

## 727 Fuel System

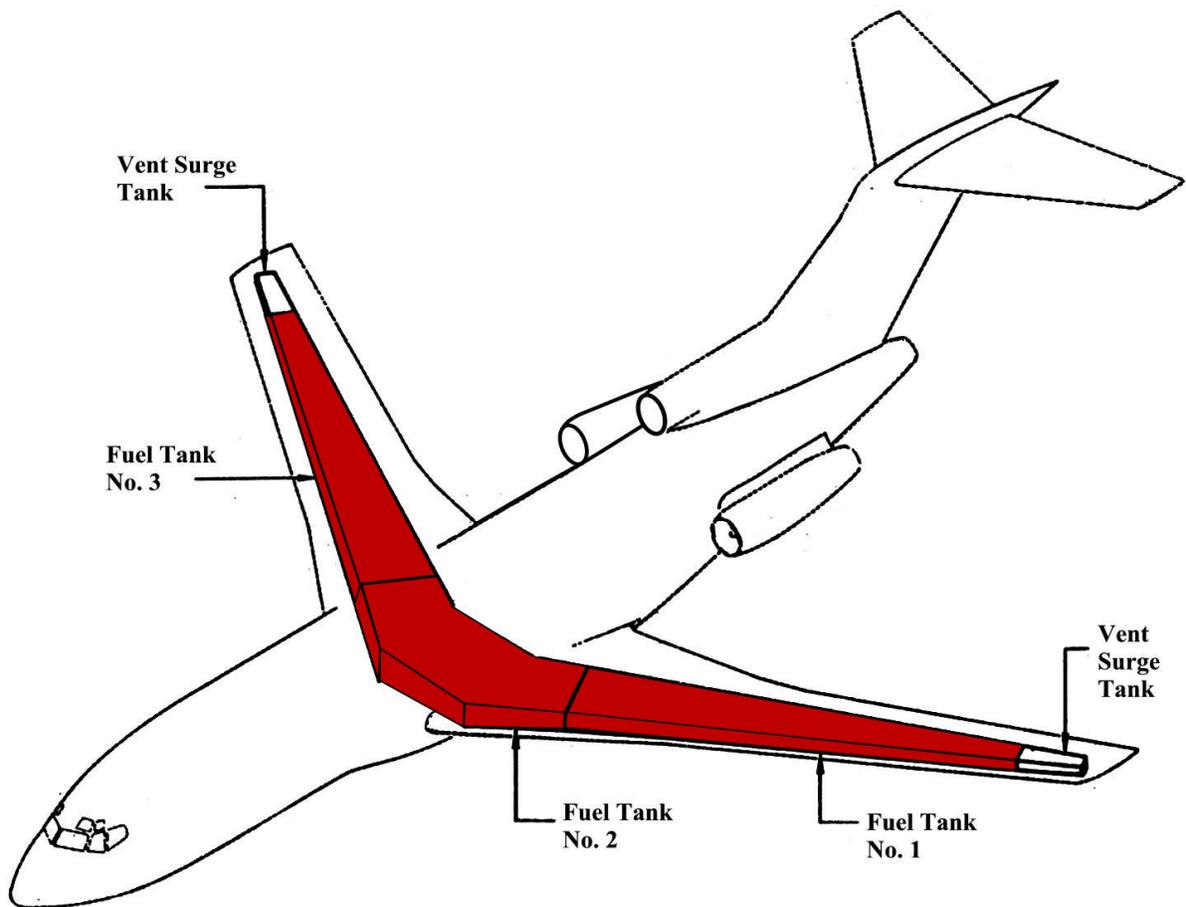
### General

Fuel is stored in both wing and a center tank. Total fuel capacity is 767 gallons or 50,800 pounds.

U.S. gallons	Pounds
L/M. 1793	11,500
R/M. 1793	11,500
Center 4086	27,800

Maximum asymmetrical load 1000 pounds. Type of fuel used is Jet-A weight 6.77 pounds per gallon.

The Aircraft has 2 vent/surge tanks, one at each wing tip used for thermal expansion. Their capacity is 27 gallons each.



**Fuel Tank Arrangement**

## **A. Fuel Panel**

Location: Bottom leading edge RT wing.

1. The fuel panel is equipped with a fueling control switch, two fueling receptacles, three fueling shutoff valve switches, indicator lights and three fueling quantity indicators.

## **B. Refuel Valve**

1. There are three electrically operated valves mounted off the wing front spar, two in the right wing one in the left.
2. The valves are operated by 28 volt D.C. power from the aircraft power supply or internal power supply.

## **C. Defuel Valve**

1. The defueling valve is a manually operated, semi-submerged, slide-type shutoff valve which controls fuel flow to the fueling and dump manifold from the fuel crossfeed manifold.

## **D. Fuel Vent System**

1. The fuel tank vent system prevents damage to the wing structure by providing positive venting of the integral fuel tanks.
2. During flight, impact pressure is applied to the ram air vent scoop to maintain a positive pressure on the fuel.
3. A 27 gallon surge tank outboard of fuel tank #1 and 3 provides fuel surge capacity.
4. Vent ducts formed by sealed, hat-shaped, upper wing skin stiffeners, connect the vent surge tanks to each fuel tank.

## **E. Fuel Tanks**

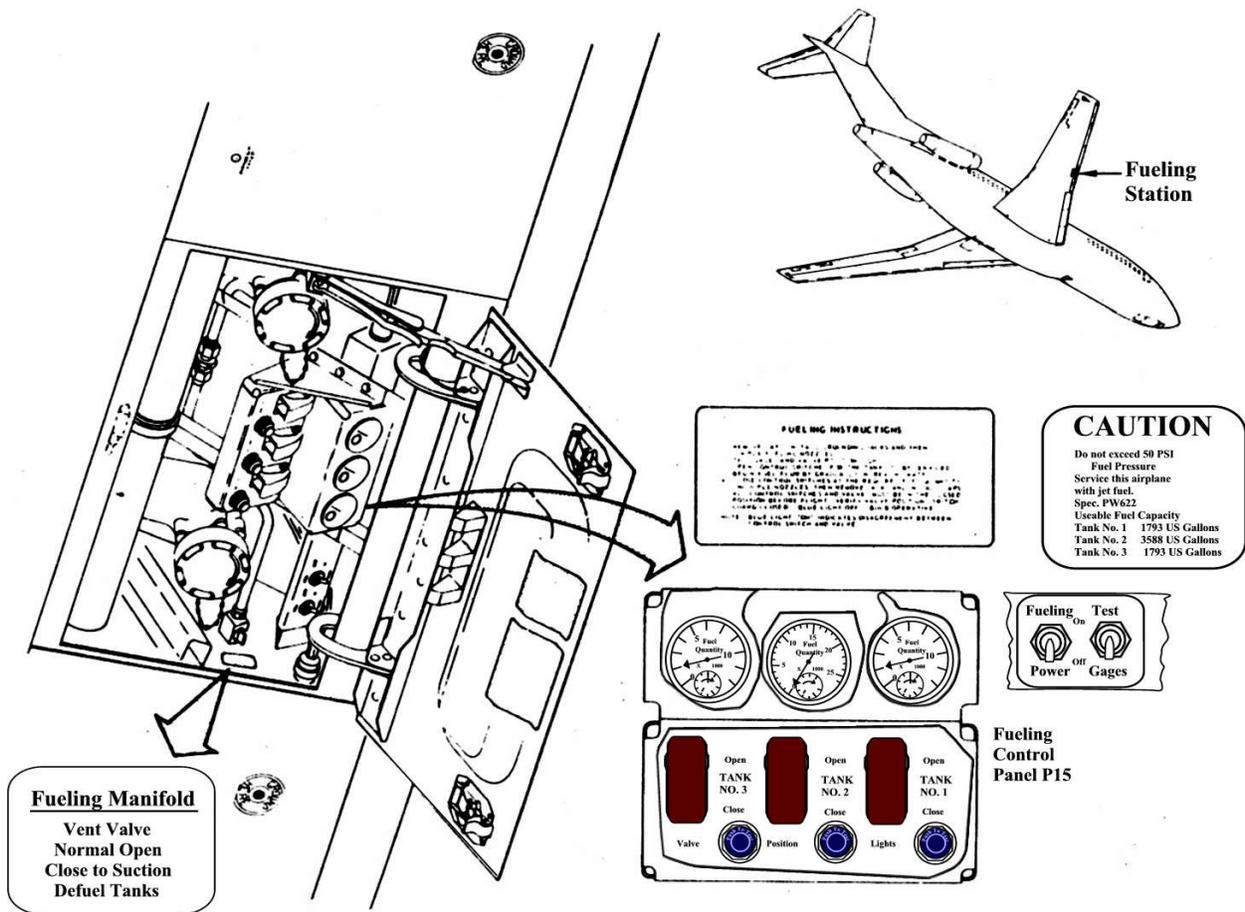
1. 1. The integral fuel tanks provide the major portion of the fuel supply storage capacity. The tanks are located in the interspar area of each wing and are designated as tanks No. 1, 2 and 3. Tank No. 1 is contained entirely in the left wing and tank No. 3 entirely in the right wing. (See figure 1.) Tank No. 2 consists of an integral portion in each wing plus removable cells in the wing center section.
2. Fuel tanks 1 and 3 are each fitted with an overwing filler port.

## **PRESSURE FUELING**

### **General**

A. The pressure fueling system provides a rapid means of filling the fuel tanks on the aircraft. The pressure fueling system distributes fuel under pressure from the fueling station in the right wing to the fuel tanks, through a system of fueling lines and valves. (See figures 1 and 2.) The fueling rate is 600 gpm at a maximum delivery pressure of 50 psi.

B. The fueling station is equipped with a fueling control switch, a fueling receptacle manifold, two fueling receptacles, three fueling shutoff valve switches and indicator lights, three fueling quantity indicators, an indicator test switch and fueling station illumination lights. (See figure 1.) Each fuel tank is provided with an electrically-operated fueling shutoff valve and a restricting orifice plate. (See figure 1.)



**PRESSURE FUELING STATION**  
**Figure 1**

C. The fueling operation consists essentially of coupling the fueling hose nozzles to the fueling receptacles, opening the electrical fueling shutoff valves and pumping fuel into the fuel tanks. The fueling quantity indicators allow the servicing personnel to fill the tanks to a predetermined level when a full fuel load is not required. The fueling volumetric top-off units provide an automatic shutoff feature when the tanks are full, and thus prevent overfilling the tanks.

**Fueling Receptacle**

A. Two fueling receptacles mounted on the forward face of the right wing front spar provide the means of connecting the fueling hoses to the pressure fueling system. (See figure 1.) Each receptacle consists of a fueling hose adapter, a cast aluminum elbow connecting the adapter to the receptacle manifold, a cap and a spring-loaded valve. Each fueling hose adapter has mating lugs which couple with and secure the fueling hose. When the hose is coupled to the adapter, a plunger in the hose nozzle opens the spring-loaded valve to allow fuel to flow into the tanks.

B. When not in use, each fueling receptacle is covered and sealed by a receptacle cap. Each cap engages the lugs on the fueling hose adapter in the same manner as the fueling hose; when the cap is in position, the seal in the cap is forced against the adapter to seal the inlet to the adapter. To prevent loss of the caps, each cap is secured to its respective adapter with a piece of chain.

## **Fueling Receptacle Manifold**

A. The fueling receptacle manifold is mounted on the aft surface of the wing front spar, inside the fuel tank, and is the collection and distribution center for the pressure fueling system. (See figure 1.)

## **Fueling Shutoff Valve**

A. Three electrically operated fueling shutoff valves mounted on the wing front spar, two in the right wing and one in the left wing, provide the means of controlling fuel distribution to the fuel tanks during refueling. (See figure 1.) Each valve is an electric motor-driven slide shutoff valve with a manual override handle. The manual override handle provides a visual check of the valve position, and a manual method of positioning the valve when the electric motor is not energized. The inlet and outlet ports of the valve are contained in a fitting mounted inside the fuel tank, while the motor and gate assemblies are mounted outside the tank. Each valve contains a thermal relief valve to relieve valve housing pressure due to thermal expansion of the fuel in the fueling lines and manifold.

B. The valves are operated by 28 volt dc power from the airplane power supply or external power supply, and are controlled by individual switches on the fueling control panel. Indicator lights mounted on the fueling control panel, adjacent to the switches, are illuminated any time the valve motor is energized.

C. The fueling shutoff valves are similar to the fuel crossfeed manifold valves, except they do not have the thermal relief check valve.

## **Measuring Sticks**

The measuring stick consists of a fiberglass tube, calibrated in pounds, with a sealing head at one end which locks into an adapter in the wing lower surface. The measuring sticks in tanks No. 1 and No. 3 are the same length, The measuring stick in tank No. 2 is longer than the other measuring sticks and therefore is not interchangeable with them.

When the sealing head is unlocked and the measuring stick withdrawn slowly from the tank, fuel enters the top of the stick (tube) and runs down to a small drip hole near the base. At the moment fuel appears, the reading opposite the calibration plane should be noted. Refer to figure 1. This reading is the weight, in pounds, of fuel in the tank if the airplane is at level attitude. To find the tank fuel quantity in gallons, the measuring stick reading is compared with a special conversion chart which compensates for deviation of airplane from the level attitude. The attitude of the airplane is determined with a special attitude gage described in Chapter 8, Leveling. When a reading has been completed, the measuring stick head is inserted into the adapter and locked by rotating clockwise to a stop. The measuring sticks will only indicate fuel quantity when fuel quantity is above 130 gallons in No. 1 and No. 3 tanks, and above 110 gallons in No. 2 tank.

**CAUTION: READ MEASURING STICK CALIBRATION FROM TOP OF STICK DOWN. MEASURING STICK CALIBRATION INCREASES NUMERICALLY FROM TOP OF STICK.**

