RFS Technologies
an Amphenol Company

DragonSkin™

The ONLY UL-2196 Listed Fire-Resistive Data/ Communication Cable, Compliance with UL 2196-rev3

Revision 2 - March 2026

Fire-safe communication systems in any environment

Executive Summary

UL 2196 is the main North American fire-test standard used to verify that critical cables remain operational during a fire. It applies to power, control, instrumentation, and communication cables—including RF coaxial cables like RFS Technologies' DragonSkin™.

UL 2196 cable is often mandated for **life-safety systems** like:

- Emergency responder radio systems (ERRCS / DAS)
- Fire alarm systems
- Fire pumps and emergency feeders
- Smoke evacuation systems
- Tunnel and transportation systems

These applications require the cable to **continue transmitting signals during a fire**, allowing emergency systems to function.

RFS Technologies' DragonSkin™ cable has successfully gone through the rigorous UL testing and becomes the only UL2196 certified and listed RF coaxial cable that meets 2-hour rating of all the following requirements:

1) CIRCUIT SURVIVABILITY DURING FIRE

- UL 2196 evaluates whether cables can **maintain circuit integrity under severe fire conditions.**
- Cables are exposed to **high-temperature furnace fire conditions (≈1850 °F / 1010 °C)** and must continue operating.
- During the test, cables remain **energized at rated voltage,** proving that the circuit still functions.

2) HOSE-STREAM TEST AFTER FIRE EXPOSURE

- After the fire exposure, the cable system must survive a **high-pressure hose-stream test**, simulating firefighting conditions.

3) RF COAXIAL SYSTEMS FUNCTIONALITY

- For RF coaxial cables used in the public-safety DAS, the system must maintain communication for firefighters and first responders during a building fire.
- Fire-rated coax must allow **RF communication pathways to remain operational during a building fire.**

DragonSkin™ Cable Design

DragonSkin™ Fire-Resistive Cable is engineered with a multilayer protection system designed to withstand extreme fire conditions while maintaining circuit integrity and sustaining RF communication capability.

UL 2196 Revision 3

UL 2196 Edition 3 (published June 26 2025) updated the standard to better address modern communication and safety systems.

Revision 3 explicitly covers:

- Power cables
- Instrumentation cables
- Control cables
- Data/communications cables
- RF coaxial and fiber-optic cables

Revision 3 places greater emphasis on testing modern communication infrastructure, rather than focusing solely on power circuits. Maintaining basic circuit integrity alone is no longer sufficient. Equally important is ensuring that RF coaxial systems remain fully operational from a signal transmission perspective during fire exposure.

UL 2196 Fire Test Configuration

DragonSkin™ cable systems were evaluated using representative installation configurations consistent with UL 2196 testing protocols.

Typical configurations included:

- Cable tray installations
- Conduit installations
- Direct support systems

The circuit was energized during testing to simulate real-world operational conditions.

Monitoring systems continuously evaluated:

- Voltage continuity
- Current flow
- Short circuits
- Ground faults
- RF performance

Electrical Performance Monitoring During Fire Exposure

During the fire endurance testing conducted by the UL lab in Jan 2026, RFS Technologies' DragonSkin™ Fire-Resistive Cable circuit was continuously monitored to verify electrical performance under fire conditions.

Testing was performed in accordance with the procedures outlined in UL 2196 Revision 3.

In addition to circuit continuity monitoring, signal performance characteristics were measured to evaluate the stability of the communication circuit during elevated temperature exposure.

Parameters Monitored

The following electrical parameters were monitored throughout the fire endurance test:

Return Loss (RL)

Return Loss measurements were used to evaluate the level of signal reflection occurring within the cable circuit. Stable RL values indicate that the cable maintained proper impedance characteristics and signal transmission properties during thermal exposure.

Insertion Loss (IL)

Insertion Loss measurements were used to determine the signal attenuation introduced by the cable system during testing. Monitoring IL ensured that the cable maintained acceptable signal transmission performance while exposed to elevated temperatures.

Test Observations

Throughout the duration of the fire exposure:

- RL measurements remained within acceptable operational limits for the communication circuit.
- IL measurements indicated stable signal transmission with no abnormal attenuation.
- No signal interruption or loss of circuit functionality occurred.

These results demonstrate that the DragonSkin™ cable maintained both **electrical continuity and signal integrity** during fire exposure conditions.

Hose Stream Test and Post-Fire Electrical Verification

Following completion of the fire endurance exposure, the Dragonskin™ cable system was subjected to the hose stream test required by UL 2196.

After the hose stream application, the circuit was again evaluated for electrical performance.

Measurements reveal that:

- Circuit continuity remained intact
- RL and IL values remained within acceptable operational parameters
- No conductor damage or insulation failure occurred

The measurements further confirms that DragonSkin™ Fire-Resistive Cable maintained **functional communication performance even after thermal and mechanical stress conditions.**

DragonSkin successfully passed these demanding tests without additional protective measures like metal conduit or extensive wrapping, demonstrating durability and reliability.

UL Listing

The Dragonskin is listed by UL under the following categories.

UL file No, Associated UL Category or Type	Description
FHJW.R40176	Fire-Resistive Data/Communication Cable
FHJR.R40176	Fire-resistive Cable
FHIT.1250	Electrical Circuit Integrity Systems
E23951 CATVP	Community Antenna Television Cable, plenum

FHJR category covers fire-resistive cable used in specific electrical system designs. The cable is tested to keep working during a fire and after being hit with water from a hose. Unless noted otherwise, standard fire testing methods are used.

The cable must meet normal electrical safety rules and also be able to keep working during a fire. When used as specified, it has been tested and meets these requirements.

Install the cable according to NFPA 70 (National Electrical Code) and the manufacturer's instructions.

Each certification lists the system number, fire rating (in hours), and maximum voltage. Installation details are provided in the system listings (FHIT). Any extra performance beyond basic electrical function will be noted in the certification.

FHIT category covers systems that protect electrical wiring so it keeps working during a fire

FHJW category covers fire-resistive data and communication cables used in certified systems. They are tested to keep working and transmitting signals during a fire, even after water exposure.

Install cables according to NFPA 70 (National Electrical Code) and the manufacturer's instructions.

Each certification lists the system number, fire rating, voltage, and performance details. See the system listing (FHIT) for installation requirements.

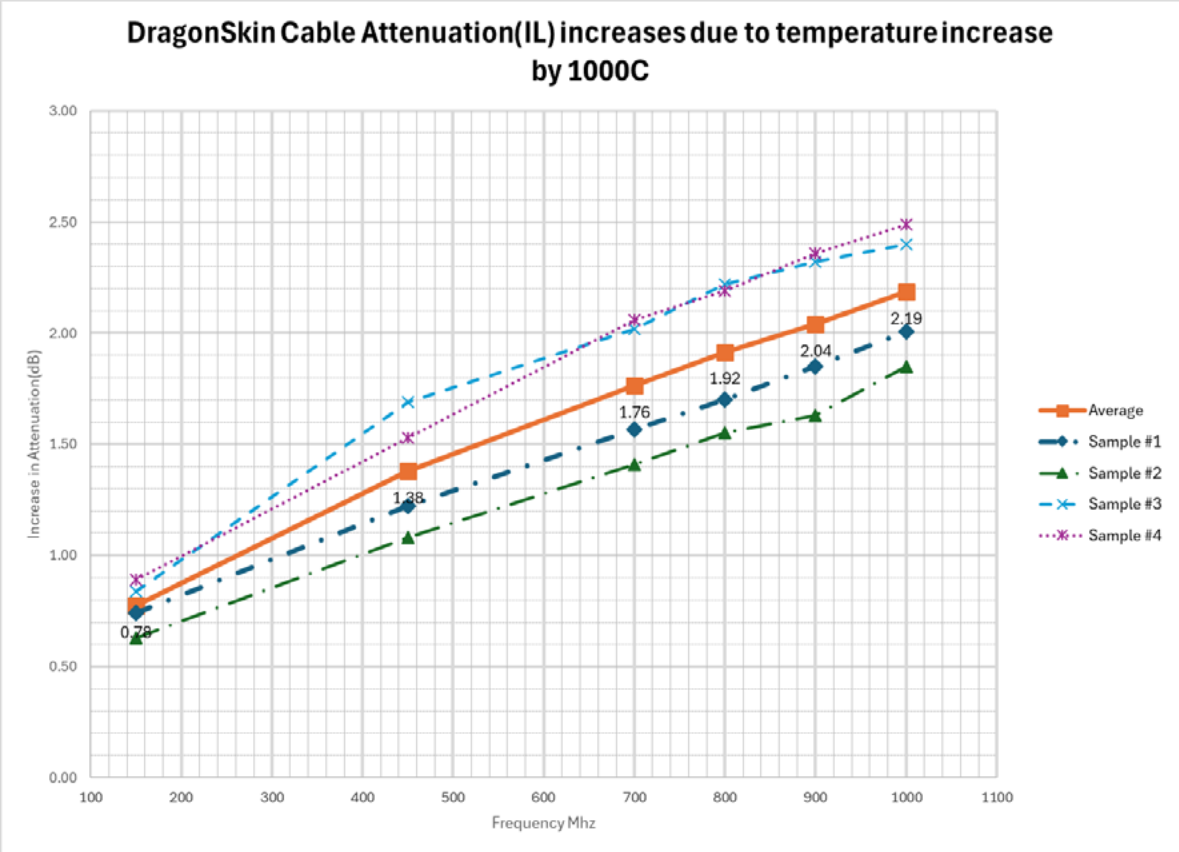
ATTENUATION AND POWER RATING

The table below shows the consistent high performance of the cables at room temperature.

FREQUENCY [MHZ]	ATTENUATION [DB/100FT]	ATTENUATION [DB/100M]	AVERAGE POWER [KW]
150	0.9	2.96	2.44
450	1.59	5.21	1.38
700	2.07	6.8	1.05
800	2.22	7.28	0.99
900	2.35	7.72	0.93
1000	2.47	8.1	0.84

Attenuation at room temperature & 1010°C (1850°F) measurements per 100 ft with 10 ft exposed to fire.

FREQUENCY [MHZ]	Average Insertion Loss (IL)		
	Pre-UL2196 test (20°C) [dB]	Maximum temperature (1010°C) [dB]	Post Hose Stream Test [dB]
150	0.90	1.80	0.87
450	1.59	3.15	1.62
700	2.07	4.04	2.07
800	2.22	4.33	2.24
900	2.35	4.59	2.40
1000	2.47	4.84	2.49



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DragonSkin™ Value Proposition

When you incorporate DragonSkin™ in your life-safety system design, you can be rest assured that the following performance will be achieved.

Enhanced Fire Survivability

Designed to maintain functionality (both circuit integrity and RF communication) in extreme fire environments.

- Ability to tolerate prolonged exposure to extreme heat conditions.
- Structural integrity under duress.
- Operational reliability throughout simulated fire events.

Code Compliance

Supports compliance with building and fire codes requiring UL 2196 fire-resistive circuits.

Installation Flexibility

Compatible with multiple installation methods including trays and conduit.

Reduced System Complexity

Provides fire protection without the need for additional external fireproofing systems.

Reduced System Development Cost

The standalone UL-2196 complaint cable design does not only simplify your deployment lead time but also greatly reduce your deployment cost.

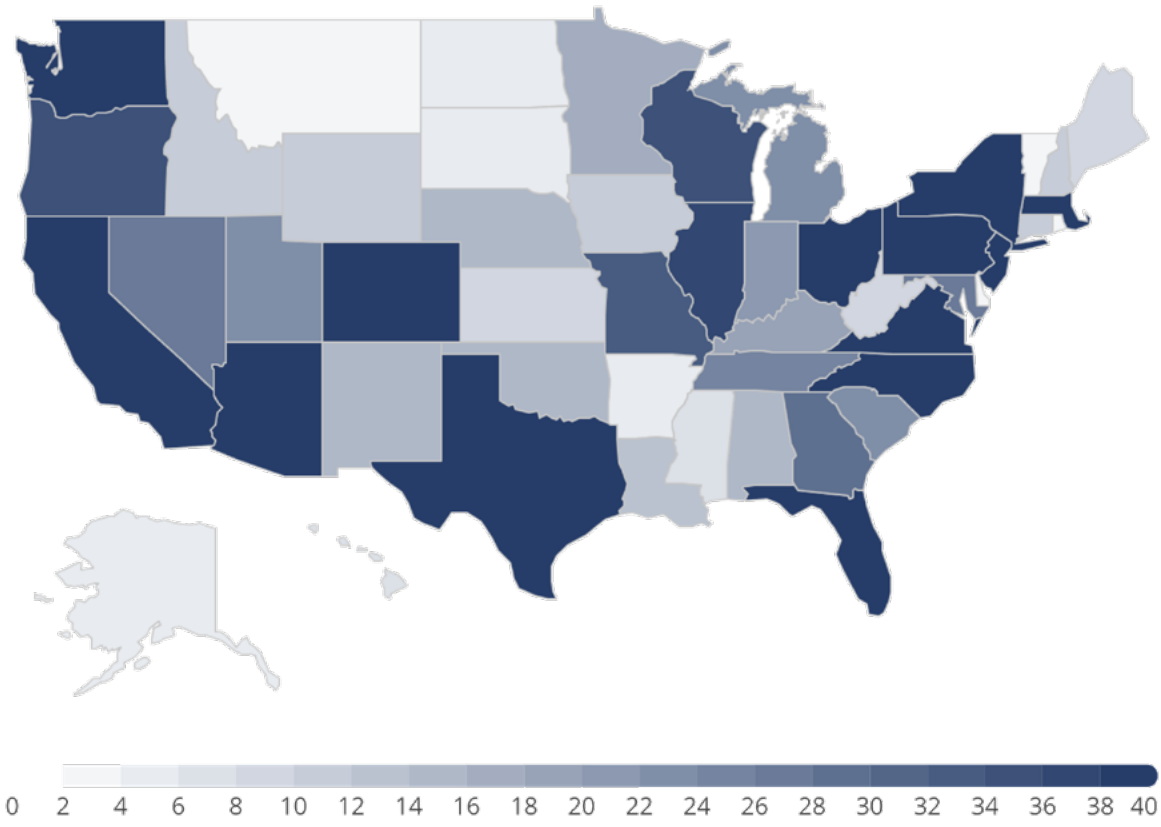
DragonSkin in Practice

Since DragonSkin was introduced to the market in 2020, it has been installed across the U.S. to help stakeholders in a vast number of environments bolster their mission-critical communication capabilities.

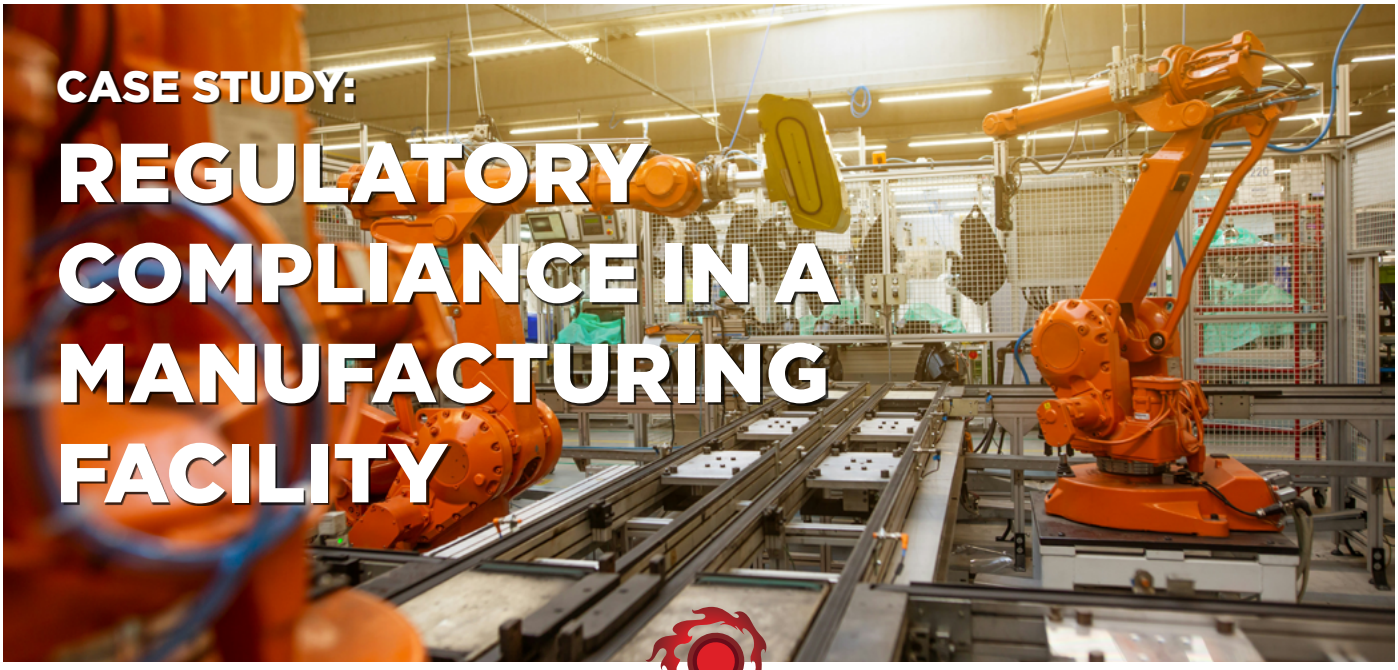
DragonSkin across the U.S.

Here you can see a map of where DragonSkin is being utilized in buildings across North America to achieve more robust critical communication systems.

DRAGONSKIN DEPLOYMENTS ACCROSS NORTH AMERICA



Let's drill into a selection of these projects to see how DragonSkin works for RFS Technologies' customers.



CASE STUDY:

REGULATORY COMPLIANCE IN A MANUFACTURING FACILITY

Overview

Manufacturing facilities often present unique challenges for connectivity due to physical barriers to RF, like racking, production lines, robotics, and large industrial equipment. These obstacles needed to be overcome to achieve complete coverage for mission-critical systems and meet all necessary safety standards. This project needed to deliver coverage across a 460,000 square foot manufacturing facility in California.

The Challenges

The deployment of DragonSkin was necessary to address the requirement for 2-hour survivability of the BDA/riser as an essential part of the overall building's Emergency Responder Communication Enhancement System (ERCES). As the facility lacked a 2-hour survivability room or a pre-existing chase to the roof, an alternative solution was needed to allow the riser to be rated to the necessary standards.

The Solution

As a stand-alone product with no need for additional conduit, DragonSkin provided a workaround for the issues arising from the lack of a chase. This was the only product on the market able to address the issue and ensure the fire-safe connectivity needed to ensure the building was compliant with safety regulations.

The Result

The project took place in mid-2024 and is now fully implemented. DragonSkin is supporting a robust public safety radio system that adheres to regulatory obligations and provides a dependable system capable of functioning effectively in extreme conditions.

Overview

The original use case for DragonSkin, high-rise buildings pose unique communication challenges and result in a high risk to occupants and rescue personnel if communication fails in the event of a fire. This customer needed a backbone to comply with fire as a component of its in-building infrastructure inside a 26-storey 'class A' office building in Phoenix, AZ.

The Challenges

This deployment was part of a retrofit where there was no pre-existing 2-hour pathway that could be used for the backbone. The installer needed a way of meeting regulatory requirements without escalating costs from multipart solutions or increased installation costs.

The Solution

DragonSkin was used in this scenario on the vertical chase to deploy a backbone that met NFPA 72 Survivability Standards using a single solution. The compact and easy-to-install nature of DragonSkin allowed for a straightforward and cost-effective deployment, equipping the building with a backbone that met all regulatory requirements.

The Result

Jim Bowen, DAS Sales Director at Windy City Wire, a major RFS Technologies distributor involved in the project, commented, "DragonSkin created an easier and more cost-effective installation on a retrofit. The customer needed to create a 2-hour rating on the backbone of an existing building that did not have a 2-hour pathway. If the customer had gone with a typical cable wrap, the coax run would've cost 3-4x as much while requiring more labor to install. DragonSkin really simplified what would've been a tough install."

Overview

Over 1.2 million Americans reside in nursing homes, with another 30,000 communities providing assisted living. Residents often need additional support with mobility, so the idea of a fire in this setting is a challenging thought, but the fact it is difficult to think about underlines why fire-safe communication is even more important.

The Challenges

Nursing homes often have complex facility layouts and multiple barriers to connectivity, from construction materials to medical equipment. As a fully occupied nursing home, it was pivotal that any solution would not affect resident comfort or daily operations.

The Solution

DragonSkin was comprehensively deployed across the community to ensure complete coverage. A solution that maintains performance in extreme heat for two hours was essential due to the nature of the environment, as it extended the window for emergency workers to evacuate residents, many of whom would require significant assistance. Additionally, the simple installation process of the cable meant the project was completed on time with minimal disruption in daily activities and resident care.

The Result

DragonSkin provided a dependable communications network capable of functioning effectively even during fires, significantly enhancing resident and staff safety. Its implementation reassured families of the community's proactive safety measures and supported administrators in meeting their legal and ethical obligations for resident safety.

Overview

Millions of commuters use subway systems across the world every day as one of the most convenient ways to travel around busy cities. However, the complexity of these networks—with underground stations and deep tunnels—presents a unique challenge in ensuring continuous communication, especially in an emergency like the event of a fire.

The Challenges

Subway systems have complex tunnel structures built using materials like reinforced concrete and metal, which significantly impact the ability to deliver complete coverage. Additionally, subway operators need to avoid disruptions that impact daily commuters, meaning any system needs easy installation and low maintenance.

The Solution

DragonSkin was extensively deployed throughout the subway system, ensuring robust communication coverage across every route, station, and connecting tunnel. The system was designed to allow complete coverage across the full length of each tunnel, overcoming the challenges usually associated with difficult, tight spaces. Additionally, its intuitive, single product installation approach made it possible to install in overnight blocks to minimize any disruption to regular subway service and commuter schedules.

The Result

The deployment of DragonSkin has established a reliable, fire-safe communications network capable that will continue to operate in the harshest conditions. Additionally, it was achieved with minimal disruption for the subway operator and commuters.

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GET IN TOUCH

DragonSkin Contact at RFS Technologies
Suzanne Kasai
Business Development Manager
E-mail: suzanne.Kasai@rfstechnologies.com
Phone: + 1 203 537 2741

Get in touch
Visit our website www.rfstechnologies.com