysis. This module asks for general information about the scenario.
 - **Title:** In this section you can see the general information. It is asked to specify the activity to be covered in this scenario, and also shows the information that was written in step 1: the name of the scenario, the property and the substance that covers the scenario.
 - **Environmental management voluntary systems:** This section asks the user to specify whether or not an Environmental Management System follows, and if so. You can choose one of the proposed or add some different.
 - **Best practices:** Users are asked to indicate if they know the current TXT BREF for Textile Industry.

admin

Risk Assessment Environmental Indicators Evaluation Knowledge Sharing Space

Analysis - Step 2: Environmental indicators

Section 1. Environmental Assessment Title

Activity covered under scenario * (Mandatory)

Scenario name

Property Name

Substance name

I have implemented environmental management voluntary systems

ISO 14001

EMAS

No

Other

I know the current BREF TXT for Textiles Industry

Yes

No

Figure. 3 Capture of section 1 of step 2

- Module 2: Definition of the finishing textile scenario
 - Section 1: In this module, you are asked to specify the technical functionality of the textile. You must choose one of the four options that are offered.
 - Section 2: In this section you must select which type of finishing process is applied to the fabric. Two options are offered: padding process or coating process. If none of these adapts to the process that the user applies, a different option can be selected.
- Module 3: Data
 - Section 1: Section 1 shows the reference quantity of the tissue that a value is going to. This data does not need to be written because it has already been requested in step 1 and only one reminder mode is displayed.
 - Section 2: This section asks to quantify the raw materials and the types of fabrics that are used during the process to be valued. There are different types of fabrics that can add and remove to user need. If the subject matter is not found, there is a box for requests of this type. You can put all the materials you want.
 - Section 3: This section contains information about the chemicals and additives used during the process. As in the previous section, the user can add and remove the substances he wants. You are asked to specify the amount of these with which you work. You can add as many as you want.

- Section 4: The last one that is in the data module of the added consumptions of the process. These are: "Electric consumption (MJ)", "Gas consumption (m3)" and "Water consumption (l)".

The screenshot displays a web-based form with the following sections:

- Section 2. Definition of the finishing textile scenario**
 - Type of finishing process**
 - Padding process
 - Coating process
 - Other
- Section 3. Quantify the data provided**
 - 3.1. Reference unit**
 - Quantity of fabric produced for the production process (m2 fabric)
 - 3.2. Raw materials. Type of fabrics**
 - Objective property
 - I am interested in future inputs regarding
 - 3.3. Raw materials. Chemicals and additives**
 - Objective property
 - 3.4. Other consumptions**
 - Electricity consumption (MJ)
 - Gas consumption (m3)
 - Water consumption (l)

Figure. 4 Capture of sections 2 and 3 of step 2

- Module 4: Results.
 - Section 1: In this section, the scenario clock is obtained, as well as the reference quantity of the fabric.
 - Section 2: This section selects the environmental indicators to be calculated.
 - Section 3: This section shows the results of the analysis and allows comments on possible improvements.

Section 4. Results

My functional unit is

Case study code: SR_P_666

Quantity of textile (m2): 666,000000

I want to calculate the following environmental indicators

Carbon footprint (g CO2 eq): 46221,0000000

Water depletion (l): 62229,0000000

Energy consumption (MJ): 37163,0000000

Resource depletion (kg Sb eq): 0,0087858

I have interest in other indicator:

Quantity of textile produced (m2): 666,0000000

Carbon footprint (g CO2 eq): 46221,0000000

Water depletion (l): 62229,0000000

Energy consumption (MJ): 37163,0000000

Resource depletion (kg Sb eq): 0,0087858

Figure. 5 Outputs of step 2

3.3 STEP 3: ENVIRONMENTAL RISK ASSESSMENT

In this step the environmental risk assessment will be carried out. Depending on the evaluations that have been requested to the tool, this step will appear in second or third place. Next, the modules that comprise this step are defined in detail.

- Module 1 Environmental release scenario. As in the previous steps, there is a section that collects the general information of the scenarios. The activity under which the scenario is described is requested. You must specify the amount of product you are working on the stage.
- Module 2: Risk management measures
 - Air Release Management: First, a series of measures are listed to prevent release of the nanomaterial into the air. The user must select all those that apply to his process both in the production or synthetics of ENMs or Nano products.
 - Water release management. This section is the same as above. The user should select those of the measures offered, which he carries out for the management of the risk of release to water.
- Results: In this section the user must enter the concentration limit values that specify the applicable legislation for his product. The tool will calculate risk characterization ratios (RCR) and release (mg).

Environmental release scenario

Activity covered under scenario *(Mandatory)

Scenario Name

Property name

Substance name

Quantity used in the scenario *(Mandatory) kg

Risk Management measures (RMM) applied to avoid releasing nanomaterials into the air.

Parameter	ENMs production / synthesis	Production of nanoproducts
<i>Wet scrubber - for dusts</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<i>Wet scrubber - for gas removal</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Waste gas membrane separation</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Separator</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Dust collection - air cyclones</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Waste gas treatment - thermal oxidation</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Waste gas treatment - catalytic oxidation</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<i>Waste gas treatment - absorption</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Biological treatment - degradable substance</i>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Waste gas treatment - condensation</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Figure. 6 Example of analysis of risk management measures

4. PREVIOUS ANALYSIS

The Ecotexnano tool is designed to keep all those scenarios that the user wants to store. These scenarios can be revised and modified as often as desired. To access these scenarios, you can enter from the main page:

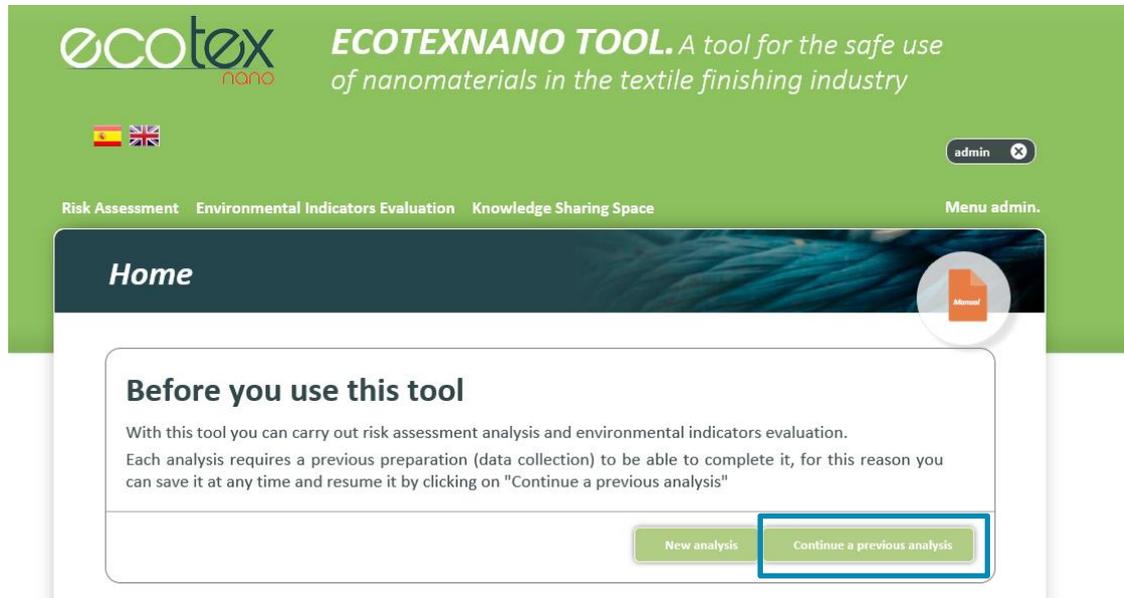


Figure. 7 Access to saved scenarios

Once in this part of the tool, the user can see in list form all the scenarios in which he has previously worked, as well as the analyzes that he has evaluated in these scenarios and the relevant information of these. They can also be modified if desired.

These scenarios can be printed once they are finalized.

Analysis

[← Return](#)

[+ New analysis](#)

Analysis Name	Substance Name	Property Name	Environmental Indicators	Environmental Risk Assessment	Occupational Risk Assessment	Edit
Analisis de muestra para la guia	Aluminium Oxide Nanomaterial	UV protection	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Re	Carbon nanotubes (CNT)	Fire resistance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ree	Carbon nanotubes (CNT)	Fire resistance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Example 1	Carbon nanotubes (CNT)	Fire resistance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Example 2	Carbon nanotubes (CNT)	Fire resistance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Example 3	Carbon nanotubes (CNT)	Fire resistance	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
33333	Magnesium Oxide Nanomaterial	Antibacterial	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Stage 1	Zinc Oxide Nanomaterial	Soil release	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	



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Figure. 8 Saved Scenario Collection Screen Example

6. ADDITIONAL INFORMATION

This chapter provides specific guidance on the content and functionalities of the knowledge sharing space plugin. The main goal of the plugin is to support the exchange of information among stakeholders, including opinions, data, and/or documents.

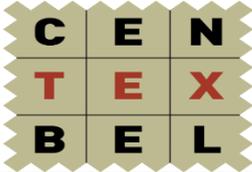
By clicking in “Documents and links”, the tool gives access to a repository of documents managed by the contents manager.



Figure. 9 Screenshot of the knowledge sharing space

7. CONTACTS

The toolkit has been developed by ITENE in cooperation with the members of the consortium and with the IT support of Nunsys, S.L. Please, use the list of contacts below to send us your opinions and/or experience with the tool. Similarly, this list of contacts can be used to communicate any failure of the tool.

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