

**Department of Primary Industry**

**AUSTRALIAN CODE OF PRACTICE  
FOR DAIRY FACTORIES**

**June 1986**

**Appendix VIII**

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## Appendix viii— 3-A: Sanitary standards for multiple-use plastic materials used as product contact surfaces for dairy equipment

Number 20-13

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

It is the purpose of the IAMFES, USPHS and DIC in connection with the development of the 3-A Sanitary Standards Program to allow and encourage full freedom for inventive genius or new developments. Multiple-Use Plastic Materials Used As Product Contact Surfaces For Dairy Equipment heretofore or hereafter developed which so differ in specifications or otherwise as not to conform with the following standards, but which, in the fabricator's opinion are equivalent or better, may be submitted for the joint consideration of the IAMFES, USPHS and DIC at any time.

### A. Scope

These sanitary standards cover the requirements of plastic materials for multiple-use as product contact surfaces in equipment for production, processing and handling of milk and milk products. Test criteria are provided for plastic materials as a means of determining their acceptance as to their ability to be cleaned and to receive effective bactericidal treatment and to maintain their essential properties under repeated use conditions. These standards do not apply to plastics for single service application nor plastics which are of rubber or rubber-like origin resulting from chemical or thermal vulcanization or curing. In order to conform with these 3-A Sanitary Standards, multiple-use plastic materials shall comply with the following material, fabrication, and standards for acceptability criteria.

### B. Definitions

#### (1) *Products:*

Shall mean the milk product which is processed in contact with plastic surfaces.

#### (2) *Product contact surfaces:*

Shall mean all surfaces which are exposed to the product, surfaces from which liquids may drain, drop, or be drawn into the product or into the container and surfaces that touch product contact surfaces of the container.

*(3) Plastic:*

Shall mean materials as defined in ASTM D 883-59T under "plastic," "thermoplastic," "thermosetting," "elastomer," except those materials included under the "3-A Sanitary Standards for Multiple-Use Rubber and Rubber-like Materials Used as Product Contact Surfaces in Dairy Equipment, Number #1800." From ASTM D 883-59T:

Plastic, n.—A material that contains as an essential ingredient an organic substance of large molecular weight, is solid in its finished state, and, at some stage in its manufacture or in its processing into finished articles, can be shaped by flow.

Plastic, adj.—The adjective "plastic" indicates that the noun modified is made of, consists of, or pertains to plastic.

Thermoplastic, n.—A plastic which is thermoplastic in behaviour.

Thermoplastic, adj.—Capable of being repeatedly softened by increase of temperature and hardened by decrease of temperature.

Note: Thermoplastic applies to those materials whose change upon heating is substantially physical.

Thermoset, n.—A plastic which, when cured by application of heat or chemical means, changes into a substantially infusible and insoluble product.

Thermoset, adj.—Capable of being changed into substantially infusible and insoluble product when cured under application of heat or chemical means.

Elastomer, n.—A material which at room temperature can be stretched repeatedly to at least twice its original length and upon immediate release of the stress, will return with force to its approximate original length.

*(4) Fabrication:*

Shall mean the standard techniques of the plastic industry for forming and shaping parts.

*(5) References: See Appendix D.*

**C. Materials**

Plastic materials used as product contact surfaces shall be non-toxic, shall comply with Section I.

Standards for Acceptability, shall be relatively resistant to abrasion, and shall maintain their original characteristics such as form, shape, flexibility and dimensions when subjected to normal cleaning and bactericidal treatment.<sup>1</sup> Plastic materials complying with Section I shall be considered to be relatively insoluble when subjected to normal cleaning and bactericidal treatment.<sup>1</sup>

Functional properties of plastic materials such as colour, transparency, or translucency shall be relatively retained in the environment of its intended use, and in cleaning and bactericidal treatment.<sup>1</sup> Only virgin, unadulterated, first run plastic materials shall be used in fabrication of plastic equipment and/or parts.

**D. Fabrication**

The surface finish of plastic materials shall comply with subsection (3) of Section I. Standards for Acceptability.

<sup>1</sup> Procedures in Sections F and G are not normal cleaning and bactericidal treatment tests but are accelerated use-simulating tests.

**E. Preparation for cleanability response, Product treatment and cleanability comparisons procedures**

(1) *Apparatus:*

Appropriate glassware, oven, hot plate, analytical balance, wide field microscope or magnifying lens, sample of 18-8 stainless steel sheet, having a 120 grit finish properly applied.

(2) *Test solutions (simulated reagents):*

(a) Test Solution A (Acid Cleaner)

Acid Solution: 2% Orthophosphoric Acid

(b) Test Solution B (Alkaline Cleaner)

Sodium tripolyphosphate, 15%

Sodium hydroxide, 80%

Trisodium phosphate, 3%

Synthetic detergent, anionic type, 2%

Above to be equivalent to 63% Na<sub>2</sub>O. Dissolve in water to produce a 2.5% solution by weight.

(c) Test Solution C (Alkaline Chlorine Sanitizer)

Hypochlorite solution: sodium hypochlorite, 400 ppm in water, adjusted to pH 8.0 ± 0.5 with sodium bicarbonate

(d) Test Solution D (Acid Chlorine Sanitizer)

Dichloroisocyanurate, potassium salt (ACL 59 Monsanto) 15.0%

Monosodium phosphate, anhydrous 60.0%

Sodium sulfate, anhydrous 25.0%

Dilute above with distilled water to give a test solution containing 400 ppm of available chlorine.

(e) Test Solution E (Quaternary Ammonium Sanitizer)

Alkyl di methyl benzyl ammonium chloride, 400 ppm in water.

(f) Test Solution F (Iodophor Sanitizer)

Nonylphenol ethylene oxide

condensate, 9-1½ to 10 moles ethylene oxide 15.0%

Iodine to provide 1.75% available iodine 2.45%

Orthophosphoric acid-100% basis 15.0%

Water 67.55%

Dilute above with distilled water to give a test solution containing 50 ppm of available iodine.

(g) Test Solution G (Acid Anionic Sanitizer)

Orthophosphoric acid—100% basis 21.0%

Dodecyl benzene sulfonic acid, sodium salt 2.75%

Nonionic wetting agent 1.00%

Water 75.25%

Dilute above with distilled water to give a test solution of 400 ppm of active anionic.

(h) Test Solution H (Simulated Dairy-Soil Solution)

Cream (27% butter fat) 55.6%

Nonfat dry milk 8.7%

Sucrose 15.0%

Water 20.7%

To give a composition of:

15.0% Fat

12.0% Milk-solids-not-fat

15.0% Sugar

58.0% Water

- (i) Test Solution I (Dairy Product, High Fat Medium)  
Pasteurized cream, minimum 36% butterfat
- (j) Test Solution J (Dairy Product, Acid Medium)  
Lactic acid, 3.0% in aqueous solution

(3) *Test specimens:*

- (a) Test Specimens, when prepared for testing shall have a surface at least as smooth as stainless steel having a 120 grit finish properly applied and shall have a total exposed surface areas of  $7.0 \pm 0.1$  square inches.
  - (aa) Molded test specimen shall be in the form of a disk 2 inches in diameter and  $\frac{1}{8}$  inch in thickness. Permissible variations in thickness are plus or minus 0.007 inch for hot molded and plus or minus 0.012 inch for cold molded or cast materials. The disk mold prescribed in Section 3 of ASTM D 647 is suitable for molding disk specimens of thermosetting materials, and Section 5 of ASTM D 647 is suitable for injection molding of thermoplastic materials.
  - (bb) Sheet test specimen shall be in the form of a bar 3 inches in length and 1 inch in width, which for comparison, shall  $\frac{1}{8} \pm 0.008$  inch thick (Surface area,  $7.0 \pm 0.1$  sq. in.)
  - (cc) Rod test specimen shall be of normal diameter as received, and cut to proper length to produce the required surface area of  $7.0 \pm 0.1$  square inches. The diameter of the specimen shall be the diameter of the rod.
  - (dd) Tube test specimen of less than 3 inches in diameter shall be the full section of the tube cut to proper length to produce the required surface area of  $7.0 \pm 0.1$  square inches including as the exposed surface area the outside, inside, and ends of the tube. For a tube having an inside diameter of 3 inches or more, a rectangular specimen shall be cut 3 inches in length laterally to the tube or cut to proper length and width to produce the required surface area of  $7.0 \pm 0.1$  square inches including as the exposed area the outside, inside, and ends of the cut section.
- (b) Test specimens from sheets, rods, and tubes shall be machined, punched, sawed or sheared from the sample and so treated on such surfaces as to have edges free from cracks, rough surfaces and loose material.

(4) *Conditioning of test specimen:*

All test specimens pre-conditioned to equilibrium in a Standard Laboratory Atmosphere (see E. (5) below) for water content at Room Temperature shall be cleaned using Test Solution B (Alkali Solution) at 165-170°F., with 6 repeated one minute immersions, followed by thorough cold water rinsing and drying at room temperature for 24 hours.

(5) *Definitions of terms relating to testing:*

Room Temperature—defined in ASTM E-41-57T.

Standard Laboratory Atmosphere—a relative humidity of  $50 \pm 2\%$  at a temperature of  $23 \pm 1^\circ\text{C}$ . or  $73.4 \pm 1.8^\circ\text{F}$ .

Hot Water—from 95 to 115°F.

Cold Water—from 45 to 65°F.

(6) *Number of test specimens:*

Two sets (Set M and Set M') of eight specimens each and two sets (Set L and Set L') of eight specimens each shall be identified and treated as:

Set M and M <sup>1</sup>	Set L and L <sup>1</sup>	For Tests in:
M-0: M <sup>1</sup> -0	L-0: L <sup>1</sup> -0	Controlled, Distilled water
M-1: M <sup>1</sup> -1	L-1: L <sup>1</sup> -1	Solutions A-B
M-2: M <sup>1</sup> -2	L-2: L <sup>1</sup> -2	Solutions A-B-H-A-B
M-3: M <sup>1</sup> -3	L-3: L <sup>1</sup> -3	Solutions A-B-C-H-A-B-C
M-4: M <sup>1</sup> -4	L-4: L <sup>1</sup> -4	Solutions A-B-D-H-A-B-D
M-5: M <sup>1</sup> -5	L-5: L <sup>1</sup> -5	Solutions A-B-E-H-A-B-E
M-6: M <sup>1</sup> -6	L-6: L <sup>1</sup> -6	Solutions A-B-F-H-A-B-F
M-7: M <sup>1</sup> -7	L-7: L <sup>1</sup> -7	Solutions A-B-G-H-A-B-G

An extra molded test specimen or a piece of the sheet, rod or tube shall be available for the comparisons required in F. (10)(b)(1) and G. (3)(b)(1).

#### F. Procedure—cleanability response<sup>1</sup>

- (1) After conditioning the test specimens according to section E.(4) above, all samples to be weighed ( $W_1$ ). After  $W_1$  has been determined:
- (2) Specimen M-0, M<sup>1</sup>-0 and L-0, L<sup>1</sup>-0 are:
  - (a) Immersed in distilled water, 165-170°F., 60 minutes.
  - (b) Rinsed, hot water.
  - (c) Dried, room temperature, 20 hours.
  - (d) Re-weighed ( $W_2$ ).
- (3) Specimen M-1, M<sup>1</sup>-1 and L-1, L<sup>1</sup>-1 are:
  - (a) Immersed in Solution A, 165-170°F., 30 minutes.
  - (b) Rinsed, hot water.
  - (c) Immersed in Solution B, 165-170°F., 30 minutes.
  - (d) Rinsed, hot water.
  - (e) Dried, room temperature, 20 hours.
  - (f) Re-weighed ( $W_2$ ).
- (4) Specimen M-2, M<sup>1</sup>-2 and L-2, L<sup>1</sup>-2 are:
  - (a) Immersed in solution A, 165-170°F., 15 minutes.
  - (b) Rinsed, hot water.
  - (c) Immersed in Solution B, 165-170°F., 15 minutes.
  - (d) Rinsed, hot water.
  - (e) Immersed in Solution H, room temperature, 20 hours.
  - (f) Rinsed, hot water.
  - (g) Immersed in Solution A, 165-170°F., 15 minutes.
  - (h) Rinsed, hot water.
  - (i) Immersed in Solution B, 165-170°F., 15 minutes.
  - (j) Rinsed, hot water.
  - (k) Dried, room temperature, 20 hours.
  - (l) Re-weighed ( $W_2$ ).
- (5) Specimen M-3, M<sup>1</sup>-3 and L-3, L<sup>1</sup>-3 are:
  - (a) Immersed in Solution A, 165-170°F., 15 minutes.
  - (b) Rinsed, hot water.
  - (c) Immersed in Solution B, 165-170°F., 15 minutes.
  - (d) Rinsed, cold water.
  - (e) Immersed in Solution C, room temperature, 60 minutes.
  - (f) Rinsed, hot water.
  - (g) Immersed in Solution H, room temperature, 20 hours.
  - (h) Rinsed, cold water.
  - (i) Immersed in Solution A, 165-170°F., 15 minutes.
  - (j) Rinsed, hot water.
  - (k) Immersed in Solution B, 165-170°F., 15 minutes.
  - (l) Rinsed, cold water.

- (m) Immersed in Solution C, room temperature, 60 minutes.
  - (n) Rinsed, hot water.
  - (o) Dried room temperature, 20 hours.
  - (p) Re-weighed ( $W_2$ ).
- (6) Specimen M-4, M<sup>1</sup>-4 and L-4, L<sup>1</sup>-4 are:  
Identical to regimen stated in paragraph (5) for M-3, M<sup>1</sup>-3 and L-3, L<sup>1</sup>-3 except: Use Solution D in place of Solution C.
  - (7) Specimen M-5, M<sup>1</sup>-5 and L-5, L<sup>1</sup>-5 are:  
Identical to regimen stated in paragraph (5) for M-3, M<sup>1</sup>-3 and L-3, L<sup>1</sup>-3 except: Use Solution E in place of Solution C.
  - (8) Specimen M-6, M<sup>1</sup>-6 and L-6, L<sup>1</sup>-6 are:  
Identical to regimen stated in paragraph (5) for M-3, M<sup>1</sup>-3 and L-3, L<sup>1</sup>-3 except: Use Solution F in place of Solution C.
  - (9) Specimen M-7, M<sup>1</sup>-7 and L-7, L<sup>1</sup>-7 are:  
Identical to regimen stated in paragraph (5) for M-3, M<sup>1</sup>-3 and L-3, L<sup>1</sup>-3 except: Use Solution G in place of Solution C.
- (10) Report the following: (For Report Form, see Appendix A)
- (a) Calculated per cent weight loss or gain—
 
$$\% \text{ Loss} = \frac{W_1 - W_2}{W_1} \times 100$$

$$\% \text{ Gain} = \frac{W_2 - W_1}{W_1} \times 100$$
  - (b) Comparison made visually with the aid of magnification
    - (1) The test specimen is compared with the original as to change in surface smoothness as: NO CHANGE, SLIGHT CHANGE, or MARKED CHANGE.
    - (2) The rating as to the smoothness of the test specimen compared to the sample of 18-8 stainless steel sheet having a 120 grit finish properly applied: SMOOTHER, EQUAL, or ROUGHER.
    - (3) Report under "Remarks" other apparent changes, such as: surface tack, exudation, cracks, and other surface discontinuities, colour changes, changes in transparency, permanent or temporary visual changes, distortions in shape, dimension, delaminations, and changes in surface tension.

#### G. Procedure—product treatment

The test specimens which were treated in section F—"Cleanability Response", are to be *further* tested as follows:

- (1) Immerse Set M and M<sup>1</sup> (Specimens M-0 to M-7 and M<sup>1</sup>-0 to M<sup>1</sup>-7 inclusive), weighed ( $W_2$ ) in: Test Solution I, at room temperature for a total time of 168 hours, renewing the test Solution I every 24 hours. Test specimens shall be rinsed with cold water to remove old solutions prior to re-immersing in renewed solution. At the conclusion of the 168 hours immersion, the specimens shall be removed and cleaned, using Test Solution B at 165-170°F., with 6 repeated one minute immersions, followed by a thorough hot water rinse, dried at room temperature for 20 hours. Re-weighed ( $W_3$ ).
- (2) Immerse Set L (Specimens L-0 to L-7 and L<sup>1</sup>-0 to L<sup>1</sup>-7 inclusive) weighed ( $W^2$ ) in: Test Solution J, at 155-160°F., for a total time of 168 hours, renewing the test Solution J every 24 hours. Test specimens shall be rinsed with cold water to remove old solution prior to reimmersing in renewed solution. At the conclusion of the 168 hours immersion, the specimens shall be removed and

cleaned, using Test Solution B at 165-170°F., with 6 repeated one minute immersions, followed by a thorough hot water rinse, dried at room temperature for 20 hours. Re-weighed ( $W^3$ ).

- (3) Report the following: (For Report Form see Appendix B)  
(a) Calculated per cent weight loss or gain—

$$\% \text{ Loss} = \frac{W_2 - W_3}{W_2} \times 100$$

$$\% \text{ Gain} = \frac{W_3 - W_2}{W_2} \times 100$$

- (b) Comparison made visually with the aid of magnification

- (1) The test specimen is compared with the original as to change in surface smoothness as: NO CHANGE, SLIGHT CHANGE, or MARKED CHANGE.
- (2) The rating as to the smoothness of the test specimen compared to the sample of 18-8 stainless steel sheet having a 120 grit finish properly applied: SMOOTHER, EQUAL, or ROUGHER.
- (3) Report under "Remarks" other apparent changes, such as: surface tack, exudation, cracks and other surface discontinuities, colour changes, changes in transparency, permanent or temporary visual changes, distortions in shape, dimensions, delaminations, and changes in surface tension.

## H Procedure—cleanability comparison

- (1) All of the test specimens after exposure to the regimen set forth in sections F and G are to be immersed in Test Solution H, at room temperature for 20 hours, cleaned using Test Solution B at 165-170°F., with 6 repeated one minute immersions, followed by a thorough hot water rinsing and drying at room temperature for 20 hours.
- (2) The sample of 18-8 stainless steel sheet having a 120 grit finish properly applied or a piece of it (approximately 3 inches in length and 1 inch in width) is to be cleaned as set forth in E. (4) This sheet or piece of stainless steel is then to be exposed to the regimen set forth in H. (1).
- (3) With the aid of magnification, visually judge the cleanability of the test specimens by comparing them with the sample of 18-8 stainless steel sheet after exposure to the regimen set forth in H. (2). Rate the cleanability of the test specimens as: BETTER, EQUAL, or POORER. (For Report Form see Appendix C.)

### Standards for acceptability

Acceptable plastic materials shall comply with the following:

- (1) None of the test specimens, after exposure to the regimen set forth in Sections F and G, shall have a loss in weight greater than 0.05 per cent.
- (2) None of the test specimens, after exposure to the regimen set forth in sections F and G, shall have a gain in weight greater than that given for the generic class shown in Table 1.
- (3) All of the test specimens, after exposure to the regimen set forth in section F and G, shall be at least as smooth and cleanable as 18-8 stainless steel sheet having a 120 grit finish properly applied. To conform with this, all of the test specimens shall be judged to be SMOOTHER or EQUAL, in the comparisons made in accordance to F.(10)(b)(2) and G.(3)(b)(2), and BETTER or EQUAL, in the comparisons made in accordance to H.(3).

These standards shall become effective Sept. 9, 1984, at which time the "3-A Sanitary Standards for Multiple-Use Plastic Materials used as Product Contact Surfaces for Dairy Equipment," Serial #20-00, amendments 20-01 through 20-07, inclusive, and Numbers 20-08, 20-11, and 20-12, are rescinded and become null and void.

## Selected references

- Technical data on Plastics, February, 1957. Manufacturing Chemists Association, 1825 Connecticut Ave., N.W., Washington, D.C.
- S.P.I. Plastics Engineering Handbook, Society of Plastic Industry, Inc., Book Division, Reinhold Publishing Corp., New York, New York.
- Terms Relating to Plastics, ASTM D-883-59T. American Society for Testing Materials, 1916 Race Street, Philadelphia, Pa. 19103.
- Descriptive Terms Pertaining to Plastics, ASTM D-675-58T, American Society for Testing Materials, 1916 Race Street, Philadelphia, Pa. 19103.
- J.F. Lakey, Association of Food & Drug Officials of the U.S. Appraisal Of The Safety Of Chemicals In Foods, Drugs, And Cosmetics, Texas State Department of Health, Austin, Texas.

**Table 1**

Generic Classes of Plastics	Maximum Per cent Weight Gain		
	Cleanability Response (Section F. Regimen)	Product Treatment (Section G. Regimen)	
		Solution I	Solution J
Polyethylene—			
ASTM Type I	0.20	0.50	0.20
ASTM Type II	0.20	0.20	0.20
ASTM Type III	0.20	0.20	0.20
Polypropylene—			
(unmodified and modified for impact resistance)	0.10	0.20	0.20
Polystyrene—			
Normal (unmodified), Type 3 of ASTM D 703-56T	0.10	0.10	0.10
Modified (impact), Type III, Grade 6 of ASTM D1892-61T	0.10	0.10	0.10
Styrene-acrylonitrile	0.20	0.50	0.50
Plasticized polyvinyl chloride—			
(a) For contact with high-water, low-fat products	0.25	0.55	0.90
(b) For contact with high-fat products	0.10	0.20	0.55
Acrylics	0.20	0.50	1.50
Polycarbonates	0.10	0.15	0.25
Nylon—			
Nylon Type 66	2.00	3.00	8.00
Nylon Type 610	1.00	2.00	4.00
Nylon Type 6	2.00	3.00	8.00
Chlorinated polyether	0.05	0.05	0.05
Acrylonitrile butadiene styrene	0.30	0.45	0.90
Fluorocarbons			
CTFE, TFE and FEP types	0.05	0.05	0.05
Vinylidene fluoride types	0.05	0.05	0.15
Reinforced Epoxy, molded, natural (no colour added), and black	0.20	0.25	0.35

Propoxylated bisphenol-A fumarate polyester-styrene copolymer	0.20	0.20	0.20
Polysulfone Resin	0.05	0.1	0.1
Cross-linked polyester resins (vinyl ester-styrene copolymer)	0.20	0.20	0.20
Polyphenylene sulfide	0.06	0.08	0.08
Polyoxymethylene copolymer	0.25	0.60	1.00
Ethylene-vinyl acetate copolymers	0.25	0.55	0.10
Polyurethane*	1.22	1.59	1.29
Polymethylpentene**	0.10	0.20	0.20
Polyphenylene oxide***	0.10	0.15	0.25
Epoxy Resin as coating****			
Isopropylidendiphenol			
Hardener-TESTA Triethylenetetramine	0.10	0.15	0.25

\* covered by 21 CFR 177.1680 for contact with dry food

\*\* as covered by 21 CFR 177.1520

\*\*\* as covered by 21 CFR 177.2460

\*\*\*\* as covered by 21 CFR 177.300

Public Law 929, 85th Congress, September 6, 1958. (The Food Additive Amendment of 1958).

Federal Register, March 28, 1959, Page 2434—Food Additives, Definitions and Procedural and Interpretive Regulations.

Machine Design Plastics Book Issue, September 20, 1962, Penton Publishing Co., Penton Bldg., Cleveland, Ohio.

**Appendix A — cleanability response**

Sample No.	Weight		Surface comparison						Remarks
	% Loss	% Gain	To original sample See F. (10) (b) (1)			To stainless with 120 Grit finish See F. (10) (b) (2)			
			No Change	Slight Change	Marked Change	Smoother	Equal	Rougher	
M-0									
M <sup>1</sup> -0									
M-1									
M <sup>1</sup> -1									
M-2									
M <sup>1</sup> -2									
M-3									
M <sup>1</sup> -3									
M-4									
M <sup>1</sup> -4									
M-5									
M <sup>1</sup> -5									
M-6									
M <sup>1</sup> -6									
M-7									
M <sup>1</sup> -7									
L-0									
L <sup>1</sup> -0									
L-1									
L <sup>1</sup> -1									
L-2									
L <sup>1</sup> -2									
L-3									
L <sup>1</sup> -3									
L-4									
L <sup>1</sup> -4									
L-5									
L <sup>1</sup> -5									
L-6									
L <sup>1</sup> -6									
L-7									
L <sup>1</sup> -7									

**Appendix B — product treatment**

Sample No.	Weight		Surface comparison						Remarks
	%	%	To original sample See F. (10) (b) (1)			To stainless with 120 Grit finish See F. (10) (b) (2)			
	Loss	Gain	No Change	Slight Change	Marked Change	Smoother	Equal	Rougher	
M-0									
M <sup>1</sup> -0									
M-1									
M <sup>1</sup> -1									
M-2									
M <sup>1</sup> -2									
M-3									
M <sup>1</sup> -3									
M-4									
M <sup>1</sup> -4									
M-5									
M <sup>1</sup> -5									
M-6									
M <sup>1</sup> -6									
M-7									
M <sup>1</sup> -7									
L-0									
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L <sup>1</sup> -5									
L-6									
L <sup>1</sup> -6									
L-7									
L <sup>1</sup> -7									

**Appendix C — cleanability comparison**

<i>Sample No.</i>	<i>Cleanability comparison See H (3)</i>			<i>Remarks</i>
	<i>Better</i>	<i>Equal</i>	<i>Poorer</i>	
M-0				
M <sup>1</sup> -0				
M-1				
M <sup>1</sup> -1				
M-2				
M <sup>1</sup> -2				
M-3				
M <sup>1</sup> -3				
M-4				
M <sup>1</sup> -4				
M-5				
M <sup>1</sup> -5				
M-6				
M <sup>1</sup> -6				
M-7				
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