

IEC 60456

Round Robin Test 2008

RRT'08

General Overview

By Dr. Tom Hilgers, Chairman IEC SC 59D „Home Laundry Appliances“

▶ Round Robin Test

What is a round robin test ?

Interlaboratory tests are called round robin test

All participants evaluating or testing the exact same test object

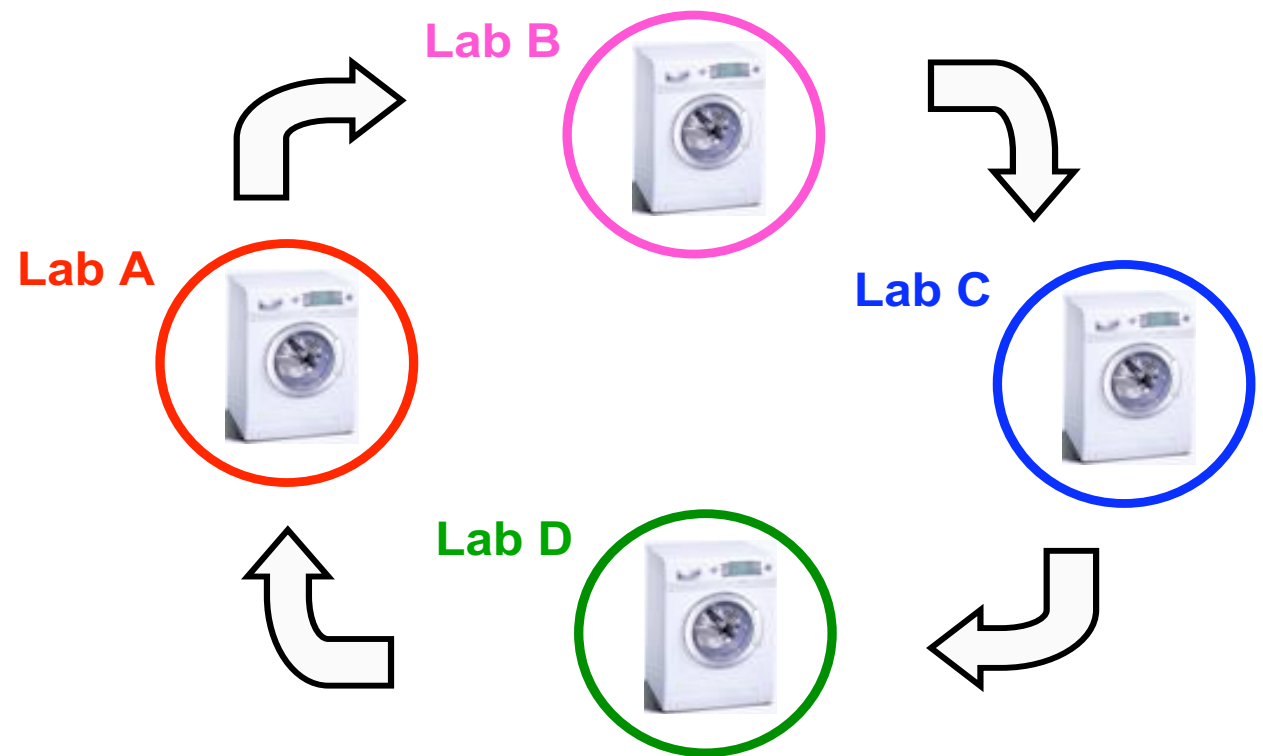
A test is performed several times: IEC60456 – test a washing machine

Same method

Same washing machine

but

- Different laboratories
- Different equipment
- Different operator
- Different material



▶ Round Robin Test

What is the reason to run a round robin test ?

- to check clarity of the method
- to check the applicability of the method for different machines
- to prove that labs are able to apply the method
- to establish figures for repeatability and reproducibility

Verification of the revised method: IEC60456 Ed.5
Verification of repeatability and reproducibility

▶ Round Robin Test

Round robin tests for IEC60456:

...

RRT 2000: New detergent: detergent A -> detergent A*

...

RRT 2004: New Reference CLS (25 participants)

RRT 2004: Wool

RRT 2005: Gentleness of action

RRT 2005: New IEC strips ratios (14 participants)

RRT 2007: Gentleness of action

RRT 2008: Edition 5 of IEC60456

▶ Round Robin Test: Ed. 5 IEC 60456

The objective of the new edition of **IEC 60456** is to:

- make the standard more **applicable to all types of automatic washing machines**
- improve the **repeatability and the reproducibility** of the tests
- improve structure and **clarity of the standard**

Scope of the round robin test (RRT):

- involving laboratories testing washing machines around the world (31 labs will participate)
- check the application of the standard to 3 different types of machines (in total 6 different machines)
- to establish figures for repeatability and reproducibility of the revised methods
- check clarity of the standard (test to be based on CDV)

The test started at the end of 2007 and is expected to be completed by end of 2008.

▶ RRT 2008: Elements

What is included:

Cotton 60, Cotton 30 and Cotton 20 programmes

Hard and soft water

Different types of washing machines:

- Horizontal axis with heater – cold fill
- Vertical axis agitator type – hot/cold fill
- Vertical axis impeller type – cold fill only

What is NOT included:

Other programmes like synthetics/blends or wool

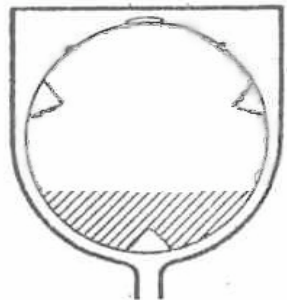
Different batches of strips and detergent

Other types of washing machines:

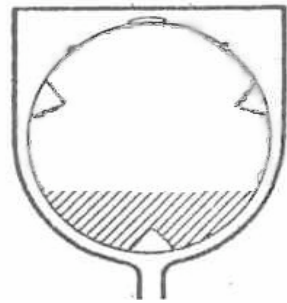
- Twin tub
- Horizontal axis without heater – hot/cold fill
- Semi-automatic washing machines

▶ RRT 2008: Treatments

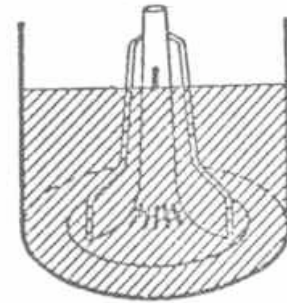
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Treatment 1
hard water
Cotton 60
Miele / Electrolux



Treatment 2
soft water
Cotton 60
Miele / Electrolux



Treatment 3
soft water
Cotton warm
Mabe / Whirlpool



Treatment 4
soft water
Cotton cold
Haier / National

	Treatment 1	Treatment 2	Treatment 3	Treatment 4
Platform	HA	HA	VA (h/c fill)	VA (cold fill)
Water hardness	hard: (2,5 ± 0,2) mmol/l	soft: (0,5 ± 0,2) mmol/l	soft: (0,5 ± 0,2) mmol/l	soft: (0,5 ± 0,2) mmol/l
Test machines	Miele / Electrolux	Miele / Electrolux	Mabe / Whirlpool	National / Haier
Test programme	Cotton 60	Cotton 60	Cotton warm	Cotton cold
Water inlet temperature	15°C	15°C	15°C / 60°C	20°C
Reference machine	CLS and/or MP lab	CLS and/or MP lab	CLS and/or MP lab	CLS and/or MP lab
Test programme	Cotton 60	Cotton 60	Cotton 30	Cotton 20
Water inlet temperature	15°C	15°C	15°C	20°C

▶ RRT 2008: Participating Labs

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**31 labs in
16 countries**

Brasil
China
France
Germany
Italy
Japan
Korea
Mexico
Slovenia
Spain
Sweden
Switzerland
Thailand
Turkey
UK
USA

▶ RRT 2008: Participating Labs

Ring Test Team to prepare and organize tests:

Hiroyu Fujii (National, Japan)
Jeremy Owens, (Intertek, UK)
Raveendran Vaidhyanathan (Whirlpool, Germany)
Rainer Stamminger (University of Bonn, Germany)
Daniel Fäh (EMPA, Switzerland)
Tom Hilgers (WfK Testgewebe, Germany)
Gundula Czyzewski, (BSH, Germany)

Supported by:

Markus Kamp (Miele, Germany)
Michael Wolf (Electrolux, Germany)
Sten-Hakan Almström (Electrolux, Sweden)

Machine Manufacturer supporting RRT 2008:

National, Japan (contact: Hiroyu Fujii)
Haier, China (contact: Wang Hajun)
Mabe, Mexico (contact: Martha Hecht)
Whirlpool, US (contact: Tony Hardaway)
Miele, Germany (contact: Markus Kamp)
Electrolux, Italy (contact: Gianantonio De Bin)

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Strips - EMPA (Daniel Fäh)
Detergent - wfk (Tom Hilgers)

▶ wfk Testgewebe GmbH

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Thank you for your attention!