



Hydraulic Energy Storage Systems

IP Status: Issued US Patent; **Application #:** 12/445,176

Hydraulic Energy Storage System

Hydraulic energy storage systems store energy by compressing air similar to a battery storing energy in an electric circuit. Existing hydraulic accumulator designs are large and heavy due to the need for two storage tanks and do not have the high energy density needed for many applications.

The need for two storage tanks and two accumulators can be eliminated and the entire hydraulic energy storage system is an open loop. The storage requirement is smaller because depressurized air is not stored. The hydraulic open loop accumulator works by drawing air in from the atmosphere and expelling air into the atmosphere. A separate hydraulic pump maintains the pressure balance of the air by increasing the amount of hydraulic fluid in the system. This results in a steady pressure of air and up to 24 times the energy density of a standard hydraulic accumulator.

This hydraulic energy storage system has applications in energy storage for wind turbines, regenerative braking systems for hybrid cars that could partially power the car, and energy storage for power construction equipment.

Technology ID

z07054

Category

Engineering & Physical
Sciences/Sustainable Technology
Engineering & Physical
Sciences/Transportation

Learn more



Licensing Terms

MN-IP Try and Buy

Center for Compact and Efficient Fluid Power (CCEFP) Try and Buy – Available to [CCEFP member companies](#)

Try

- Trial period is up to 12 months
- Trial fee is \$0; In place of Try fee, a business plan for the Try period is required
- No US patent fees during Try period¹

Buy

- In place of a conversion fee, a post-Try period business plan is required²
- First \$1M cumulative sales are royalty-free
- Sublicense freely
- Royalty rate: 2% of Net Sales
- Patent(s) expenses paid by licensee
- Qualified startups: 5% of equity of startup is allocated to University at formation³
- Transfer fee for transferring license to a third party - \$25,000

Please contact us for detailed term sheet for a Try & Buy agreement as well as guidelines for Try¹ and post-Try period² business plans as well as qualified startups³

FEATURES AND BENEFITS OF THE OPEN ACCUMULATOR:

- Requires up to 25 times less air which means less weight, and greater energy storage potential compared to traditional systems
- Lower capital equipment cost due to its smaller size and lighter weight
- Up to 24 times the energy density of comparable standard accumulators

Researchers: Perry Y. Li, PhD Professor, Department of Mechanical Engineering, College of Science and Engineering