

THINKY

An introduction to Planetary Centrifugal Mixers

What is a THINKY Mixer?

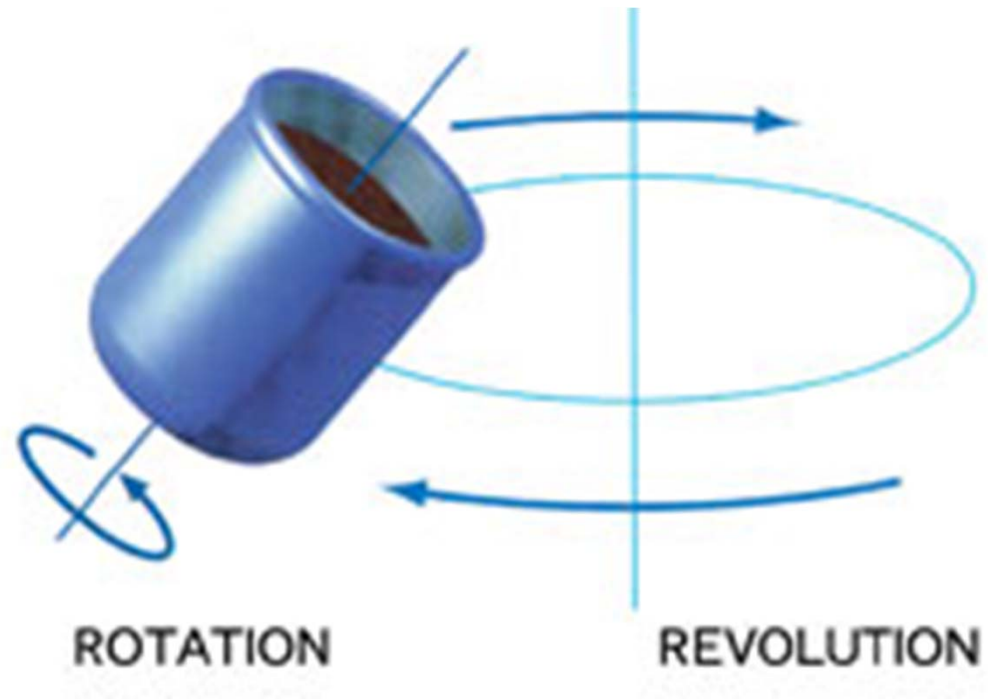
- A THINKY Mixer **mixes**, **dispersed** and **degasses** your materials in seconds to minutes within your own product container
- It can process materials with very low to very high viscosity up to 100 million centipoise (mPa·s)



*Flux paste and solder powder
15 seconds*

How does it work?

- THINKY Mixers use a “planetary” mixing action
- A combination of
 - **Rotation**
 - and
 - **Revolution**



Planetary Centrifugal Mixer Basics

- The material container rotates at a 45° angle whilst it revolves in a set radius
- Intensive circulation of the material in the container under 400G of force results in quick mixing and air being squeezed out

Oil Based Modelling Clay

Start



30 sec



2 mins



7 mins



What can it mix?

- Water-like liquids
- Pastes
- Powders
- Mixtures of liquids and solids
- Mixtures of high and low viscosities

And any combination of these!



What can it mix?

- Adhesives
- Inks
- Cosmetics
- Pharmaceuticals
- Sealants
- LED phosphors
- Nano-particles
- Precious metal fillers



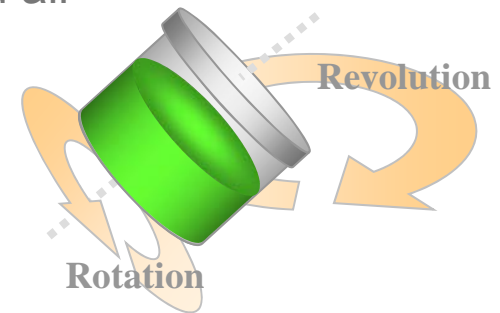
Controlling mixing results

- Different mixing results can be achieved by altering
 - The speed of **Rotation** and **Revolution** and
 - The ratio between them
- There are two standard modes which are used to achieve optimal mixing results
 - **Mixing Mode**
 - **Defoaming Mode/ Degassing Mode**



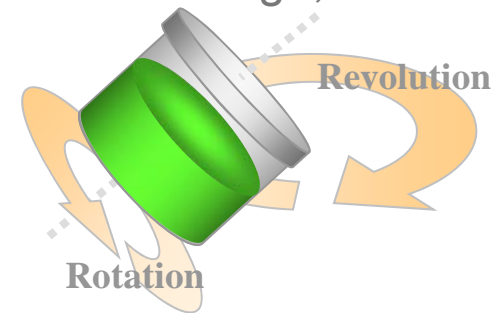
Two modes – 1) Mixing

- The Mixing Mode has high speed **Rotation and Revolution**
 - The ratio between them is 1:2.5
 - Typical speeds are 800rpm:2000rpm
 - With normal spin radius, this provides **400G of mixing force**
- The Mixing Mode achieves fast, homogeneous mix
 - This mixing action adds no air to the materials
 - In fact, it has a tendency to remove entrapped air



Two modes – 2) Degassing

- The Degassing Mode has high speed **Revolution**
 - The ratio between them is 1:36
 - Typical speeds are up to 60rpm:2200rpm
 - It is more similar to a simple centrifuge action
 - With normal spin radius, this provides **510G of force**
- The Degassing mode removes any remaining air
 - Too fast a rotation will separate the material like a centrifuge, although it degasses well



Is it easy to operate?

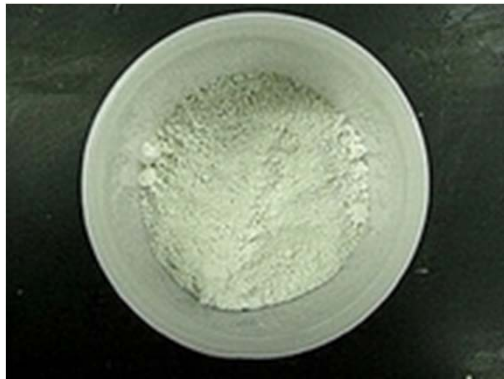
- Load material into the container
- Measure the gross weight & adjust the counter balance dial to suit
- Set the time, speed & mode
or
- Recall a previously saved program or recipe
- Press the start button

- Up to five mixing profiles or recipes can be registered in memory slots and recalled



What is multi-step mixing?

- Allows you to process up to five continuous steps in a batch
 - Mix -> degas -> mix -> degas, etc
 - Is very effective for powder applications, heat- or shear-sensitive materials or reactive materials



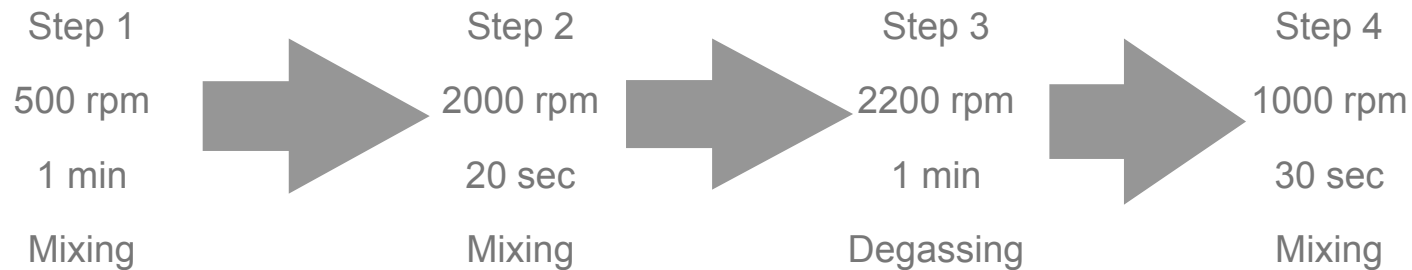
Mixing talc into a viscous silicone

Example: Quality improvement for powder mixing

- Problem of mixing hard-to-wet powder into a liquid
 - Once some of the powder starts wetting, the rest tends to wet as well
 - To trigger this wetting, the mixer starts at a slow speed akin to mixing by hand
 - Then, mix at full speed
 - Degas
 - Re-mix again to make sure any dense particles which might separate in degassing mode are mixed and the material is fully homogenous
- Dynamic speed change from slow to fast, or vice versa, gives “shaking” effect to the materials which can result in better mixing quality
- Speed adjustments in a cycle can increase or decrease shear, which can change the material viscosity, etc

Example: Quality improvement for powder mixing

- Program all steps to one memory slot
 - Batch time - two minutes and 50 seconds total
 - Stages proceed automatically



THINKY advantages

- **Super fast** processing
- It can process materials regardless of viscosity and density
- There is no mess and no contamination
- High quality
- Can accommodate small to large samples
- Easy operation of the machine
 - Load materials into the jar
 - Press button to recall set program
 - Then **Start**



THINKY ARE-250

Our most popular mixer

- Use for the majority of materials
- No vacuum
 - But usually no bubbles > $\text{\O}1\mu\text{m}$
- Processes 0.5ml – 300ml
 - 310 grams gross



THINKY ARV-310

- Same size as ARE-250
- Includes integral vacuum capability
- Used where even micro-bubbles cannot be tolerated
 - < $\text{Ø}1\mu\text{m}$ bubbles
- See our Technical Bulletin - *Vacuum Mixing & Degassing*



THINKY ARV-5000

- Includes integral vacuum capability
- Up to 5kg mixing



THINKY ARV-930Twin

- Includes integral vacuum capability
- Max 0.5l in 0.75l container x 2
- 1 litre overall mixing capacity



What is counterbalance?

- All THINKY mixers are equipped with balance adjusters
- High speed spins of the single containers requires a counter dummy weight to spin in balance
- Unbalanced spins cause heavy vibrations of the mixing unit
 - Like a wobbling washing machine



Containers

- Mixing quality and speed is optimised by using a suitable container
- Ideal containers have rounded internal corners and no gaps on the container wall surfaces
 - This allows no particles to be trapped on sharp corners or gaps
- Standard containers are 300ml HDPE
- Stocked containers include
 - 90ml PP
 - 150ml HDPE
 - 240ml PP



Adapters

- THINKY Mixers hold a small container with an optional adapter
- You can use various sizes of jars, syringes and cartridges. We also can make adapters for your container needs



- The cooling adapter has a freeze gel function that keeps the material cool throughout the mixing process
- The heat insulation adapter allows you to process heated materials up to 130 C

Why THINKY?

- There are many engineered materials which are
 - Hard to mix
 - Hard to de-aerate or de-gas
 - Hard to wet, or get dry powders into liquids
- They can be
 - High and/or low density materials
 - High SG metallic powders
 - Pasty, viscous materials
 - Fine particles
 - etc!

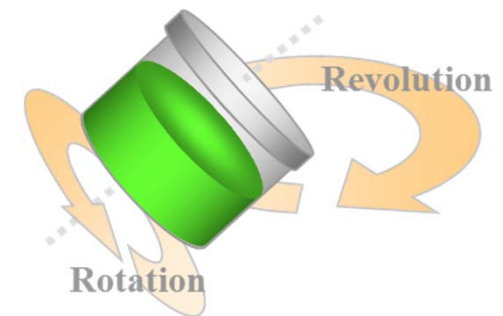
THINKY Mixer are the ideal solution for all types of engineered compounds. The precision can be simply confirmed when examined under a microscope.

THINKY solutions

- For high viscosity, materials with different densities, or dry particle mixing
- Simultaneous mixing & degassing in one batch
- Process in your own container
 - jar, barrel, cartridge, syringe
- Remove voids and re-disperse filled materials already packed in syringes
- Non-invasive processing ends the risk of cross contamination between batches
- Process from 0.5ml - no waste of expensive materials
- Re-mixing of separated materials to prolong shelf life
- No volatile constituent loss with vacuum-less processing
- No material damage unlike processes involving rollers, mixing blades or propellers
- No unit cleaning between batches

THINKY solutions

- Saves time and cost significantly
- Improves yield rate
- Reduces production cycle time in seconds to minutes
- Improves productivity
- Production on demand reduces material stock
- Improves and produces consistent quality, regardless of operator skills, with digitally controlled processing



THINKY Corporation

- Some background information
 - THINKY was founded in 1971 in Japan
 - First patent on mixing mechanisms was filed in 1989
 - There are now over 18,000 customers worldwide
- THINKY as a company covers R&D, manufacturing, quality control, sales, repair and custom design of mixers and accessories
 - INTERTRONICS is the distributor for THINKY products

The logo for THINKY, featuring the word "THINKY" in a bold, black, sans-serif font with a white outline, set against a light gray background.

Thank you!

- Thank you for your interest in the THINKY Mixers
- Please visit our website for more information, technical specifications and a product video

www.intertronics.co.uk/thinky

- **Come and see a THINKY Mixer!** We welcome you to our Technology Centre for a demonstration
- Call us on +44 1865 842842

September 2011

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