

주조 시 발생하는 porosity가 sprue의 길이와 굵기에 따라 주조체에 미치는 영향에 관한 실험적 연구

동우대학 치기공과

=Abstract=

An Experiment on How the Length and the Diameter of the sprue Effects the Size of the porosity, that is Created During the Moduling Process

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This experiment was done to find out how the length and the diameter of the sprue effects the porosity created during the moduling process, which is caused by the metal 's shrinking and stretching action. the experiment was done in two groups(A and B), using experimental gold, and made 10 copings for both groups.

1. In group A, The length of the sprues were given the same, but the diameter of the sprue were 6, 8, 10, 12, 18 gauge. As a result, the porosity came out big with 12 and 18 gauge and for 10, 8, 6 gauge, the porosity was hardly seen or none was noticeable.
2. In group B, the diameter was given the sam for the sprues, but the length of the sprues were 5, 10, 15, 20, 25mm. As a result, the porosity came out big with 25, 20, 15mm the porosity was hardly seen or none was noticeable.
3. The diameter needs to be big and the length, short.
4. The appropriate sized sprue must be chosen for each individual tooth, according to it 's shape and size.

차 례

가

- 1.
- 2.

sprue

I. 서 론

Crown MOD inlay

가

가

가 가

가

가

가
가

spruing

가

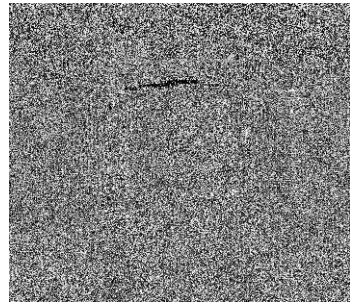
가

가

II. 실험 재료 및 방법

1. 실험재료 및 기구

Sprue, ring, cristobalite(whip mix Co. USA),
, ABF-WAX CERATIVE, vaccum
mixer(whip mix Co. USA), ring furnace, blow
pipe, mimic(SAM SIN, Korea)



1. Plastic die

2. 실험방법

Coping < 1>
 plastic die Wax pattern die
 (Picosep, Renfert, Germany) 24
 gauge wax banding

modeling margin wax(Metalor, Switzerland)
 . Sprue single method ,
 metal ring 가
 1/4 inch (hot sport) 1 700 30
 (1).

1. Sprue

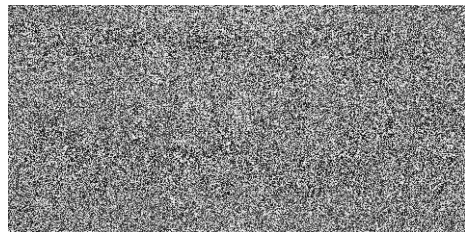
동일 길이 (15 mm)	A 6 gauge	B 8 gauge	C 10 gauge	D 12 gauge	E 18 gauge
동일 굵기 (10 gauge)	F 25 mm	G 20 mm	H 15 mm	I 10 mm	J 5 mm

wax pattern wetting
 agent (cristobalite, whip mix
 Co. U.S.A) (2)
 special liquid
 w/p ratio

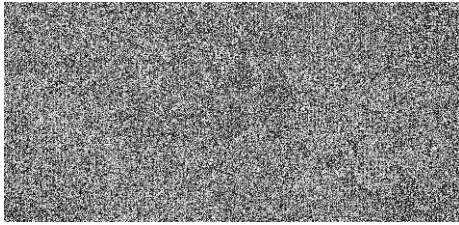
2.

consistency	working time	setting time	ready for burnout	setting expansion
30ml/100g	2~4 minutes	16 minutes	30 minutes	0.50 %
hygroscopic expansion	Thermal expansion (480°C)	Thermal expansion (650~700°C)	Compressive strength (wet)	Compressive strength-dry
1.50 %	1.15 %	1.25	500 psi (35 kg/cm ²)	500 psi (35 kg/cm ²)

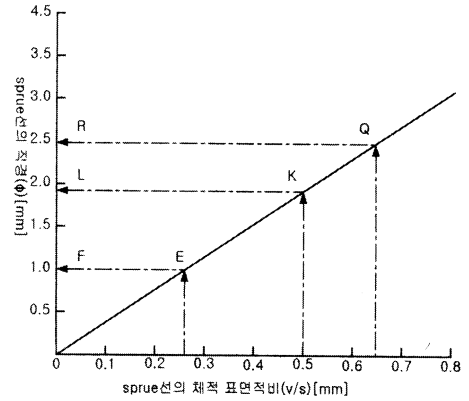
furnace wax 1
 250 30
 Casting MIMIC(SAM SIN.
 Korea) oxygen-propane gas
 가 bottom gold
 casting ring credle
 ring , 2
 가 ,
 Ring sprue
 가 가 가
 가 . Ring
 , 50µm aluminum oxide sand
 blasting (2,3).



2. Sprue

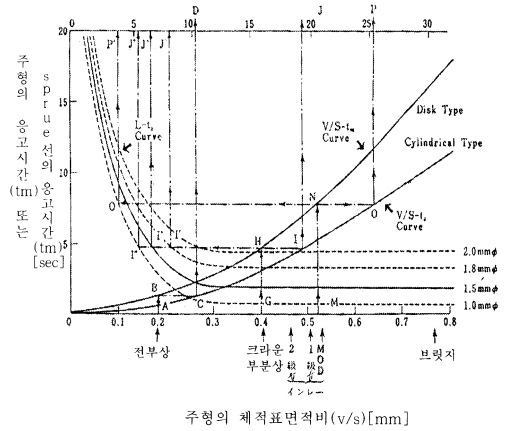


3. Sprue



III. 실험결과

Crown pattern sprue
mm sprue mm
?



가 (4).

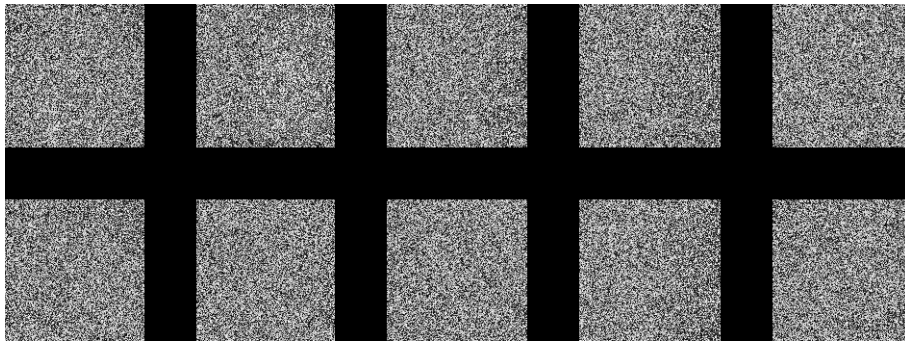
4. Sprue

crown A B C
D E F G H I J
sprue 1mm
crown G H I J
K L 2mm
sprue

hot spot
sprue 30%
sprue

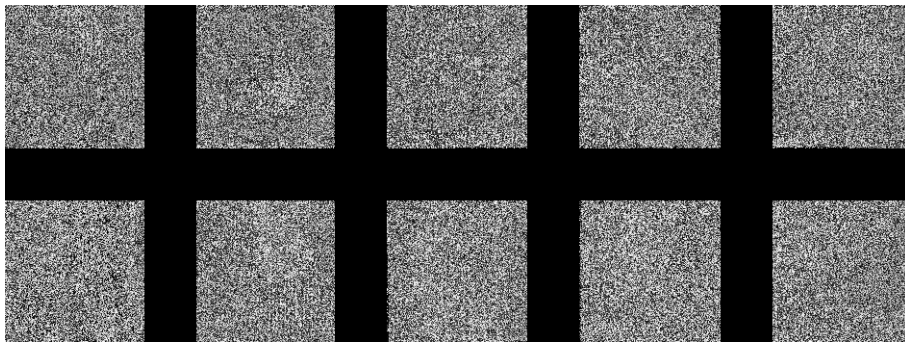
G H
H I' J'
1.8mm 8mm
H I" J"
sprue 8mm 1.5mm
inlay bridge

hot spot 가
A group 15mm
6, 8, 10, 12, 18gauge
18, 12 10, 8,
6
B group 10gauge



A B C D E

5. (A group)



A B C D E

6. (B group)

5, 10, 15, 20, 25mm . 가 . Blow hole
 25, 20, 15 , 가 , ,
 10, 5 . 가 , , 1

IV. 고찰

가
 가
 blow hole Blow pipe flux

2

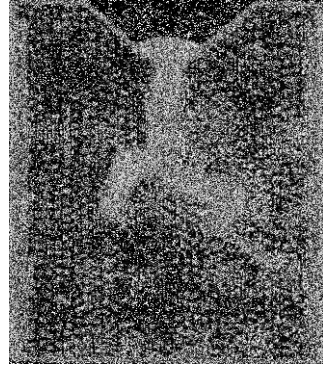
가 가

가

가
가

가
가

가 가



7.

(back pressure porosity)

가

가

가

가

7>

가

가

, crown MOD inlay

가 가

가

pattern

, sprue

가

back pressure porosity

ring
5~6mm

(7).

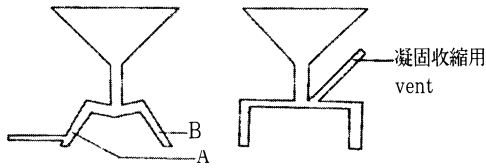
가

가

, 가
vent

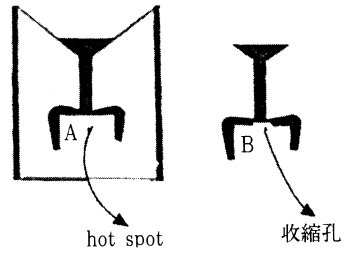
crown

<



좌: MOD Inlay, vent가 있는 A부는 vent가 없는 B부 보다 더 凝固 時間이 훨씬 짧다.
 우: hot spot가 생기기 쉬운 部分에 vent를 세워서 그 部分의 凝固를 빠르게 할 수 있다.

8. Vent



왼편그림 A부에 溶湯이 衝突함으로 hot spot이 되고 이 部分의 凝固가 느려져 오른편 그림의 B부와 같은 收縮孔이 생김

9. Hot spot

가 . 가 , < 9>
 A sprue
 sprue 가
 sprue 가 hot sprue
 spot B . sprue
 sprue , sprue , reservoir blind vent vent가 < 9>
 sprue , sprue hot
 spot vent < 8>
 sprue
 sprue , hot spot
 < 8> hot spot
 A hot spot A group
 가 가 A 15mm 6, 8, 10, 12, 18gauge
 hot spot hot spot 18, 12
 가 B 10, 8, 6
 B B group

10gauge 5, 10, 15,
20, 25mm 25, 20, 15

, 10, 5
sprue ,

V. 결론

porosity 가
sprue
gold A
group B group group
10 coping

1. 6, 8, 10, 12, 18gauge
18, 12
10, 8, 6

2. B group 10gauge
5, 10, 15, 20, 25mm
25, 20, 15
, 10, 5

3. , .

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