Getting the most from your Findenser™

Whilst Findenser replaces the need for water-cooled condensers in most common chemistry applications, there are some limitations to its performance. Knowing what these limitations are and discussing them with customers before a trial will ensure the best outcome during the trial.

Frequently Asked Questions?

	Issue	Advice
Can anyone copy Findenser?	Radleys protect all key products with international patents and rigorously defend them.	Findenser is currently protected by a Community Design 002214940-0001. We also have international patents pending.
Can the glass be repaired if it breaks?	Many customers ask if Findenser can be repaired if the glass is broken. Understandably, they assume that because it is glass, it will be easy to repair.	Unfortunately, this is not the case. Why? The temperature Findenser would be exposed to during any glass repair procedure would compromise the sealants and lead to water leaks. It is also not practical or safe to disassemble Findenser to allow a repair of the glass.
What is the chemical resistance of Findenser?	Findenser is resistant to the majority of solvents and splash-resistant to dilute acids and alkalis at room temperature. Extended exposure to acids or alkalis will attack the surface of the Findenser so it is important to clean off any chemical spills immediately after they occur.	
Your customer wants a larger Findenser.	We are concerned that a larger Findenser will add too much weight and may cause stress on the glass joint.	We currently have no plans to introduce a larger Findenser.
Your customer wants a smaller Findenser.	Findenser Mini is now available and is suitable for small flasks from 25ml up to 250ml.	
What joint sizes are available?	Findenser and Findenser Mini are available in a range of end cone/socket sizes. Findenser Mini: B14 Cone, B14 Socket, B19 Cone, B19 Socket, B24 Cone, B24 Socket. Findenser: B19 Cone, B19 Socket, B24 Cone, B24 Socket, B29 Cone, B24 Socket.	
How do I clean Findenser?	It is recommended that Findenser is cleaned after use using the following protocol: • Flush the internal glass surfaces with a suitable cleaning solvent such as acetone or IMS. This is best achieved with a wash bottle. External exposed glass surfaces may also be cleaned with a suitable solvent. • Allow washing solvent to drain into a suitable receptacle. • Wash the whole Findenser assembly in warm soapy water, using a soft brush to clean fins. • Rinse with warm water both internally and externally. • Allow to air dry. If necessary, Findenser may be cleaned in a dishwasher but the temperature should not exceed 50˚C.	
What should I NOT do with Findenser?	• Do not expose to temperatures below 0˚C. • Do not autoclave. • Do not drop or subject to impact. • Do not exceed 60˚C when oven drying. • Do not exceed 50˚C when using in a dishwasher. Failure to observe the above may lead to failure of the seals or cracking of glass.	

Choosing the right Findenser for your flask size

	Flask Size									
	Joint Size	25ml	50ml	100ml	150ml	200ml	250ml	500ml	1000ml	2000ml
RR31109 Findenser Mini	B14	✔	✔							
RR31107 Findenser Mini	B19	✔	✔	✔						
RR31105 Findenser Mini	B24	✔	✔	✔	✔	✔	✔			
RR31104 Findenser	B19			✔	✔	✔	✔			
RR31100 Findenser	B24			✔	✔	✔	✔	✔	✔	✔
RR31102 Findenser	B29							✔	✔	✔

This is for general guidance only

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Optimising Findenser and Findenser Mini performance

	Issue	Advice
Non comparable set-up	If your customer has a large or over-sized condenser, with fast-flowing, chilled water then there is every possibility that Findenser will not perform as well. You are not comparing 'apples with apples'.	To compare a water condenser with Findenser, it should be of a similar length to Findenser (400mm) or Findenser Mini (275mm). The water condenser should have a water flow of no more than 2L/min and a water temperature of no less than 12°C.
Too much solvent in the flask	If a flask is over-filled, the condensation load on the Findenser will exceed its ability to cool and condense effectively. This is called 'overloading'. In such circumstances Findenser may not contain the solvent.	Working solvent volumes should be a maximum of half the flask volume, e.g. 5ml in a 10ml flask, 1 litre in a 2 litre flask. This is standard 'good practice' when heating solvents.
What is the maximum recommended volume of solvent for use with Findenser?		Findenser: Maximum flask size 2 litres, maximum solvent volume 1 litre. Findenser Mini: Maximum flask size 250ml, maximum solvent volume 125ml.
Over-heating or poorly regulated heating	Scientists commonly over-heat solvents. However, because they are typically using a large or oversized water condenser and lots of cooling water, the condenser may adequately contain the solvent and therefore they do not normally pay attention to careful temperature control. There is no benefit to the chemistry in overheating the solvent as the chemistry cannot get any hotter than the solvent boiling point, no matter how high the temperature.	Standard 'good laboratory practice' when heating solvents is that the hotplate or block temperature should be no more than 20°C above solvent boiling point for high boiling point solvents (>80°C), or 10°C above boiling point for lower boiling point solvents (<80°C). Where an oil bath is used, the hotplate or oil bath temperature should be no more than 10°C above the boiling point of solvent for high boiling point solvents (>80°C), or no more than 5°C above boiling point for lower boiling point solvents (<80°C). In all cases, care should be taken if the heating control is not fully calibrated, or does not have precise settings.
Will Findenser work in a warm lab?	Because Findenser uses air to cool and dissipate heat, it requires the ambient air temperature to be significantly cooler than a boiling point temperature. Experience shows that at ambient temperatures >24°C there is insufficient air cooling for the heat from the Findenser fins to be effectively dissipated. This can be an issue when using low boiling point solvents (<80°C). In warmer climates, Findenser may not be effective, particularly for low boiling point solvents.	For Findenser to work effectively the ambient temperature in the lab should be no higher than 24°C. It is also important to maximise airflow around Findenser to allow for heat dissipation.
Inert gas flow encourages evaporation	A flow of inert gas (e.g. Nitrogen) through the flask will encourage evaporation and reduce performance of the Findenser. Gas flow is sometimes used to encourage evaporation, e.g. blowdown systems.	If inert gas is required it should be introduced through the top joint of the Findenser, with all flask ports sealed (using a suitable bubbler to avoid build-up of pressure) and not through a flask sidearm or joint at the bottom of the Findenser. Gas flow should be kept to a minimum.
Condensing Diethyl Ether	Some very low boiling solvents are just too difficult to condense with any kind of air condenser. In such circumstances a water-cooled condenser may be the only option.	Diethyl Ether in particular is very difficult to condense. Findenser will cope with smaller volumes (up to 100ml in a 250ml flask) with a hotplate/heating block accurately controlled at no more than 5°C above boiling point.
Each of the above points will reduce performance of the Findenser. Affects will be additive.	The higher the boiling point of the solvent, the greater chance the application will cope with operating outside one or more of these boundaries, but all solvents will fail at some point the further these boundaries are pushed.	

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