

Report

## Bonfire

NS-EN 16510-1:2022 Residential solid fuel burning appliances – General requirements and test methods

Author(s):

Asbjørn Østnor



# Bonfire

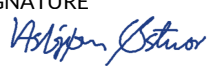
VERSION 2	DATE 2023-09-20
AUTHOR(S) Asbjørn Østnor	
CLIENT(S) Bålstedet AS	CLIENT'S REF. Geir Egholm
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TEST OBJECT Bonfire	TEST OBJECT RECEIVED 2023-08-10
TEST PROGRAMME NS-EN 16510-1:2022 Residential solid fuel burning appliances – General requirements and test methods	TEST LOCATION RISE Fire Research
	DATE OF TEST 2023-08-24

## SUMMARY:

Because there are no test standard for safety test of Fire pits, the tests are based on the test method for heating appliances EN 16510-1:2022.

The distance to a combustible wall shall be minimum 700 mm without reflector.

With reflector the distance to a combustible wall shall be minimum 800 mm

PREPARED BY Asbjørn Østnor	SIGNATURE
APPROVED BY Asbjørn Østnor	SIGNATURE 
REPORT NO. 20012-115 B	CLASSIFICATION Restricted
	CLASSIFICATION THIS PAGE Restricted

## History

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VERSION	DATE	VERSION DESCRIPTION
1	2023-09-15	First version.
2	2023-09-20	The temperature on the wall (700 mm distance) in Table 2 was given in °C and not in K. This is corrected.

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## 1. Product description

Product name:	Bonfire
Manufacturer:	Bålstedet AS
Place of production:	USA
Variants:	-
Sampling:	The tested fireplace was selected by the client.

Bonfire is a fire pit for outdoor use made of stainless steel (304). The burning chamber has holes in the top for preheated air.

Dimension of Bonfire:

Height 35.5 cm

Diameter 49.5 cm

Weight of stove 9 kg

Weight of deflector 2.8 kg

## 2. Test performance

The safety test performed in accordance with NS-EN 16510-1.

Operators:	Asbjørn Østnor
Conditioning of the test material:	NA
Number of single tests:	2

## 3. Remarks/deviations

- The requirements for temperatures on combustible materials are degrees Celsius above ambient temperature in Kelvin.
- The safety tests are based on the method in EN 16510-1, but the batch load are adjusted to the burning chamber of the fire pit.

## 4. Test results

### 4.1. Safety test

*Table 1: Test fuel specifications - Safety*

Test fuel specifications - Safety	
Fuel type	Fir timber
Moister content	14 %
Lower calorific value ( $H_u$ )	17.430 MJ/kg
Size, length	2" x 2", 150 mm

The safety test was performed with the fire pit placed in the test hearth with ceiling. Key figures and measured temperature rise are presented in Table 2 and 3.

*Table 2: Results from safety test 1.*

	UNIT	RESULT	REQUIREMENT
Duration	h	2.83	-
Wight of one batch, average	kg	4.26	-
Weight of test fuel, total	kg	17.03	-
Moisture content in test fuel	%	14	-
Combustion velocity	kg/h	6.02	-
Lower calorific value	MJ/kg	17.43	-
Ambient temperature	°C	24	-
Wall (700 mm distance)	K	61	≤ 65
Floor	K	24	≤ 65
Ceiling, 2.2 m above floor <sup>1)</sup>	K	65	≤ 65
Outside surface of fire pit pit <sup>2)</sup>	K	250	≤ 35

<sup>1)</sup> Some sparks can reach the ceiling and can cause higher temperatures than measured. Use of ceiling will be at the owners responsibility. Each load of wood should be small, and consist of hardwood like birch.

<sup>2)</sup> You need tool or protective gloves to touch the fire pit during operation.

Table 3: Results from safety test 2 with reflector.

	UNIT	RESULT	REQUIREMENT
Duration	h	2.0	-
Wight of one batch, average	kg	3.78	-
Weight of test fuel, total	kg	11.35	-
Moisture content in test fuel	%	14	-
Combustion velocity	kg/h	5.68	-
Lower calorific value	MJ/kg	17.43	-
Ambient temperature	°C	24	-
Wall (800 mm distance)	K	64	≤ 65
Floor	K	26	≤ 65
Ceiling, 2.2 m above floor <sup>1)</sup>	K	64	≤ 65
Outside surface of fire pit <sup>2)</sup>	K	250	≤ 35

<sup>1)</sup> Some sparks can reach the ceiling and can cause higher temperatures than measured. Use of ceiling will be at the owners responsibility. Each load of wood should be small, and consist of hardwood like birch.

<sup>2)</sup> You need tool or protective gloves to touch the fire pit during operation.

## Appendices

### A Evaluation of safety distances

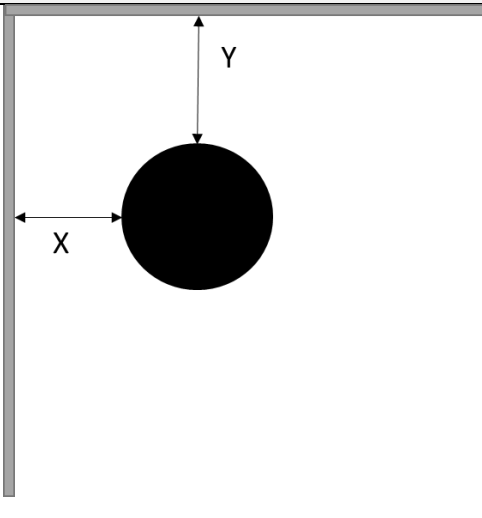
### B Pictures

### C Description of test item

## Appendix A - Evaluation of safety distances

According to the test results from safety testing, distance from the stove to combustible walls has to be minimum 700 mm without deflector and 800 mm with deflector.

*Table 4: Declared minimum safety distances assessed by RISE Fire Research based on performed safety test of Bonfire.*

RISE evaluation of safety distances		
		
Bonfire	Combustible wall	
	x [mm]	y [mm]
Minimum distances	700	700
Minimum distances with deflector	800	800

## Appendix B - Pictures



*Picture 1: Bonfire with test fuel*



*Picture 2: Bonfire with deflector.*



## Appendix C - Description of test item



### SOLO STOVE FIRE PIT STAND

Instructions & Other Information



**⚠ Must read before use. Failure to do so can result in serious injury or death.**

Vor Gebrauch unbedingt lesen. Andernfalls sind schwere Verletzungen oder Todesfälle möglich. **HIER SCANNEN.**

À lire absolument avant toute utilisation. Le non-respect de cette consigne peut entraîner des blessures graves, voire mortelles. **SCANNER ICI.**

Leer antes de usar. El no hacerlo puede resultar en lesiones graves o muerte. **ESCANEE AQUÍ.**

Lezen voor gebruik. Het nalaten hiervan kan leiden tot serieuze verwondingen of de dood. **SCAN HIER.**

Da leggere prima dell'uso. In caso contrario, possono verificarsi lesioni gravi o morte. **SCANSIONA QUI.**

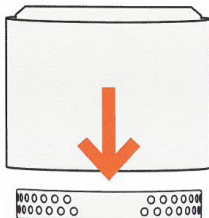
**SCAN HERE**



## HOW TO USE YOUR FIRE PIT STAND

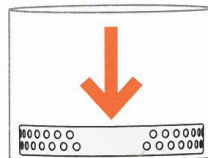
### Step 1

Use your stand to provide extra protection to heat sensitive surfaces such as wood decks. Before lighting your fire pit, place the stand on a level surface and center your fire pit on top of the stand. Light your fire pit and enjoy!

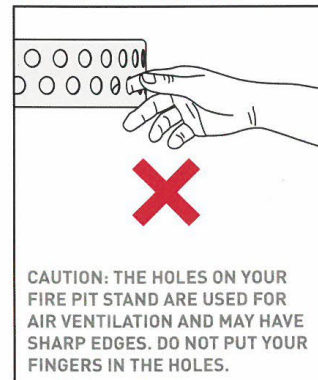


### Step 2

For easy storage, place your fire pit stand directly inside your fire pit. Always place your fire pit in its carrying case or under its wetherproof cover (certain models) when not in use.



### SAFETY WARNING



## TIPS & WARNINGS ABOUT YOUR STAND

Your fire pit stand was designed to elevate your fire pit away from heat sensitive surfaces such as wood decks, but fire pits burn extremely hot, and hot air may still gather underneath. Please use with caution and at your own risk. Never leave your fire pit unattended unless the fire and coals are fully extinguished.

Composite decking (such as Trex, TimberTech, Azek, TIVA, Nexan, and Versadeck) differ significantly in quality and have varying heat resistance ratings. If you plan to use your fire pit and stand on composite decking please check with your manufacturer or builder to ensure your surface can handle high temperatures, or further elevate or insulate your fire pit to avoid potential damage.

**FOR QUESTIONS OR COMMENTS, PLEASE VISIT [SOLOSTOVE.COM/CONTACT](https://www.solostove.com/contact)**

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## SOLO STOVE FIRE PIT<sup>2.0</sup>

Instructions & Other Information



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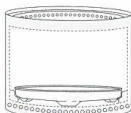


## HOW TO USE YOUR SOLO STOVE FIRE PIT<sup>2.0</sup>

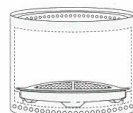
**Step 1** Unwrap your Solo Stove fire pit.  
Remove the nested flame ring and set it aside.

**Step 2** Remove all packaging and items  
inside the fire pit, including the ash pan and  
base plate.

**Step 3** First, position the ash pan in the  
bottom center of the fire pit **(A)**. Then, place  
the base plate in the center of the fire pit until  
it nests above the ash pan. Install the base  
plate with the dome pointed up **(B)**.



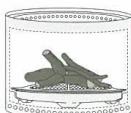
**(A)**



**(B)**

**Step 4** Start to build your fire by placing  
your tinder, kindling, and small wood pieces in  
the center of the fire pit.

*For best results, do not overfill with wood that covers  
or extends above the upper vent holes.*



**Step 5** Light your fire.

**Step 6** Place the flame ring back on top of the  
fire pit with the angled edges pointing upward.

*This will provide protection from the wind and enhance  
the look of the flames.*



**Step 7** As your ember bed gets hotter, start  
adding in 1-3 pieces of wood. As those catch,  
add enough wood to fill the burn chamber.

**Step 8** When you're ready to call it a night,  
let the fire pit burn out on its own.

good moments,  
**SHARED**

Follow us on social media @solostove  
and tag us in your good moments!



#solofirstburn



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## CARE & USE

Caring for your fire pit correctly will maintain its look and prolong usability

### First Use

When you first use your fire pit, the unique double-wall airflow within the unit will take approximately 5-15 minutes to achieve full efficiency. The more evenly your fire burns inside your fire pit, the more prominent the flame pattern showing the secondary combustion will appear.

### Ash Removal

01. Empty the ashes after every fire to maintain optimal airflow and smokeless flames.
02. When the fire pit has completely cooled, brush the remaining ashes on the base plate into the holes to collect in the ash pan below.
03. Lift the removable base plate with two fingers and a thumb using the two center holes to access the ash pan.
04. Lift the ash pan out of the burn chamber and dispose of the ashes responsibly.
05. Clear all remaining debris, ash, and other particles from the burn chamber before replacing the ash pan.
06. Replace the base plate on top of the ash pan with the domed side pointed up.

### Storage

It's important to keep rain and snow out of your fire pit. Solo Stove Shelter is a great cover option and can be purchased separately for all fire pits. For Ranger and Bonfire, you can also use the carrying case included with your purchase.

Prolonged exposure to moisture may result in increased staining or rusting. Due to extremely high temperatures inside, the fire pit may show signs of staining/rust. This is normal and will not affect normal use.

Prolonged exposure to harsh weather will increase rust and discoloration.

### Patina

Due to extremely high temperatures, discoloration of the fire pit will occur and is considered normal. Stainless steel has an increased resistance to rust; however, it is not rust-proof.

### Firewood

For best results, use dried and split hardwoods. Kiln-dried oak and juniper are excellent options.

Overfilling your fire pit above the upper vent holes will decrease efficiency and produce more smoke.

## USER WARNINGS



WARNING! FOR OUTDOOR USE ONLY!

01. Do not use Solo Stove fire pits until you have read the operating instructions and user warnings. Serious injury, death, and/or property damage may occur.
02. Always use Solo Stove fire pits in accordance with all applicable local, state, and national codes. Contact your local fire department for details.
03. Solo Stove fire pits are not toys and can be dangerous. When using Solo Stove fire pits, exercise the same caution you would with an open fire.
04. Do not operate Solo Stove fire pits if under the age of 18 unless under strict adult supervision.
05. Never leave Solo Stove fire pits unattended while hot, especially when children and pets are nearby or when used on or near potentially combustible surfaces.
06. Do not alter or modify Solo Stove fire pits in any manner. Doing so could result in serious injury, death, and/or property damage.
07. Solo Stove fire pits are for outdoor use only.
08. Do not use Solo Stove fire pits for indoor heating. Toxic carbon monoxide can accumulate and cause asphyxiation and possibly death.
09. Do not use Solo Stove fire pits in a building, a garage, or any other enclosed area.
10. Do not use Solo Stove fire pits under any overhead or near any unprotected combustible constructions. Avoid using near any overhanging trees or shrubs.
11. Always use Solo Stove fire pits on a level, noncombustible surface.
12. NOTICE. Exercise extreme caution when using Solo Stove fire pits on or around combustible surfaces. Use on wood or composite decking is at your own risk and can lead to charring or ignition if not adequately elevated, insulated, or misused. Even when using Solo Stove Stand, wood and composite decking materials differ significantly in quality and have varying heat resistance ratings. Check with your manufacturer or builder to ensure your surface can handle high temperatures, or further elevate or insulate your fire pit to avoid potential damage.
13. Do not use gasoline, kerosene, diesel fuel, lighter fluid, alcohol, or any other flammable liquid to light or relight Solo Stove fire pits. Doing so can lead to serious injury or property damage, in particular if the flammable liquid pools in the bottom of the fire pit.
14. Do not lean over Solo Stove fire pits when lighting or when they are in use.
15. Solo Stove fire pits are extremely hot when in use. Never touch or attempt to move your fire pit during use or before it has completely cooled down.
16. Do not lean against or let any body part touch Solo Stove fire pits during use or after use until it has completely cooled down. Any direct contact may lead to serious injury whether accidental or otherwise.
17. Do not lean any objects against Solo Stove fire pits while in use.
18. Do not store or use gasoline or any other flammable vapors or liquids in the vicinity of Solo Stove fire pits while in use. Keep area around Solo Stove fire pits clear and free of any flammable or combustible materials.
19. Do not use Solo Stove fire pits on or near automobiles, trucks, vans, or recreational vehicles.
20. Keep all electrical cords away from Solo Stove fire pits.
21. Do not use Solo Stove fire pits in windy conditions.
22. Do not wear flammable or loose clothing when operating Solo Stove fire pits.
23. The use of alcohol, prescription, or non-prescription drugs may impair the consumer's ability to operate Solo Stove fire pits safely.
24. Solo Stove fire pits are designed for use with standard firewood logs and may not function properly with other fuel sources.
25. Do not use water to extinguish the fire as this could cause damage to the fire pit as well as injury to the user.
26. Dispose of ashes properly! Ashes should be placed into a metal container with a sealed metal lid. Ashes and embers can maintain heat and combustion can occur even after several hours.
27. After a period of nonuse, check your Solo Stove fire pit for signs of damage and creosote buildup. Do not operate until the necessary repairs and/or cleanup is done.
28. Solo Stove fire pits are not for commercial use.
29. Do not burn with the base plate upside down or without the ash pan in place.
30. The removable base plate may not always rest completely flat. The shape of the base plate may continuously fluctuate as it heats and cools. This is normal.
31. Do not throw logs into the fire pit as this may dent or damage the base plate.
32. Do not attempt to move the fire pit until it has completely cooled.

FOR QUESTIONS OR COMMENTS, PLEASE VISIT [SOLOSTOVE.COM/CONTACT](https://SOLOSTOVE.COM/CONTACT)



## SOLO STOVE HEAT DEFLECTOR

Instructions & Other Information



**⚠ Must read before use. Failure to do so can result in serious injury or death.**

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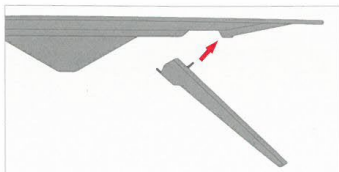
Da leggere prima dell'uso. In caso contrario, possono verificarsi lesioni gravi o morte. **SCANSIONA QUI.**

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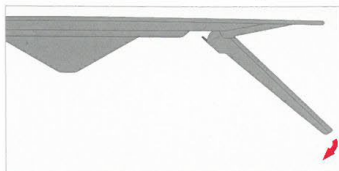


## HOW TO ASSEMBLE SOLO STOVE HEAT DEFLECTOR

01. Insert the **side tab** into position at an angle, as shown.



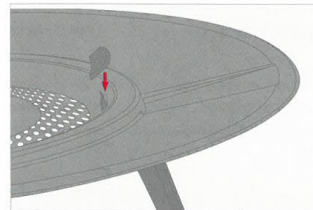
02. Push the **upper tab** into position by pressing inward at the bottom of the leg.



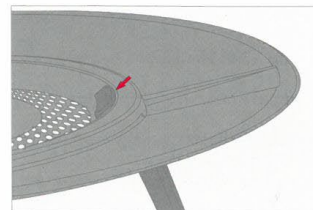
03. With both **tabs** inserted, the leg will appear as shown.



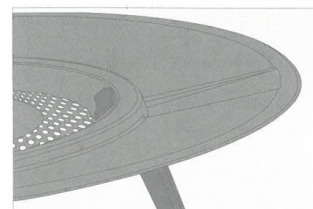
04. Using a **cap**, secure the upper tab from the top-side of Heat Deflector. First push down on the **cap**.



05. After pushing down, press the **cap** in toward the perforated grate.



06. Repeat the steps for each leg to complete the assembly.



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## USAGE GUIDELINES

Heat Deflector is designed to direct heat from Solo Stove fire pits with established beds of coals and even fire levels.

**Do not use the heat deflector if the fire level is consistently near or above the level of the deflector. High fires will reduce the effectiveness of Heat Deflector.**

### 1. Start a Fire

Fire pits should be started, allowed to preheat, and begun to ember before attempting to use the deflector. Depending on your firewood, this may take 10-20 minutes. *Ember is when the firewood begins to char, lighten, and glow.*

A level bed of embers works best with Heat Deflector. Fuel with approximately 4- to 6-inch diameter logs, stacked evenly. Add logs occasionally as needed.

#### Firewood

For best results use dense hardwoods such as **oak, maple, hickory, or mesquite**, as they produce the most heat energy.

Hardwoods such as birch, or softwoods like pine, contain more pitch and resins. While they may create a hotter initial flame, they burn quickly and have less heat density in their embers where most heat is generated.

### 2. Place Heat Deflector

Heat Deflector may be used with Solo Stove Hub, or stand-alone using the included legs and caps. **When assembled, Heat Deflector must always be used with your fire pit's flame ring. Ensure the flame ring is installed correctly, with the ring pointed upward.** Then, place Hub or the leg assembly directly over the flame ring.

Once the fire pit has begun to ember, gently place the deflector onto the fire pit using high-heat gloves. **High-heat gloves should always be worn when working with and around Heat Deflector.**

Ensure that Hub or the legs, depending on how you have assembled Heat Deflector, are firmly nested inside the outer lip of the fire pit.

### 3. While In Use

Heat Deflector will radiate noticeable heat 2-4 feet away from the fire pit. Heat can be felt from ground level to about 3 feet high.

Logs can be added while Heat Deflector is in place, or Heat Deflector can be removed to occasionally stoke and manage the fire.

### 4. Care & Maintenance

Soot buildup may occur on the bottom of Heat Deflector. This is normal, and soot can be cleaned off with soap and water if desired. Ensure Heat Deflector is thoroughly dry before storing.

As soon as your first use, Heat Deflector will show signs of patina, or discoloration. Stainless steel also has a color-changing quality under high heat, which will naturally occur with Heat Deflector.

Heat Deflector may experience some slight deformation as it heats and cools. This is normal and will not affect the performance of Heat Deflector.

Allow to air cool when not in use. Do not rapidly cool the Heat Deflector (e.g. by pouring water onto the surface when hot).

## SAFETY WARNINGS

01. Heat Deflector will be hot during use. Do not attempt to handle without high-heat gloves.
02. Do not attempt to pick up a hot Heat Deflector with sticks or fire pit tools.
03. Do not allow children or pets near Heat Deflector at any time when in use or while cooling.
04. Do not attempt to set Heat Deflector on a fire pit with flames above the bottom level of Heat Deflector.
05. Do not place any objects on Heat Deflector. Do not use the top of Heat Deflector as a heating or warming surface for objects.
06. Do not set a hot Heat Deflector on wet surfaces, such as grass. Do not use in rain or snow as it could result in property damage or injury.
07. Do not block the holes in the top of Heat Deflector, as this will reduce airflow and performance.
08. Do not use a damaged Heat Deflector. Property damage or injury could occur.
09. Do not use Heat Deflector in a manner other than specified. Property damage or severe injury could occur.
10. Store Heat Deflector in a clean, dry area when not in use.

**FOR QUESTIONS OR COMMENTS, PLEASE VISIT [SOLOSTOVE.COM/CONTACT](https://www.solostove.com/contact)**



**RISE Fire Research AS**

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# Verification

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*Finalised on 2023-09-20 13:44:35 CEST (+0200)*

## Signatories

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