Acid Purification—Diffusion Dialysis Product Line

AP– L05 Diffusion Dialysis Lab Unit

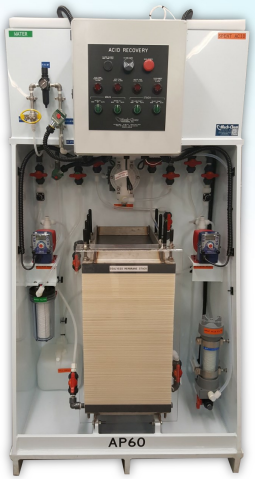
Electrodialysis Lab Unit

AP-15 Modular System

AP-30 Modular System

AP– 300 Diffusion Dialysis System

AP-45 Modular System



AP-60 Modular System

Mech-Chem
Associates, Inc.
144 Main Street, P.O. Box 473
Norfolk, Massachusetts 02056
(508) 528-5990
www.mech-chem.com

Acid Purification—Diffusion Dialysis Product Line:

R&D Pilot/Benchtop Systems

Note: Lab units are available for monthly rental or may be purchased.

AP– L05 Diffusion Dialysis Lab Unit

The **Acid Purification Lab Unit** is designed for testing on small volumes of acid solutions to provide users with an introduction to the technology and initial performance data. Evaluation of the results may lead to further pilot scale testing, or to full-scale installation at the facility. Mech-Chem's Acid Purification Units scale-up with consistent efficiency meaning the results generated on a lab unit will match those of a full-scale unit.

Lab units are available for monthly rental or may be purchased. The Lab units are designed to process between 1/2 to one gallon of acid solution, per 24 hours of operation, depending upon the type and concentrations of acids and dissolved metals in solution .

Electrodialysis Lab Unit

Electrodialysis Systems can be operated as a continuous or batch style process. In a continuous system Electrodialysis Stacks are placed in series in order to produce the process quality desired. In a batch system, the dilute and concentrate streams are circulated through an Electrodialysis Stack until the desired concentrate is reached.

Mech-Chem designs, manufactures and installs all sizes of Electrodialysis Systems based on our various customers' needs. These systems are modular units containing all the components, stack, instrumentation and controls needed to operate the system once it arrives. Simply hook up power, the process streams, and the reclaimed / reject lines and then turn on the unit.

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Acid Purification—Diffusion Dialysis Product Line

AP– 15 Modular Systems
15 Gallons Per Day (55 Liters Per Day)

AP– 30 Modular Systems
30 Gallons Per Day (110Liters Per Day)

AP– 45 Modular Systems
15 Gallons Per Day (170 Liters Per Day)

AP– 60 Modular Systems
60 Gallons Per Day (230 Liters Per Day)

Mech-Chem Associates, Inc.'s Acid Purification (AP) Systems are simple to operate, dependable, and economical. Our AP Systems use an advanced membrane separation technology known as Diffusion Dialysis to separate, recover, and purify strong acids from spent acid solutions contaminated with dissolved metals. An anion exchange membrane serves as a semi-permeable barrier between a flowing stream of water and a flowing stream of process acid. Through this membrane, the processes of both Diffusion and Dialysis occur. These processes are carried out hundreds of times through the numerous internal channels that are contained in the many layers that make up the centrally-located stack of the Acid Purification System.

This acid purification technology is capable of recovering acids from concentrated baths that would have been discarded in the past. The purified acid is returned to the process tank for continued use, while a concentrated metal-containing aqueous solution is removed for waste treatment. Typically, 80-90% of the available acid is recovered in one pass through the AP System, with 70-90% of the dissolved metals removed from this process acid in the same pass through. The Acid Purification Systems manufactured by Mech-Chem Associates, Inc. are tailored to the client's needs with respect to materials of construction and operating capacity required

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Acid Purification—Diffusion Dialysis Product Line:

AP-300 System (Large Scale)

**Note: Systems in larger need than the AP-300 systems are available as custom designed systems.*
AP-300 modular units can be designed to run in series along with a mother control module to accommodate volume needed.

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Acid Purification—Diffusion Dialysis Product Line Sizing Chart:

Model Sizing Based On Frequency of Acid Dump:

Based upon 24 hours per day/ 7 days per week operation.
Actual calculation: bath volume divided by calendar day of bath life equals gallons/liters per day required.

	50 Gallons *(190 Liters)*	***100 Gallons*** *(370 Liters)*	***200 Gallons*** *(750 Liters)*	***500 Gallons*** *(1900 Liters)*	***1000 Gallons*** *(3800 Liters)*
Volume Per Day	AP-60	AP-150*	AP-300*	AP-600*	AP-1200*
Volume Per Week	AP-15	AP-15	AP-30	AP-150	AP-300*
Volume Per Month	AP-15	AP-15	AP-15	AP-30	AP-45

**Note: Systems in larger need than the AP-300 systems are available as custom designed systems.*
AP-300 modular units can be designed to run in series along with a mother control module to accommodate volume needed.

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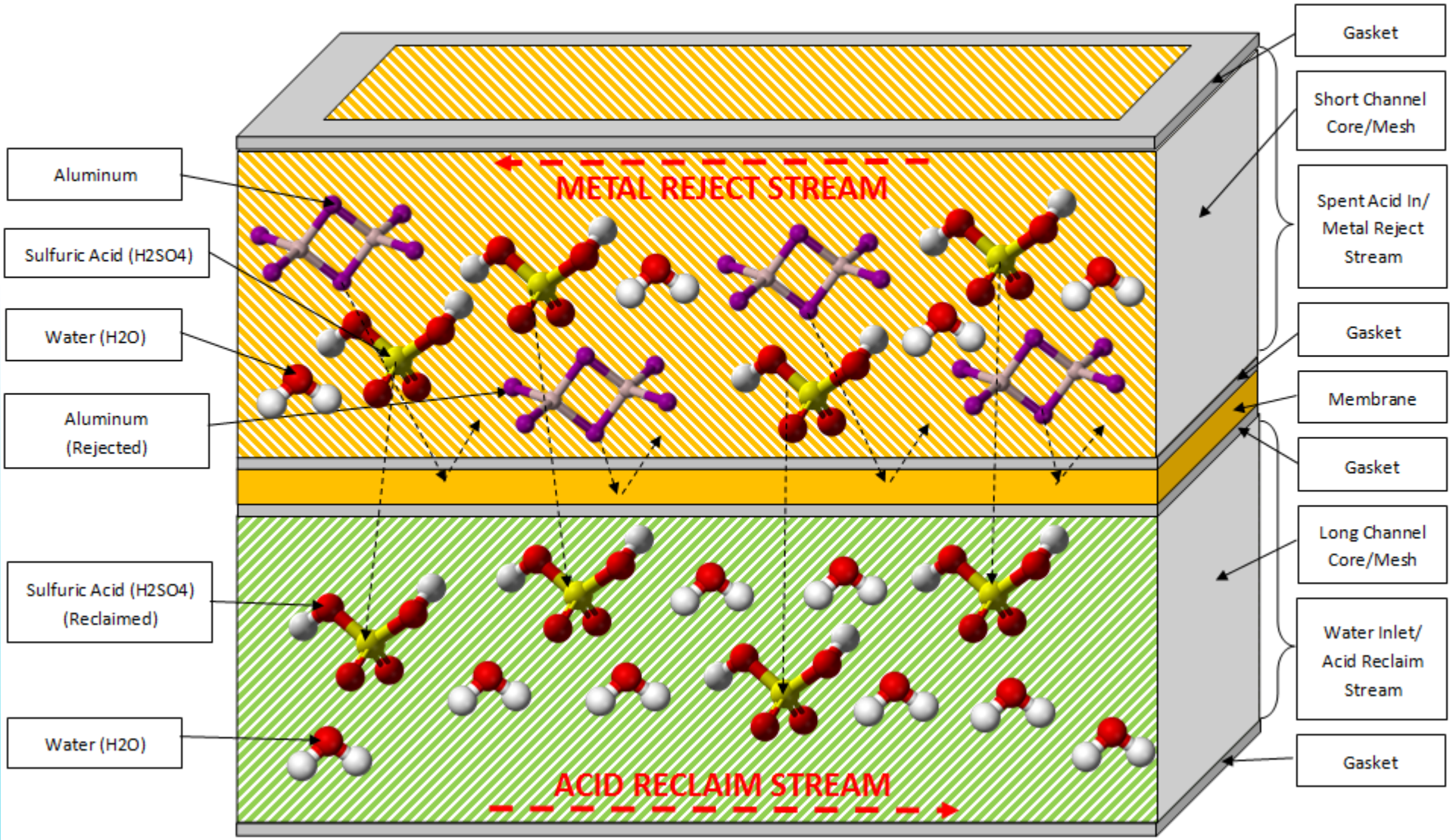
Diffusion Dialysis: Membrane Diffusion Diagram

(Example: Aluminum & Sulfuric Acid Diffusion Dialysis)



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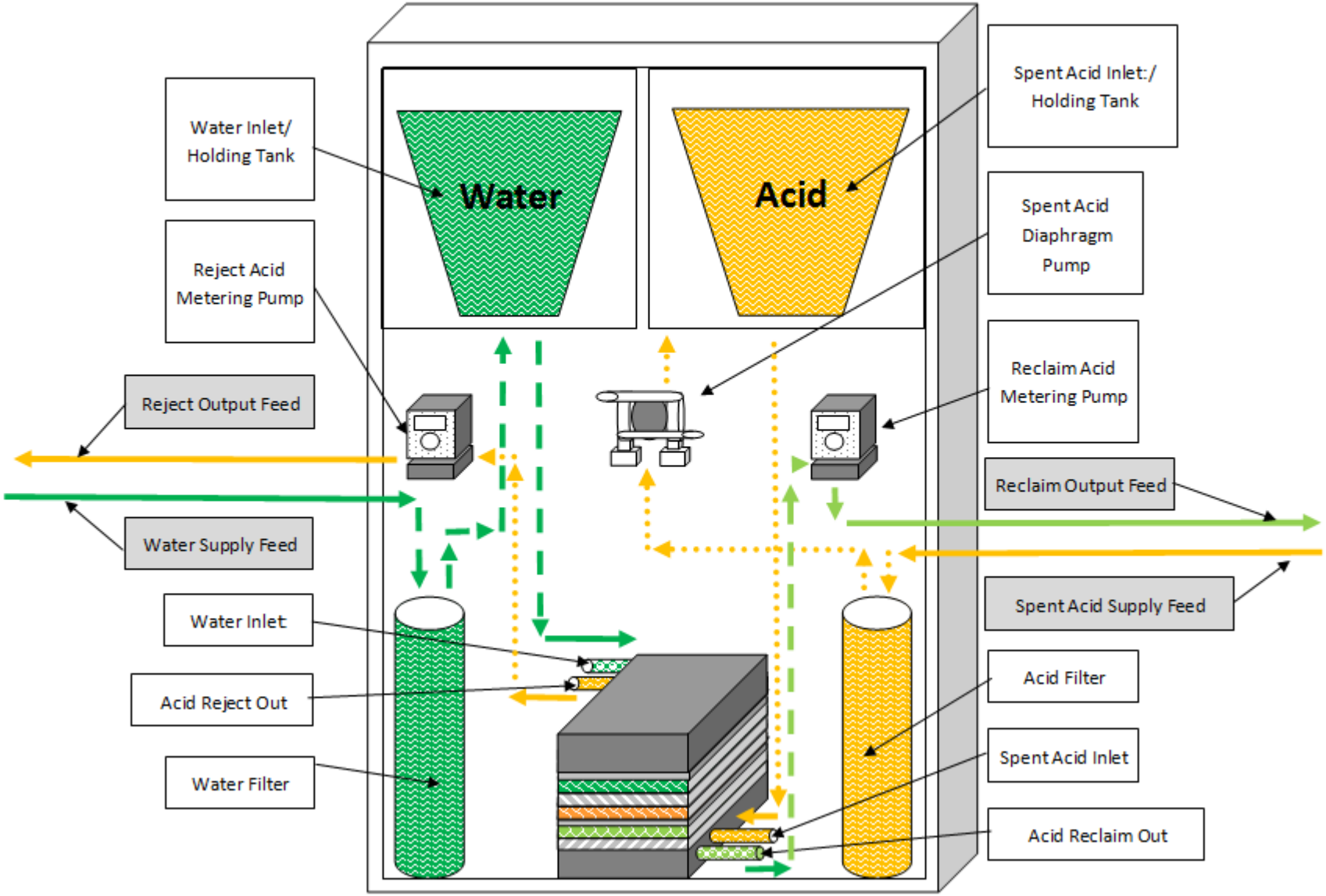
Diffusion Dialysis: Modular Unit Flow Diagram



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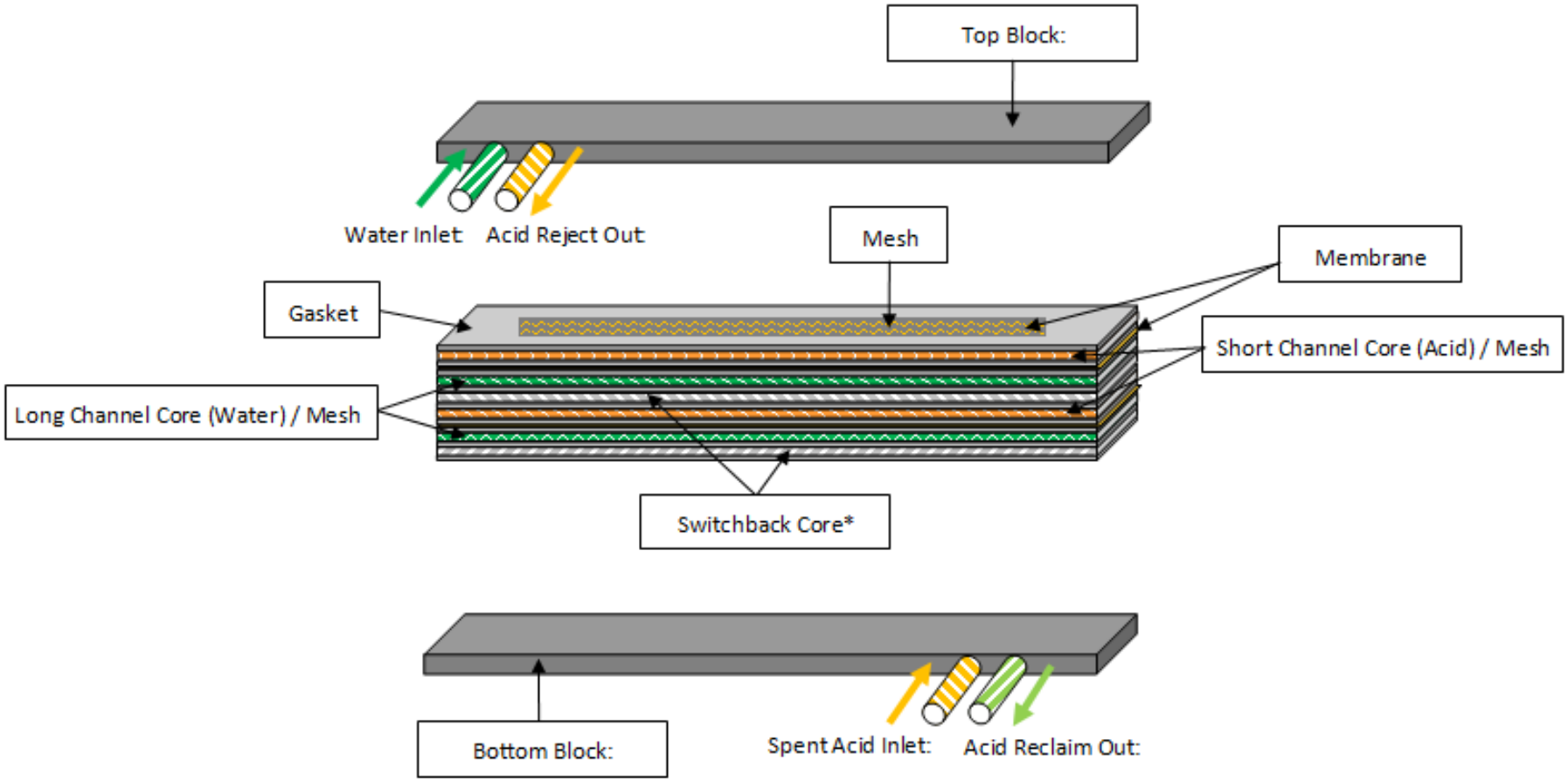
Diffusion Dialysis: Stack Layout Diagram



* Note: At the end of every cell the Switchback Core direction is reversed 180° degrees to reverse the current flow direction.

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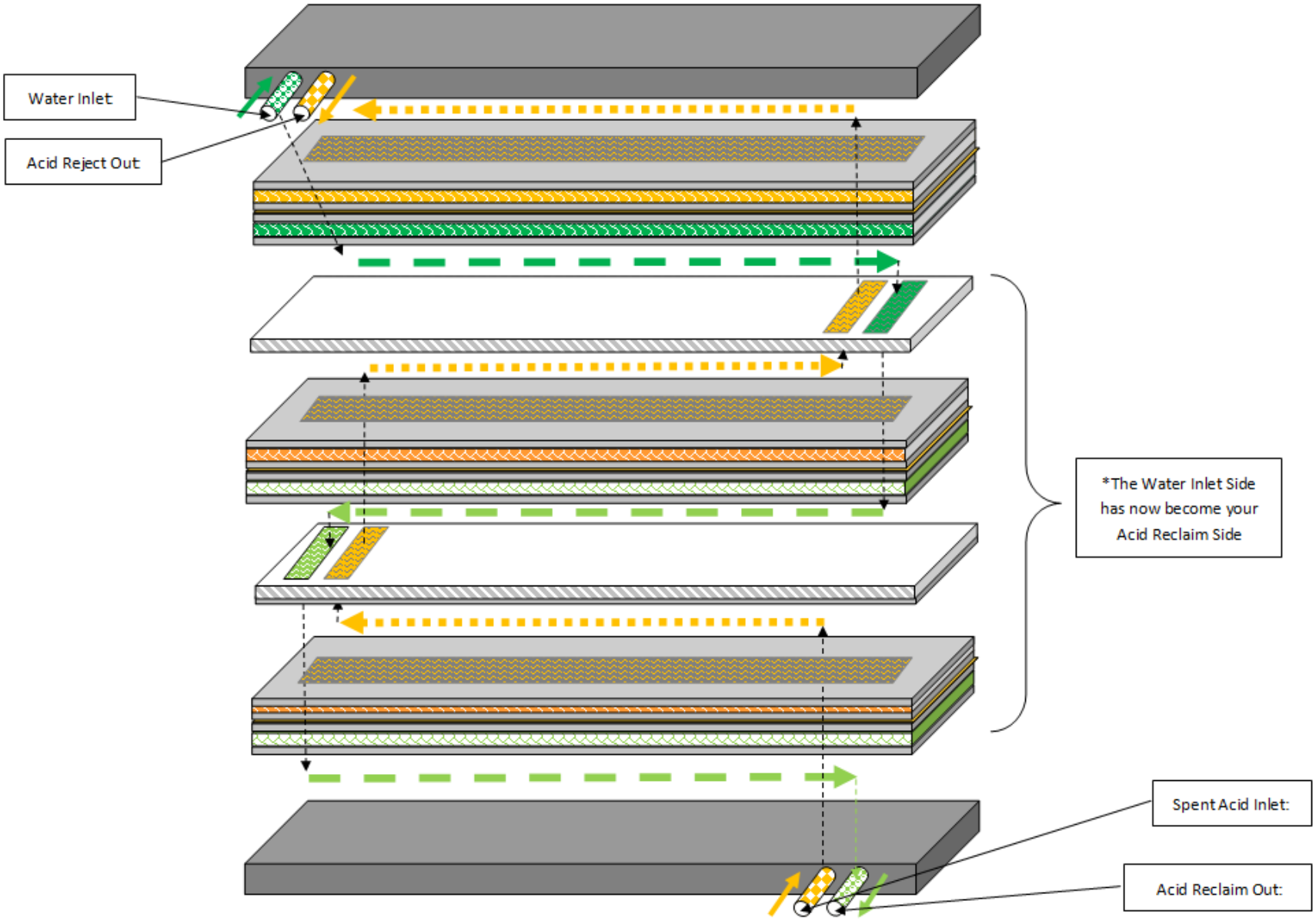
Diffusion Dialysis: Stack Flow Diagram



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