



miVac
DUO concentrator

Genelab

miVac
Concentrator range

Speeding your concentration, improving your drying

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**Introducing
the miVac
range**

miVac from Genevac is a range of centrifugal concentrators capable of removing water and organic solvents from a variety of sample formats including tubes, microplates and vials. There are three concentrators, three pumps and a novel refrigerated trap in the miVac range. miVac concentrators feature built-in special methods for working with alcohols, water and water mixtures to improve performance and optimise concentration times. The miVac Pressure Controller helps to further optimise concentration and provides the user with full control of the concentration process. There are two sizes of system available; the larger Quattro concentrator and the smaller Duo. miVac systems are suitable for use with a wide range of solvents, from volatile organic types through to water and many medium boiling point solvents. There is a choice of medium or high vacuum pump and a dedicated DNA system with built-in pump. Rotors are chosen according to the

type of sample format in use and can include both deep and shallow well microplates, glass vials and tubes. Rotors are easily interchangeable.



miVac is the first concentrator system with modules designed to work together – and look good.

What is a centrifugal vacuum concentrator?

The principle behind centrifugal vacuum concentrators is very simple; as atmospheric pressure reduces, the boiling point of a solvent also reduces. When the pressure is low enough, the solvent will boil, enabling removal of solvents at very low temperatures, depending upon solvents used and the vacuum level applied. To prevent the evaporating sample boiling over or ejecting material in an uncontrolled way, samples are spun in a centrifuge. The g-force generated is sufficient to keep each sample in its own tube.

Samples are placed in a rotor inside the vacuum chamber. The rotor is spun, the vacuum pump switched on, and if required, heat to speed concentration is provided by electrical heaters in the centrifuge wall. Solvent vapour boiling off the samples is then pumped away by the vacuum pump. Unless a refrigerated condenser or cold trap is used, the flow rate of the vacuum pump limits the speed of concentration. A well designed cold trap, such as the miVac SpeedTrap, is used to recover the waste solvent before the pump, which further speeds the process by maintaining a good vacuum in the system.



miVac Duo and Quattro Concentrators

miVac concentrators are extremely quiet when in use and typical results with water show that miVac systems are up to 40% faster than comparable machines, due to the very high displacement pumps. Performance can be further enhanced through the use of the

miVac SpeedTrap refrigerated condenser – see page six for details. A large, clear acrylic lid allows you to monitor the drying process and is specially treated with a novel coating to resist the most aggressive chemicals and solvents.

These two precision-engineered systems allow you to safely concentrate your samples or take them through to complete dryness. The miVac Duo system has been designed to accept a two-swing position microplate holder or disc rotors for tubes and vials.



The miVac Quattro is a bigger system with a larger capacity bowl, enabling it to use a four-swing position rotor and much higher capacity disc rotors. In both swing rotors, each position for shallow well

microplates can accept multiple plates through the use of stackers, so that a miVac Duo can hold six shallow plates.

In the larger miVac Quattro, up to twenty shallow-well microplates or eight deep-well plates can be used simultaneously, vastly increasing your throughput and slashing drying times.

With such a wide variety of available rotors, the miVac evaporators are suited to many different tasks. These include drying or concentration in microcentrifuge tubes, conical centrifuge or other plastic tubes, glass vials and shallow or deep well microplates. miVac concentrators can be used in a wide range of application areas such as ADME / toxicology, polymer chemistry, DNA, RNA & peptides, oligosynthesis, forensics / drugs of abuse testing, food science and agrochemical research.

The compact size of the miVac concentrators saves valuable bench space; even the busiest lab will have room for a miVac. Their simple, robust design will ensure years of reliable service, even when used intensively, such as in teaching or multi-user laboratories. Intuitive controls allow inexperienced users to get first-class results first time with most samples, while allowing more sophisticated programming for experienced workers.

The large display makes miVac very easy to use and can show the actual temperature and elapsed time. Setting is simple, with just one 'set and select' knob and a minimum of keys. All status and programme information is displayed alphanumerically on the large LCD display, giving every user confidence in their run conditions and results.

Specifications	Duo	Quattro
Dimensions mm (in.) WxDxH	360x424x300 (14.2x16.7x11.8)	480x594x300 (18.9x23.4x11.8)
Max g-force	250	250
Vacuum connection	0.5 in. or 12.7 mm	0.5 in. or 12.7 mm
Weight	21 kg (46.3 lbs)	35 kg (77.2 lbs)
Temperature range	Ambient, 30°C - 80°C	Ambient, 30°C - 80°C



Vacuum Pumps



There is a choice of three oil-free pumps to complement the miVac concentrators according to your application. For most people, the high-displacement miVac Duo Pump will be quite sufficient

to give excellent results with either the miVac Duo or Quattro concentrator. This quiet and compact two-head diaphragm pump will remove 38 l/min (2.3 m³ h) of solvent vapour and is housed in a smart case to match the other miVac components. It is suitable for removing solvents that boil below 130°C, including water, methanol, ethanol and their mixtures.

For more demanding applications, we recommend the miVac Quattro Pump, as this four-head diaphragm pump can reach pressures of 2mbar or below, which are needed for successful drying of medium boiling point solvents. Both pumps are controlled automatically by the miVac evaporation chamber.

Exceptionally demanding uses will require a special scroll-type vacuum pump, as used on larger Genevac systems. This pump is capable of routinely removing solvents at pressures down to 0.15 mbar. You should consult your local sales person about the exact pump configuration your application requires.

When using solvent mixtures and/or a wide range of solvents, a high vacuum pump, such as the Quattro Pump and the miVac Pressure Controller, are recommended.

Specifications	Duo Pump	Quattro Pump	Scroll Pump
Vacuum level (Maximum)	10 mbar	<2 mbar	0.15 mbar
Flow rate	38 l/min (2.3 m ³ h)	33 l/min (2 m ³ h)	83 l/min (5 m ³ h)
Vacuum connection	0.5 in. or 12.7 mm	0.5 in. or 12.7 mm	0.5 in. or 12.7 mm
Outlet connection	3/8 in. or 9.5 mm	3/8 in. or 9.5 mm	3/8 in. or 9.5 mm
Dimensions mm (in.) WxDxH	215x394x300 (8.5x15.5x11.8)	215x394x300 (8.5x15.5x11.8)	249x427x288 (9.8x16.8x11.3)
Weight	13 kg (28.6 lbs)	18 kg (39.6 lbs)	23 kg (50.7 lbs)

Genevac scroll-type pumps are capable of routinely removing solvents at pressures down to 0.15 mbar.



SpeedTrap

The miVac SpeedTrap is a novel high power cold trap used to condense solvent vapours. Cold traps can seriously improve the performance of any vacuum concentration system. When a cold trap condenses vapours back to liquid, there is a corresponding massive volume reduction helping to pull a vacuum;

speeding up the concentration process considerably. When choosing a cold trap, it is important to note that condensing power is more important than low trap temperatures.

Most traditional traps are large and cumbersome, based on a stainless steel vessel with cooling coils attached to the outside. The trap is connected in the vapour path between the concentrator and the pump. The vessel walls are chilled to sub zero temperatures by a gas compressor system, similar to that used in a refrigerator.



These older traps are inefficient and difficult to use, and if water is condensed it freezes, and must then be defrosted before the trap can be emptied. Some systems require the use of an interchangeable glass flask and thermal transfer fluid; however a flask covered in slippery cold silicone fluid at -40°C may become a dangerous liability when it needs to be emptied. Recent studies performed on these older designs of cold trap have shown that the actual temperature of the glass flask during concentration can be near to 0°C .

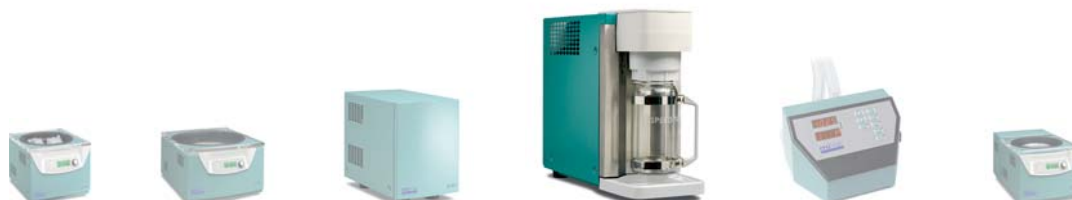
The miVac SpeedTrap is radically different. It is very small in size and requires little bench space, being only 212 mm (8.3 in.) wide. The SpeedTrap operates in a unique way. The cold condenser coils are suspended directly in the vapour path, solvent vapours condense directly on to the coils and run off into the collection vessel below without freezing, even when using water. There are huge benefits to this method; it is highly efficient, with more than twice the condensing power of a similar system, the user can quickly see the solvents in the trap, and emptying the trap is easy, requiring no defrosting. The collection vessel is removed with a simple quarter turn, allowing safe disposal of the solvents. What could be easier?

miVac SpeedTrap is supplied with a one litre glass condensing vessel.



The SpeedTrap jar is extremely easy to remove and empty, requiring just a quarter-turn.

Specifications	
Minimum temperature	-50°C
Cooling power	134 Watts
Refrigerant medium	R404A
Glass vessel capacity	1 litre
Vacuum connections	0.5 in. or 12.7 mm
Dimensions mm (in.) WxDxH	212x563x450 (8.3x22.2x17.7)
Weight	25 kg (55.1 lbs)



Pressure Controller



miVac modular concentrators are excellent laboratory work horses! To enhance their performance further, a pressure display and controller is recommended.

The miVac pressure controller can be added to any modular miVac system and allows the user full control over the running pressure in the system. A vacuum ramping mode is included so that concentration can be commenced gently and is used to help prevent bumping or spitting. For users who are uncertain of the appropriate pressures to choose, an automatic mode can be used which controls the vacuum profile.

Correct use of pressure control with the miVac SpeedTrap will make concentration faster and will enable more solvents to be caught in the SpeedTrap, reducing volatile solvent emissions. Pressure control enables the user to set the optimum boiling (and therefore condensation) temperature for the solvent which is being concentrated so that the cold trap can condense it easily. It is not always true to say that a cold trap with a very low temperature, say -104°C is better than a cold trap of -50°C – please ask for a copy of our paper comparing cold trap performance, or contact your local agent for a full explanation.

Specifications	
Voltage	90V - 250V
Frequency	50Hz - 60Hz
Display range	0 to 1100 mbar
Control	1mbar increments
Connections	3/8 in. or 9.5 mm

The pressure controller includes a large, clear display of current pressure.

4 modes of operation:

- 1 Full vacuum
- 2 Control at one set pressure
- 3 Programmable vacuum ramp followed by control at one set pressure
- 4 Automatic – sensing the optimum pressure



DNA system

The miVac DNA integrated system is a centrifugal concentrator capable of removing water and organic solvents from a variety of sample formats including tubes, microplates, and vials. It is designed specifically for working with nucleic acids (RNA and DNA) and is supplied complete with everything the scientist requires; built in high performance



vacuum pump, concentration chamber with electro-magnetic drive for quiet, maintenance free operation, and a fixed angle aluminium rotor for 1.5 ml or 2 ml micro-centrifuge tubes. Simply position the system on the bench, connect the power lead and exhaust tube and look forward to faster, trouble free concentration!

in its class, due to the high displacement vacuum pump. The clear acrylic lid allows you to monitor progress and is specially treated with a novel coating to resist the most aggressive chemicals and solvents. The miVac DNA system is everything you would expect of a DNA concentrator, and more!

The miVac DNA is suitable for simple organic solvents, e.g. methanol, ethanol, up to 100°C boiling point, and water in low sample numbers and volumes. There is a range of possible rotors including an option for microtitre plates. For a wider range of solvents and/or a larger range of sample formats, select miVac Duo or Quattro concentrator with miVac SpeedTrap, Pressure Controller and pump.

The miVac DNA system is very simple to use. Concentration time and temperature are readily monitored on the large clear display. Parameters can be easily set and selected using the friendly dial. To improve performance there are built-in special modes for working with water and alcohols, which optimise concentration time. Concentration using the miVac DNA is faster than any other system



Specifications	
Dimensions mm (in.) WxDxH	360x597x300 (14.2x23.5x11.8)
Max g-force	250
Pump details	See Duo Pump on page 5
Weight	34 kg (75 lbs)
Temperature range	Ambient, 30°C - 80°C



miVac makes the difference

miVac concentrators have many features to make evaporation faster and safer. Taken together, these make miVac a very powerful concentration system.

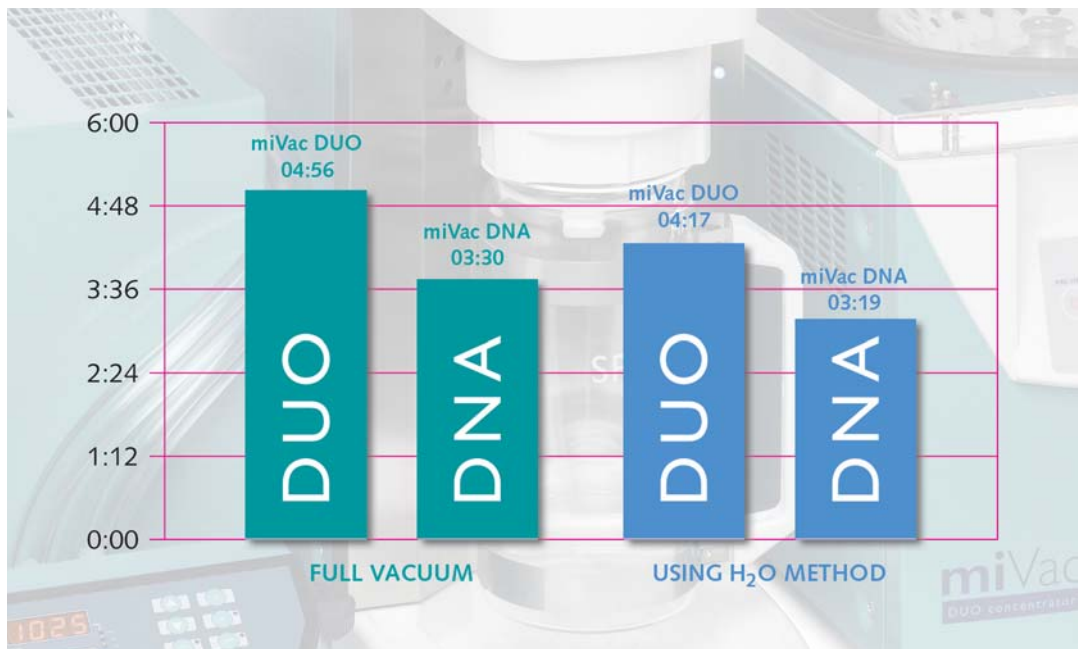
- Concentration methods – speed up concentration of water and alcohols
- JetRotors – further speed concentration
- miVac SpeedTrap – reduces solvent emissions and speeds concentration
- miVac Pressure Controller – enhances the performance of the SpeedTrap and allows optimisation of concentration parameters for a wide range of solvents

Concentration methods are available on every concentrator and provide three options for control; full vacuum, a method for water and a method for alcohols. In a concentrator, the heat source is the chamber, as the heat is needed at the rotor, where the solvents are. Between these two there is a vacuum, across which heat does not travel well. To improve the concentration speed, the methods allow some air to enter the chamber at set intervals, the air acting as a heat transfer medium. Use of these methods makes a significant difference in concentration speed, as the chart below shows.

JetRotors help to conduct the heat to the samples. Using a solid aluminium holder is the most efficient method for optimal heat transfer. The **miVac SpeedTrap** condenses the solvent vapours, returning them to the liquid state. The volume reduction of condensation helps to pull a vacuum, and prevents solvents being taken through the pump. If no cold trap is present, the pump must pump away all the solvent vapours, which is a time consuming process.

The **miVac Pressure Controller** helps the user to optimise concentration conditions for every solvent or solvent mixture that they are processing. Choosing the correct pressure setting for each solvent will further enhance recovery in the cold trap and help to keep concentration times as short as possible.

Performance improvement using miVac H₂O method



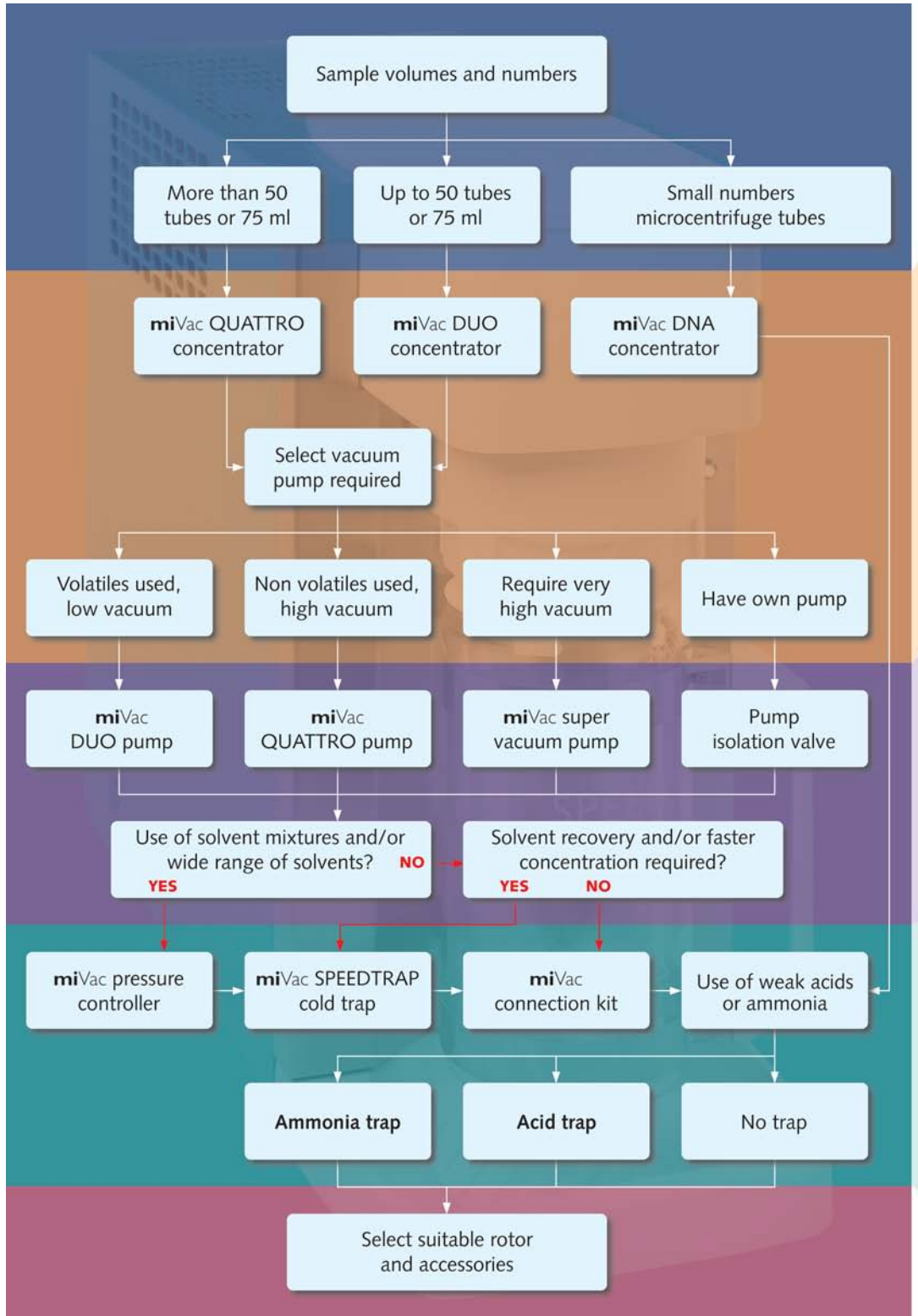
Choosing your system

Choose your concentrator

Choose your pump

Choose your condenser and traps

Choose your rotor



For small numbers of small samples containing simple alcohols and/or water the miVac DNA is recommended. For larger numbers of samples and larger tube sizes the miVac modular concentrators are recommended. Please consult our JetRotors brochure, available via www.miVac.co.uk for up to date information on the available rotors.



miVac Quattro concentrator



miVac Duo concentrator



miVac DNA concentrator

If you have a range of solvents, you should choose the highest specification pump based on the highest boiling point solvent.

miVac Duo pump



miVac Quattro pump

Genevac scroll pump



miVac pressure controller

If you have a solvent mixture or a wide range of solvents the miVac Pressure Controller will enable you to select the optimum parameters for each solvent and for mixtures.



miVac SpeedTrap

You will not gain the benefit of the Pressure Controller if you do not have a SpeedTrap. With or without a Pressure Controller a SpeedTrap will provide solvent recovery helping to protect you and the environment and will make concentration faster.

Ammonia & acid trap

The trap can take either an acid or ammonia neutralising solution to help prevent emissions of noxious vapours.



miVac connection kit

The connection kit is required when choosing a modular concentrator

Sample Holders

miVac are the only concentrators of their class to be supplied with rotors made from solid aluminium. The 'JetRotors' range provides very high performance concentration compared to rotors made from plastic, or of an open construction. Speed increases compared with polypropylene types range between 40% and 200%, depending on sample format, providing a significant advantage when working with stubborn solvents, such as water. The precision solid aluminium rotors efficiently conduct the heat energy needed for concentration to the samples, whereas in an open or plastic rotor the samples are effectively insulated by the plastic and/or the vacuum in the chamber.



Rotors are available for all common tubes, vials, microtitre plates, centrifuge tubes and microcentrifuge tubes. A full list of available rotors and capacities can be found on the miVac website. A custom rotor service is available to ensure that you gain best use of your system. If you are unsure of the rotor or system you require, or need further information, please contact your local agent for assistance, or visit www.mivac.co.uk for details.



miVac accessories

A range of optional accessories is available for the miVac series.

All Duo or Quattro concentrators will need the miVac connection kit. This contains all that is needed to turn the separate units of the miVac series into a fully integrated system. It includes vacuum tubing, a tube cutter, catch pot, and pump control lead.

Solutions change colour when exhausted, indicating when they need to be changed. For neutralising radioactive vapours an activated carbon trap is available. Traps are fitted after the pump and before the vapour is discharged to atmosphere or fume extraction system.



miVac connection kit.



When working with chemicals that may be harmful, such as acids or ammonia, a range of vapour neutralising traps is recommended. A vapour wash bottle with either acid or ammonia neutralising solution is available for use with these chemicals.

MCK-0000-Y00
VAP-TRAP0-100

miVac connection kit
Trap for neutralising acid or ammonia vapours, requires neutralising solutions

NH3-REF00-100

Ammonia neutralising solution 4 x 500 ml

ACD-REF00-100

Acid neutralising solution 4 x 500 ml

Ordering information

Using the chart on page eleven, simply select the concentration system components you require, not forgetting connection kit, accessories, and rotors. The miVac DNA system is supplied with a rotor which accepts 48 1.5ml or 2ml microcentrifuge tubes. Please note miVac system part numbers vary by voltage and country and are therefore not shown here.

A full list is available from your local distributor. Information on the connection kit and accessories is found on page nine. Genevac also manufactures an extensive range of high performance evaporators suitable for chemistry and high throughput applications, for details visit www.Genevac.com.



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