

A low-angle photograph of industrial machinery, including a large horizontal pipe and a vertical tower with a ladder, set against a clear blue sky. A bright, glowing light fixture is visible. A large, intense fire with orange and yellow flames is superimposed over the lower half of the image, partially obscuring the machinery.

# **INTEGRAFLAME<sup>®</sup> CIC** **Strength Under Fire**

**Solutions for circuit integrity applications in case of a fire**



**CABLE USA**

MANUFACTURERS OF  
HIGH TEMPERATURE CUSTOM  
ENGINEERED CABLES

IntegraFlame is a registered TM



THE ONLY 200°C FLEXIBLE



# INTEGRAFLAME

IntegraFlame® CIC takes the fire where critical circuits need to keep safety equipment functioning even when exposed to the extreme heat (1093°C/2000°F) of a fire and is specifically designed to replace Mineral Insulated (MI) cable. Cable USA's IntegraFlame® CIC is the cable of choice. IntegraFlame is unique in that it is the only FLEXIBLE 200°C continuous operating temperature circuit integrity cable on the market.

The other low temp 90°C Circuit Integrity Cables on the market may fail in hot environments often found around reboilers and heat exchangers in a Refinery or Petrochemical Plant. In addition, these 90°C Circuit Integrity Cables are jacketed with Polyolefins which do not have sufficient resistance to harsh chemicals found in a Refinery or Petrochemical Plant. Cable USA IntegraFlame® provides high temp assurance, protection from chemicals and moisture, and its flexibility provides significant savings in time and labor on costly installations. No special tools for installation required.

Fire is the most devastating environmental influence that acts on a cable, in addition to exposure to moisture, chemicals, temperature extremes and physical or mechanical abuse.

These environmental abuses can significantly impact a cable's operating life and its ability to perform.

IntegraFlame® CIC is specifically engineered to maintain electrical integrity in applications where exposure to open flames can result in catastrophic loss or devastating damage to a plant. A pioneer in high-temperature cable products, Cable USA has designed IntegraFlame® CIC to maintain circuit integrity at flame temperatures of 1093°C/2000°F for extended periods of time, facilitating an orderly shutdown of critical equipment.

Cable USA engineers, polymer scientists and our technical sales team have extensive experience with applications requiring cables that withstand severe environmental influences. IntegraFlame® CIC is uniquely designed to endure the effects of acids, alkalies, chemicals, oils, gases, open flame, water and steam, and physical or mechanical abuses.\*

IntegraFlame® CIC cables are ideally suited for the myriad of applications in petroleum refineries, chemical processing plants, steel and aluminum plants, coke mills, glass plants, power plants and offshore rigs.



## CHARACTERISTICS OF INTEGRAFLAME® CIC:

- ▲ Assures circuit integrity for 60 minutes in flame temperatures up to 1093°C/2000°F\*\* with low smoke and fume emissions, resulting in a quick cool down.
- ▲ Withstands continuous operation in temperatures up to 200°C/392°F.
- ▲ Overall cable impervious to moisture up to 260°C with optional moisture barriers, individual conductors always impervious to moisture up to 200°C.
- ▲ Remains flexible down to 160°C /320°F.
- ▲ Maintains mechanical strength and impact resistance.
- ▲ Good resistance to radiation.

\* Chemical resistance is enhanced by outer Fluoropolymer jackets.

CONTROLS ▲ INSTRUMENT ▲ LIGHTING ▲ POWER AND SIGNAL CIRCUITS ▲



# THE CIRCUIT INTEGRITY CABLE ON THE MARKET!



## APPLICATIONS:

- ▲ Power, Control and Instrumentation Cables and Power-Limited Circuits.
- ▲ Control Emergency Shutdown Motor Operated Valves (MOV) and Emergency Isolation Valves (EIV) as found in petrochemical plants and refineries.
- ▲ Fire Suppression Systems
- ▲ Ovens and Furnaces
- ▲ Overhead Cranes and similar high-temperature equipment requiring circuit integrity under rigorous conditions.
- ▲ Lighting

## PRODUCT ATTRIBUTES:

- ▲ Ideally suited for critical circuits requiring electrical integrity in the event of fire.
- ▲ Provides the utmost in temperature, chemical and moisture resistance.
- ▲ Flexible – designed to replace Mineral Insulated (MI) cables in many applications.
- ▲ Suitable for hot environments normally found around re-boilers and heat exchangers.
- ▲ Suitable for low-voltage power cables

## COMPLIANCE INFORMATION:

- ▲ Passes Hydrocarbon Pool Fire Test – 60 minutes @ 1093°C/2000°F fast rise Temperature Curve 480V, 17A.
- ▲ Passes IEEE-383 Flame Test 2,000°F, 2-hours @ 1,000V.
- ▲ Passes IEEE-383 Flame Test 2,000°F, 3-hours @ 480V.
- ▲ Passes 2196 – 2-hours Circuit Integrity Fire Test.
- ▲ Passes IEEE-1202/FT4 Flame Test.
- ▲ Meets Low Smoke (LS) requirements of UL-1685.
- ▲ Passes MIL-W-25038 Fire Test, 2-hours.

## RATINGS:

- ▲ Temperature Rating: 200°C/392°F.
- ▲ Voltage: 600V – 1,000V (300V instrumentation).
- ▲ High Voltage: Breakdown: >20Kv.

## CONSTRUCTION:

- ▲ Uses a flexible, pyro-stable ceramifiable elastomer – inherently moisture resistant.
- ▲ Standard moisture, heat and chemical resistant jacketing: Fluoropolymers such as ETFE (150°C), FEP (200°C), or PFA (260°C).
- ▲ Instrumentation, Control and Power – 27% nickel-plated copper conductor per ASTM B355 stranded per ASTM B174 (Class H) or ASTM B173 (Class K). Nickel-plated copper melts at approximately 1316°C/2400°F. Bare copper melts at approximately 1080°C/1980°F.
- ▲ Thermocouple Extension – Annealed, solid alloys matched and calibrated to standard limits of error per Table VIII of ANSI MC 96.1. Specify thermocouple type JX, KX, TX, RSX, or EX.
- ▲ Insulation – proprietary combinations of premium insulation materials, incorporating thermally processed pyro-

stable polymer compound, enhanced with heat resisting minerals and ceramics.

- ▲ Conductor Jacket – Color coded\*\*\* or surface printed, braided ceramic yarn impregnated with flame, heat and moisture resistant finish.
- ▲ Cable Core – Insulated conductors, shielded or unshielded pairs/triads cables with flame retardant fillers as necessary for roundness, overall glass reinforced mica tape(s).
- ▲ Overall Jacket – Braided ceramic yarn impregnated with flame, heat and moisture resistant finish. Standard coloring is white with red and blue tracers for visibility.

Also available in single conductor constructions.

## INSTALLATION:

- ▲ Installation requires standard electrician tools and procedures.

## OPTIONS:

- ▲ Stainless Steel Braided Armor.
- ▲ Nickel Plated Copper electrical shields
- ▲ Can be Tray Rated with optional PFA jacket.\*\*\*

## TYPICAL DATA - MANY OTHER DESIGNS AVAILABLE

Description	AWG Size	No. of Conds.	Insulation Thickness	Jacket Thickness	Overall Diameter	NET WGT. LBS/M FT.
86162PC6.IS	16	4 (2/PR I/S+O/S)	.050	.020	.872	402
86162PS6.OAS	16	4 (2/PR O/S)	.050	.020	.760	303
861404C1.PFA	14	4	.070	.015	.615	220
861407C1.PFA	14	7	.070	.015	.735	332
861409C1.PFA	14	9	.070	.015	.865	415
861412C1.PFA	14	12	.070	.015	.980	500
861416C1.PFA	14	16	.070	.015	1.100	680
861202C1.PFA	12	2	.070	.015	.570	180
861203C1.PFA	12	3	.070	.015	.610	222
861204C1.PFA	12	4	.070	.015	.660	280
861004C1.PFA	10	4	.082	.015	.785	410

Dimensions in inches (nominal).

Data regarding additional sizes is available from Cable USA. Consult factory for minimum run quantities and delivery at time of quotation. Power Sizes available.

**WHERE EXPOSURE TO FLAME IS A RISK**

\*\*\* Standard conductor coding: 2-4 conductors, color coded tracers; 5+ conductors, each conductor number printed (black on white background).



**FACILITY HISTORY**

Business Established: ..... 1984  
Present Building Constructed: ..... 1987  
First Expansion: ..... 1989  
Second Expansion: ..... 1994

**FACILITY SIZE**

Land Area: ..... 3.37 Acres  
Total Size of Facility: ..... 66,000 Square Feet  
Office Space: ..... 6,000 Square Feet  
Factory / Production: ..... 57,000 Square Feet  
Distribution / Warehouse: ..... 3,000 Square Feet

**PRIMARY PROCESSES**

Cable USA is an integrated facility which houses all engineering, manufacturing, quality control and administrative operations under one roof.

**PRODUCT TYPES AND PROCESSES**

- ▲ Thermoplastic Fluoropolymer Extrusion – Specializing in FEP, ETFE, and PFA
- ▲ Textile Braiding
- ▲ Stainless Steel Braiding
- ▲ Short-Run / Specialty Cables
- ▲ Miniature Multi-Conductor Cables
- ▲ Extreme-Temperature Applications
- ▲ Composite Cable Design
- ▲ Coiled / Retractable Wire and Cable

**MATERIALS USED**

- |                       |                      |
|-----------------------|----------------------|
| ▲ FEP                 | ▲ E-CTFE             |
| ▲ ETFE                | ▲ Polyethylene       |
| ▲ PFA                 | ▲ Polypropylene      |
| ▲ Polyurethane        | ▲ PVC                |
| ▲ Silicone Rubber     | ▲ PVDF               |
| ▲ Polyester Elastomer | ▲ And many others... |

**EXTRUSION CAPABILITIES**

- ▲ (9) Hot-Melt Extrusion Lines
- ▲ (2) Silicone (HAV) Extrusion Lines

**CONDUCTORS AND ADDITIONAL MATERIALS**

- ▲ All types & platings of copper conductors
- ▲ Copper-alloy high performance conductors
- ▲ Thermocouple alloys
- ▲ PET tape
- ▲ Mica tape
- ▲ Ceramic tape
- ▲ Fiberglass tape
- ▲ Fluoropolymer tape (sintered, un-sintered, conductive, colored)
- ▲ Shielding Braids (copper, NPC, alloy)
- ▲ Armoring Braids (SS302, 304, 316)
- ▲ Textile Braids (glass, K-fiber)

**PRODUCT SIZE RANGE**

**Minimum**

- ▲ #32 AWG / .002 wall thermoplastic
- ▲ #24 AWG / .015 wall silicone

**Maximum**

- ▲ 1100 MCM
- ▲ 3.000" O.D. (braided jacket)
- ▲ 2.000" O.D. (high-temperature jacket)
- ▲ 1.750" O.D. silicone rubber

**Maximum Reel Size:** 84.00"

**SOME OF OUR SPECIALTY CABLE TYPES**

- ▲ High-Temperature Wire & Cables
- ▲ Coil Cords
- ▲ Very Large Cables
- ▲ Flat Festoon Cables
- ▲ Vented Cables
- ▲ Pump Cables
- ▲ Custom Products per Customer Specifications

**SYNERGIZING TECHNOLOGY**

Cable USA has the unique ability to provide a comprehensive family of high-temperature wire and cable products to address the specialized needs of industry. With over 50-years of combined experience in solutions for the Wire and Cable industry, our World Class team of polymer scientists and engineers are uniquely qualified to develop solutions to new technology challenges.



2584 South Horseshoe Drive • Naples, Florida 34104-6131  
phone 239.643.6400 • fax 239.643.4230  
sales@cableusa.cc • www.cableusa.cc



**MANUFACTURERS OF  
HIGH TEMPERATURE CUSTOM  
ENGINEERED CABLES**



A member of The Marmon Group of companies