
LEED™ CERTIFICATION

Case Study



Systecon's facility for certified flow, TDH and kW performance testing.

| <i>Systecon Flow Test Stand</i> | | |
|--|-----------------------------|---------------------------|
| System Flow (GPM) | System DP (Feet) | System KW (KW) |
| 900 | 30.0 | 65.3 |

Systecon Inc. has a fully certified testing facility for LEED™ certification. All flow meters, kW meters, pressure gauges and tachometers are independently certified annually. This allows the Consulting Engineer to verify his pumping system performance, and satisfy the commissioning requirements of the LEED™ certification program.

LEED™ (Leadership in Energy and Environmental Design) Certification is a standard that has been applied to various construction projects in the last few years. The LEED™ program is sponsored by the US Green Building Council, which is a coalition of leaders in the construction industry that promote building designs that are environmentally responsible, innovative and energy efficient.

The LEED™ Certification program is a voluntary set of standards for developing energy efficient, sustainable buildings. LEED™ was created to do the following.

- Establish a common standard for “green building” design.
- Promote integrated design techniques for the entire building and its systems.
- Raise the consumer awareness of the benefits of “green buildings”.

LEED™ has a credit rating system that evaluates the complete building performance. All areas of construction are targeted in this rating system. The six major areas are: sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality and innovation and design process. Each of these six areas address various issues, such as storm water management, water use reduction, alternative transportation, optimizing energy performance, content of recycled materials, ventilation effectiveness, commissioning and measurement and verification of energy performance. There are various levels of certification for the program, ranging from certified to platinum.

The intent of the LEED™ certification program is to use technologies and design strategies that are innovative, energy efficient and sustainable. The Systecon pumping package is ideally suited for LEED™ projects. The custom factory assembled pumping package is designed to minimize energy consumption. Systecon’s quality control procedures and factory testing reduce onsite commissioning and validate the performance of the complete pumping system before it ships. Systecon’s control system optimizes the performance of the pumping system by measuring and evaluating the power consumption (kW). The kW of the pumping package can be used by the building management system to determine total power consumption of the hydraulic system.

The three areas where Systecon has an impact on projects trying to obtain LEED™ certification are:

- Optimizing Energy Performance
- Commissioning
- Measurement and Verification

Optimizing Energy Performance

The minimum energy performance requirements for the LEED™ certification program must comply with ASHRAE Standard 90.1 or the local energy code, whichever is more stringent. LEED™ points can be obtained by optimizing the energy performance of the building above and beyond the requirements of ASHRAE Standard 90.1. Depending if it is a new or existing building, LEED™ points can be obtained by reducing energy consumption of the HVAC, lighting, and hot water heating systems by 5 to 60 percent.

Systecon pumping packages are designed to minimize pumping energy. Systecon's Wire to Water Efficiency, pioneered almost twenty years ago, is a control strategy that analyzes the efficiency of the entire pumping system. The efficiencies of the pumps, motors and drives are evaluated. In addition, the kW of the pumping package is also measured. All of this information is compiled and evaluated at least two times per second to determine the optimum operating point of the pumping system. The Wire to Water controls continually evaluates all of this pertinent information to make intelligent pump staging decisions to increase system efficiency and reduce system energy.

The reduction in pumping energy from a Systecon package and its impact on the other major equipment such as chillers, boilers and cooling towers increases the potential for obtaining LEED™ points. The Wire to Water report and an energy analysis (see below) can be provided to the design engineer to allow him to determine the potential energy savings of a Systecon pumping package versus a traditional field built pumping system. Systecon's other technologies, such as VariPrime variable flow technologies, may further enhance LEED™ certification.

Energy Analysis Report Used for Comparing Energy Usage of Different Systems

| System GPM | Hours | Primary Pumps | | Secondary Pumps | | Variprime System | |
|---------------|---------|---------------|-------------|-----------------|-------------|------------------|-------------|
| | | C.S. KW | C.S. KWH | V.S. KW* | V.S. KWH | V.S. KW* | V.S. KWH |
| 154.3 | 297.84 | 5.82 | 1732.1 | 1.40 | 417.0 | 2.70 | 804.2 |
| 308.6 | 586.92 | 5.82 | 3413.3 | 2.80 | 1643.4 | 3.20 | 1878.1 |
| 462.9 | 1051.20 | 11.63 | 12226.7 | 4.50 | 4730.4 | 5.20 | 5466.2 |
| 617.2 | 1585.56 | 11.63 | 18441.9 | 6.70 | 10623.3 | 7.90 | 12525.9 |
| 771.5 | 1690.68 | 11.63 | 19664.5 | 9.50 | 16061.5 | 11.40 | 19273.8 |
| 925.8 | 1568.04 | 17.45 | 27357.2 | 12.80 | 20070.9 | 15.90 | 24931.8 |
| 1080.1 | 989.88 | 17.45 | 17270.2 | 17.10 | 16926.9 | 21.70 | 21480.4 |
| 1234.4 | 613.20 | 17.45 | 10698.3 | 22.70 | 13919.6 | 29.30 | 17966.8 |
| 1388.7 | 306.60 | 17.45 | 5349.2 | 29.50 | 9044.7 | 38.60 | 11834.8 |
| 1543 | 70.08 | 17.45 | 1222.7 | 37.30 | 2614.0 | 49.40 | 3462.0 |

8760
Total Hrs./Yr.

117,376
Total C.S. KWH

96,052
Total V.S. KWH

119,624
Total V.S. KWH

Percentage kW Savings: 43.95%

Commissioning

The minimum commissioning requirements for the LEED™ certification program must ensure that the fundamental building systems are designed, installed and calibrated to operate as intended.

The Systecon pumping package is a custom designed pumping system specific for the particular application. This allows the engineer and owner to have a pumping system that is manufactured and tested exactly as designed. All individual components, package configuration, design approach and system performance are in place for the entire design, construction and commissioning process. Systecon's factory performance testing and extensive quality control (QC) program have an impact on the field commissioning required for LEED™ certification. The factory flow test validates the performance of the pumping system that was predicted during the design process. The total performance of the pumping system, including flow, head and kW, has been verified before the package ships from the factory. Additionally, the Systecon QC program also verifies the operation of the pumping system. All control sequences such as pump staging, valve operation, chiller sequencing and failure modes are reviewed and verified. This factory testing reduces onsite commissioning.

Measurement and Verification

The intent of the Measurement and Verification section of the LEED™ guidelines is to provide for the ongoing accountability and optimization of the building energy and water consumption performance over time. One additional LEED™ point can be obtained in this section. The requirements are such that continuous metering equipment shall be installed for lighting, motor loads, chiller and boiler efficiencies, VFD operation, etc.

The controls of a Systecon pumping package continually monitor the kW of all of the pumps. The SCRIPT control system allows for this information to be shared with the building management system through a serial connection (ModBus, BACnet, etc. protocols). The Systecon pumping package can send pumping kW information to the building management system for trending. Therefore, Systecon provides a means for the building management system to continuously monitor the energy of the pumping system over time. A Systecon pumping package can help ensure that the LEED™ point under this section is secured.

The LEED™ certification program is becoming much more prevalent, particularly with government and institutional type projects. A Systecon pumping package is an innovative product that falls in line with the intent of the guidelines set forth by the US Green Building Council's LEED™ certification program.

LEED™ and SYSTECON – A PERFECT MATCH