VOLUME 18 NO. 9
SEPTEMBER, 1955

Journal of

MILK and FOOD TECHNOLOGY

Official Publication

International Association of Milk and Food Sanitarians, Inc.

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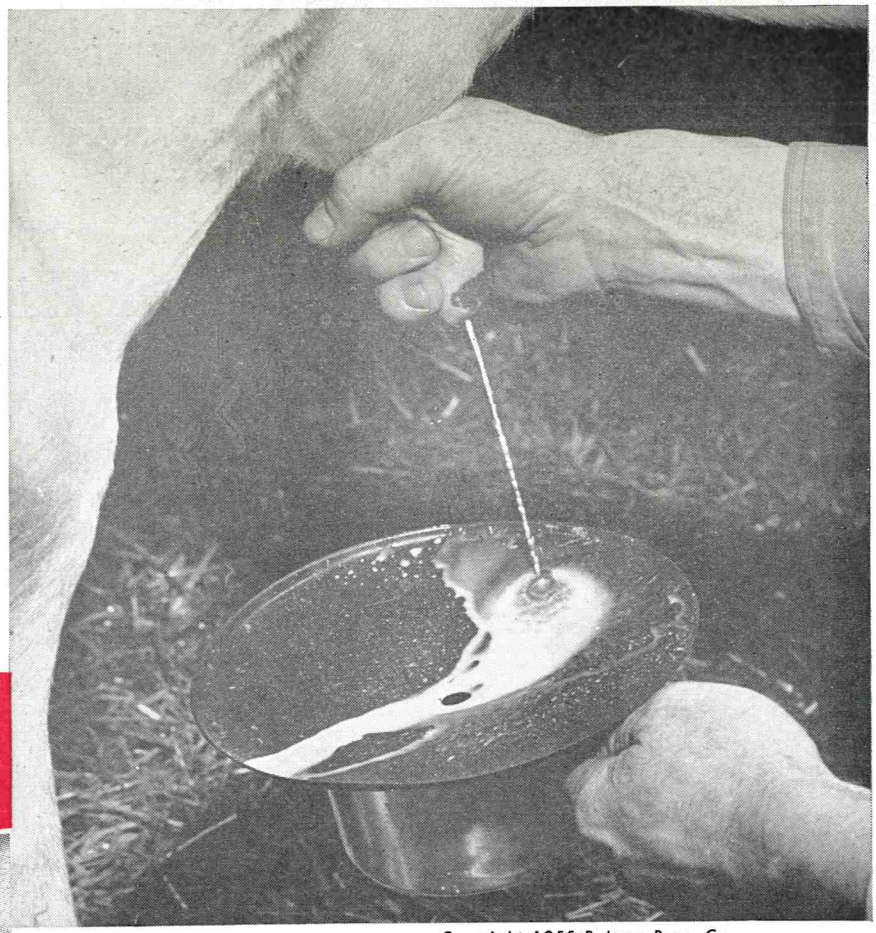

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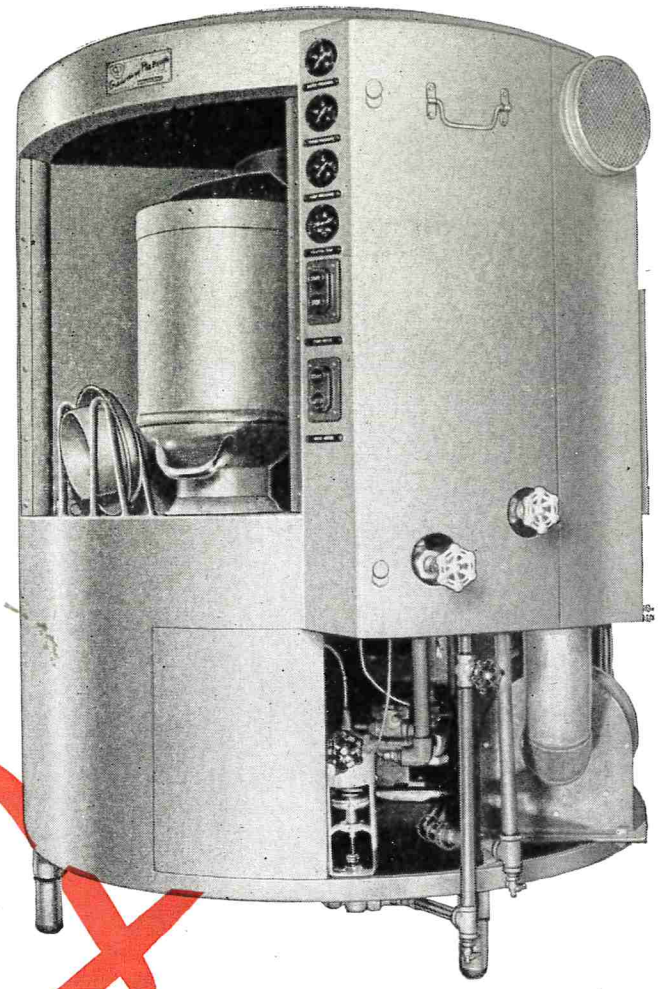

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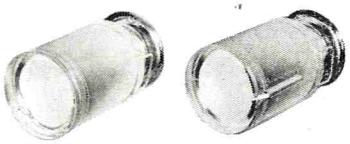

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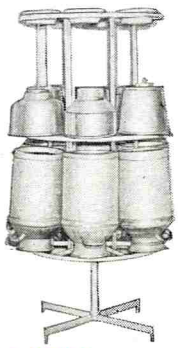

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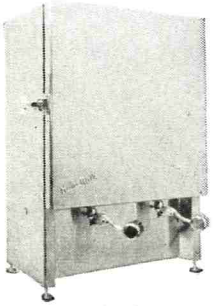

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The Journal of Milk and Food Technology (including Milk and Food Sanitation) is issued monthly beginning with January number. Each volume comprises 12 numbers. Published by the International Association of Milk and Food Sanitarians, Inc., with executive offices of the Association at Ritz Building, 12½ East Broadway, P. O. Box 437, Shelbyville, Ind.

Entered as second class matter at the Post Office at Shelbyville, Ind., March 1952, under the Act of March 3, 1879.

EDITORIAL OFFICES: J. C. Olson, Jr., Associate Editor, Dept. Dairy Husbandry, University of Minn., St. Paul, Minn.; H. L. Thomasson, Managing Editor, P. O. Box 437, Shelbyville, Ind.

Manuscripts: Correspondence regarding manuscripts and other reading material should be addressed to J. C. Olson, Jr., Associate Editor, Dept. Dairy Husbandry, University of Minn., St. Paul, Minn.

"Instructions to Contributors" can be obtained from the Edtor for the use of contributors of papers.

Journal of

MILK and FOOD TECHNOLOGY

INCLUDING MILK AND FOOD SANITATION

Official Publication

International Association of Milk and Food Sanitarians, Inc.

REG. U.S. PAT. OFF.

Vol. 18 — SEPTEMBER — No. 9

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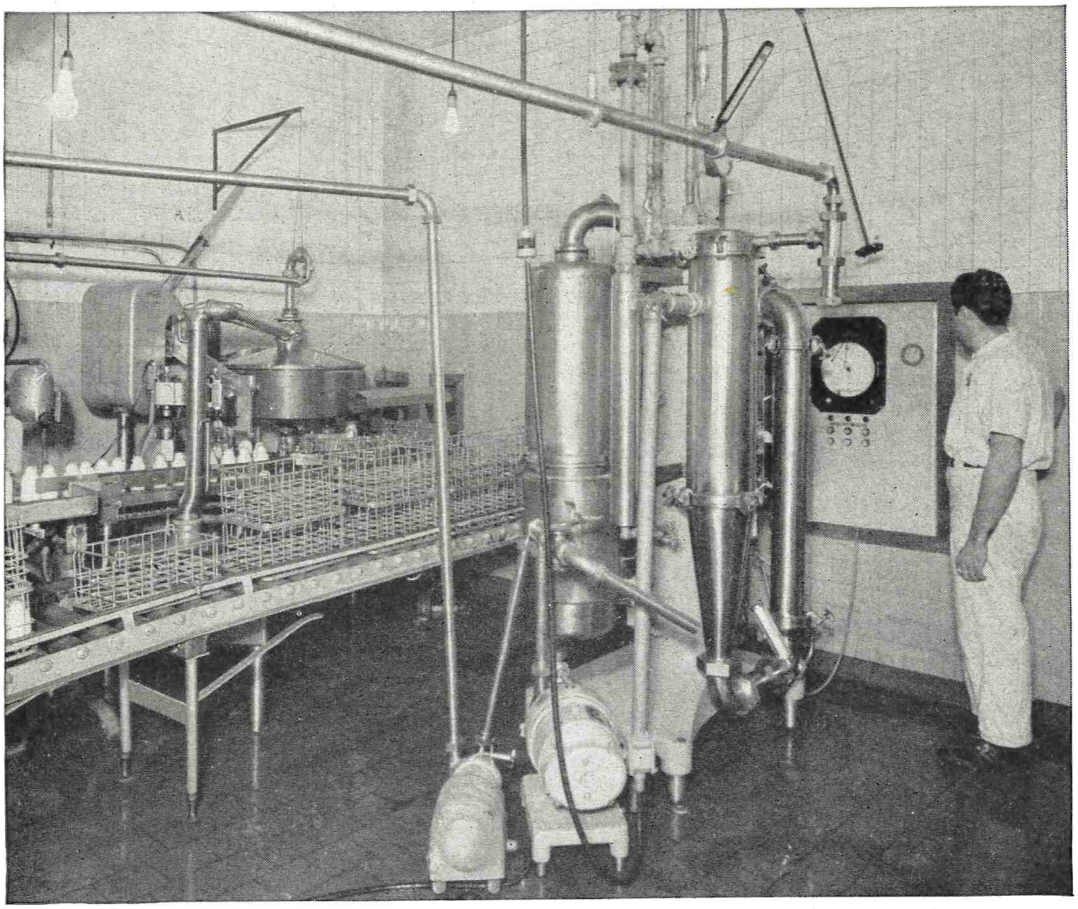
Subscription Rates: One volume per year
Individual non-members, Governmental and Commercial Organization subscription, 1 yr. $5.50
Public, Educational and Institutional Libraries, 1 yr. $3.00
Single Copies 1.00

Orders for Reprints: All orders for reprints should be sent to the executive office of the Association, P. O. Box 437, Shelbyville, Ind.

Membership Dues: Membership in the International Association of Milk and Food Sanitarians, Inc., is $5.00 per year, which includes annual subscription to the Journal of Milk and Food Technology, (including Milk and Food Sanitation). All correspondence regarding membership, remittances for dues, failure to receive copies of the Journal, changes of address, and other such matters should be addressed to the Executive Secretary of the Association, H. L. Thomasson, Box 437, Shelbyville, Indiana.



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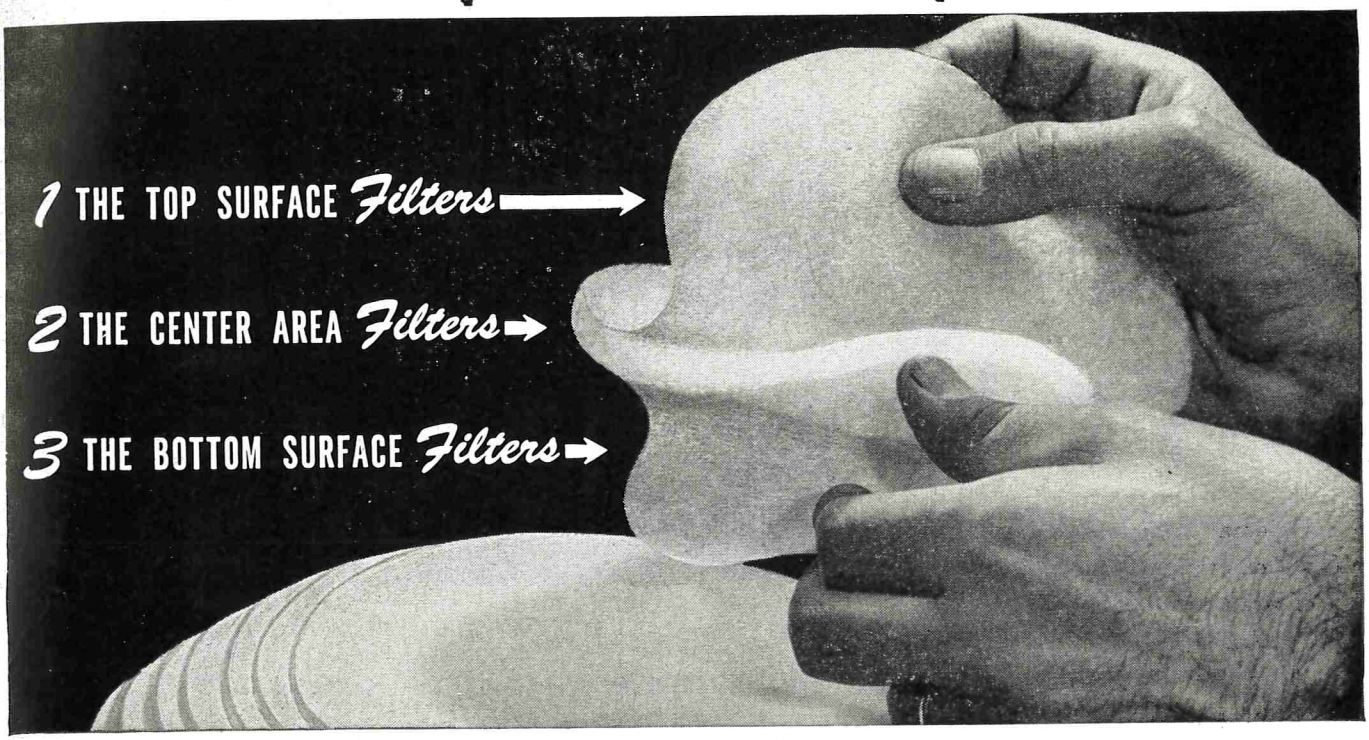

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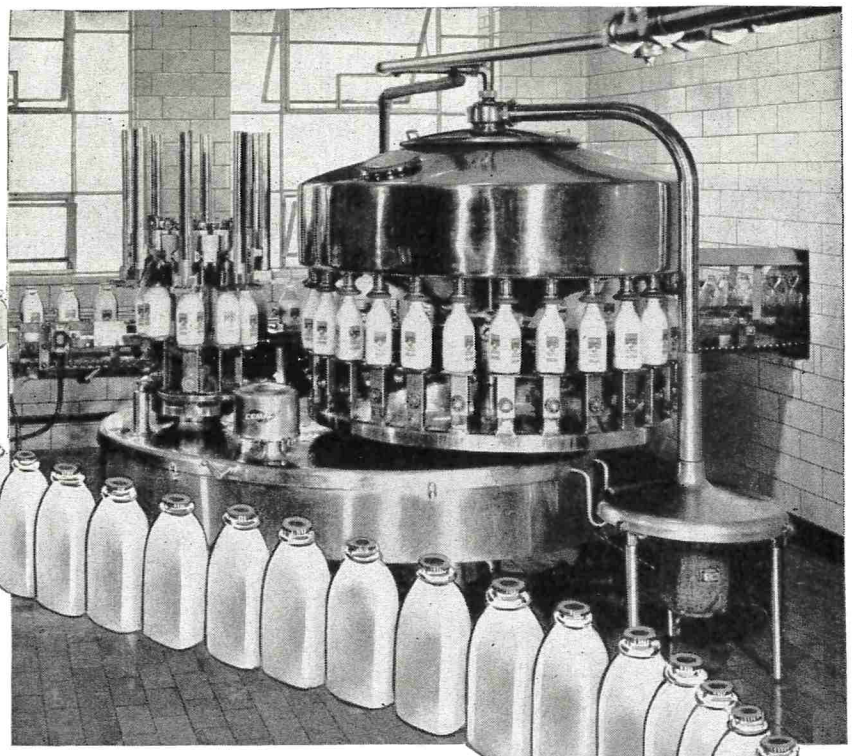

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A SIMPLIFIED PROCEDURE FOR SANITIZING GLASSES AT SOFT DRINK STANDS

H. Hellman and H. Shuval

Division of Sanitation, Ministry of Health, Jerusalem, Israel

(Received for publication April 8, 1955)

A simplified method of sanitizing drinking glasses used in soft drink stands in Israel is described. A pressure spray device served as a pre-rinse and final rinse, while the brushing, detergency and sanitizing phases were combined into one operation by the use of a brush-container filled with a quaternary ammonium based detergent sanitizer. The contact time between the glasses and the sanitizer was from five to ten seconds and satisfactory low bacterial counts were obtained by the swab test method.

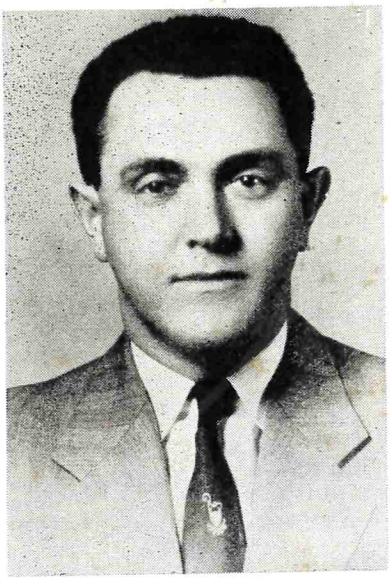
The object of this study was to develop a simplified yet effective method of sanitizing drinking glasses used in soft drink stands (kiosks) in Israel.

The common practice has been to "wash" glasses after each use by placing the glass over a pressure spray device (Figure 1) which sprayed the inside and outside of the glass with water. Former objections to this device as a plumbing hazard can be obviated by proper installation.

The obvious ineffectiveness of this spray method in sanitizing glasses was clearly demonstrated by a field survey run by the Division of Sanitation of the Ministry of Health. The standard swab rinse test (1) was used to test the bacterial densities on the glasses rinsed by the sprayer method. The median bacterial count found on 108 glasses at different soft drink stands in the City of Jerusalem was 3,120 bacteria per glass (Table No. 1), the maximum count being 38,500 and the minimum being 218. The standard count considered as acceptable is 100 bacteria per glass.

The problem of introducing an effective and practical method of glass sanitization was complicated by the limited space available in the soft drink stands, as well as the fact that stand operators have little time to wash glasses. The soft drink stands which are so popular in Israel are generally small booths, spacious enough to contain one operator who is usually hard pressed for time in his task of selling cakes, candy, cigarettes, newspapers, as well as soft drinks served in glasses.

The installation of a two basin hot water system (1) would be difficult from both a technical and financial point of view, and in addition difficulties would arise in the use of hot glasses. The standard three basin method (1), using a chemical sanitizer, was likewise not felt to be feasible for reasons of space and the difficulties in getting the operators to comply with the time consuming washing procedure. Under present day conditions in Israel single service paper drinking cups had to be ruled out on financial grounds.



Hillel I. Shuval received the B.S. degree in chemical engineering from the University of Missouri in 1948 and the M.P.H. degree from the University of Michigan in 1952. In 1949 the author was appointed as a sanitary engineer in the Ministry of Health of the newly formed government of Israel. He now holds the position of Asst. Director of the Division of Sanitation, of the Ministry of Health in Israel. In 1951 he was awarded a World Health Organization Fellowship in Environmental Sanitation.

The Simplified Technique

A series of experiments were carried out, both in the laboratory and in the field, in an attempt to develop a simplified, yet effective, method of glass washing and chemical sanitization. The importance of brushing the glass thoroughly in a detergent solution has been pointed out by both Mallman (2) and Andrews (3) and was of necessity to be included in the simplest of glass washing techniques. The need for sanitization of the glasses in addition to detergent and brushing action was also considered essential.

In the simplified procedure which was developed, the existing pressure spray, which is already in universal use, provides a first rinse which removes most traces of syrups which might remain in the glass. In

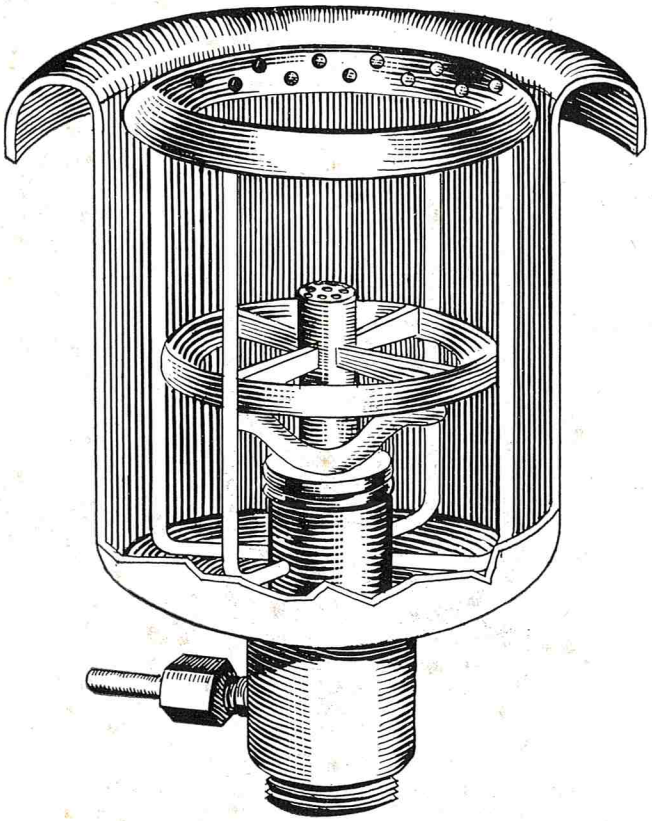


Figure No. 1 — Standard Pressure Spray Type Glass Rinser.

the second step, the brushing, detergency and sanitizing phases were combined into one operation. In cooperation with equipment manufacturers a single brush-container (Figure 2) was designed for this purpose. The container has removable brushes fixed to the inside, which give the glass a thorough brushing in a detergent-sanitizer solution both inside and out, when the inserted glass is twisted back and forth by the operator. The third step in the operation is a final rinse in the pressure sprayer.

This glass washing procedure required little space and could be installed with little cost. Furthermore it is simple enough and rapid enough to meet the needs of the average soft drink stand operator.

HYPOCHLORITES

The problem of an adequate detergent-sanitizer presented certain difficulties. The first detergent-sanitizer studied was a hypochlorite based product combined with a non-ionic detergent. A solution containing 250 p.p.m. of active chlorine was initially prepared and placed in the brush-container which was installed in an operating soft drink stand. Swab rinse tests were made on the glasses after washing. It may be observed from the results shown in Table 2 that within one and one-half hours after the hypochlorite solution had been introduced, and after washing 64 glasses, the chlorine concentration had been reduced from 250 ppm to 30 ppm. During this same interval the bacterial counts per glass increased from acceptable densities during the first 40 minutes to numbers well in the hundreds.

TABLE 1 — SWAB TEST RESULTS FROM GLASSES RINSED BY PRESSURE SPRAY ONLY

Glass number	Bacteria per glass	Glass number	Bacteria per glass
1	218	15	4,560
2	272	16	4,750
3	560	17	6,080
4	580	18	7,000
5	700	19	8,460
6	840	20	8,750
7	1,000	21	10,000
8	1,710	22	10,000
9	1,900	23	10,500
10	1,900	24	16,800
11	1,900	25	24,500
12	2,090	26	28,000
13	2,280	27	38,500
14	3,120[a]		

[a]Represents the median value.

The reduction in the strength of the hypochlorite solution was at first associated solely with the addition of organic matter to the brush-container. However, it was noted in a laboratory study of this problem that a rapid reduction of the free chlorine content took place in the brushing container without any glasses being washed and with no addition of organic soil. The chlorine content in the brush-container dropped from 216 p.p.m. to 18 p.p.m. on standing seven hours (Table 3). The rapid loss of strength of the chlorine was not noted in metal or glass containers which did not contain the brushes into which the same hypochlorite solution was placed. It is felt that the chlorine demand of the brushes themselves may have contributed to the rapid loss of effectiveness of the sanitizing solution.

In addition to the above mentioned difficulty, hypochlorites were not considered a desirable sanitizing agent, in this case, since a definite chlorine taste was imparted to the glasses despite the final rinse.

QUATERNARY AMMONIUM COMPOUNDS

The glass washing procedure as outlined above was used successfully with a Q.A.C. (quaternary ammonium compound) based detergent-sanitizer (polyalkyl naphthylene methyl pyridinium chloride) which had been tested for its bactericidal efficiency by the Weber and Black method (4).

The Weber and Black test results indicated that expected bacterial kills of 99.99% in 30 seconds were not achieved unless the Q.A.C. solution had a concentration of at least 600 p.p.m. of active ingredient. Hardness of the diluting water has been shown by Butterfield, *et al* (5) to reduce the bactericidal efficiency of quaternaries. The Jerusalem water used had a total hardness of 250 p.p.m. ($CaCO_3$), and could well account for the high concentration of sanitizer required to achieve the desired results.

FIELD TESTS

In field tests of the new glass sanitizing procedure a concentration of 1000 p.p.m. of the Q.A.C. was used. This being done to insure that a minimum of 600 p.p.m. would remain at the end of a day's run and to ensure proper sanitization despite the short period of contact of five to ten seconds, which was the maximum obtainable in actual practice. The results of swab tests[1] taken from glasses washed under actual field conditions in soft drink stands which had installed the experimental glass washing technique conformed to acceptable standards. The median bacterial density was 25 per glass for 67 glasses from five stands participating in the field test. The maximum count was 116 bacteria per glass which was only slightly above the required standard of 100 bacteria per glass (Table 4). To date, several hundred soft drink stands in all parts of the country have installed the new glass washing procedure and preliminary field reports indicate that satisfactory results are being obtained consistently.

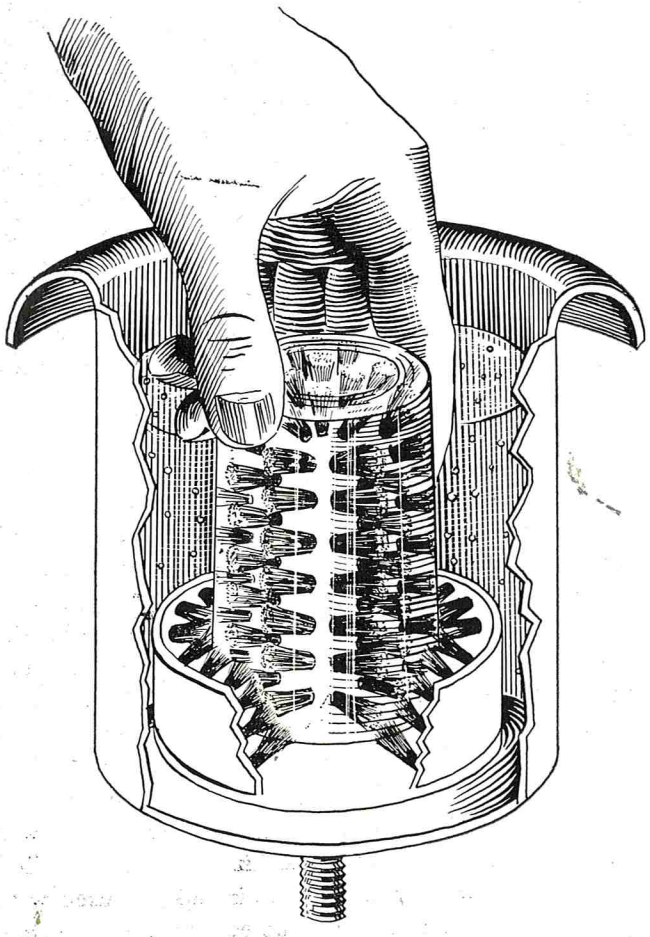


Figure No. 2 — Special Brush-Container Sanitizing Unit.

TABLE 2 — LOSS OF SANITIZING EFFECTIVENESS OF HYPOCHLORITES WHEN USED IN BRUSH-CONTAINER GLASS WASHER

Elapsed time (min.)	Bacteria per glass	Available Chlorine (p.p.m.)
0	23	250
10	3	
15	8	
20	5	
25	27	
30	30	
35	24	
40	25	
45	950	50
50	760	
55	380	
60	36	40
65	380	
70	475	
80	52	
90	950	30

MECHANICAL REMOVAL

In order to determine whether the effects of mechanical removal with the aid of the detergent alone could produce the same low counts on glasses as was achieved with a detergent-sanitizer, an additional study was made. The procedure used for glass washing was identical to that used in the previous field tests, except that a detergent alone replaced the detergent sanitizer. The concentration of the detergent used was 600 p.p.m.

Swab tests taken from 56 glasses washed in the detergent solution gave a median bacterial density of 7,000 per glass with a maximum of 19,250 and a minimum of 2090 (Table 5). From a test made at the end of the run it was noted that the detergent washing solution was very heavily polluted with bacteria, which apparently had been built up during the washing procedure. Such a bacterial build-up did not occur when a detergent-sanitizer was used, and in fact the sanitizer solution was found to be free of bac-

[1]Asolectin was added to swab test solutions to serve as a deactivator for the quaternary.

TABLE 3 — COMPARISON OF AVAILABLE CHLORINE LOSSES IN BRUSH CONTAINER WASHER AND IN WASHERS WITHOUT BRUSHES

Elapsed time (hr.)	Elapsed time (min.)	Available chlorine (p.p.m.) Glass container without brush	Metal container without brush	Metal container with brush
0	0	216	216	216
0	15	216	216	189
0	45	212	216	182
1	15	216	216	151
1	45	216	216	126
2	45	216	216	105
3	45	216	216	74
4	15	216	209	31
6	0	212	205	22
7	0	.....	.....	18
11	0	.....	.....	18
13	45	.....	.....	12
25	45	209	175	2

TABLE 4 — RESULTS OF SWAB TESTS ON GLASSES WASHED WITH A DETERGENT-SANITIZER CONTAINING A QUATERINARY AMMONIUM COMPOUND

Glass number	Bacteria per glass	Glass number	Bacteria per glass
1	3	9	25[a]
2	6	10	30
3	8	11	35
4	11	12	36
5	13	13	43
6	14	14	52
7	17	15	72
8	24	16	116

[a]Represents the median value.

TABLE 5 — RESULTS OF SWAB TESTS ON GLASSES WASHED WITH DETERGENT ONLY

Glass number	Bacteria per glass	Glass number	Bacteria per glass
1	2,090	8	7,000[a]
2	2,660	9	8,750
3	7,000	10	8,750
4	7,000	11	10,000
5	7,000	12	10,500
6	7,000	13	10,500
7	7,000	14	19,250

[a]The median value is 7,000.

teria at the end of the run. Since this study was done in the laboratory with artificially polluted glasses the results are not felt to be fully indicative of what might be expected in the field. The glasses were polluted to a much greater extent than would be found under average field conditions. Controlled field studies on this aspect were not made therefore the results are not considered conclusive. The data do seem to indicate that bacterial build up in the detergent solution negated any significant mechanical bacterial removal obtained by brushing in the detergent solution. However, it is felt that more study should be made on this question.

DISCUSSION

Generally it has been considered good practice to separate the cleaning and sanitizing phases of utensil washing so as to minimize the organic load in the sanitizing solution. However, in the case of glasses from soft drink stands being considered here, it appears that the pre-rinse in the pressure spray is sufficient to remove the major portion of any organic matter which might cling to the sides of the glass. The remaining soil is removed by brushing in a detergent-sanitizer and the resulting loss of bacterial efficency is not great as has been shown by field test results. The high initial concentration of detergent-sanitizer used, compensates for loss of strength during the day's run.

The period of contact between the glass and the sanitizer is considerably shorter than the two minutes which is generally specified for chemical sanitization. However, field tests clearly indicate that satisfactory results are being obtained with periods of contact between five and ten seconds. It would be desirable not to rinse the glass in the pressure spray after sanitizing so as to insure an even longer period of contact with the sanitizer, however, the question of the unknown toxicity of the Q.A.C. in the higher than usual concentrations being used indicated the final rinse as a precautionary measure. The public also required this rinse on esthetic grounds since they did not want "soap" in their drink.

SUMMARY AND CONCLUSIONS

A simplified and effective method of washing and sanitizing drinking glasses used in soft drink stands in Israel was developed. A pressure spray device served as a pre-rinse and final rinse, while the brushing, detergency and sanitizing phases were combined into one operation by the use of a specially designed brush-container filled with a detergent-sanitizer. It is recognized that this device has been discredited in the United States in the past largely because it was so installed as to constitute a plumbing hazard and was used without detergent or sanitizer. When installed above a sink with an adequate air gap and used with detergent and sanitizer such objections are overcome.

A hypochlorite based detergent-sanitizer was found to lose its bactericidal efficiency in a short time in the brush-container even when no glasses were washed in

it. This phenomenon is apparently associated with the high chlorine demand of the brushes themselves. In addition, hypochlorites were found to be undesirable, in this case, due to the traces of odor that clung to the glasses.

A quaternary ammonium compound based detergent-sanitizer used with an initial concentration of 1000 p.p.m. was found to produce satisfactory results when used in the trial procedure. The contact time between the glass and the detergent sanitizer was from five to ten seconds. In a field test involving soft drink stands using the trial procedure the median density was found to be 25 bacteria per glass while a survey of stands rinsing glasses in the usual pressure spray device alone gave a median density of 3,120 bacteria per glass.

The same washing procedure using a detergent alone, instead of a detergent-sanitizer, did not produce satisfactory results.

The authors are grateful to Dr. W. Silberstein, Director of the Ministry of Health Central Laboratory, for his help and guidance, and to Dr. K. Rabinovitz and Dr. H. Drimer, bacteriologists, and to Mr. Meyer Rigby, chemist, who played such important roles in the laboratory phase of this study.

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IODINE AND SANITATION[1]

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One of the major objectives of organized and even unorganized community health has been environmental medicine which encludes environmental health and environmental sanitation. In industry, the emphasis on environmental sanitation is even greater, inasmuch as actual financial losses or gains due to keeping-qualities of materials are quickly apparent, depending upon low or high standards which may be in operation. The potential benefits of proper sanitization procedures have become a subject of intense interest to everyone and upon which the spotlight is strongly focused today. Direct and indirect benefits to all and monetary gains to many result from proper modern sanitary practices. There is sufficient evidence that effective sanitation assures better health. Public health authorities everywhere and especially in our country are increasingly insistent that we practice proper environmental sanitation. Environmental health needs have changed in recent years and there has been a steady broadening of the horizons of public health.

Sanitarians in these modern times must be trained so that they have a knowledge of all environmental influences as they affect health and well-being. They must be familiar with the basic principles and techniques dealing with environmental regulations and the control of environmental health hazards. But they must go beyond this; they must be prepared to teach others to establish proper sanitary and hygienic practices. And in addition, they must be prepared to educate the public. A significant contribution can be made if well-trained sanitarians will become familiar with the conditions wherein they work and then speak the language of that area with those who are to be trained and regulated. All workers must be made sanitation-conscious, be prepared to recognize unsound sanitary practices and appreciate the problems at hand. Health enforcement officials, on the other hand, must also understand the situations and approach them in a realistic practical perspective. Adequate sanitation is everyone's responsibility if we are to have clean, pleasant and sanitary surroundings. Too often, those in industry fail or even refuse to cooperate, indicating added expense. It should not require much effort to impress everyone with the fact that failure to pay in effort and slight monetary consideration for public health will mean greater losses in terms of inefficiency, disability, illness and even in loss of life itself. In this activity, it is possible to adopt an approach which at least does not bring about active opposition and conflict. It is important to establish desirable attitudes and to build intelligent lay opinion for good sanitary habits. We are dealing with all kinds of human beings, who must be made to understand, must even be convinced, and must be won over to the regulations we seek to further. Goals must be carefully defined and characteristics explained in all details. Cooperative action is the very essence of democracy and is productive. When health worker and lay worker and an informed and enlightened lay public work together to encourage better environmental sanitation, more is accomplished than if the health worker or sanitarian merely sits in judgment. Gathering the facts, familiarizing one's self with and interpreting them in an understandable manner and serving as an educator rather than as a policeman will bring about more marked and even, striking improvements. Better results will be obtained with a program stressing health education, leadership and health service rather than law enforcement alone.

An informed public opinion, educated to the advantages and values of environmental sanitation, and active co-operation on the part of all concerned are bound to result in an elimination of unfavorable environmental practices and the strengthening of the favorable. The magnitude of the problem is self apparent. This is likely to leave one at times discouraged and even frustrated. However, there is compensation in the fact that progress has been and is being made. Environmental sanitation has been improved in many places with appreciable returns in human and economic values.

The major emphasis of this presentation is placed upon the effectiveness of sanitization by chemicals and in the more recent use of free iodine solutions and iodine-liberating preparations in sanitization procedures. Employing these iodine solutions makes available a useful and effective means of quickly sanitizing suitable equipment as a necessity in modern environmental health practice.

The employment of suitable effective sanitizing chemical solutions as a final step in the practice of

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[1]Presented at the Laboratorian's Short Course, University of Florida, Agricultural Experiment Station, Gainesville, Florida, April 5, 1955.

sound sanitation is an additional safeguard, and is not to be used as an excuse for careless and insanitary methods in operation. Chemical sanitizers are effective, readily available and usually low in cost. Sanitization by chemicals is not intended nor can it be expected to take the place of overall sanitary control and proper supervision. However, we must recognize the frailties of humans and also that continuous careful inspection and supervision or policing if you please are not possible at all time. It, therefore, is of paramount importance to be assured that the final step in the overall operation should be the use of an effective sanitizing chemical compound. If the latter can provide for many purposes a detergency as well as a sanitizing action, the value of the sanitizing method is increased.

DEFINITIONS

It is important to understand and properly use various terms employed in sanitization procedures. A knowledge of their meanings as they reflect present-day usage is not only desirable for legal reasons, but much confusion and misunderstanding with resulting uncertainties will be avoided if they are employed properly. Certainly, sanitarians should not find themselves being criticized because all those in this profession do not always "speak the same language". With this in mind, the definitions of the following are presented.

A *disinfectant* is a chemical agent which destroys disease-producing or other harmful microorganisms, but not necessarily bacterial spores. The term is employed for substances used on inanimate objects. A *germicide* or *bactericide* is a chemical agent which kills bacteria but not necessarily bacterial spores; the term is used for substances applied to inanimate objects as well as living tissue. A *sterilizing agent* or sterilizing process is one which destroys *all* microorganisms including spores. Where a chemical possesses an unusually wide range in its destructive powers against microorganisms of all kinds including bacteria (lower and higher forms), fungi, viruses and protozoa, the term *"biocidal"* frequently is used. This term is especially applicable when referring to the effectiveness of free iodine solutions. A *bacteriostatic agent* prevents or inhibits the growth or development of bacteria . The term *"antiseptic"* is actually defined in the Federal, Food, Drug and Cosmetic Act of 1938. Section 201 (o) of the Act states: "The representation of a drug in its labeling as an antiseptic shall be considered to be a representation that it is a germicide, except in the case of a drug purporting to be, or represented as an antiseptic for inhibitory use as a wet dressing, ointment, dusting powder or such other use as involves prolonged contact with the body". The term is used especially for substances applied to the living body (humans and animals). As legalized in this country, an antiseptic is a substance, "which when applied to microorganisms, will render them innocuous either by actually killing them or preventing their growth, according to the character of the preparation or the method of application". Preparations "which remain in contact with the organisms in the affected part of the body for a long period of time, may properly be designated as antiseptics, if their action is merely to inhibit the growth of bacteria". Products "which are in contact with the affected parts for but a brief period of time, may be called antiseptics, only if they will destroy organisms if used as directed".

The term "sanitizer" is applied to an agent which reduces the number of bacteria to safe levels as may be judged or evaluated by public health requirements and regulations. It is used commonly in connection with cleaning operations on inanimate objects as on eating and drinking utensils, dairy and other food-handling equipment and the like. Its purpose is not only to safeguard public health by eliminating or reducing contact with disease-producing organisms, but also to reduce and eliminate microorganisms which may affect the quality of dairy and other food products.

Substances which during washing serve as cleaning agents, removing dirt, soil or foreign material are known as "Detergents". "Sanitizing Cleaners" or "Detergent Sanitizers" are dual-purpose compounds which serve both as cleansing agents and sanitizers. Detergents in weak aqueous solutions have the effect of lowering the surface or interfacial tension of water. Accordingly they have been or are also known as "surface tension depressors" or "wetting agents" or "surface tension depressants" or "surface active agents" and more recently as "surfactants". The ideal detergent is one possessing maximum or at least great, easy dirt-removing power, with effective performance in the shortest time, with no damage to the articles treated, and with a minimum of manual labor.

An almost limitless number of surface active substances is available on the market. They usually serve as effective detergents, or dispersing, emulsifying, spreading, penetrating, solubilizing or wetting agents. Their solutions may or may not produce frothing especially when shaken or agitated. They penetrate porous materials and usually produce foam when shaken or stirred. An individual surface-active compound or surfactant may possess at the same time one or several of these functions in varying degrees. Usually one property may predominate over the others and

this property is responsible for the general name of the compound. It is usually necessary to carry out many practical studies to determine the requirements for effective use for its individual varied application. The commonly used surface active agents consist of molecules, one portion of which is a carboxylate or a sulfate, sulfonate, alcohol-ether or polyhydric alcohol. This portion, having an affinity for water and said to be hydrophilic or water-loving, is combined to make up the whole molecule with the other portion, which having an affinity for oleaginious substances, is spoken of as being lipophilic or oil-loving. The latter portion generally is a long hydrocarbon chain (as in fatty acids) or a cyclic hydrocarbon or a combination of both.

ELECTRIC CHARGE

It is common practice to classify surface-active agents or surfactants depending upon an exhibition of a particle charge of their colloidal solutions in water, so that we hear of ionic (or ionogenic) and nonionic compounds. The former are either cationic or anionic, depending on whether the surface-active portion of the surface-active agent has a positive electrical charge (cationic) or whether the effective portion of the molecule is in the anion (negative electric charge). There are some surfactants available which are bi-ionic (or amphoteric or ampholytic; the compound is also known as an ampholyte). They behave as anionic surfactants in an alkaline medium and as cationic surfactants in an acid medium; in other words the active portion of surfactants has a positive or negative charge depending upon the pH of their aqueous solutions. Ionic compounds are readily inactivated by many substances and especially by antagonistic surface active compounds.

Nonionic substances do not exhibit an electrical charge. They possess electrical neutrality (are not attracted to either cathode or anode). In general, nonionic compounds are compatible with other surface active agents (ionic and nonionic) and electrolytes, and are neutral, usually less irritating and less toxic. This inert character chemically, electrically, etc. is especially valuable in a surface-acting substance. The available marketed nonionics are heat-stable, non-volatile, usually complex mixtures, and water-miscible or dispersible in water.

CHEMICAL SANITIZERS

Among the more important chemicals employed in sanitization procedures, especially for food handling and processing equipment, we find chlorine and chlorine compounds, quaternary ammonium compounds and iodine and iodine compounds. Until recently, only the use of solutions of chlorine and chlorine-releasing compounds has had general acceptance. As an all-around sanitizing agent, there are certain drawbacks to chlorine and chlorine compounds. Among them are the fact that in use dilutions, they are not effective against tubercle bacilli and poliomyelitis and other viruses; they act as bleaches, thus affecting the clothing of operators, etc.; and it is necessary to test the use solutions to be assured that effective concentrations for effective sanitization still persist, inasmuch as the gross appearance of such use solutions does not give any indication of their potency. Solutions of the quaternary compounds also do not establish a "tell tale" as to potency. They are inactivated readily by many substances under practical use conditions, and they do not possess the broad antibacterial spectrum as displayed by the halogens, being more selective in their activity on different microorganisms.

IODINE

For more than a century, iodine, as tincture of iodine, was used in wounds, even before microbiology was introduced as a branch of science. Since 1881, when Koch reported on the antiseptic properties of iodine, the latter has been extensively used and considerable data have been presented extolling such virtues. The efficiency of free iodine solutions has been found to fulfill a function that many other antibacterial agents do not and cannot accomplish. Iodine (free) exerts its biocidal effect over a wide pH range, including the reactions apt to be encountered in practical routine. The concentration of free iodine necessary to disinfect does not vary greatly with different species of microorganisms and iodine being quite non-selective, covers a wide spectrum in its action. In a recent presentation (1), notation was made of the use of iodine as an antiseptic for the skin, wounds and mucous membranes of man and animals; for the sterilization of air and of inanimate objects; as a bactericide, fungicide, virucide, and protozoacide, (also killing thermoduric and psychrophilic bacteria, tubercle bacilli and poliomyelitis virus); for the disinfection of drinking water and swimming pool water, and for the sanitization of eating and drinking utensils and for equipment in bakeries, dairies and in food establishments. The introduction recently of new iodine-liberating compounds for the sanitization of dairy, food, eating and drinking utensils and equipment has resulted in even greater interest in the use of free iodine solutions. The latter continue to possess the many valuable, effective and useful properties possessed by iodine, but of special value in sanitization pro-

cedures is the so-called "built in" or self-controlled concentration indicator displayed by these solutions. The concentration or strength of the use-solution is readily detected, being indicated and the potency approximated by the color imparted by the free iodine. Even a few p.p.m. of free iodine, serving as a "tell-tale" indicator, will impart a yellow or pale amber tinge to the solution. The deeper the amber or brown color, the greater is the iodine concentration. It requires very little experience with these free iodine solutions for a user to quickly note when the strength of the latter is at or below minimum requirements for effective usefulness.

The over-all effectiveness exhibited by free iodine solutions has been detailed by the author (1) and others in numerous presentations and is recognized and accepted by all workers. In practice, the U.S.P. Iodine Tincture and the Strong Solution of Iodine (Lugol's Solution) are the two preparations of iodine readily available on the market and purchasable even at the corner drugstore. Other formulations of free iodine require individual or extemporaneous compounding and dispensing. This and other cognate factors including at times the stability factor and pH of such solutions have confined the scope of application of these two marketed solutions to comparatively limited use. It therefore appeared desirable to formulate solutions of free iodine which, in addition to any other application for their use, would be also practical for use as sanitizing agents in the dairy and food handling industries and for eating and drinking utensils and equipment sanitization.

Iodine even though in use for more than a century continues to serve as a most effective biocidal agent. The introduction of new iodine-liberating preparations enables it to continue to expand and even improve its usefulness as the changing needs of today require. It merits even wider use and application.

IODOPHORS

Iodine is sparingly soluble in water. Though the strength of a saturated solution is approximately one part in 3450 at 20° C, it is time consuming to make such a saturated aqueous preparation. Accordingly, soluble iodides (usually sodium or potassium iodide) are employed to make the iodine more readily soluble in water; however, this means added expense. Other inexpensive solubilizing agents have been used; and more recently various synthetic detergents or surfactants have been employed as solubilizing agents or iodine carriers. The resulting combination or complex possesses antibacterial as well as detergent and surface-activating properties. Such compounds are more generally referred to as "iodophors" (iodo-*iodine* and phor-*carrier*). A large variety of different ionic and nonionic detergents can serve as iodine-carriers. Other than their ionization characteristics, the synthetic surfactants have little in common structurally or functionally. The many detergents or surfactants in the various types or groups differ in respect to the amount of iodine which can be present in each, their stability, reactivity (amount of iodine liberated), their detergency and in other characteristics.

Of the various iodine-based sanitizers (combinations of iodine and surfactants) introduced to date, the nonionic detergents in general have been found most efficient and the most stable iodine carriers. The addition of a suitable buffering agent and certain acids to maintain the proper pH gives such an iodine preparation its maximum biocidal properties and makes available a more stable product. Not all nonionic detergents are suitable for the production of a nonionic-iodine "complex". Alkylphenoxypolyglycol ethers have thus far proved to be among the best. The available iodophors marketed as detergent-sanitizers retain all of the desirable properties of iodine, at the same time suppressing to a minimum many of the undesirable characteristics. The biotic properties of the iodine are unimpaired and, under certain conditions, enhanced. Present day improved laboratory techniques and modern stringent standards for biocidal agents have proved them most effective. Under conditions of use, solutions are not affected by hard water, are compatible with anionic, cationic and other nonionic compounds, do not stain permanently, are safe, non-toxic and noncorrosive (except on silver or silver-plated implements), effective dual purpose products (detergent and sanitizer), useful over a wide pH range, miscible with water in all proportions, and are practically free of flavor, taste and odor. Some individuals may detect a faint iodine odor. This odor can be masked with a flavoring agent. It is of interest to note that some people prefer the almost negligible odor, as it is not objectionable and serves as a "tell-tale" that a sanitizing agent has been or is being used. Milkstone formation is prevented by these iodine-sanitizing preparations, inasmuch as the compounds responsible for such residue are solubilized. The "wetting" properties provide a greater penetrating and spreading power, and aid in a quick draining without spotting or streaking or film production, this being useful when sanitizing eating and drinking utensils which are drain-dried. These preparations are economical. Though simple indicator papers or color comparison kits are supplied to check the potency of use solutions and thus be assured of biocidal action at all times, the concentration or

strength of the use-solution is indicated by the color imparted by the free iodine. This so-called "built-in" concentration indicator or "tell-tale" indicator reveals a color which is an accurate measure of the potency of the use-solution. Even a few p.p.m. of free iodine will impart a yellow tinge or pale amber color to the solution. With but little experience, even the unskilled worker can learn to tell quickly by the color of the solution when the strength or concentration is below minimum requirements for effective usefulness. Thus the color of free iodine solutions and these iodophors indicates their biocidal effectiveness, serving as an important visual safeguard against the use of solutions of ineffective concentrations of the compound. The U.S. Public Health Service and various Health Departments concerned with environmental sanitation have indicated the acceptability of certain iodophor preparations for the sanitization of milk and food utensils.

IODINE IN SANITARY PRACTICE

As a sanitizing agent, iodine has been used for the treatment of water supplies for over a half century. In 1922 (1) "the United States Public Health Service recommended the disinfection of drinking water by the addition of the 7 per cent tincture of iodine in an amount approximately equivalent to 1 drop of the latter per quart of water and a time period of 10 to 30 minutes depending upon the clarity". The United States Armed Forces have at present adopted an iodine-releasing chemical, tetraglycine hydroperiodide, as a disinfectant for water in canteens. In times of floods and other emergencies when drinking water is at a premium, iodine treatment "will assure a safe potable water for human consumption" (1).

The sanitization of air-raid shelters with iodine was used in Great Britain as a prophylactic measure against influenza. Other workers reported on the effectiveness of iodine as an aerial disinfectant (1).

In a detailed study in our laboratory, we reported on the usefulness of free iodine as a sanitizing agent for treating eating and drinking utensils and its importance, especially when such utensils are used by the sick. Sanitization of dishes, cups, glassware, knives, forks and spoons was effected by a one-second immersion in iodine solutions (50 to 200 p.p.m.), having first scraped these utensils and having employed a preliminary 10 second rinse in water (3).

A presentation on iodine sanitizers was recently made (2). We have conducted and are continuing studies on various proprietary and non-proprietary preparations containing free iodine or iodine-releasing chemicals. A detailed report of a bacteriological study on such preparations and their effectiveness as compared to hypochlorite (available chlorine) is being presented at the forthcoming annual meeting of the Society of American Bacteriologists. At this time, I can report briefly the following:

Solutions containing free iodine are very effective preparations for the sanitization of hard, non-porous surfaces after first cleaning the latter. This includes the sanitization of eating and drinking utensils, dairy and food plant equipment, tank trucks, etc. Such iodine sanitizers can be combined with suitable detergents as in the available marketed iodophors. Some of these iodophors, all liquids, are marketed as a "Germicide for Dairy and Food Plant Sanitation"; or "Detergent-Germicide for Dairy Farm Sanitation; or "Triple Action-Cleaner, Sanitizer and Deodorant", or "Complete Germicide and Detergent for Eating and Utensil Sanitation". Another marketed iodophor is available as a "General Purpose Cleaner, Disinfectant and Sanitizer". Generally speaking, iodine-iodide solutions acid buffered to a low pH (2.5 to 3.0) are more effective than unbuffered iodine-iodide solutions (as in Iodine Tincture (2%) U.S.P. and Iodine Solution (2%) N.F.), inasmuch as the unbuffered solutions after dilution to the suitable free iodine content and admixed with material during cleansing tend to become alkaline. The effective concentrations of the acid-buffered iodine-iodide solutions used in practical sanitization procedures are approximately identical to the concentrations used for the available marketed iodophors used as sanitizers. These are usually dilutions for immediate use yielding from 25 to 75 p.p.m. of free iodine, the exact concentration depending upon the specific practical application. However even lower concentrations, as low as 10 to 12.5 p.p.m. may be effective under certain conditions of immediate use. On the other hand, if one intends to prepare a solution of free iodine to be used over a prolonged period of time during a working day, at least two to three times the concentration indicated above should be used, for the assurance of greater safety. As indicated previously, the United States Public Health Service, Health Departments and sanitarians all over the country have approved these iodine preparations for the sanitation of utensils between each usage

FORM OF IODINE

Recently, greater attention has been focused upon the kind or form of iodine present in aqueous solutions. The following variety of chemical forms may exist when iodine is dissolved in water: I_2, I_3^-, I^-, HIO, IO^- and IO_3^-. It now appears that each of these

strength of the use-solution is indicated by the color imparted by the free iodine. This so-called "built-in" concentration indicator or "tell-tale" indicator reveals a color which is an accurate measure of the potency of the use-solution. Even a few p.p.m. of free iodine will impart a yellow tinge or pale amber color to the solution. With but little experience, even the unskilled worker can learn to tell quickly by the color of the solution when the strength or concentration is below minimum requirements for effective usefulness. Thus the color of free iodine solutions and these iodophors indicates their biocidal effectiveness, serving as an important visual safeguard against the use of solutions of ineffective concentrations of the compound. The U.S. Public Health Service and various Health Departments concerned with environmental sanitation have indicated the acceptability of certain iodophor preparations for the sanitization of milk and food utensils.

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A presentation on iodine sanitizers was recently made (2). We have conducted and are continuing studies on various proprietary and non-proprietary preparations containing free iodine or iodine-releasing chemicals. A detailed report of a bacteriological study on such preparations and their effectiveness as compared to hypochlorite (available chlorine) is being presented at the forthcoming annual meeting of the Society of American Bacteriologists. At this time, I can report briefly the following:

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Recently, greater attention has been focused upon the kind or form of iodine present in aqueous solutions. The following variety of chemical forms may exist when iodine is dissolved in water: I_2, I_3^-, I^-, HIO, IO^- and IO_3^-. It now appears that each of these

entities may possess different characteristics as to biocidal and even therapeutic properties. Data have been presented revealing that the biocidal property of such iodine solutions are due mainly to the activity of diatomic iodine (I_2). The biocidal activity of triatomic iodine (I_3^-) is almost nil. The biocidal effectiveness of HIO is difficult to evaluate as it is unstable, fleeting and generally present only in minimal amounts. It is possible that in the future, preparations of iodine intended for making aqueous solutions where the biocidal properties are desired will be formulated so that the diatomic iodine (I_2) will predominate. Since the various forms of iodine indicated above which may be present in aqueous solutions are difficult or impossible to distinguish titrimetrically and require a spectrophotometric analysis, the latter may be the method of choice for determining quantitatively the forms of iodine and especially the amount of diatomic iodine (I_2) present.

SUMMARY

A brief consideration is presented indicating the need for sanitarians to be trained so that they have a knowledge of all environmental influences as they affect health and well-being. Furthermore, it is important that cooperative action exist between health worker, lay worker and an informed and enlightened lay public, all to work together to encourage better environmental sanitation.

Acknowledgment of the meanings of various terms employed in sanitization procedures as they reflect present-day usage is needed by sanitarians. These definitions are herein presented.

The employment of suitable effective chemical solutions as a final step and an additional safeguard in the practice of sound sanitation is stressed. Among the more important chemicals employed in sanitization procedures, solutions of free iodine and iodine-liberating compounds play a leading role. They are highly effective as biocidal agents. Descriptions and many of the useful properties of iodophors and free iodine solutions used as sanitizers or sanitizer-detergents in sanitization procedures are given. Even the color of such solutions serves as a useful "tell-tale" or 'built-in" indicator as to the potency or efficiency of the sanitizing solution.

Acid-buffered iodine-iodide solutions and available marketed preparations of iodophors are effective as sanitizing agents in concentrations from 25 to 75 p.p.m. of free iodine and even concentrations as low as 10 to 12.5 p.p.m., the exact concentration depending upon the specific practical application. If the solution is to be used over a prolonged period of time during a working day, from two to three times this concentration should be employed for the assurance of greater safety. The 25 p.p.m. free iodine concentration in the above is equivalent to at least 200 p.p.m. available chlorine concentration (diluted hypochlorite).

Attention also is directed to the fact that in the future, formulation for the preparation of free iodine solutions may be prepared to determine the I_2 (diatomic iodine) content, as this form of iodine appears to possess the greatest biocidal activity.

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SUPPLEMENT NO. 3 TO THE 3-A SANITARY STANDARDS FOR FITTINGS USED ON MILK AND MILK PRODUCTS EQUIPMENT AND USED ON SANITARY LINES CONDUCTING MILK AND MILK PRODUCTS

Formulated by
International Association of Milk and Food Sanitarians, Inc.
United States Public Health Service
The Dairy Industry Committee

April 26, 1955

In keeping with the provisions of the 3-A Sanitary Standards for Sanitary Fittings and Connections Used On Milk and Milk Products Equipment, this supplement incorporates the following paragraphs covering "Special Sanitary Fittings" into the standards:

Special Sanitary Fittings

As 3-A Sanitary Standards are not intended to limit individual ingenuity, this supplement sets forth a basis for the approval of special sanitary fittings to meet specific applications where standard 3-A Sanitary Fittings designs are not applicable.

Where special sanitary fittings are required and interchangeability with respect to face to face, or centerline to face dimensions is not important, the following conditions must be met:

These special fittings must qualify with respect to material, finish, construction, thread dimensions, and use of gaskets as set forth for approved 3-A fittings in the standard to which this statement is a supplement. All product contact surfaces of such fittings shall be accessible for cleaning and inspection. All internal angles shall have radii of not less than 1/16-inch, except gasket recesses and grooves in which all sharp corners shall be avoided.

SUPPLEMENT NO. 4 TO THE 3-A SANITARY STANDARDS FOR FITTINGS USED ON MILK AND MILK PRODUCTS EQUIPMENT AND USED ON SANITARY LINES CONDUCTING MILK AND MILK PRODUCTS

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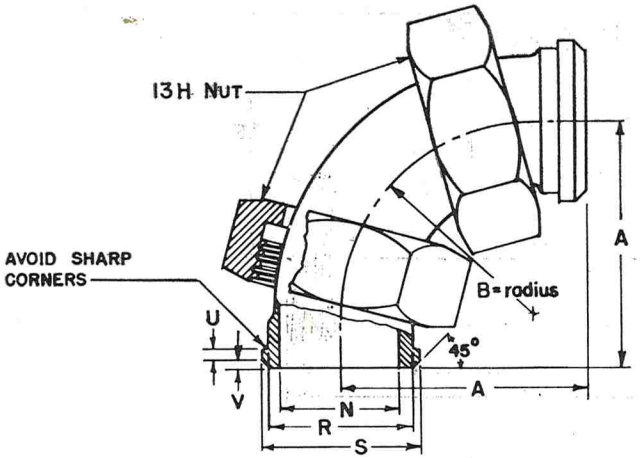
The Dairy Industry Committee

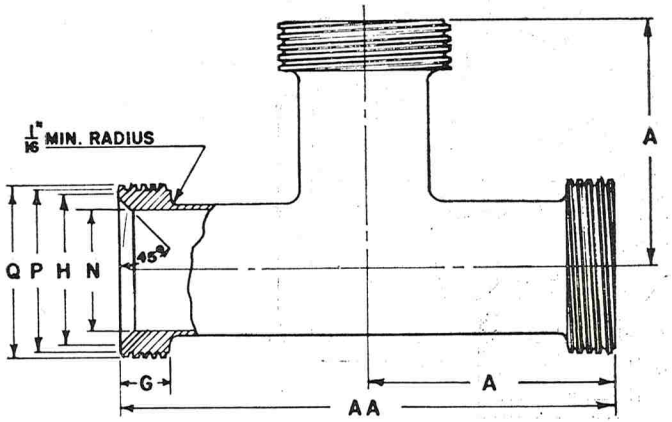
April 26, 1955

In keeping with the provisions of the 3-A Sanitary Standards for Sanitary Fittings and Connections Used on Milk and Milk Products Equipment, this supplement incorporates the following fittings into these standards:

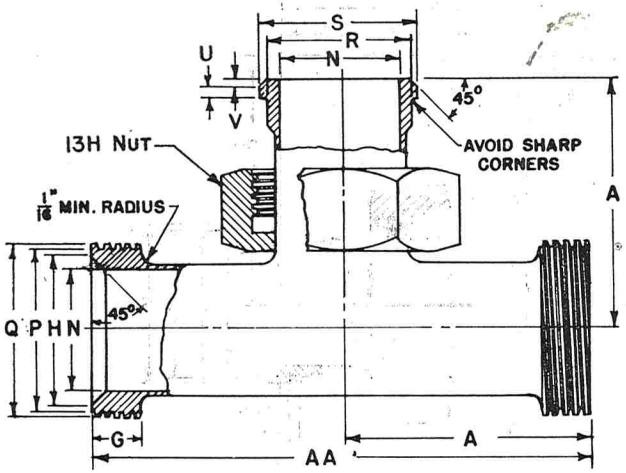
PART NAME	*3-A DRAWING NO.*
2E Bend	3A-100-22
7X Tee	3A-100-22
7AX Tee	3A-100-22
7BX Tee	3A-100-22
2EG Bend	3A-100-23
7XG Tee	3A-100-23
7AXG Tee	3A-100-23
7BXG Tee	3A-100-23



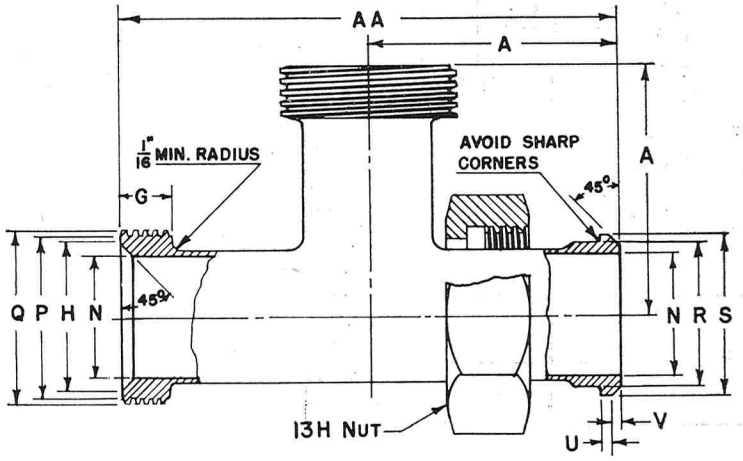
2-E BEND



7X TEE



7AX TEE

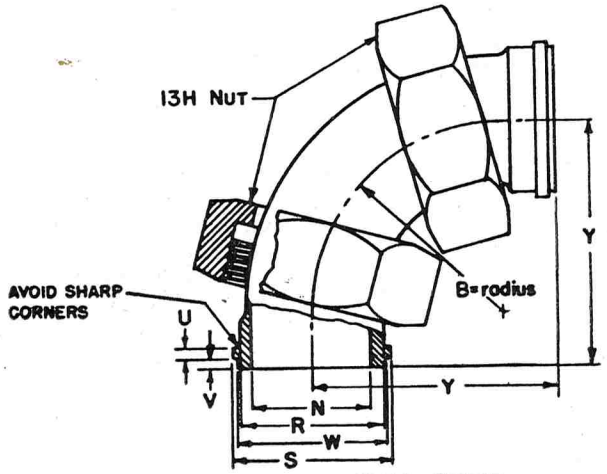


7BX TEE

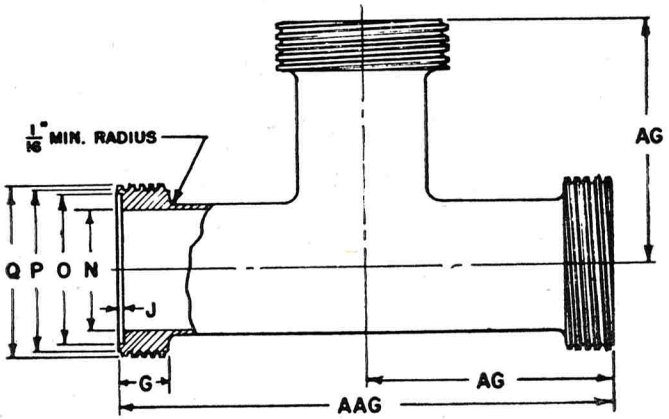
SIZE	ACME THD. PER INCH	A	AA	B	$G_{MAX.}$	H	N	P	Q	R	S	U	V
1"	8	2"	4"	1 1/2"	9/16"	1 3/16"	.902"	1.317"	1.462"	1.160"	1.316"	3/16"	1/8"
1 1/2"	8	2 7/8"	5 3/4"	2 1/4"	9/16"	1 23/32"	1.402"	1.849"	1.994"	1.676"	1.848"	3/16"	5/32"
2"	8	3 23/32"	7 7/16"	3"	19/32"	2 1/4"	1.870"	2.381"	2.526"	2.192"	2.380"	1/4"	5/32"
2 1/2"	8	4 27/32"	9 11/16"	4"	23/32"	2 3/4"	2.370"	2.913"	3.058"	2.708"	2.912"	1/4"	3/16"
3"	8	5 29/32"	11 13/16"	5"	3/4"	3 5/16"	2.870"	3.445"	3.590"	3.224"	3.444"	9/32"	3/16"
4"	6	8 1/16"	16 1/8"	7"	7/8"	4 1/4"	3.834"	4.509"	4.695"	4.256"	4.508"	5/16"	1/4"

3A STANDARD
SANITARY FITTINGS
3A-100-22

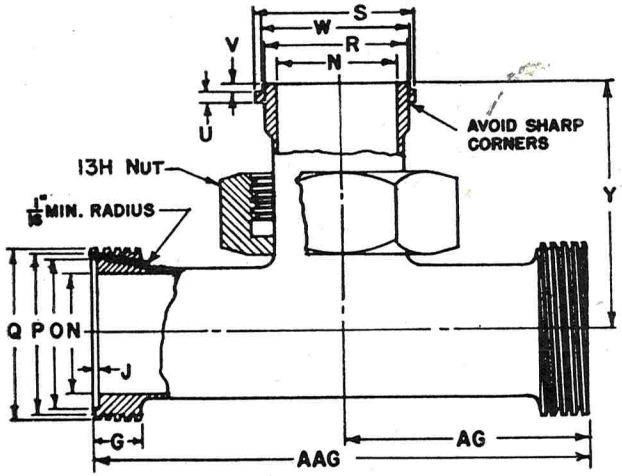
1-25-55



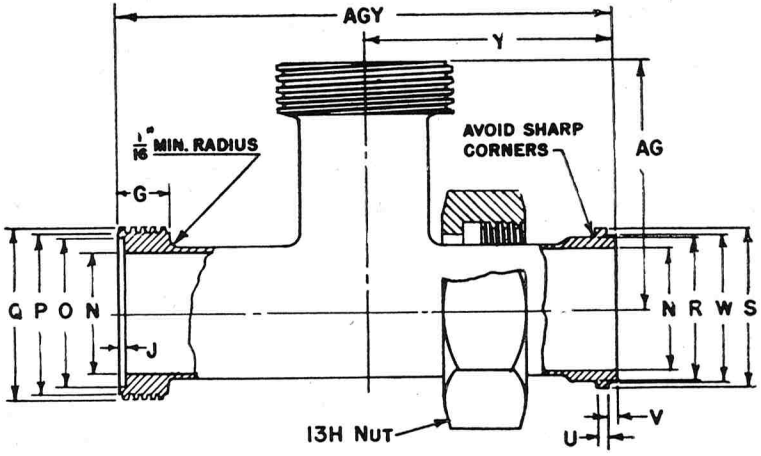
2EG BEND



7XG TEE



7AXG TEE



7BXG TEE

SIZE	ACME THDS PER INCH	AG	AAG	AGY	B	G Hex	J	N	O	P	Q	R	S	U	V	W	Y
1"	8	1 7/8"	3 3/4"	3 51/64"	1 1/2"	7/16"	.062"	.902"	1.219"	1.317"	1.462"	1.160"	1.316"	9/64"	3/32"	1.187"	1 59/64"
1 1/2"	8	2 3/4"	5 1/2"	5 33/64"	2 1/4"	7/16"	.062"	1.402"	1.750"	1.849"	1.994"	1.676"	1.848"	9/64"	3/32"	1.718"	2 49/64"
2"	8	3 9/16"	7 1/8"	7 3/16"	3"	7/16"	.062"	1.870"	2.250"	2.381"	2.526"	2.192"	2.380"	1/32"	3/32"	2.218"	3 5/8"
2 1/2"	8	4 21/32"	9 5/16"	9 3/8"	4"	17/32"	.062"	2.370"	2.750"	2.913"	3.058"	2 708"	2.912"	1/32"	3/32"	2.718"	4 23/32"
3"	8	5 23/32"	11 7/16"	11 1/2"	5"	9/16"	.062"	2.870"	3.312"	3.445"	3.590"	3.224"	3.444"	1/4"	3/32"	3.280"	5 25/32"
4"	6	7 1/8"	15 3/4"	15 49/64"	7"	11/16"	.062"	3.834"	4.312"	4.509"	4.695"	4.256"	4.508"	9/32"	7/64"	4.280"	7 57/64"

3A STANDARD
SANITARY FITTINGS
3A-100-23

1-25-55

SUPPLEMENT NO. 5 TO THE 3-A SANITARY STANDARDS FOR FITTINGS USED ON MILK AND MILK PRODUCTS EQUIPMENT AND USED ON SANITARY LINES CONDUCTING MILK AND MILK PRODUCTS

Formulated by
International Association of Milk and Food Sanitarians, Inc.
United States Public Health Service
The Dairy Industry Committee

April 26, 1955

In keeping with the provisions of the 3-A Sanitary Standards for Sanitary Fittings and Connections Used on Milk and Milk Products Equipment, this supplement incorporates the following fittings into these standards:

I. FITTING NAME

Compression Type Tank Outlet Valves (Nos. 60-TF, 60-CF or Nos. 60TFG, 60-CFG).

All such valves shall be readily cleanable, close coupled and with no stuffing box. All product contact surfaces shall be accessible for cleaning and inspection. The valve bore shall be of such design as to be self-draining in its installed position.

Threaded terminals on valve outlet connections shall be provided with a 3-A Sanitary Standard Fitting or snap-on type moulded rubber composition or plastic cap.

The valve may be of metal to metal or rubber-like material to metal seat. If rubber or rubber-like seals are used, they shall be non-toxic, readily removable, relatively non-absorbent and grooves and material shall be readily cleanable.

All internal angles shall have radii of not less than 1/16-inch.

(See attached 3-A Drawing No. 3A-100-24.)

II. FITTING NAME

Compression Type In-Line Valves (Nos. 60-T, 60-C, 60-TG, 60-CG)

All such valves shall be readily cleanable and with no stuffing box. The valve bore shall be of such design as to be self-draining in its installed position. All product contact surfaces shall be accessible for cleaning and inspection.

The valve may be metal or rubber-like material to metal seat. If rubber or rubber-like seals are used, they shall be non-toxic, readily removable, relatively non-absorbent, and grooves and material shall be readily cleanable.

All internal angles shall have radii of not less than 1/16-inch.

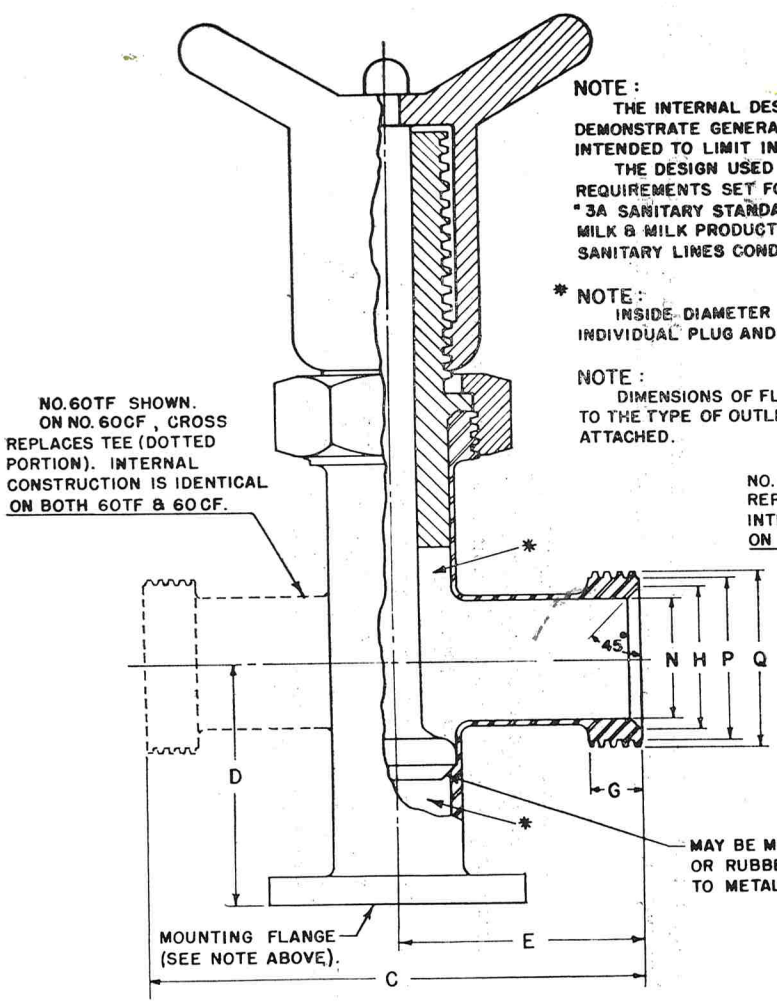
Center to face and face to face dimensions shall conform to 3-A Fittings standards.

(See attached 3-A Drawing No. 3A-100-25.)

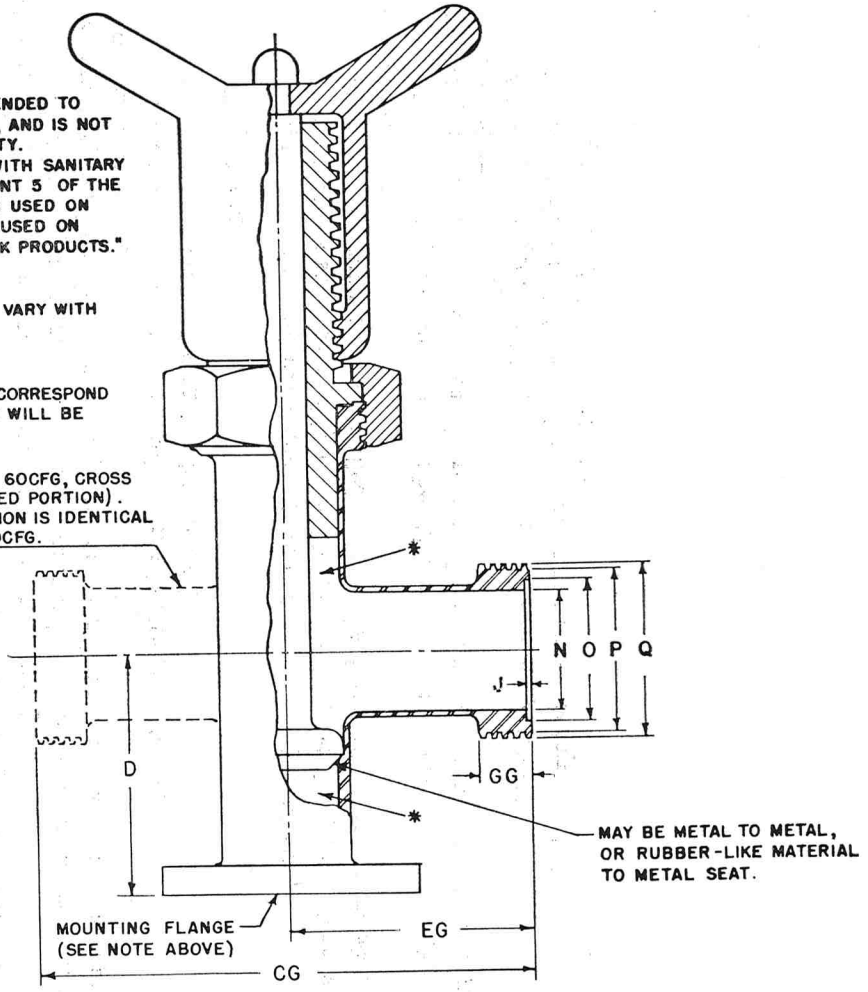
NOTE :
THE INTERNAL DESIGN SHOWN IS INTENDED TO DEMONSTRATE GENERAL PRINCIPAL ONLY, AND IS NOT INTENDED TO LIMIT INDIVIDUAL INGENUITY.
THE DESIGN USED SHALL CONFORM WITH SANITARY REQUIREMENTS SET FORTH IN SUPPLEMENT 5 OF THE "3A SANITARY STANDARDS FOR FITTINGS USED ON MILK & MILK PRODUCTS EQUIPMENT, AND USED ON SANITARY LINES CONDUCTING MILK & MILK PRODUCTS."

* NOTE :
INSIDE DIAMETER IN THIS AREA WILL VARY WITH INDIVIDUAL PLUG AND SEAT DESIGN.

NOTE :
DIMENSIONS OF FLANGED PORT WILL CORRESPOND TO THE TYPE OF OUTLET TO WHICH VALVE WILL BE ATTACHED.



60TF & 60CF COMPRESSION VALVE



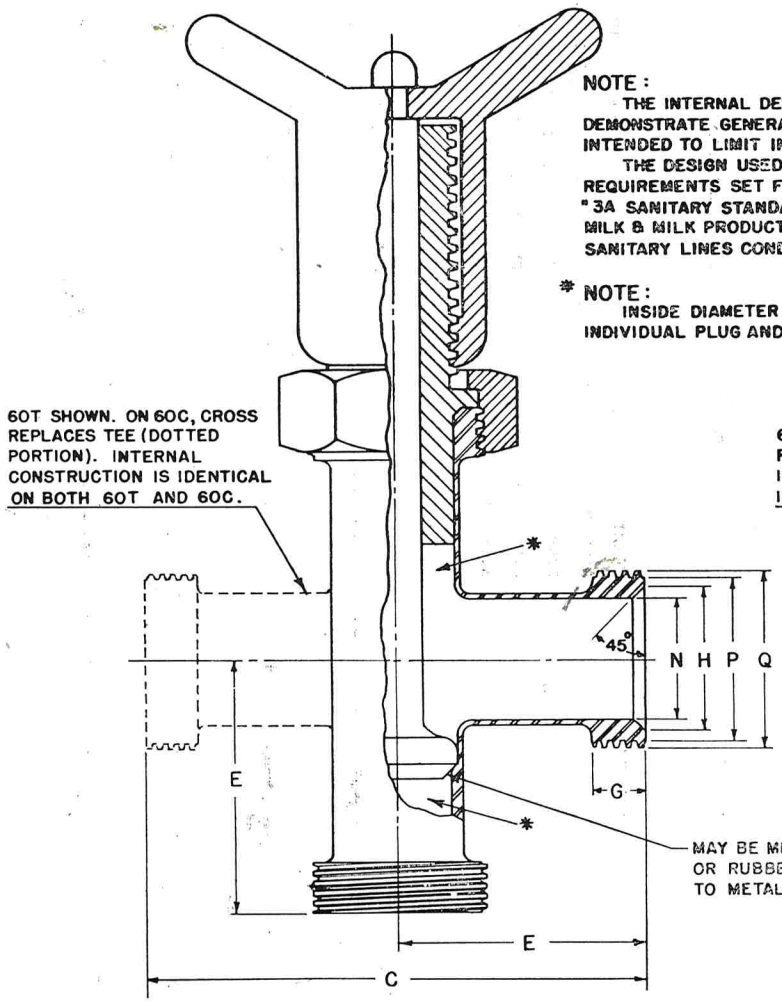
60TFG & 60CFG COMPRESSION VALVE

SIZE	ACME THDS. PER INCH	C	CG	D	E	EG	G_{MAX}	GG_{MAX}	H	J	N	O	P	Q
1"	8	3 5/8"	3 3/8"	1 21/32"	1 13/16"	1 11/16"	9/16"	7/16"	1 3/16"	.062"	.902"	1.219"	1.317"	1.462"
1 1/2"	8	4 3/4"	4 1/2"	2 3/16"	2 3/8"	2 1/4"	9/16"	7/16"	1 23/32"	.062"	1.402"	1.750"	1.849"	1.994"
2"	8	5 9/16"	5 1/4"	2 19/32"	2 25/32"	2 5/8"	19/32"	7/16"	2 1/4"	.062"	1.870"	2.250"	2.381"	2.526"
2 1/2"	8	6 3/8"	6"	3"	3 3/16"	3"	23/32"	17/32"	2 3/4"	.062"	2.370"	2.750"	2.913"	3.058"
3"	8	7"	6 5/8"	3 9/32"	3 1/2"	3 5/16"	3/4"	9/16"	3 5/16"	.062"	2.870"	3.312"	3.445"	3.590"
4"	6	9 5/16"	8 15/16"	4 13/32"	4 21/32"	4 15/32"	7/8"	11/16"	4 1/4"	.062"	3.834"	4.312"	4.509"	4.695"

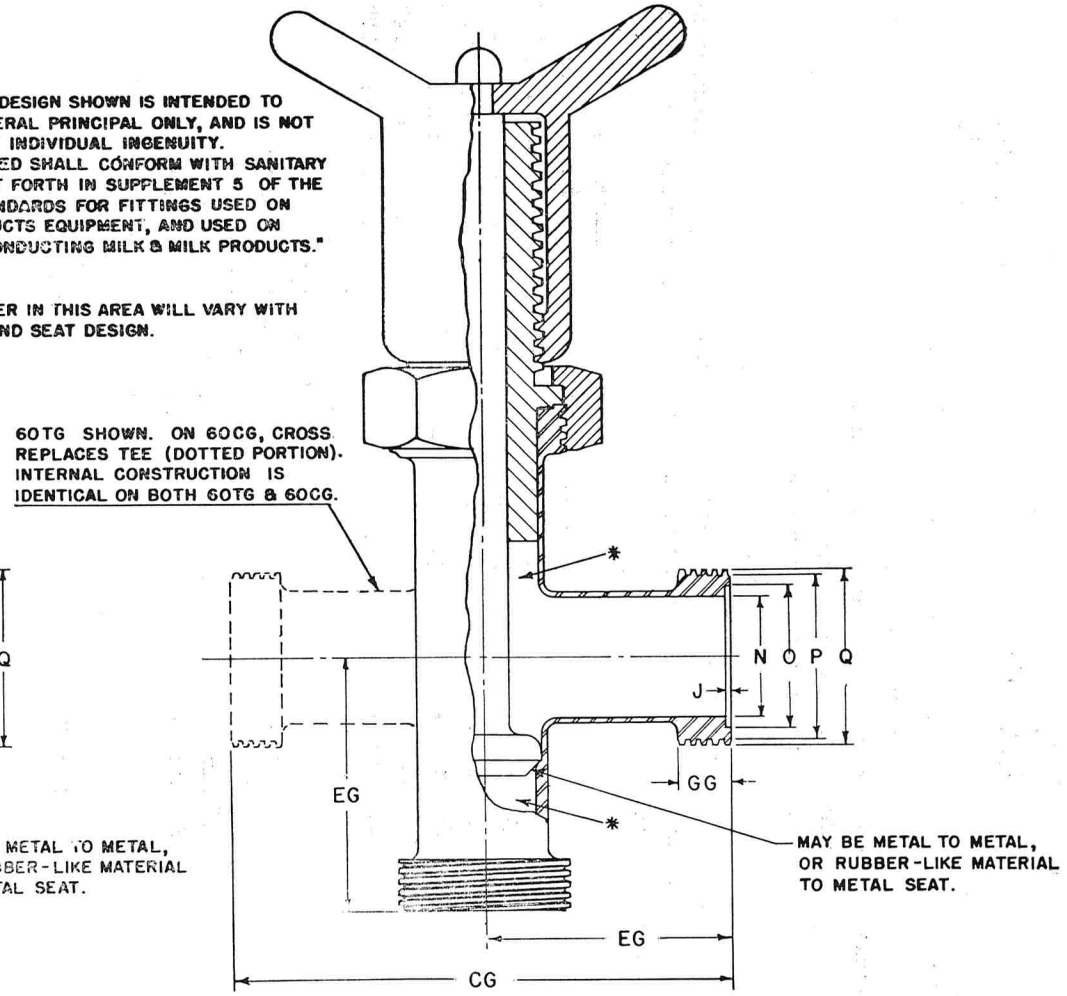
3A STANDARD
SANITARY FITTINGS
3A-100-24
6-23-55

NOTE :
THE INTERNAL DESIGN SHOWN IS INTENDED TO DEMONSTRATE GENERAL PRINCIPAL ONLY, AND IS NOT INTENDED TO LIMIT INDIVIDUAL INGENUITY.
THE DESIGN USED SHALL CONFORM WITH SANITARY REQUIREMENTS SET FORTH IN SUPPLEMENT 5 OF THE "3A SANITARY STANDARDS FOR FITTINGS USED ON MILK & MILK PRODUCTS EQUIPMENT, AND USED ON SANITARY LINES CONDUCTING MILK & MILK PRODUCTS."

* NOTE :
INSIDE DIAMETER IN THIS AREA WILL VARY WITH INDIVIDUAL PLUG AND SEAT DESIGN.



60T & 60C COMPRESSION VALVE



60TG & 60CG COMPRESSION VALVE

SIZE	ACME THDS PER INCH	C	CG	E	EG	G_{MAX}	GG_{MAX}	H	J	N	O	P	Q
1"	8	3 5/8"	3 3/8"	1 13/16"	1 11/16"	9/16"	7/16"	1 3/16"	.062"	.902"	1.219"	1.317"	1.462"
1 1/2"	8	4 3/4"	4 1/2"	2 3/8"	2 1/4"	9/16"	7/16"	1 23/32"	.062"	1.402"	1.750"	1.849"	1.994"
2"	8	5 9/16"	5 1/4"	2 25/32"	2 5/8"	19/32"	7/16"	2 1/4"	.062"	1.870"	2.250"	2.381"	2.526"
2 1/2"	8	6 3/8"	6"	3 3/16"	3"	23/32"	17/32"	2 3/4"	.062"	2.370"	2.750"	2.913"	3.058"
3"	8	7"	6 5/8"	3 1/2"	3 5/16"	3/4"	9/16"	3 5/16"	.062"	2.870"	3.312"	3.445"	3.590"
4"	6	9 5/16"	8 15/16"	4 21/32"	4 15/32"	7/8"	11/16"	4 1/4"	.062"	3.834"	4.312"	4.509"	4.695"

3A STANDARD
SANITARY FITTINGS
3A-100-25
6-23-55

SUPPLEMENT NO. 6 TO THE 3-A SANITARY STANDARDS FOR FITTINGS USED ON MILK AND MILK PRODUCTS EQUIPMENT AND USED ON SANITARY LINES CONDUCTING MILK AND MILK PRODUCTS

Formulated by
International Association of Milk and Food Sanitarians, Inc.
United States Public Health Service
The Dairy Industry Committee
April 26, 1955

In keeping with the provisions of the 3-A Sanitary Standards for Sanitary Fittings and Connections used on Milk and Milk Products Equipment, this supplement incorporates the following tolerances for each of the types of the fittings as specified herein:

Fitting Name		MAXIMUM TOLERANCE Centerline-to-face	Face-to-face
Tees, Crosses & 90° Ells	1″ thru 2″	plus or minus 1/32″	plus or minus 3/64″
Tees, Crosses & 90° Ells	2½″ thru 4″	plus or minus 3/64″	plus or minus 1/16″
Three-Way Plug Valves	1″ thru 2″	plus or minus .024″	plus or minus .024″
Three-Way Plug Valves	2½″ thru 4″	plus or minus .032″	plus or minus .032″
Straight Way Plug Valves	1″ thru 2″	.....	plus or minus .024″
Straight Way Plug Valves	2½″ thru 4″	.....	plus or minus .032″

		MAXIMUM TOLERANCE in degrees
Bends — Angularity of	1″ thru 2″	plus or minus ½-degree
Bends — Angularity of	2½″ thru 4″	plus or minus 1-degree
Bevel — Angularity of	1″ thru 2″	plus or minus ½-degree
Bevel — Angularity of	2½″ thru 4″	plus or minus 1-degree

Fitting Name		MAXIMUM TOLERANCE in inches
All 3-A fittings	1″ thru 4″	plus or minus .010″
Large Diameter of Bevel Seat — Dimension H		
Plain Ferrules	all sizes	present dimension minimum
U Dimension of the Shoulder		
45 Degree Bends—2K and 2P	all sizes	From a practical angle, due to the relative impossibility of measurement means, the right is reserved to hold 45 degree bends as close to the tolerances for 90 degree elbows as can be attained.

APPROVED BY:

C. A. Abele - Chairman, CSP of IAMFS — (Date) July 18, 1955

John D. Faulkner - Chief, MF, DSES, USPHS — (Date) July 11, 1955

E. H. Parfitt - Chairman, SSS-DIC — (Date) July 29, 1955

~~George W. Putnam~~ D. G. Colony - Chairman, Technical Committee, DISA — (Date) July 24, 1955

3-A SANITARY STANDARDS FOR MANUALLY OPERATED BULK MILK AND MILK PRODUCTS DISPENSERS, MULTI-SERVICE MILK CONTAINERS, AND DISPENSING MECHANISMS

Formulated by
International Association of Milk and Food Sanitarians, Inc.
United States Public Health Service
The Dairy Industry Committee

June 14, 1955

It is the purpose of the IAMFS, USPHS, and DIC in connection with the development of 3-A Sanitary Standards, to allow and encourage full freedom for inventive genius of new developments. Bulk milk and milk products dispensers, multi-service milk containers, and dispensing mechanisms which are developed, which so differ in technique, design, material and construction, otherwise, as not to conform to the following standards but which are, in the opinion of the manufacturer or fabricator equivalent or better, may be submitted at any time for the consideration of IAMFS, USPHS, and DIC.

DEFINITION

For the purpose of this sanitary standard, a manually operated bulk milk and milk products dispenser consists of a refrigerated cabinet, multiservice milk container(s), and a dispensing mechanism(s), which are designed to dispense individual servings of homogenized milk or milk products in a sanitary manner.

A. MATERIAL

(1) *Cabinet and Appurtenances*:

All interior and exterior surfaces of the cabinet and all exposed surfaces of appurtenances shall be of durable non-absorbent, corrosion-resistant material. All internal and external surfaces of the cabinet shall be at least as smooth as a No. 2-B mill finish on stainless steel.

The dispensing mechanism with the exception of the dispenser tube shall be made of a corrosion-resistant material or provided with a corrosion-resistant finish.

(2) *Multiple-Use Product Contact Surfaces*:

Multi-service cans and covers shall be of hot-dipped tinned steel, 18-8 stainless steel, or equally corrosion-resistant material that is non-toxic and non-absorbent, the product contact surfaces of which shall be at least as smooth as a No. 4 mill finish or 120 grit finish properly applied.

Multi-use dispenser tubes, when used, shall be made of 18-8 stainless steel or of equally corrosion-resistant material.

(3) *Single-Use Product Contact Surfaces*:

Single service parts having product contact surfaces shall consist of material which is non-toxic, commercially stable, non-absorbent and shall not impart off-flavors.

B. FABRICATION

(1) *Cabinet and Appurtenances*:

All interior seams or permanent joints of the cabinet shall be moisture tight. All exterior seams or permanent joints of the cabinet shall be sealed against moisture. The finish of welds shall be not less than that of the adjoining material.

All interior angles of junctions of floor and walls shall have radii of not less than ¼-inch.

The dispenser cabinet shall be supported by smooth legs with rounded bottoms which will give a minimum of 3-inch clearance space between the bottom of the dispenser and the surface on which the dispenser is mounted. The area around the legs shall be readily accessible for cleaning. If the legs are of hollow tube stock, they shall be effectively sealed. Legs shall have no internal angles.

The dispenser cabinet shall be provided with adequate mechanical refrigeration and suitable automatic controls capable of maintaining the temperature of the cabinet at not more than 40°F. when testing at 110°F. ambient temperature.

Milk in the dispensing tube shall be maintainable at not more than 50°F. when controls are set for maximum temperature of 40°F. under test conditions prescribed above.

The refrigeration breaker strip, if used, shall be sealed or gasketed against the entrance of moisture behind it. Exposed surfaces of refrigeration breaker strip shall have no internal angles.

Insulation shall be installed in such manner that occurrence of voids between parts of the insulation will be prevented.

Access to cabinet interiors for inspection purposes shall be possible without adjusting the dispensing mechanism.

Door(s) shall be of the type which can be opened without being removed and shall be provided with a rubber or rubber-like gasket around the inside. The door gasket shall be sealed in place against the entrance of moisture behind it or shall be removable without tools. Removable door gaskets shall have no internal angles. Hollow gaskets shall be sealed against the entrance of moisture into the internal cavity. Exposed surfaces of gaskets shall have no internal angles.

When the door or doors are in the fully opened position with all removable parts removed, all surfaces within the refrigerated portion of the cabinet shall be accessible for cleaning and visual inspection.

The refrigeration unit shall be readily accessible for cleaning and shall be effectively screened against insects. Such screens or their equivalent shall be constructed of corrosion-resistant material with openings not over 3/32-inch in diameter or slots not over 3/32-inch wide. They shall be located and mounted so as to be readily cleanable and shall be tight fitting.

Knurled surfaces shall not be used.

All appurtenances within the refrigerated portion of the cabinet, which are directly related to the dispensing operation, shall be removable without the use of tools and when removed shall be disassemblable without the use of tools. When disassembled, all surfaces of such appurtenances shall be visible and accessible for cleaning.

All seams or permanent joints of appurtenances shall be welded or sealed with durable, non-absorbent, corrosion-resistant material and shall be smooth and flush.

(2) *Multiple-Use Product Contact Surfaces*:

Cans shall have a minimum neck diameter of 7-inches and shall be of the seamless or solderless type, stainless steel cans may be welded. The covers shall be of the umbrella type fitted with a standard vent hole and with two holes in the rim for sealing wires. The can shall be provided with means for sealing of all openings so that the product can not be withdrawn or any substance added to the contents without breaking or defacing the seals on the cover or the emptying device. The can shall be fitted with two lugs at 180° spacing to permit the sealing of the covers to the can.

Cans supplied with single service non-metallic dispensing tubing shall be provided with positive means of positioning or holding the tube during filling, storage, and transportation to protect the covering material from damage.

All surfaces of attachments to the product container, with which the milk comes in contact, shall be visible and accessible. Permanent attachments shall be welded or brazed to the container with durable, corrosion-resistant, non-toxic material. All joints shall be smooth and flush.

Any permanently attached container outlet tube shall be of uniform straight bore and the interior and exterior surfaces of the tube shall be visible when viewed from outside the container.

There shall be no exposed threads in the milk zone.

(3) *Dispensing Tubes and Dispensing Devices and Mechanisms*:

Single service, non-metal dispensing tubes for use without bactericidal treatment at the milk plant shall be clean and shall (1) be given bactericidal treatment at the tube fabricating plant so that they shall not have more than one colony per ml of capacity in 3 out of 4 samples examined by the rinse method described in "Standard Methods for the Examination of Dairy Products"; (2) be individually packaged in a moisture-proof non-toxic material either prior to bactericidal treatment or after such treatment by methods and in materials which preclude recontamination; (3) be capable of being applied to the container without recontamination of product contact surfaces and (4) be closed or sealed at the dispensing end, so as to make the tube's re-use impracticable.

Single service dispensing tubes shall be of predetermined length. The length of the tube shall be such that the operator may put it in operation without cutting or by cutting only at a point not over ¼-inch beyond the termination of the dispensing mechanism.

A moisture-tight compartment or covering shall be provided for the protection of the entire dispensing tube when attached to the container. If the tube is not provided with a moisture-proof covering it shall be housed in a compartment having a moisture-tight closure which is removable after the container is placed in the cabinet. Such compartment closure shall be so made that it cannot be re-used or returned to its original condition after removal, or a multiple use moisture-tight closure that is tamper-proof may be used. The tube covering shall be removable after the container is placed in the cabinet and shall be so made that it cannot be re-used or returned to its original condition after removal. The discharge opening of the dispensing tube shall be provided with a moisture-tight single-use closure or plug and a single-use covering which is removable after

the dispensing tube is placed in the operating position.

The dispensing mechanism, whether attached to the cabinet or located in or attached to the product container, shall be so fabricated as to be easily disassembled without the use of tools. When disassembled, all surfaces shall be visible and accessible for cleaning.

The dispensing mechanism shall be so designed as to divert condensation or other moisture away from the normal filling position of the service container. If a removable drain guard is used, it shall be so designed that milk can not be dispensed unless such guard is in position.

Permanent drains, if used, shall not terminate within or beneath the cabinet.

Appendix

The following is not a part of this standard but is suggested to safeguard the quality of the milk or milk products delivered from these bulk milk dispensers and to facilitate standardization of operation.

A. *WASHING AND BACTERICIDAL TREATMENT OF CANS*

Bulk milk dispenser cans should be effectively washed and given bactericidal treatment by means of a milk can washer at the dairy processing plant where they are filled. The washing and bactericidal treatment of these cans should produce cans which should have residual bacterial plate count of not more than 1 per ml of capacity as determined in accordance with the procedures contained in "Standard Methods for Examination of Dairy Products" published by the American Public Health Association.

Where difficulty is encountered in producing clean cans which meet the above maximum residual bacterial plate count, the cans and covers should be given supplementary cleaning by manual methods or by the use of a brush-type can scrubber, and should be given supplementary bactericidal treatment by a steam jet or by immersion for two minutes in bactericidal solution.

B. *METHOD OF FILLING*

Bulk milk dispenser cans should be filled on a filling machine of a type that protects the top of the can effectively during the filling operation. The can should be covered immediately after filling with a single service parchment paper (having a vent opening) and the can cover sealed into place with wire seals at two points at 180° spacing.

C. *REFRIGERATION*

Adequate refrigeration should be provided so that the milk temperature does not exceed 50°F. at any time between filling and placing of the bulk milk dispenser cans in the dispenser cabinet.

D. *MINIMUM INTERIOR DIMENSIONS OF CABINETS*

(1) *For 12 and 20-quart cans*: Height, 21¼″; Depth, 11″; Width, 11″ and/or multiples of 11″ for multiple-can cabinets.

(2) *For 40-quart cans*: Height, 25¾″; Depth, 14½″; Width, 14½″ and/or multiples of 14½″ for multiple-can cabinets.

E. *PROTECTION OF CLEAN CANS*

After bactericidal treatment all cans and covers should be protected from contamination during transportation and storage.

APPROVED BY:

C. A. Abele — July 21, 1955 (Date)

C. A. Abele - Chairman, CSP of IAMFS

John D. Faulkner — August 16, 1955 (Date)

John D. Faulkner - Chief, MF, DSES, USPHS

E. H. Parfitt — Aug 23 1955 (Date)

E. H. Parfitt - Chairman, SSS-DIC

George W. Putnam — June 14, 1955 (Date)

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NEWS AND EVENTS

DR. HENRY B. MORRISON TO BOLIVIA

Dr. Henry B. Morrison, Professor of Dairy Industry, University of Kentucky and Secretary of the Kentucky Association of Milk and Food Sanitarians has accepted a position with the Foreign Operations Administration and will be located in Cochabamba, Bolivia for the next two years. Dr. Morrison will assist in the training of personnel being recruited to operate a dairy plant being built with the financial assistance of UNESCO. In addition, Dr. Morrison's duties will include supervisory work in the processing of milk, butter, cheese and dried milks. It is hoped that Dr. Morrison will be a regular contributor to the "Pipeline Chatter" column during the next two years. Many of the membership will enjoy hearing of his experiences. How about it, Hank?

DIVERSEY INTRODUCES NEW ALUMINUM PROTECTED BACTERICIDE PACKAGE

In the first major improvement in bactericide packaging in the last 20 years, The Diversey Corporation of Chicago is currently introducing DIVERSOL in aluminum-protected five pound packages for dairy farm use.

The use of aluminum for this purpose is claimed to bring to the milk producer, for the first time, all of the outstanding characteristics of this amazing metal . . . better product protection and easier handling.

This new DIVERSOL package eliminates the troublesome and expensive breakage occuring when bactericides are packed in bottles or jars. And, since the package opens more easily and pours more accurately, Diversey believes it will help the producer speed up his cleanup.

Inside the package will be the same DIVERSOL that has protected milk quality for over 30 years. According to Diversey, DIVERSOL'S sure, swift bacteria kill-power continues to insure low counts and top quality milk without danger to equipment. Its non-corrosive cleaning action is said to protect equipment and utensils, thus lengthening their lives and lowering replacement costs.

CANCO OFFERS HELPFUL 'KIT' TO DAIRY TRADE

The new "Complete Line" selling kit, a supplement

to the basic "Great Performance" merchandising kit which was distributed six months ago, has been developed by the American Can Company to help build volume for dairy by-products as well as for milk.

The new kit is being distributed to Canco customers through salesmen in the three divisions across the country, according to Edward Evans, assistant general manager of the company's Fibre Milk Container department.

The kit, featuring the slogan, "If it's made with milk —it's HEALTH MAGIC," includes a wide assortment of newspaper advertising mat services, 12 radio scripts, a recipe folder, three attractive retail counter display pieces, and a brochure explaining 13 full-color films for theater and television advertising which are available to Canco customers.

Also available are a TV Kit with "live" television commercial scripts with slides, a filmed TV commercial jingle (mailed ready to use), three one-minute "general" radio commercials and three one-minute "recipe" commercials which can be adapted for local brand and selling theme.

A postage-free order form is enclosed in the kit for use to obtain, without cost, additional quantities of these materials.

SCIENTISTS FIND METHOD FOR CONTROLLING RESISTANT ROACHES

After months of experimentation, scientists have produced a new kind of insecticide that provides 100% control of the new resistant variety of roaches. It is no secret that in recent years, some roaches have become immune to ordinary roach killers, just as flies became resistant to DDT.

The first cases of these resistant roaches were reported in Corpus Christi three years ago. Since then the resistant roach strains have spread and developed over the entire country. Many cases have recently been reported in such far apart cities as New York, Chicago, and Miami. To date, no product on the market could kill them. The chlorinated hydrocarbon insecticides are losing their power to control roaches. This new brush-on formulation, SUPER-NO-ROACH, now available to householders for the first time, contains organic phosphate compounds. It is more effective, longer lasting, and safer than any other roach killer now on the market.

SUPER-NO-ROACH is brushed on surfaces where roaches are found. Insects that walk across the invisible coating pick up some of the organic phosphate compounds. Then they become paralyzed and die. The liquid is brushed only where needed, leaving a residual coating effective for months. SUPER-NO-ROACH kills all four varieties of roaches found in America, as well as the resistant strains. These are the American, German, Oriental and Brown-Banded roaches.

This new product is manufactured by Gaston Johnson Corporation, Long Island City 3, N.Y., and will be available in most stores.

PERSONNEL TRAINED IN QUANTITY COOKERY

The availability of equipment and personnel especially trained in quantity cookery was announced today by the Midwest Research Institute, Kansas City, Missouri.

Midwest Research Institute, which early this spring moved to a new laboratory building, has the most modern equipment for research in the manufacture of food products and in the development of food preparation equipment. Institute personnel have already done much work in the field of quantity cookery and have, therefore, been able to apply their knowledge of the field to the selection of equipment included in the new facilities. The staff at Midwest Research Institute assigned to quantity cookery is under the direction of dieticians trained in all phases of food service. Among the areas of work in which they have engaged in the food field are the development of food products and recipes, cookery equipment, food cost control, foods for special diets, and food service methods.

NATIONAL HEALTH FORUM

Theodore G. Klumpp, M.D., president of Winthrop-Stearns, Inc., pharmaceutical manufacturer, and a vice president of the National Health Council which annually conducts the National Health Forum, will be chairman of the 1956 Forum, to be held March 21 and 22 in New York City.

Hugh R. Leavell, M.D., Council president, announced the appointment after the Council's Board of Directors had accepted the recommendation of the Forum Planning Committee that next spring's conference concern itself with chronic illness. Dr. Klumpp is a director and treasurer of the Commission on Chronic Illness, which will complete its work and terminate its corporate life in June, 1956.

Dr. Klumpp is now forming his 1956 Forum Committee. This group will determine just how to carry out the request of the NHC Board that next year's Forum "identify specific activities under way to

improve the care of the long-term patient" and "point up community responsibility for concerted action on chronic illness."

"Chronic illness is a tremendous problem that will continue to grow as we find new ways to prevent or control the acute illnesses and lengthen the life span still more," said Dr. Klumpp.

"Nearly every community in the United States and nearly every health effort today face pressing questions in connection with long-term illness. These problems demand a concerted approach such as the National Health Forum makes. Trying to find practical answers through the Forum should challenge every one of the NHC organization members and other groups as well."

Dr. Klumpp is an authority in the field of geriatrics and vocational rehabilitation. He served as chairman of the Task Force on Medical Services of the (Hoover) Commission on Organization of the Executive Branch of the Government and is a director of the World Medical Association. He is a former chief of the Drug Division, U. S. Food and Drug Administration, and was director of Drugs, Food and Physical Therapy and Secretary of the Council on Pharmacy and Chemistry of the American Medical Association. In 1951 Dr. Klumpp was chairman of the Offices of Defense Mobilization's Task Force on Employment of the Handicapped.

A leader in the drug industry, Dr. Klumpp is president of the National Pharmaceutical Council, vice president of the American Drug Manufacturers' Association and past president of the American Pharmaceutical Manufacturers' Association, which last month presented him with the distinguished service award.

DAIRY REMEMBRANCE FUND

The Dairy Remembrance Fund has announced the receipt of nine new memorial contributions in recent weeks.

They include:

1. Mrs. Robert Rosenbaum, an authority on early American silver, an author, and prominent in social and civic activities in Philadelphia.

2. Mrs. A. R. Nielsen, West Palm Beach, Fla., wife of A. R. Nielsen of Alfar Creamery.

3. E. K. Slater, former editor of the Olsen Publishing Company. He was honored by the National Dairy Council at its annual conference in Jan. 1954 for his many contributions to the dairy industry.

4. Percy T. Storr, who was formerly with Food Materials, Corp., New York.

5. Miss Madeline Nolan, formerly with the Association of Ice Cream Manufacturers of New York state.

6. William Cammack of the Cresant Creamery Company, St. Paul, Minn., former president of the International Association of Ice Cream Manufacturers.

7. John E. Rakestraw of Rakestraw's, Mechanicsburg, Pa.

8. James H. DeCoursey of DeCoursey's Creamery, Kansas City, Mo.

9. Alan H. Miller, former sales manager of the ice cream division of Abbotts Dairies, Philadelphia.

The National Dairy Council has been honored by a contribution to the Fund in recognition of its services to the dairy industry during 40 years of progress.

Other honors went to Mrs. Enid W. Lowey in observance of her fifth anniversary of employment by the American Jersey Cattle Club; Cliff Plumb, director of the Bureau of Food Control, State Department of Agriculture, "in honor of many years of service to the people of New York state;" Edward C. Damrow on the 50th anniversary of Damrow Brothers, Fon du lac, Wisc.; Ridgeway Kennedy Jr., from Gelinanes Ice Cream Company, San Juan, Puerto Rico, in appreciation of his visit to San Juan; David Schlegel on occasion of his retirement from Cleveland Bowman Company, Cleveland, of which he was co-founder in 1919 after serving 20 years in the dairy industry in Philadelphia; and Roberts Everett, executive vice president of the Dairy Industry Supply Association, in appreciation of a fine service to the industry over many years.

Headquarters for the Dairy Remembrance Fund remain at 111 North Canal street, Chicago 6.

FOLDER DESCRIBES OAKITE'S NEW CHLORINATED CLEANER

The three-in-one action of Oakite Chlor-tergent in removing soils, bacteria, and odors is the subject of a new folder published by Oakite Products, Inc., manufacturers of industrial cleaning and sanitizing materials.

The folder describes the advantages claimed for the material: its penetrating and steel-brightening detergency; its highly active chlorine content which makes it effective for sanitizing after cleaning; its nonsudsing character, which makes it particularly effective for cleaning in place; its ability to destroy odors instead of masking them; and its safety and stability, even at high temperatures. Typical uses of Oakite Chlor-tergent in food and beverage plants and restaurants are listed, and methods of application are discussed.

Copies of the folder are available to readers writing on company letterhead to Oakite Products, Inc., 138C Rector Street, New York 6, N.Y.

HELPFUL INFORMATION

Editorial Note: Listed below are sources of information on a variety of subjects. Requests for any of the material listed should be sent by letter or postcard to the source indicated.

"Wipe Out Brucellosis" Agricultural Research Service folder. Available from Supt. of Documents, Washington, D. C. Price 5 cents.

Preferences for canned orange juices that vary in brix-acid ratio. Agricultural Marketing Service Report. Available from Supt. of Documents, Washington, D. C. Price 20 cents.

Progress in farm-to-plant bulk milk handling. Farmer Cooperative Service Publication, U.S.D.A. Available from Supt. of Documents, Washington, D. C. Price 25 cents.

Dairyman's Salt Guide on uses of salt in the Dairy Industry. Morton Salt Company, Industrial Division, Dept. MFT, 120 South LaSalle Street, Chicago 3, Ill. Free.

Weather or Not. Sound color film, 21.5 minutes long. Available from National Fertilizer Association, 616 Investment Bldg., Washington 5, D.C.

Corn's Hidden Enemies. Sound color film, 12 minutes long. Available from Shell Oil Company Film Laboratory, 634 South Michigan Avenue, Chicago 5, Ill.

Agricultural Process Engineering. Book by S. M. Henderson and R. L. Perry. John Wiley and Sons, 440 Fourth Avenue, New York 10, N.Y.

Uses of Sodium Benzoate in Foods. Available from Heyden Chemical Corporation, 342 Madison Avenue, New York 17, N. Y.

Food Composition Tables — Minerals and Vitamins. (A report by the Food and Agricultural Organization of the United Nations.) Published by the Columbia University Press, New York, 27, N.Y. 117 pages. Price $1.00.

Dairy and Poultry Statistics 1953. Published by U.S.D.A., Washington 25, D.C. Available from Supt. of Documents, Washington, D. C. 125 pages. Price 45 cents.

Symposium on Odor. (Papers presented at the 1954 meeting in Chicago.) Published by American Society for Testing Materials, Philadelphia 3, Pa. 88 pages. Price $2.25.

Vicious Circle, Movie film portraying Avian type tuberculosis, losses to owners of hogs and chickens and methods of control. Available from Extension Service, U.S.D.A., Washington, D.C.

Know the Eggs You Buy. A wall chart. Available from Supt. of Documents, Washington, D. C. Price 5 cents.

The Practice of Sanitation, Second Edition. Book by E. S. Hopkins and W. N. Schulze. Published by The Williams and Wilkins Company, Baltimore, Md. 465 Pages. 1954.

Tile for Dairies and Food Plants. Available from Stark Mantel and Tile Company, 2516 West North Avenue, Milwaukee 5, Wisconsin.

An Industrial Waste Guide to the Milk Processing Industry; U. S. Department of Health, Education and Welfare, Public Health Service Publication No. 298, 1953. Available from Supt. of Documents, Washington, D.C. Price 15 cents.

Story of Starches. Available from National Starch Products, Inc. 270 Madison Avenue, New York 16, N. Y. Free.

Milk For The City. Movie film about 28 minutes in length. Available on reservation from HP Hood and Son, 500 Rutherford Avenue, Boston, Mass.

Fair and Carnival Sanitation. A 12 page handbook on general sanitation. Available from California State Department of Public Health, Sacremento, Calif.

Industrial Detergency. Book edited by W. J. Niven. Published by Reinhold Publishing Company, 430 Park Avenue, New York, N.Y. 340 pages. Price $8.75.

Articles on Farm Bulk Tanks and Bulk Milk Handling in Recent Issues of Olsen Publications. Free brochure. Available from Readers Service Department, Olsen Publications, 1445 North 5th Street, Milwaukee 12, Wisc.

Natural Plant Hydrocolloids. Book. Number 11 of Advances in Chemistry Series. Publications Dept., American Chemical Society, 1155 Sixteenth Street N. W., Washington, D. C. 104 pages. Price $2.50.

Available — A list of the papers and abstracts presented at the Eighteenth Klenzade Educational Seminar, March 24-26, 1955, French Lick, Indiana, from which selections may be chosen. Write Dept. JMFT, Klenzade Products, Inc., Beloit, Wisc.

Control Mastitis in Dairy Cattle. Station Bulletin 545. Available from Agricultural Experiment Station, Oregon State College, Corvallis, Ore.

Sanitation in the Canning Industry. Booklet. Available from Klenzade Products, Inc., Beloit, Wisc.

Industrial Fermentations. Vol. I and II. Book. Published by Chemical Publishing Company Inc., 212 Fifth Avenue, New York, N.Y. 1954. 565 pages (Vol I). 578 pages (Vol. II). Price $12.00 Each.

Fundamentals of Radiobiology. Book by Z. M. Bacq and Peter Alexander. Published by Academic Press, Inc., 125 E. 23rd Street, New York 10, N. Y. 1955. 389 pages. Price $6.50.

(Please mention Journal of Milk and Food Technology when corresponding about items mentioned in this column.)

D. A. PETTEE REPLACES DR. R. WHITAKER AS MILK JUDGE IN CONTEST

A new Milk Judge has been appointed for the Collegiate Students' International Contest in Judging Dairy Products.

He is D. A. Pettee, of The Creamery Package Mfg. Company, who replaces Dr. R. Whitaker, National Dairy Research Laboratories, who has served as Milk Judge in the contest since 1947, and who is resigning because of the press of other duties. The appointment was announced in Washington by C. J. Babcock, Contest Superintendent.

The contest, held annually under the sponsorship of American Dairy Science Association and Dairy Industries Supply Association, has four judges — one for each product to be judged. Judges for the other products are:

Cheese Judge — Harry L. Wilson, Kraft Foods Co., who has served in this capacity since 1929.

Butter Judge — Dr. N. E. Fabricius, Ladysmith (Wisc.) Milk Cooperative, who has served since 1947.

Ice Cream Judge — J. Hoffman Erb, The Borden Company, who has also served since 1947.

In the contest, three-man teams from the leading land grant colleges of the North American continent grade ten samples each of milk, butter, cheese and ice cream. All samples are rated, prior to the contest, by official judges. Those individuals of the competing teams, or the full teams, teams whose ratings come closest to those of the official judges are named winners in the various divisions of the contest.

Top awards are three cash fellowships, worth $1,380, $1,280, and $1,180, awarded by DISA. Other awards include silver cups and gold, silver and bronze medals awarded by International Association of Ice Cream Manufacturers, Milk Industry Foundation, American Butter Institute, National Cheese Institute and DISA.

Mr. Pettee's appointment as a judge marks the first time a man from the dairy industrial supply and equipment field has become a product judge, as previously judges were from the dairy processing field. Mr. Pettee has had wide experience, however, in milk quality improvement programs, both in New England, of which he is a native, and the Middle West. For the past 18 years, he has been active in the staging of the Intercollegiate Judging Contest of Dairy Products, held in connection with the Eastern States Exposition.

The next Collegiate Students' International Contest in Judging Dairy Products will be held in late October in St. Louis in conjunction with the regular annual conventions of Milk Industry Foundation and International Association of Ice Cream Manufacturers and stand-by convention activities of DISA.

ST. LOUIS AREA DAIRY INDUSTRY PEOPLE PLANNING FOR GREAT FALL CONVENTIONS

A joint Dairy Conventions Committee, which, with special subordinate committees, is planning the entertainment features of the October week of the 1955 conventions of International Association of Ice Cream Manufacturers and Milk Industry Foundation, held a first meeting i nlate April in St. Louis, with local and national representatives of the milk and ice cream organizations and also of Dairy Industries Supply Association participating.

International Association of Ice Cream Manufacturers will open the 1955 Conventions Week in St. Louis with its 51st annual convention, October 23-26. That convention's final session will be held jointly with a first session of Milk Industry Foundation's 48th annual

convention. MIF'S sessions will conclude October 28. Dairy Industries Supply Association's will be a stand-by role throughout the week.

By agreement among the organizations, Karl G. Meyer of Banner Creamery Co., representing IAICM, will act as General Chairman of the Dairy Conventions Committee. Arthur Kerckhoff, Jr., Pevely Dairy Co., selected by MIF, and Carl G. Meyer (not to be confused with Karl G. Meyer). Meyer-Blanke Company, selected by DISA, serve as Vice Chairmen. The enterprises of which the three respectively are officers of companies with St. Louis headquarters.

Members of the national staffs of the three collaborating associations, Ernest B. Kellogg, MIF, Robert H. North, IAICM, and Joseph S. Cunningham, DISA, join the Chairman and the Vice Chairmen in an Executive Committee of the Dairy Conventions Committee.

Among the joint features which the committee is planning are an opening social event on Sunday evening, October 23; a Collegiate Night on Tuesday, October 25; a Theater Night on Wednesday, October 26; ladies' events on several days during the week; plant visitations; possible other special events; and general welcoming activities.

To be closely responsible for the respective events and activities ,the Committee's Chairman and Vice Chairmen have appointed, to be chairmen and vice chairmen of special project committees, St. Louis area men and women, many of whom took part in the April Planning meeting. The special project committee heads so far announced are:

Reception Committee — Howard H. Swackker, Beatrice Foods Co., Chairman; Ed Watters, Sealright Company, Vice Chairman.

Special Events with Sunday's social feature a pirme responsibility — Albert H. Knese, Blanke-Baer Extract and Preserving Co., Chairman.

Collegiate Night — Prof. W. H. E. Reid, University of Missouri, Chairman; Neil C. Angevine, Meyer-Blanke Co., Vice Chairman.

Theater Night — Oliver W. Hickel, Warner-Jenkinson Mfg. Co., Chairman; Fred Schulenberg, Anheuser-Busch, Inc., Vice Chairman.

Ladies' Events — Marie Harrington, St. Louis Dairy Council, Chairman; Mabel Henry, Sealtest, Vice Chairman.

Plant Visitations — Charles E. Driver, St. Louis Dairy Co., Chairman; Sam Scism, The Borden Company, Vice Chairman.

Early in May a St. Louis Hotels Convention Reservation Bureau, under the direction of the St. Louis Convention and Publicity Bureau, began the entering of room reservations for dairy industry members.

Today's Biggest Value

★ IN BACTERICIDES

★ **KLENZADE X-4**
SODIUM HYPOCHLORITE SOLUTION

★ **New and improved — nearly 40% more bactericidal power at no increase in price.**

★ **Sodium Hypochlorite content increased from 4.62% to 6.4%.**

★ **Saves money — goes one-third again as far.**

★ **Lower pH, kinder to hands — use dilutions are non-injurious to equipment.**

★ **Leaves no film, sediment, or deposits — rinses clear and free — easily diluted — always ready for use.**

★ **One of America's most popular and widely used *safe* bactericides for dairy farms and plants.**

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Branch Offices and Warehouses Throughout America
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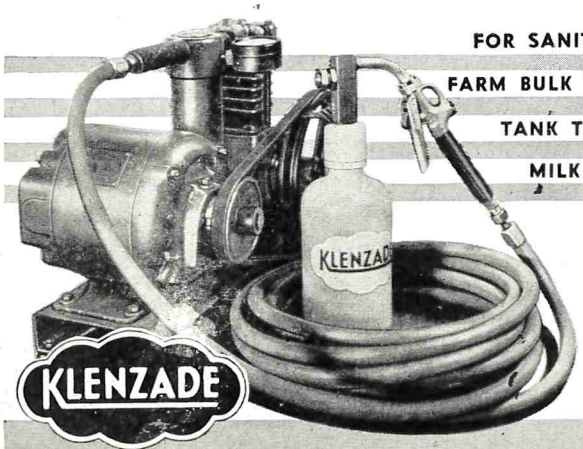

FOR SANITIZING
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TANK TRUCKS
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KLENZADE FOG SANITIZER

Quality control is easy when milk is sold from *bulk dispensers*

Restaurants, cafeterias, schools and other food-serving establishments are turning rapidly to the sale of cold milk from bulk dispensers made of Stainless Steel.

It's a method that combines sanitary handling with the utmost in appetite appeal. Milk is served cold from a unit that looks clean and is easy to keep clean . . . a unit made of Stainless Steel, the sanitary qualities of which have made it the standard material for food processing and handling equipment of all kinds.

The dispenser can, delivered by the dairy, is kept refrigerated in the dispenser to maintain quality. The cleaning and sanitation of the cans are controlled by the dairy. These cans, each of which holds approximately 80 servings, are also available in Stainless Steel.

If you would like more information on sale of milk from Stainless Steel bulk dispensers, mail the coupon below.

UNITED STATES STEEL CORPORATION, PITTSBURGH
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United States Steel Corporation
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Pittsburgh 30, Pa.

Please send me complete information on Stainless Steel bulk milk dispensers.

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City.....State.....

UNITED STATES STEEL

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Wilson Refrigeration Co. ..... Inside Back Cover

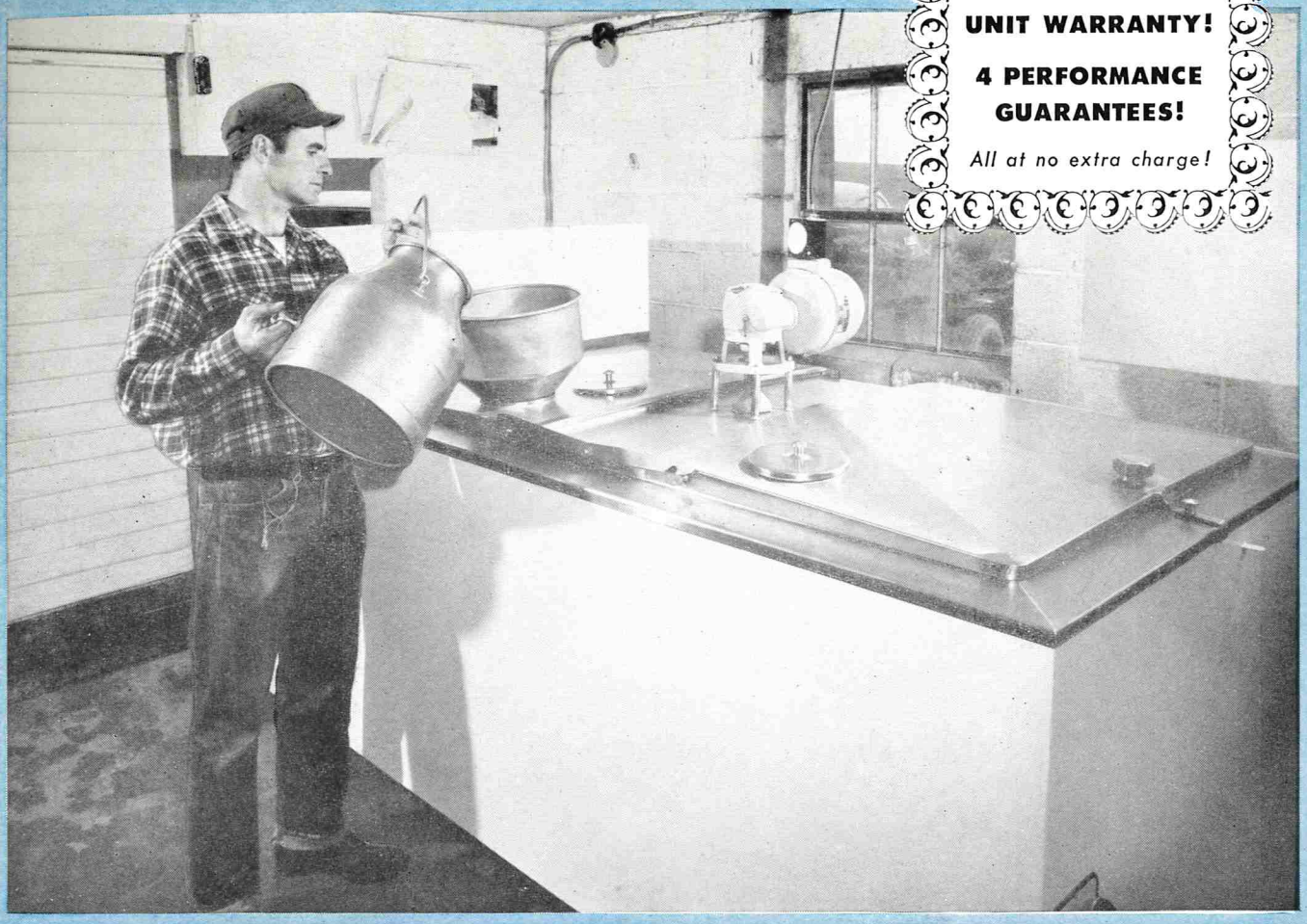
No wonder sanitarians everywhere are enthusiastic about **WILSON** Bulk Milk Coolers — they're **GUARANTEED!**

10-YEAR CABINET WARRANTY!

5-YEAR SEALED UNIT WARRANTY!

4 PERFORMANCE GUARANTEES!

All at no extra charge!



Producer E. M. Quade, Peosta, Iowa, says: "... Wilson's fast cooling makes for better milk ... and I never have to wash milk cans!"

Wilson offers cooperation, solicits your support on the hard basis of facts. Take a look at the Wilson record:

PROVED RIGHT with fast, dependable, low-cost, *ice-water-spray* cooling (sweet water) and famous *Drop-In Unit* in over 20,000 bulk and front-opening can cooler installations! BACKED by over 25 years' experience in the milk-house! FAMOUS for dependable performance and extra protection with "life-time" galvanized steels, plastic-type finishes and stainless steel alloys! And now, dramatically INSURED by GUARANTEES unmatched in the industry!

You can *depend* on Wilson to meet every requirement of producer, dairy and sanitarian! Write for information.

WILSON DROP-IN UNIT. Easily removed for emergency use of block ice in case of power failure—for ice or substitute unit in case of mechanical failure. You're always SAFE — with Wilson!

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Division, Tyler Refrigeration Corporation

WILSON

BULK MILK COOLERS

Complete range of sizes — from 80 to 700 gallons

Only WILSON spells out these product claims in guarantees!

WILSON GUARANTEES good operating condition of inner and outer cabinet shells, bridge, covers, agitator blades and tank shaft of Wilson Bulk Milk Coolers for *ten years from installation.*

WILSON GUARANTEES good operating condition of Sealed Compressor mechanism for *five years* — four years beyond one-year complete product warranty.

WILSON GUARANTEES *milk cannot freeze* in a Wilson Bulk Milk Cooler.

WILSON GUARANTEES *milk tank will not bulge or distort* after it is put in operation, in such a way as to affect calibration.

WILSON GUARANTEES that *milk tank cannot be distorted by a build-up of ice* in the refrigeration coils, even if controls should fail to function.

WILSON GUARANTEES that *all mechanical parts can be serviced . . . without disturbing calibration.*

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