



International Association for Soaps,  
Detergents and Maintenance Products

# A.I.S.E. Laundry Detergent Testing Guidelines

Minimum requirements for comparative  
detergents testing



***v.8. – April 2023***

## IMPORTANT NOTICE

*The users of these Guidelines shall only quote the A.I.S.E. Guidelines as and when the test has been run fully in line with the A.I.S.E. Guidelines and the fixed 14 stain set.*

*These guidelines are for comparative performance testing of detergents, NOT washing conditions. This means that identical wash conditions are to be used for all detergents tested.*



## Test Protocol

- Principle based
- Includes **minimum** requirements – free to exceed those but not lower them
- Can be adapted to different countries/regions, differences in wash habits, wash cycles and temperatures, recommended dosages, etc.\*

## Scope

- Logistics: communication, selection, pick-up, sampling
- Test execution
- Results: calculation, evaluation, communication

## Categories

- Heavy Duty Detergents, Light Duty Detergents, Laundry Additives

## Countries

- Should apply to all A.I.S.E. member countries

## Benefits

- More realistic and more reliable comparison of product qualities for consumers
- Improvement in test quality
- Common approach



## Main Topics of the Guidelines

- Information about start of test
- Quality assurance in test lab
- Washing machine, cycle, temperature
- Number of replicates
- Dosage
- Soil Donator
- Stain Set
- Dyes for dye transfer inhibition \*
- Dyes for color maintenance
- Test execution
- Statistical evaluation
- Communication of results prior to publication
- Future improvements of protocol

\* further development ongoing

## ISO/IEC GUIDE 46-2017

“Every reasonable effort should be made to reflect what is available on the market, unless the limits of selection are explained

Note “reasonable efforts to reflect what is available on the market” might include consulting manufacturers (agents/representatives/importers) or checking current literature, catalogues, and a variety of other sources, including the internet. It is in the interest of consumers and manufacturers (agents/representatives/importers) that such information be made available.”

(excerpt from ISO/IEC GUIDE 46-2017 section 4.1)



# Process followed for Test Protocol

## Review existing test protocols in Western Europe, e.g.

- Que Choisir, StiWa, Which? Consumentenbond, Test Achat, AFISE
- Terpstra soil workshop

## Review and sharing of internal company data

- on consumer habits (stains/soils, wash temperature)
- textile/dye markets/trends
- internal & external testing experience

## Develop “consensus” proposal



# Key Learnings and Principles (1/2)

- Only a representative set of stains can give a consumer relevant assessment of a product's performance – drive towards use of stains that represent consumer problems in the most realistic way.
- Stains should be commercially available.
- Include (body) soil source since testing WITHOUT soil can lead to seriously misleading results as (body) soil has a significant impact on the absolute level of performance and can also impact the relative performance and ranking of products (ref. Soil Workshop Wageningen).



# Key Learnings and Principles (2/2)



- Select most consumer/market relevant dyes for Dye Transfer and Color Maintenance.
- Select the most consumer relevant wash temperature for the product categories that are tested.
- For additives, select detergents as “base” that are representative of additives user habits.





- Reliable washing machines, representative for local market
- Fuzzy logic disabled to ensure equal program length/rinse cycles for all test products (to avoid suds interference with washing cycle length)
- Calibration of machines and yearly validation
- Purchase of stains and other test materials from same production lots
- Adherence to expiry date/recommended storage conditions
- NO drying of test fabrics in tumble dryer and ensure constant exposure conditions to light



# Washing Cycle and Temperature

- Select the washing cycle and temperature that are most relevant in the country.
- Different washing cycles/temperatures may be used if justified by product category.
- In most countries this is 40°C for generalist detergents.



- **Dosages should be based on manufacturers' recommendation:**
  - Generalists: normal soil/medium water hardness.
  - Additives: a harmonized dosage (when not clear from the instructions); mechanical action (rubbing) and exposure time should be selected according to test objective
- **In case the manufacturers' dosage instructions lead to large differences between products, it should be highlighted.**
- **Dosage of powders is according to the declared grams on the package. For liquids it is ml.**



- **Addition of 4 sheets wfk-SBL2004 or SBL-CFT, introducing about 32 grams of ballast soil.**
- **SBL (Standard Ballast Soil) is currently the best option to simulate normally soiled laundry (in the absence of normally soiled consumer bundles or wash & wear tests).**



# Stain Set – Principles

- A representative set of stains should typically comprise a minimum of about 15 stains. Size of stain should permit accurate reading (minimum diameter about 50 mm).
- The total amount of soil coming from ballast soil and stains should be consistent with consumer habits.
- Stains should cover all consumer relevant stain categories for the products that are tested.
- Stains should be produced in a reproducible quality.
- Select suitable stain candidates from available suppliers (Warwick Equest, wfk, Swisstat, CFT) - use mix of “natural” and “standard” stains.
- Remove stains with artifacts e.g. high T aging or presence of foreign pigments/carbon black, soot etc. which can alter the chemical behaviour of the “stain”
- Low variability (before and after wash)
- High discrimination



# A.I.S.E. Stain Set – v.7. October 2020



Stains	Standard Stains			Hand-made Stains* (ex Warwick-Equest)	Stain classes Consumer denomination/Chemical nature
<b>Tea</b>		WFK 10J	CFT CS-97	WE5LTWKC	Drink / Bleachable
<b>Coffee</b>			CFT KC-H109	WE5ECWKC	Drink / Bleachable
<b>Red wine</b>			CFT KC-H026	WE5RWWKC	Drink / Bleachable
<b>Fruit juice</b>			CFT CS-15		Drink / Bleachable
<b>Tomato puree</b>				WE5TPWKC	Food / Bleachable
<b>Salad Dressing Balsamico</b>			CFT CS-406		Food / Bleachable Enzymatic
<b>French Squeezy Mustard</b>				WE5FSMWKC	Food / Bleachable Enzymatic
<b>Chocolate</b>		WFK 10Z	CFT CS-44		Food / Enzymatic
<b>Grass</b>	EMPA 164		CFT CS-07	WE5SGWKC	General soil / Bleachable Enzymatic
<b>Grass/Mud</b>				WE5GMWKC	General soil / Bleachable Enzymatic Particulate
<b>Blood</b>				WE5DASBWKC	General soil / Enzymatic
<b>Unused motor oil</b>	EMPA 106	WFK 10 RM	CFT C-01s		Grease, Oil / Greasy Particulate
<b>Cooked Beef Fat</b>				WE5BBPC2 (on polyester/cotton)	Grease, Oil / Greasy Enzymatic
<b>Make up</b>	EMPA 143/2	WFK 10MU	CFT CS-17	WE5FM2WKC	Cosmetics / Greasy Particulate

## Color Maintenance

- Adopt A.I.S.E. 14 monitor dye set as common, most consumer/market relevant dye set.
- Add local consumer/market relevant dyes/shades (pastel, unbrightened) if needed/desired.



# A.I.S.E. 14 Dye Set

Fabric number of A.I.S.E. (14) Monitor Dye Set	Fabric number of A.I.S.E. (14) Dye Set	Dye Class
1	A.I.S.E. 1	Sulphur Black
2	A.I.S.E. 3	Vat Green
3	A.I.S.E. 5	Vat Blue
4	A.I.S.E. 8	Direct Yellow + cationic after-treatment (Tinofix ECO)
5	A.I.S.E. 16	Reactive Red
6	A.I.S.E. 20	Reactive Black (pale shade)
7	A.I.S.E. 21	Reactive Black (heavy shade)
8	A.I.S.E. 22	Reactive Orange
9	A.I.S.E. 24	Reactive Blue
10	A.I.S.E. 26	Reactive Violet
11	A.I.S.E. 27	Reactive trichromatic combination
12	A.I.S.E. 29	Reactive trichromatic combination
13	A.I.S.E. 33	Disperse Navy + heat set
14	A.I.S.E. 39	Acid Red + syntan





## Dye Transfer

- **The current StiWa protocol focuses on the following unfinished dyes:**
  - Direct Black 22
  - Direct Orange 39
  - Direct Red 83.1
  - Acid Blue 113
- **Market reality is that most direct dyes will have some sort of finish. Thus dye transfer is dependent on the durability of that finish.**
- **Further development work is underway to optimize this dye set.**



# Execution of the Tests



# Test Execution for Heavy Duty Detergents (Stain Removal and Whiteness)



<b>Number of cycles</b>	minimum of 6, ideally 8
<b># Stain set Replicates</b>	1 internal
<b>Standard white fabrics</b>	Cotton, polyester/cotton, polyester and polyamide to measure whiteness
<b>Ballast load</b>	3 kg, clean white ballast load, <u>normalized</u> with 3 washes at 60C with ECE (88031 ex WFK) detergent w/o brightener and bleach to have <u>comparable</u> low optical brightener levels for ALL test products
<b>Ballast soil</b>	4 SBL sheets for HDD
<b>Dosage</b>	recommended dosage for normal soil/medium hardness for generalists
<b>Temperature</b>	40C (or locally adjusted) for generalist detergents



## Evaluation

### Stain removal:

- The evaluation of the degree of stain removal can either be assessed via suitable instrumental measurements such as reflectance (Y-value, SRI) or image analysis, as long as these methods are fully validated.
- Important is a statistical evaluation to arrive at meaningful conclusions.
- Reflectance via spectrophotometer, using the Y-value of the Y, x, y colour coordinates measurement, light source D65 with a UV cut-off filter at 420 nm. Aperture used for real stains 15 mm (minimum 12 mm). Stains are measured unfolded, 2 measurements per stain (in the center of the circular area, or closest homogenous area).
- Measurements are taken on each stain BEFORE wash (to verify quality of stains) unless there is a quality control in place and AFTER the wash and to evaluate standard deviations and are reported.
- Rank products based on statistic evaluation (95% confidence level). An approach for how to do this for a multitude of test products is recommended.
- Rank products on all stains, and if desired per consumer relevant stain classes. An approach for how to do this for a multitude of test products is recommended.

## Evaluation

### Whiteness:

- Basic whiteness as Y-value and Visual whiteness simulated as Ganz-Griesser value on 4 standard fabrics (cotton, polyester/cotton, polyester and polyamide) after 6 (8) cumulative washes



# Test Execution – Color Maintenance

<b>Colored Fabrics</b>	14 A.I.S.E. Monitor Dye set (plus additional “local fabrics” if needed/desired)
<b>Temperature</b>	40°C for generalists (or adjusted based on consumer habits) Reference to Tenside 2004, 156-162.
<b>Dosage</b>	Recommended Dosage for normally soiled laundry/medium water hardness (15l water / machine) or harmonized dosage
<b>Ballast</b>	3.0 kg (normalised as in SR testing) Addition of 2 SBL sheets to suppress excessive foam formation
<b>Number of washes</b>	20
<b>Evaluation</b>	Before and After the wash : Measurement of colour difference delta E expressed in Grey Scale units (ISO 105 A 05)



# Test Execution – Dye Transfer

<b>Equipment</b>	Linitester
<b>Color Donator</b>	Direct Orange 39 Direct Black 22 Acid Blue 113 Direct Red 83.1
<b>Color Acceptor</b>	Cotton and polyamide (6x16cm)
<b>Temperature</b>	60°C
<b>Time</b>	30 minutes
<b>Dosage</b>	See dosage/usage (slide 11)
<b>Water volume</b>	100 ml
<b>Number of replicates (internal/external)</b>	1 fabric per cyclinder / 2 external repetitions
<b>Evaluation</b>	Measurement of color difference delta E, expressed as Grey Scale units (ISO 105 A 04)



# Test Execution for Light Duty Detergents (Stain Removal and Whiteness)



<b>Wash Program</b>	Delicate cycle (NOT cotton or wool), high water level
<b>Ballast load</b>	2.5 kg (normalised as in SR testing for generalists)
<b>Ballast soil</b>	2 SBL sheets
<b>Dosage</b>	Recommended Dosage for lightly soiled laundry/medium water hardness (15l water / machine)
<b>Temperature</b>	30°C





- **According to ISO/IEC GUIDE 46-1985**

“... inform the manufacturer (agent/representative/importer) of test results on his own product and to invite his comments in sufficient time before publication. The test results submitted to the manufacturer (agent/ representative/importer) should be accompanied by the list of characteristics tested and the test methods used. If the manufacturer (agent/ representative/importer) disagrees with the test results, it is recommended that he speedily supplies data to demonstrate that the test results are wrong or exceptional, or that the test methods used were unsuitable. In the case of exceptional results, it may be appropriate to take further samples.”

(excerpt from ISO/IEC GUIDE 46-1985 section 3.2)



# Future Improvements



- **Future improvements to increase consumer relevance as far as stain removal, ballast soil, whiteness maintenance, color maintenance or dye transfer testing is concerned will be evaluated when they become available.**
- **We will review this on a yearly basis.**



# Acronyms

<b>A.I.S.E.</b>	International Association for Soaps, Detergents and Maintenance Products
<b>ISO</b>	International Standardisation Organisation
<b>IEC</b>	International Electrotechnical Commission
<b>SBL</b>	Soil Ballast Load
<b>ECE</b>	ECE Standard Detergent
<b>HDD</b>	Heavy Duty Detergent
<b>SRI</b>	Stain Removal Index
<b>UV</b>	Ultra violet
<b>SR</b>	Stain Removal

