



Laboratoire d'isotopes stables - G.G. Hatch - Stable Isotope Laboratory

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The system is based on a Rotulex glass system originally designed by Dr. Bruce Taylor of the Geological Survey of Canada in the mid-1980s. This one also contains a 60 micron filter gasket at the VCR connection.

Breakseal cracker system for IRMS



The bottom of the borosilicate glass is protected with a wad of clean copper turnings. This is a physical barrier to prevent glass against glass from scratching the bottom of the cracker tube. It also has the advantage of removing traces of H₂S from sulphide bearing carbonates where the copper will turn a blackish colour. The change in colour is not necessarily a problem with future CO₂ samples. Change the copper when it is really discoloured.

After installing the new crackers, let them pump for at least 24 hours to remove as much moisture a possible from them. You can heat them with a heat gun if necessary to speed it up. Remember that the smaller the sample the more traces of moisture, or H₂S, can contaminate your samples and cause CO₂ protonation into HCO₂ (mass 45). This in turn affects the 45/44 ratio and thus the delta value.

Multiport: Install the top part onto the multiport Swagelok. For ideal conditions the ferrules should be stainless steel. Finger tighten the nut and make a tick mark using a marker onto the nut and the cracker. Using two wrenches tighten the nut 1¼ turn for a perfect seal (fig 1). If you need to remove the crackers to access the inlet under the top IRMS cover, then loosen the nut at this point. When you put it back onto the multiport **DO NOT RETIGHTEN WITH 1¼ TURN**. The ferrule is already in place, simply reattach and lightly tighten.

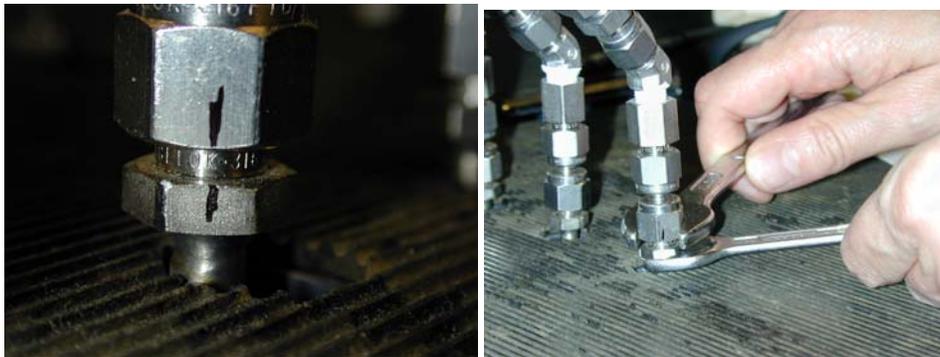


Fig 1 Tick marks followed by tightening 1¼ turn.

Inlet: Simply plug the cracker into the Cajon union and finger tighten (Fig 2).



Fig. 2 Inlet only cracker setup.

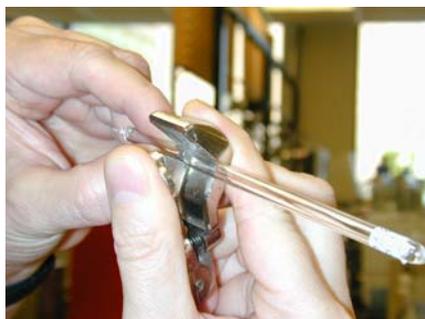
Breakseal setup



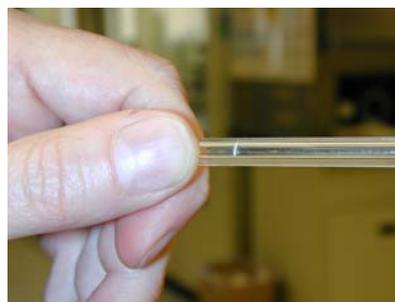
Insert breakseal into bottom tube



Pinch with thumb and finger against the edge of the female Rotulex joint



Place against the fingers the edge of the tube cutter. This creates an etched line on the glass tube for easy breaking and at the perfect distance from the bottom of the glass cracker tube.



Etched line is about ¼ the length of the tube diameter



The etched line should now be right at the bottom of the ball joint below the O'ring.



Place tube onto the cracker keeping the inner breakseal straight. When ready to crack, gently move the bottom front to back or side to side to release the gas. It should break easily if the etch is well done. After releasing the gas, leave the bottom joint in its final position (bent). **DO NOT STRAIGHTEN AFTER CRACKING THE TUBE.** This can damage the O-ring with a sharp glass edge rubbing onto it.