

THINGS TO KNOW

Before specifying pumps

New pumps take up less space making apparatus more nimble and more capable of carrying non-suppression equipment

Frequently, we refer to the pump on fire apparatus, particularly major pumpers, as the heart of the fire truck. Without a pump, the fire apparatus is nothing more than a very expensive personnel and equipment transportation vehicle.

For many departments their fire apparatus, particularly pumpers, has evolved into the expensive transportation vehicle that delivers personnel and equipment to the non-suppression emergencies like EMS, technical rescue, and hazmat, which represent the majority of call types for many departments.

This evolution is prompting departments to specify apparatus that have shorter wheelbases for increased manoeuvrability in tight spots and that have more compartment space for their non-suppression equipment.

Water-flow requirements

When developing the specifications for the pump on your next piece of fire apparatus, start by determining the most common water flow requirements necessary for your department to provide fire suppression services for your community. Ask yourself questions such as these to get a good understanding of what the pump needs to be capable of doing.

- How good is the available water supply? Is it necessary to pump water through long supply lines because of hydrant spacing? Does the department depend upon drafting from static water sources?
- What kind of water flows are most commonly required for the occupancies in our community: single-family residential; multi-family residential; commercial occupancies like big-box retail, shopping malls, and office campuses; or industrial and manufacturing occupancies?
- What is the community's topography and geography: urban, rural, or wildland urban interface?
- How many lines, and what fire flow, does the department expect to operate from the fire apparatus?
- What is the available staffing for those hose lines?

Pump manufacturers have responded to fire departments' fire apparatus pump needs with an array of new products, from flows per minute, PTO driven pumps, to those with new casting designs and attachments, and from slimmed-down popular models that fit in smaller spaces to high-pressure models useful in pump-and-roll applications.

Apparatus manufacturers are using customized non-manifold fire pumps. These have customized suction and discharge manifolds instead of large and bulky pumps that take up valuable compartment space.

These new technologies are enabling manufactures to be more responsive to fire departments' desire to have apparatus with shorter wheelbases, easier to reach hose compartments for cross-lay hose loads, and pump-and-roll capabilities for all fire engine types. While many of these pumps are PTO-driven they can be split-shaft pumps as well.

PTO pumps come of age

PTO-driven pumps are not just for bush fire fighting apparatus anymore. E-ONE manufactures apparatus with PTO-driven pumps rated up to 5,679 L/min @ 1,034 kPa (10.34 Bar). PTO-driven pumps have a couple of significant advantages for the buyer.

- The cost of this pump is less than a mid-ship pump.
- The Stainless Steel manifold plumbing on these large PTO-driven pumps is quite simple and custom designed enabling E-ONE to prefabricate custom suction and discharge manifolds that meet the customer's needs.
- PTO-driven pumps make for compact pump modules, for increased compartment space in the vehicle.
- They have easier operations because the apparatus operator engages the pump by simply pushing a button in the cab, regardless of whether the truck is in drive, neutral or park.

These savings in weight and space dedicated solely to the pump and manifold can be a huge advantage for fire departments when considering the needs for a pumper and a rescue truck - one vehicle for all emergency needs.

The pump-and-roll capability of a PTO-driven pump increases the fire fighting capability of the apparatus, particularly during wildland interface operations to protect structures.

Incorporating CAFS

CAFS will add a considerable cost to the apparatus. If you are planning this option, make sure that your members understand everything about CAFS and how to use it at a fire scene or you might be wasting your time and money having a system installed if you don't plan on using the system on a fairly regular basis.

A favourite saying of a retired fire chief of the Phoenix Fire Department, is that if you are building a pumper today without a compressed air foam system, it's already obsolete.

Most of the PTO-driven pumps on the market can incorporate a CAFS, where the compressor is integrated into the pump transmission or powered by a second PTO drive. CAFS usually use much lower flow rates, but with PTO-driven pumps, departments still have the ability to provide the big-water fire protection when it is needed.

Because PTO-driven pumps have fewer parts they present less headaches when it comes to repair and regular preventative maintenance. Increasingly, many departments see this as a significant issue, especially those that do not have a full-time service department to maintain their vehicles.

The newer fire fighters entering the fire service today don't have that mechanical knowledge because practically everything in our society is electrical. The more simple design and operation of a PTO-driven pump are making them a more popular choice with fire departments, especially when it comes to the training of new driver operators.

Today's fire chief should be looking for fire apparatus that can support the department's multi-hazard missions, a mission where the fire suppression component has become a lower-frequency and lower-magnitude (fewer big fires) requirement. However, he or she knows they still need a pump capable of providing high water volume for those large fires that still do happen occasionally. This newer generation of PTO-driven pumps provides them with a practical and economical solution.

Purchasing pumps: Single-stage or two-stage?

There are several questions you need to answer before making your selection

There has always been a big controversy about what type of pump to choose when you are writing specs for a new piece of apparatus.

If price is a concern when buying your new pumper, then the choice and size of the pump is another area you need to investigate. First of all, do you need a 7,500 L/min single-stage or two-stage pump or will a 5,600 L/min or 4,700 L/min pump single stage suffice?

The questions you need to ask yourself go on. What do you need to accomplish? Do you need to pump a lot of volume or pressure or, in the case of a two-stage pump, both?

A single-stage pump has one dual suction impeller that takes water in both sides and provides water discharge to all discharge gates.

A two-stage pump has two impellers operating side by side, which gives, the pump operator a choice by the use of a transfer valve with a volume or pressure position.

The newer single stage pumps coupled with today's higher horsepower diesel engines are significantly more efficient and provide better performance than pumps from 20 to 30 years past.

Again it comes down to having the right tool for the right job. You and your apparatus committee ultimately have to decide what is the right choice and the type of operation for your department that you are trying to perform.

Another consideration when designing your new pumper is whether you are planning on installing a foam system based on Class A, Class B Foam (or both), or a complete CAFS.

In any case, proper planning is the key to any apparatus purchase. Install what you feel your department really needs and investigate a great deal before you settle on your options.

For more information and help on Fire and Emergency Truck specifications, contact:

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