

Rocket and Rocket 4D Evaporators



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ALL DIMENSIONS ARE IN MILLIMETRES
 Tolerances unless otherwise stated:
 ±0.05mm for two place decimals
 ±0.10mm for one place decimals
 ±0.50mm for nominal dimensions
 ±0.10° for angles
 ▽ surface finish for machined faces

Issue: Date:

N/A

Equipment

Scale:
 Drawn: P
 Checked:
 Drawing: N

Revolutionary Rocket

The Rocket Evaporator uses patented vacuum technology to evaporate solutions to dryness, or a concentrate, rapidly and safely. Two models are offered: the Rocket itself, which evaporates samples in flasks, tubes, or a variety of innovative Genevac sample holders; and the Rocket 4-D, designed to evaporate large sample volumes, with auto-feed if required. The split cutaway illustration, showing part of the Rocket 4-D on the left and the Rocket on the right, highlights their distinct and common features.

Rocket technology

Using a single, common, oil-free vacuum pump, the Rocket creates two vacuum environments:

- 1 a low vacuum causes the solvents in the sample to boil at a low temperature, often below 0°C;
- 2 a second vacuum environment boils deionised water to make low temperature, low pressure steam. The temperature of the steam heating the vessels or flasks in the Rocket is controlled in this way, while the temperature of the aluminium outer chamber is also carefully controlled at the user's set temperature.

Solvents boiling in the flasks or vessel will cause cooling, therefore the steam created by the Rocket will condense on the cold outer surface of the flask or vessel. Condensation of steam releases energy into the samples to speed evaporation, without heating the samples themselves. Condensed steam is thrown off due to the rotational force and re-boiled to make more steam.

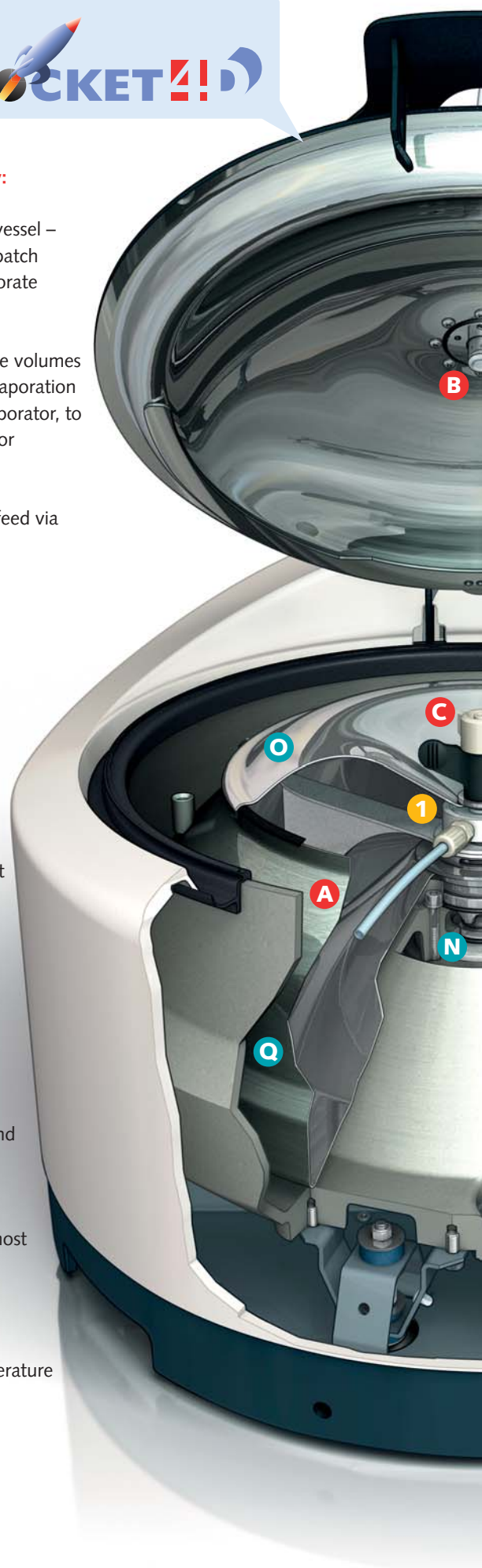


Features of the Rocket 4D only:

- A** Removable 316 stainless steel vessel – holds up to 5 litres of sample (batch mode), or can be used to evaporate larger samples with autofeed.
- B** Autofeed coupling enables large volumes of solvent to be fed into the evaporation vessel under control of the evaporator, to ensure safe, rapid evaporation or concentration.
- C** Auto feed option with sample feed via centre of inner lid.

Features common to both the Rocket and Rocket 4D:

- F** Auto-draining frost-free solvent condenser, collects all solvents as liquids. Plastic coated glass for safety and visibility.
- G** Easy to use controls. Select the method for the solvents to be evaporated, set the maximum safe temperature and start.
- H** USB upload of new methods and software and download of recorded data.
- I** Built in second condenser for most volatile solvents.
- J** Solvent drains.
- K** High power heaters with temperature control for outer chamber.
- L** Outer chamber.



Rocket 4D – space and time for science



- Press and go – fully automated from start to finish
- Big capacity - can process up to 100 litres in one operation
- Lift off – Rocket technology offers the fast route to perfect results
- Error free – eliminates bumping and foaming
- Light work – effortless emptying of vessel using pouring stand
- Powerful cold traps provide improved solvent recovery and drying of samples
- Quick clean – so easy compared with large glass evaporator flasks



Above: The 5 litre 316 stainless steel vessel can be used for batch processing, or in conjunction with the autofeed option.

Right: The vessel is easily removed from the Rocket 4D using detachable handles.

Rocket 4D is a fully automated system for drying or concentrating very large volumes with no user intervention and in complete confidence – no bumping, foaming or sample loss. Simply load your sample, select the correct method, press start, and walk away – the system will do the rest.

Rocket 4D can process any volume from just a few litres to as many as

100. It uses Rocket technology to heat a single product vessel accurately with low temperature, low pressure steam. Solvents in the vessel are boiled under a separate vacuum and so will be at much lower temperature than the steam surrounding the vessel. By spinning the product vessel at high speed, the g-forces generated control the pattern of boiling so that bumping and foaming are eliminated.



Perfect drying of volumes from one to 100 litres

Rocket 4D has a single, 5 litre 316 stainless steel vessel for drying product. This has detachable handles and is easily lifted into and out of the evaporator. Access to the dried or concentrated product in the vessel is very easy. Dried products can be scooped out, or re-dissolved while the vessel is still in the system. Liquid products can be easily drained via a drain port in the side of the rotor, using a dedicated pouring stand.

Users wishing to dry volumes larger than five litres should choose the 'Autofeed' option, which enables the Rocket 4D to draw in product from the user's own external supply. The Rocket 4D controls product feed, drying and the discharge of condensed waste solvent without any external intervention.

The autofeed system has an integrated rinse circuit, which washes the system through with compatible clean solvent and then air, to prevent drying of product in the autofeed system. Dried products are automatically re-dissolved in a small volume of solvent at the end of the process, using solvent from the rinse system. Alternatively, the same circuit can be used under manual control for solvent exchange, by selecting a different solvent for re-dissolve.

Cleaning the Rocket 4D between cycles is very straightforward. The PTFE feed tubing is easily detached for cleaning or replacement and the vessel can be readily cleaned, wiped, inspected and even put in a dishwasher. It's all so easy compared with handling large glass evaporator flasks!



A typical Rocket 4D autofeed system, with recirculating chiller option.



Easily controlled emptying



Make time for science with the Rocket



- No waiting – five times faster than other 'intelligent' evaporators
- Perfect results – no monitoring or intervention required for excellent sample recovery
- Error free – eliminates foaming, bumping and cross-contamination
- Easy to use – simple controls and intelligent software
- Space saving – one Rocket replaces several rotary evaporators
- Environmentally friendly cold traps and advanced methodology provide very high solvent recovery



The Rocket high speed evaporator is designed to dry or concentrate up to six flasks, each containing a maximum of 450ml of solvent, or 18 ASE® vials, with no user intervention or attention. It is five times faster than other 'intelligent' evaporators and is capable of replacing several rotary evaporators, saving much valuable bench space.

Rocket controls are very easy to use. Load your samples, select the correct method, press start and walk away. The evaporator is equipped with high performance features that prevent foaming, bumping and cross contamination. A built-in, two-stage cold trap provides very high levels of solvent recovery, even with volatile organic solvents. Auto-draining, under the control of the Rocket, ensures that optimal solvent recovery is maintained under all conditions.

Using SampleGenie™ or Flip-Flop™ sample handling systems further extends the scope of the Rocket. These enable large volumes to be concentrated or dried directly into a smaller vial, increasing sample recovery and inter-sample reproducibility, while eliminating the drudgery associated with manual transfers. Methods on every Rocket can easily be optimised, and new methods uploaded via USB key. Data is downloaded in the same way.

The Rocket has an on-board strobe that allows each of the six flask positions to be viewed separately in real time.

Further information on how to concentrate with the Rocket can be found at www.Genevac.com/CFA

See the Rocket demonstration at www.Genevac.com/movie/Rocket



Innovative Rocket sample handling choices – what else?

Evaporation Flasks

For drying or concentrating up to 450ml solvent.

- 450ml volume
- Dried sample is re-dissolved and removed using a pipette



Puck

Enables up to 18 ASE® vials to be dried in one operation, in place of flasks.



- Up to 18 ASE® tubes can be evaporated at one time

250ml SampleGenie™

For drying the sample directly into a range of vials from 12mm to 28mm diameter and up to 70mm tall. SampleGenie™ obviates the need for manual transfers, saves time and eliminates sample handling errors.

- 250ml volume plus vial
- Direct drying of sample into vial
- Eliminates manual transfers



400ml SampleGenie™

for concentrating the sample directly into GC autosampler vials. The vial is protected from the steam, so that only the solvent in the flask evaporates.

- Insulated vial
- Sample in the flask evaporates – not in the vial
- Eliminates manual transfers, graduated washing steps and errors



Flip-Flop™

is for users of ASE® vials who wish to concentrate their samples and also have them presented in a GC autosampler vial. It consists of a special double-ended tube with SampleGenie™ adaptor and GC vial.



- Works in combination with the Puck to enable direct concentration into a GC vial



The secret of perfect results

ΔT

The Rocket software monitors the temperature of coolant entering the condenser and compares it with the temperature of that leaving the condenser.

The difference (Delta T) equates to the heat energy transferred from the evaporated solvent to the condenser and is proportional to the flow rate of solvent vapour entering the condenser. As samples approach concentration or dryness, the change in ΔT is used to determine the auto stop trigger point.

Features of the Rocket only:

D Strobe viewing window and strobe controls enable monitoring of the progress of evaporation, without stopping to open the lid. Each flask may be viewed separately, in real time.

E Glass evaporation / SampleGenie™ flasks.

M Deionised water in sump – used to make low temperature, low power steam for efficient high speed evaporation.

N Direct drive motor for high rotational speeds of 500 x gravity or more, to control boiling and help eliminate bumping and foaming.

O Inner chamber lid separates the outer steam environment from the samples.

P Outer chamber lid.

Q Low temperature, low pressure steam fills the outer chamber and heats the vessels/flasks directly.



Mechanical data

Blue = Rocket. Red = Rocket 4D. Black = both.

Maximum speed	1800rpm / 1500rpm
Maximum G-force	700g / 500g
Drive system	Direct drive
Maximum Sample load	6 x 450ml / 5 litres
Maximum imbalance	50g / self balancing

Vacuum system

Pressure display	0-1200mbar
Pressure control	Automatic / 3mbar 0.5mbar to atmosphere
System ultimate vacuum	3mbar / 0.5mbar
Bumping / Foaming protection	Dri-Pure®

Temperature and control

Control range	Ambient +7°C to 60°C
Control accuracy	±1°C
Temperature sensing	via thermistor
Display range	0°C to 60°C
End of method	Time or automatic
Process visualisation	Strobe & Delta T / Delta T only

Solvent compatibility

Boiling point range	40°C to 160°C at ambient
Includes	Alcohols, DCM/methylene chloride, DMF, ethyl acetate, water
HCl	Not compatible
Di-ethyl ether	Requires Inert Gas Purge option / N/A

Dimensions

Width x Depth x Height	720 x 640 x 530mm
Headspace required	755mm (lid open)
Weight	75kg / 70kg

Services

Rocket requires one of the following electrical supplies, Rocket 4D requires two of each (excluding chiller)

UK & Europe	230V (±10%), 50Hz, 13A
USA	120V (±10%), 60Hz, 15A
Japan	100V (±10%), 50Hz or 60Hz, 15A
USB A	For data upload and download

Deionised water	50K to 1M Ohm approx. 50ml per day
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Rocket 4D feed configuration

Feed	6mm OD PTFE hard wall tube
Drain	8mm OD PTFE hard wall tube
Rinse solvent for feed system	1 litre of compatible solvent for every 20 litres fed product
Liquid Sample Recovery	via port or 3/8" or 1/2" hose barb

Cold trap cooling requirement

Temp range	-20°C to +10°C dependent upon application
Heat removal	700 Watts at +10°C / 1500 Watts at +10°C
Flow rate	1.5 to 2.5 l/min
Pressure	1 (min) to 7 bar (max) static
Connections (to chiller):	8mm nylon hardwall tube for Genevac supplied chiller Quick connect coupling to chiller or female M16 fine thread to other sources 1/4 inch (6.5mm) hose barb for cold water connection (standard).

Recirculating chiller

Powerful recirculating chillers are available for the Rocket and Rocket 4D evaporation systems. The systems can control the chillers via RS232 links, thereby providing improved solvent recovery and better drying of samples compared with using a static cooled supply. Connection kits with insulated pipe work are available to accompany the chillers.



Chiller specification

Width x Depth x Height	320 x 500 x 600mm/ 500 x 760 x 640
Weight	48kg / 85kg
Cooling Power	500W at 10°C / 1500 W at 10°C
Electrical connections	As evaporator

Maintenance

All seals are durable consumables and user replaceable. Easy access is provided to the pump, which can be maintained by trained users.

Safety

Conforms to UL 61010-A-1:2002 & BS EN 61010-1:2001 for laboratory equipment.
CE certified.



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