PILOT PLANT FACILITIES and PROJECT MANAGEMENT

MATRIC offers world-class pilot plant facilities and infrastructure not commonly available in today's chemical industry. These facilities allow for technology validation, data collection for scale up, intermediate scale production for market development, or other specialized testing. MATRIC has the ability to combine our skilled technician workforce with our powerful technical team to design, build and operate a pilot plant suited for your specific needs.

Facilities

MATRIC's primary pilot plant building is designed for high pressure, highly reactive chemistries. Built to facilitate and support safe operations, the building marries robustness of design with updates to offer state of the art piloting capabilities. The building is subdivided into 24 operating bays of various sizes with a 12" thick concrete wall on the inside and a lightweight blowout wall to the rear to direct any energy release away from normally occupied areas of the building. The bays range in sizes suitable for many types of operations with the largest being 50' long x 12' deep x 50' tall, offering the ability to build a large and complex-pilot process. The building is also equipped with most common utilities available in a typical chemical complex.

The smaller scale pilot facility, known as the Annex, offers a much different environment for testing. This facility consists of an array of two-story hoods suitable for larger scale research equipment and capable of controlling toxic or odiferous chemistries. The Annex offers 310 sq.ft. of hood space with 30" of working depth and 16' in height. The hoods are arranged in a manner that allows for multiple, independent projects or two separate integrated processes taking up to 64 linear feet of hood space each.

A modern Siemens PCS-7 distributed control system provides state-of-the-art process automation for both facilities. The PCS-7 is the same system used in many commercial production facilities and has full SIL III capabilities and redundancy for process safety needs. MATRIC also utilizes an OSI PI data historian to log process information from the DCS and when your team cannot be present for testing, MATRIC can offer clients secure, remote access to their data in essentially real-time via the data historian and its graphical user interface.

Project Execution

MATRIC has completed a variety of projects in the pilot plant area including flammable, hazardous, and highly reactive chemistries. Some clients start with MATRIC early in a laboratory scale program and the pilot plant is the next progression in development. Other clients have completed much of their own early research and need the facilities and know-how to build a pilot plant capable of validating the technology operating on a continuous or semi-continuous basis. Many of these projects include closed recycles and are scaled to provide the engineering information to design the commercial scale operation. Other clients need a more simple proof of concept run, and some just need market development samples as they progress toward commercialization.

The pilot plant is staffed with technicians with specific knowledge and experience in pilot scale operations and construction methods. The same technicians typically build, operate and maintain the pilot plants, so they have intimate knowledge of every aspect of the plant and offer insight into the pilot plant design. They are supported by a dedicated pilot plant engineering and construction staff who aid in design, procurement, construction and operations management.
Equipment
MATRIC has an inventory of equipment available for client use, but MATRIC personnel can also acquire new or used equipment that we don’t have for the project in order to make sure the plant fits your process and development needs. The following is a list of just some of the equipment that MATRIC has on-site. Most of the listed equipment is installed and ready to operate. Additional equipment is often available in our warehouse including surplus instrumentation, pumps, etc.

80-Gallon Reactor:
Jacketed, stirred tank reactor with a pump around loop and heat exchanger and an overhead distillation column and condenser for use as needed. Capable of running on cooling water, tempered water, steam, or hot oil up to 250°C in batch or continuous mode.

Packed Bed Reactors:
A variety of sizes are available for clients. Two examples are a 2" diameter x 20' long jacketed reactor and a 6" x 22' long adiabatic reactor. MATRIC can also have custom sized reactors readily made based on your space velocity and dimensional needs. This can be done for new projects as needed, at relatively low cost.

Molten Salt Reactor:
MATRIC has a MAN Diesel & Turbo molten salt, tubular reactor with three independent salt zones for temperature control. Designed to operate one tube at a time, the reactor has six different sized tubes and a 24 point thermocouple for thorough studies of temperature profiles.

Smaller Stirred Tank Reactors & Crystallizers:
MATRIC has a 5-gallon glass lined reactor, a 10-gallon Hastelloy reactor, and a set of 15L, 30L & 50L glass crystallizers / reactors available.

Separations
MATRIC has a large inventory of glass Oldershaw columns and readily available steel packed columns for distillation, absorption, stripping, etc., a number of which are usually ready for client use. A 4.8 sq. ft., Hastelloy wiped film evaporator is available for use for short residence time applications. MATRIC also has a 2" diameter Karr column for liquid-liquid extraction, and a variety of crystallization equipment.

Utilities
The pilot plant building has house utilities comparable to most chemical manufacturing facilities. Utilities include cryogenic quality nitrogen, process water, deionized water, reverse osmosis water, plant air, electricity (120V, 240V & 480V), hot oil, and house steam (100 psig and 30 psig). Additionally, MATRIC has equipment such as steam generators, chillers, vacuum pumps, etc. to supplement our utility services where the conditions are outside of our normal house-supplied capabilities.

Environmental Services
The pilot plant is equipped to handle gaseous emissions via a flare, in-process scrubbers, or a small thermal oxidizer. The air permit is setup to provide the flexibility needed for R&D projects and typically will not require revision or resubmission for new projects. The plant has a wastewater permit with ties to an industrial/municipal wastewater treatment plant. MATRIC also has a good relationship with a qualified hazardous waste contractor.