

2.38 Vehicle Assembly Building (VAB)

Description:

The Vehicle Assembly Building (VAB) is one of the largest and most-recognizable buildings in the world. It was built in 1965 to support assembly of Apollo/Saturn vehicles, and was later modified to support the Space Shuttle Program. The VAB covers eight acres and is 525 feet tall, 716 feet long, and 518 feet wide.

The VAB is a 1,831,549-square-foot facility used to assemble and mate solid rocket boosters (SRB) and an external fuel tank (ET) on a mobile launch platform (MLP) to an orbiter. United Space Alliance (USA) is the prime contractor for the Space Flight Operations Contract (SFOC), and has primary responsibility for shuttle launch preparation operations and launch equipment maintenance and engineering. ISC is responsible for maintenance and engineering of certain VAB support systems, including structural and roof systems, protective systems, high voltage power supply, facility grounding and lightning protection, water and wastewater, utilities, and roads and grounds. The VAB is split into high bay and low bay sections. The 525-foot-tall high bay contains four vehicle assembly and checkout cells (HB 1-4). Bays 2 and 4 face west and bays 1 and 3 face east located between six, 41-story towers (A-F) and a transfer aisle. HB-1 and HB-3 are used for integration and stacking of the space shuttle, ET and SRBs on top of an MLP. HB-2 is used for ET checkout and storage and as a contingency storage area for orbiters. HB-4 is used for ET checkout and storage, as well as for payload canister operations and SRB contingency handling. The 210-foot-tall low bay is divided by the south end of the transfer aisle and contains eight work cells and four, six-story towers (K-N). The work cells are used by space shuttle main engine maintenance and overhaul shops and serve as a holding area for SRB forward assemblies and aft skirts. All towers in the VAB contain operations and maintenance shops, general offices and materials storage space and equipment rooms. A walkway between the Launch Control Center and VAB is located at the southeast corner of the building (fourth floor of Tower D). The facility is constructed of carbon structural steel framework, aluminum siding and luminous plastic exterior wall panels, concrete floors and foundation, and a combination of built-up and membrane roofing. The roof was replaced, and panels and vertical doors were refurbished between 2006 and 2009.

Two large fold up doors are located at the east and west sides of the building and provide access to the high bay work cells. Large sliding doors located on the north and south ends of the building provide orbiter and large equipment access to the transfer aisle. Numerous powered, coiling, roll-up doors, used for ancillary functions

by USA operations, maintenance and logistics shops, are located throughout the building and are maintained by USA. A total of 71 cranes (maintained by USA) are located throughout the building, including two, 250-ton bridge cranes in the transfer aisle.



The massive Vehicle Assembly Building is located in Kennedy Space Center's Launch Complex 39 Area.

Ammonia Servicing:

Not available

Building Management System:

The VAB is equipped with a remote command and control which is operational 24-hours-per-day, seven-days-a-week, and monitors HVAC, power, water, elevator and pneumatics systems inside the facility.

Chilled Water:

Yes

Clean Room:

The VAB is equipped with two clean rooms. The first is the Extended Duration Orbiter (EDO), the second is the Robotic Manipulation System (RMS) Lab. Each is rated as a 100,000 clean work area (CWA).

Electrical Service:

This facility is outfitted with 480 volt, three-phase power at 60 hertz, and can be reconfigured to meet customer requirements

Potable Water:

Potable water tested and verified to be in compliance with the federal government standard is available in this facility.

VAB (Continued)

Compressed Air:

The Utility Annex compressor system feeds the VAB and the orbiter processing facilities. The two on-line compressors are each capable of producing 150 horsepower. The operating pressure is 125 pounds per square inch, with a capable output of 650 cubic feet per minute.

Gaseous Nitrogen:

The maximum gaseous nitrogen (GN2) pressure is 5,600 pounds per square inch gage (psig). The water volume is 4,800 cubic feet so that at maximum pressure there is 1,468,800 cubic feet of nitrogen stored in the GN2 battery.

Gaseous Helium:

The maximum gaseous helium (GHe) pressure provided to the VAB storage battery is 5,660 psig. The volume of the VAB storage battery is 5,200 cubic feet of water volume. So that at maximum pressure there is 1,679,600 cubic feet of helium stored in the battery.

Control Rooms:

Not available

Cranes:

The VAB is serviced by two, 250-ton, and one, 325-ton bridge cranes (east - west), with a 462.5-foot hook height.

The VAB also is serviced by one, 175-ton bridge crane running along the transfer isle (north - south), with a 156-foot hook height.

Relative Humidity:

The VAB does not have HVAC support for the entire facility. Some areas that have HVAC are the towers, labs, and other miscellaneous areas. Extended Duration Orbiter (EDO) Room A/C was designed for 65 gallons per minute at 42 degrees to maintain 75 (+/- 5) degrees F and 40 to 55 percent relative humidity. The Robotic Manipulation System (RMS) Room A/C was designed for 36 gallons per minute at 42 degrees to maintain 75 (+/- 5) degrees F and 30 to 55 percent relative humidity.

Temperature Range:

See relative humidity specifications for temperature range information.



The drifting smoke plumes from the launch of space shuttle Atlantis seem to swirl above the Vehicle Assembly Building (right) and NASA News Center (left) near sunset at Kennedy Space Center.

Uninterruptible Power Supply (UPS):

The VAB is equipped with both UPSs and backup generator power. The specific capabilities and their availability throughout different portions of the VAB facility will be addressed based upon the customer's specific requirements.

Vacuum Chamber:

None

Video Camera/Recorders:

The VAB is equipped with a closed circuit TV monitoring system.

Floor Space:

1,831,549 square feet

Door Height:

High bay doors are 456 feet high, and are comprised of a lower door that is 114 feet high and an upper door that is 342 feet high. Low bay door is 53 feet high.

Door Width:

High bay doors are comprised of a lower door that is 192 feet wide and an upper door that is 76 feet wide. Low bay door is 56 feet wide.

Processing Area:

The VAB has about five acres of high bay space available for many aspects of processing activities.

Office Space:

Due to rules governing the storage and use of ordnance within close proximity to office space, the office space within the VAB currently is used for storage.