

MOLECULAR SIEVE CO₂ AND H₂O SCRUBBING SOLUTION

Introduction

Campbell Scientific manufactures non-dispersive mid-infrared absorption gas analyzers that require internal scrubbing agents to ensure the detector remains free of CO₂ and water vapor. Previously, chemical bottles containing magnesium perchlorate and decarbite were used as the scrubbing agents. These chemicals posed potential health and environmental hazards, disposal issues, and high shipping costs and restrictions.

- › **Innovative:** With extensive research, Campbell Scientific has eliminated issues associated with hazardous chemical scrubbers with the release of a zeolite molecular sieve type 13X for the EC150/ EC155, IRGASON, AP200, CPEC200, and the zero-air generator. This molecular sieve is a material with small pores that blocks the passage of large particles such as water vapor and CO₂ from passing into internal areas of the sensor.
- › **Reliable:** Tests of the scrubbing ability of the molecular sieve show comparable results to that of the previous magnesium perchlorate/decarbite scrubber chemical bottles. Testing of a calibrated gas analyzer replaced with molecular sieve bottles (Figure 1) illustrate how quickly CO₂ and H₂O can be scrubbed. CO₂ is typically scrubbed out within a few hours, whereas H₂O can be scrubbed out within a day.
- › **Long-Lasting:** Depending on the climate, the molecular sieve can perform properly for up to two years before needing replacement.
- › **Easy Maintenance:** Single-piece construction simplifies the sensor installation and eliminates multiple mounting accessories on the tripod/ tower crossarm.

All Campbell Scientific gas analyzers and several other eddy covariance products use the molecular sieve to scrub out H₂O and CO₂, however the type of analyzer/product dictates which size of material bottle that is needed. Table 1 shows the part number associated with the amount of molecular sieve that is purposed for each product.

The new molecular sieve has a long lifespan that results in low maintenance, low cost, and reliable measurements.

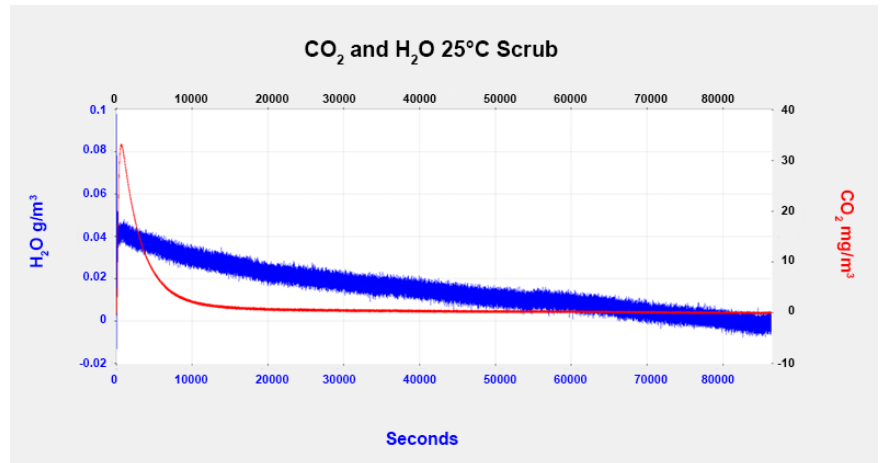


Figure 1. Number of seconds used to scrub CO₂ and H₂O.

TABLE 1. Molecular Sieve Part Numbers		
Products	Part Number	Molecular Sieve Amount
EC150 Gas analyzer	32897 (IRGASON/ EC150 bottle assembly)	22 g
IRGASON Gas analyzer	32897 (IRGASON/ EC150 bottle assembly)	22 g
EC155 Gas analyzer	33384 (EC155 bottle assembly)	6 g
AP200 Scrub Bottle	27450 (250 g molecular sieve bottle)	500 g
CPEC200 Scrub Module	27450 (250 g molecular sieve bottle)	1000 g
Zero-Air Generator	27450 (250 g molecular sieve bottle)	500 g