# 1.1 Welcome

Congratulations on your purchase of a member of the “Pro-Designer” family of software tools.

The Pro-Designer series of software tools currently includes SuperPro Designer and EnviroPro Designer. By acquiring any member of our Pro-Designer series, you are joining a large group of engineers and scientists from companies like Abgenix, ADM, Ajinomoto (Japan), Allergan, Avecia (UK), Aventis (France, Canada, and USA), AWE (UK), Baxter BioScience, Bio-Rad Laboratories, Biotechna (Lithuania), Bristol-Myers Squibb, Cabot Corporation, Cangene (Canada), CDI, Centocor, Colgate Palmolive, CRAB (Italy), CRB Consulting Engineers, CuraGen, Development Center for Biotechnology (Taiwan), Dow Chemical, Diosynth, DSM Pharmaceuticals, Du Pont, Fluor, Frito-Lay, Genencor, GlaxoSmithKline, Hershey Foods, Hoffmann-La Roche, ICOS Pharmaceuticals, Idec Pharmaceuticals, IFF, Intel, Jacobs Engineering, Kraft Foods, Kvaerner Process, Lockwood Greene, Lonza Biologics, Lucent, Merck, M+W Zander Facility Engineering (Germany), Novo Nordisk (Denmark), Pfizer, Procter & Gamble, Purdue Pharma, Regeneron, Scherring-Plough, Schweizerhall, Serono (Switzerland), Shreya Life Sciences (India), Sony (Japan), Sumsung (Korea), U.S. DOA, DOD, DOE, Wacker-Chemie (Germany), Wyeth Pharma, etc. (just to name a few) in the U.S. and abroad who already are employing our technology to design new processes or improve the performance of existing ones.

The Pro-Designer set of software tools is today’s best option for any chemical, biochemical or environmental engineer and scientist in R&D, process engineering or manufacturing. Whether you are a member of a biochemical, pharmaceutical, specialty chemical, food company or whether you are employed by an environmental consulting firm or a water purification/treatment plant, you can benefit from making this product part of your every day computing options. We are certain that once you get acquainted with this product, it will become the most valuable tool in your team’s toolbox. Its use will enhance the productivity and communication efficacy of all members in your group as well between your group and other parts of your organization.

All of the Pro-Designer software tools feature a unique balance between flexibility, ease of use and computational power. They can be readily used by a computer novice who is not very familiar with simulation and economic evaluation. You will find that all of the Pro-Designer software tools are based on the same user-friendly interface making it easy to migrate from one product to another as your needs may change in the future. And in case you stumble across a question, help is one keystroke away. Hitting **F1** will get you into a sophisticated hypertext-based help system, featuring the already familiar MS-Windows Help interface. The system allows you to search for topics related to keywords, jump from one help topic to another, and so on.

While we have made every effort to make all of our products’ learning curve as smooth and short as possible, at the same time, we have equipped our software with several features that will satisfy even the simulation veteran when it comes to preliminary design and evaluation of process alternatives:

- Material and Energy Balances of Integrated Processes
- Equipment Sizing

- Scheduling of Batch Processes
- Cost Analysis and Economic Evaluation
- Throughput Analysis and Debottlenecking
- Environmental Impact Assessment

just to name a few of many issues that can be explored. Further, including your results into reports created by your word processor or spreadsheet is just a couple of mouse clicks away. Using the latest OLE technology, you can simply copy all or parts of your flowsheet or the Gantt chart and simply paste it into your favorite Windows application. For users who need to do additional analysis of the results, we have included the option of exporting all reports (including the Gantt chart) in a spreadsheet-compatible format so that they can be opened and manipulated by spreadsheet programs like MS-Excel, Lotus 1-2-3, etc.

## 1.2 About This Manual

Users generally don't like reading manuals. The manual you are holding in your hands was put together with that in mind. As a minimum, however, you should read the first two chapters.

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| ***Chapter 1*** ***Introduction*** | You will find useful information about hardware and software requirements for this program in order to run flawlessly on your machine; directions about the installation procedure; and a guide for the rest of the manual. |
| ***Chapter 2*** ***Tutorial*** | In this chapter you will find a step-by-step approach to what it takes to develop a design case using this program. This is done using a very simple process. In addition, three more examples are described in greater detailed. The first, which deals with the production of ß-galactosidase, is recommended for users in the biochemical and related industries. The second, which deals with a synthetic pharmaceutical process, is recommended for users in the pharmaceutical, agrochemical, and specialty chemical industries. The third, which analyzes and industrial wastewater treatment plant, is recommended for users in the environmental field. |

If you look at the end of this chapter you will find a listing with all the chapters contained in the manual and a brief description of each chapter. You don't have to read them all now. You can visit them at your own pace and as questions may arise related with the subject they describe.

## 1.3 Hardware and Software Requirements

All of the Pro-Designer series software will run on any IBM PC and 100% compatible based on the Intel Pentium II (or better) processor that runs Win95, Win98, WinNT 4.0, Win2000 or WinXP. Here's a more detailed description of the hardware requirements:

***Hard Disk*** Depending on your choices during installation, the programs will occupy anywhere from 100 MB (for minimum installation) to 150 MB (for full installation, including the on-line help and examples) of space on your hard disk.

***Processor / RAM*** Although any of our programs will run under the minimum configuration requirements for Windows 95 / 98 / 2000 (486 processor and 16II MB), a Pentium II with 128 MB of RAM or better is recommended.

***Mouse*** The presence of a mouse or a similar pointing device supported by Win95 / Win98 / WinNT / Win2000 / WinXP is required.

***Video Adapter / Monitor*** Any video adapter and monitor supported by Win95 / Win98 / WinNT / Win2000. All of our Pro-Designer software will run under any video mode (Super VGA and higher) and any monitor combination. In fact, you can run our software on any of today's portables that run Win95 / Win98 / WinNT / Win2000 / WinXP. However, realistically, the program requires a minimum of 1024x768 resolution and for best efficiency and comfort a 17 inch (or larger) monitor is recommended.

***Printer*** Any printer supported by Win95 / Win98 / WinNT / Win2000 / WinXP. A laser postscript printer with 4MB of memory is recommended for best quality printouts. If you try to print pages with heavy graphics (i.e., several icons and streams), you may experience problems (like missing sections of the printout) if the printer does not have enough memory.

## 1.4 Installation

Most versions of Pro-Designer (except the academic and industrial site licenses) require the use of a **hardware security key**. Simply plug the key into the parallel port of your computer. If the port is occupied by the printer cable, uplug it, plug the key into the port, and then plug the printer cable into the key.

Once you have checked that you satisfy the hardware and software requirements and pluged the security key (if one is required), you are ready to run the Setup program to install your program. The setup program will:

1. Copy all necessary files onto your hard disk at a directory of your choice.
2. Make the necessary updates of your computer's registry.
3. Personalize your copy of the program.
4. Create a program group in the Start Button and include in it icons to run the program, the program's on-line Help, the ReadMe file and the examples.

**Caution**: The installation process will overwrite any files with the same name residing in the specified destination directory *without further warning*. If you are upgrading to a newer version of the program and have modified any of the files that came with it (e.g.,

the component databank file, or the heat transfer agent databank file, or any of the example design case files), it is highly recommended that you make a backup before installing the newer version. In addition, it is strongly recommended that you install the newer version in a different directory.

### ➔ To Run the Setup Program...

1. Make sure Windows is running on your machine.
2. Insert the CD into your CD-ROM drive to open the installation program. Follow the on-screen instructions to finish installing the functional demo of SuperPro Designer. If the installation program does not open automatically, locate and run the installation script (Setup.exe) that is available on the CD.
3. During the installation, you will be asked to choose:
   a. The location on your hard disk where you want the program to be installed.
   b. Your name and your organization's name.
   c. Which components you wish to include. The "Setup" program will ask you to choose a type of installation: typical, minimum or custom installation. Depending on your choice, different sets of files will be copied. Typical installation is recommended for most users. Custom installation will let you pick and choose what components you need copied on your disk. Minimum installation will only copy the files that are absolutely necessary for your program to run. It will not copy the help files and the example files. If your hard disk space allows, it is highly recommended that you install the help files as well as the example files. The examples contain several design cases completed with the program, along with all their reports. If you decide not to include the examples during the first installation, you can always run the setup program later and copy them to your hard disk at that time. To avoid re-installing the entire program, the second time, select "Custom" from the installation options, and pick only the "Example" component.
4. At the end of installation, you will be asked to choose what to do next; you can do one of the following:
   a. Start the program, and/or
   b. View the README file.

It is recommended that you review the README file at some point before you start using your program, so you might as well do it now and get it over with. The README file is a Windows Hypertext file that contains last minute changes and other information that became available after the printing of the manual.

## 1.5 Databanks

Pro-Designer supports up to three different databanks: the Designer databank, the User databank and the DIPPR databank. Starting with version 4.5, all databanks come in relational database format (Microsoft Access .mdb format). The Designer and User

databanks are installed automatically with the program installation at default locations on the hard disk. They can be found in the 'Dbases' subfolder within the Pro-Designer installation folder. A demo version of the DIPPR databank with only 5 components is also installed in the same directory. If the full DIPPR databank is already available or becomes available after installation, it has to be registered with Pro-Designer like the other two databanks as explained in the next section.

The Designer databank is maintained and constantly updated by our staff at Intelligen but, unlike previous versions of Pro-Designer, it cannot be edited or modified by the user. The User databank is an expandable user-maintained databank that allows users to readily add and edit information for additional pure components, utilities, sites etc. according to their needs. The DIPPR databank is a pure-component only databank developed and maintained at Brigham Young University.

To avoid accidental corruption of their data, all databanks are password-protected. The User databank password can be provided upon request to users who are interested in expanding or modifying the databank from within Microsoft Access or would want to access the data from other applications. For regular use, however, it is highly recommended that the databanks be updated and maintained from the interfaces that Pro-Designer provides and can be accessed through the **Databanks** menu.

## *Databank Registration*

Upon installation, Pro-Designer automatically registers the databanks with the system and makes them immediately available to the application. If the databanks are moved to another location or their file name is modified or the password is changed or a different databank is to be used, then you should inform the program accordingly. The same applies for registering DIPPR with the program since, by default, DIPPR is not assumed to be available. To do that, select **Databanks / Availability, Passwords & Locations…** from the main menu and provide the new information in the dialog that pops up (Figure 1.1). It is the responsibility of the users to make sure that the password saved within Pro-Designer matches exactly the password of the corresponding databank files. Otherwise, Pro-Designer will not be able to access those databanks. By installation, the DIPPR databank is assumed to have no password (password is an empty string). If this is not the case, the correct password can be provided with the help of the Database Locations dialog.

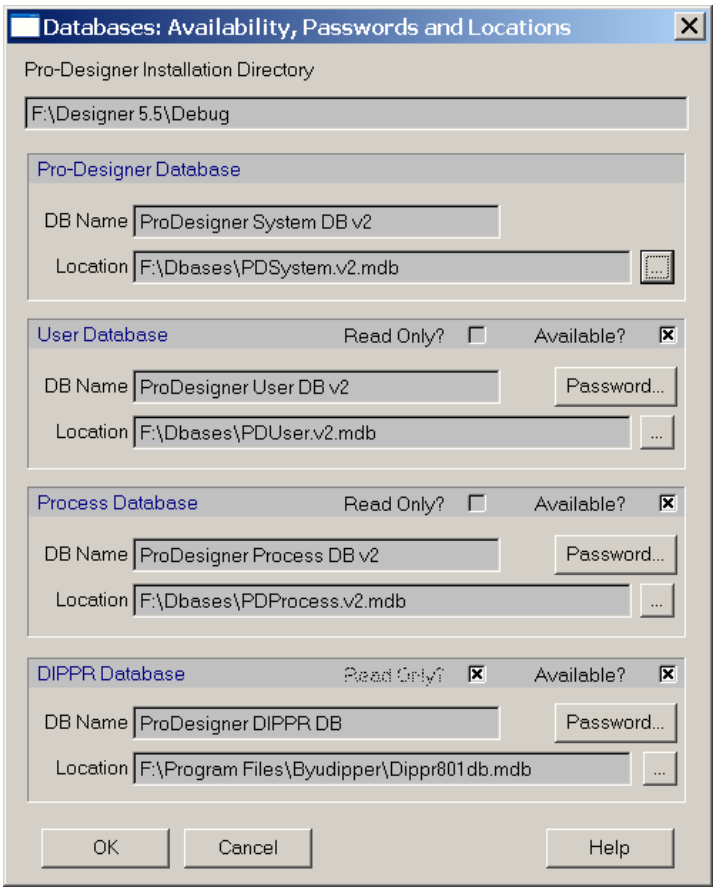


Figure 1.1: Dialog for editing the location and password of Pro-Designer and DIPPR databanks.

In previous versions of Pro-Designer (versions earlier of 5.0), changes done in the databanks did not have any effect in existing design cases. This is no longer the case. After you make changes through the Database Locations dialog, the system checks consistency between the currently open design cases and the newly available databanks. The same check is done every time an old design case is opened. If inconsistencies are found, then changes to affected open design cases might be forced by the program. If such changes are undesirable, it is strongly recommended that the affected design cases be closed without saving and re-opened only after the correct (compatible) databanks are selected through the Database Locations dialog. Note that old-version design cases that were developed with pre-5.0 version of Pro-Designer or new design cases that have no data allocated to the databanks are not affected in any way by changes in the databanks.

## *Importing Data from Old-Version User Databanks*

Although much less frequently than the program itself, Pro-Designer databanks might also come in different versions. The latest version of Pro-Designer always supports

only the latest databank version. That means that older version databanks cannot be used. This poses no problem for the Designer and the DIPPR databanks that are not editable by the user and are always backward compatible, i.e., the newer versions will always subsume older ones and therefore they can safely substitute them. Databank versioning, however, could be problematic for the User databank. In order to continue being able to use within Pro-Designer data that exist in older User databanks, you have to explicitly import them to the newer version databank. To do this you must use the dialog (shown in Fig. 1.2) that comes up when you select the **Databanks / Import Data to Databanks…** menu option.

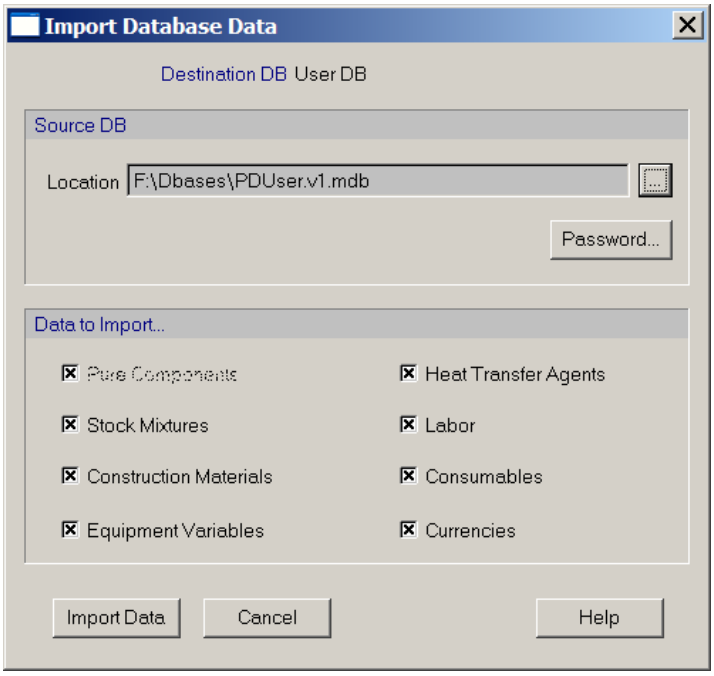


Figure 1.2: Dialog for importing data to new-version User databank

In this dialog you will have to provide the location of the old databank and its password. If the password has not been changed or is not known, you can use the 'Use default (system) password' option in the Databank Password dialog to avoid providing a password. In that case, the program will try to open the old databank with the default password. After defining what types of data you would like to import, click on the **Import Data** button to initiate the transfer process. Note that stock mixture data cannot be transferred unless the pure components are transferred as well. When the transfer is complete, the data from the old-version databank will be available inside the new-version User databank. Please note that data importing is a very sensitive process that could fail if it creates conflicts within the destination databank, e.g. if it attempts to import a component that already exists in the new databank. Users are warned for such conflicts and if the number of failures exceeds a limit, the transfer process is aborted. Therefore, it is highly recommended that this process be activated when the new-version databank is still empty (as it is the case right after installation of the new version.)

# 1.6 Technical Support

Technical Support is available for registered users only. This is why it is very important that you complete the registration card as well as the questionnaire that was included in your package. After you fill-up the registration form, please use the pre-stamped envelope addressed to:

Intelligen Inc.
2326 Morse Ave.
Scotch Plains, NJ 07076
USA

and mail it in.

To receive technical support on any of our Pro-Designer software products, you may contact us by:

e-mail (preferred) at: TechSupport@intelligen.com

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| send us a fax at: | (908) 654-3866 |
| call our tech. supp. at: | (908) 654-0088 or (262) 367-7043 or (609) 410-6484 (USA) |
| call our tech. supp. at: | +30 2 310 498-292 (Europe) |

# 1.7 Extending the License Agreement for Another Term

If you are licensing this program for a limited time, you will find out that after the license expires, the program will give you several warnings and eventually will not start unless you renew your license. The license renewal process is very simple and, in most cases, it can be done from your own office with a simple telephone call to us. Before you start the license renewal procedure, you must get in touch with us to inform you about your password for that time. Once you know your password, you are ready to start the license renewal procedure. Note that the password is only good for extending the license agreement for one term. The next time you need to extend your license for another term, you have to acquire another password.

➔ **To Renew your License for Another Term...**

1. Make sure Windows is running on your machine.
2. From the Start button, select the **Run**. In the dialog that comes up, type in: <*InstallationDirectory*>\DESIGNER.EXE /R
   Then click **OK** (or hit **ENTER**). <*InstallationDirectory*> should be a string of characters like: C:\Program Files\Intelligen\SuperPro Designer\. This will start the program in the License Renewal mode. In this mode, you cannot open an old

design case, or start a new design case, since as you will notice, the only active menu option at the main (top) menu is **Help**.

3. From the main menu, select the **Help/Renew License...** option and in the dialog that comes up, type in your password. Please note that the password supplied to you is case sensitive, so make sure you type it in exactly as is (including spaces, dashes if it happens to have any).
4. After you have finished typing your password, click on **OK**. Shut down the program (by selecting **Alt+F4** or double-clicking at the top left window box). That's it. Now you are ready to start your program the usual way

**NOTES**:

**a.** The first time you start your program after your license agreement has expired (and you haven't renewed your license yet), the program will detect the violation and prompt you to get your license agreement renewed. From that point on, you can only start the program again a few times before it locks itself. Once the program locks itself, the only way to get it unlocked is to contact us, at INTELLIGEN, INC. and acquire the necessary password to use in the procedure described above.

**b.** You can only apply the above procedure (to extend your license agreement) for only a fixed number of times (currently it is 6 times). After that, you will have to send your old hardware key to us and we will supply you with another key that you can use for six more terms.

**c.** Although it is a rare case, it may happen that your hardware key becomes defective and does not respond to the above renewal procedure. If that is the case, your old key will be replaced with a new one.

## 1.8 Overview of the Chapters in the Manual

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| **Chapter 1** ***Introduction*** | Describes in a few words the organization of the manual, the hardware and software requirements for this program, the installation procedure and how to start it, getting technical support and an overview of all the chapters in the manual. |
| **Chapter 2** ***Tutorial*** | Presents a systematic approach to what it takes to develop a design case using this program. This is done using a very simple process. In addition, three more examples are described in greater detailed. The first, which deals with the production of ß-galactosidase, is recommended for users in the biochemical and related industries. The second, which deals with a synthetic pharmaceutical process, is recommended for users in the pharmaceutical, agrochemical, and specialty chemical industries. The third, which analyzes and industrial wastewater treatment plant, is recommended for users in the environmental field. |

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| **Chapter 3 Components and Mixtures** | Defines ingredients (pure components and stock mixtures). Explains all component properties (basic and environmental) that are necessary to describe a species as part of your component databank and/or mixture databank. It explains in detail how to introduce a new pure component and/or a stock mixture in the databank or in the current design case. Finally, it explains the special components of water, primary biomass and activity-reference and the role they play in bio-process simulation. |
| **Chapter 4 Streams** | Describes in detail all you need to know about streams: their types (input, output or intermediate, as well as bulk or discrete); their classification (raw material, revenue, solid waste, liquid waste or emission); how to edit or view their simulation data (temperature, pressure, density and composition) and their environmental properties (COD, ThOD, BOD5, BODu, etc.); how to draw them on the screen and edit their corners (elbows); how to customize their appearance or style (color, font, tag name, etc.) |
| **Chapter 5 Unit Procedures** | This chapter describes the common features found in all unit procedures: operations, equipment, section, branches, icon, ports, labels, colors, costing options, sizing and number of units, scheduling information, batch vs. continuous mode of operation, default data values, materials of construction, heat transfer agents, auxiliary heating/cooling/power and rating vs. design modes of equipment sizing.<br><br>The description of operation models is available in the Help Facility only. The file that includes that material is also supplied to you and copied on your hard disk as part of the standard installation. It is in MS-Word 97 format. You may open it and print any section you need at any time. |
| **Chapter 6 Scheduling** | When a plant, as modeled by our software, is assumed to be operating in batch mode (that is the final product is delivered in batches, not continuously), you must describe exactly when each operation is started and when it ends. In other words, you must describe the scheduling of all operations leading to the manufacturing of the final main product. This chapter presents in detail all the scheduling information that you need to supply for each operation and for the whole process, how to supply the data, and how the software manipulates the data to calculate the batch time and other related scheduling output information. This chapter also covers Gantt charts: the alternative (visual) way of examining and manipulating scheduling information. |

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| **Chapter 7**<br>**Resources** | Resources (such as raw materials, heating and cooling utilities, power, cleaning agents, and labor) are very valuable commodities since they must be shared by several operations (and often several recipes run at the same site) yet they are only available up to certain levels. Pro-Designer presents resource consumption charts that depict the demands of the simulated recipe for such resources. Resource bottlenecks are easily identified if the calculated demands cannot be met. |
| **Chapter 8**<br>**Economic Evaluation** | This chapter describes the data and methodologies utilized in cost analysis and economic evaluation. An in-depth coverage of the terms and calculations made by the economic engine is presented. Some information is also provided on the cost analysis and economic evaluation reports generated by the program. More detailed information on the reports is provided in chapter nine. |
| **Chapter 9**<br>**Debottlenecking** | Presents all the terms and the methodology used when performing throughput analysis and debottlenecking studies. An example has also been included. |
| **Chapter 10**<br>**Emissions** | Describes how Pro-Designer estimates primary and secondary emissions from different operations and presents information about the emissions report. |
| **Chapter 11**<br>**Reports** | Describes in detail the content and organization of all reports created by the program: the stream report, the economic evaluation report, the itemized cost report, the throughput analysis report, the environmental impact report, the emissions reports, and the input data report. |
| **Chapter 12**<br>**Visual Objects** | Presents in detail how you can enhance the appearance of your flowsheet by highlighting certain parts and by adding visual elements (rectangle boxes/shadows, arrows, comments (text), etc.) |
| **Chapter 13**<br>**Design Case** | Describes what is contained in every design case file and provides some tips on how to maintain the files related with a given project or several projects |
| **Chapter 14**<br>**Interacting with Other Windows Programs** | Explains how to export a flowsheet (in its entirety or parts of it) so that it can be incorporated in another application (either another graphic package like CorelDraw, AutoCAD, etc. for further enhancing the drawing details or a word processor as part of your submitted reports). In addition, in this chapter we examine how you can export the results contained in the Gantt Chart and the reports generated by the program so that they can be read by Excel (or other spreadsheet applications). |

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| **Chapter 15**<br>**Menus and Palette Buttons** | Explains in brief each menu option and toolbar button of the program's user interface. |
| **Chapter 16**<br>**Databanks** | Provides information on the various databases for materials, utilities, labor, equipment, sites, etc. that are utilized by the software. |

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