Certified Mission Critical Operator

Candidate Handbook
2019

Introduction

About Global Skills Exchange

As a nationally recognized developer of skills standards and measurement tools, Global Skills Exchange (GSX) bridges the gap between learning and work. Skills standards establish the knowledge, skills, and abilities required to perform successfully in a given role. When used as measures, these skills standards provide the means to determine if an individual has met established industry criteria and provide proof of competence of complex work roles. Our expertise in this area assures that individuals who successfully meet these standards are qualified for key job roles and that employers are able to easily identify qualified professionals.

About CMCO

The Certified Mission Critical Operator (CMCO) program, developed by data center experts and administered by GSX, ensures certified individuals meet industry standards for operations job roles. The CMCO designation provides hiring managers the assurance that successful candidates have the knowledge to perform foundational-level operational tasks within a mission critical data center environment.

The CMCO assessment measures acceptable performance across seven (7) domains:

1.0 Mission Critical Infrastructure
2.0 Safety, Security, and Emergency Response
3.0 Critical Productions Space
4.0 Facility and System Documentation
5.0 Networking and Communications
6.0 Real-Time Information Management
7.0 Operations and Procedures

The full CMCO assessment blueprint can be found in Appendix A.

Benefits

Benefits of obtaining the CMCO credential include:

For individuals:

- Measures your understanding and ability to apply the facts, concepts, and principles of mission critical operator tasks.
- Promotes professional development which will enhance your expertise in the mission critical operator field.
- Increases the number of employment opportunities available to you across the mission critical field.
- Provides you with a sense of pride and professional accomplishment.
- Demonstrates your commitment to the profession.

For employers:

- Provides a reference point for determining which individuals possess the appropriate understanding and ability to apply the facts, concepts, and principles of mission critical functions.
- Promotes the improved synchronization and alignment of individual capabilities with the mission critical profession.
- Serves as an easy identifier for competent professionals within the mission critical discipline.

For the profession:

- Defines standards and drives accountability for all mission critical professionals.
- Documents the mission critical operator essential body of knowledge (EBK) as the professional standard.
- Ensures all mission critical operator professionals have met the established standard through a formal standardized evaluation.
- Establishes an entry point for individuals wishing to pursue a career in the field.
- Supports continuing competence of certificants through recertification every three years.

Eligibility Requirements

The CMCO credential is open to any individual seeking to obtain the Mission Critical Operator Certification. However, it is recommended that an individual have one (1) year of formal training or hands-on experience.

How to Register

Individuals interested in obtaining the CMCO credential must first register for the program, then select and book a specific Pearson VUE testing session. Registration is completed online at mc-gsx.learningbuilder.com. Individuals will be asked to complete a short demographic survey, then review and electronically sign an agreement regarding the security and confidentiality of the CMCO assessment content. The testing fee will be collected by Pearson VUE upon registration. Individuals will have a window of one (1) year to schedule the CMCO assessment before their Pearson VUE registration expires; if it is allowed to expire, the individual will be required to pay the testing fee again.

Assessment Fees

Assessment fees are non-refundable fees paid to take the CMCO assessment. The fee is required every time you take the assessment. For specific rates, please see the table below:

Candidate Type	Registration Fee
Non-Government, Non-Student	$250
Government	$190
Students	$125

Discounts are available for organizations who want to buy vouchers in bulk for their employees. For more information please go to our website (http://mccerts.com/) or contact GSX (cmco@skillsdmo.com or 703.662.9830).

Test Accommodations

For more information regarding physical or language accommodations, please visit the Pearson VUE Test Accommodations page, Test Accommodations. Additional fees may apply for test accommodations; please contact GSX for more information.

Candidate Agreement

As part of the assessment, candidates are required to read and agree to GSX's Candidate Agreement. GSX's Candidate Agreement states that candidates will not share assessment content or any related information with anyone, at any time. The Candidate Agreement must be completed before the individual is allowed to view any assessment material.

Testing Environment

Candidates may not bring any of the following items into the test center:

- Smartphones/Cell phones
- Laptops
- Hand-held computers or personal electronic devices, including e-readers, tablets, and smart watches
- Calculators
- Tape recorders
- Pagers
- Notes
- Newspapers
- Books
- Bags
- Hats/Coats
- Purses/wallets

If there is not a designated secure storage area at the test center, candidates may bring the items into the testing room, but the items must be placed in an inaccessible location within the room during the assessment.

Candidates are expected to conduct themselves in a professional manner while in the testing environment. Candidates who do not conduct themselves in such a manner are subject to disciplinary action, which can include dismissal from the test center regardless of the candidate's completion of the assessment.

Test center proctors and administrators are responsible for monitoring candidates during the administration of the assessment and providing instructions regarding taking the assessment at the outset of the testing session. Test center proctors and administrators are not allowed to help candidates read or comprehend assessment questions. During the administration of the assessment, candidates are not permitted to talk to anyone other than a proctor or administrator.

Non-Discrimination Policy

The CMCO program does not discriminate on the basis of race, color, national origin, sex (including pregnancy or childbirth), religion, age (40 or over), disability (physical or mental), sexual orientation, marital status, parental status, political affiliation, genetic information, or retaliate for participating in protected activities. The CMCO program complies with all applicable jurisdictional laws and regulations related to protection against discrimination in access to CMCO. Additionally, CMCO procedures ensure that all applicants and candidates are treated in an equitable and consistent manner throughout the entire certification process. The eligibility requirements, assessment instrument content, assessment environment, scoring method, maintenance process, and recertification process provide for a fair, impartial, and bias-free certification program.

Scoring the Assessment

The CMCO assessment is electronically scored and a single overall score is computed. Candidates must earn a score equal to or higher than the pre-determined cut-score to pass the assessment. A score report is automatically generated upon completion of the assessment which includes a pass/did not pass result, as well as a summary of performance in each of the seven (7) domains covered in the assessment. Candidates scores will be displayed in a graph format that shows how they performed in each area in comparison to other candidates who have completed the CMCO assessment.

The post assessment scores provided are *scaled scores*. A *scaled score* is the total number of correctly answered questions converted into a standardized scale. For the CMCO assessment, the score is based on a scale ranging from 100 to 800 with the passing threshold of 650.

Sample Questions

The following sample questions are provided to help familiarize candidates with the type of questions to expect on the CMCO assessment. The questions provided are developed from two (2) of the seven (7) CMCO assessment domains. Each item below only has one (1) correct answer.

S1. Which of the following cable types featured multiple twisted-pair copper conductors?

A. Power cord
B. CAT6a
C. Coaxial
D. Fiber

S2. Which of the following explains why battery monitoring is performed?

A. To check for proper orientation
B. To identify pending failures
C. To control float voltage
D. To monitor for leaks

Answers: S1-B, S2-B

Digital Badges

Digital badges will be issued to signify the CMCO credential. Candidates will receive access to their CMCO digital badge three to five (3-5) business days after meeting the CMCO assessment requirements. Information on how to access and use the digital badge will be provided in an email sent to the certificant. Digital badges are tokens that appear as icons or logos on a web page or other online venue signifying accomplishments, such a certification or mastery of a skill. GSX will maintain a record of the digital badge with certificant metadata. This metadata includes:

- The issuer's name (i.e., CMCO);
- The certificant's name and e-mail address;
- A short description of the badge; and
- Other details, such as the issue date and the expiration date.

Digital badges are viewable by the certificant and those to whom the certificant provides his/her unique badge URL. The badge serves as proof that the certificant met all of the CMCO program requirements.

GSX will maintain a registry of all certificants who have met the CMCO requirements. Confirmation of an individual's CMCO status (as Active or Inactive) will be provided to interested parties upon request, but an individual's score will not be provided.

Use of CMCO Credentials

Certificants are authorized to use the designation "CMCO" or "Certified Mission Critical Operator" once they have received their CMCO digital badge. Certificants may use this credential on business cards, resumes, and signature lines. This designation signifies that they have met the requirements for the Certified Mission Critical Operator Certification. Certificants can use the designation and/or the URL to their BadgeCert page as long as their certification is active. "CMCO" and "Certified Mission Critical Operator" are the only designations approved for use and should appear after a comma following the certificant's name. No other designator and no other usage is approved by GSX.

Examples of correct use:

- Jill A. Smith, CMCO
- Jill A. Smith, Certified Mission Critical Operator

If the certification expires, the certificant will no longer be authorized to use the designation until he or she has recertified. Use of these credentials beyond the authorized period (without

complying with recertification requirements) constitutes unauthorized use of the credential. GSX may also revoke the use of this designation if an individual exhibits signs of misconduct, violation of its policies, or for any reason at any time.

Retesting

A candidate who does not pass the CMCO assessment will be allowed to immediately retest at their convenience. If thecandidate fails the assessment a second time, he/she must wait an additional ninety (90) days to retake the assessment. After the second failed attempt, the candidate must wait ninety (90) days for each additional attempt.

Appeals Policy

After a candidate has received a written notice of violations and applicable sanctions from GSX, they will have thirty (30) calendar days to file a written request for appeal pursuant to GSX Candidate Appeals Process. The candidate is required to file a written request for appeal, along with a statement describing the grounds for the appeal, why the appeal should be granted, and all supporting evidence. A candidate's appeal will not be considered after such thirty (30) calendar day period has expired.

If GSX determines that a written request for appeal is filed in a timely manner and GSX upholds its original decision, such appeal and the information submitted by the candidate will be submitted for binding arbitration to the Candidate Appeals Committee, which consists of voluntary industry peers. Three (3) members of the Candidate Appeals Committee will be appointed to act as an arbitration panel for the appeal. This appeals process shall not address any failures to pass any GSX certification assessment, nor include any challenges to individual assessment questions, answers or failing scores.

The arbitration panel will deliberate and rule on the appeal. The decision of the majority of the members of the arbitration panel present at the hearing for the appeal, at which a quorum is present, will be the decision of such panel. The decision of the arbitration panel is final and binding as to all matters related to the appeal.

Code of Ethics

The Certified Mission Critical Operator (CMCO) Candidate Code of Ethics Policy (“Code of Ethics”) applies to those seeking affiliate with the CMCO program. This Code of Ethics is a requirement for:

- Individuals who register for the CMCO certification,
- Individuals who obtain the CMCO certification, and
- Individuals who wish to maintain the CMCO certification.

It is a violation of the Code of Ethics Policy for any candidate to participate in any incident of cheating, breach of security, misconduct, submission of fraudulent information, or any other behavior that could be considered compromising the integrity or confidentiality of the CMCO assessment. All candidates will adhere to the following:

Candidate Code of Ethics Policy

- All information submitted to participate in the CMCO program must have been completed by the participating candidate.
- A candidate shall abide by all the terms and conditions set forth in the CMCO Non-Disclosure Agreement (NDA).
- A candidate shall offer and provide professional services with integrity.
- A candidate shall not disclose any confidential client information without the specific consent of the client.
- A candidate will always conduct themselves in a manner which enhances the image of the profession.
- A candidate shall provide services to clients competently and maintain the necessary knowledge and skill to continue to do so in those areas in which they are certified.
- A candidate shall not solicit clients through false or misleading communications or advertisements.
- In the course of performing professional activities, a candidate shall not engage in conduct involving dishonesty, fraud, deceit or misrepresentation, or knowingly make a false or misleading statement to a client, employer, employee, professional colleague, governmental or other regulatory body or official, or any other person or entity.

Contact

For more information please contact us at:

Email: cmco@skillsdmo.com
Phone: 703.662.9830
www.MCCerts.com

Appendix A: Assessment Blueprint

The table below lists the domains measured and the extent to which they are represented in the assessment. Certified Mission Critical Operator (CMCO) assessment are based on these objectives.

Domain	% of Assessment
1.0 Mission Critical Infrastructure	21%
2.0 Safety, Security, and Emergency Response	14%
3.0 Critical Production Space	14%
4.0 Facility and System Documentation	12%
5.0 Networking and Communications	5%
6.0 Real-Time Information Management	17%
7.0 Operations and Procedures	17%
Total:	**100%**

1.0 Mission Critical Infrastructure

1.1 Compare and contrast various types of HVAC systems.

- Refrigerant-based cooling system
    - Air cooled chiller
    - Water cooled chiller
    - Direct Expansion (DX)
    - Pump refrigerant
- Water-based cooling system
    - Pumping systems
        - Primary/secondary
        - Variable primary
    - Cooling tower
    - Heat exchanger
    - Thermal storage
- Alternative technologies
    - Thermal wheel cooling
    - Free-air cooling
        - Air side economization
    - Geo-thermal cooling
    - Evaporative cooling
- 100 percent (%) fresh air technology
    - Exhaust methodology
- Fan systems
- Air handling unit
    - Dedicated outdoor air handling unit
    - Rooftop unit
- Terminal devices

    - Fan Powered Terminal Units
    - Variable Air Volume

1.2 Summarize various power source technologies.

- Utility
    - Multiple source / multiple feed
    - Low vs. medium voltage systems
    - Switching / fail over
- Generator
    - Standby vs. continuous vs. prime ratings
    - Fuel type
        - Fuel oil
        - Natural gas
    - Automatic transfer switch
    - Paralleling switchgear
- Uninterruptible Power Supply (UPS)
    - Double conversion
    - Line interactive
    - Delta conversion
    - Rotary UPS
    - Diesel Rotary UPS
    - Flywheel
    - Load bus synchronization
- Battery
    - Lithium
    - Lead Acid
        - Flooded wet-cell
        - Valve Regulated Lead Acid (VRLA)
    - Nickel Cadmium (NiCad)
- Alternative power sources
    - Fuel cells
    - Solar panels
    - Wind
    - Co-generation
    - Super capacitor

1.3 Compare and contrast various power distribution concepts and equipment.

- Level of redundancy
    - N
    - N+1
    - 2N
    - 2(N+1)
- Dual cord

- Close transition vs. open transition vs. soft loading
    - Static transfer switch
    - Automatic transfer switch
    - Breaker pairs
    - Soft loading closed transition switch
- Tier level/Topology
    - Tier I (Basic)
    - Tier II (Redundancy)
    - Tier III (Concurrent maintainability)
    - Tier IV (Fault tolerance)
- Electrical protection
    - Grounding
    - Over current
    - Protective relays
    - Surge protection / Transient Voltage Surge Suppressor (TVSS)
    - Lightning protection
    - Arc flash protection
    - Zone selective interlock

1.4 Identify basic plumbing concepts and the relationship to core mechanical systems.

- Water treatment
    - Blow down
- Humidification
- Water source
    - Municipal
    - Water storage
    - Reclamation
    - Well
- Floor drains
    - Trap primers
- Make up water
- Water pumps / pressurization
- Natural gas piping
- Backflow preventer
- Filtration

1.5 Explain life safety system elements, their purposes and impact on normal operations.

- Fire detection
    - Fire alarm
    - High sensitivity smoke detection
    - Smoke and heat detection
    - Flame/flash detection
    - Fire alarm control panel

        - Beam detector
            - Laser
- Fire suppression
    - Sprinklers
        - Wet pipe
        - Drypipe
        - Mist
        - Fog
    - Pre-action
        - Double interlock
        - Single interlock
    - Clean agent
    - Fire extinguishers and types
    - Foam system
- Fire-rated construction
    - Walls
    - Doors
    - Dampers
    - Shutters
    - Penetrations
- Fire pump system
    - Jockey pumps
    - Primary pumps
    - Secondary pumps
    - Transfer switch/controls
- Emergency lighting
- Emergency receptacle identification
- Emergency Power Off (EPO)

2.0 Safety, Security, and Emergency Response

2.1 Given a scenario, implement proper safety techniques in a mission critical environment.

- Personal Protective Equipment (PPE)
- Lock out/Tag out
- Barrier/boundaries
- Machine guarding
- Fall protection and arrest
- Arc flash labels and hazard analysis
- Global Harmonization System
- Confined space access and ventilation

2.2 Given a scenario, execute security methods and best practices.

- Physical security

    - Gates
    - Vehicle barriers
    - Locked doors
    - Special industry classifications
        - Penetrations
        - Access Control Vestibule (e.g. mantrap)
        - Intrusion detection
    - Intercom or radio system
    - Video surveillance
- Access control systems
    - Biometrics
    - Card readers
    - Keypad
    - Key lock

2.3 Identify basic emergency response procedures.

- Incident reporting
- Call tree
- Building or critical area emergency action plan
    - Mass notification methods
- Hazardous material spill procedure
    - Refrigerant leak
    - Fuel leak
    - Battery electrolyte leak
- Severe event preparation and reporting
    - Inclement weather event
    - Internal/external site event
    - National/Regional event
    - Natural disaster

3.0 Critical Production Space

3.1 Explain the importance of common items and best practices that affect various critical environments.

- Component redundancy within the critical space
- Raised access floor
    - Loading
    - Bridging
    - Ramps
- Rack layout/installation
    - Power cabling
        - Labeling
    - Rack power distribution
    - Rack placement

    - Rack cooling
- Best practices
    - Blanking panels
    - Ensure integrity of space
        - Return air plenum
        - Supply air plenum
        - Room envelope
    - Cleanliness
        - Dust
        - Cardboard
        - Pallets
    - Power load balancing
        - Phase balance
        - Redundancy balance
- Alternative technologies
    - Fluid cooled processors
    - Direct Current (DC) power
    - Alternate voltages
    - Compact server cabinets (all-in-one)
- Grounding
    - Signal reference ground grid system
    - Rack grounding
    - Cable tray grounding and bonding
    - Master ground bus bar

3.2 Explain air flow management techniques and strategies.

- Computer room air conditioners / computer room air handler unit
- In-row cooling
- Containment
- Perforated tile placement
- Tile removal limitations
- Return air methodologies
- Hot aisle/cold aisle
- Thermal considerations
- Temperature / pressure control strategies

3.3 Summarize data cable management techniques and cable types.

- Types
    - Fiber
    - Copper
        - Coaxial
        - Category 3 (CAT3)
        - Category 5e (CAT5e)

        - Category 6a (CAT6a)
- Labeling
- Bend radius limitations
- Cable segregation
    - Power, data and fiber
- Cable dressing and placement
- Cable tracing and testing

4.0 Facility and System Documentation

4.1 Compare and contrast various types of record documentation ("as-built").

- Single line diagram / One line diagram
    - Electrical
    - Mechanical
    - Plumbing
    - Fire protection
- Panel schedules
- Submittals
- Flow diagrams
- Floor plans
- Equipment layout plans
- Equipment schedules
- System architecture diagrams
    - Networking
    - Building Management System (BMS)/ Building Automation System (BAS)/ Supervisory Control and Data Acquisition (SCADA)
- Control diagrams
- Design specifications

4.2 Interpret and explain the contents of various operating and maintenance (O&M) manuals and their associated purpose.

- Shop drawings
- Sequence of operations
- Warranty information
- Seasonal operation
- Preventative maintenance procedures and schedules
- Maintenance procedures
- Troubleshooting procedures

4.3 Identify the contents and purpose of testing reports.

- Commissioning reports
    - Electrical testing reports
        - InterNational Electrical Testing Association (NETA)

    - Functional Performance Testing
    - Integrated System Testing
- Short circuit, protective device coordination, arc flash study
- Testing, adjusting and balancing reports

5.0 Networking and Communications

5.1 Identify basic networking concepts.

- Basic IP address concepts
    - Private vs. public
    - Numbering schemes
- Domain Naming Service (DNS) concepts
- Network types
    - Corporate networks
    - Building management networks
    - Special purpose networks
        - Supervisory Control and Data Acquisition (SCADA) transmission networks
        - Fire system network
        - Programmable Logic Controller (PLC) / Direct Digital Control (DDC) control networks

5.2 Identify essential networking structures and their purpose.

- Components
    - Router/switch
    - Patch panel
- Locations
    - Manhole / duct bank
    - Service entrance / demarcation point (demarc)
    - Communication room / service closet
    - Main Distribution Frame (MDF) / Intermediate Distribution Frame (IDF)

5.3 Identify various types of communications systems.

- Wired systems
    - Plain Old Telephone Service (POTS)
    - Private Branch Exchange (PBX)
- Wireless systems
    - Radio system
    - Microwave
    - Satellite
    - Cellular
        - Distributed Antenna System (DAS)
    - Wireless Fidelity (Wi-Fi)
        - Wireless Access Point (WAP)

6.0 Real-Time Information Management

6.1 Explain the fundamentals of environmental and system monitoring.

- Critical production environmental conditions
    - Static pressure
    - Humidity
    - Temperature
    - Air flow
- Systems and equipment parameters
    - Water flow
    - Leak detection
    - Moisture detection
    - Indoor air quality
    - Hydrogen concentration
    - Outdoor ambient environment
    - Weather station
    - Corrosion monitoring
    - Battery monitoring
- Metering
    - Power
        - Utility / generator power
        - Conditioned power
        - Branch circuit power
        - Power Distribution Unit (PDU)
            - Floor (Transformer)
            - Remote Power Panel (RPP)
            - Rack/ Cabinet Distribution Unit (CDU)
        - Outlet
    - Water levels
        - Cooling tower basin
        - Make-up water storage
        - Water treatment/chemical levels
    - Fuel
        - Fuel level
        - Fuel quality
    - Gasses
        - Compressed air
        - Nitrogen
        - Medical gas
        - Natural gas
    - Process variables
        - Temperature

        - Pressure
        - Differential Pressure
        - Flow

6.2 Identify common engineering units and conventions.

- Power
    - Kilo-Volt-Ampere (KVA) / Kilowatt (KW)
    - Power factor
    - Power Usage Effectiveness (PUE) / Data center Infrastructure Efficiency (DCIE)
    - Voltage/Current/Frequency
        - Medium vs. low voltages
        - Three phase vs. single phase
        - Alternating Current (AC) vs. Direct Current (DC)
        - Three wire vs. four wire
    - Power density
- Cooling and air flow
    - Ton
    - British Thermal Unit (BTU) / Kilowatt (KW)
    - Gallons per Minute (GPM) / Liters per Minute (LPM)
    - Cubic feet per Minute (CFM)
    - Celsius/ Fahrenheit
    - Head pressure
        - Pounds per Square Inch (PSI)
    - Inches of water column
    - Sensible and latent heat
        - Wet/dry bulb temperature
    - Relative and absolute humidity/dew point
    - Approach temperature
- General measurements
    - Pounds per square foot
    - Pounds per linear foot
    - Loading requirements
    - Torque
        - Foot – pounds
    - Sound / noise
        - Decibels

6.3 Explain common monitoring platforms and controls.

- Platforms
    - Building Management System (BMS) / Building Automation System (BAS)
    - Electrical Power Monitoring System (EPMS)
    - Supervisory Control and Data Acquisition (SCADA)
    - Programmable Logic Controller (PLC)

    - Human Machine Interface (HMI)
    - Meters, gauges and relays
    - Local control systems
- Controls
    - Adjust set point
    - Equipment status
    - On/off schedule
    - Alarm thresholds and reset
- Process control devices
    - Variable Frequency Drive
    - Thermostat
    - Actuator
    - Variable Air Volume
    - Control valves

6.4 Interpret output from system and monitoring reports and explain the overall impact of these reports on a mission critical environment.

- Normal state vs. abnormal state
- Alarm condition
- Trending
- Predictive results
- Mitigate risks/failures
- Integration of information across multiple systems to provide overall status
- Effects of local failures on other mission critical systems
- Verify corrective actions

7.0 Operations and Procedures

7.1 Given a scenario, execute proper change management procedures.

- Restricted change periods / blackout dates
- Maintenance windows
- Switching windows / cutover windows
- Methods of procedures
    - Dry run / testing
    - Switch tag
    - Back-out / contingency plan
    - Tool / materials inventory
    - Pre / post change documentation
- Permit to work / End user approval
- Hot work permit
- Energized work
- Double custody switching (e.g. two person rule)

- Standard Operating Procedure (SOP), Emergency Operating Procedure (EOP) and Preventive Maintenance (PM)

7.2 Explain common organizational structure concepts.

- Chain of command
- Escalation path
- Organizational chart
- Client - contractor relationships
- Vendor management

7.3 Explain the importance of security procedures.

- Authorization procedures
- Site access rules
- Escorting vendors/visitors
- Material shipping/receiving and inspection
- Security patrolling / fire watch
- Confidentiality policies
- Sensitivity of equipment, information, and mission
- Awareness of cyber security best practices

7.4 Identify general and industry specific regulatory, standard and compliance organizations/associations.

- Uptime Institute
- Occupational Safety and Health Administration (OSHA)
- American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
- American National Standards Institute (ANSI)
- Telecommunications Industry Association (TIA)

Appendix B: Acronym List

AC	Alternating Current
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ATS	Automatic Transfer Switch
BAS	Building Automation System
BMS	Building Management System
BTU	British Thermal Unit
CAT3	Category 3
CAT5e	Category 5e
Cat6a	Category 6a
CDU	Cabinet Distribution Unit / Cooling Distribution Unit
CFM	Cubic feet per Minute
CMCO	Certified Mission Critical Operator
COAX	Coaxial
CRAC	Computer Room Air Conditioner
CRAH	Computer Room Air Handler
DAS	Distributed Antenna System
DC	Direct Current
DCIE	Data Center Infrastructure Efficiency
DDC	Direct Digital Control
DNS	Domain Naming Service
DRUPS	Diesel Rotary UPS
DX	Direct Expansion
EOP	Emergency Operating Procedure
EPA	Environmental Protection Agency
EPMS	Electrical Power Monitoring System
EPO	Emergency Power Off
FACP	Fire Alarm Control Panel
FERC	Federal Energy Regulatory Commission
FPTU	Fan Powered Terminal Units
GHS	Global Harmonization System
GPM	Gallons per Minute
GSX	Global Skills Exchange
HHS	Department of Health and Human Services
HIPAA	Health Insurance Portability and Accountability Act
HMI	Human Machine Interface
HSSD	High Sensitivity Smoke Detection
HVAC	Heating Ventilation and Air Conditioning
IAQ	Indoor Air Quality
ICC	International Code Council

IDF	Intermediate Distribution Frame
IP	Internet Protocol
ISA	International Society of Automation
ISO	International Standards Organization
ITIL	Information Technology Infrastructure Library
KVA	Kilo-Volt-Ampere
KW	Kilowatt
LEED	Leadership in Energy and Environmental Design
LPM	Liters per Minute
MDF	Main Distribution Frame
MOP	Method of Procedure
NEC	National Electrical Code
NERC	North American Electric Reliability Corporation
NETA	InterNational Electrical Testing Association
NFPA	National Fire Protection Association
NiCad	Nickel Cadmium
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
P&ID	Process and Instrumentation Diagram
PBX	Private Branch Exchange
PDU	Power Distribution Unit
PLC	Programmable Logic Controller
PM	Preventative Maintenance
POTS	Plain Old Telephone Service
PPE	Personal Protective Equipment
PSI	Pounds per Square Inch
PUE	Power Usage Effectiveness
PV	Pearson Vue
RPP	Remote Power Panel
SCADA	Supervisory Control and Data Acquisition
SOP	Standard Operating Procedure
STS	Static Transfer Switch
TIA	Telecommunications Industry Association
TVSS	Transient Voltage Surge Suppressor
UPS	Uninterruptible Power Supply
USGBC	United States Green Building Council
VAV	Variable Air Volume
VFD	Variable Frequency Drive
VRLA	Valve Regulated Lead Acid
WAP	Wireless Access Point
Wi-Fi	Wireless Fidelity