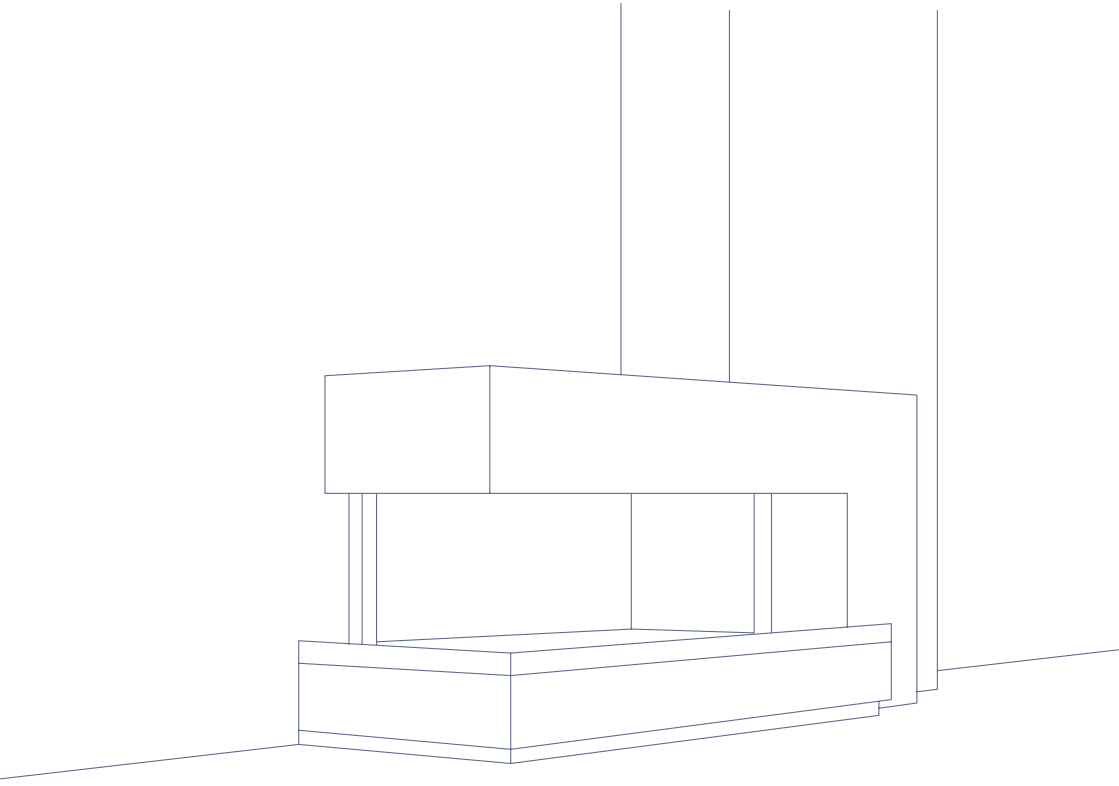
Technical Solutions Fireplaces

DEKTON MANUAL



DEKTON® by COSENTINO

A product designed by COSENTINO®

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1. BASIC CONCEPTS ABOUT EXTREME HEAT

1.1. DEKTON® PARAMETERS ESPECIALLY RELEVANT FOR THIS APPLICATION:

• Maximum temperature: 300 ºC.

• Thermal linear dilation: between 5,1 and 6,5. 10^{-6} • $ºC^{-1}$ (UNE EN ISO 10545-8)

• Thermal conductivity: 0,483 W/m.k (EN 12524)

• Flexural and bending strength: > 59 N/mm^2 (UNE EN ISO 10545-4)

1.2 FORMS OF HEAT TRANSFER: :

• Heat conduction (Heat transmitted through direct contact between objects): Avoid direct contact with heat sources (i.e. incandescent firewood) and metal parts exceeding the maximum temperature (i.e. perimeter frame of the glass enclosure of fireplaces).

• Heat radiation (Heat transmitted between objects without any contact between them): Avoid that effect when the transmitter exceed the maximum temperature (i.e. inside cladding of a conventional fireplace).

• Heat convection (Heat transfer between objects trough the movement of a fluid- gas or liquid-): Facilitate the circulation of air in contact with very hot parts of fireplace, to avoid a continuous and progressive heating because of the lack of ventilation (i.e. fireplaces inside covered blind furniture).

• Direct flame: Avoid direct contact with flame (i.e. in inside cladding of conventional fireplaces in which exists the risk of projecting the flame against the surface).

1.3 PHENOMENA RELATED WITH EXTREME HEAT:

• Always take into account how the material expands when subjected to abrupt changes in temperature (i.e. metal structure of the fireplace) to avoid tensions because of lack of planning of the space for that expansion.

2. FIREPLACE TIPOLOGIES

2.1. CLASSIFICATION ACCORDING TO THE FORM IN WHICH HEAT IS GENERATED

• WOOD BURNING FIREPLACES: Conventionals. Managed temperatures can be very high (more than 500ºC). They are very dirty, sparks can escape at any time. Air intake (release of the smoke) must be through the roof.

• GAS FIREPLACES: They function with natural gas, butane or propane. Temperature and flame intensity can be adjusted and controlled. Heat of the flame and the heat achieved by the metal conduction where the gas moves has to be taken into account. They must have a ventilation to the exterior. It is recommended to protect the wall with an insulating panel. Two types: Embedded or separate like a heater.

• ELECTRIC FIREPLACES: "Electric heaters" that perform a visual effect of fire, but without flame, no fuel is used. The heat is adjustable and fireplaces do not need any release of smoke. 1000-2000 W maximum.

• BIOETHANOL FIREPLACES: They work by burning a liquid fuel called Bioethanol. They do not need air intake or smoke extractor. Although managed temperatures are not as high as in wood burning fireplace, their temperature is still very high.

2.2. CLASSIFICATION ACCORDING TO THE INSULATION MEASURES INCORPORATED

Conventional fireplaces

• Possibility of assembling the parts on construction site

• Usually not insulated thermally (an important part of the heat is transmitted through the walls)

• There is no an industrial manufacturer behind them

• There is no a data sheet about the model with maximum temperatures

Prefabricated fireplaces

• Received at construction site as a whole

• Usually insulated thermally (so that heat is evacuated through an air grille and/or front glass)

• The manufacturer takes responsibility for the solution

• Each industrial model includes a technical sheet

3. POSSIBILITIES OF THE USE OF DEKTON AROUND THE FIREPLACE

COMMON USE

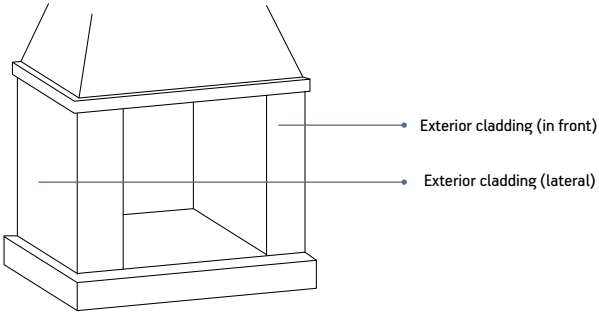
- Exterior cladding in front: separated from heat by a refractory wall (resistant to fire action)
- Exterior side cladding: separated from heat by a refractory wall
- Top furniture (it is usually volumetric, not a horizontal plane)

SPECIALS

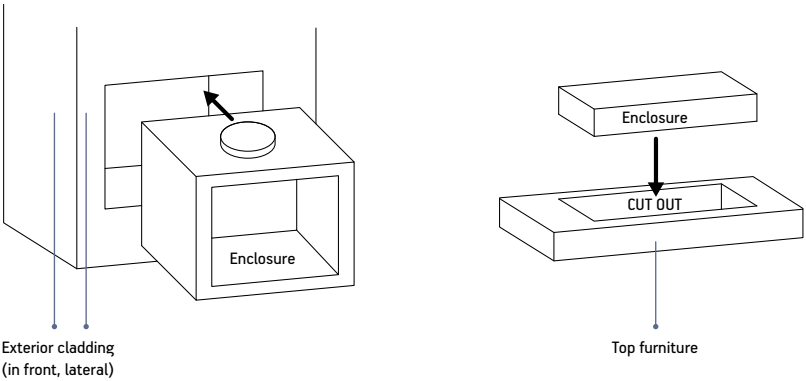
- Interior cladding: It is not recommended

The following images show the fireplace types and diverse possibilities in which Dekton® can be installed:

3.1. CONVENTIONAL FIREPLACE



3.2. PREFABRICATED FIREPLACE



4. ASPECTS TO BE CONSIDERED

4.1. THERMAL ASPECTS

Risks because of extreme heat.

• In opened conventional fireplaces: high risk of exceeding maximum temperature defined in any point of the surface (direct flame, uncontrollable fire, not refractory interior walls and badly solved window frames).

• In prefabricated fireplaces: low risk of exceeding the maximum temperature defined in any point of the surface, but be careful with related phenomena: metallic enclosure that expands and contracts with each use, lack of ventilation.

Particular features according to different uses:

• Tiling. It is necessary to have a separating wall (refractory material) plus isolation so that adhesives can support certain temperature (consult fabricators of adhesive which ones are the appropriate). Reinforcement using mechanical fixing. Take into account that glued materials have limited movement.

• Top furniture / corbel. When fireplace is placed in the center of the cut out of the countertop, it is necessary to leave an adequate space between the heat emitter and the material because of the possible different expansions, heat must go out the top and exposition of the edge of the cut out to the heat must be avoid.

When fireplace is placed below, leave a space of at least 10 cm between the material and the heat emitter, which in any case must be isolated.

• Heat supply circuit. In gas fireplaces, these circuits can reach very high temperatures, that is why it is necessary to take care of the all insulation through all the circuit.

• Vertical shot of the fireplace. It must be adequately isolated to make shooting function and avoid the transmission of the heat to the material.

4.2. OTHER ASPECTS ON WHICH THE FIREPLACE CAN INFLUENCE

Dimensional aspects

Free expansion. Metallic materials (i.E. That can be found in windows of fireplaces) have higher dilatation than dekton®, so to avoid direct contact, leaving a sufficient space (that will depend on the maximum temperature that can be achieved).

Fabrication of the tiling:

• Interior corners. Corners must be carefully fabricated, without chippings and with a minimum ratio of 10 mm. Avoid pressure of expanded metal. Special attention in corners which can suffer double tensions.

• Mitred edges. Mitred edges must be straight from start to finish, without inside corners and changing cut plane (i.E. Of straight mitred edges).

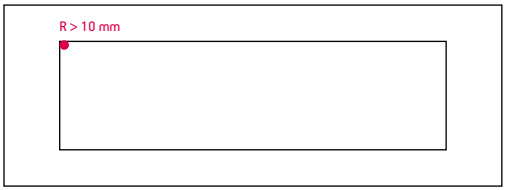
• Joints. If worksurface is long and requires more than one piece, joints will be preferably in the cut out leaving a strip in each piece, instead of the two strips in the same piece. This reduces rounded corners and possible tensions due to temperature changes.

Installation aspects

• Supports. If the structure which supports the countertop is metallic and heats up very fast and/or reaches high temperatures, undesirable effects can be produced (i.E. Tensions in claddings because of the dilation). That is why it is necessary to take precaution during the collocation, guaranteeing that distances are respected in the installation.

Aspects of use

• Hot objects. Both the firewood tray and the container of the combustible are potential emitters of extreme heat. It is necessary to take precaution when handling.



5. PRACTICAL CASES

1ST CASE: FIREPLACE WITH METALLIC STRUCTURE COVERED WITH THE MATERIAL WITHOUT ENOUGH SPACE TO DILATE

Detected deficiency:

Metallic structure exposed to heat of the fireplace (dimensional and installation aspect).

Critical aspects:

Metallic structure of the fireplace reaches several hundred degrees as they are exposed to the heat, expanding centimeters with regard to their size being under room temperature.

This dilation can be produced in several directions, breaking the covering material when pressing it.

Good practices:

It is convenient to design the walls with straight forms, leaving joints, to facilitate movements in both directions.

Leave adequate space between metallic borders and the material.

The material can be glued to the bricks with an adhesive, because they expand similarly and work jointly.

Use refractory products for that application.

2ND CASE: FIREPLACE EMBEDDED IN A FURNITURE WITHOUT INTERIOR VENTILATION

Detected deficiency:

Direct exposure to flame (thermal aspect).

Critical aspects:

Hot stones subjected to heat can reach very high temperatures, therefore their use should be controlled by experts who know how to limit the maximum temperature.

The tray of the burning coals under the top furniture must have a minimum ventilation to avoid extreme heat, superior to the limit fixed.

Good practices:

Avoid contact of hot stones with the surface if the temperature of the particles exceed the maximum.

Place barbecue in the center of the cut out (not having a lot of distance in one side and little in the other).

Take into account that corners next to the fireplace must have bigger radius than the usual ones in countertops, at least 10 mm.

If there is no adequate ventilation of the tray of the burning coals, leave a joint between the countertop and the furniture facing (instead of the mitred edge of the image).

3RD CASE: FIREPLACE CLADDING WITHOUT TAKING INTO ACCOUNT RADIANT EFFECT

Detected deficiency:

Incorrect design of the corners (dimensional aspect).

Critical aspects:

Metal elements reach several hundred degrees as they are exposed to the heat, expanding centimeters with regard to their size being under room temperature.

Good practices:

Leave an adequate space with the metallic structure (at least 1 cm), because they have different dilations.

Study with special attention corners and changes of direction of claddings, anticipating all potential movements of the structure of the fireplace and possible support issues it may have.

Make minimum radius of 10 mm when wall cladding have a polygonal geometry (like in the picture).

ANEXO I.

TYPICAL INSTALLATION OF A PREFABRICATED FIREPLACE ON A CONSTRUCTED FURNITURE COVERED WITH DEKTON®

1. Before starting the fabrication of the fireplace, it is necessary to choose its placement properly, taking into account some factors that affect the use of it.

Verify that all the material needed is prepared: Tools, materials, adhesive, etc.

Start the installation of the supporting structure of the fireplace.

2. Once the structure of the fireplace is made, proceed with the placement of Dekton®.

Use a specific adhesive for the material in which it is made. It must withstand the heat the fireplace will reach

3. All aspects mentioned in this document and instructions given by the manufacturer of the fireplace must be considered.

ANEXO I.

TECHNICAL DATASHEET TYPE OF A PREFABRICATED FIREPLACE AND INCLUDED THERMAL SPECTS

GAS FIREPLACE

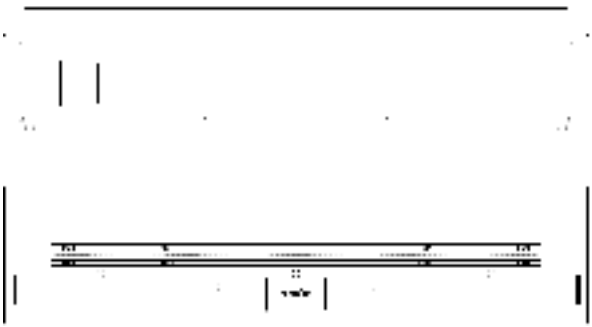
- Dimensions of the structure of the barbecue (important for the cut-outs)
- Pipe diameter (important for ventilation)
- Material in which it is made (important for dilation)
- Heat input/ output (important for thermal aspects)

TECHNICAL DATA

Model	Portofino 50	Units
Heat input maximum	[illegible]	kW
Heat output Nom./Red. Pn	[illegible]	kW
Exhaust type	[illegible]	
Efficiency level	72.5	%
Efficiency class	2	class
NOx	[illegible]	mg/m3
Consumption G20 Nom./Red.	[illegible]	m³/h
Consumption G31 Nom./Red.	[illegible]	kg/h
Press. nom. supply G20/G31	20/37	mbar
Press. nom. nozzles G20/G31	10/37	mbar
Press. nom. nozzles G30/G31 fed.	[illegible]	mbar
Ø burner nozzle G20/G31	[illegible]	mm
Pilot nozzle	[illegible]	mm/h
Power supply x 50/60 Hz	230V/50 / 9V/DC	V
Power input	[illegible]	W
Gas connection pipe	[illegible]	Ø mm
Gas valve-to-burner supply pipe [illegible]	[illegible]	Ø mm
Remote control battery [illegible]	[illegible]	type
Receiver battery [illegible]	[illegible]	type
Electrical protection	[illegible]	
Gas category	[illegible]	
Max flue line lenght (Ø150)	[illegible]	m
Max flue line lenght (Ø200)	[illegible]	m

BIOETHANOL FIREPLACE

- Dimensions of the structure of the barbecue
- Material in which it is made (important for dilation)
- Heat input/ output (important for thermal aspects)



TECHNICAL DATA:

Capacity: 6 L / (US) 1,56 gal / (UK) 1,32 gal

Burning time: 4 - 10 h

Heat output: 2,3 - 8,4 kW / 11938 - 28490 BTU

Net weight: 25 kg / 55 lbs

Air circulation: min. 2m

Minimum room size:
please contact our Project Department for details

Power supply: 230 V / 115 V

Finish:
TOP: brushed stainless steel / optional: RAL colours / optional: black powder coated steel,
CASING: galvanized steel,
GLASS SHIELD: hardened glass

COSENTINO

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