IS 13424 (2001): Safety Evaluation of Bathing Bars and Toilet Soaps - Methods of Test [CHD 25: Soaps and other Surface Active Agents]

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भारतीय मानक

नहाने की बट्टियों और प्रसाधन साबुनों की सुरक्षा मूल्यांकन — परीक्षण पद्धतियाँ

(पहला पुनरीक्षण)

Indian Standard

SAFETY EVALUATION OF BATHING BARS AND TOILET SOAPS — METHODS OF TEST

(First Revision)

ICS 71.100.40

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

October 2001

Price Group 4

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Soaps and Other Surface Active Agents Sectional Committee had been approved by the Chemical Division Council.

Toilet soaps and bathing bars are applied on the skin many times a day by most people, taking their safety 'in use' for granted. In order to make sure that such products do not endanger the normal health and well being of the consumer by way of the two frequently observed hazards, namely, skin irritation and skin sensitization, their safety evaluation is carried out through animal testing and on human subjects. Based on the experience gained over the years and to keep in line with the strong international movement of reduction of animals for experimental purposes, the technical committee responsible for formulation of this standard decided to revise it.

Hence in the present (first) revision two test methods, namely, a simple skin irritancy test involving human subjects (the species of concern) is introduced by replacing the primary skin irritation test on animal and a skin sensitization test on guniea pigs (Buehler test and Magnusson and Kligman test) have been incorporated for assuring safety of toilet soaps and bathing bars. For assessing skin sensitization potential animals cannot be avoided since, such a test on humans, would run the risk of subjecting them to long lasting adverse sensitization effects. Ethical considerations prevent testing of new formulations directly on human subjects, unless one is sure of the innocuousness of formulations. If the formulation happens to be a sensitizer, it would cause irreparable damage and misery to the volunteer, unlike the short duration skin irritancy test. The latter would only have a reversible transient effect.

The rationale of the choice of guinea pigs for skin sensitization method is that guinea pigs are the most sensitive species for the type of testing. Skin sensitization test can be performed by any of the two methods, namely, Buehler test or Magnusson and Kligman guinea pig maximization test. The latter method is the most sensitive and stringent one and is described in detail in IS 11601 and also in this standard along with the Buehler test for the sake of completeness. While it is recognized that Buehler test is not as sensitive as the Magnusson and Kligman guinea pig maximization test, regulatory agencies, such as, US FDA, OECD, EPA, etc, have approved of this test for the purpose of substantiation of safety of chemicals.

It is further recommended that formulations which are made conforming to IS 4707 (Part 1) :1988 'Classification of cosmetic raw materials and adjuncts: Part 1 Dyes, colours and pigments (*first revision*)' and IS 4707 (Part 2) : 1993 'Classification of cosmetic raw materials and adjuncts: Part 2 List of raw materials generally not recognized as safe for use in cosmetics (*first revision*)', guidelines of CTFA (Cosmetics, Toiletries and Fragrance Association), EEC (European Economic Community) directive and guidelines of IFRA (International Fragrance Association) are likely to be safe and such products may not warrant any safety testing. However, if the manufacturer feels it necessary to generate data on such formulations, he may do so. Whereas, products which contain novel ingredients which are not under the purview of the above documents would require safety assessment using the methods as given in this standard.

All animal tests should comply with the *Prevention of Cruelty to Animals Act*, 1960 and *Breeding of and Experiments on Animals (Control and Supervision) Rules*, 1998 as updated from time to time. Any studies involving human subjects should be as per the *'Ethical Guidelines for Biomedical Research on Human Subjects'* published by ICMR (Indian Council for Medical Research, New Delhi) and as revised from time to time.

The composition of the Committee responsible for formulation of this standard is given in Annex A.

In reporting the result of a test made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

SAFETY EVALUATION OF BATHING BARS AND TOILET SOAPS — METHODS OF TEST

(First Revision)

1 SCOPE

This standard prescribes a short duration skin irritancy test on human subjects and skin sensitization tests on guinea pigs.

2 SKIN IRRITANCY TEST ON HUMAN SUBJECTS

2.1 Outline of the Method

The test involves patch testing of toilet soaps and bathing bars on human subjects and assessing the reaction in comparison to a positive control patch tested simultaneously.

2.2 Procedure

Apply a solution of the bathing bar/soap topically on the upper arm of human subjects, under occlusive patch for a duration of 24 h and assess the skin reactions subjectively using the Draize Scale, 24 h after removal of the patches. Follow up the reactions, if any, at 72 h and one week thereafter to confirm recovery.

2.2.1 *Human Subjects*

Select twenty four healthy adult human subjects, preferably equal number of males and females who do not have any previous history of adverse skin conditions and are not under any medication likely to interfere with the results. Pregnant ladies and breast feeding mothers should be excluded. Explain the test procedure to each volunteer and obtain a signed informed consent from each of them.

2.2.2 *Test Patches for Topical Treatment*

Ideally use ready-made standard test patches measuring about 1 cm diameter. Fix three such test patches on a transparent porous surgical adhesive tape of sufficient length (approximately 14 cm) and breadth. Alternatively if such patches are not available, use 1 cm diameter discs made out of chromatography paper (Whatman No. 3) taken on a slightly bigger polythene sheet having about 0.25 cm hole punched at the centre and fixed on the adhesive tape. Keep about 2.5 cm distance between the two adjacent test patches (filter paper discs).

2.2.3 *Samples*

Store samples for the test appropriately to prevent any contamination or spoilage. Do not use any spoiled or deteriorated sample. Preserve adequate quantity of the sample which is used for the testing for at least 2 years for any retesting. Identify each sample with a unique code number and make appropriate entry in the records.

2.2.4 *Preparation of the Sample*

Prepare 8 percent (mass/mass) solution/suspension of the sample to be tested in distilled water. Use a mechanical agitator and heat (not more than 38°C) if needed.

2.2.5 *Positive Control*

Use sodium lauryl sulphate (SLS), analytical grade, at a concentration of 3 percent (*w/w*) in distilled water as the positive control.

2.2.6 *Patch Testing*

Use inside of any one of the upper arms of the volunteer for the test. A maximum of 6 samples in 2 rows of 3 each can be tested on each upper arm. Dispense 40 ml solution of each of the sample individually on separate patches using a micro pipette. Take 3 samples on one strip of adhesive tape and two samples on the other along with the positive control. Place the two strips containing the patches on the upper arm vertically one parallel to the other and reinforce them by cross bands of adhesive tape placed over the patches. Remove the patches after a contact period of 24 h and rinse the treated sites with water to remove any residue. However, if the volunteer experiences unbearable discomfort with any of the patches, the volunteer is instructed to remove such patches any time prior to the targeted 24 h contact. Mark such sites with a blue/ black marker to facilitate evaluation later. The volunteer is also requested to note down the signs and symptoms of the discomfort and the time of removal of the patch and hand it over to the investigator.

2.2.7 *Observation and Scoring*

Assess the skin reaction under a constant artificial daylight source, 24 h after the removal of the patches. Score the reactions, namely, erythema, dryness and wrinkling on a 0-4 point scale and oedema on another 0-4 point scale as per the Draize Scale given in Table 1, with a maximum combined score of 8. Compare the average score produced by each of the test sample with that produced by the positive control. Toilet soaps

and bathing bars showing an average score of 4 and above, a score which would be produced by 3 percent SLS, out of the possible maximum score of 8, are irritant. In case, the average score produced by SLS is lower than 3, then repeat the test using another set of volunteers.

Table 1 Draize Scale for Scoring the Treatment Sites

(*Clause* 2.2.7)

Score for Erythema/ Dryness and Wrinkling	Reaction	Score for Oedema	Reaction
(1)	(2)	(3)	(4)
0	No reaction	0	No reaction
1	Very slight erythema/dryness with shiny appearance	1	Very slight oedema
2	Slight erythema/ dryness/wrinkling	2	Slight oedema
3	Moderate erythema/ dryness/wrinkling	3	Moderate oedema
4	Severe erythema/ wrinkling /scales	4	Severe oedema

2.2.8 *Analysis of Data*

Analyse the data statistically using Student's *t*-test (paired *t*-test).

2.2.9 *Reporting*

The test report shall contain the following information:

a) Location of the study and date,

b) Identification of the sample,

c) Number of volunteers used,

d) Procedure followed and any deviation,

e) Result of the test in a tabular form and statistical analyses,

f) Any unusual findings,

g) Conclusion, and

h) Name of the investigator.

3 SKIN SENSITIZATION TEST ON GUINEA PIGS—BUEHLER TEST

3.1 Outline of the Method

Apply the material at a suitable concentration topically on the clipped skin of guinea pigs under covered patch for 6 h, once a week for three consecutive weeks for inducing sensitization. Challenge the animals topically two weeks later with the highest non-irritant concentration of the test material in an identical manner as was done for sensitization induction. Assess the resulting skin reactions 24 and 48 h after removal of the patch and compare them with the reactions produced on the control group of animals treated simultaneously.

3.2 Procedure

The test is carried out in two phases:

a) *Preliminary Irritancy Test* — To determine the suitable concentrations of the test material for sensitization induction and challenge treatments.

b) *Main Test* — Carry out induction and challenge treatments with the test substance using the concentrations determined in the preliminary irritancy test.

3.2.1 *Animals*

Use equal number of male and non-pregnant female healthy albino guinea pigs, weighing about 300-400 g each. Use 4 animals for the preliminary irritancy test and 30 animals (20 for the test substance and 10 as control) for the main test. Select a few more, two days prior to the treatment, to replace the ones which may be found unsuitable due to skin blemishes, at the start of the test. Keep the animals individually in cages located in a room maintained at 23 ± 3°C, relative humidity 40-70 percent, light dark cycle of 12 h in 24 h with adequate ventilation and air changes. Animals should have access to standard feed and water all the time. Prior to each treatment remove hair from the flanks by clipping depending on the nature of the treatment. Assess sensitivity of the animal stock every six months by the use of any one of the positive control substances, for example, Dinitrofluorobenzene (DNFB), Dinitrochlorobenzene (DNCB), hexylcinnamic aldehyde (HC), etc, which are strong to moderate sensitizers. These compounds should give a response in 15 percent or more of the animals. For such confirmation use the same method described in this standard. In the event, the animals are sourced from an outside agency, where the sensitivity monitoring is not conducted, carry out sensitivity test using the same stock ideally before carrying out the actual test or in parallel with the test on another group of animals. A test carried out on an insensitive stock is invalid.

3.2.2 *Test Patches for Topical Treatment*

2.5 cm wide surgical cotton gauze, is folded into 12 ply of 2.5cm × 2.5cm dimension. Place this on a 2cm × 2cm thin polythene sheet which is stuck at the centre of a 2.5 cm wide and 6-7 cm long surgical adhesive plaster.

3.2.2.1 *Samples*

Store, preserve and identify the samples as described under **2.2.3**.

3.2.2.2 *Preparation of sample*

Prepare solutions/suspension on a weight-to-weight basis using distilled water. For water insoluble material, (some of the positive controls) use either refined groundnut oil or pharmaceutical grade paraffin oil or propylene glycol.

Prepare adequate quantity of the solution/suspension to complete all treatments of the day with a single aliquot of solution. When a very low concentration is required, it is best to prepare a concentrated stock solution/ suspension and dilute a quantity of the stock to the required concentration for treatment. Use a mechanical agitator and heat (not more than 38°C) to facilitate solution preparation, if required.

3.2.3 *Preliminary Irritancy Test*

Select four treatment sites — two on the right and two on the left flanks — each approximately 2.5cm × 2.5cm, from the clipped area of each animal. Take 0.5 ml each of 4 serial concentrations (for example, 0.5, 1.0, 2.0, 5.0 percent and so on) of the test substance on 4 different patches supported by polythene sheets and apply on the four selected sites of each animal. Cover the patches and hold them tightly by the aid of cloth bandage and return the animals to their respective cages. 6 h later, remove the patches and mark the four corners of each test sites with indelible ink. Assess the sites for skin irritancy response 24 h after the removal of the patches (30 h after the application of the patch). Select the concentration which produces a mild irritation (score 1 on a scale of 0 to 3 as described in **3.2.4.3**, based on the mean of readings from four animals) for topical induction and select the highest concentration (based on the mean of readings from four animals) which does not produce any irritancy response as the challenge concentration.

3.2.4 *Main Test*

3.2.4.1 *Induction*

As mentioned in **3.2.1**, use 20 animals for inducing sensitization with the test sample and 10 as control. Induction treatment is given once a week for 3 weeks. Take 0.5 ml of the solution/suspension of the test sample at the selected concentration on a single patch (**3.2.2**), apply on the left flank of the animal of the test group, bandage as described earlier (**3.2.3**) and allow a contact period of 6 h. Give the control group a similar treatment but with vehicle (distilled water) in place of the test substance. At the end of the contact period remove the patches and any substance sticking to the treatment site with moistened tissue paper. Repeat the application 7 days and 14 days later on the very same treatment site on each animal.

3.2.4.2 *Challenge*

Fourteen days after the last induction treatment, give the untreated flank of all the animals (including that of the control group) a challenge treatment, using the highest non-irritant concentration of the test substance in the same manner as described earlier (**3.2.3**). 6 h later remove the patches, clean the area with moistened tissue paper and mark with indelible ink. 21 h after the removal of the patches, examine the area and clip the hair, if necessary. Approximately 3 h later assess the skin reactions (double blind) under a constant artificial day light source and grade them as per Table 2. Assess the reaction again 24 h later, that is, 48 h after the patch removal. If the response in the first challenge is not conclusive, then a second challenge treatment may be given one week later using a new set of control animals.

3.2.4.3 *Scale for evaluation*

Scale for evaluation is given in Table 2.

Table 2 Scale for Evaluation

(*Clauses* 3.2, 4.2 *and* 3.2.4.3)

Scale	Observation	Reaction
(1)	(2)	(3)
0	No visible change	No reaction
1	Discrete or patchy erythema	Mild
2	Moderate and confluent erythema	Moderate
3	Intense erythema and swelling	Severe

NOTE — If 15 percent or more of the animals are showing definite positive response as compared to that of control animals, the product could be considered as a sensitizer.

3.2.5 *Reporting*

The test report shall include the following information:

a) Location of the study and date;

b) Identification of the sample;

c) Guinea pigs: Strain, source, number, age, sex, housing conditions,diet. Date and results of the last sensitivity check including the substance and vehicle used. Individual weight of animals at the start and at the conclusion of the test;

d) Procedure followed and any deviation;

e) Result of the preliminary irritancy study with conclusion on induction challenge concentration to be used in the test;

f) Result of the main test should be summarized in tabular form, giving skin reactions of each animal at each observation along with any narrative description of the nature and degree of effects observed;

g) Any unusual findings;

h) Conclusion; and

j) Name of investigators.

4 SKIN SENSITIZATION TEST ON GUINEA PIGS — GUINEA PIG MAXIMIZATION TEST — MAGNUSSON AND KLIGMAN

4.1 Outline of the Method

Test material along with Freund's Complete Adjuvant (FCA) is injected intradermally for inducing sensitization on guinea pigs. FCA enhances the sensitivity of the immune system of the animals. The induction treatment, thus given, is further boosted with the help of a closed patch application of the test material on the injected sites after a week. This is followed by topical challenge treatments with the test material a fortnight later to finally assess the allergenicity potential. Necessary concentrations of the test materials for the above mentioned treatments are determined through preliminary irritancy studies.

4.2 Procedure

Carry out the test in two phases as described below:

a) *Preliminary Irritancy Test* — To determine suitable concentrations of the test material for sensitization induction and challenge treatments.

b) *Main Test* — Induction, boosting and challenge treatments with the test substance using the concentrations determined in the preliminary irritancy test.

4.2.1 *Animals*

Use a total of 26 Albino guinea pigs (8 for preliminary irritancy test, 10 for the test material, 4 for treated control and 4 for untreated control) of either sex bred from a stock which is disease-free as well as showing positive sensitization response with any of the well known skin sensitizers. Select a few more, two days prior to the treatment, to replace the ones, which may be found unsuitable due to skin blemishes, at the start of the test. House the animals and look after them as described earlier (**3.2.1**). Follow the currently described procedure to assess the sensitivity of the animal stock and 30 percent or more animals should show a positive response in the sensitivity test. Prior to each treatment hair from the flanks/shoulder is removed by clipping depending on the nature of the treatment.

4.2.2 *Samples*

Store, preserve and identify the samples as described under **2.2.3**.

4.2.3 *Preparation of Sample*

Prepare solutions/suspension on a weight-to-weight basis using distilled water/normal saline. Prepare adequate quantity of the solution/suspension to complete all treatments of the day with a single aliquot of solution. When a very low concentration is required, it is best to prepare a concentrated stock solution/ suspension and dilute a quantity of the stock to the required concentration for treatment. Use a mechanical agitator and heat (not more than 38°C) to facilitate solution preparation, if required.

4.2.4 *Preliminary Irritancy Test*

4.2.4.1 *Intradermal irritancy test*

This is carried out to find out the suitable intradermal induction injection concentration which will be used for sensitizing the animals. Inject intradermally (at least 1 cm apart on the clipped and shaved flank of 4 guinea pigs of the same sex and weighing around 300 g each) with 0.1 ml each of 0.25, 0.5, 1 percent or more of toilet soap/bathing bar in normal saline (0.9 percent sodium chloride) using a sterilized tuberculin or disposable syringe fitted with 26 gauge needle. Place the animals in their individual cages. 24 h later examine the intensity and extent of reactions by size in millimetres (length and breadth) for erythema (redness) and oedema (swelling). Select the concentration which produces a slightly irritant reaction, namely, 7mm × 7mm erythema and oedema (mean from 4 animals) for intradermal induction injection concentration.

4.2.4.2 *Topical irritancy test*

Saturate an 8 mm diameter chromatography paper (Whatman No. 3) discs with a range of concentrations, for example, 0.5, 1, 2, 5, 10 percent and so on toilet soap/bathing bar in distilled water/suitable solvents and hold them in place using 10 mm diameter aluminium discs/cup. Place these at least one cm apart on the clipped and shaved flank of four guinea pigs, each weighing about 400 g. Hold the patch test discs/cups containing the paper in position with surgical adhesive plaster tapes and cloth bandage. Leave the animals in their individual cages and look after them as described in **3.2.1**. Remove the patches 24 h after application. Examine the treated sites 24 and 48 h after the removal of patches. Score the resulting reactions for irritation on a 0-3 scale as described under **3.2.4.3**. For boosting the sensitization response through topical application, select a concentration giving a slightly irritant (score 1) reaction. Select the highest concentration which causes no visible reaction (score 0) for challenge treatment (final treatment).

4.2.5 *The Main Sensitization Test*

Select 10 guinea pigs weighing about 300 g each from the stock as described under **4.2.1**.

4.2.5.1 *Sensitization treatment — Induction*

Carry out the sensitization treatment in two stages — intradermal injection followed one week later by topical application.

a) *Intradermal injection* — Clip the hair from a 2 cm × 4 cm area of skin on the dorsal shoulder region and give 3 pairs of intradermal injections within the clipped area (*see* Fig. 1) using a sterilized tuberculin or disposable syringe fitted with a 26 gauge needle in the following manner:

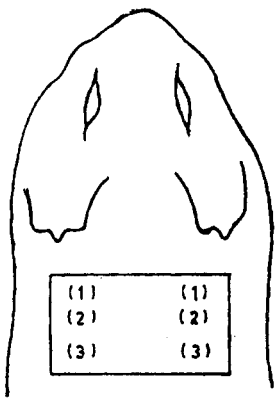

FIG. 1 GUINEA PIG VIEWED FROM ABOVE SHOWING THE SITES OF INTRADERMAL INDUCTION INJECTIONS

1) Two 0.1-ml injections of 50 percent FCA in normal saline on sites marked '1'.

2) Two 0.1-ml injections on sites marked '2' of toilet soap/bathing bar in normal saline at the concentration selected for sensitization induction from the intradermal irritancy test (*see* **4.2.4.1**).

3) Two 0.1-ml injections on sites marked '3' of toilet soap/bathing bar in normal saline mixed with 1 : 1 FCA, such that the final concentration of test substance injected is the same as in that (2) above.

b) *Topical treatment-boosting* — One week after the injection, clip and shave the same 2 cm × 4 cm treated area. Saturate a 2 cm × 3 cm chromatography paper (Whatman No. 3) with toilet soap/bathing bar at selected concentration as determined under **4.2.4.2** and place over the shaved site. Cover this by 4 cm × 6 cm piece of thin polyethylene sheet. Hold the paper saturated with test substance covered by polyethylene sheet in place for 48 h by surgical adhesive plaster tape and cloth bandage. Remove the patches at the end of 48 h.

4.2.5.2 *Topical challenge*

Fourteen days after the boosting treatment, challenge (final treatment to determine sensitization) the guinea pigs by occluded patch. For each animal, saturate an 8 mm diameter chromatography paper (Whatman No. 3) disc with the toilet soap/bathing bar at the selected challenge concentration [highest topical non-irritant concentration (**4.2.4.2**)] and place it in a 10 mm diameter aluminium patch test disc/cup. Apply this on to the clipped and shaved flank (*see* Fig. 2) and hold in position using surgical adhesive plaster tape and cloth bandage for 24 h. Examine the challenged site for inflammatory response-redness (erythema), swelling (oedema) 24 and 48 h after removal of the patch using the scoring system described under **4.2.7**. One week after the first challenge, a further challenge on the opposite flank may be given exactly in the same manner as the first. Provide a third challenge one week later on the opposites flank if the earlier challenge results are inconclusive.

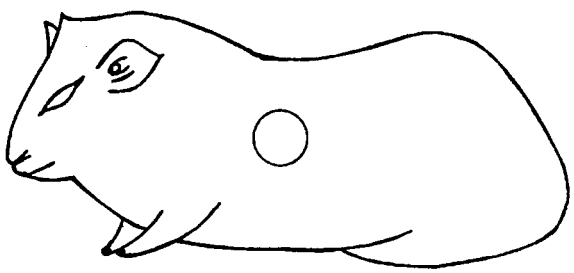

FIG. 2 SITE OF TOPICAL CHALLENGE ON GUINEA PIG

4.2.6 *Treated and Untreated Controls*

4.2.6.1 *Treated controls*

At the same time as the main test, select 4 guinea pigs of the same weight range as treated controls. Give them mock sensitization treatment at the same time and in the same way as for the main test animals except that the test substance is omitted from the intradermal injection induction and topical application boosting. But treat them exactly the same way as the test animals at every challenge with the test material.

4.2.6.2 *Untreated controls*

Challenge 4 animals which did not receive any treatment previously but are of the same weight range as the main test animals, exactly in the same manner as the test and treated control animals.

4.2.7 *Scale for Evaluation*

Score the skin reactions resulting from treatment using the scale given in Table 3.

Table 3 Scale for Evaluation

Scale	Observation	Reaction
(1)	(2)	(3)
0	No visible change	No reaction
1	Discrete or patchy erythema	Mild
2	Moderate and confluent erythema	Moderate
3	Intense erythema and swelling	Severe

NOTE — If 30 percent or more of the animals are showing definite positive response as compared to that of control animals, the product could be considered as a sensitizer.

4.2.8 *Conclusion*

Consider a reaction in a test animal as positive response if it is significantly greater than the response on treated and untreated control animals. When there is no reaction on treated and untreated control animals, a reaction score of 1 or more in any of the test animals is considered to be a positive sensitization response. Toilet soaps/ bathing bars producing a positive sensitization response in 30 percent of the animals in this test pose a risk to the consumer.

4.2.9 *Reporting*

The test report must include the information as required under **3.2.5**.

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Soaps and Other Surface Active Agents Sectional Committee, CHD 25

Organization	*Representative(s)*
Directorate General of Health Services, New Delhi	DR P. DASGUPTA (*Chairman*) SHRI B. R.WADHAWAN (*Alternate*)
Association for Consumer Action on Safety and Health (ACASH), Mumbai	SHRI YOGESH KAMDAR SHRI N. G. WAGLE (*Alternate*)
Central Board of Excise and Customs, Ministry of Finance, New Delhi	CHIEF CHEMIST DEPUTY CHIEF CHEMIST (*Alternate*)
Central Pollution Control Board, Delhi	DR S. K. GHOSH
Consumer Guidance Society of India (Regd), Mumbai	SHRI N. G.WAGLE SMT R. TALWANI (*Alternate*)
Consumer Education and Research Centre, Ahmedabad	DR C. J. SHISHOO SHRI SANTOSH YELLORE (*Alternate*)
Department of Industrial Development, Ministry of Industry, New Delhi	SHRI SHAISH KUMAR SHRI B. B. SHARMA (*Alternate*)
Development Commissioner, Small Scale Industries, New Delhi	SHRI J. S. REKHI
Directorate General of Supplies and Disposals (Inspection Wing), New Delhi	SHRI P. JAYAKUMARAN SHRI M. A. KHAN (*Alternate*)
Federation of Associations of Small Scale Soap and Detergent Manufacturers of India, Delhi	SHRI SANTOSH KUMAR SHRI R. C. DOSHI (*Alternate*)
Godrej Soaps Limited, Mumbai	SHRI A. RANGARAJAN
Gujarat Detergent Manufacturers Association, Ahmedabad	SHRI S. A. PATEL SHRI MAHENDRA VYAS (*Alternate*)
Hindustan Lever Limited, Mumbai	DR A. N. BHAT DR V. R. DHANUKA (*Alternate*)
Indian Soaps and Toiletries Manufacturers Association, Mumbai	SHRI V. P. MENON
Karnataka Soaps and Detergents Limited, Bangalore	DR K. B. PATIL SHRI M. P. NAIK (*Alternate*)
Khadi and Village Industries Commission, Mumbai	SHRI A. A. WARSI
K. S. Krishnan Associates (P) Limited, New Delhi	SHRI K. S. KRISHNAN SHRI S. KRISHNAN (*Alternate*)
Ministry of Defence (DGQA), Kanpur	SHRI M. S. SULTANIA SHRI S. S. SHUKLA (*Alternate*)
Mumbai Grahak Panchayat, Mumbai	SHRI BHIMRAO BAGALKOTE SMT VASUDHA CHACHAD (*Alternate*)
Nand Kishore Khanna and Sons, Mumbai	SHRI P. P. KHANNA SHRI A. C. KHANNA (*Alternate*)
National Test House, Kolkata	SHRI A. K. CHAKRAVORTY SHRI P. K. CHAKRABORTY (*Alternate*)
Nirma Limited, Ahmedabad	SHRI K. K. PATEL SHRI M. A.BHATT (*Alternate*)
Oil Technologists Association of India, Kanpur	DR B. R. GAIKWAD SHRI P. K. TIWARI (*Alternate*)
Procter and Gamble Hygiene and Healthcare India Limited, Mumbai	DR ARUN VISHWANATH SMT SHWETA PURANDRE (*Alternate*)
Reliance Industries Ltd, Mumbai	REPRESENTATIVE
Resarch, Design and Standards Organization (Ministry of Railways), Lucknow	SHRI A. K. CHOUDHURI

(Continued on page 8)

(*Contenued from page 7*)

Organization	*Representative(s)*
The Non-Power Soap Manufacturers Association, Mumbai	SHRI R. C. DOSHI SHRI Y. R. DOSHI (*Alternate*)
Tata Chemicals, Pithampur	REPRESENTATIVE
BIS Directorate General	SHRI LAJINDER SINGH, Director & Head (Chem) [Representing Director General (*Ex-officio Member*)]

Member-Secretary
SHRIMATI CHITRA GUPTA
Deputy Director (Chem), BIS

Panel for Toxicological Evaluation of Soaps and Detergents, CHD 25 :P 1

Hindustan Lever Limited, Mumbai	DR K. M. CHERIAN (*Convener*)
All India Institute of Medical Sciences, New Delhi	DR J. S. PASRICHA
Consumer Education and Research Centre, Ahmedabad	SHRI S. H. CLERK DR R. C. TRIVEDI (*Alternate*)
Consumer Guidance Society of India (Regd), Mumbai	SHRI N. G. WAGLE DR S. G. BHAT (*Alternate*)
Federation of Associations of Small Scale Soap and Detergent Manufacturers of India, Delhi	SHRI SANTOSH KUMAR SHRI R. C. DOSHI (*Alternate*)
Haffkine Institute for Training Research and Testing, Mumbai	DR V. RAMAKRISHNA RAO
Industrial Toxicological Research Centre (CSIR), Lucknow	DR P. B. VISWANATHAN DR VIRENDRA MISRA (*Alternate*)
KEM Hospital, Mumbai	PROF RUI FERNANDES
Lokmanya Tilak Municipal Medical Hospital, Mumbai	DR H. R. JERAJANI
Nand Kishore Khanna and Sons, Mumbai	SHRI P. P. KHANNA SHRI A. C. KHANNA (*Alternate*)
Nirma Limited, Ahmedabad	REPRESENTATIVE
Rallis India Limited, Bangalore	DR K. SUNDRARAJA RAO
Seth G. S. Medical College, Mumbai	DR (MS) N. A. KSHIRSAGAR
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