THE CP MILK IRRADIATOR

THE CREAMERY PACKAGE MFG. COMPANY

SALES BRANCH OFFICES (Write Nearest One)

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		Philadelphia, Pa.,	2412 Walnut St.		

Note how plentifully the other vitamins occur in every-day foods . . . but VITAMIN-D is scarce

KEY TO CHART +++ Excellent Source ++ Fair Source + Weak Source tr Trace

Name of Food	A	B	C	D
Vegetables				
Asparagus	++	+++	.....	.....
Beans, Kidney (canned)	+	+++	.....	.....
Beans, Navy (cooked)	+	+++	.....	.....
Beans (lima)	+	+++	+	.....
Beans, String (cooked)	++	++	.....	.....
Beans, Soy (cooked)	+	+++	.....	.....
Beets (root)	+	+	+	.....
Brussels Sprouts	++	+++	+	.....
Cabbage (raw)	++	+++	+++	.....
Cabbage (cooked)	+	++	+	.....
Carrots (fresh raw)	+++	++	++	.....
Carrots (cooked)	++	++	+	.....
Cauliflower	+	++	+	.....
Celery	+	++	.....	.....
Chard	++	+	.....	.....
Corn (fresh—yellow)	++	++	+	.....
Cucumber	+	+	++	.....
Dandelion Greens (cooked)	++	++	+	.....
Lettuce	++	++	+++	.....
Onions (raw)	+	++	++	.....
Parsnips	+	++	.....	.....
Peas (cooked)	++	++	++	.....
Potatoes, Sweet (cooked)	++	++	+	.....
Potatoes, White (baked)	+	++	+	.....
Radishes	.....	++	++	.....
Rhubarb (cooked)	.....	.....	+	.....
Rutabagas	+	++	++	.....
Spinach (cooked)	+++	+++	+	.....
Squash (cooked)	++	.....	.....	.....
Turnip (cooked)	+	++	.....	.....
Turnip Greens (cooked)	+++	++	+	.....
Meats—Fish				
Fish (average)	+	+	.....	tr
Kidney (beef)	++	++	+	.....
Liver (beef-pig)	++	++	++	.....
Meat (average)	+	++	+	.....
Oysters (raw)	++	++	+	tr
Sweetbreads	+	+	.....	.....

Name of Food	A	B	C	D
Fruits				
Almonds	+	++	.....	.....
Apples (raw)	+	+	+	.....
Bananas (raw)	++	++	++	.....
Cantaloupe	++	++	.....	.....
Cranberries (cooked 3 min. unstirred)	.....	.....	+++	.....
Grapefruit	+	++	+++	.....
Grapes	+	++	+	.....
Lemon Juice (fresh)	+	++	+++	.....
Orange Juice (fresh)	++	++	+++	.....
Pears	+	+	+	.....
Pineapple (fresh or canned)	++	++	++	.....
Prunes (dried)	+++	++	.....	.....
Raisins	.....	+	.....	.....
Raspberries (fresh)	.....	.....	++	.....
Tomatoes	++	+++	+++	.....
Dairy Products				
Butter	+++	.....	.....	+v
Buttermilk	+	++	+	.....
Full Cream Cheese	++	+	.....	+
Eggs (yolk)	+++	++	.....	++v
Milk (whole)	+++	++	+	+v
Grain Products				
Barley (pearled)	+	++	.....	.....
Oatmeal (cooked)	+	++	.....	.....
Rice, Whole (cooked)	.....	++	.....	.....
Rye Bread	+	++	.....	.....
Wheat, Whole	+	+++	.....	.....
Fats and Oils				
Lard or Olive Oil	+	.....	.....	.....
Margarine, Oleo	+	.....	.....	.....
Cod Liver Oil, and other fish oils.	+++	.....	.....	+++

This composite chart is compiled from the most authoritative sources available

OBSERVE how plentifully the other vitamins are distributed in many foods, yet how scarce vitamin-D is.

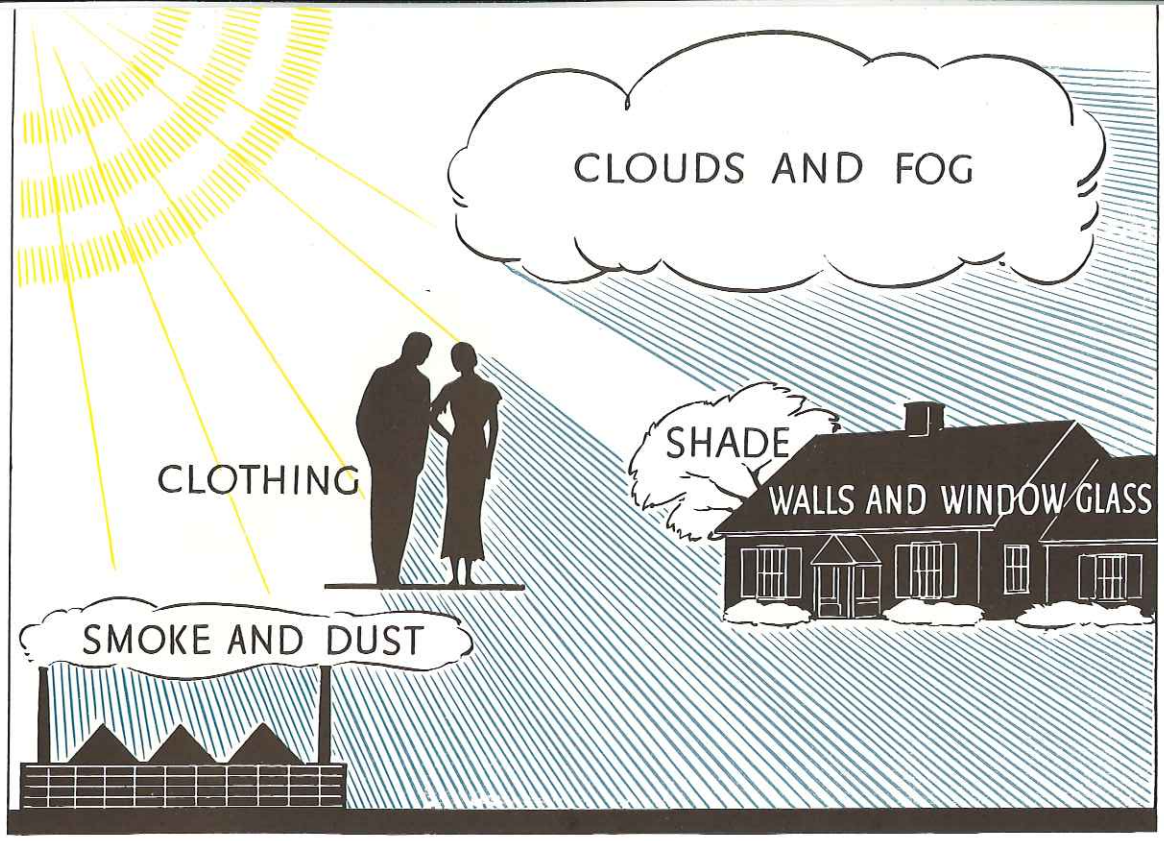
NOTES: V = 500% variation in the vitamin-D content of these foods. Other vitamins also are subject to wide variation in certain foods, viz., older fruits and vegetables, in which vitamin-C content diminishes rapidly; vitamin-A content of squash, pumpkin, carrots, etc., seems to parallel intensity of pigmentation (carotin).

Vitamin-E: Cereals, milk, bananas, lettuce, spinach, and whole wheat bread are good sources of this vitamin.

Vitamin-G: Usually associated with vitamin-B.

Approximate vitamin-D equivalent to one teaspoonful of cod liver oil (Steenbock standard): 5 to 25 eggs, 1 to 5 pounds of butter, 10 to 50 quarts of whole milk.

Irradiated Vitamin-D Milk +++ ++ + +++



How Nature's Supply of Vitamin D, Ultra Violet Rays of Sunlight, Is Cut Off by Weather and Civilized Life

INTRODUCTORY

Scientists have learned that there is a class of obscure substances present in living tissues and foods, the absence of which interferes with normal processes of growth and resistance to disease and infection. These have been named vitamins.

The discovery of the vitamins and the part they play in the maintenance of health calls for a program which will assure to everyone an ample supply of these food principles. In the case of most of the already identified vitamins, this is comparatively simple—a selection of readily available foodstuffs is all that is necessary.

The fact that milk and dairy products are rich in vitamin content has been of great value to the dairy industry. Milk contains plenty of Vitamins A and B. Vitamin C is plentiful in fruits and vegetables. A well balanced diet containing dairy products, vegetables and fruits assures a sufficiency of these three vitamins.

With Vitamin D, the situation is somewhat different. Its action is to regulate the utilization of the bone-forming elements, calcium and phosphorus in the body. Lack of this vitamin during infancy and childhood is practically certain to result in the development of rickets. In adults, its absence is probably an important cause of tooth decay.

Unlike other vitamins, Vitamin D is found to only limited extent in ordinary foods. Egg yolk, butter and natural milk have a small but variable Vitamin D content. Plant foods are practically devoid of it. The net result is that under modern conditions of living, human beings, especially infants and children, in temperate climates do not receive enough Vitamin D for adequate bone

and teeth development. Cod liver and halibut liver oils are often used as preventive agents against rickets, but many children find the flavor disagreeable.

Nature, however, has made provision for lack of Vitamin D in the diet. This provision is sunlight. When the ultra-violet rays of sunshine, or like rays from any source, fall on the human skin, Vitamin D is created in the tissues and carried into the blood stream. Vitamin D is the sunshine vitamin. In our modern mode of life, spent largely indoors where these vital rays from the sun are filtered out by window glass (for ordinary glass absorbs all ultra-violet), children and adults are deprived of the benefit of nature's provision. Even out of doors, smoke, haze and clouded skies shut off these rays. In winter, the amount available is much below what is needed.

All things considered, it is obvious that an ample supply of Vitamin D should be provided as is the case with the other vitamins. As rickets is a serious disease of children, whose principal food item is milk which already contains the calcium and phosphorus necessary for the growth of bones and teeth, it seems appropriate that milk should be made the carrier of Vitamin D.

Discovery of Irradiation

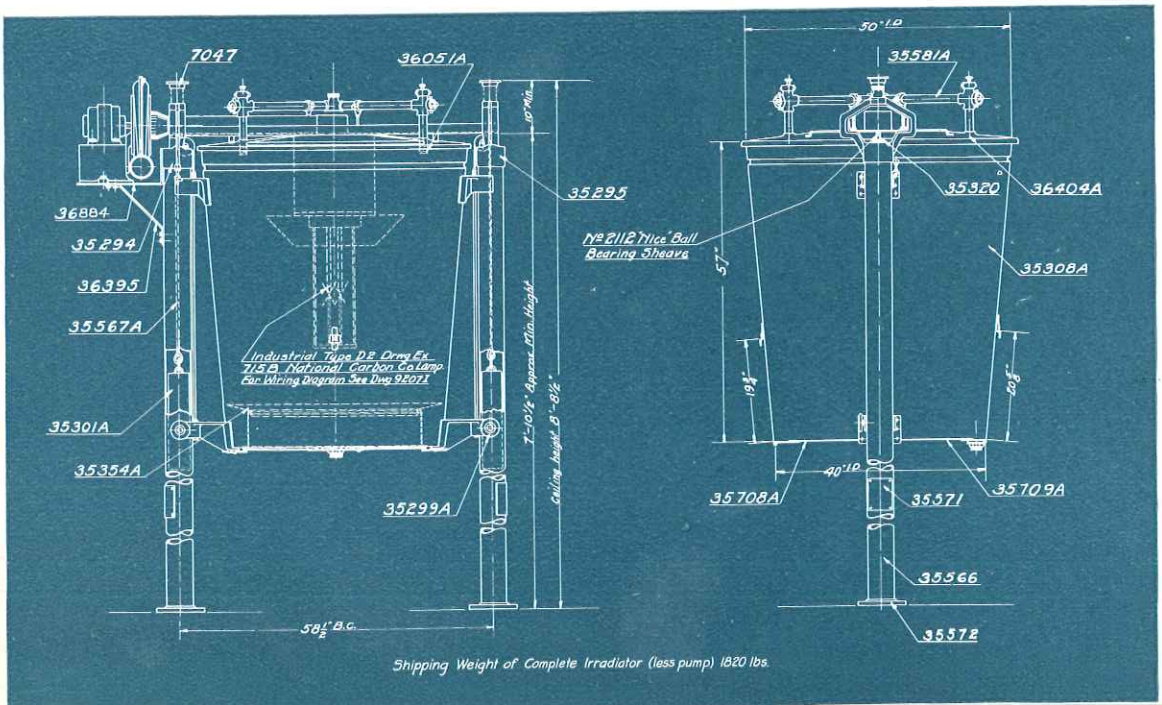
In the period from 1924 to 1928, Dr. Harry Steenbock of the University of Wisconsin, and other investigators demonstrated that certain food products develop anti-rachitic characteristics when exposed to ultra-violet irradiation. Milk is one of these substances. Whole milk has its Vitamin D content increased sufficiently by irradiation, so that when consumed in customary quantities, it will give adequate protection against rickets.

The process was patented, the patent assigned to the Wisconsin Alumni Research Foundation and is now made available on equitable terms to the dairy industry.

The process of irradiating milk is simple, consisting of a few seconds' exposure of milk in a thin film to a reliable source of ultra-violet rays.

Our function is to co-operate with scientific investigators, health authorities, and the medical and dental professions, by providing efficient apparatus for carrying out the approved process on a commercial scale under controlled conditions. The CP Milk Irradiator has been developed for the purpose of imparting to milk a uniform protective Vitamin D potency.

Dimensions of the CP Milk Irradiator



Two CP Milk Irradiators at Producer's Creamery, Benton Harbor, Michigan. All milk delivered by this progressive concern is irradiated.

DESCRIPTION OF THE CP MILK IRRADIATOR

Equipment

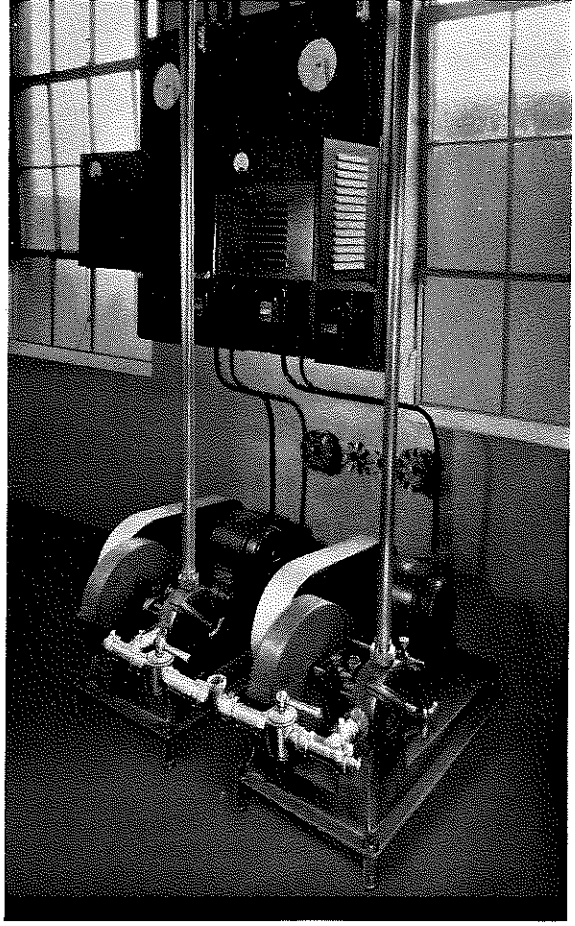
While the irradiation process is fundamentally simple, it is necessary to provide equipment, which in design, operating characteristics, and means for control assures the milk being properly treated at a minimum cost for electrical energy and labor.

The requirements are met by the CP Milk Irradiator. It has been and is continually being subjected to scientific tests for efficiency, both as to economy of operation and effectiveness of the process.

To effect these results, the apparatus is made cylindrical in form. Milk is fed at a steady and predetermined rate to a distributor trough at the top and flows in a thin film over the inner surface of the cylinder, where it is exposed during its travel to the light from a carbon arc lamp suspended in the center of the cylinder. It will be seen that with uniform distribution around the cylinder and with a dependable source of light at the center, all portions of the milk will receive equal exposure and be uniformly activated. An advantage of this form is that the light is entirely surrounded by the cylinder, hence no light rays are wasted. Reflectors and shields are unnecessary. Workmen are protected against exposure to the ultraviolet light.

The shape, size and capacity of the CP Milk Irradiator have been determined, on the one hand, by the primary requirement that the treatment shall be adequate to produce irradiated milk of satisfactory Vitamin D potency, and on the other hand, by our desire to offer the most economical and convenient unit from an operating cost standpoint. The treatment or process is, of course, specified by scientists and is measured by accepted laboratory methods. Any apparatus to receive approval must meet the laboratory test, and its maximum capacity is that at which the desired po-

Cleaning the irradiator. Lowering drum permits reaching all surfaces coming in contact with milk.



Regulated and sealed capacity milk pumps and recording ampere meters used with two irradiators.

tency is obtained.

In the CP Milk Irradiator, there are combined the desirable features of maximum capacity in small space, together with the most economical use of electrical energy. The output per hour per kilowatt of electrical energy is higher than with other shapes or sizes—an important consideration to the plant owner.

The Carbon Arc Lamp

The source of ultra-violet irradiation is a National Carbon Company carbon arc lamp, fully automatic, operating at 50 volts and 60 amperes across the arc. A toggle switch to turn the light on or off, is the only manual control. Operating difficulties experienced with other types of lamps are practically eliminated by the use of the carbon arc lamp. Among its specific advantages are the following:

(1) Radiation is instantly available at full power.

(2) Character and intensity of radiation is always the same at a given arc voltage and current. There is no deterioration with age.

(3) The quality of light from the carbon arc being determined by the type of carbon used, that type of carbon is chosen which is best adapted to milk irradiation.

(4) The ultra-violet output of the carbon arc lamp developed for this purpose is ample for large scale production at very low unit cost.

(5) Ample anti-rachitic potency can be imparted without affecting other important vitamins present in the milk and without flavor change.

Control

Having provided equipment to irradiate milk in an approved manner, the operation and control is a simple matter. It is necessary only to supply the milk, regulate its rate of flow and apply the correct amperage of electric current to the carbon arcs. Control of rate of milk flow is effected by using a positive fixed capacity pump to meter the milk to the machine. Correct amperage to the lamp is obtained through the use of proven automatic current regulation device built into the lamp control unit, which compensates for any changes in line voltage.

Complete Record of Operation

For the information of the plant owner and to meet requirements of health or milk control officials, the operation is recorded on a chart similar to a recording thermometer. This shows the amperage consumed, the operation of the supply pump and the duration of the run. One pen records when the pump is started, how long it operates and when it is shut down. The other pen records amperage flow to the lamp from throwing in the switch until the circuit is broken. With simultaneous milk and current flow, both at rates determined by test to be correct for the apparatus used, everyone concerned has assurance that the milk has been irradiated in an approved manner. The records produced by the irradiator ammeter have the same value as records of performance as temperature recorder charts have as to pasteurization.

What Equipment Includes. The equipment regularly furnished includes the irradiator cylinder with integral distributing and collecting troughs, necessary supporting stands or framework, motor driven ventilating fan, arc lamp, control and switch boxes, and recording ammeter. Metering pump is furnished as an extra when suitable pump is not available.

The pump we supply and recommend is a displacement type pump having variable speed drive. The variable speed is provided so that the capacity can be regulated closely. When the capacity has been adjusted, the variable speed device is sealed. Occasional tests should be made as to capacity and when a falling off is observed, the speed may be readjusted to compensate for any slight slippage due to wear. By this means, capacity is held within narrow limits. By sealing the speed adjustment between check-ups, unauthorized change of speed and rate of flow are prevented. Every safeguard to the integrity of the irradiating process has been provided in the CP Milk Irradiator Equipment.

The illustration and elevation drawing shown on page four are of the standard single lamp unit which has a proved capacity of 4000 pounds of milk per hour, using 3000 watts electrical energy.

The apparatus is compact and easily installed in a plant without structural changes or special foundation. It is, of course, entirely sanitary.

Two metal columns support the entire apparatus. Lamp, ventilating fan and covers are carried by the cross-frame. The irradiating cylinder is mounted on brackets which slide up and down on the columns and is balanced by counterweights within the columns.

Easily Cleaned

Operation is with the cylinder in the uppermost position. To clean it, the attendant stands on the floor and lowers the cylinder around him making it easy to reach all surfaces.

There being no heating or cooling in the irradiating process, there is no scale or deposit on the milk surfaces. Hence, cleaning is as simple as it can possibly be made.

Irradiating cylinder, covers and all milk surfaces are of tinned copper, but will be furnished of stainless steel alloy or other suitable materials on special order.

Fitting Into Plant Routine

Milk may be irradiated either before or after pasteurization. The recommendation is to irradiate raw milk before pasteurization and preferably at as low a temperature as possible.

Milk after irradiation does not lose its potency by cold storage or pasteurization. Where capacities in excess of that supplied by one irradiating unit are required, two or more may be installed.

In planning for irradiation, bear in mind that it is desirable to irradiate in a continuous run free from all but an occasional shutdown. Our engineers will be pleased to furnish layouts and other engineering data on request.

Alternating Current Required

The carbon arc lamp uses 60 cycle alternating current at 50 volts. Alternating current at line voltage reduced to operating voltage by step-down transformer included in control box furnished with the lamp.

Direct current can be used by installing a motor generator set to produce alternating current.

License Necessary

The process of irradiating any food product or pharmaceutical product to increase Vitamin D potency is protected by U. S. Patent No. 1,680,818, controlled by Wisconsin Alumni Research Foundation, Madison, Wisconsin. Applica-

tions for license to use the process should be made to the Foundation at the above address.

CP Milk Irradiating Equipment is sold outright, but can only be supplied to those having a license from the Foundation.

Low Cost Protection

The cost of irradiating milk, including license fee and royalties for the use of the process, interest and depreciation on equipment, cost of electrical energy, carbons and labor, will vary with quantity handled, also electric rate and labor costs in different localities. However, under average conditions, the total cost will amount only to a small fraction of a cent per quart. It is undoubtedly the least expensive method of providing an anti-rachitic food.

To the enterprising milk distributor, irradiated milk presents an opportunity for both service and profit. At a small advance in selling price per quart on a reasonable output, the profit over cost is attractive. With a large output to be treated, it should be possible to place irradiated milk on the market with no increase in price to the consumer. Such an enterprise should be launched with the previous approval and co-operation of the medical profession and health officials.

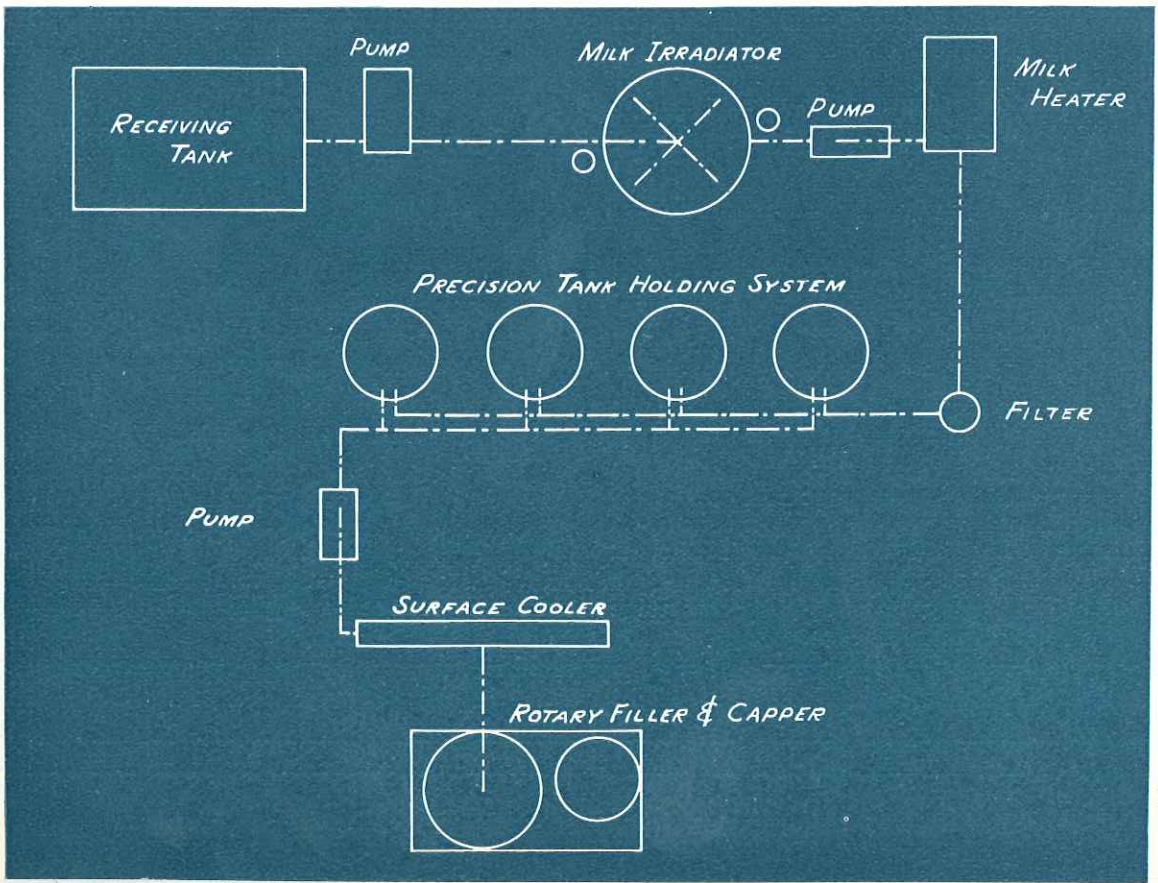
Brief Facts About Irradiation and Vitamin D Irradiated Milk

1. Milk being the natural food for infants and children, is ideally adapted to carry a supply of Vitamin D.
2. Milk can be irradiated under controlled conditions and in commercial quantities by the carbon arc and given a Vitamin D potency sufficient to prevent rickets.
3. The process can be made practically automatic and is economically adaptable to large scale production.
4. Irradiation creates Vitamin D in milk without the addition of any foreign substance. Nothing is added to or subtracted from milk.
5. No alteration of odor or taste of the milk results from irradiation under proper and accurately controlled conditions.
6. The cost of irradiation is a very small fraction of a cent per quart.
7. The process is based on a sound, scientific foundation and equipment has been developed making it practicable on a commercial scale.
8. Popular recognition of the need for ample Vitamin D content in the child's food creates a broad and ready market for this product.

Further particulars, prices and engineering service may be had on request.

TYPICAL INSTALLATION DIAGRAM

Showing how the CP Milk Irradiator fits into the milk flow line. Upon request our engineering department will make detailed floor layouts for specific installations. There is no cost or obligation for this service.



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