

# CERAMIC HONEYCOMB MONOLITH

## PHYSICAL & CHEMICAL PROPERTIES

### 25X25 Channels

#### Chemical composition (WT%)

chemical components	Porcelain Porous	Porcelain Dense	Mullit porous	Cordierite Porous	Cordierite Dense
SiO <sub>2</sub>	50	32	25.0	44	60
Al <sub>2</sub> O <sub>3</sub>	40	59	69.0	46	26
MgO	7	3	1.3	8.6	7.9
Other	-		-	-	-

#### Geometric Data

Outside dimensions	150 x 150 x 300 mm	5,9 x 5,9 x 11,81 in
Channels	25 x 25 = 625	25 x 25 = 625
Channel width	4.9mm	0.193 in
Inner walls	1.0 mm	0,039 in
Spec. area	540 m <sup>2</sup> /m <sup>3</sup>	164.6ft <sup>2</sup> /ft <sup>3</sup>
Void fraction	68%	68%

#### Physical data

Name	Unit	Porcelain porous	Porcelain dense	Mullit porous	Cordierite Porous	Cordierite Dense
Density	g/m <sup>3</sup>	2.40	2.80	2.30	1.9-2.15	2.4
	lb/ft <sup>3</sup>	150	175	144	119	150
Packing density	kg/m <sup>3</sup>	740	814	740	620	660
	lb/ft <sup>3</sup>	46	50.5	46.3	38.8	41.3
Average heat	10 <sup>-6</sup> K <sup>-1</sup>	6,2	6,2	6,2	3,4	3,5
Expansion coefficient	10 <sup>-6</sup> °F <sup>-1</sup>	3,4	3,4	3,4	1,89	1,94
Specific heat capacity	J / kgK	900	998	998	1016	942
	BTU/lb°F	0,215	0,238	0,238	0,243	0,221
Heat conductivity	W/Mk	2,42	2,50	2,42	1,63	1,89
	BTU in/ft <sup>2</sup> hr°F	16,8	17,3	16,8	11,3	13,1
Temperature change	max K	500	550	550	600	500
Resistance	max °F	900	990	990	1080	900
Softening point	°C	1500	1580	1580	1400	1320
	°F	2732	2876	2876	2552	2408
Max. Temperature	°C	1400	1500	1500	1300	1200
	°F	2550	2730	2730	2372	2228
Open porosity	%	20	3	15	5	20

## 40X40 Channels

### Chemical composition (WT%)

chemical components	Porcelain Porous	Porcelain Dense	Mullit porous	Cordierite Porous	Cordierite Dense
SiO <sub>2</sub>	50	32	25.0	44	60
Al <sub>2</sub> O <sub>3</sub>	40	59	69.0	46	26
MgO	7	3	1.3	8.6	7.9
Other	-		-	-	-

### Geometric Data

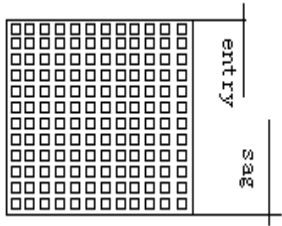
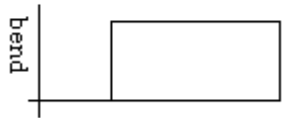
Outside dimensions	150 x 150 x 300 mm	5,9 x 5,9 x 11,81 in
Channels	40 x 40 = 1600	40 x 40 = 1600
Channel width	3.0mm	0.119 in
Inner walls	0.7 mm	0,028 in
Spec. area	825 m <sup>2</sup> /m <sup>3</sup>	251.4ft <sup>2</sup> /ft <sup>3</sup>
Void fraction	64%	64%

### Physical data

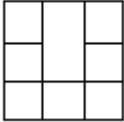
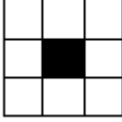
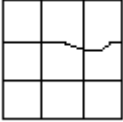
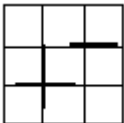
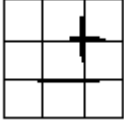
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	lb/ft <sup>3</sup>	150	175	144	119	150
Packing density	kg/m <sup>3</sup>	820	920	740	620	660
	lb/ft <sup>3</sup>	51.3	57.5	46.3	38.8	41.3
Average heat	10 <sup>-6</sup> K <sup>-1</sup>	6,2	6,2	6,2	3,4	3,5
Expansion coefficient	10 <sup>-6</sup> °F <sup>-1</sup>	3,4	3,4	3,4	1,89	1,94
Specific heat capacity	J / kgK	900	998	998	1016	942
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Open porosity	%	20	3	15	5	20

**RTO HONEYCOMB CERAMIC QUALITY CONTROL STANDARDS**

## 1 . Dimensions

Content	definition	Tolerance of dimensions		Test instruments
		A	B	
1.1 Dimensions Length×width× Height 150×150×300 mm	vertical with extrusion  parallel with extrusion	+2.5mm  -1 mm  -----  +2.5 mm  -1 mm	+3 mm  -2 mm  -----  +3 mm  -2 mm	vernier caliper
1.2 convex surface ( concave )	sides surface around  	Max  1.5 mm	Max  2 mm	ruler
1.3 bend	Height  	Max  1.5 mm	Max  2 mm	Ruler and Proof stick
25×25 holes      wall thickness : 0.9~1.3mm      diameter of holes : 4.98 ~ 4.58mm				

## 2 . Appearance Demand

Content	Definition	Tolerance	
		A	B
2.1 web and cell defects	Defect is defined with a depth of $\geq 10\text{mm}$ missing walls are not Allowed to be situated side by side  Missing walls                  plugged holes     Deformed holes    Swollen holes( wall thickness change suddenly into incassation)   	Max2	Max3
		Max2	Max3
		Max2	Max3
100% of pieces checked by optometry			

2.2 face and sides Cracks	vertical with extrusion  parallel with extrusion  crack definition: a width of crack $\geq 0.2\text{mm}$ , a depth of crack $\geq 10\text{ mm}$	max 2 crack with 60mm long         1mm wide	max 2 cracks with 60mm long         1mm wide
2.3 edge and corner chips	Edge chip:	Max.1 chip	Max. 2 chips

Ceramic Honeycomb Monolith

	<p>Comer chip:</p>	<p>Length ≤10mm</p> <p>Width: ≤10mm</p> <p>Depth: ≤10mm</p>	<p>Length ≤15mm</p> <p>Width: ≤15mm</p> <p>Depth: ≤15mm</p>
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1. These standards have combined the German honeycomb standard with our practical condition. We can negotiate upon your special requirement.
2. The standard will be legalized after signature by both sides, and will be served as legal standard for check and accept of the commodity.

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**MATERIAL SAFETY DATA SHEET****1. IDENTIFICATION OF THE PRODUCT AND THE COMPANY**

PRODUCT: Ceramic honeycomb monolith , material: Cordierite any dimentions

MANUFACTURER: Hisina Industrial Co.,Ltd.

DATE OF ISSUE: APR. 10, 2008

**2. COMPOSITION:**

	Percentage	Carcinogen (Y/N)
Aluminum Oxide	46-50	N
Silicon Dioxide	44-45	Y
Iron Oxide	0-1	N
Tianium Dioxide	0-1	N
Calcium Oxide	0-1	N
Magnesium Oxide	8-9	N
Sodium Oxide	0-4	N

The ceramic honeycomb are not a regulated chemical as they don't release or otherwise result in exposure to a hazardous chemical under normal conditions of use.

**3. PHYSICAL AND CHEMICAL DATA**

STATE OF AGGREGATION: SOLID

SPECIFIC GRAVITY: 2.2g/cm<sup>3</sup>SOLUBILITY: in water: insoluble  
in alcohol: insoluble  
other solvents: insoluble

SOFTEN POINT: 1400C

**4. FIRE AND EXPLOSIVE HAZARD DATA**

As sold the material is inflammable and there is no risk for fire or explosive

**5. CORROSIVITY AND REACTIVITY**

Silicate Products may react, although not violently, with hydro fluoric acid or active fluorides.

**6. HEALTH, FIRST AID AND MEDICAL DATA**

a) INHALATION: In normal use dust creation is not possible. Dust can only be created in case of machining, grinding or similar operations normally not foreseen for this products. If dust is created, there is the possibility of breathing in irritant powders. Prolonged exposure to Silica can lead to silicosis. Silica may be a possible carcinogen. More than 97 % of the Silica in this material is chemically bound as Silicates and glass-phase. The content of Silica in the dust of this material is very, very low.

b) SKIN: Absorption: n/a

Handling: These articles are hard and abrasive and may have sharp broken edges.

c) EYE: Dust may cause irritation. Breaking the material may result in fine and sharp fragments.

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In case of contact: irrigate with water. Do not wipe away fragments or particles. Call for medical assistance if fragments are in eyes.

d) INGESTION: n/a

## **7. PERSONAL PROTECTION INFORMATION**

Respiratory Protection: wear dust masks if dust is created

Ventilation: local ventilation recommended if dust is created

Protective gloves: recommended

Eye protection: recommended

Other equipment: adequate covering to protect from sharp edges. Other equipment as customer's policies dictate.

## **8. STORAGE, HANDLING AND USE PROCEDURES**

a) Stacking height of pallets max. 2,5m

b) Avoid rough handling to avert abrading or crushing the articles.

c) Minimize dust.

d) Watch footing if articles fall onto walking surfaces.

e) Protect against sharp, broken edges.

f) Waste disposal method: landfill in accordance with local, state and federal regulation. Be guided by extraneous matter to which these articles may have been exposed in the user's process.

## **9. OTHER PRECAUTIONS**

As sold these articles are solid, inert and non-hazardous. If Customers processing introduces hazardous (toxic), flammable or explosive materials to the articles, be guided by their nature.