IMSDesign-2015 - Hydranautics New Projection Program

New Features in **IMSDesign-2015**

The IMSDesign-2015 RO/NF projection program is developed using Microsoft's .NET Technology which offers enhanced program features and greatly improved graphics to aid the RO/NF designer. IMSDesign-2012 and earlier versions date back to 1998 and was developed using VB6 technology.

You will be able to use all saved IMSDesign-2012 des files dating back to 2010 (some 2009 files will also be usable). This is a short list of differences and improvements you will find:

When you will see differences in projected data:

- The feed pressure will be higher for brackish water RO and NF elements for temperatures < 25C in IMSDesign-2015. This reflects more accurate temperature corrections factors found in field and lab data results.
- The permeate TDS and boron levels for seawater RO elements for temperatures > 25C will be higher in IMSDesign-2015. This also reflects more accurate temperature corrections factors found in field and lab data results.
- For Fouling Factor, if there is a difference, IMSDesign-2015 is correct.
- There will be minor variances for calculated acid or caustic feed, pH, CO2 levels, HCO3 and CO3 levels and IMSDesign-2015 is considered correct.

Setup Screen

- Many of the program's features are customizable or set as default.
- The 6 most recent projections will be saved for quick retrieval.
- A PDF summary of New Features in IMSDesign-2015 can be quickly accessed by clicking a web link.

Analysis Screen

- **Balancing Ions:** You can balance cations or anions as required by using the underlined ion. It is possible to balance using Ca, Mg and SO4 in addition to Na and Cl.

- **Multiple Analyses:** The designer will be able to blend a number of feed streams into one feed stream. You can only pick this option or the Custom Ion, not both. This will be used in conjunction with the Analysis Save feature.
- **Custom Ions Option:** This feature allows for new custom ions. For cations you can pick 3 of 13 cations from a list of Cu, Cr, Mn, Fe, Co, Ni, Mo, Ag, Al, Pb, Zn, Ra and U. For anions you can pick 2 of 3 anions from a list of Br, I and S. Bromide is in seawater. Iodide and Sulfide are common in industrial waste waters.
- **New Ions:** The phosphate PO_4 anion has been added for all projections.
- **New Saturation Limit Calculations:** $Ca_3(PO_4)_2$ & CaF_2.
- **New Saturations Limits with Antiscalants for Alarms:**
  - LSI has been increased from 1.8 to 2.5.
  - $CaSO_4$ has been increased from 230% to 400%.
  - $BaSO_4$ has been increased from 8,000% to 10,000%.
  - Silica has been increased from 100% to 140%.
- **SDSI:** Calculated only for seawater RO or for any feed TDS exceeding 10,000 ppm.
- **LSI:** Calculated only for brackish water RO and NF when feed TDS is less than or equal to 10,000ppm.
- **Automatic TDS Calculation:** Na and Cl are loaded automatically when TDS is inputted before entering any other ions

Design Screen

- **% Flux Decline:** The designer can select Annual or First Year. Annual is linear and the historic default. First Year is exponential and is recommended especially for waste waters.
- **Hybrid Option:** This option allows you create a hybrid for the 1st stage of the first pass in 1-pass or 2-pass designs.
- **Input Flasher:** When you pick an Option or a 2-pass design, the program will flash where data input is required so the designer does not have to guess.
- **Floating Diagram:** Appears during design to graphically display the design and what is being changed. The diagram can be resized and the last size is remembered and used the next time you open the program.
- **Element Selection:** The element selection experience has been enhanced.
  - When you open up Element Selection, the elements that best fit the size and water type will be displayed.
  - When you click the checkbox of an element, it will automatically calculate the feed pressure and permeate TDS.
  - You can check as many checkboxes as you like to get a quick comparison. If you don't like the pre-selected elements you can expand the element list to all elements.
  - Each element will have all pertinent specification data like production flow in gpd and nominal % salt rejection like before, but also displays now standard test condition test pressure, area in square feet, and mil spacer thickness.
- **Summary Calculations:** This feature allows engineers to create an Excel sheet of data for a range of inputted Temperature/Age/Recovery and now Feed pH. A large amount of data can be exported which include important design parameters and permeate ions.
- **Interstage Pipe Loss:** During Setup, this can be selected as an input on the Design Screen. The default is 3 psi (0.2 bar). As before, this applies only between stages (e.g. between stage 1 and 2 or 2 and 3).

Flow Diagram

- **Improved Graphics:** All streams of all stages of all passes are now displayed.
- **More Data Reported:** You can select two parameters (pH, conductivity, osmotic pressure etc.) to be shown in addition to the flow, pressure and TDS.
- **Highlight Your Stream:** You can hover your pointer over the stream number or membrane block and it will highlight its data and the data-column below.

Hydranautics Industrial Design Guidelines

- **Easy to Find:** The Design Guidelines is easily accessible at the top of the design page.
- **Multiple Feed Stream Options:** Updated for 10 different feed streams.
- **Typical Guidelines:** The Typical design guidelines are the basis for alarms for an industrial quality design.
- **Aggressive Guidelines:** The Aggressive design guidelines are offered for residential or commercial quality designs or when pretreatment is extremely good in an industrial design.

Printout

- **Flow Diagram:** By default, the Flow Diagram will be printed along with the print results.
- **Specific Energy:** as kwh per 1000 gallons permeate or kwh per cubic meter now on the front page.
- **Delta P:** The delta P per stage is now reported on the front page – useful for LD technology.
- **Highest Element Flux:** The highest flux per element per stage is now reported on the front page.
- **Highest Element Beta:** The highest element beta per stage is now reported on the front page, not just the last element, which is useful for hybrid designs.
- **NDP per Pass:** The average NDP per pass is now reported on the front page.
- **Red Font for Alarms:** Now displayed on the screen and on printouts.
- **Print Options:** Select up to four different permeate ions to display on page 2 of the printout.

Saving and Opening a Program

- **Preliminary File Names:** When saving, a smart file name is suggested to the user using:
    - Name_Temperature_Age_Recovery_Date".
    - "Peace Camp_25.0C_3Y_85R_10-14-2014.desx".
- **Opening the Program:** You can now open the program automatically by double clicking the desx file.

If you have any issues installing or running this software, please send an e-mail to:
imsd-support@hydranauticsprojections.net