

The last measure of protection between the fuel delivery system and the aircraft is the fuelling nozzle, so the equipment must be fail-safe

Making the right choice

The ability to efficiently refuel aircraft is one of the most important functions in successfully operating a commercial airport or military air base. That capability, coupled with the proficiency of flight line personnel, is largely dependent on the quality of the fuelling equipment that is being used. The performance and reliability of this equipment not only impacts on-time departures, it also has a significant influence on the safety of passengers, personnel, aircraft and support facilities.

Nozzle variations

There are four main types of nozzles used for fuelling aircraft: overwing nozzles for small airplanes and some helicopters; underwing nozzles for larger commercial airliners, private jets and military aircraft; fuselage nozzles, also used on larger commercial and military aircraft; and nozzles with built-in swivel end connections that can be used for either underwing or fuselage fuelling points.

What to look for

In the case of nozzles, the best quality products in the marketplace are those that are constructed of highly durable materials for optimum service life, designed for ease of connection and include a variety of built-in safety features.

An ideal choice of material for a nozzle is an aluminum body and stainless steel components. The aluminum

is desirable because its lighter weight affords greater maneuverability during the fuelling process, while reducing wear and tear. The stainless steel components incorporate strength into the nozzle, helping to extend service life.

Built-in features to prevent poor connections help to ensure safe and efficient fuelling. Some manufacturers have added a secondary lock to their nozzles to preclude fuel handlers from connecting nozzles to badly worn single point adapters. This integral safety feature helps to prevent fuel spills that can occur when a tight seal cannot be made between a nozzle and an aircraft fuelling adapter. Another design element is square locating pins in the nozzle end connection to facilitate a better match-up with the square slots on aircraft adapters.

Recent product improvements

The basic configuration of fuelling nozzles has not changed much over the last several years but manufacturers, working closely with commercial and military aviation fuelling equipment users, have added even more features to their designs that have significantly enhanced safety and reliability.

A good example of this is the development of a Hose-End Shut-Off Strainer Ball Valve, which is designed to bolt to the inlet of a fuelling nozzle. The strainer ball valve helps to keep pipeline and hose debris from contaminating fuel. A strainer ball valve equipped with a side port enables maintenance personnel to inspect or clean the



strainer without disassembly, preventing unintentional fuel discharge. It can also be reversed for defueling if the need arises.

Flexibility

Another recent product development that has improved fuelling efficiency and safety is the swivel inlet nozzle configuration. This nozzle type can be used on aircraft with either underwing or fuselage fuelling points. Because it employs square locating pins to ensure proper mating, the swivel nozzle enables easy connection to any aircraft, including smaller jets with reduced size refuelling access points. This product's design alleviates the need for using multiple types of nozzles to accommodate aircraft with different fuelling points.

Its flexible design also helps to alleviate hose stress. Simply by twisting the inlet assembly, a swivel nozzle changes from

0° to 45° or any configuration in between. A built-in primary interlock system prevents the nozzle from being opened when it is not connected to an aircraft adapter. A secondary interlock protects the nozzle from interfacing with worn-out adapters. This type of nozzle cannot be removed from the adapter until the operating lever is rotated to the fully closed position.

End users who are thinking about integrating a swivel nozzle design into their fuelling system should consider the nozzle's head loss. A nozzle with the lowest possible head loss will significantly reduce the time it takes to complete the fuelling process. Swivel nozzles are more commonly used in military applications but can also be used for commercial aircraft. ■

For more information:

This article was written by Mike Uffer, Cla-Val fuelling manager, +1 800.942.6326, mikuffer@cla-val.com, www.cla-val.com

