Liquid CO_2 Drycleaning

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Liquid CO_2 Drycleaning

- Description of liquid CO_2 drycleaning?
- Brief history
- State of the technology
- The future

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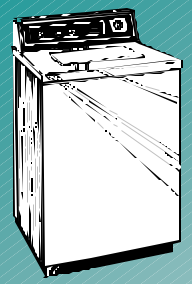
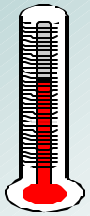
What is CO_2 Drycleaning?

- What is liquid CO_2?
- How does it clean?

- Mechanical action



- Temperature



- Chemical detergents

- Time

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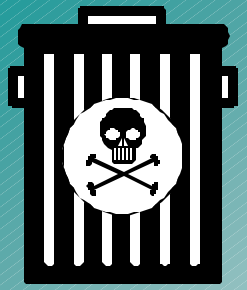
The History of CO_2 as a Solvent

- Traditionally used solvents
- Industry atmosphere



- Origins of CO_2 as a solvent
- Companies involved

Solvents

Solvent - A substance (usually liquid) capable of or used in, dissolving something. - Webster's Collegiate Dictionary

- **White Spirits**
- **Fluorocarbon based (CFCs)**
- **Perchloroethylene**
- **Petroleum**

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Industry Atmosphere

- **INTENSIFYING US REGULATIONS**
  - NESHAP compliance
  - Higher controls for new machines
  - State and local regulations intensified
- **SUPERFUND LIABILITY**
  - State taxation of perc and petroleum
  - Landlords hesitant to renew leases
  - Health/Environmental risks of perc
- **INCREASED MEDIA PRESSURE**

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Project History

- ~1980 - Hughes Aircraft uses liquid CO_2 for cleaning of weaponry systems
- 1993 - US EPA Grant to Los Alamos Lab
- 1994 - Raytheon Environmental Systems, Inc. develops core process for cleaning fabrics
- 1995 - Global Technologies granted rights
- 1997 - Alliance Laundry Systems purchases license

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State of the Technology

- Alliance Laundry Systems' Role
- Description of CO_2 cleaning machine
- Safety issues
- Cleaning cycle description
- Cleaning ability of CO_2
- Advantages of CO_2

Who are we?

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Markets Served

- Drycleaning Industry
- On-Premise Laundries
- Vended Laundries
- Multi-Housing
- Home Laundry
- Export to more than 60 countries

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Company History

- 1908 - Founded as Speed Queen Co.
- 1956 - Merged with McGraw-Edison
- 1978 - Acquired Huebsch Originators
- 1979 - Acquired by Raytheon Company
- 1987 - Acquired Holiday Hammond
- 1994 - Acquired Unimac Company
- 1995 - Raytheon Commercial Laundry
- 1998 - Alliance Laundry Systems, LLC
- 2000 - Acquired Ajax

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Process Specifications

- Operating pressure: 700 - 750 psi
- Operating temperatures: 55° - 70° F
- Cycle time: 25- 35 minutes
- Mechanical action created by injection jets
- No basket rotation
- No Carbon Filtration

GeneSys
Cleaning System

The Alliance Laundry Systems Liquid CO2 Drycleaning Machine

- Beta units currently operational
- Designed for the average drycleaner
- Modular foot print
- Unique mechanical action:
  - Combination of injection jets and rotating basket
    - Alliance Laundry Systems Patent

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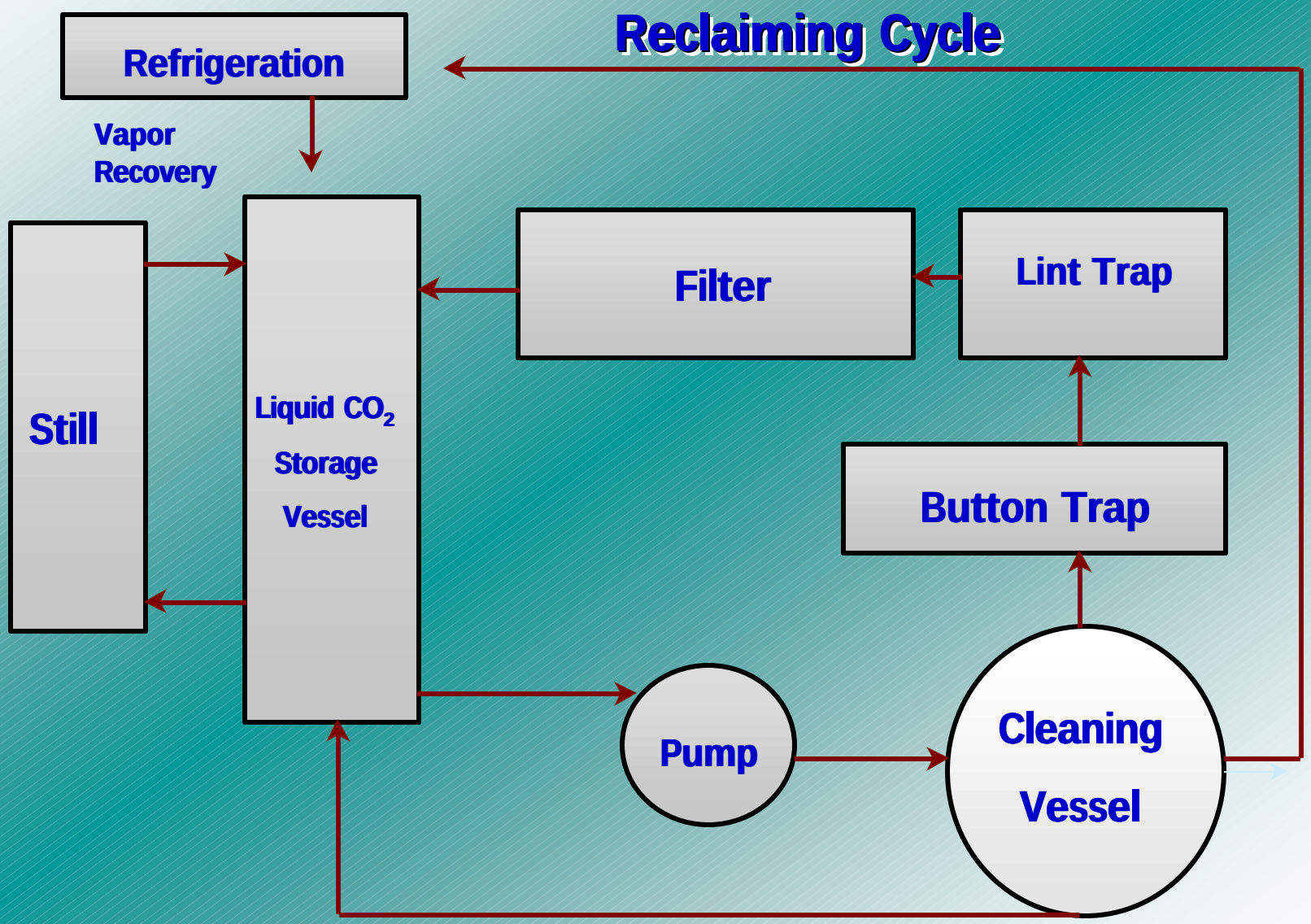
CO_2 Cleaning Cycle

- Load cylinder & press start!
- Purge
- Clean & filter
- Reclaiming
- Unload

Block Diagram of Process



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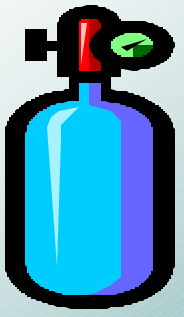
System Components

COMPONENT	CO_2 MACHINE	PERC MACHINE
VALVES	✓	✓
PUMP	✓	✓
FILTER	CARTRIDGE	VARIOUS
BUTTON/LINT TRAP	✓	✓
ROTATING BASKET	✓	✓
DRYING MODE	RECLAIM CO_2 GAS	BLOWN HEAT & VAPOR ABSORBER
STORAGE METHOD	PRESSURE VESSEL	BASE TANKS
CLEANING CHAMBER	PRESSURE VESSEL with BASKET INSIDE	STEEL SHELL with BASKET INSIDE
PURGE TANK	✓	N/A
STILL	✓	✓

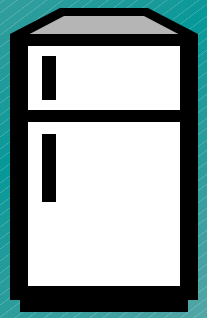
Common High Pressure Systems



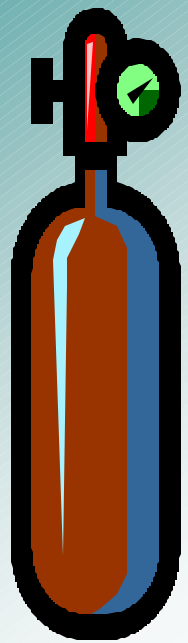
Home Oxygen Unit…2400 psi

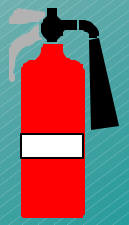
Dentist uses Nitrous Oxide… 800 psi

Scuba Diver … > 3000 psi



Refrigerator …350 psi





Fire Extinguisher …800 psi

Soda Fountain CO_2 …838 psi

Home Air Conditioner…300 psi

Gas Grill…110 psi

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CO_2 Process Advantages

- Faster cycle times, better work flow
- Gentler on garments - Increases fabric life
- Less labor needed to finish garments
- Improved work environment
- Lower environmental costs
- Landlords' concerns addressed
- Cleans wider variety of garments

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Future of CO_2

- Testing / Pre-production
- Deliberate approach
- Supporting industries
- Price

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