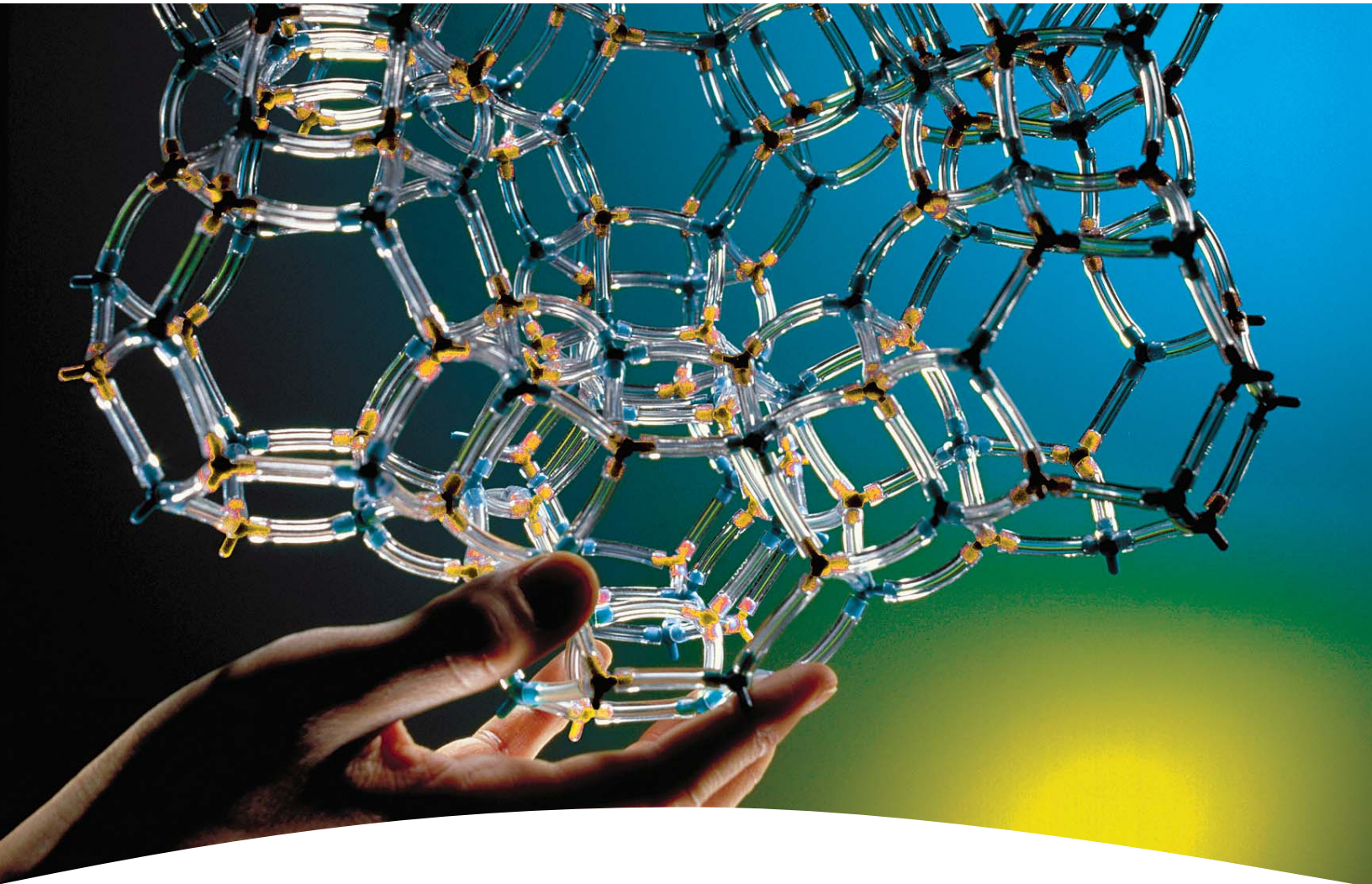


UOP MOLSIV™ APG-III Adsorbent



GREATER CO₂ ADSORPTION CAPACITY FOR
REDUCED PLANT OPERATING AND CAPITAL COSTS

**Enhanced performance adsorbent
for air pre-purification units**

UOP MOLSI[®]V APG-III Adsorbent is an advanced molecular sieve engineered for improved performance in air separation plant pre-purification units (APPU).

APG-III has significantly greater CO₂ adsorption capacity compared with earlier generation molecular sieves. The improved CO₂ capacity of APG-III offers several benefits for air separation plant designers as well as plant owners and operators. For new unit designs, the use of APG-III can reduce the APPU size and lower plant capital and operating costs. APG-III can also be used for plant revamps to reduce energy consumption or increase plant production capability.

APG-III can significantly reduce capital and operating costs and offers greater operational flexibility

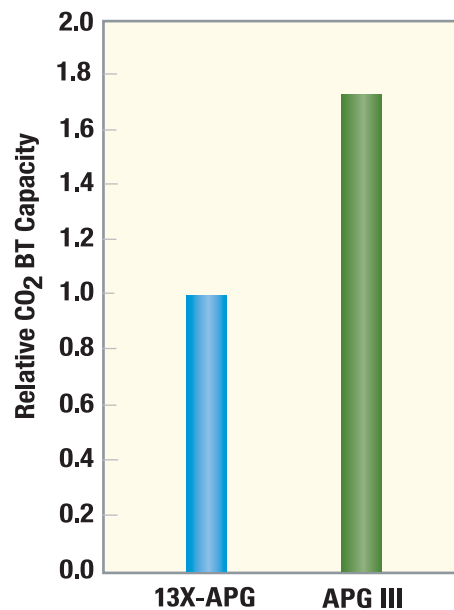
Outstanding Adsorption Capacity

In tests conducted at real world APPU operating conditions, APG-III demonstrated approximately 1.7 times the capacity of the industry standard UOP MOLSI[®]V Adsorbent 13X APG.

Improve Performance for New Units and Revamps

The enhanced CO₂ adsorption capacity of APG-III provides several potential benefits in new plant designs or in revamps of existing plants. With APG-III, significantly reduced capital and operating costs and greater operational flexibility can be achieved.

Dynamic Test Results



New Units

In new grassroots APPU units, relative to earlier generation adsorbents, APG-III can provide:

- Significant reductions in the prepurifier footprint
- Cost reductions for major equipment such as vessels and regeneration gas heaters
- Reductions in regeneration energy requirements
- APPU designs at increased feed air temperatures with the potential elimination of the feed air chiller
- Reduced adsorption and regeneration pressure drops



and operating ibility

Reloads / Revamps of Existing Units

For revamps or reloads of existing APPU's containing 13X APG or competitive 13X, the replacement of the existing molecular sieve with APG-III can provide the following benefits:

- Significant increase in treatable feed air flow rate
- Management of CO₂ concentrations and feed temperatures exceeding original design
- Longer adsorption times with better operational stability, less frequent regenerations, lower energy costs and longer adsorbent life



How Can APG-III Benefit You?

UOP has closely evaluated both grassroots and retrofit APPU designs to determine the potential benefit to your operations. Our studies compare APG-III with the industry standard 13X APG. Both cases use UOP A-201 or D-201 Activated Alumina for water removal.

New Grassroots Unit

This case compares two design options for a new APPU. One uses 13X APG and the other APG-III for CO₂ removal. The higher CO₂ breakthrough capacity of APG-III allows for a larger molecular sieve bead diameter to be used without an increase in the adsorbent inventory. The APPU with APG-III can therefore be designed with a smaller bed diameter. Since the APPU vessels have less steel which needs to be heated and cooled, the regeneration requirements are also reduced.

Retrofit for Increased Throughput

In this case, the 13X APG in the APPU is replaced with APG-III to achieve greater throughput. A larger diameter molecular sieve bead has to be used to avoid bed lifting with the increased feed flow rate. This requires an adsorbent with greater CO₂ capacity to avoid an increase in the adsorbent inventory. The APG-III retrofit achieves a 16% increase in the feed flowrate with no change to the APPU equipment. The reduced adsorption and regeneration pressure drops with the larger APG-III bead are an additional benefit.

Grassroots APPU Design

Adsorption time, (hr)	4
Feed air flow rate, NM ³ /hr	100,000
Feed temperature, (°C)	10
Feed pressure, (kg/cm ² a)	7
Feed CO ₂ concentration, (ppmv)	400

Product	13X APG 8x12	APG-III 4x8
Relative bed weight (Includes water removal zone)	1.00	0.95
Bed diameter (m)	5.0	4.2
Relative regeneration flowrate @175°C	1.00	0.85

Retrofit-Increased Feed Flowrate

Adsorption time, (hr)	4
Feed temperature, (°C)	10
Feed pressure, (kg/cm ² a)	7
Feed CO ₂ concentration, (ppmv)	400

Product	13X APG 8x12	APG-III 6x8
Relative bed weight (Includes water removal)	1.00	1.00
Feed air flow rate (NM ³ /hr)	100,000	116,000
Relative pressure drop Adsorption Regeneration	1.00 1.00	0.88 0.60



Get the edge you need to reach your business goals

Worldclass Service and Support

For new units and retrofits, UOP offers a complete set of technical services including:

- Performance projections for new units and retrofits including calculation of the APPU
 - Cycle time
 - Adsorbent quantity
 - Bed dimensions
 - Pressure drops
 - Regeneration requirements

- Unit operation optimization and troubleshooting assistance
- Vessel internals consultation

Contact your UOP sales specialist for an APG-III performance projection for your next project and learn how APG-III can improve your bottom line.

Find out more

If you are interested in learning more about UOP's Adsorbents, please contact your UOP representative or visit us online at www.uop.com.



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UOP5357
April 2010
Printed in U.S.A.
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