



Outdoor Transmission Enclosures

Diverse Options for RF Installations



GatesAir's Outdoor Transmission Enclosures offer a reliable and cost effective method for broadcasters to deploy transmission systems. This application has become crucial for an array of broadcasters exploring new locations typically not used for terrestrial broadcast services, from high-power broadcasters adding repeater sites to effectively blanket their markets to low-power and mobile broadcasters who rely on shared sites or single-frequency networks with multiple transmitters.

GatesAir's custom-built Outdoor Enclosures, constructed of steel or aluminum, offer a cost-effective and technically-sound alternative for broadcasting from non-traditional locations. Pre-built enclosures vastly reduce the square footage in comparison to traditional structures. Installation costs are also minimized: Enclosures are transported to the site and can be placed onto a small concrete foundation or other suitable structure.



From a system standpoint, our Outdoor Enclosure also offers everything required to support terrestrial transmission. This includes heating, ventilation and air conditioning (HVAC) and electrical systems, the transmitter and associated hardware, filtering and antenna systems. Quality enclosures also implement design characteristics that meet the most pertinent industry standards for construction and equipment protection, ensuring that the broadcaster's investment in technology is secure.

Our Outdoor Enclosures are compatible with transmission systems in multiple standards, including ATSC, DVB-T/H, ISDB-Tb, FM and DAB/DMB to support mobile and terrestrial broadcasts for main and repeater systems.

Proper HVAC configuration is perhaps the most challenging requirement for an outdoor transmitter system. GatesAir Outdoor Enclosures are built with this issue in mind, utilizing an HVAC system that is both efficient and environmentally-friendly.

Our Outdoor Enclosures use newer environmentally-friendly refrigerants such as 407C, which have replaced older R22 refrigerants. These newer refrigerants are permissible in most countries around the world.

Our Outdoor Enclosures also utilize an airflow strategy to keep equipment at proper operating temperatures and costs low. The size of the cooling system is based on the size of the structure and its estimated heat load. This information is used to determine the appropriate airflow based on the directed airflow of the equipment in place. We engineer

these systems to direct a portion of the cool air from the HVAC system to the rear of the transmitter will create an appropriate cold and hot air mixture. Turbulence in that area mixes the hot and cold air to maintain an efficient and reliable transmission system.

We utilizes a closed loop air conditioning system in Outdoor Enclosures that is not open or vented to the outside. This keeps external moisture, dust and dirt ingress out of the enclosure. This efficient design reduces heat loads on transmitters. Transmitter cooling with internal fan

systems that direct airflow in one direction, from the front of the enclosure across the PA modules and through to the rear of the transmitter cabinet helps the circulation of the air in the enclosure.

Heating the enclosure may also be required for cold environments and cold startup of electrical equipment, transmitters and RF components. GatesAir Outdoor Enclosures use proper levels of insulation, typically an R rating of 6.5 or better, to maintain the desired environment and improve efficiency.

RF and Antenna Systems

GatesAir's Outdoor Enclosures are spacious enough to both accommodate the transmitter and associated hardware and additional needs for any operation. This includes satellite or microwave receivers, wireless receivers (for wireless network connections), media servers, routers, uninterruptible power supplies and computers.

Our Outdoor Enclosures meet the demands of digital broadcasts that require a mask filter to minimize out-of-band interference. In UHF systems, ceramic 12-pole filters are commonly used to minimize the system footprint. This design features ceramic resonators with small cavities on the inside of the filter as opposed to using traditional, larger air cavities. VHF applications will require traditional air cavity mask filters.

Our Outdoor Enclosures make use of AC line filtering to remove AC emissions like harmonics and other undesirable artifacts from the AC line — a requirement for minimizing interference with nearby consumer radios and TV sets. Surge suppressors minimize electrical spikes for lines coming in the enclosure. Examples include GPS and satellite antenna cables.

The transmission line out to the antenna and tower will usually be 1-5/8-to-3-inch, in rigid or flexible style. Rigid line is best used up to the point it leaves the enclosure, given the limited space inside. Attaching a standard rigid EIA flange at the exit point gives the option of continuing with rigid line or switching to a flexible-style solution. Dehydrators for transmission line and antenna pressurization can assist inside the enclosure.

Our Outdoor Enclosures offer a variety of mounting systems, depending on the enclosure. The ideal mounting system includes three separate pipes, about 18 inches long and one inch in diameter to support antennas in the range of five-to-six pounds. An antenna shelf provides enough space for comfortable separation between GPS, Yagi, wireless WAN/LAN and other antenna choices.

Allowances can be made for GPS-capable antennas, such as for single-

frequency networks, effectively locking in exciters across multiple enclosures in the same market, allowing for a perfectly timed, synchronized transmission network. Sma

ll wireless antennas, such as G3-style models, can also be installed to assist with monitoring procedures over cellular communications — especially useful if a local T1 line is not available to the site.

The antenna shelf on the Outdoor Enclosures will provide mounting for an ice bridge to protect the antenna systems associated transmission line and cabling. Multiple pre-drilled holes into the antenna shelf will support multiple ice bridge mounting options, designed to protect both the antenna(s) and the associated transmission line from snow, ice and other elements that can settle on top of the systems or fall from the tower, potentially causing service problems.

Product Details

Our Outdoor Enclosures are available in steel or aluminum. The choice of materials is often dictated by the specifics of an installation. For example, steel is thinner but heavier, making it difficult to use for rooftop installations. Steel enclosures make more sense for pole-mount installations on towers housing very small, low-power transmitters. These are more common for low-power gap fillers in multi-site transmission systems. Stainless steel enclosures can also be used in highly corrosive environments.

We begin the infrastructure build-out by identifying electrical requirements and ensuring compliance to various safety and construction standards. Electrical systems are specified for single-phase, split-phase or three-phase depending on availability; single- and split-phase are most common given the site seclusion of most enclosure installations.

The electrical system is often built out within a small cabinet or AC distribution box affixed to the side of the enclosure. The AC distribution panel lives within the cabinet to accommodate the appropriate breakers. The electrical system is then specified and built to

meet the appropriate UL standards, typically UL60950, an American National Standard detailing Safety of Information Technology.

Protection from outside elements is another critical design consideration with all GatesAir Outdoor Enclosures. Transmitter outdoor enclosures should meet NEMA 4X-rating, UL508A listings and partial Telcordia specifications. Outdoor enclosures protect equipment from corrosive environments such as salty ocean air as well as keeping dirt and moisture outside. NEMA 4X and UL508A standards represent compliance for the construction of industrial control panel enclosures built for installations in hazardous and environmentally-diverse locations. Watertight and airtight seals around entry points for transmission line and other cables will further assist in keeping dirt and moisture outside.

Our Outdoor Enclosures meet Telcordia GR-487-CORE specifications to support noise pollution standards, as well as specifications for wind resistance, and more specifically, to prevent significant leakage from wind-driven rain. This standard provides criteria for analyzing electronic equipment cabinets used in outside plant environments and applications, noting acoustic noise and environmental vibrations. It ensures that transmission systems outfitted within compliant enclosures in urban or congested areas, like suburban neighborhoods, will pass noise tests with the neighbors.

Our Outdoor Enclosures are built off-site and delivered by vehicle will also pass Telcordia standards such as GR-63-CORE, which addresses transportation vibration and shock — ensuring the enclosure reaches the site in one piece.

UAX Outdoor Enclosure

