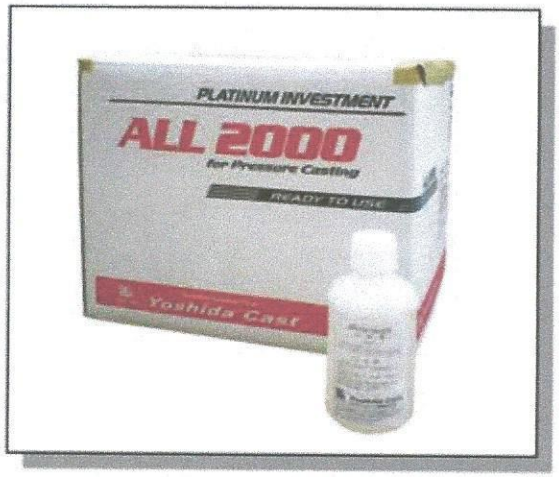
PLATINUM INVESTMENT
ALL 2000
for Pressure Casting
READY TO USE
Yoshida Cast

CAUTION MARK SYSTEM in THIS MANUAL

HINTS&ADVICE :

Information for your better results or/and securing efficiency

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CAUTIONS :

Informing possibilities of FAILURE or/and INJURY

WARNINGS :

Warning HARMFUL RESULTS, SERIOUS INJURIES and/or CASUALTIES

WARNINGS FOR SAFETY

★ this product contents powder of **natural silica crystal**. Well ventilation of working room must be secured in order to not inhale dust and powder. **WARE DUST MASK** when handling. In case of long term of inhalation and respiration of powder silica, you will have **SERIOUS PROBLEMS of your LUNG or/and RESPIRATORY ORGANS.**

★ When molds are rapid cooling, **COLD CRACKING with WATER EXPLOSION**
AVOID STRIPPING action when any person is/are being beside or near you

- Direct contact of powder to your bare skin may creates chapped skin or rough skin.
- When casting mold is burning with furnace, smoke and burning smell comes out due to melting wax. avoid to inhale, or you may feel sick.
- When powder is spilled on clothes, it remains longer even cleaning is done.
- Avoid any contact and keep away from infants and children when it is handled or/and storing.

CAUTIONS for EFFICIENCY & RESULTS

You may have casting failure if blow cautions are not maintained!

- **Notified mixing ratio of each categories must be followed.**
- When PLATINUM LIQUID of providing binder is diluted, calculate and measure exactly.
- Powder quantity and CAST LIQUID must be mixed with exact measurement.
- Dehydration of molds must be done with appropriate conditions.
- In case dehydration process is performed with All 1 powder, confirm moisture of ALL 1 powder.
- During investing or /and after investing, avoid any vibration. Keep the mold in still place.
- Dehydrated molds should be cast within the same day of dehydration. Too much aged molds may create rough cast skin when they are cast.
- Use appropriate furnace which corresponds platinum castings.
- Use appropriate burn-out cycle with proper furnace.
- Do not burn casting mold with 1000C temperature or/and with over 4 hours to secure mold permeability.
- For ecological reason, do not discard waste powder illegally. Consign industrial discarders when necessary.
- During long term storage of PLATINUM LIQUID of a binder, constituent may precipitates. But it can be used normally.
- **Avoid moisture and keep it in dark cool place.**

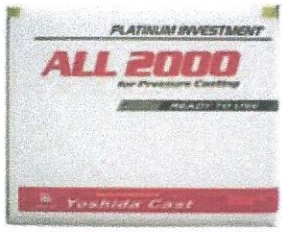
CAUTIONS for MACHINE MIXING / *This product is recommended to use mixing device*

- **SEPARATE MIXING CONTAINERS from one which is being used with gypsum investment powder.**
  Heat with over 800C temperature may decompose gypsum molecules, and this composure create unexpected harmful gas which creates gas porosities.
- **Do not use a mixer for gypsum type investment powder.**
  Due to higher viscosity of slurry than normal gypsum one, a motor of mixer will be damaged if gypsum type mixer is used with this product.

Particle distribution of this product has been accurately controlled by computers and standard quality is controlled with absolute conditions. However, if there is/are case extraordinary quality or anomalous accident happens under a normal usage or storage, please report it to Yoshida Cast or your dialer with your information of condition of usage.

HIGH CLASS INVESTMENT POWDER for PLATINUM PRESSURE CASTING

ALL 2000



100% HIGH CLASS SILICA/w EXCLUSIVE BINDER

PREPERATION for WORKING

Yoshida Cast

◆ PREPARATION

1 Put below ware and protections.

■ WORKING UNIFORM ■ DUST MASK ■ RUBBER GLOVES

2 Required equipment for powder mixing.

■ SCALE ■ LADLE or SMALL SHOVEL ■ MEASURING SYLINDER
■ SPATULA or POWDER MIXER for platinum ■ RUBBER BOWL (when powder mixer in not used)

3 Required equipments for dehydration process.

■ ALMA-RING of higher temperature resistant flask for platinum or steel casting.
■ PAPER PACKING TAPES or RUBBER FLASK CAP ■ STAINLESS CONTENER (flat shape and more than 10 cm depth)
■ ALL 1 platinum investment powder for dehydration process

4 Required equipments for quenching process

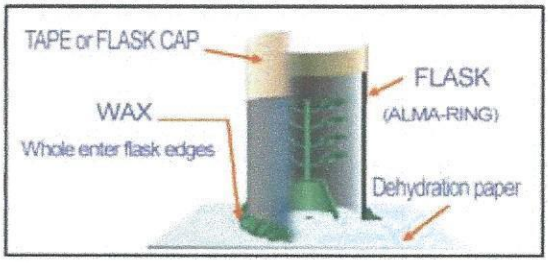
■ PROTECT EYE GLASSES ■ HEAT GLOVES ■ RING-TONG ■ STEEL BUCKET
■ METAL BASKET ■ STEEL WIRE ■ HAMMER

PREPERATION for INVESTING

Yoshida Cast

1 Put an alma-ring flask together with a prepared wax tree which has been attached with a dehydration paper, and vacuum seal with melted wax. (See figure)

2 Put a rubber cap or tape along the top end part of a flask in order to prevent over flowing of powder slurry from the top when the flask is in vacuum process.



HINT & ADVICE

Pour investment slurry should be leveled over 2 cm higher than the top part of a wax tree due to depression of slurry surface by dehydration.

CAUTION!

Secure the distance between the top surface level of investment and the top part of the molded wax tree should be at least 1 cm after completion of dehydration, or the part may tears or breaks when it is cast. Especially if the mold is cast centrifugally, the thickness of the part must be secured enough thickness from the break by force of centrifuge.

PRESSURE CASTING

In case shape of casts is much filigree, ALL 1 powder should be mixed by 1:1 ratio with ALL 89

DILUTION of CONCENTRATE

Yoshida Cast

Add fresh water into the PLATINUM LIQUID, which is provided concentrate to be appropriately used.
And the making dilution is called CAST LIQUID in this manual.

CAST LIQUID for CENTRIFUGAL CASTING = **PLATINUM LIQUID 40cc** + **FRESH WATER 960cc**

MASURE QUANTITY ACCURATELY WITH USING A MASURING CYLINDER

CAUTION!

- There is a possibility of internal collapses in the mold if cast liquid is diluted too much.
- There is a case of unease of breaking cast mold if cast liquid is diluted too less.

MIXTURE RATIO

Yoshida Cast

1 Weigh sufficient quantity of ALL 89 powder and remove them into a mixing container.

2 Calculate right quantity of cast liquid with blow shown formula and pour it into the powder.

FORMULA

HAND MIXING **QUANTITY OF POWDER** × **40% Weight Ratio**

400 cc of CAST LIQUID for 1 KG of POWDER

HINT & ADVICE

Mixing ratio is the same in both hand mixing and machine mixing.

CAUTION!

DO NOT MIX THE POWDER WITH LESS THAN 38% OF CAST LIQUID,
or **MISS FILLING may happen** due to shortage of mold permeability.

More than 38% / for PRESSURE CASTING

1 Pour accurate quantity of CAST LIQUID into a mixing container.

2 Pour weighed quantity powder into poured CAST LIQUID.

3 Start mixing with meddle speed.

4 Recommending time of mixing process is approximately 10 minutes.

Between 34 - 37% / especially for HAND MIXING

1 Pour accurate quantity of CAST LIQUID into a mixing bowl

2 Add 2/3 quantity of total powder quantity into poured CAST LIQUID.

3 Start mixing with a spatula

4 After hand agitation work is easy to do, add remainied1/3 of powder into the slurry.

5 Continue hand mixing till creamy slurry is created. This powder will never solidifies without dehydration.

- In case more than 36% slurry is mixed with a mixer, do not mix over 10 minutes. The slurry will be be harder due to evaporation by mechanical heat. Especially if a mold is cast by pressure casting, permeability of the mold will be less and it may cause miss filling of metal when it is cast.
- When less than 35% slurry is mixed for centrifugal casting, there is a case more than 10 minutes is required.
- Higher mixing ratio of CAST LIQUID may create rougher casting surface.

PRIMARY DEGASSING PROCESS

Yoshida Cast

After mixing process is done, degassing have to be done in order to erase internal bubbles with vacuum.
It may be effective if vibration is applied during degassing process.

PRIMARY DEGASSING PROCESS Approx. **90 seconds** with a vacuum investor

CAUTION!

- **DO NOT OMIT THIS PROCESS** There is a higher risk to have remaining bubbles in molds.
- Confirm if vacuum gauge indicates high vacuum (over -0.09 MPa) in a chamber.

HINT & ADVICE

- This powder will never solidifies without dehydration.

POURING SLURRY into FLASKS (HAND POURING)

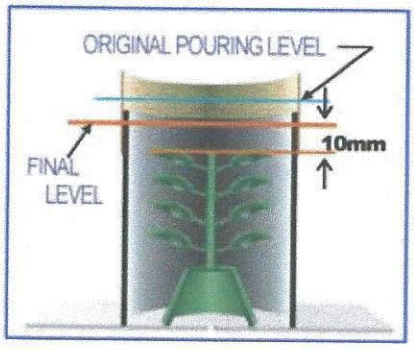
Yoshida Cast

1. Put flasks onto a table of vacuum investor.
2. Slowly pour primary degassed slurry into put flasks.
3. A recommended slurry level in each flask is approximately over 2cm from the top edge of wax-trees in flasks. The same way should be followed in case a WAX-DISK of Yoshida Cast's original way is used.

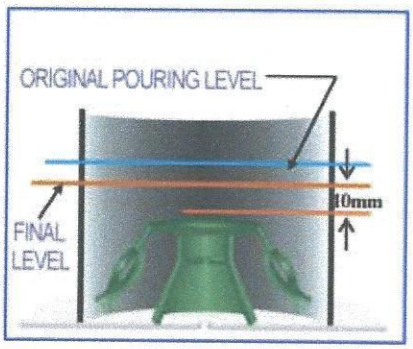
CAUTION!

The thickness between the top part of wax tree and slurry level at completion of dehydration
SHOULD BE SECURED AT LEAST 1 CM

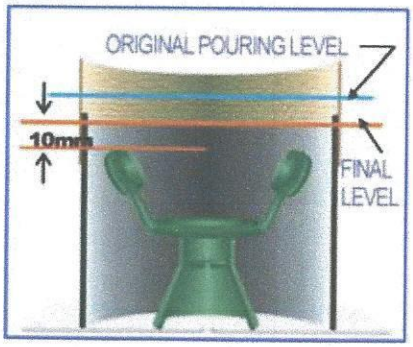
- The final level of slurry will be leveled down to 1cm lower than original level due to dehydration process.



WITH NORMAL TREE FORM



PRESSURE / DOWNWARD



PRESSURE / UPWARD

HINT & ADVICE

Directly contact of pouring slurry to wax tree may create distortion or/and braking of wax patterns.
To prevent this kind of accidents, use a spatula to protect the wax tree from direct contact of pouring slurry.

SECONDLY DEGASSING PROCESS

Yoshida Cast

1 Start a secondly degassing process. It may be effective if vibration is applied during degassing process.

SECONDLY DEGASSING PROCESS Approx. **2 MINUTES** with a vacuum investor

2 After two minutes past, stop vacuum and open molds into air atmosphere.

3 Apply vibration to mold approximately 1 minute in order to settle the slurry onto surface of wax patterns.

DEHYDRATION (IN CASE OF USE ALL 1 POWDER)

Yoshida Cast

1 Prepare a stainless steel flat container and lay ALL 1 powder into the container.

RECOMMENDING SIZE **WIDTH / TO PUT ALL MOLDS DEPTH / MORE THAN 10 CM**

HINT & ADVICE

RECOMMENDED MOISTURE OF POWDER

When the powder is softly held by hand and open palm, lump of powder should remain in the hand. When the powder doesn't stay in lamp shape, moisture of the powder is being shortage.

CAUTION!

- When try powder is used for dehydration, molds may be cracked during dehydration due to faster speed of dehydration process.
- In case if large mass of powder is remained in a hand, too much moisture. If this powder is used for dehydration, internal tear in a mold may happen due to too much moisture remaining after de-hydration process.

RECYCLE USAGE OF ALL 1 POWDER AS DEHYDRATOR

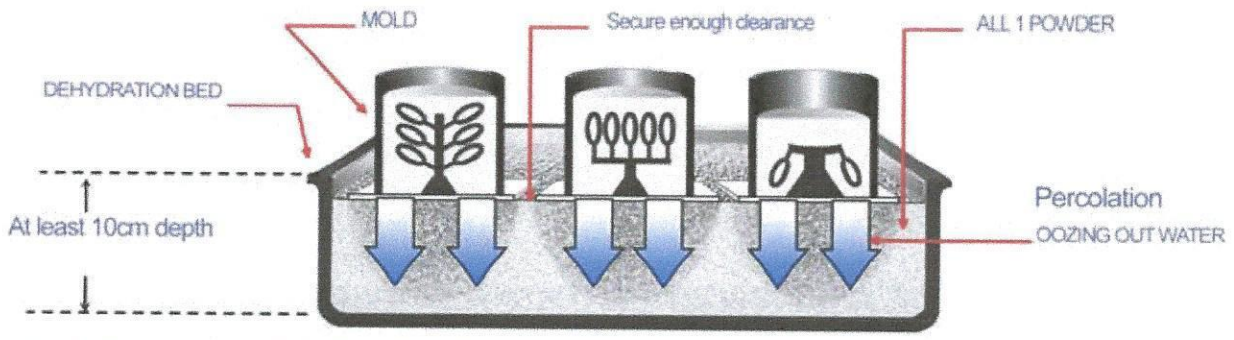
After appropriate dry is processed, ALL 1 can be used. Before the re-use, mix the powder well.

DEHYDRATION with OTHER MATERIALS

Porous fire bricks or/and news paper may be used for dehydration.
When other materials are used, check and test them to be sure if there are possibly used for.

2 Replace molds from the vacuum investor to a dehydration bed. When the mold is moved, use any flat plate in order to prevent dropping wax tree out of a flask from the bottom.

3 Quietly leave molds on the dehydration bet without any small vibration and await 10 hours until it is pre-hardened



1 Gently tear and rip a piece of dehydration paper out from the bottom of pre-hardened mold.

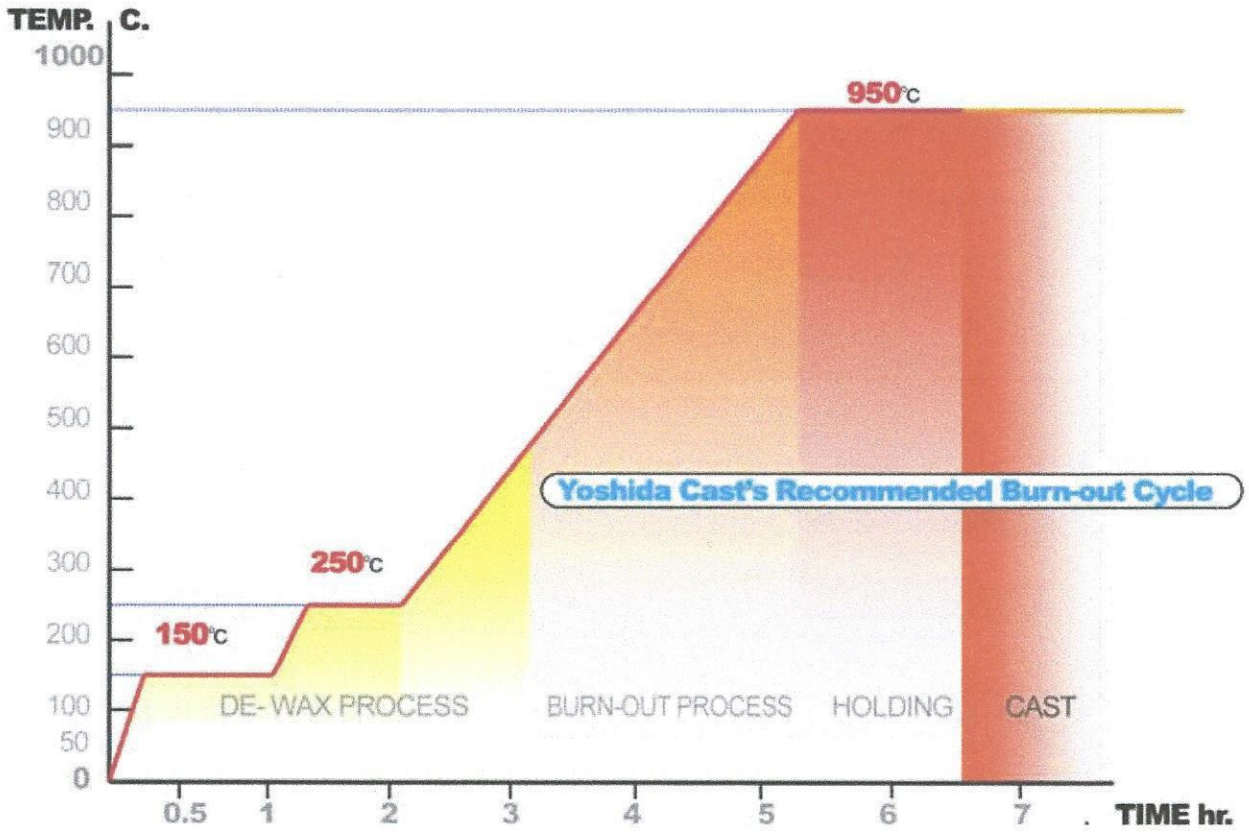
2 Check if there are remainders around or/and in the pouring cup of molds and replace them into a room temperature furnace.

HINT & ADVICE Softly draw a number onto the bottom surface of each mold in order to individually identify the mold how many grams of casting metal should be prepared to cast.

3 Start heating.

BURN-OUT CYCLE

STANDARD BURN-OUT CYCLE WITH NORMAL WAX



step 1	Increase to150°C in 10 min. from room temp.
step 2	Hold 50 min. with150°C
step 3	Increase to 250°C in 10 min.
step 4	Hold 50 min. with 250°C
step 5	Increase to 950°C in 3 – 4 hrs.
step 6	Hold 1 – 1.5 hr. with 950°C
step 7	START CASTING

HINT & ADVICE ★ In case carving wax is desired to be cast, 350°Cholding segment should be added into the cycle to prevent remaining carbon oxide in mold cavities.

CASTING

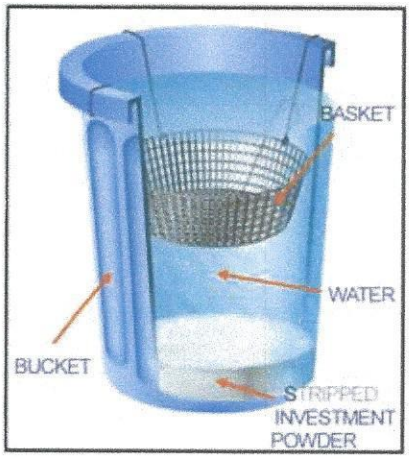
Yoshida Cast

- Replace burn-out mold to a platinum casting machine.
- Select appropriate cast temperature. Proper casting temperature should be decided by the shapes and alloys.
- When appropriate pre-investing process, sprueing, investing, burn-out, mold temperature and cast temperature are secured, good casts come up.

MOLD STRIPPING

Yoshida Cast

1 In case there is no water-jet stripper is not installed, prepare sufficient size of bucket.
Also metal wire basket should be set into the bucket to prevent un-expecting metal loosing during stripping process.
Then pour sufficient quantity of water into the bucket.

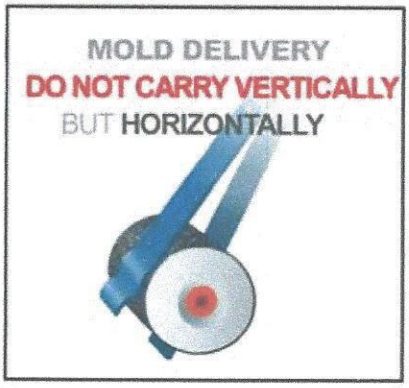


HINT & ADVICE

The recommended mesh size of basket may be approximately 3mm square pitch.

2 After casting, age cast mold few minutes (ex; If Pt/Pd, 5 – 10 minutes cooling)

3 Replace a cast mold and dip it into water to do RAPID COOLING.



WARNING !

- **When cast molds are replaced, use extreme caution.**
  DO NOT DROP A CAST MOLD
- When molds are rapid cooling, **COLD CRACKING with WATER EXPLOSION** is created.
  - Ware **PROTECT EYE GLASSES**
  - Ware **FIRE RESISTANT GLOVES**
  - **Dip** a mold **PARALLELY** to water
  - **Sink** a mold into water **FAST** and **DEEPLY**

- Surface of cast platinum has been glazed. Process to remove the part chemically or use sand blast.

WARNING !

- **HYDROFLUORIC ACID** has been used to remove glazed silica. HOWEVER, this chemical is **EXTREMELY DANGEROUS. Yoshida Cast has been recommending** to any customers who do chemical process on platinum surface to use our **less danger chemical.**
  SILICATOOL Z, which is strong alkaline remover is available to purchase form our distributors to **secure your better safety.**
  CAUTION: SILICATOOL Z is not a safe medicine! REQUIRED APPROPRIATE PROTECTION.

◆ PRESSURE CASTING / DOWNWARD ATTACHMENT (DILUTION 4%)

★ Yoshida Cast recommends to use a mixer for platinum investment

flask size 76Φ×80H (mm)

FLASK	TOTAL QTY	ALL 2000	CAST LIQUID (40%)
1	350 g	350 g	140 cc
2	700 g	700 g	280 cc
3	1050 g	1050 g	420 cc
4	1400 g	1400 g	560 cc
5	1750 g	1750 g	700 cc
6	2100 g	2100 g	840 cc
7	2450 g	2450 g	980 cc
8	2800 g	2800 g	1120 cc
9	3150 g	3150 g	1260 cc
10	3500 g	3500 g	1400 cc

flask size 90Φ×80H (mm)

FLASK	TOTAL QTY	ALL 2000	CAST LIQUID (40%)
1	500 g	500 g	200 cc
2	1000 g	1000 g	400 cc
3	1500 g	1500 g	600 cc
4	2000 g	2000 g	800 cc
5	2500 g	2500 g	1000 cc
6	3000 g	3000 g	1200 cc
7	3500 g	3500 g	1400 cc
8	4000 g	4000 g	1600 cc
9	4500 g	4500 g	1800 cc
10	5000 g	5000 g	2000 cc

flask size 100Φ×80H (mm)

FLASK	TOTAL QTY	ALL 2000	CAST LIQUID (40%)
1	560 g	560 g	224 cc
2	1120 g	1120 g	448 cc
3	1680 g	1680 g	672 cc
4	2240 g	2240 g	896 cc
5	2800 g	2800 g	1120 cc
6	3360 g	3360 g	1344cc
7	3920 g	3920 g	1568 cc
8	4480 g	4480 g	1792 cc
9	5040 g	5040 g	2016 cc
10	5600 g	5600 g	2240 cc

◆ PRESSURE CASTING / UPWARD ATTACHMENT (DILUTION 4%)

★ Yoshida Cast recommends to use a mixer for platinum investment

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FLASK	TOTAL QTY	ALL 2000	CAST LIQUID (40%)
1	500 g	500 g	200 cc
2	1000 g	1000 g	400 cc
3	1500 g	1500 g	600 cc
4	2000 g	2000 g	800 cc
5	2500 g	2500 g	1000 cc
6	3000 g	3000 g	1200 cc
7	3500 g	3500 g	1400 cc
8	4000 g	4000 g	1600 cc
9	4500 g	4500 g	1800 cc
10	5000 g	5000 g	2000 cc

flask size 90Φ×80H (mm)

FLASK	TOTAL QTY	ALL 2000	CAST LIQUID (40%)
1	700 g	700 g	280 cc
2	1400 g	1400 g	560 cc
3	2100 g	2100 g	840 cc
4	2800 g	2800 g	1120 cc
5	3500 g	3500 g	1400 cc
6	4200 g	4200 g	1680 cc
7	4900 g	4900 g	1960 cc
8	5600 g	5600 g	2240 cc
9	6300 g	6300 g	2520 cc
10	7000 g	7000 g	2800 cc

flask size 100Φ×80H (mm)

FLASK	TOTAL QTY	ALL 2000	CAST LIQUID (40%)
1	860 g	860 g	344 cc
2	1720 g	1720 g	688 cc
3	2580 g	2580 g	1032 cc
4	3440 g	3440 g	1376cc
5	4300 g	4300 g	1720 cc
6	5160 g	5160 g	2064cc
7	6020 g	6020 g	2408 cc
8	6880 g	6880 g	2752 cc
9	7740 g	7740 g	3096 cc
10	8600 g	8600 g	3440 cc