

Advanced Precooling Systems *For Longer Shelf Life*



Cooling Systems For The Food Industry

www.trj-inc.com

Get Legs... For longer shelf life.

Precooling will ensure the longest possible shelf life, or in industry terms: "legs".

Without proper precooling, produce begins to lose its value. Proper precooling retains that just picked freshness that consumers demand. TRJ has the solution. Their experience and advanced design solutions can extend shelf life, increasing your repeat business.

When it comes right down to it, proper precooling really is as important as choosing the right seed. TRJ has based their reputation on providing fast, yet economical precooling systems that continually ensure excellent arrivals, long shelf life, satisfied customers and increased profits for growers and shippers.

Many of the features and benefits of TRJ systems are unique to TRJ. Take advantage of their years of experience for precooling systems that will give your produce legs!



TRJ has been awarded the Red Book Credit Services Business Character Award for maintaining a reputation of high ethical trading practices, business competence and financial stability.



Shown left: (3) 350 horsepower ammonia screw compressors for a large freezing project

Shown below: system comprised of a 90 ton modular ice bin, plate icemaker and a Posi-jector™ for broccoli icing operation



Hydrocoolers

Suitable for: • Artichokes • Asparagus • Avocados • Green Beans • Beets • Broccoli • Brussels Sprouts • Cantaloupes • Carrots • Celery • Cherries • Endive • Greens • Kale • Leeks • Nectarines • Parsley • Peaches • Radishes • Romaine Lettuce • Spinach • Sweet Corn • Turnips • Watercress and more

TRJ hydrocoolers provide a fast, reliable and efficient means of cooling many water tolerant fruits and vegetables. TRJ hydrocoolers are custom designed to meet your specific needs including integrated conveyors, booth, pumps and refrigeration systems.



12 pallet system with powered conveyors

Benefits

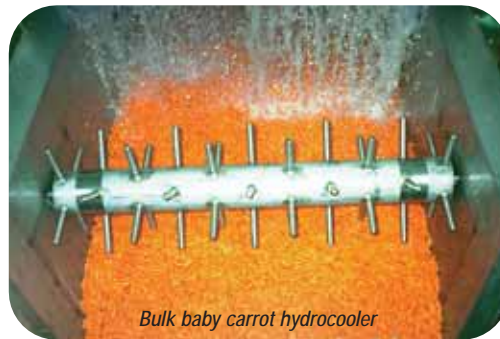
- ▶ Extends shelf life by cooling produce fast
- ▶ Cools crops up to 15 times faster than air
- ▶ Hydrates some products, reduces wilting
- ▶ Rinses while it cools
- ▶ Flexible means of cooling produce packed in bins, bulk, or palletized
- ▶ Relative low cost and little maintenance



12 pallet front loaded system



Belt conveyor unit handles individual cartons or bulk product



Bulk baby carrot hydrocooler

Features

- Capacities range from 5,000 to 60,000 pounds per hour
- Units can be designed to operate with stand-alone or central plant refrigeration systems
- Variable speed conveyor drives on powered units allow for changing cooling requirements
- Plate or pipe style cooling coils available
- Cooling surfaces are located above product for improved sanitary design
- Cold water recirculation includes easy to clean filtration system
- Epoxy coated booths, optional stainless steel construction for more sanitary applications
- Easy clean reservoirs and water distribution pans
- Ammonia or "Freon" based systems available
- Energy saving advanced controls
- Anti-bacterial systems available



Ice Making, Storage & Distribution Systems

Extend Shelf Life by Removing Field Heat Fast!

Whether it's flake, plate, tube, shell, block or crushed ice, TRJ engineers can store and distribute it any way that suits your budget, through the use of automatic storage bins, pneumatic conveying systems, screw conveyors and liquid ice pumping systems.



Benefits of Using Ice

- ▶ Remove field heat fast and extend shelf life
- ▶ Show your customers evidence of adequate precooling
- ▶ Maintain product freshness by slowing respiration
- ▶ Decrease moisture losses & resulting wilting or shriveling
- ▶ Control the growth of microorganisms
- ▶ Help retain natural sugars in some crops

Applications for Ice

- Liquid Ice Injection
- Top icing cartons and bins of produce
- Bulk commercial ice sales
- Export shipments
- Packaged ice for consumer use

- Truck icing
- Case icers
- Railcar icing
- Water chilling



3



Icemakers

Benefits of Ownership

- Save costs! Manufacture ice for as little as 1/10 of the cost of commercially purchased ice. Larger systems save even more energy costs by making ice during lower cost energy periods.
- Save labor costs through automation.
- Make your operation more self sufficient by lowering outside source dependency.



Icemaker Features

- Efficient, simple and reliable
- Self contained units reduce installation costs
- Industrial quality construction
- Corrosion resistant construction
- Variable ice thickness to suit different applications
- USDA approved for food processing plants
- Portable and modular systems available
- Reliable PLC controls automate the icemaker; reduces downtime

Two 43 ton per day modular plate icemakers for broccoli and sweet corn liquid icing system



Ice Storage Systems

TRJ provides various designs of ice storage systems using equipment such as automatic ice rakes, screw conveyors and insulated enclosures to best suit your needs.

Benefits & Features

- ▶ Save energy costs by accumulating ice during off peak hours
- ▶ Save labor costs through automation
- ▶ Most efficient use of storage space by complete leveling of ice
- ▶ Store ice in a sanitary, all galvanized steel bin
- ▶ Stainless steel option available
- ▶ Deliver ice with the simple turn of a switch
- ▶ Allow a buffer storage for ice availability during icemaker maintenance
- ▶ Conserve ice by insulating it from ambient conditions



Why Buy a TRJ Ice System?

Put TRJ's many years of experience to work for you to ensure that these factors and many others are adequately addressed:

- Initial cost and return on investment
- Ice type and inherent properties
- Storage and distribution design
- Location of equipment
- Utility rebates
- Future expansion
- Site preparation

System Configurations

Portable Ice Systems

Benefits & Features

- ▶ Two-piece, pre-engineered and fully packaged systems
- ▶ Standard units range from 20 to 150 tons ice manufacturing
- ▶ 40 to 150 tons automatic storage capacity
- ▶ Higher resale value and equity
- ▶ Easier to finance since the entire investment can be moved
- ▶ Can be operational in one day
- ▶ Generate additional income through off-site leasing
- ▶ Allows owner to move the entire investment in equipment
- ▶ Reduced site work coordination of subcontractors
- ▶ Single source design, performance & construction responsibility



Modular Ice Systems

Benefits & Features

- ▶ Modular, factory built and tested icemaking packages
- ▶ Field erected ice storage bins
- ▶ Sizes range from 20-300 tons per day icemaking
- ▶ 20-280 tons storage
- ▶ Lowest cost for automatic systems
- ▶ Easily erected and dismantled
- ▶ Can be installed inside of existing cold rooms or warehouses
- ▶ Simple to maintain and operate
- ▶ Completely integrated components ensure compatibility and successful performance



LIQUID ICE INJECTORS

One Step Precooling and Body Icing

Suitable for any ice tolerant fresh products such as:
Broccoli • Sweet Corn • Carrots • Radishes • Greens
Cantaloupes • Brussels Sprouts • Green Onions • Parsley and more

Labor Saving - Up to ten times faster than shovel icing palletized produce. Our one step precooling and body icing process has become one of the fastest and most foolproof means of preserving fresh vegetables, since the ice totally envelops the product.

Save Costs by Reducing Carton Size - Liquid ice fully surrounds the product, so in most cases the carton size can be reduced when compared to top iced cartons.

Positive Injection Results in a Thorough Icing Job -

This is why we call them Posi-jectors™. Good arrivals demand a consistent, thorough icing job, nothing less. **Getting the job done right the first time is critical.** Our unit employs a pumping system which forces the liquid ice directly into the carton. Others rely on less positive methods, which can result in costly re-icing and excessive handling.



Posi-Jector Liquid Ice System Model PJ1000G

COVERED BY ONE OR MORE OF THE FOLLOWING PATENTS: 1,213,153 / 1,216,281

Salt Free Mixture - Reduces concerns with equipment and truckbed corrosion, effluent contamination and diet conscious buyers. Other systems require salt to operate.

Accepts Any Type of Ice - Including crushed block, plate, flake, tube and shell ice.

Adjustable Injection Pressure -

For delicate products the injection pressure is easily adjusted to gently yet positively inject the liquid ice into each and every carton.

Adaptability To Shed Pack Systems -

Suitable for shed packed produce since liquid ice can be injected into closed or open cartons.

Ease of Installation -

Systems are delivered utility ready for quick installation.



Technical Features

- Positive Injection
- Cold water recovery system increases efficiency, saves ice
- Powered turntable allows access to all sides of pallet
- Capacities available from 400-1000 cartons per hour
- Corrosion resistant epoxy finish for long life
- Adjustable injection pressure allows for icing delicate products
- Factory wired for single point power connection

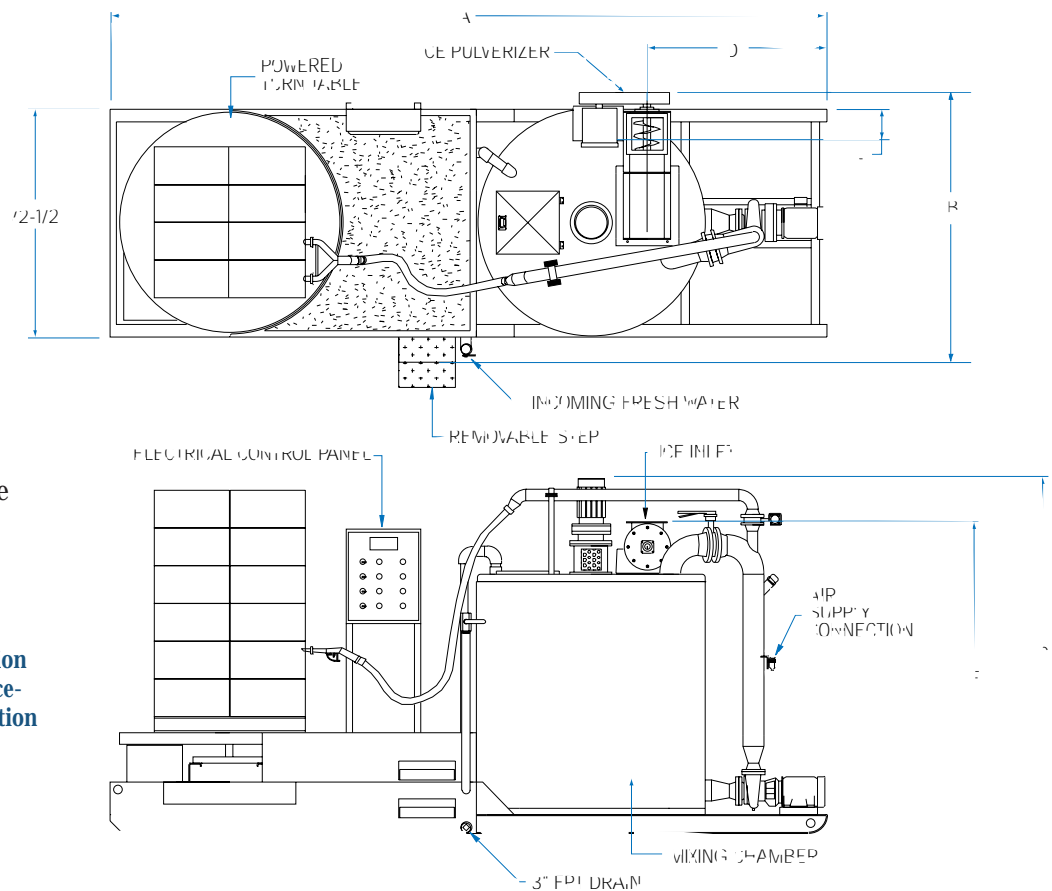


Options

- Powered pallet infeed and discharge conveyors with common cold water recovery (replaces turntable)
- Static platform for staging iced pallets, with cold water recovery
- Top icing conveyor systems for shed packed produce
- Single injection probe available for irregular stacking configurations
- Ice delivery systems
- 300# Ice Block Crusher
- Anti-bacterial systems available
- Custom configurations
- Leasing & financing available

See pages 3 & 4 for more information about complete systems including ice-making, ice storage and ice distribution systems.

TRJ Salt Free Liquid Ice Injection System



Specifications & Dimensions

POSI-JECTOR MODEL	CAPACITY (Cartons/Hr.)	DIMENSIONS (Inches)						CONNECTED LOAD/ 3PH,60HZ		WATER	AIR	SHIPPING WT	OPERATING WT
		A	B	C	D	E	F	230 VOLTS	460 VOLTS				
PJ-1000	400-700	240"	88"	113"	66"	9"	99-1/2"	84 AMPS	42 AMPS	2" FPT 100 GPM	1.5 CFM 80 PSIG	10,200 lbs	22,450 lbs
PJ-2000	400-1000	276"	96"	145"	86"	9"	123-1/2"	112 AMPS	56 AMPS	2" FPT 150 GPM	1.5 CFM 80 PSIG	12,700 lbs	33,250 lbs

Dimensions and specifications are subject to change without notice. Do not use for construction.

Forced Air Coolers

TRJ's Forced Air Coolers' versatility allows for cooling of almost any fruit or vegetable and can function as a precooling unit and a room cooler.

Suitable for: • Artichokes • Avocados • Green Beans
Brussels Sprouts • Cabbage • Cantaloupes • Cauliflower
Cherries • Cucumbers • Grapes • Honeydews • Kiwi • Nectarines
Okra • Onions (dry) • Peaches • Sweet Peppers • Plums
Summer Squash • Strawberries • Tomatoes and more

Benefits

- ▶ Increase shelf life by removing field heat fast
- ▶ Rapid cooling system with quick product turnaround
- ▶ Efficient and quiet operation
- ▶ Modular construction allows for relocation
- ▶ Simple installation compared to plenum type systems
- ▶ No special ducting required
- ▶ No water resistant cartons required
- ▶ Fans can operate at relatively high static pressures
- ▶ More energy efficient than room cooling
- ▶ Can be located in existing cold rooms

Features

- High surface area cooling coil
- High air flow fan capacity
- Galvanized steel housing for long term protection against corrosion
- Optimum temperature differential to achieve desired relative humidity
- Optional digital controls
- Optional two speed control for room cooling conditions
- Ammonia and "Freon" models available
- Various defrosting options



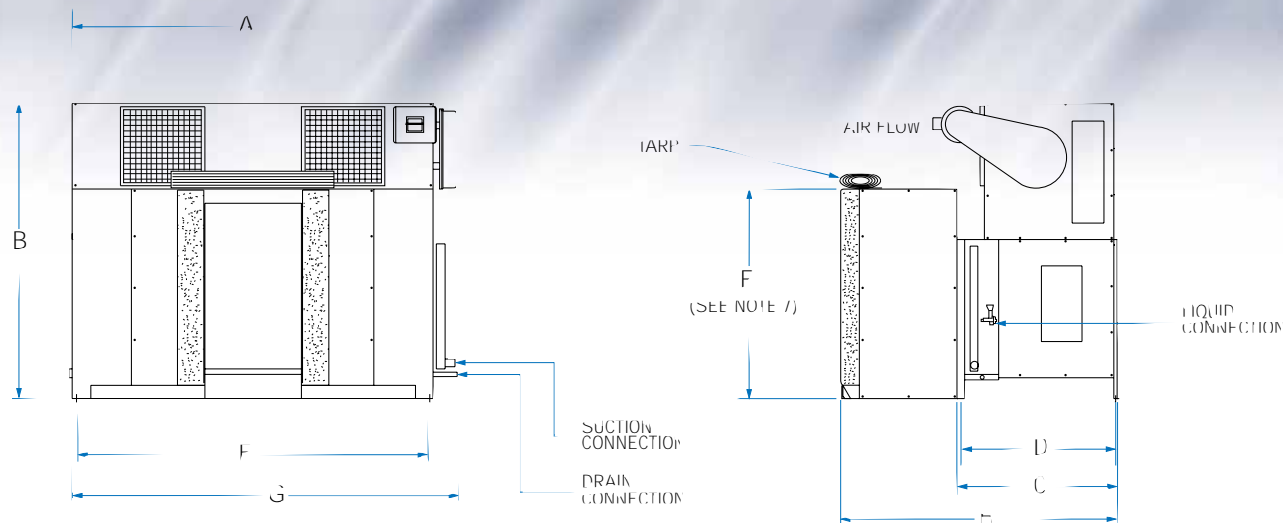
SuperFlow™
FORCED AIR COOLERS
by TRJ Refrigeration, Inc.

Receivers can look for the Superflow™ logo on your cartons as their assurance of a quality pre-cooled product. Call TRJ for free camera ready artwork.

The two speed capability is a real energy saver over other single speed systems and can, in some cases, result in utility company rebates. Advanced temperature controls and PLC's on multiple systems are used to control the unit's functions, which are capable of interfacing with PC based plant management systems.

The TRJ system is complete with a packaged refrigeration system and cooling unit, ready for field installation.





TRJ Superflow™ Forced Air Coolers Dimensional Information

MODEL	A	B	C	D	E	F	G	H
SF-32	120-1/8"	102-1/2"	54-3/4"	52-1/2"	84"	122-1/2"	133"	97-3/4"
SF-38	120-1/8"	102-1/2"	54-3/4"	52-1/2"	84"	122-1/2"	133"	97-3/4"
LF-32	134"	110"	62-3/4"	60-1/2"	89"	135-1/2"	147"	105-3/4"
LF-38	134"	110"	62-3/4"	60-1/2"	89"	135-1/2"	147"	105-3/4"
LA-32	123"	128"	62"	56"	89"	124"	134"	105"
LA-38	123"	128"	62"	56"	89"	124"	134"	105"

Dimensions and specifications are subject to change without notice. Do not use for construction.

Capacities and Options

MODEL	PALLETS/CYCLE (Note 1)	FAN HORSEPOWER	DF	LP (Note 2)	HGD (Note 3)	WD	AD (Note 4)	TR REQ'D (Note 5)	APPROX WT(LBS)
SF-32	8	15	X	X	X	X		22	3900
SF-38	8	15	X	X			X	22	3900
LF-32	12	15	X	X	X	X		38	4300
LF-38	12	15	X	X			X	38	4300
LA-32	12	15	X		X	X		38	3800
LA-38	12	15	X				X	38	3800

The optional dual function package (option DF) provides the added capability for the unit to function as a precool and a room cooling unit. This is proven to be a popular option since it provides greater flexibility. It includes a two speed motor and a special control package. Also available with electronic variable speed drive control.

Notes:

1. Optimum pallets per cycle, however, number of pallets varies by product
2. Dimensions for low profile units available on request
3. Hot gas defrost recommended only on multiple unit installations
4. Consult factory for application suitability
5. TR is Tons Refrigeration (capacity)
6. Special options and configurations available on all models
7. Maximum pallet height shown. Unit built to accommodate customer's highest pallet
8. Consult TRJ for compressor system details
9. Specifications subject to change without notice

Option Codes:

- DF - Dual Function
- LP - Low Profile
- HGD - Hot Gas Defrost
- WD - Water Defrost
- AD - Air Defrost

Industrial Refrigeration

Cold Storage • Freezing Systems • Process Cooling

As a design, engineering and manufacturing company, TRJ Refrigeration, Inc. has considerable experience in refrigeration design, construction, installation and service of high quality refrigeration systems. The following describes the varied types of systems designed by TRJ:

Three 350 HP ammonia compressors for -46° freezing system

- ▶ Company engineers have carried out projects exceeding 2,000 TR
- ▶ Large central plant installations using multiple rotary screw and reciprocating compressors
- ▶ Direct expansion, gravity, mechanical pump or gas pressure fed systems
- ▶ Single and two-stage compression systems
- ▶ Critical charge systems
- ▶ Blast freezing and low temperature storage
- ▶ Secondary coolants such as water, glycols, brines, etc.
- ▶ Control systems technology such as computer control with remote monitoring
- ▶ Energy management
- ▶ Supplied to many parts of the world including Mexico, Canada and Europe
- ▶ Various industries such as fresh and frozen food, bakery, industrial ice, and fishing

TRJ provides customers with a comprehensive range of services such as feasibility studies, system design, build, installation, service and maintenance, existing system analysis and recommendations for performance improvements. TRJ utilizes superior technology and advanced refrigeration techniques to provide innovative solutions to your specific cooling and freezing needs.

Designed in accordance with applicable industry standards, our systems meet or exceed the requirements or suggestions and recommendations of ASHRAE, IIAR, RETA of which we are members.



TRJ electrical panels and controls are supplied in-line with NEC requirements



Packaged Refrigeration Systems

Most systems can be pre-packaged as shown above. Some of the advantages of factory packaging are:

- Reduces field installation time and costs
- Modular construction allows for future relocation of equipment
- Up to 500 TR capacity using halocarbon or ammonia
- Complete with compressors, condensers, all vessels and electrical equipment required
- Factory construction offers a high degree of quality control over construction, testing and finishing



Cooling coils for large vegetable cold storage facility

TRJ, your single source for Parts

TRJ's parts and equipment sales department can provide virtually any part for your refrigeration or mechanical system. Count on competitive prices from a knowledgeable sales team, backed by experienced engineers. Here are just a few of the manufacturers whose equipment and parts we sell:



Refrigerating Specialties Division
Parker Hannifin Corporation

CYRUS SHANK CO.



Standard



**TOLL-FREE PARTS HOTLINE:
888-840-3434**



24 hours a day/7 days a week
or E-mail a parts quote request.

VIKING® REFRIGERATION AMMONIA PUMPS

PRECOOLING & STORAGE GUIDE

FOR FRUITS & VEGETABLES

Commodity	Precooling Systems			Maximum Storage/Days	Recommended Storage Temp	Highest Freezing Temp
	Hydrocool	Liquid Ice	Forced Air			
Artichokes	✓		✓	14	32-36	29.9
Asparagus	✓			14	32-36	30.9
Avocados	✓		✓	14-28	40-55	31.5
Beans, Green	✓		✓	10	40-45	30.7
Beets, Bunched	✓			28-56	32-36	30.3
Broccoli	✓	✓		10-14	32	30.9
Brussels Sprouts	✓	✓	✓	14-28	32-34	30.5
Cabbage			✓	14-28	32	30.4
Cantaloupes	✓	✓	✓	10-14	38-40	29.9
Carrot, Bunched	✓	✓		10-14	32	30.7
Carrot, Topped	✓			28-42	32	29.5
Cauliflower			✓	10-14	32	30.6
Celery	✓			14-28	32	31.1
Cherries, Sweet	✓		✓	7-14	30-32	28.8
Cucumbers			✓	10-14	50-55	31.1
Endive, Escarole	✓		✓	14-21	32	31.9
Grapes			✓	7-14	32	29.7
Greens, Leafy	✓	✓		7-14	32	31.4
Honeydews			✓	14-21	45-50	30.5
Kale	✓	✓		10-14	32	31.1
Kiwi Fruit			✓	14	32	29.0
Leeks	✓	✓		56-84	32	30.7
Nectarines	✓		✓	14-28	32	30.4
Okra			✓	7-10	45-50	28.7
Onions, Green		✓		7-10	32	30.4
Onions, Dry			✓	30-240	32	30.6
Parsley	✓	✓		28-56	32	30.0
Peaches	✓		✓	14-28	32	30.4
Peppers, Sweet			✓	14-21	45-50	30.7
Plums			✓	21-30	32	30.5
Radishes, Bunched	✓	✓		7-14	32	30.7
Romaine Lettuce	✓			3-6	32	31.7
Spinach	✓			10-14	32	31.5
Squash, Summer			✓	10-14	41-50	31.1
Strawberries			✓	7-10	32	30.6
Sweet Corn	✓	✓		4-6	32	30.9
Tomatoes, Ripe			✓	3-5	45-50	31.0
Turnips	✓			56-112	32	30.1
Turnip Greens	✓	✓		10-14	32	31.7
Watercress	✓			4-7	32-35	31.4

Some storage conditions may vary depending on varieties of fruits and vegetables. Where multiple cooling methods are indicated, one or combinations of methods may be more desirable depending on conditions. This guide is intended for general use only. Consult TRJ Refrigeration, Inc. for details.



Cooling Systems For The Food Industry

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