



Welcome to Haskel International

Haskel International Inc. is recognized as the world's leading manufacturer of hydraulic and pneumatic driven, high pressure systems and accessories. For nearly 60 years, Haskel has been a recognized leader in high pressure technology, manufacturing a wide range of high pressure air driven liquid pumps, gas boosters, air amplifiers, systems and accessory equipment.

Our main manufacturing facilities are certified to ISO 9001:2000. Dedicated professionals at distribution and sales locations around the globe are ready to offer application-engineering expertise and problem-solving experience.



Product Information

Air Driven Liquid Pumps

Haskel International has nearly 60 years of hydraulic and pneumatic engineering experience in the design and manufacture of air driven liquid pumps. Continuous investment in new machinery and technology keeps Haskel at the forefront of the field.

We offer the most complete range of models in the industry measured for:

- A. Capability of ultimate pressure, flow or output horsepower
- B. Compatibility with a variety of liquids





Air and Hydraulic Driven Gas Boosters



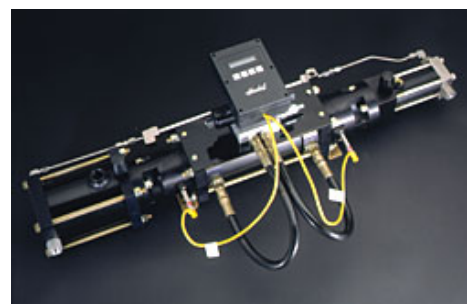
Haskel International Air and Hydraulic Driven Gas Boosters provide for pressures up to 39,000 psi (2690 bar). Used for virtually all known gases, these boosters are ideal for increasing gas pressure, transferring high pressure gas, charging cylinders and scavenging. Key features include:

- Air driven - no electric required
- No airline lubricator required
- Hydrocarbon free - separation between air and gas sections
- Pressures to 39,000 psi (2690 bar)
- Wide range of models
- Built-in-cooling on most models
- Standard and custom systems available

HG Series Gas Booster

Depending on the application, the basic booster is supplied as a single-stage/double-acting or two-stage design for integration by the customer. Both designs feature:

- Base booster with integral water cooling jackets
- Smart-valve controller with relief valve protection for smooth, reliable operation
- Full separation between hydraulic drive and modular gas compression sections provide hydrocarbon-free operation
- Stainless steel interconnecting pipe work included on two-stage models





Single-Stage/Double-Acting Units

- Available in 9 models with flow rates to 160 scfm and maximum supply and outlet pressures to 20,000 psi
- Designed for high flow and low-to-medium compression ratios
- Multiple units can be driven by one power source
- Accepts full available supply pressure

Two-Stage Units

- Available in 9 models with flow rates to 29 scfm, maximum supply pressure to 9,000 psi, and maximum outlet pressure to 20,000 psi
- Designed for low flow and medium-to-high compression ratios
- Modular construction for easy gas section maintenance
- Adapts readily to multiple units in parallel or in series driven by one power source

Hydraulically Driven Gas Booster Systems

Series 100 Basic Gas Booster System

This economical gas booster system is based on an open frame L-shaped hydraulic power supply and offers the following standard features:

- Haskel's advanced HG Series Gas Booster(s)
- Smart-valve controller with relief valve protection for smooth, reliable operation
- Hydraulic power supply with reservoir and drip pan
- Gas pressure and hydraulic pressure instrumentation
- Hydraulic cooling loop
- Stainless steel interconnecting pipework on all gas sections



Series 200 Fully-Equipped Gas Booster System

This fully-equipped gas booster system is incorporated in an enclosed cabinet. The circuit is similar to the Series 100 systems, but includes various additional features such as:

- Electric control panel with 24 VDC power supply (optional motor starter)
- Automatic gas outlet pressure shutdown
- Weatherproof enclosure with control panel
- Removable access panels
- Gas filtration inlet/outlet



Series 200 optional features include:

- Motor starter
- Inlet pressure control loop
- Temperature control loop
- Water chiller - cooling loop
- Noise attenuated panels
- Heater hydraulic reservoir
- Remote operator station

Applications for Haskel Gas Boosters and Gas Booster Systems

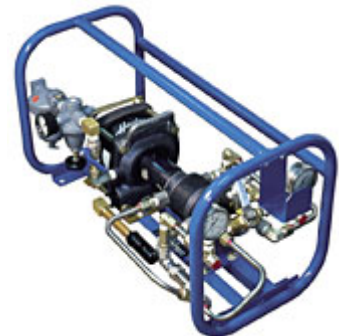
Model 26968 Oxygen Booster System

Used by almost every airline in the world for filling on-board emergency cylinders. Also used by major diving contractors, emergency medical service companies and mine rescue centers.



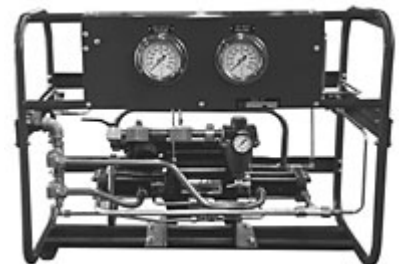
Model 52059 Transfer Unit

Capable of handling liquefied gases such as SF₆, CO₂, Freon, and others. The system illustrated is used by utility companies to transfer SF₆ (arc suppressant) from cylinder to circuit breaker and circuit breaker to cylinder. Benefits include the ability to transfer liquid and gas and to draw vacuum in one compact unit.



Model 80324

Compressed natural gas roll-bar frame transfer unit for gas storage transfer to vehicles.



High-Purity 12,000 psi Nitrogen System

Used for pressure testing, purging and cryostat charging at a missile manufacturing facility.





Mobile Nitrogen Charging Cart

Used for aircraft ground support in both commercial and military applications. Features self-contained accumulators, struts and tires.



High Flow, High Pressure Hydraulic Driven Helium Gas Booster System

Used at many military facilities. Haskel has also introduced a standard line of hydraulic driven gas boosters for industrial applications. (Contact Haskel International for further details.)



Natural Gas Driven Natural Gas Amplifier System

Consumes no energy while providing direct fills to vehicle storage cylinders for natural gas powered vehicles.



Combination Gas Booster - Liquid Pump Test Control System

Haskel's ability to incorporate and interface electronic controls provides precise compression and control of gases for gas-assisted injection molding, foam production, automotive air bag vessel filling, cryostat charging and other critical applications. Major oil companies use the system shown for testing relief valves, isolation valves, etc. System includes bar code and serialization capability for pressure test requirements and traceability.





Air Pressure Amplifiers

Haskel International has nearly 60 years of hydraulic and pneumatic engineering experience in the design and manufacture of high pressure generating equipment and controls. Continuous investment in the new machinery and technology keeps Haskel at the forefront of the field.

We offer the most comprehensive range of models in the industry combining:

- A. Simple principles of operation
- B. Rugged construction
- C. Capability to meet the most demanding industrial applications



Haskel Air Amplifiers provide an alternative to purchasing dedicated high pressure compressors. They are compact, require no electrical or mechanical drive connections, are powered by the same air they amplify, and can be mounted in any position. Key features include:

- Infinitely variable outlet pressure and flow capability
- No heat, flame or spark risk
- No air line lubrication required - eliminates oily exhaust
- Long seal life with easy maintenance
- Wide range of models, controls and options
- Wide range of standard and custom systems

Air Amplifier Model Ranges

HAA31 Models

- Single-acting, single-stage air pressure amplifiers
- 3 models with ratios of (2.5:1), (3.5:1) & (4.5:1)
- Maximum inlet pressure of 125 psi
- Maximum outlet pressures from 320 psi to 600 psi

AA Models

- Single-acting, single-stage air pressure amplifiers
- 3 models with ratios of (8:1), (15:1) & (30:1)
- Maximum inlet pressures from 1,250 psi to 4,500 psi
- Maximum outlet pressures from 2,500 psi to 4,500 psi





AAD Models

- Double-acting, single-stage air pressure amplifier provides outlet flow on each stroke of cycle and gains "lift" from inlet pressure
- 4 models with ratios of (2:1), (5:1), (15:1) & (30:1)
- Maximum inlet pressures from 300 psi to 4,500 psi
- Maximum outlet pressures from 300 psi to 5,000 psi



AAT Models

- Two-stage air pressure amplifier provides two high pressure pistons of different ratios within a single unit for maximum efficiency at higher outlet pressures
- 3 models with ratios of (7/30), (15/30) & (30/50)
- Maximum inlet pressures from 300 psi to 3,000 psi
- Maximum outlet pressures from 4,500 psi to 5,000 psi



Air/Gas Driven Chemical Injection Pumps



Haskel International has nearly 60 years of hydraulic and pneumatic engineering experience in the design and manufacture of air/gas and electric pumps. Continuous investment in the new machinery and technology keeps Haskel at the forefront of the field.

We offer the most complete range of models in the industry measured for:

- A. Capability of ultimate pressure, flow or output horsepower
- B. Compatibility with a variety of liquids



Key features include:

- No external lubrication required
- All stainless steel construction (wetted parts: 316 SS; others: 300-series)
- Integral pneumatic timer
- Adjustable stroke length
- Pressure up to 10,000 PSI (690 bar)
- Injection rates between 0.5/37,500 L/day
- Separation between drive and fluid pumping sections

Metering Pumps

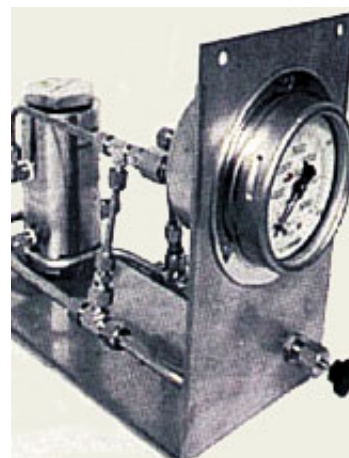
Haskel International metering pumps and systems are used throughout the world by most of the leading oil and gas companies and their operators. A complete reference guide is available on request, detailing the depth and experience the Company has in meeting the requirements of the chemical injection industry.



Haskel IRCD Injection Rate Control Devices

The Haskel IRCD is a unique and revolutionary system for the multi-point injection of chemicals into oil and gas production systems. The IRCD can be supplied as individual units or in a panel configuration, which can be installed adjacent to the point of injection. It only requires one high pressure feed line from either an air or electric-driven chemical injection pump, regardless of the number of injection points the system has. Key features and benefits include:

- Accurate flow rates from 20 ml/hr. to 3,000 L/hr.
- Pressure to 15,000 psi
- No moving parts, thus reducing number of pumps required, maintenance costs and leak problems
- Can be supplied individually or in panel configurations
- Lightweight and space-saving
- Lower installation costs - requires only one high pressure line
- Easy to add units to existing system
- Control of injection rate and smooth flow at injection point improves performance
- Not susceptible to temperature extremes





Low-Flow System (0 to 120 L/hr.)

- Standard Unit (316 SS): 10,000 psi
- High Pressure Unit (Duplex SS): 15,000 psi

Medium-Flow System (20 to 2,000 L/hr.)

- Standard Unit (316 SS): 10,000 psi
- High Pressure Unit (Duplex SS): 15,000 psi

High-Flow System (200 to 4,000 L/hr.)

- Standard Unit (316 SS): 10,000 psi
- High Pressure Unit (Duplex SS): 15,000 psi



High Pressure Valves and System Accessories

Haskel International offers a wide range of high pressure valves and system accessories designed to assist in the controlled use of pressure and flow-generating equipment manufactured by Haskel and others. Continuous investment in the new machinery and technology keeps Haskel at the forefront of the field. Our selection of components includes:

- Air Pilot Switches
- Air Pilot Switches Selection Charts
- Air Operated Directional Control & Release Valves
- Air Piloted Valves Typical Application
- Air Piloted Valves Selection Charts
- Regulating Relief Valves
- Stainless Steel Check Valves
- Hydraulic Accumulators & Gas Receivers
- Filters
- Plenum Chambers
- 6,000 psi Gas Storage Cylinder
- High Pressure Valves, Fittings & Tubing
- Port Adapters





Accessories and Product Information

BuTech™ Valves

BuTech high pressure valves, fittings and tubing are available in a variety of materials and pressure ratings to 150,000 psi. Specific series models utilize the same pressure connections as our gas boosters.



Air Pilot Switches

Like a pressure switch, these units are designed to sense pressure, but produce an air signal up to 150 psi.



Regulating Relief and Back Pressure Control Valves

Provide over pressure on any high pressure, low flow gas or liquid system.



Gas Receivers

Gas receivers in 10,000 and 20,000 psi series. Eleven models from 20 to 897 cu. in. displacements.



Storage Cylinder

- Manufactured and certified to DOT-E-9909-6000 specifications for 6,000 psi gas at 70°F.
- Actual volume: 2640 ACI (1.53 ACF)





Filters

- 5 microns
- 6,000 psi, 30,000 psi; two models 1/4" S.P. tube
- SS or paper elements



HydroSwage® Hydraulic Tube Expansion Equipment

Haskel International offers a wide range of equipment designed for hydraulic expansion of heat exchanger tubes into tube sheets through the direct application of high internal hydraulic pressure. This equipment constitutes the HydroSwage product line.

"HydroSwage®" is a trademark that has become synonymous with the process of hydraulic expansion. This demonstrates how Haskel technology stands as the industry benchmark for hydraulic expansion equipment.

HydroSwage products are designed and manufactured for use in a wide range of markets and applications:

- Power Generation
- Nuclear Power Generation
- Petro-Chemical
- Pulp and Paper Mills
- Pharmaceutical
- Heating and Air Conditioning
- Sanitary
- Package and Stationary Boilers
- Hydro-Forming

Haskel offers more than 30 years of engineering experience in the design and manufacture of hydraulic expansion systems and tooling. Our vision is to provide our customers innovative solutions using hydraulic expansion technology. We constantly explore new processes and develop new products that offer a unique approach to our customers' specific applications and requirements.





Nanojet® Laboratory Homogenizers



Nanojet homogenizers from Haskel International provide high pressure homogenizing by opposing jet stream action. This high pressure process was developed primarily for the production of fine micro-emulsion, nanosuspensions and stable liposomes. With recovery rates of 96%, Nanojet is an effective tool for cell disruption processes. Applications include biotechnology, food industry, pharmaceutical, dairy products, photographic coatings, textiles, cosmetics, and the paint industry.

Nanojet® Models LAB 8H & LAB 30P

Model LAB 8H

- Hydraulic pressure intensifier
- Capacity 8 L/hr.
- Maximum pressure 1600 bar

Model LAB 30P

- Pneumatic pressure intensifier
- Capacity 20 L/hr.
- Maximum pressure 1600 bar

Additional Auxiliary Features

- Gas-tight construction of complete unit
- Heat-resistant unit
- Gas-tight tank
- Pre-heater
- Feeder for viscous substance
- Available on all production models

Nanojet Models LAB 15H & LAB 30H

Model LAB 15H

- Hydraulic pressure intensifier
- Capacity 15 L/hr.
- Maximum pressure 1600 bar



Model LAB 30H

- Hydraulic pressure intensifier
- Capacity 30 L/hr.
- Maximum pressure 2000 bar

Application Guidelines

Aerospace & Defense

- Fire Protection
- Oxygen Life Support Charging
- Escape Chute Charging
- Aircraft Jacking
- Reliability and Safety Testing
- Helium Leak Pressure Testing
- Environmental Control Cooling
- Satellite Launch Pressure Loading
- Missile Test Systems



Automotive

- CNG Natural Gas Refueling
- Airbag Inflation Charging Systems
- Hose and Radiator Pressure Testing
- Refrigerant Charging and Leak Detection
- Brake System Testing
- LPG Recovery and Charging



Energy

- HydroSwage Tube Expansion
- SF6 Charging and Recovery Systems
- Boiler and Heat Exchange Pressure Testing

Oil & Gas

- Chemical Injection
- Blowout Preventers
- Well Head Control
- Wire Line Lubrication
- Pressure Testing
- Valve Actuation
- Subsurface Safety Valve Control
- Platform Leg Tensioning





Performance and Quality Standards

Haskel International puts quality into everything we do. Our products are distributed worldwide, have an excellent reputation for reliability, and are backed by outstanding technical support. Our main manufacturing locations are fully registered to ISO 9001.



Air/Gas Driven Liquid Pumps, Gas Boosters and Air Amplifiers

Haskel International manufactures a comprehensive range of products and systems. All products can be supplied either as bare product for OEM use, fitted with system controls, or as fully packaged systems.

- Pumps can be supplied offering liquid pressures up to 100,000 psi (7000 bar)
- Gas Boosters offer pressures up to 39,000 psi (2690 bar)
- Air Amplifiers can boost compressed air in direct supply to output ratios between 2:1 and 35:1



High Pressure System Components

Haskel International's extensive system engineering program has led to the development of a variety of high pressure system components such as relief valves, control valves, gauge snubbers, filters, intensifiers, receivers, regulators, high pressure valves, fittings and tubings up to 100,000 psi (7000 bar). We maintain a large in-stock inventory of these components available for immediate shipment.





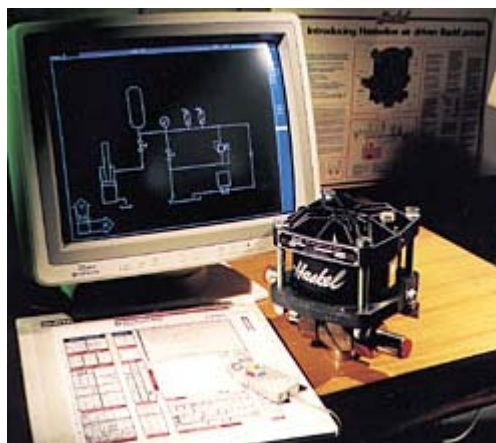
Chemical Injection Pumps/Systems



- No external lubrication required
- All 316 stainless steel construction
- Integral pneumatic timer
- Adjustable stroke length
- Pressure up to 10,000 psi (690 bar)
- Injection rates from 0.5/250 L/day
- Separation between drive and fluid pumping sections

Problem Solving and Accessibility

Haskel International manufactures and distributes a wide range of products and systems to solve diverse problems. The overview in this section provides an introduction of our capabilities. Product literature and detailed information are available for each product group. Our services and operations are fully international, with manufacturing facilities in the United States, Europe and Asia. Offices and distributors throughout the world give Haskel International the presence to serve all of our customers.



Many products require expert advice before final specification. To this end, our sales force is trained to define and solve your problems. When necessary, we can tailor solutions based on your specific performance and duty requirements.

Haskel International adheres to strict quality assurance standards and meets the requirements of major specifics in international defense, offshore petrochemicals, and the automotive and processing industries.



Standard and Custom Liquid and Gas Systems

Haskel can custom-build portable-to-large PLC control systems for a wide range of industries and applications. Manufacturing Divisions have cleanroom facilities for oxygen and similar requirements to 1000-level clean.

- Portable pressure test packs
- Pressure, proof, leak, burst, fatigue testing of hydraulic, gas, refrigerant, automotive hose and rigid pipes pressure and functional testing of valves
- Volumetric stretch testing of gas containers
- Helium leak detection of refrigerant and air conditioning equipment
- Oxygen transfer and pressurization of accumulators
- CFC refrigerant and halon fire extinguishing substance recovery and charging
- SF-6 recovery and reclaim from circuit breakers
- Chemical injection, metering and dosing pumps and packaged systems
- Hydraulic or Pneumatic Hose Test Bench

Service Support

Haskel International's Customer Service Department offers product support in the areas described below. For more information or to request a quotation, contact our Customer Service Manager (Direct Phone: 818-556-2574; Direct Fax: 818-556-2549). For inquiries regarding repairs, troubleshooting or technical services related issues, please e-mail us.

Product Line Training

Training can take place at the customer's location or at Haskel International in Burbank, California. The factory-certified training course covers:

1. Theory of Operation
2. Troubleshooting
3. Cleaning Procedures
4. Complete Repair
5. Servicing & Preventive Maintenance

Basic Charges: Haskel In-Plant - Consult Factory Customer On-Site - Consult Factory

Interested parties will be sent a Training Brochure outlining dates, times, number of attendees and a price quotation.

On-Site Service Calls - Troubleshooting & Repair

For a quotation, please consult your nearest Haskel office.

Travel and expenses will incur for airfare, meals, lodging and car rental. Receipts will be furnished on request to document expenses. Weekend and holiday service is available.



System Start-Up Service Call

Provide instructions on the proper care and maintenance for all Haskel systems and power units. It is intended to assist with installation suggestions, start-up and proper maintenance of the system or power unit.

Interested parties will be sent a System Start-Up brochure with a formal quotation outlining services provided and pricing.

Service Contract/Agreement

This service provides for annual preventive maintenance and service on equipment manufactured by Haskel International. The Company manufactures a number of varied products. Quotations for Service Contracts will vary according to the system or product line.

When a Service Contract is purchased with a new product manufactured by Haskel, training and on-site commissioning of the unit will be provided on written request. Purchase orders for Service Agreements related to manufactured items under contract must be received (15) days prior to product shipment. Service Contracts will normally carry a term of (1) year from the date of shipment for service maintenance, and must be renewed at least (30) days prior to expiration.

For all services rendered and expenses incurred, invoicing will be under normal purchase order procedures. Services vary in costs and circumstances. All charges will be submitted by written quotation prior to the execution of any service.

Inquiries can be made to Haskel Distributors, Regional Sales Managers or the factory. Travel plans should be made at least (2) weeks in advance of the anticipated service date so that a technician can be available.

Locate a Haskel Distributor

Analytical and Control Technology 2000 Co., Ltd.

46/87 Moo 12 Nuanchan Rd.

Kwaeng Klongkoom

Khet Bungkoom

Bangkok, Thailand 10230

Phone: 662-944-4748

Fax: 662-944-5854

E-mail: actc@ksc.th.com