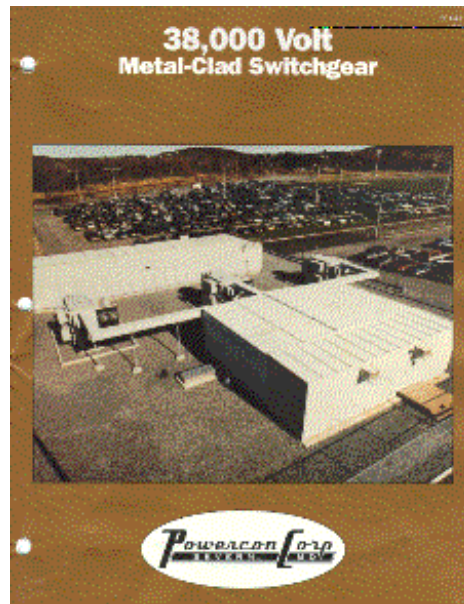


# POWERCON CORPORATION



## 38,000 VOLT METAL-CLAD SWITCHGEAR

### BROCHURE #PC-041

ELECTRONIC VERSION CREATED: 6/30/96

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# Metal-Clad Switchgear

This bulletin describes Metal-Clad Switchgear - one of Powercon's switchgear product lines.

This advanced switchgear line is completely factory built, wired and assembled. Each cubicle may contain the circuit breaker, bus bars, primary and secondary disconnecting devices, instrument transformers, instruments and relays, secondary wiring and other necessary components. The switchgear is designed so that additional circuit breaker or auxiliary cubicles may be added in the future.

## The Circuit Breaker:

- Vacuum interrupters with stored energy operating mechanism
- Primary disconnecting device
- Secondary disconnecting devices
- Auxiliary switches
- Ground contacts
- Control wiring
- Interlocks

In addition to the standard equipment described, custom engineered switchgear is offered to meet individual purchaser needs.

With a highly skilled professional engineering manufacturing team, an organizational entity has been developed to provide the material and services our

customers require. The engineering staff - application product design - development - manufacturing - has achieved the extensive

system experience and knowledge required in the application, manufacture, delivery, and service of Power Systems Switchgear.

This product is the result of seasoned technical efforts combined with the well versed, skilled, competent, veteran work force exerting their combined efforts to provide the best in service and equipment.

Our membership in NEMA, ANSI and IEEE keeps us up to date on the ever changing standards so that we meet today's exacting demands.

From the guidance of highly qualified engineering management focusing its attention on sound imaginative technical practices, has come the creative achievements and flexibility that has given Powercon a worldwide reputation for top quality **switchgear and service**.

The proven performance of Metal-Clad Switchgear with vacuum circuit breakers is attested to by the great numbers of equipments that have seen service.

Technical data such as dimensions, weights, shipping and miscellaneous information is available upon request from Powercon's sales department.

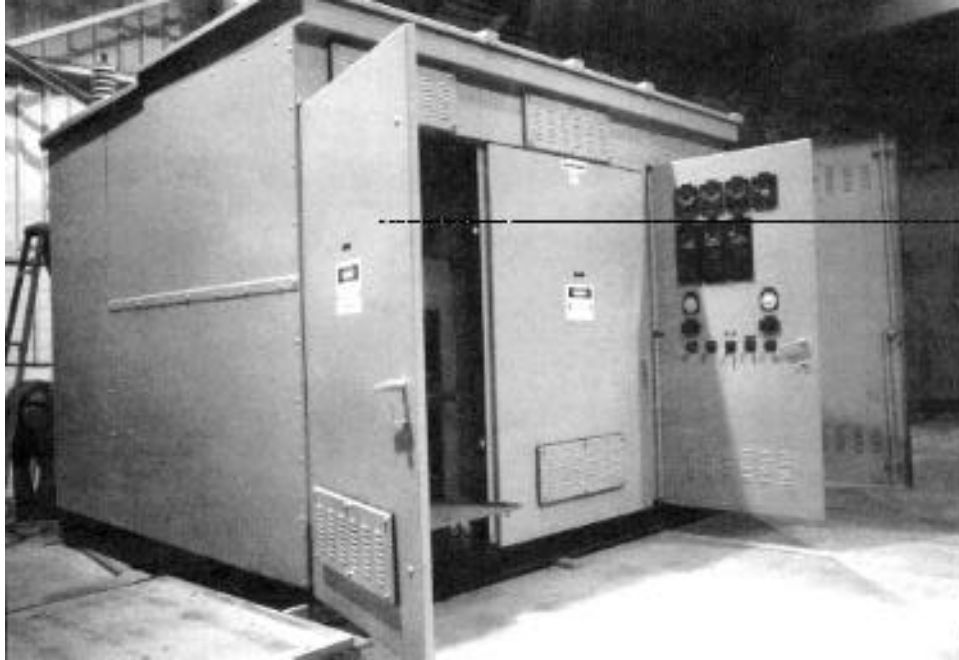
Powercon reserves the right to make such changes finds necessary.

(For Guide Specifications - See Publication PC-029)

**Table 1 - Applicable Industry Standards**

American National Standards Institute (ANSI) 70 East 40th Street New York, New York 10017		National Electrical Manufacturers Association (NEMA) 2101 L Street N.W., Suite 300 Washington, D.C. 20037	
Standard No	Description	Standard No.	Description
C37.04	CA High-Voltage Circuit Breaker Rating Structure	SG-2	High Voltage Fuses
C37.06	Preferred Ratings of AC High-Voltage Circuit Breakers		
C37.09	Test Procedures for AC High-Voltage Circuit Breakers	SG-4	Power Circuit Breakers
C37.010	Application Guide for AC High-Voltage Circuit Breakers		
C37.11	AC High-Voltage Circuit Breakers Control Requirements	SG-5	Power Switchgear Assemblies
C37.20.2	Switchgear Assemblies and Metal-Enclosed Bus		
C37.100	Definitions of Power Switchgear		

# Metal-Clad Switchgear



**Single Circuit Outdoor with Utility Metering**

Identification	Rated Values								Rated Required Capabilities			
	Voltage		Insulation Level		Current				Current Values			
	Rated Maximum Voltage	Rated Voltage Range Factor	Rated Withstand Test Voltage		Rated Cont. Current	Rated Short Circuit Current (at rated Max KV)	Rated Interrupting Time	Rated Permissible Tripping delay	Rated Max. Voltage Divided by K	Max. Sym Interrupting Capacity	3-Sec. Short Time Current Carrying Capacity	Closing and Latching Capacity 2.7K Times Rated Short Circuit Current
			Low Frequency	Impulse								
E				I	Y	E/K						
Circuit Breaker Type	kV rms	K	kV rms	kV crest	Amps	kA rms	Cycles	Sec.	kV rms	kA rms	kA rms	kA crest
38 PC	38	1.65	60	150	1200 2000	21	5	2	23.0	35	35	95

*Note: 27KV - 125KV BIL also available.*

# QUALITY FEATURES MAKE



## The Leader In Value *Second To None!*

Powercon Switchgear, the leader in value, is designed and manufactured to:

Maximize **Safety - Quality - Reliability**

which in turn

Minimizes exposure to **Product Liability**.

In order to minimize such exposure Powercon provides:

· **A Documented Quality Assurance Program.** Product Liability - Quality Assurance - *without* one you have the other. Powercon's in depth application of the basic elements of **Product Quality** - Performance - Features *Conformance* - *Reliability* - *Durability* - *Serviceability* all meld together for excellence in Quality Assurance.

· **Design & Conformance Testing** in accordance with industry standards ANSI/IEEE C37.20.2. Only by successfully performing these *rigorous tests* on prototype equipment can a manufacturer be assured that the metal enclosed equipment will produce a switchgear assembly that will produce a switchgear assembly that would function safely and satisfactorily. Powercon has available test data

ring its proper role in maintenance but providing preventive and predictive activities. In addition, of course, **reliability** is designed by specifying the best available materials, manufacturing, and design using only highly experienced personnel with strict quality control, tested in accredited laboratories. Continued customer usage has proven acceptance to the product.

In order to assure the greatest possible **reliability** in the product, the product receives a continuous inspection during manufacture,

demonstrating that its manufactured equipment has passed these tests

· **Experience.** Powercon's experience gained in over 30 years of supplying Power Distribution Switchgear for critical facilities such as computers, hospitals, airports, autos, aluminum, copper, steel, pharmaceutical, etc. and a host of other industries has resulted in a product that is superior to the existing standards and provides an unequaled cushion of protection, The Powercon Corporation manufactures switchgear that exceeds the norm for world class equipment.

### Safety - Quality - Reliability

**Product Liability** factors now place greater emphasis on **Quality - Reliability - & Safety** which are primary concerns in switchgear. First, because **quality** represents the best long term value to customers. Second, because power continuity is a basic requirement in an industry which requires the highest of **reliability** of equipment and, Thirdly, because a high degree of **safety** is necessary when operating the switchgear.

**Reliability** is designed into the equipment by not only considering thorough testing and thorough checking by Quality Assurance Supervision.

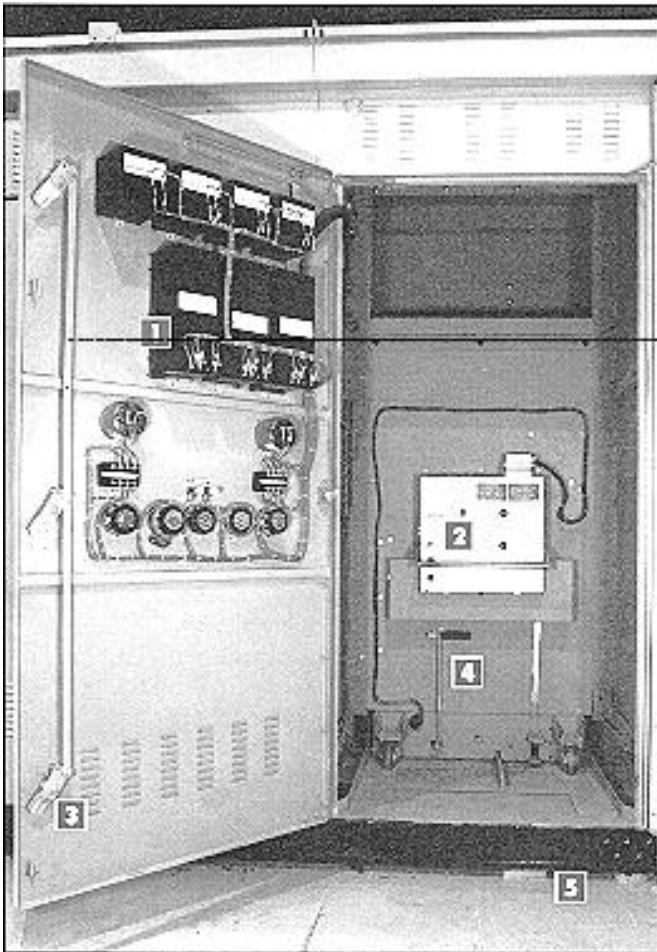
An increase in safety has demanded that this switchgear be installed, operated, maintained, handled, etc. by **Qualified Personnel**.

Detailed instruction books that are provided refer to **safety** standards and practices along with instructional details, all contribute to increased **safety - quality - reliability**.



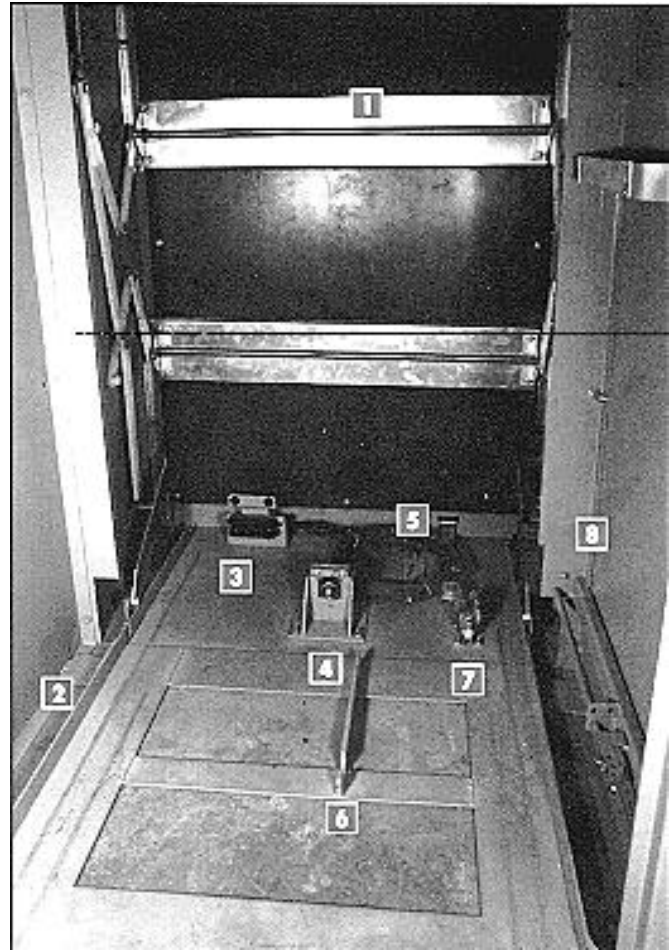
## **Metal-Clad Switchgear** **Horizontal Drawout with A Super Structure:**

Powercon's design provides a ruggedness and greater structural strength which is in a class by itself. The jig welded members form an assembly to provide a plumb and square switchgear unit. This assures interchangeability of units and results in a minimum of installation time.



**38kV vacuum breaker shown in the connected position within an outdoor Metal-Clad unit (48" wide unit)  
38kV, 150KV BIL, 1200A or 2000A**

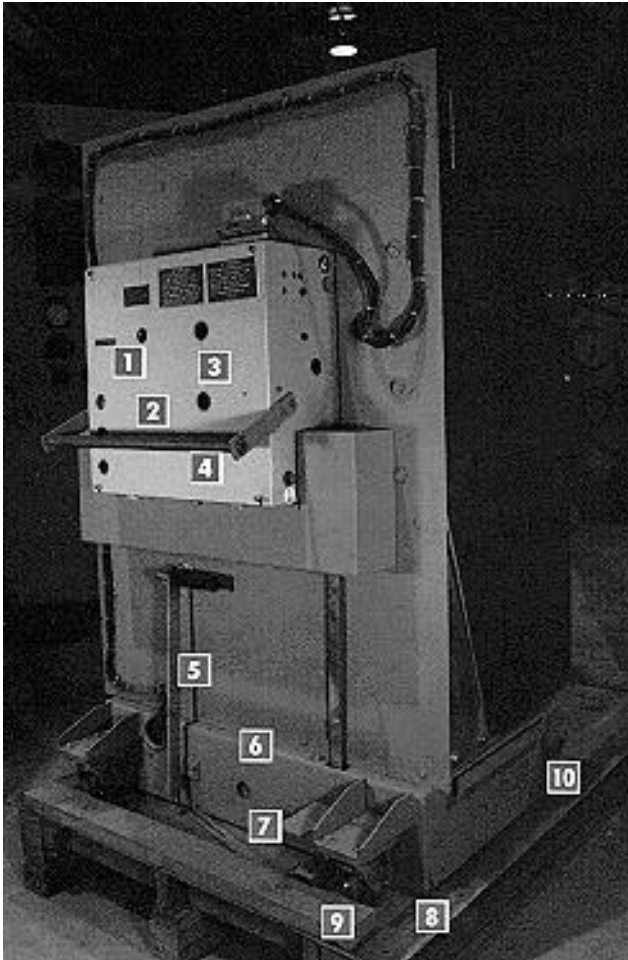
1. Relays and controls
2. Circuit breaker
3. 3-point door catches
4. Secondary connection handle
5. Channel base



**Front view circuit breaker cell**

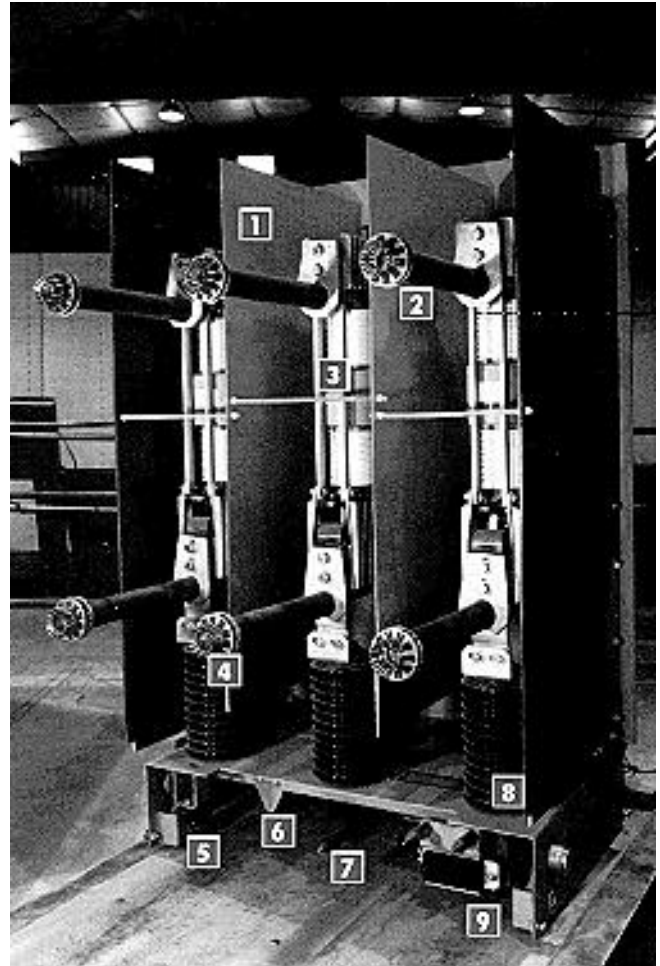
1. Sliding metal shutters (grounded)
2. Space heater
3. Stationary secondary contact block
4. Rack-in nut
5. Ground bus
6. interlock rail
7. Stationary Position Switch
8. Shutter Mechanism

## Metal-Clad Switchgear Horizontal Drawout with A Super Structure:



**38kV circuit breaker removed from cell**

1. Mechanism manual charging port
2. Breaker stored energy mechanism shield
3. Manual close and trip buttons
4. Hand grip bar
5. Secondary connection handle (for use in test position)
6. Racking port
7. Foot pedal mechanical interlock
8. Track guide pin
9. Front swivel casters
10. Shutter activating roller (typical both sides)



**Rear view of 38kV vacuum breaker**

1. Phase barriers
2. Primary studs and finger cluster
3. Vacuum interrupter unit
4. Primary studs and finger cluster
5. Rear wheel housing (typical)
6. TOC switch actuator plate
7. Horizontal racking screw
8. 150KV BIL porcelain insulators
9. point secondary contact (sliding) 48 point (optional)

# Metal-Clad Switchgear Horizontal Drawout with *ASuper Structure*:

**See Guide Specification Publication PC 029**

**It Consists Of:**

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Framework of welded steel</li> <li>• Sheet steel enclosure, including a hinged front door, which may be used as an instrument panel</li> <li>• Compartment and inter-unit barriers</li> <li>• Three-phase insulated bus and connections</li> <li>• Porcelain bus supports</li> <li>• Stationary primary disconnecting devices</li> <li>• Stationary secondary disconnecting devices</li> <li>• Circuit breaker racking-in device</li> </ul> | <ul style="list-style-type: none"> <li>• Circuit breaker interlocking device</li> <li>• Instruments and relays</li> <li>• Control wiring</li> <li>• Terminal blocks</li> <li>• Instrument transformers</li> <li>• Provision for connecting main cable</li> <li>• Guide rail on floor of structure</li> <li>• Wiring channels</li> <li>• Control cut-outs</li> </ul> |
|--|---|

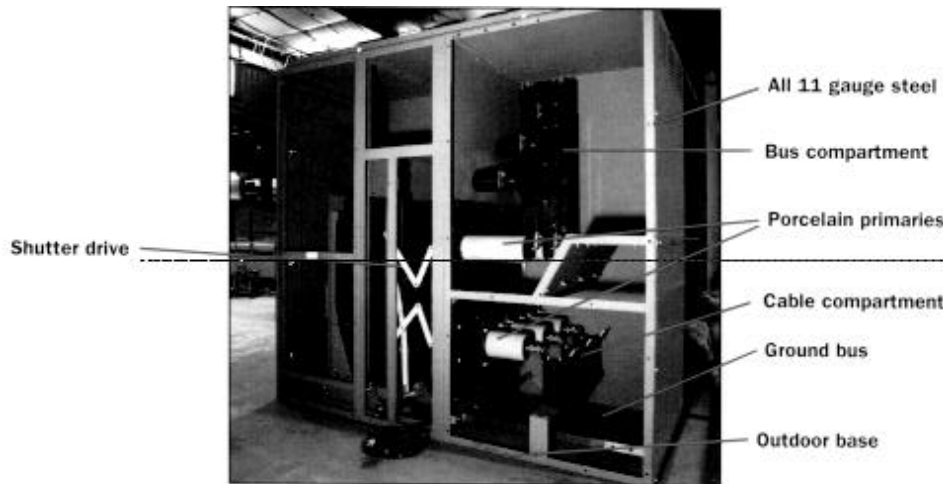
The breaker, bus, potential transformers, current transformers and cables all have their own compartments. And, each function is isolated by rugged partitions.

Powercon metal-clad provides the value of a superior insulation system at vital points, and greater structural strength from a rugged all-welded steel frame.

Relays and instrumentation are mounted on the front of the unit door so that the breaker can be removed or inserted without damaging a relay.

Guide rails are provided so that the breaker will roll into proper position in the cubicle. The mechanism assures perfect alignment when the breaker is racked into its operating position.

***Porcelain - The Ultimate in Insulation***



Enclosure Section View - 38kV Stationary Structure  
**Enclosure Section View - 38kV Stationary Structure**

**World Wide Service...**

**Powercon Field Service Engineering**

Powercon's 24-hours-a-day field service is provided through factory Field Service Engineers. Our Field Service Engineers are highly skilled SWITCHGEAR experts extremely proficient in providing the highest quality service for switchgear and its components.

***Powercon is prepared to provide you with:***

- Emergency repair
- Repair and maintenance services for existing or obsolete equipment
- Installation supervision of new equipment
- Advice and instruction of preventive maintenance procedures

- Coordination Check of new equipment
- In warranty service
- Other required installation and engineering services.

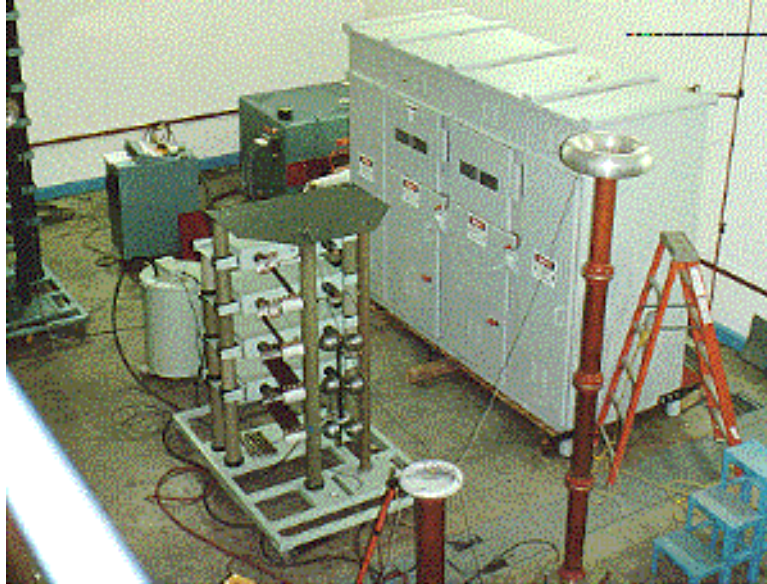
Powercon Service Engineering is based at the manufacturing facility in Severn, Maryland, only 6 miles from the Baltimore-Washington International Airport.

Our Service Engineering group is in close liaison with other Powercon engineers who create the application, and the mechanical and electrical design of each switchgear equipment. Powercon also maintains detailed records of every part and component manufactured and/or purchased for each project. They have immediate access to the purchasing staff for suppliers service.



# Powercon's Power Lab & Quality Assurance Programs Provide Outstanding Performance

*Second to None.....*



## **Documented Quality Assurance.**

The control of quality is a top management function and responsibility. Powercon has established a high quality tradition over many years. Constant vigilance and careful workmanship combine to create rigid requirements for quality.

The Quality Control Procedures used by Powercon have been in use since its inception. There have been additions required during the intervening years as more information and data was collected and the need arose to be more inclusive. The Quality Control Procedures are fully documented and emanate with the initial engineering designs.

Because final quality must be assured, every complete equipment is tested at the factory for conformity to rigid standards verifying the mechanical and electrical specifications. The following are some of the tests made on Powercon switchgear, among many others.

- Final master fixture alignment of all mating and matching points, bushing matching; auxiliary contact mating; grounding shoe contact to assure operation.
- Auxiliary wiring check to assure correctness and continuity. This includes primary current injection primary voltage application control power to actually operate and synthesize the entire control and protective system, when required.
- All relays and devices given complete secondary power check by test consoles, when required.
- High potential tests of primary and secondary circuitry in accordance with ANSI standards.
- Final inspection.

