

# Outdoor Fire Feature Basics & the Importance of Certification

Chuck Parsons  
*HPC Fire*

This session will explore the basics of the outdoor fire feature.

- A. Ignition Types:
- B. Importance of appliance certification
- C. Basics
- D. Controls
- E. Safety Considerations
- F. Maintenance

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# Fire Pits 101



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## Ignition Types



### Electronic Ignition:

- Needs Power 120v, 24v or even 12v

*Flame sensing for added safety*

*12v and 24v good for pools, or adding water features*

*Can be tied into home automation and Pool controls*

*Wide Range of Sizing and BTU*

*Easy operation. Wall switch, remote control, timers and automation systems*

*Rarely have any type of flame adjustment*



- Battery Operated

*Usually Flame rectification for flame sensing.*

*Not ideal for outdoor operation.*

*Limited BTU Usually millivolt valve*



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## Ignition Types



### Push Button Ignition with Flame Sensing:

- *Most use safety pilot valve.*
- *May have piezo igniter or battery-operated spark for pilot ignition.*
- *Reliable for outdoor use.*
- *May be limited in sizing, based on safety pilot valve capacity.*
- *Spark to light with flame sensing (fire tables).*
- *Convenience of flame height adjustment.*
- *Does not require power (circuit)*



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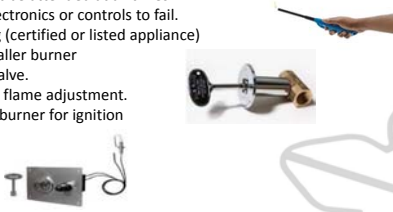
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*Ignition Types*

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**MATCH-LIT**

- No Safety Pilot. Must be attended at all times.
- Very Reliable. No electronics or controls to fail.
- Very limited in sizing (certified or listed appliance)
- Low BTU, equals smaller burner
- Utilizes ¼ turn ball valve.
- Offers wide range of flame adjustment.
- Some offer spark to burner for ignition



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*Certifications and Listed Appliances*

**HPC**  
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- Currently Tested to **ANSI Z21.97/CSA 2.41-2014** – Outdoor Decorative Gas Appliance for U.S. and Canada.
- Many different testing agency CSA, UL, Intertek
- All agencies will test to the ANSI Z21.97/CSA 2.41-2014
- Listed appliance give consumer added confidence.
- Improves Product levels



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*The Basics*

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**Fire Feature Sizing:**

- Broad number of styles available.  
Round, Square, Rectangular, Linear, as well as custom shapes and sizes.
- Large range of sizing from 13” to 54” (round), Up to 120” or longer for linear units
- Fire feature should be proportional to the area of the install. Too large for small or too large for area.
- Understanding of clearances. Know what combustibles are around.
- Bigger Doesn’t always mean better.

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## Know Your Clearances



**Clearances to Combustibles:**  
 Check Manufacturer's clearances before installation.  
 Some may have Multiple clearances depending on size and type of feature  
 All listed appliances will have clearances, included with installation instructions  
 Manufacturers list their own clearances, and then are tested to those clearances with 3<sup>rd</sup> party testing facilities (CSA, UL)

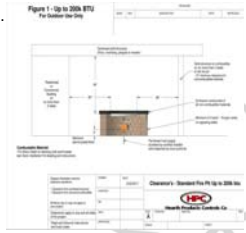


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## Gas Line Planning



**All About the Gas**

- Almost all appliances are built for 1/2lb gas pressure.
- Can't be certified to 2lb or higher gas pressure.
- Know your existing gas pressure. **NG** should operate between **6"-7"W.C.**, **LP** should have an inlet pressure of **11"W.C.**
- Gas Line **sizing** is critical to proper appliance operation.

Pipe Size (inches)	Natural Gas (8.97 w.c.)	
	Capacity (cfh)	Length (feet)
1/2	10	100
3/4	15	150
1	20	200
1 1/4	30	300
1 1/2	40	400
2	60	600
2 1/2	80	800
3	100	1000
3 1/2	120	1200
4	140	1400
4 1/2	160	1600
5	180	1800
6	240	2400
8	360	3600
10	480	4800
12	600	6000
14	720	7200
16	840	8400
18	960	9600
20	1080	10800
24	1440	14400
30	1800	18000
36	2160	21600
42	2520	25200
48	2880	28800
54	3240	32400
60	3600	36000
72	4320	43200
84	5040	50400
96	5760	57600
108	6480	64800
120	7200	72000
144	8640	86400
168	10080	100800
192	11520	115200
216	12960	129600
240	14400	144000
270	16200	162000
300	18000	180000
360	21600	216000
420	25200	252000
480	28800	288000
540	32400	324000
600	36000	360000
720	43200	432000
840	50400	504000
960	57600	576000
1080	64800	648000
1200	72000	720000
1440	86400	864000
1680	100800	1008000
1920	115200	1152000
2160	129600	1296000
2400	144000	1440000
2700	162000	1620000
3000	180000	1800000
3600	216000	2160000
4200	252000	2520000
4800	288000	2880000
5400	324000	3240000
6000	360000	3600000
7200	432000	4320000
8400	504000	5040000
9600	576000	5760000
10800	648000	6480000
12000	720000	7200000
14400	864000	8640000
16800	1008000	10080000
19200	1152000	11520000
21600	1296000	12960000
24000	1440000	14400000
27000	1620000	16200000
30000	1800000	18000000
36000	2160000	21600000
42000	2520000	25200000
48000	2880000	28800000
54000	3240000	32400000
60000	3600000	36000000
72000	4320000	43200000
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### Gas Types



#### Liquid Propane (LP):

- A by-product of natural gas processing and petroleum refining.
- Shipped and stored in pressurized tanks. Due to its low boiling point it vaporizes into a gaseous state as soon as it is released from its pressurized container.
- Operates at a higher pressure than NG, true 1/2LB pressure (11"-14"W.C.)
- It's a heavy fuel. Heavier than air. Sinks, Pools.
- 2 More carbon Molecules (C3H8) than natural gas, burns dirtier than NG



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### Liquid Propane Concerns



Drawback to propane - **black soot** -due to the nature of the desired yellow flames.  
 Sooting issue is reduced with the use of an **Air Mixer** before the burner ring to provide some additional primary air, reducing the sooting.

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### Small propane Tanks (20lb BBQ tank)



Requires different type of certification.

Not useable on larger BTU appliances.

Larger BTU can freeze tank or trip the interior valve on large BTU units

Good For smaller BTU units (35K – 90K)

Not for use on any true Electronic Ignition Fire Feature.

Short burn times (7hrs)

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### Enclosure Basics



There are 3 main considerations to constructing a lasting fire feature enclosure

- *Materials must be noncombustible.*
- *Ventilation of cavity.*
- *Drainage.*

Once these criteria have been met the rest is up to the designer's imagination.



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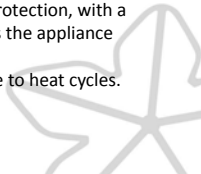
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### Enclosure Ventilation



#### What is the Purpose of the enclosure ventilation?

- Ventilates any trace gases that may be inside the enclosure. Critical for an LP application. Even a NG application may develop a small leak that could fill enclosure with gas over time.
- The Ventilation will purge heat that will build up under operation. Most electronic ignition units have some form of thermal protection, with a limit switch of some sort. Removing the heat prevents the appliance from shutting of on limit.
- Prevents moisture/condensation from building up due to heat cycles. Prevents mold growth.



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### Results Of No Ventilation (LP application)



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## Drainage



Drainage is often a critical and often overlooked element of fire feature planning. This can be critical mistake when installing electronics, and circuits. Due to the masonry detail of most stone enclosures, they are sealed up tight and can retain water, which will eventually fill the enclosure and engulf the electronics and other key components of operation.

The ideal situation is a planned floor drain or drain tile. When this step is overlooked, it can be dealt with by simply installing ventilation openings all way to grade level which will allow the water to drain out of ventilation openings before engulfing electronics.

Most Manufacturers design their equipment to resist water but none are waterproof. Its like submerging electronic controls in a bucket of water.

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## Drainage Problems



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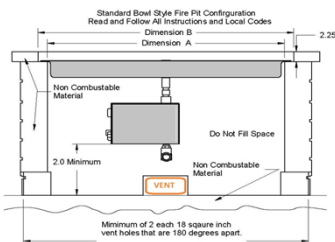
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## Basic Fire Feature Enclosure



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### Controls Operating the Appliance



When talking about common fire feature controls normally we are referring to electronic ignition. There are a number of ways of operating the fire pit.

Simple wall switch to open and close the circuit.

Timers. Again, opening and closing the circuit.

Remote control. Should always be coupled with a wall switch.

Home automation.

Bluetooth/WiFi enabled equipment.

Emergency Stops. Critical for commercial applications.



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### Safety Considerations



Any outdoor gas burning appliance should always be installed by a professional. That's why we are here today.

- NFI Certified technician and installers. (Just a fireplace with no chimney)
- Licensed Plumber.
- Licensed Gas Technicians.
- Always follow Manufacture's installation instructions and local codes



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### Appliance Connectors (Flex Lines)



Never use thread sealant/pipe dope on the flare inlet fitting, or any other flare fitting. This will prevent the mechanical seal and cause leaks at the inlet.



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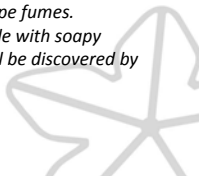


### Leak Checks



- Never use flame for leak checks.
- If pressure test must be done, disconnect gas line from appliance and cap off. Too much pressure can damage some valves.
- Gas Sniffers can be used for general leak locations, but should be followed by a soapy water spray or leak check solution. Gas sniffers tend to be very sensitive and can even be set off by pipe dope fumes.
- Proper way to leak check a gas line is to use spray bottle with soapy water and soak each joint and all fittings. The leak will be discovered by the telling bubbles at the leak.

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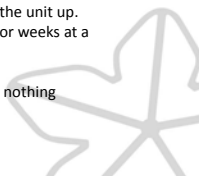
### End User Maintenance



Fortunately, most fire features are simple and easy. Bi yearly maintenance should be performed to maintain equipment. The warranty may depend on some maintenance as well.

- Keep the unit free from debris. Remove sticks, twigs, leaves and other combustible material.
- Keep all ventilation opening free of debris.
- If the unit will be unused for extended periods of time, cover the unit up, especially in northern climates where snow may sit on them for weeks at a time.
- Keep drainage free from clogging debris.
- Do not cook on the fire feature. Hot dogs and smores are fine nothing beyond that.
- Burn the fire feature as often as you can.

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### Thank You



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