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News You Can Use…

Aluminum Cable

Aluminum cable that is properly terminated and sized per the NEC is not the 'stuff of legend' from the 50's and 60's. During those decades, aluminum cable was used, abused and misused for service conductors and branch circuit conductors. The biggest single issue with aluminum is the need to properly torque the initial installation and subsequently re-torque all the connections that were made initially. This means that every connection with an aluminum conductor under a screw, such as a receptacle, must be re-torqued annually. There are two reasons for this requirement. First, aluminum conductors under brass and steel - dissimilar metals cause corrosion and increased resistance to current flow - this creates heat. Secondly, aluminum tends to shrink and creep. This means the conductor under the lug gets further away from the metal and then electricity has a tendency to arc across the space, resulting in a possible fire.

With the price of copper being so volatile and a tough economic climate, a proposal to substitute aluminum cable for the copper cable specified for the secondary conductors is not unexpected. Hopefully, the savings realized by using aluminum would be to the owner's benefit. While the use of properly terminated aluminum cable poses no safety or maintenance issues, and the approval of aluminum cable is a conditional one, the following list of conditions must be adhered to: 1. Aluminum cable shall be used only for the secondary conductors from the utility company transformer to the lugs on the main circuit breaker, 2. Aluminum cable shall be sized per the appropriate table in the NEC for ampacity, 3. Conduit shall be sized for the proposed aluminum conductors, 4. The aluminum conductors shall be terminated, at both ends, with "ILSCO brand, CPM series", or approved equal, compression fittings. These compression fittings terminate the aluminum conductors with a copper pigtail which then is landed on the equipment lugs.

Dartmouth Hitchcock Medical Center
Platelet Production Lab
Lebanon, New Hampshire
Architect: Fleck and Lewis Architects

The scope of work for this project was to renovate 1,400 sf of existing lab space to create a new, cleanroom lab suite and support areas. Included in the completed suite were a Class 100,000 cleanroom, gowning vestibule, prep-lab space, wet lab, support and office space. The space was located within the existing Dartmouth Medical School laboratory building on the Dartmouth Hitchcock Medical Center Campus. The renovations called for HVAC, plumbing, fire protection and electrical upgrades.

The project posed a number of design and construction challenges. The existing building is a fully functioning research laboratory and the surrounding areas needed to remain operating as normal during the course of the renovation. Although the existing building systems were in good operating condition, the 24/7 nature of a research facility necessitated careful investigation of building systems and design of system modifications to limit interruption of critical building services.

The HVAC system within the lab consists of new constant-air-volume (CAV) terminals, provided with hot water re-heat coils, dedicated to each lab area, and re-circulating HEPA fan-powered re-circulating filter diffusers. The CAVs deliver fresh air via the existing medium-pressure building supply air system, while the HEPA diffusers serve to filter room air in compliance with air change requirements. New exhaust CAV terminals were provided to control the pressure differential between the lab spaces and the building in general. The existing building DDC system was extended to provide precise control over the lab HVAC equipment.

The plumbing design provided new, laboratory-grade plumbing fixtures throughout. Emergency showers and eyewashes were provided and served with tempered water. In addition to traditional wall mounted gas turrets, a custom ceiling panel was provided with outlets for laboratory grade vacuum and compressed air. The existing fire protection system was modified to provide sprinkler protection throughout the renovated area, with particular attention to coordinating sprinklers heads so as not to be obstructed by densely located lab equipment.

The electrical design consisted of new normal and emergency power services to the lab suite, with careful coordination required for all the specialty lab equipment. New power for the space was obtained from the existing electrical distribution system. High-efficiency light fixtures were used to provide the high light levels required for the space. The specified fixtures were specialty, gasketed, cleanroom fixtures to maintain the integrity of the cleanroom ceiling. The design also included a cleanroom suitable intercom system in addition to the typical low voltage system needs for telephone and data.

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Rutland Regional Medical Center
Infrastructure Master Plan
Rutland, Vermont
Architect: Lavallee Brensinger Architects

The scope of this project was to evaluate the HVAC, plumbing, fire protection and electrical systems infrastructure for a 420,000 sf hospital that provides acute medical care services to the community.

Our solution included reviewing all engineering systems: mechanical, electrical, plumbing and fire protection. The work began with an identification of primary systems to be evaluated. This effort included the gathering of all available system drawings, schematics and reports, interviews with facility staff and personnel, and thorough site visits and walkthroughs. This large volume of information was compiled into several abbreviated drawings, schematics and charts to summarize the systems to be evaluated. The report included an executive summary with recommended projects. The recommendations were organized by building for prioritization within the five year Infrastructure Plan.

A five year master plan typically incorporates the infrastructure assessment results as an aid to planning and budgeting. Knowing that certain system deficiencies will exist for a year or two, but will be eliminated with a project in year three, helps the staff plan and efficiently utilize facility resources.

A full evaluation of a hospital's infrastructure systems gives a facility an unmatched understanding of current operations. This understanding can be used by the health care system to more efficiently plan, train and budget. This improved efficiency equates directly into dollar savings and lower operating costs.

Faulkner Hospital
Taiclet Family Center
Boston, Massachusetts
Client: Partners HealthCare

In an economy where project funding can be limited, renovation of building spaces has generally been the most cost effective approach for owners, with the goals of providing newer and more efficient building systems technologies in an aesthetically pleasing environment. The challenges of such designs often include interfacing new technologies with older designs. These hybrid systems offer increased energy efficiency without the cost of a complete gut and new system.

The Faulkner Hospital Taiclet Family Center, comprising 2,000 square feet, is an example of joining old with new. Family is often an integral part of the healing process and as such newer medical building designs focus not just on the care and comfort of the patient, but the patient's family as well. The intent of the space is to serve as a consultation area between family and hospital staff while providing a comfortable waiting area. Services such as copy machines, computers with internet access and television will be provided for occupant use. Hospital staff will also be able to inform family and friends of updates on a patient's status during procedures.

The new design included conversion of an existing constant volume system with local reheat coils to new variable-air-volume (VAV) boxes with perimeter radiation. New DDC controls connected to the building management system provide individual room temperature control for greater comfort. Dedicated exhaust systems for waiting areas ensured any germs introduced to the environment were directly exhausted to the outdoors instead of being sent back to the air handling units. A new exhaust fan dedicated to the bathrooms ensured ventilation requirements were brought up to code for increased indoor air quality.

The lighting was designed around a modular ceiling grid with linear recessed fixtures for the waiting areas and recessed down lighting for the consultation room and waiting entry areas. Occupancy sensors and dimmable ballast offer reduced energy costs of periods of low occupancy.

"By creating surroundings that are calming, providing access to information and allowing for comfortable waiting spaces, stress can be reduced and our patients' ability to cope with their medical situation can be increased," says David Trull, President of Faulkner Hospital. the local Authority Having Jurisdiction. The fire alarm system in the renovated area was extended to the existing Medical Center fire alarm system.