315 North Madison Street, Bldg. #100
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Modern Thermal Design

"Control Your Energy Destiny, or Someone Else Will."

modernthermaldesign.com
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MODERN THERMAL DESIGN

WASTE HEAT AMMONIA WALKIN FREEZERS

Turn recovered heat into dependable subzero cooling

UP TO
40 YEARS
DESIGN SERVICE LIFE*

LOWER ELECTRICITY USE. LOWER PEAK DEMAND. LONG ASSET LIFE.

MTD integrates heat-driven ammonia-water absorption refrigeration for cold storage, process cooling and freezer applications. The system replaces the large electric compressor with a thermal cycle powered primarily by recovered heat.

678,000
kWh saved per year
100-ton example

113 kW
peak demand reduced
at design load

90%+
compressor electricity avoided
when waste heat is available

BENEFITS FOR FACILITY OWNERS

- Uses otherwise-wasted exhaust, jacket-water, steam or process heat
- Eliminates the large refrigerant compressor and its overhaul cycle
- Cuts annual electrical consumption and utility demand charges
- Produces subzero cooling for freezers and industrial processes
- Low vibration, quiet operation and few major moving components
- Natural ammonia refrigerant with zero ozone-depletion potential
- Expandable from tens to thousands of refrigeration tons

HOW WASTE HEAT BECOMES COLD

1. **RECOVER** — Capture usable heat
2. **SEPARATE** — Drive ammonia from solution
3. **CONDENSE** — Reject heat outdoors
4. **FREEZE** — Expand and absorb freezer heat

ILLUSTRATIVE 100 TON RETURN

Compressor system	Absorption auxiliaries	Annual energy reduction
1.25 kW/ton	**0.12 kW/ton**	**678,000 kWh**

10.7% ROI **8.3-YEAR PAYBACK** **$3.17M / 20 YEARS**

$117,972 year-one savings | 11.5% 20-year IRR | 3% annual utility escalation

ENGINEERED AND INTEGRATED BY MTD

Waste heat recovery | Ammonia absorption refrigeration | CHP integration | Thermal storage

MTD
DESIGN-BUILD

Example assumptions: 100 refrigeration tons; 8,000 operating hours/year; 75% average load; 1.25 kW/ton compressor baseline; 0.12 kW/ton absorption auxiliaries; $0.15/kWh electricity; $12/kW-month demand; 113 kW design-demand reduction. Actual savings depend on heat quality, temperatures, load profile, ambient conditions and utility rates. *Up to 40-year design service life with proper maintenance.