

## 10 Tips For Selecting a Burner

**When it is time to choose a burner for your process application, use sound, practical judgment as well as adept know-how.**

With practice, selecting a burner can be an almost intuitive task, but there are many variables to consider to ensure proper burner operation. Some of them are simple common-sense items while others are a bit more complex. Use these 10 tips to aid in your next burner selection.

### **TIP 1: Consider Capacity**

When selecting a burner, capacity is key. Verify that the burner has ample capacity for your process. Too little capacity can cause a reduced workload or prevent your system from reaching the required temperature. This can dramatically affect the bottom line of production, so it is an important selection parameter.

### **TIP 2: Know What Turndown Performance Your Process Requires**

Turndown is the ratio of the maximum capacity to the minimum capacity. For example, a burner with a maximum capacity of 1 million BTU/hr and a minimum capacity of 100,000 BTU/hr has a turndown ratio of 10 to 1. This is an important factor in burner selection because it indicates the flexibility of a burner to handle various load sizes. A larger turndown allows a larger load differential.

The turndown of the burner must be equal to or larger than the turndown required for the process. In other words, the burner must be flexible enough to meet the minimum and maximum heat input requirements. System turndown varies greatly from process to process and in many cases is not large, but it still should be a consideration: Lack of turndown can cause operation issues. Burner turndown usually is listed in the manufacturer's literature.



**As processes get more complex, burner selection can get difficult. You may want to consult a burner supplier to determine if an in-duct air-heating burner like this one -- typically used for makeup air units or dryers -- would be right for your process application.**

### **TIP 3: Know Your Process Temperature**

When choosing a burner, be sure it can meet the temperature requirements of your system. In the burner world, there are two main categories: low temperature and high temperature. Low temperature burners generally are designed to operate below 1,000°F (538°C). Consequently, they are less expensive and are made up almost entirely of metal and components that can handle only lower temperatures, leaving them susceptible to problems if used at higher temperatures. High temperature burners normally are designed with materials that are not as affected by excessive heat. Typically, a refractory block is attached to the outlet of this type of burner, helping to protect any metal parts and enabling the burner to withstand the punishment of high temperature operation.

### **TIP 4: Pick the Right Tool for the Job**

Consider process needs when selecting a burner. Sometimes the products of combustion can spoil a finished good. In this case, one would have to utilize a means of indirect firing. This can be as simple as firing into a tube, effectively sealing the products of combustion from the load, but tube firing is not possible with every burner and can require special considerations. All applications will have some process need that will affect burner choice.

### **TIP 5: Know What Flame Geometry You Need**

Depending on your burner chamber, too long of a flame may cause flame impingement. Impingement can lead to hot spots, which can create other problems. To avoid this, make sure that the burner you select has the flame geometry to fit where you need it to fit. Flame geometries typically are listed in the manufacturer literature.

### **TIP 6: Consider Chamber Conditions That Affect Burner Operation**

When firing into a chamber, be cautious of cross-velocities, which can cause issues with lighting or flame stability. Cross-velocities can be compensated for with a secondary sleeve to protect the flame.

Backpressure also can have an affect on burner operation. Large backpressures can prevent or inhibit gas and airflows to a burner but normally can be counteracted by increasing the burner air and gas pressures. These are relatively simple issues with relatively simple solutions, but if they are neglected, they can lead to problems with burner operation.

### **TIP 7: Understand That Mounting Dictates Burner Choice**

Mounting goes a long way in determining what burner to use for a specific application. The two basic ways to mount burners are wall mounting and in-duct mounting. Wall mounting normally allows for easy access to the burner, but the burner is left more susceptible to the cross-velocity issue.

In-duct mounting puts the fire in the process stream, parallel with the process flow. This can be useful to avoid cross-velocity issues, but because the burner is enclosed in the duct, it tends to limit access, which can make maintenance more difficult. Sometimes this is a problem; other times, it is not.

Many common applications dictate which way a burner can be mounted but some applications can go either way. In applications that can accommodate either style, weigh the benefits of both to decide which way to go.

### **TIP 8: Keep Special Considerations in Mind**

Special considerations include but are not limited to area rating (indoor or outdoor, standard or hazardous), fuel type, fuel pressure, local code requirements and emissions requirements. Some of the special considerations are easily addressed by looking at manufacturer literature; for instance, literature will indicate at a glance if a burner can fire on oil. Other special considerations require a higher degree of knowledge about a particular burner. When addressing more exotic considerations, it is best to contact an expert to ensure that a burner will be compatible. For example, the considerations to operate a burner with a low BTU fuel may require custom modification of the burner nozzle.

### **TIP 9: Ponder Piloting**

Most burners are lit either by a pilot or a direct spark to the main gas. This is a straightforward burner selection point. Some burners can utilize either method for ignition. Due to safety considerations on larger systems, piloting is the norm, but the application may indicate which is the best method to use.

### **TIP 10: Consult with a Burner Supplier**

As processes get more complex, burner selection can get difficult. This is especially true if your application dictates a lot of special considerations. In these instances, it is probably best to contact an expert. The manufacturer, a supplier or a consulting engineer with knowledge of burners should be able to help.