

THINKY

An introduction to Planetary Centrifugal Mixers



What is a THINKY mixer?

- A THINKY Mixer **mixes, disperses** 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 (cP) or millipascals (mPa•s)

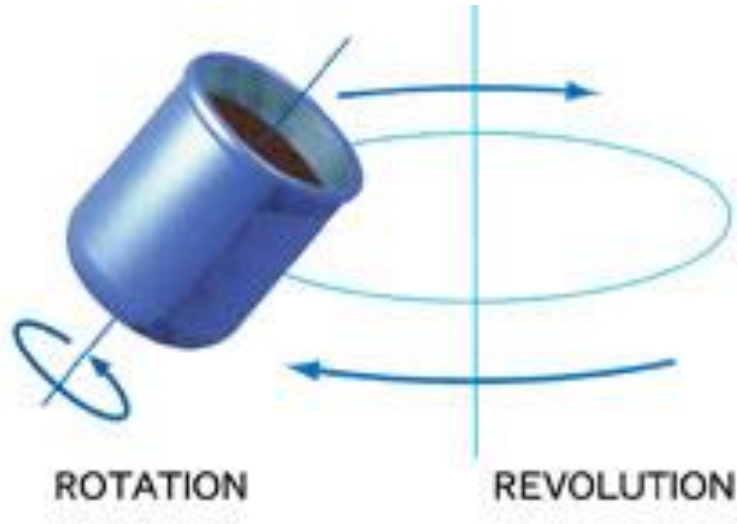


Flux paste and solder powder 45 seconds



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



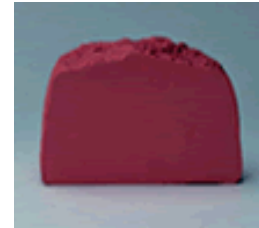
30 sec



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

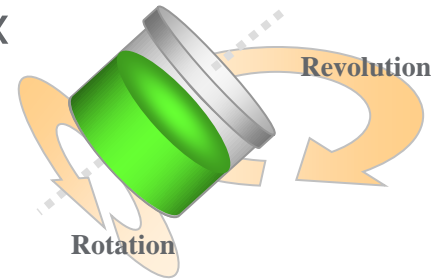
There are two standard modes which are used to achieve optimal mixing results

- **Mixing Mode**
- **Defoaming Mode/Degassing Mode**



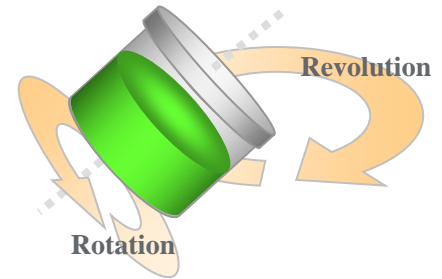
Two modes – 1) Mixing

- The Mixing Mode has high speed **Rotation and Revolution**
 - On the **ARE-250**:
 - 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**
 - On the **ARE-250**
 - 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?

1. Load material into the container
 2. Measure the gross weight & adjust the counter balance dial to suit
 3. Set the time, speed & mode
- or
3. Recall a previously saved program or recipe
 4. Press the start button
- Mixing profiles or recipes can be stored and recalled
 - See our ['Getting Started'](#) video to find out more



What is multi-step mixing?

- Allows you to process up to nine 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



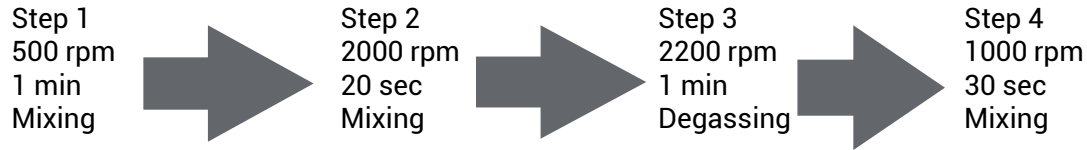
Example: powder mixing

- 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: powder mixing

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



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-310P

- Same capacity 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 ARM-310

- Use for the majority of materials
- No vacuum or degassing modes
- Processes 0.5ml – 250ml
 - 310 grams gross



THINKY ARE-400 Twin

- Mixes 2 x 250ml containers
- USB connectivity for control and data-logging
- Stores up to 20 programmed recipes
- No vacuum
 - But usually no bubbles > $\varnothing 1\mu\text{m}$



THINKY ARE-500

- Mixes up to a 0.5l container
- Can mix up to 1.1kg of material
- Stores up to 5 programmed recipes



THINKY ARV-501

- Mixes up to a 0.5l container
- Can mix up to 700g of material
- Stores up to 20 programmed recipes
- Vacuum mixing possible through optional stand or your own external vacuum pump source.



THINKY ARV-931Twin

- Includes integral vacuum capability
- Max 0.5l in 0.75l container x 2
- 1 litre overall mixing capacity
- Can apply 670G when using defoam mode



THINKY ARV-5000

- Includes integral vacuum capability
 - A full vacuum can be achieved in 30 seconds
- Up to 4L or 5kg mixing
- Stores 10 recipe profiles
- Equipped with an air cooling mechanism



THINKY ARV-10K Twin

- Includes integral vacuum capability
 - A full vacuum can be achieved in 30 seconds
- Up to 20kg mixing, 10kg containers x 2
- Stores 20 recipe profiles



THINKY SR-500

- Designed to bring solder paste up to optimal mixed quality and temperature in a few minutes
- Standard 500g solder paste containers can be conditioned without repackaging
- Stores up to 10 programmed recipes



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 in sharp corners or gaps
- Stocked containers include
 - 90ml PP
 - 150ml HDPE
 - 240ml PP
 - 300ml HDPE
- Containers are also available in capacities from 12ml to 4L



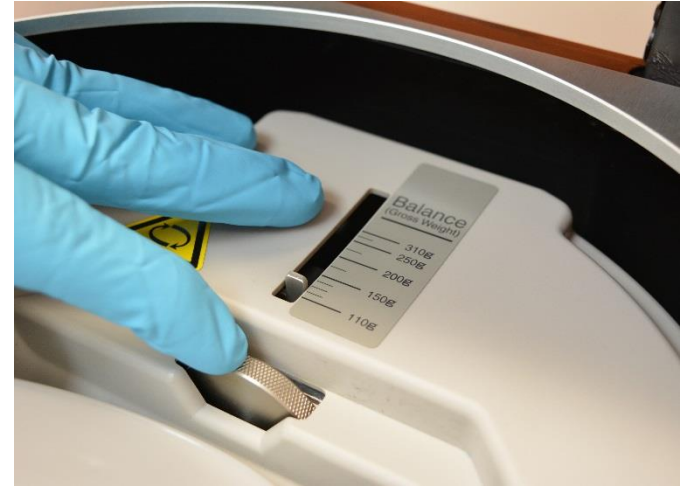
Adapters

- 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



What is a 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



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

THINKY Mixers are effective for effortless, homogeneous mixing of all types of engineered compounds. The precision can be simply confirmed when examined under a microscope.



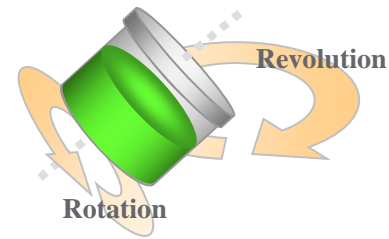
Benefits of using THINKY mixers

- For high viscosity, materials with different densities
- 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



Benefits of using THINKY mixers

- 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



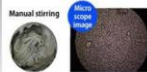
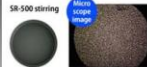
Our customers

- Our selection of [customer case studies](#) showcase the importance of achieving consistent, homogeneous mixes during production.

CASE STUDY

intertronics
adhesives, coatings, sealants & equipment
for your manufacturing and technology applications

THINKY SR-500
Solder Paste Mixer
& Conditioner



[More efficient operations at EMS provider with consistent solder paste conditioning](#)

CASE STUDY

intertronics
adhesives, coatings, sealants & equipment
for your manufacturing and technology applications

THINKY ARV-310
Vacuum mixing and
degassing machine



[Manufacture of NMC electrodes for lithium-ion batteries with high active material content](#)



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Find out more

- Thank you for your interest in the THINKY Mixers
- **Visit our website** for more information, technical specifications and a product videos:

www.intertronics.co.uk/thinky

- **Come and see a THINKY Mixer!** We welcome you to our Technology Centre for a demonstration
- **Call us** to discuss your application on +44 (0)1865 842842

