COMMENTS OF H_2O TARGETS

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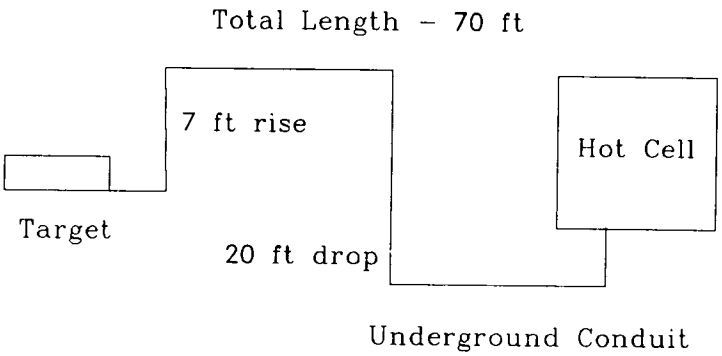
Target: Ni on Cu with Havar and Al foils
: water is new batch every run (0.45 mL H_2O^{18} Target)
: 70 ft. of polyethylene tubing (0.035 mm)
: 15 μA for 30 min. (transfer ~ 95% of activity)

Transfer made in



: use 2-3 psia to transfer and transfer time is 3-5 min.

After each run, we pass N_2 gas through target and line for 20-30 min. at 1-2 psia and once every month flush out line with MeOH (6X 1mL) and then dry system with N_2 at 2 psia.

When we follow this procedure we have no problems, but if we don't follow this procedure, then after 6-7 months we encounter a problem with transfer. However, when we follow the above procedure after a transfer problem, the line is again useful for transfer.

What I have observed is that if you do not maintain your transfer line in good condition as stated above, many pockets of air and water form in the line which then requires a large pressure to break up these pockets and clear the line.

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Ti TARGET & WINDOWS

Recycled water aniox (OH- 1x8) resin
TFE Tubing
0.5 mm 200 foot rise of 18 feet
1 Atm. no overpressure
2.3mL target volume 2.5 ml into target recover
12.5 MeV 20 μA 30 min. runs (>22 μA drop in yield)
No problems with H_2O removal from target
Use vacuum to pull down in 4 minutes

Dider Le Bars
CERMEP
Lyon, France

Beam:	protons 16 MeV
Target Material:	Ti body, Ti 25 μm window, Al 400 μm degrader/spacer
New or recycled H_2O:	Recycled by distillation each time
Recovery:	90-95% recovery from target
Tubing - Kind:	Polyethylene low density
- Length:	30 meters
- Bore:	0.5mm ID
Pressure:	20-30 psi (1.5 atmosphere)
Volume:	1.4 ml
Maximum μA:	10 μA (poor cooling); typically 5 μA, 60 min.
Vertical Lift:	10 ft. (3 meters)

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There has been a great deal of discussion concerning water targets for F-18. Recent experience at Case-Western Reserve University confirms some reports and contradicts others. We have had the opportunity to use several new targets in the course of a target development program. These targets were a silver spacer, double foil design with a head space above the water. Silver foils were used in most cases with the front foil being 0.025mm and the back foil 0.25mm thick. Helium or hydrogen was used to pressurize the head space to 1.6 bar to counteract external pressures on the foils.

It was observed that a new target is prone to produce fluoride of minimal reactivity (using 2-FDG via the triflate with tetramethyl ammonium hydroxide as a benchmark reaction) and also is prone to causing blockage of the 0.1mm exit tubing. However, the situation improves with use and the process can be hastened by thorough cleaning. Stainless steel elements in the fluid path inevitably lead to problems from corrosion. Traces of machining oils and polishing compounds are likely sources of difficulty and are easy to remove from flat surfaces, but are very difficult to remove from the channels which bring water and gas into the target chamber. In one instance it was necessary to circulate hot concentrated sulphuric acid through the passages to obtain optimum performance. Once a silver target is well cleaned the difficulties of clogged lines and low chemical yields essentially disappear. Those problems which do occur are easily traceable to the usual causes such as excess beam on a dry target back, contaminated water, etc.

Routine cleaning of these targets was at one time performed by polishing with jeweller's rouge. This works well, but can cause severe problems occasionally when the rouge is not removed completely. We have found sodium bicarbonate with a little methanol to be a good substitute which is easily removed with water.