Professional Textile Services

Quality Assurance

RAL-GZ 992

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Professional Textile Services

Quality Assurance

RAL-GZ 992

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Bonn, May 2019

RAL DEUTSCHES INSTITUT FÜR GÜTESICHERUNG UND KENNZEICHNUNG E.V.
(GERMAN INSTITUTE FOR QUALITY ASSURANCE AND CERTIFICATION)

Contents

Quality and Test Regulations Professional Textile Services for Commercial Linen RAL-GZ 992/1

1-1 Area of application ... 7
1-2 Definitions ... 7
1-2.1 Manufactured textile goods ... 7
1-2.2 Industrial linen care ... 7
1-2.3 Commercial linen ... 7
1-2.4 Commercial linen ... 7
1-2.5 Rental linen ... 7
1-2.6 Laundry machines area ... 7
1-2.7 A washing cycle ... 7
1-2.8 Test pieces ... 7
1-2.9 The soil area ... 7
1-2.10 The clean area ... 7
1-3 Technical Rules ... 7
1-4 Quality Regulations ... 8
1-4.1 Laundry plant ... 8
1-4.1.1 Building area ... 8
1-4.1.2 Personnel area ... 8
1-4.1.3 Soiled linen area ... 8
1-4.1.3.1 Acceptance of the soiled linen. No particular requirements. ... 8
1-4.1.4 Wet wash area ... 8
1-4.1.4.1 Water treatment ... 8
1-4.1.5 Clean linen area ... 8
1-4.2 Linen care ... 9
1-4.2.1 Degree of whiteness (W_{GG}) ... 9
1-4.2.2 Tint value (TV) ... 9
1-4.2.3 Basic white value (Y_{420}) ... 9
1-4.2.4 Fabric incrustation ... 9
1-4.2.5 Loss in tensile strength ... 9
1-4.2.6 Chemical deterioration of fibres ... 9
1-4.3 Linen finishing ... 9
1-5 Test regulations ... 10
1-5.1 Laundry plant ... 10
1-5.2 Linen care ... 10
1-5.2.1 Degree of whiteness (W_{GG}) ... 10
1-5.2.2 Tint value (TV) ... 10
1-5.2.3 Basic whiteness value (Y_{420}) ... 10
1-5.2.4 Inorganic fabric incrustation ... 10
1-5.2.5 Reduction in tensile strength ... 10
1-5.2.6 Deterioration Factor (s) ... 10
1.5.3 Linen finishing ... 11
1-6 Monitoring ... 11
1-6.1 First test ... 11
1-6.2 In-house tests ... 11
1-6.3 Monitoring tests ... 11
1-7 Identification ... 11
1-8 Amendments ... 11
1.9 Appendix ... 12
1-9.1 Table 1 Number of Washing Cycle Tests ... 12
1-9.2 Table 2 Correlations between tint value, colour deviation and coloristic significance ... 12
1-9.3 Checklist for the in-house test ... 13
1-9.4 Checklist for plant inspection in accordance with RAL-GZ 992/1 ... 14
1-9.5 Statement on the washing cycle check ... 19
1-9.6 Evaluation of the Washing Cycle Check ... 23

Contents

Quality and Test Regulations Professional Textile Services for Healthcare Linen RAL-GZ 992/2

2-1 Area of application ... 25
2-2 Definitions ... 25
2-2.1 Healthcare linen ... 25
2-2.2 Disinfection ... 25
2-2.3 Disinfection of linen ... 25
2-2.4 Disinfection of hands ... 25
2-2.5 Abrasive disinfection ... 25
2-2.6 Spray disinfection ... 25
2-2.7 Sanitizing ... 25
2-2.8 Contagious diseases ... 25
2-3 Technical rules ... 25
2-4 Quality Regulations ... 26
2-4.1 Laundry plant ... 26
2-4.1.1 Building area ... 26
2-4.1.3 Soiled linen area ... 26
2-4.1.4 Wet wash area ... 26
2-4.1.5 Clean linen area ... 27
2-4.2 Linen care ... 27
2-4.3 Linen finishing ... 27
2-4.4 Hygiene requirements ... 27
2-4.4.1 Rooms ... 27
2-4.4.2 Equipment ... 27
2-4.4.3 Personnel ... 27
2-4.4.4 Clean linen ... 27
2-5 Test regulations ... 27
2-5.1 Laundry plant ... 27
2-5.2 Linen care ... 27
2-5.3 Linen finishing ... 27
2-5.4 Hygiene requirements ... 28
2-6 Monitoring ... 28
2-6.1 First test ... 28
2-6.2 In-house tests ... 28
2-6.3 Monitoring tests ... 28
2-7 Identification ... 28
2-8 Amendments ... 28
2-9 Appendix ... 29
2-9.1 Specimen hygiene certificate ... 29
2-9.2 Checklist for plant inspection in accordance with RAL-GZ 992/2 ... 30

Contents

Quality and Test Regulations Professional Textile Services for Linen from Food Processing Businesses RAL-GZ 992/3

3-1 Area of application ... 39
3-2 Definitions ... 39
3-2.1 Manufactured textile goods ... 39
3-2.2 Industrial care for linen ... 39
3-2.3 Food processing businesses ... 39
3-2.4 Linen from food processing businesses ... 39
3-2.5 Rental linen ... 39
3-2.6 Laundry machines ... 39
3-2.7 A washing cycle ... 39
3-2.8 Test pieces ... 39
3-2.9 Soiled linen area ... 39
3-2.10 Clean linen area ... 39
3-2.11 Disinfection ... 39
3-2.12 Disinfection of laundry ... 39
3-2.13 Disinfection of the hands ... 39
3-2.14 Disinfection by abrasion ... 39
3-2.15 Spray disinfection ... 39
3-3 Technical Regulations ... 39
3-4 Quality regulations ... 40
3-4.1 Laundry plant ... 40
3-4.1.1 Building area ... 40
3-4.1.2 Personnel area ... 40
3-4.1.3 Soiled linen area ... 41
3-4.1.4 Clean linen area ... 41
3-4.2 Care of laundry ... 41
3-4.2.1 Degree of whiteness (W_{GG}) ... 42
3-4.2.2 Tint value (TV) ... 42
3-4.2.3 Basic whiteness value (Y_{420}) ... 42
3-4.2.4 Fabric incrustation ... 42
3-4.2.5 Reduction in tensile strength (guide values) ... 42
3-4.2.6 Chemical fibre deterioration (guide values) ... 42
3-4.3 Distribution of finished linen ... 42
3-4.4 Hygiene requirements ... 42
3-4.4.1 Rooms ... 42
3-4.4.2 Installations ... 42
3-4.4.3 Staff ... 42
3-4.4.4 Hygiene plans ... 43
3-4.4.5 Clean linen ... 43
3-5 Test regulations ... 43
3-5.1 Laundries ... 43
3-5.2 Care of laundry ... 43
3-5.2.1 Degree of whiteness (W_{GG}) ... 43
3-5.2.2 Tint value (TV) ... 43
3-5.2.3 Basic whiteness value (Y_{420}) ... 43
3-5.2.4 Inorganic fabric incrustation ... 43
3-5.2.5 Reduction in tensile strength ... 43
3-5.2.6 Deterioration Factor (s) ... 43
3-5.3 Completion of linen ... 43
3-5.4 Hygiene requirements ... 44
3-6 Monitoring ... 44
3-6.1 Initial test ... 44
3-6.2 In-house tests ... 44
3-6.3 Supervisory tests ... 44
3-7 Identification ... 44

Contents

3-8 Amendments ... 44
3-9 Appendix ... 45
3-9.1 Number of washing cycle checks ... 45

Quality and Test Regulations Professional Textile Services for Clothing of Care Home Residents RAL-GZ 992/4

4-1 Area of application ... 47
4-2 Definitions ... 47
4-2.1 Manufactured textile goods ... 47
4-2.2 Industrial care for linen ... 47
4-2.3 Care homes ... 47
4-2.4 Institutions within the meaning of the Residential Home Act ... 47
4-2.5 Clothing belonging to the residents of care homes ... 47
4-2.6 Rental linen ... 47
4-2.7 Laundry machines ... 47
4-2.8 A washing cycle ... 47
4-2.9 Test pieces ... 47
4-2.10 Woollen test fabrics ... 47
4-2.11 The soiled linen area ... 47
4-2.12 The clean linen area ... 47
4-2.13 Disinfection ... 47
4-2.14 Disinfection of laundry ... 47
4-2.15 Disinfection of the hands ... 47
4-2.16 Disinfection by abrasion ... 47
4-2.17 Spray disinfection ... 48
4-2.18 Solvent treatment ... 48
4-2.19 Wet cleaning ... 48
4-3 Other applicable technical regulations and literature ... 48
4-4 Quality regulations ... 49
4-4.1 Laundry plant ... 49
4-4.1.1 Building area ... 49
4-4.1.2 Personnel area ... 49
4-4.1.3 Soiled linen area ... 49
4-4.1.4 Clean linen area ... 49
4-4.2 Care of linen ... 50
4-4.2.1 Washing cycle tests for disinfectant washing processes ... 50
4-4.2.2 Washing cycle tests for wool washes incl. silk ... 51
4-4.3 Distribution of finished linen ... 51
4-4.4 Hygiene requirements ... 52
4-4.4.1 Rooms ... 52
4-4.4.2 Installations ... 52
4-4.4.3 Personnel area ... 52
4-4.4.4 Hygiene plans ... 52
4-4.4.5 Clean linen ... 52
4-5 Test conditions ... 52
4-5.1 Laundry plant ... 52
4-5.2 Care of linen ... 52
4-5.2.1 Degree of whiteness (W_{GG}) ... 52
4-5.2.2 Tint value (TV) ... 53
4-5.2.3 Basic whiteness value (Y_{420}) ... 53
4-5.2.4 Inorganic fabric incrustation ... 53
4-5.2.5 Reduction in tensile strength ... 53
4-5.2.6 Deterioration factor (s) ... 53
4-5.2.7 Dimensional changes ... 53
4-5.2.8 Structural changes ... 53

Contents

4-5.3 Completion of linen ... 53
4-5.4 Hygiene requirements ... 53
4-6 Monitoring ... 53
4-6.1 Initial test ... 53
4-6.2 In-house tests ... 53
4-6.3 External monitoring ... 53
4-7 Identification ... 54
4-8 Amendments ... 54
4-9 Appendix ... 55
4-9.1 Table 2, overview washing cycle controls (WCC) ... 55
4-9.2 Table 3, number of washing cycle controls (WCC) ... 55

Implementing regulations for the award and use of the RAL Quality Certification Mark for Professional Textile Services

1 Basis of Quality ... 57
2 Award ... 57
3 Use ... 57
4 Monitoring ... 57
5 Violation Penalties ... 58
6 Lodging an Appeal ... 58
7 Re-award ... 58
8 Amendments ... 58

Specimen 1 Certificate of Obligation ... 59
Specimen 2 Award Certificate ... 60

RAL History ... Inside Back Cover

Quality and Test Regulations Professional Textile Services for Commercial Linen

1-1 Area of application

The quality and test regulations RAL-GZ-992/1 refer to the professional linen care of finished textile products with reference to commercial linen by industrial laundries or the regulations refer to the corresponding services rendered by institutions.

1-2 Definitions

1-2.1 Manufactured textile goods

are goods in accordance with DIN 60 000, made of fibrous textile materials, semi- and finished products, which are brought into a suitably saleable condition for passing onto the processing plant, the market or the end user by manufacturing ready to wear clothes, making-up or by other manufacturing processes.

1-2.2 Industrial linen care

is offered by laundry plants in contrast to linen care in the private household.

1-2.3/1-2.4 Commercial linen

is linen which occurs in the hotel and catering sector, in workshops, manufacturing plants, farms, commercial enterprises, institutions, public authorities etc. with the exception of hospitals, clinics, nursing homes, etc. as well as with the exception of food processing businesses, e.g. kitchen linen. Also linen which occurs in private households occupied by one or more people belongs to commercial linen.

1-2.5 Rental linen

is linen which is not the property of the linen user.

1-2.6 Laundry machines area

includes machines in laundry plants which are used for washing, draining, vibrating, drying and finishing manufactured textile products.

1-2.7 A washing cycle

according to this regulation includes a whole washing programme in accordance with the respective procedural rule.

1-2.8 Test pieces

according to these regulations are sample strips from standard cotton fabric according to DIN 53 919 Part 1 which undergo washing cycles under conventional operating conditions in order to check the washing cycle.

1-2.9 The soil area

includes the acceptance, sorting, storage and identification of soiled linen. The washing machines are also loaded here.

1-2.10 The clean area

includes draining and unloading the clean linen, the laundry machines and equipment area for drying, ironing, finishing, storing and dispatching the clean linen, as well as all associated activities, controls and checks.

1-3 Other applicable technical rules and literature

The following Technical Regulations in the most recent version apply to the models which refer to the area of application of these quality and test regulations.

DIN 5033-4	Colour measurement; spectrophotometric method
DIN 5033-6	Colour measurement; three area method
DIN 11900	Laundry and drycleaning machines; general definitions
DIN 11901	Laundry and drycleaning machines; quantity measured, symbols, units, calculation formulas
DIN 11902	Laundry and drycleaning machines; checking the machine through put, processing effects and consumption of resources, test conditions and procedures
DIN EN 12 829	Surface active agents - production of water with standardized calcium and magnesium hardness
DIN EN 14065	Textiles - Laundry processed textiles - Biocontamination control system
DIN 38404-5	German standard method for examination of water, waste water and sediment - physical and physical-chemical parameters (group C) - part 5: determination of the pH-value (C5)
DIN 38404-10	German standard method for examination of water, waste water and sediment - physical and physical-chemical parameters (group C) - part 10: Calcite saturation of water (C10)
DIN EN ISO 13934-1	Textiles - Tensile properties of fabrics - Part 1: Determination of maximum force and elongation at maximum force using the strip method

DIN 53919-1	Standard cotton fabric for assessing the washing procedure;requirements
DIN 53919-2	Testing the washing procedure with test strips
DIN EN ISO 6330	Textiles - Domestic washing and drying procedures for textile testing
DIN 54270-2	Testing textiles; determination of intrinsic viscosity of cellulose; Cuen method
DIN 54270-3	Testing textiles; determination of intrinsic viscosity of cellulose; $EWNN_{mod(NaCl)}$ method
DIN 60000	Textiles, basic definitions
BGV A 1	Accident prevention regulations – principles for prevention (previously VBG 1)
BGR 500 Sec. 2.6	Operating regulations for laundries (previously VBG 7y)
BGV C8	Accident prevention regulations – health service (previously VBG 103)
Company publication	CIBA-Geigy-Brochure No. 9334 D 1980 - Methods and possible applications for the colorimetric whiteness evaluation of textiles – R. GRIESSER

1-4 Quality Regulations

1-4.1 Laundry plant

1-4.1.1 Building area

The laundry plant should be separated as far as possible into "soil" and "clean" areas.

1-4.1.2 Personnel area

Apart from the proprietor there should always be at least one qualified and appropriately experienced person in the laundry plant who monitors and checks all technical operations.

1-4.1.3 Soiled linen area

1-4.1.3.1 Acceptance of the soiled linen. No particular requirements.

1-4.1.3.2 Storing the soiled linen

The soiled linen must be stored in a dry condition until it is washed.

1-4.1.3.3 Sorting

The soiled linen must be sorted in accordance with the utilized washing procedure and identified according to supplier or contract.

1-4.1.3.4 Work stations

The work stations in the soil area must be functional and clearly laid out, enabling efficient operation. Order and cleanliness must be observed.

1-4.1.4 Wet wash area

1-4.1.4.1 Water treatment

If naturally soft water is not available, water treatment must be carried out in a plant which supplies service water with a hardness of 0 mmol/l Ca (0° hardness), below 0.01 mg/l iron and below 0.03 mg/l manganese and below 0.05 mg/l copper. The water treatment plant must be checked daily in the inspection record book regarding the service water values.

1-4.1.4.2 Laundry machines area

The washing machines and spin driers/drainage machines, including their controlling and checking equipment, must be in working order. The scouring solution must be removed without difficulty.

1-4.1.4.3 Washing procedure

The rules of procedure must be easily accesible in the wet wash area. The following must be set out in the rules of procedure for the appropriate washing procedure: scouring solution ratio, loading ratio, detergent dosage, alkalinity, bleaching agent dosage; scouring solution temperature when pre-washing, clear washing and rinsing; bleaching operation.

1-4.1.4.4 Work stations

The work stations in the wet wash area must be functional and clearly laid out, enabling a continuous operation. Order and cleanliness must be observed.

1-4.1.5 Clean linen area

1-4.1.5.1 Drying

The utilized drying machines, including their controlling and checking equipment, must be in working order. Besides temperature control, the loading ratio and drying effect must be recorded in the checklist.

1-4.1.5.2 Ironing

The ironers must work perfectly. The laying and folding of the linen to be ironed must be carried out by a skilled person. Besides the type of linen preparation prior to ironing and the type of input device to the ironer, the checklist includes the proper functioning of the input device and ironer (including winding, elasticity, suction performance), type of laying and folding and the proper functioning of the folding machine.

1-4.1.5.3 Processing shaped items

The utilized presses, tunnel finishers or dolly finishers must work perfectly.

1-4.1.5.4 Storage

The storage of the clean linen must be clearly laid out. Storage areas and storage surfaces must be well maintained, neat and clean.

1-4.1.5.5 Dispatching the clean linen

The cargo holds in the vehicles must be covered. Vehicle floors and outer surfaces must be clean. The drivers of the transport

vehicles must wear work clothes provided by the user of the quality mark.These work clothes must be regularly maintained by the operator.

1-4.1.5.6 Work stations

The work stations in the clean linen area must be functional and clearly laid out, enabling a continuous operation. Order and cleanliness must be observed.

1-4.2 Linen care

Each user of the quality mark receives 100 cm x 80 cm test pieces made from standard cotton fabric, in accordance with DIN 53 919 Part 1, from the testing laboratory in accordance with section 1-6.1. The amount of test pieces corresponds to table 1, section 1-9.1.

Each test piece must be washed without nets if the plant does not carry out the majority of its washing in nets. Test pieces must also be used if commercial linen or public authority/ large-scale contracts are processed.

The test piece must go through the whole washing procedure, including all washing and rinsing cycles. It must be passed on from one washing cycle to the next and air-dried overnight. Each washing cycle is marked on the accompanying test piece list which is checked by a second representative of the user of the quality mark. If the test piece has passed through 25 washing cycles, it is cut in half to a length of 50 cm, crosswise. One half of the test piece must be marked with the number "25".

The unmarked half of the test piece must go through another 25 washing cycles as stated above and it is then marked with the number "50". After 25 or 50 washing cycles the appropriate smoothing of the test piece must be observed. Immediately after the conclusion of the 50 washing cycles, the test piece halves, marked with "25" and "50", must be sent to the testing laboratory (section 1-9.5) together with a statement on the washing cycle check and the completed accompanying list for washing cycles and test pieces.

When carrying out each washing cycle check with test pieces, the washing procedure must not be changed (e.g. hot wash procedure for white linen subdivided according to point of origin; hot wash procedure for towelling; low temperature wash procedure for coloured linen, work clothes and protective clothes). If there are severel washing devices or washing procedures in use, the annual washing cycle checks must be divided proportionally between the individual devices and procedures. Commercial linen and public authority/large-scale contracts must also be taken into account during the washing cycle check.

The features evaluated for professional textile services are tested on the test pieces at the testing laboratory in accordance with section 1-6.1. An evaluation of 25 washing cycles is only carried out if it is necessary to support or reproduce the test results after 50 washing cycles.

1-4.2.1 Degree of whiteness (W_{GG})

The degree of whiteness is a measure of the whiteness of linen as perceived by the human eye.
The value should not fall below 170 after 50 washing cycles. Data only in whole numbers.

1-4.2.2 Tint value (TV)

The tint value describes the colour deviation from the neutral white of the white standard. The TV must not exceed R 1.5 in the red-violet direction and G 2.49 in the blue-green direction after 50 washing cycles. Data up to 2 decimal places.

The relationship between colour deviation, tint value and the colouristic significance can be seen in table 2, section 1-9.2.

1-4.2.3 Basic white value (Y_{420})

The basic white value is the brightness of linen after the UV part of the light source has been filtered out and after the brightness effect has been removed from the clean linen. The value must not fall below 87 after 50 washing cycles. Data only in whole numbers.

1-4.2.4 Fabric incrustation

Inorganic fabric incrustation, defined as ash content, must not exceed 0.7 % after 25 washing cycles or 1.0 % after 50 washing cycles. Data to one decimal place in accordance with the rounding-off rule, allowing for a test tolerance of 5 %.

1-4.2.5 Loss in tensile strength

The relative strength reduction is calculated from the values for the maximum tractive power (wet) of the test pieces in pre-washed condition (3 washes in accordance with DIN 53 919 Part 1, Paragraph 5.2.2)

and after 25 or 50 washing cycles (in accordance with section 1-4.2). This reduction in wet tear strength must not exceed 15 % after 25 washing cycles or 30 % after 50 washing cycles.

Data to one decimal place in accordance with the rounding-off rule.

1-4.2.6 Chemical deterioration of fibres

Chemical deterioration of fibres, identified as deterioration factor (s), must not exceed 0.5 (0.6 when complying with the Protection against Infection Act) after 25 washing cycles or 1.0 (1.2 when complying with the Protection against Infection Act) after 50 washing cylces. Data to one decimal place in accordance with the rounding-off rule.

1-4.3 Linen finishing

Clean linen, which is ready for dispatch, must be as clean and stain-free as possible, greying must be minimal, it must be completely dry even in problem areas, have a neutral odour and be properly packed. Ironed linen must also be as smooth as possible and must be properly folded for cupboard storage. Shaped items must also be as smooth and dry as possible and have a finish which is specific to articles.

1-5 Test regulations

1-5.1 Laundry plant

Representatives of the testing laboratory carry out a plant inspection at least once a year to ensure that the requirements are being implemented in accordance with section 1-6.1, including filling out the checklist in accordance with section 1-9.4 and assessing the inspection record book. A plant employee (not the proprietor or operator of the laundry plant) must keep the inspection record book.

1-5.2 Linen care

The main method of checking that the requirements are being implemented is by checking washing cycles with test pieces in accordance with section 1-4.2, including an assessment by the testing laboratory in accordance with section 1-6.1 (section 1-9.6). The following is identified on the test pieces: W_{GG}, TV, Y_{420}, fabric incrustation, reduction in strength and chemical deterioration of fibres.

1-5.2.1 Degree of whiteness (W_{GG})

Defined by the spectral procedures in accordance with DIN 5033 part 4 or by the three-area procedure in accordance with DIN 5033 part 6, under illumination with xenon lamps and an adequate approximation to standard illumination D_{65}. Measurements are carried out in a double layer using whitener-free filter paper as a base (e.g. Schleicher + Schüll No. 604) at a degree of thickness which is opaque and with at least four stages of the textile scale of standard white to adjust the measuring instruments to specific conditions.

The measuring instruments are calibrated against the barium sulphate standard. The calculation of standard colour values is carried out for the D_{65} type of light and the 10° standard observer. The degree of whiteness formula, according to Ganz, is used to calculate the DW value after the formula parameters

$$W = (D \cdot Y) + (P \cdot x) + (Q \cdot y) + C$$

Y, x and y are the colorimetric dimensions used for brightness and standard colour values. D, P, Q and C are the formula parameters, the sizes of which determine the "white taste".

(Bibliography: CIBA-Geigy brochure No. 9334 D, 1980 - Methods and possible applications for the colorimetric whiteness evaluation of textiles – R. GRIESSER).

1-5.2.2 Tint value (TV)

Standard colour values and standard colour value sections are measured and calculated as in Section 1-5.2.1. Tint values are then calculated according to the Ganz/Griesser formula: $TV_{GG} = (m \cdot x) + (n \cdot y) + k$. x and y are the colorimetric values to be used for measuring the standard colour value sections. m, n, and k are for the formula parameters which determine the desired degree of whiteness.

1-5.2.3 Basic whiteness value (Y_{420})

Standard colour values and standard colour value sections are measured and calculated as in Section 1-5.2.1. with the UV component being filtered out by using a 460 nm barrier filter. If no 460 nm barrier filter is available, a 420 nm barrier filter may also be used. the used filter must be mentioned in the measuring protocol, e.g. Y_{420} or Y_{460}.

1-5.2.4 Inorganic fabric incrustation

Definition in accordance with DIN 53 919 part 2, section 8.4.1, as ash content in a muffle furnace for one hour at 800°C.

1-5.2.5 Reduction in tensile strength

Definition in accordance with DIN 53 857, wet test. When the reduction in strength is below 12 %, only "below 12 %" is indicated. When it is more than 12 %, the exact determined value is indicated.

1-5.2.6 Deterioration Factor (s)

1-5.2.6.1 The deterioration factor (s) is calculated from the limiting viscosity numbers (LVN) in the initial state and after 25 or 50 washes in accordance with DIN 53 919 part 2:

$$s = \frac{\log\left(\frac{2000}{[\eta]_{tx}} - \frac{2000}{[\eta]_x}\right) + 1}{\log 2}$$

$[\eta]_x$ = Limiting viscosity number in $EWNN_{mod\ (NaCl)}$ of standard cotton fabric pre-washed 3 times.

$[\eta]_{tx}$ = Limiting viscosity number of standard cotton fabric washed 25 or 50 times.

The limiting viscosity number in iron (III)-tartaric acid-sodium complex is determined by carrying out an average of two tests each in accordance with DIN 54 270 part 3.

1-5.2.6.2 Alternatively the deterioration factor (s) can be calculated from the average degree of polymerization (DP) in the initial state and after 25 or 50 washes according to the Eisenhut formula:

$$s = \frac{\log\left(\frac{2000}{P_{tx}} - \frac{2000}{P_x}\right) + 1}{\log 2}$$

P_{tx} = DP of the test piece washed 25 or 50 times

P_x = Average degree of polymerization of the test piece pre-washed 3 times

The DP is determined by cuoxam according to the improved Fa-Chem-Fa-2-method. Manufacture of copper hydroxide in accordance with DIN 54 270 part 2, section 6.1, by means of a solution in ammonia (25%).

Calculation of the DP according to SCHULZ-BLASCHKE:

$$DP = 2000 \cdot \frac{\eta_{sp}}{c} \cdot \frac{1}{1 + 0.29 \cdot \eta_{sp}}$$

$$\eta_{sp} = \frac{\eta - \eta_o}{\eta_o}$$

c = Weighed portion cellulose in g/l
η = Retention period of the solution in seconds
η_o = Retention period of solvent in seconds

The deterioration factors calculated from the DP and the LVN are approximately the same.

1.5.3 Linen finishing

1-5.3.1 In-house testing must be used in accordance with section 1-6.2, to spot check 5 samples each of dried linen, ironed linen and shaped items

a) visually for folding, shaped item finish, packing

b) visually by means of comparison fabrics for cleanness, absence of stains, greying (match against four-stage textile white standard), smoothing.

c) for odour at a distance of 10 cm.

The results must be recorded in an inspection record book under entries for supplier, order no., etc. (see section 1-9.3)

The frequency of these spot checks, which are carried out regularly and entered in the inspection record book, is determined for each plant by the plant inspectors.

1-5.3.2 In plant inspections the results of at least 10 test samples from tests a, b and c are included in the checklist (see section 1-9.4) in accordance with section 1-5.3.1.

1-6 Monitoring

1-6.1 First test

A suitable testing institute must be commissioned by the Gütegemeinschaft sachgemäße Wäschepflege e.V. for the first test and for external monitoring tests.

The first test, which is a requirement for the award of the quality mark in accordance with section 1-7.1, includes verification that the quality and test regulations RAL-GZ 992/1 have been carried out.

1-6.2 In-house tests

Every user of the label is obliged by the quality regulations to carry out and record all the necessary in-house tests. These records must be kept for at least 2 years.

1-6.3 External monitoring tests

External monitoring tests are carried out at least once a year by a plant inspection in accordance with section 1-5.1 and 1-5.3 and by washing cycle checks in accordance with section 1-5.2. The washing cycle checks are graded according to the throughput of the laundry plant and include verification of sections 1-4.2 to 1-4.2.6.

1-7 Identification

1-7.1 Professional textile services of commercial linen which complies with the quality and test regulations RAL-GZ 992/1, can be identified by the quality mark and caption depicted below if the address of the laundry plant is stated in full.

Commercial Linen RAL-GZ 992/1

1-7.2 The statutes and trademark documents of the Gütegemeinschaft sachgemäße Wäschepflege e.V. apply exclusively for the award and use of the quality mark.

1-7.3 The labelling must be complete and clearly legible.

1-8 Amendments

Any amendments to these quality and test regulations, even editorial changes, require prior written approval from RAL. They come into force when, after a reasonable transitional period, users of the quality mark are notified by the Board of the Certification Association.

1-9 Appendix

1-9.1 Table 1

Number of washing cycle checks

Tons of processed linen per day	Number of annual washing cycle checks
up to 1	2
up to 2	3
up to 3	4
up to 4	5
up to 5	6
up to 7	7
up to 20	7
≥ 20	10

The number of annual tests to be carried out by the quality mark holder is determined on the basis of the calculated daily tonnages. The company is assigned to the relevant category by the test centre, which uses the usage data recorded by the certificate holder in the inspection book to verify the calculated daily tonnages during its annual inspection. The number of washing cycle tests is based on this classification.

1-9.2 Table 2

Correlations between tint value, colour deviation and coloristic significance

Tint Value	Colour Deviation	Coloristic Significance
> -5.5	RR	coloured towards red-violet
- 5.5 to - 4.51 - 4.5 to - 3.51 - 3.5 to - 2.51 - 2.5 to - 1.51 - 1.5 to - 0.51	R5 R4 R3 R2 R1	very strong strong distinct slight trace
- 0.5 to - 0.49	N	negligible colour deviation from neutral white of the white standard
0.5 to 1.49 1.5 to 2.49 2.5 to 3.49 3.5 to 4.49 4.5 to 5.49	G1 G2 G3 G4 G5	trace slight distinct strong very strong } blue-green deviation from white standard
> 5.5	GG	coloured towards blue-green

Bibliography: CIBA-Geigy brochure No. 9334 D, 1980 - Methods and possible applications for the colorimetric whiteness evaluation of textiles – R. GRIESSER

1-9.3 Checklist for the in-house test

Checklist for the in-house test

Linen finishing in accordance with section 1-5.3.1 or 1-7.2 according to RAL-GZ 992/1

Name of auditor: _____ Date: _____

Customer: _____ or Order No. _____

Type of linen	Sample No.									
	1		2		3		4		5	
a) Dried linen										
- Cleanness	+	-	+	-	+	-	+	-	+	-
- Stain-free										
- Non-greying/Degree of Whiteness										
- Perfect drying										
- Neutral linen odour										
- Adequate packing										
b) Ironed linen										
- Cleanness										
- Stain-free										
- Non-greying/Degree of Whiteness										
- Perfect drying										
- Perfect smoothing										
- Proper folding for cupboard storing										
- Neutral linen odour										
- Adequate packing										
c) Shaped linen items										
- Cleanness										
- Stain-free										
- Non-greying										
- Perfect drying										
- Perfect smoothing										
- Perfect finish										
- Neutral linen odour										
- Adequate packing										

_____

Signature of the auditor

Evaluation requirements in accordance with section 1-4.3
implemented ≙ +
not implemented ≙ –

1-9.4 Checklist for plant inspection in accordance with RAL-GZ 992/1

Checklist for plant inspection

Laundry plant: _____

_____

Plant inspection on: _____

by: _____

Accompanied by employee: _____

_____

	Evaluation Levels		
1. Building area	++	+	-
- Separation between "soil" and "clean" area as far as possible			
*- Type and method of separation			
- Separation in "soil" and "clean" areas in accordance with BGR 500 or RAL-GZ 992/2 with separate accesses			
- Physical barrier between "soil" and "clean" areas			
- Functional separation in "soil" and "clean" areas			
2. Personnel area			
- Person responsible for technical procedural sequences available (apart from the proprietor)			
Remarks:			
3. Soiled linen area			
a) Storage			
- Type and method of storage _____			
_____			
- Storing of soiled linen dry			
b) Sorting			
- Sorting according to washing procedure			
- Identification according to supplier or order			
c) Work stations			
- Work stations functional and clearly arranged			
- Order and cleanliness evident			
Remarks:			

_____

* Please delete as applicable!

Checklist for plant inspection in accordance with RAL-GZ 992/1

		Evaluation Levels		
		++	+	-
4.	**Wet wash area**			
a)	**Water treatment**			
-	Softening equipment available and in working order			
-	Service water O° of hardness (0 mmol/1Ca)			
-	Service water < 0.1 mg/l iron			
-	Service water < 0.03 mg/l manganese			
-	Service water < 0.05 mg/l copper			
-	Entries in the inspection record book orderly (with regard to checking water treatment)			
b)	**Laundry machines area**			
-	Tunnel washer available			
-	Washer extractor machines available			
-	Washing machines and washer extractor/ drainage machines in working order			
-	Controlling and checking equipment in working order			
-	Problem-free removal of scouring solution			
c)	**Washing procedure**			
-	Rules of procedure easily accessible			
-	Scouring solution ratio correct			
-	Loading ratio correct			
-	Detergent dosage correct			
-	Alkalinity correct			
-	Bleaching agent dosage correct			
-	Scouring solution temperature during			
	- pre-washing sequence correct			
	- clear washing sequence correct			
	- rinsing sequence correct			
-	Bleaching procedure correct			
-	Rinsing effect in order			
-	Last rinsing bath pH 6 to 7			
-	Drainage adequate			
d)	**Work stations**			
-	Work stations functional and clearly laid out			
-	Order and cleanliness evident			
	Remarks:			

Checklist for plant inspection in accordance with RAL-GZ 992/1

5. Clean linen area

	Evaluation Levels		
	++	+	-
a) Drying			
- Drying machines in working order			
- Control and checking equipment in working order			
- Temperature control correct			
- Overdrying is avoided			
- Loading ratio observed			
- Drying effect correct			
b) Ironing			
- Number and type of ironers			
- Ironer 1: _____			
- Ironer 2: _____			
- Ironer 3: _____			
_____			
- Type and method of linen preparation			
(manual or mechanical _____			
- Type and method of linen input into the ironer _____			
(manual or with an input machine) _____			
- Input machine in working order			
- Ironers in working order			
- Winding-on correct			
- Elasticity correct			
- Suction performance correct			
- Type of laying and folding (manually or by means of folding machines)			
_____			
- Folding machine in working order			
- Laying and folding (carried out by a skilled person)			
c) Processing shaped items			
- Type and method of shaped items processing (press or tunnel/dolly finisher)			
_____			
- Press/Presses in working order			
- Tunnel finisher in working order			
- Dolly finisher in working order			
d) Storage			
- Storage clearly laid out			
- Order, cleanliness and proper maintenance of the storage area and storage surfaces evident			

Checklist for plant inspection in accordance with RAL-GZ 992/1

		Evaluation Levels		
		++	+	-
e)	**Dispatching the clean linen**			
-	Cargo holds in vehicles covered			
-	Vehicle floors clean			
-	Vehicle exterior clean			
-	Drivers wear work clothes			
-	Work clothes in good condition and clean			
f)	**Work Stations**			
-	Work stations functional and clearly laid out			
-	Order and cleanliness evident			
	Remarks:			

6. Linen finishing

-	End check existing			
-	Entries in the inspection record book orderly			
a)	**Dried linen**			
-	Cleanness			
-	Stain-free			
-	Non-greying/degree of whiteness			
-	Perfect drying			
-	Neutral linen odour			
-	Adequate packing			
b)	**Ironed linen**			
-	Cleanness			
-	Stain-free			
-	Non-greying/degree of whiteness			
-	Perfect drying			
-	Perfect smoothing			
-	Folding for cupboard storage available			
-	Neutral linen odour			
-	Adequate packing			
c)	**Shaped linen items**			
-	Cleanness			
-	Stain-free			
-	Non-greying			
-	Perfect drying			
-	Perfect smoothing			
-	Perfect finish			
-	Neutral linen odour			
-	Adequate packing			

_____

Signature of the auditor

Completing the checklist for the plant inspection

Numbers 1 to 5

The actual state of the plant ascertained during the inspection is marked with a cross or an entry is made in the correct evaluation column.

The following applies to the 3 evaluation levels:

++ means Requirements implemented very well

\+ means Requirements implemented

\- means Requirements not implemented

Number 6

During the plant inspection 1 item of linen from all of the available and processed orders for dried, ironed and shaped-item linen is

a) visually checked for folding, shaped-item finishing, packing

b) visually checked with the aid of comparison fabrics for cleanness, absence of stains, greying, smoothing

c) checked for odour at a distance of 10 cm.

A total of at least 10 linen items must be checked.

The determined actual state is marked with a cross in the correct evaluation column as per number 1 to 5.

Evaluating the checklist

The plant inspection is considered positive when all the requirements of the RAL-GZ 992/1 have been (at least) fulfilled (evaluation level +) in accordance with the checklist.

1-9.5 Statement on the washing cycle check

To the testing laboratory: _____

_____

_____

Statement

on washing cycle check no. _____

In accordance with sections 1-4.2 and 1-5.2 of the RAL-GZ 992 quality of the quality mark for professional textile services, the signatories guarantee that the enclosed test pieces have been washed 25 or 50 times as indicated in the accompanying test piece list.

We are aware that incorrect data on the check sheet and/or incorrect treatment of the test pieces in accordance with the implementation regulations of the quality mark will result in the permanent revocation of the label.

Place: _____ Date: _____

Plant Proprietor or
Plant Manager:

Machine Washer:

_____

Enclosed: Accompanying washing cycle list A
Accompanying washing cycle list B
Accompanying test piece list
Test piece "25"
Test piece "50"

Accompanying washing cycle list A

To the testing laboratory: _____

_____

_____

Accompanying Washing Cycle List A

Tunnel washer and countercurrent washing equipment

Date: _____

Washing cycle check no. _____

Laundry plant _____

_____

Service Water:

Hard water _____ °dH

Softening equipment, type: _____ Capacity: _____ m^3

Washing Machine:

Model: _____

Type: _____

Subdivisions: _____

Loading: _____ kg dry linen

Type of linen/washing procedure: _____

_____

Washing procedure for tunnel washer and countercurrent washing equipment:

Total duration of washing procedure including rinsing _____ min.

Cycle time: _____ min.

Maximum temperature: _____ °C

Additives	Quantity	Dosage per minute/cycle/machine
Detergents		
Bleach		
other additives		

Hard water rinsing yes / no Hard water intake begins after _____ min.

Accompanying washing cycle list B

To the testing laboratory: _____

_____

_____

Accompanying Washing Cycle List B

Bath exchange or washer extractor machines

Date: _____

Washing cycle check no. _____

Laundry plant _____

_____

Service Water:

Hard water _____ °dH

Softening equipment, type: _____ Capacity: _____ m^3

Washing Machine:

Model: _____

Type: _____

Subdivisions: _____

Loading: _____ kg dry linen

Type of linen/washing procedure: _____

_____

Washing procedure for bath exchange or washer extractor machines:

Washing or rinsing bath	Duration min.	Temperature °C	Scouring solution ratio	Detergent name/quantity	Bleaches or other additives
1. Washing bath					
2. Washing bath					
3. Washing bath					
1. Rinsing bath					
last rinsing bath					

Number of rinsing baths _____ of which_____ x soft water, _____hard water

Accompanying Test Piece List

To the testing laboratory: _____

_____

_____

Accompanying Test Piece List

Washing cycle check no. _____

Laundry plant: _____

_____

_____

Washing machine: (model/type) _____

Type of linen/washing procedure: _____

Start of washing cycle check: _____ End: _____

Number of washes

1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**	**9.**	**10.**
11.	**12.**	**13.**	**14.**	**15.**	**16.**	**17.**	**18.**	**19.**	**20.**
21.	**22.**	**23.**	**24.**	**25.**	**26.**	**27.**	**28.**	**29**	**30.**
31.	**32.**	**33.**	**34.**	**35.**	**36.**	**37.**	**38.**	**39.**	**40.**
41.	**42.**	**43.**	**44.**	**45.**	**46.**	**47.**	**48.**	**49.**	**50.**

Date:_____ Signature: _____

1-9.6 Evaluation of the washing cycle check

To the testing laboratory: _____

_____

_____

Evaluation of the Washing Cycle Check _____

Laundry plant: _____

_____

_____

Statement on washing cycle check dated: _____

Start of washing cycle check: _____ End: _____

Type of linen/Washing procedure: _____

The standard cotton fabric test piece, in accordance with DIN 53919 part 1, was washed 25 or 50 times according to the above mentioned statement.

The determination of the individual actual values resulted from the quality and test regulations RAL-GZ 992/1 for the quality mark for professional textile services.

Tested feature	Desired value for 50 washes	Actual value after	
		25 washes	50 washes
Wet tear-strength loss	max. 30 %		
Deterioration factor	max. 1.0		
Ash content	max. 1.0 %		
W_{GG}	min. 170		
TV	max. R 1.5 max. G 2.49		
Y_{420}	min. 87		

Place, date _____

Manager of the testing centre: Auditor:

_____

Signature Signature

This analytical report may only be used if reproduced in full.

Quality and Test Regulations Professional Textile Services for Healthcare Linen RAL-GZ 992/2

2-1 Area of application

The quality and test regulations RAL-GZ 992/2, in connection with the quality and test regulations RAL-GZ 992/1, apply to the professional linen care of manufactured textile goods, consisting of healthcare linen with its special hygienic requirements, and to the appropriate services provided by these institutions.

2-2 Definitions

Sections 1-2.1 to 1-2.10 of RAL-GZ 992/1 are valid and in addition:

2.2.1 Healthcare linen

is linen which occurs as a result of examining, treating, nursing and tending patients in hospitals and in nursing and medical wards of homes; also including linen from medical laboratories and pathology departments as well as infective linen from other areas.

2.2.2 Disinfection

is the elimination of all pathogenic micro-organisms and viruses.

2.2.3 Disinfection of linen

according to this regulation is carried out by means of disinfecting washing procedures.

2.2.4 Disinfection of hands

takes place using skin friendly and listed detergents in the soiled laundry area before washing hands and/or in the clean laundry area after hands have been washed. When disinfecting the hands, the skin, finger tips and space between the fingers must all be made thoroughly wet. Wiping or washing the disinfectant off afterwards reduces its effectiveness and should be avoided. The disinfectant should be vigorously spread over the hands and rubbed in for a period of 30 seconds until it dries.

2.2.5 Abrasive disinfection

is used for disinfecting surfaces.The disinfectant is distributed over the surface with a scouring cloth, sponge, etc.

2.2.6 Spray disinfection

is used for disinfecting surfaces. The disinfectant is sprayed onto the surface.

2.2.7 Sanitizing

(from English) means decreasing the number of microorganisms to a harmless degree.

2.2.8 Contagious diseases

are diseases, in accordance with the IfSG, caused by pathogens which can be transmitted directly or indirectly to human beings.

2-3 Technical rules

Note Section 1-3 of the RAL-GZ 992/1, and additionally in the latest version:

RKI-List
"List of disinfectants and disinfection procedures, tested and approved by the Robert-Koch-Institut"

VAH/DGHM-List
List of disinfectant agents approved by the VAH (Association for Applied Hygiene), mhp-Verlag GmbH, Wiesbaden, formerly the list of the disinfectant procedures that have been tested under the "Guidelines for testing chemical disinfectant agents" and found to be effective by the German Association for Hygiene and Microbiology, list for use in laundry disinfecting

RKI Guideline (Healthcare Linen)
„Guideline hospital hygiene and infection prevention" - enclosure to the points 4.4.3 and 6.4 „Hygiene requirements of linen from the healthcare sector, the laundry and the washing procedure, and the conditions for allocating healthcare linen to commercial laundries.

RKI Recommendation on Surface Cleaning and Disinfecting
Hygiene requirements when cleaning and disinfecting surfaces - Recommendation by the Commission for Hospital Hygiene and Infection Prevention at the Robert Koch Institute

IfSG
Law for the prevention and control of diseases contagious to human beings (German Infection Protection Act).

Biological Agents Ordinance
Regulations on the implementation of EU guidelines on protecting employees from risks posed by biological agents in the workplace (Biological Agents Ordinance – BioStoffVO)

BG-Information TA 2048
Linen which poses a risk of infection for employees, assessing the risk, and guidance on the Biological Agents Ordinance for laundries

2-4 Quality Regulations

2-4.1 Laundry plant

2-4.1.1 Building area

2-4.1.1.1 Air-lock for personnel

The laundry plant must be divided into a "soil" and an "clean" laundry area with separate accesses.

An air-lock for the personnel, situated between the two areas, must have facilities for disinfecting hands and for changing and keeping protective clothing.

An air-lock is unnecessary if personnel work exclusively in either the "soil" or "clean" area.

The doors of the air-lock for the personnel must be bolted in such a way that only one door can be opened at any one time into either the "soil" or "clean" laundry area.

2-4.1.1.2 Facilities for disinfecting containers

Facilities, separated from the personnel air-lock, must be available for disinfecting soiled linen containers which may then be used for clean linen in the clean laundry area.

2-4.1.1.3 Social facilities

A changing room must be available for keeping personal clothing. It must be possible to keep food or drink in the common room or break room.

2-4.1.1.4 Sanitary facilities

There must be facilities for cleaning hands in the "soil" and "clean" laundry areas.

Exchanging air between the "soiled" and "clean" linen areas is not permitted.

Special attention must be paid to all procedures for reducing the germ content of air. Separate male and female toilets should also be available in both laundry areas.

2-4.1.1.5 Ventilation

There must be an effective separate aeration and de-aeration system for the "soil" and "clean" laundry areas. Exchanging air between the "soil" and "clean" linen areas is not permitted. Special attention must be paid to all procedures for reducing the germ content of air.

2-4.1.2 Personnel area

There must be a trained member of staff in the laundry responsible for monitoring the observance of the required hygiene procedures. The range of duties must include the submission of a detailed hygiene plan and continually informing the personnel about the purpose, necessity and extent of hygiene measures (documentation in the inspection record book).

2-4.1.3 Soiled linen area

2-4.1.3.1 Acceptance of soiled linen

Soiled healthcare linen must be accepted, stored and transported in robust, thick and closed receptacles only, e.g. cloth sacks with at least 220 G.S.M., polyethylene sacks with a sheet thickness of at least 0.08 mm, etc. Soaked linen must be accepted, transported and stored in leak-proof receptacles. Linen occurring as a result of notifiable diseases in accordance with § 6 IfSG must be accepted, transported and stored in specially marked receptacles only. Highly infective linen in accordance with sec. 3.9 washing procedures and disinfection and sec. 3.9.1 of the BGR 500 chapt. 2.6 (operating industrial laundries) must not be accepted.

2-4.1.3.2 Storage of soiled linen

Healthcare linen must be stored in a dry condition, separate from all other soiled linen.

2-4.1.3.3 Sorting the soiled linen

Soiled linen must be delivered already sorted and identified. If this is not the case, the rules of the trade association are to be observed (see BG Information TA 2048).

This does not exclude the removal of objects which do not require washing, in accordance with BGV A1 Accident Prevention Regulations - principles for prevention, third section "obligations of the insured" and fourth section, point four "personal protective equipment". However, entering the linen sacks should be limited to a minimum by using the appropriate technical devices, e.g. a metal detector.

2-4.1.3.4 Works stations

Section 1-4.1.3.4 of the RAL-GZ 992/1 must be adhered to.

2-4.1.4 Wet wash area

Sections 1-4.1.4.1 to 1-4.1.4.4 of the RAL-GZ 992/1 must be adhered to, including the following:

2-4.1.4.1 Water treatment

Only water from the water mains and/or own well with drinking water quality must be used for rinsing the linen. When using surface water and/or other water (e.g. well water), it must be filtered or chlorinated to eliminate germs. The water treatment plant must be continuously regenerated and regularly cleaned. Softened water or water from the drainage area which is fed back into the rinsing process must be checked regularly as required by the doctor responsible for hygiene, to identify and eliminate the risk of bacterial contamination. Appropriate disinfectant agents or procedures should be applied if necessary.

2-4.1.4.2 Laundry machines area

The washing machines must have separate openings for loading and unloading on the soiled and clean sides respectively, or the linen must be delivered to the washing machines by sealed mechanical or pneumatic equipment. There must be at least one washing machine which meets the requirements of section 3.1 of the BGA list of dis-infectants. Those parts and surfaces of the washing and extraction equipment which come into contact with the linen after the completion of the disinfecting process must be disinfected daily.

2-4.1.4.3 Washing procedures

The only disinfecting washing procedure for healthcare linen permitted are those in accordance with point 3.9 washing procedures and disinfecting washing procedures of the BGR 500 section 2.6 "operating laundries" and the appendix with reference to points 4.4.3 and 6.4 of the RKI guidelines.

2-4.1.4.4 Work stations

Section 1-4.1.4.4 of the RAL-GZ 992/1 must be adhered to.

2-4.1.5 Clean linen area

Sections 1-4.1.5.1 to 1-4.1.5.6 of the RAL-GZ 992/1 must be adhered to, including the following:

2-4.1.5.1 Drying

Subsequent processing of the damp linen must be carried out without interruption.

2-4.1.5.2 Ironing

When processing the clean linen for ironing, contact with the linen must be kept to a minimum.

2-4.1.5.3 Processing shaped items

When processing the clean linen for finishers, contact with the linen must be kept to a minimum.

2-4.1.5.4 Storing the clean linen

The clean linen must be almost germ-free when packed for storing.

2-4.1.5.5 Dispatching the clean linen

The linen must be transported in receptacles which protect the packing from mechanical damage. The cargo holds in the vehicle must be covered. The inner surface of the cargo holds must be easy to clean and disinfect. After transporting soiled linen and before transporting clean linen the cargo hold of the vehicle must be adequately disinfected.

2-4.2 Linen care

Section 1-4.2 of the RAL-GZ 992/1 must be adhered to.

2-4.3 Linen finishing

Section 1-4.3 of the RAL-GZ 992/1 must be adhered to.

2-4.4 Hygiene requirements

2-4.4.1 Rooms

Floors, walls, exterior surfaces of equipment and machines in the soil and clean laundry areas must allow moist cleaning and disinfection. The floors of the work rooms must be cleaned and disinfected regularly, and a scouring disinfection must be carried out at least once a week.Sanitary and common rooms must be kept in a clean condition, contributing to the hygiene awareness of the personnel. It is indispensible to ensure a minimum amount of germs in the immediate surroundings of the clean area, in the transportation containers and the motor vehicle fleet.

2-4.4.2 Equipment

Transport equipment, receptacles, racks, shelves etc. must be cleaned and disinfected daily. The following must be available in the soil and clean laundry areas, and particularly in the changing and common rooms and in the toilets: Hand washing facilities with running hot and cold water, cleaning agents not harmful to the skin, throw-away towels, as well as disinfectant dispensers for disinfecting hands.

2-4.4.3 Personnel

The laundry management must provide employees, who work in the soil laundry area, with specially marked protective clothing which must be changed at least once a week. The personnel must be instructed to disinfect hands, especially after using the toilet and to adhere to the hygiene requirements, particularly between the soil and uncontaminted laundry areas. When leaving the clean area, protective clothing must be changed and hands must be disinfected. Smoking and eating are prohibited in the soil and clean laundry areas. In addition, drinking is also prohibited in the soil area.

2-4.4.4 Clean linen

The linen processed must be free of any microbiological contamination. Linen is considered almost germ-free when at least 9 out of 10 impressions, each of which must be at least 20 cm^2, taken from different kinds of linen from various places, show no more than 2 germ colonies on an area of 10 cm^2 after incubation for 48 +/- 2 hours in a culture medium at a temperature of 36°C +/- 1°C. A third of the samples are to be taken from stitched seams.

2-5 Test regulations

2-5.1 Laundry plant

Section 1-5.1 of the RAL-GZ 992/1 must be adhered to, including completing the test list in accordance with section 2-9.2.

2-5.2 Linen care

Section 1-5.2 of the RAL-GZ 992/1 must be adhered to.

2-5.3 Linen finishing

Section 1-5.3 of the RAL-GZ 992/1 must be adhered to.

2-5.4 Hygiene requirements

Representatives of the testing laboratory check that the requirements are being implemented by means of plant inspections in accordance with section 2-6.1, including completing the checklist in accordance with section 2-9.2.

Analysis of samples of untreated water, scouring solution and rinsing water.

Bacteriological check of the disinfection and washing process by means of soiled germ carriers in accordance with sections 4.4.3 and 6.4 of the RKI guideline for healthcare linen. Impressions are taken from the immediate surroundings of the clean area, from the transportation containers and from the laundry´s fleet of vehicles.

Healthcare Linen RAL-GZ 992/2

2-6 Monitoring

2-6.1 First test

A suitable testing and hygiene institute is commissioned by the quality mark association for the first test and for external monitoring tests. The first test, as a prerequisite for enlarging the quality mark in accordance with section 2-7, requires that the quality mark was issued in accordance with section 1-7.1 for at least three months in order to be able to ensure reliable control of the washing requirements in accordance with RAL GZ-992/1. The first test includes verification that the quality and test regulations RAL-GZ 992/2 have been implemented.

2-6.2 In-house tests

Section 1-6.2 of RAL-GZ 992/1 must be adhered to.

2-6.3 Monitoring tests

Monitoring tests are carried out as in section 1-7.3 of the RAL-GZ 992/1 and include verification that the quality and test regulations RAL-GZ 992/2 have been implemented.

2-7 Identification

2-7.1 Professional care of healthcare linen which complies with the quality and test regulations RAL-GZ 992/2 can be identified by the quality mark and caption depicted below if the address of the laundry plant is stated in full and there is a certificate for the period of use issued by the quality mark association in accordance with section 2-7.4.

2-7.2 Section 1-7.2 of the RAL-GZ 992/1 must be adhered to.

2-7.3 Section 1-7.3 of the RAL-GZ 992/1 must be adhered to.

2-7.4 An enlarged quality mark, including the caption RAL-GZ 992/2 is issued for the period of one year or extended at the request of the quality mark user.

During its period of issue this enlarged label may be used as a hygiene certificate (see section 2-9.1) in advertising, as an enclosure with offers and when negotiating orders. An advertisement with only the words "Hygiene Certificate" on writing papers, printed matter, vehicles or with other advertising material, etc. is not permitted.

2-8 Amendments

Any amendments to these quality and test regulations, even editorial changes, require prior written approval from RAL. They come into force when, after a reasonable transitional period, users of the quality mark are notified by the Board of the Certification Association.

2-9 Appendix

2-9.1 Specimen hygiene certificate

HYGIENE CERTIFICATE

Healthcare Linen

RAL Quality Mark RAL-GZ 992/2

As a result of the microbiological and hygiene tests specified by the RAL German Institute for Quality Assurance and Certification and executed by Hohenstein Laboratories, the RAL Hygiene Certificate "Healthcare Linen" RAL-GZ 992/2 is being awarded to the textile services company

Mustermann
Wäscherei
Musterstraße 10
12345 Musterstadt

as evidence that the requirements according to RAL-GZ 992/2:2011 have been fulfilled as well as the requirements for the processing of textiles from the healthcare system (hospitals, rehabilitation clinics, nursing homes, medical practices including outpatient surgery and comparable medical treatment and care centres) which are specified in the German Law on the Prevention and Control of Infectious Diseases.

The RAL Hygiene Certificate is valid for the time period stated below, provided that no deficiencies in quality assurance occur within this period. The certificate may be used during its award period in advertising, as an appendix to bids and in order negotiations etc. Advertising only displaying the words "RAL Hygiene Certificate" on envelopes, vehicles and other similar advertising materials is not permitted.

Valid from 1 January 2018 to 31 December 2018

Karl-Rainer Dauer · The President

Dr. Timo Hammer · The Managing Director

GÜTEGEMEINSCHAFT SACHGEMÄSSE WÄSCHEPFLEGE E.V. · 74357 BÖNNIGHEIM · GERMANY

2-9.2 Checklist for plant inspection in accordance with RAL-GZ 992/2

Checklist for Plant Inspection

Laundry plant: _____

_____

_____

Plant inspection on: _____ Time: _____

by: _____

Accompanied by employee: _____

Position: _____

	Evaluation Levels		
	++	+	-
1. Building area			
a) Air-lock for personnel			
- Physical barrier between "soil" and "clean" laundry areas with separate accesses			
* - Personnel work exclusively in either the soil or clean area (air-lock unnecessary)			
or			
*- Air-lock for personnel available			
- The doors of the air-lock are bolted in such a way that only one door can be opened at any one time			
- Air-locks for personnel contain facilities for disinfecting hands			
- for changing protective clothing			
- for keeping protective clothing			
b) Facilities for disinfecting containers			
- Facilities for disinfecting containers existing			
c) **Social facilities**			
- Changing room existing			
- Keeping personal clothes in the changing room possible			
- Changing room clean			
- Common room or break room available			
- Keeping food and drink in the common room or break room possible			
- Common or break room clean			

* Please delete as applicable!

Checklist for the plant inspection in accordance with RAL-GZ 992/2

	Evaluation Levels		
	++	+	-
d) Sanitary facilities			
- Facilities available for cleaning hands in the soil and clean areas			
- Separate male and female toilets available in the soil and clean areas			
e) Aeration			
- Separate aeration for soil and clean laundry areas			
- Separate de-aeration for soil and clean laundry areas			
- Exchange of air between soil and clean laundry areas not possible			
- Aeration of the clean area with almost germ-free air possible			

Remarks:

2. Personnel area

- **Person responsible** for hygiene procedures			
Name: _____			
- **Hygiene plans** available			
- Hygiene plans detailed and complete			
- **Continually** instructing the personnel on hygiene procedures according to the inspection record book			
- Instructions in the last 3 months			

Remarks:

3. Soiled linen area

a) Accepting healthcare linen			
- in thick closed receptacles			
*- Type and method of acceptance storage and transport of the soiled linen _____ _____			
- Cloth sacks ≥ 220 G.S.M.			
- Polyethylene sacks with a sheet thickness ≥ 0.08 mm			
- In leak-proof receptacles for soaked linen			
- In specially marked receptacles if § 6 IfSG is applicable			
- Highly infective linen not accepted in accordance with § 29 par. 1 of the rules for the prevention of accidents in laundries			

_____

* Please delete as applicable!

Checklist for the plant inspection in accordance with RAL-GZ 992/2

	Evaluation Levels		
	++	+	-
b) Storing healthcare linen			
- Separate from other soiled linen			
- Storing healthcare linen dry			
- Storing sacks _____			
e.g. in containers			
in trolleys			
on shelves			
on the floor			
c) Sorting healthcare linen			
- Sorting not applicable			
- Identification not applicable			
- Entering linen sacks only with technical devices			
- Type of technical devices (e.g. metal detector) _____			
d) Work stations			
- Work Stations functional and clearly laid out			
- Order and cleanliness evident			
Remarks:			

4. Wet wash area

a) Sections 4 a - 4 d of the checklist for the plant inspection implemented in accordance with RAL-GZ 992/1			
b) Water treatment			
- Plant is continuously regenerated			
- How is it regenerated? (e.g. automatically) _____			
- How often is it regenerated? (e.g. daily) _____			
- Plant is regularly cleaned?			
- How is it cleaned? _____			
- How often is it cleaned? _____			
- Is Water used exclusively from the water mains and/or from own well with drinking water quality to rinse linen.			
- Source of water (well or water mains) _____			

Checklist for the plant inspection in accordance with RAL-GZ 992/2

	Evaluation Levels		
	++	+	-
- When using surface water and/or water (eg. well water) is bacteria eliminated			
* - by filtration or			
* - by chlorination			
- Is reclaimed water from the washer extractor and drainage areas only used for pre-washing			
c) Laundry machines area			
* - Washing machines have separate openings for loading and unloading on the soil and clean sides respectively			
or			
Linen is delivered to the washing machines			
* - by sealed mechanical equipment			
or			
* - by pneumatic equipment			
- A washing machine is available to disinfect infective linen in accordance with § 18 IfSG			
- The parts of the washing/drainage equipment which come into contact with linen after the end of the disinfection process are disinfected daily.			
d) Washing procedure			
- Only disinfection and washing procedures in accordance with the German rules for the prevention of accidents in laundries or the appendix to points 4.4.3 and 6.4 of the RKI guide-lines are used for healthcare linen.			
- Washing procedures are implemented in washing machines			
* - by thermal disinfection of linen			
Scouring solution ratio: _____			
Type of detergent: _____			
- Amount of detergent g/l: _____			
Disinfection temperature in °C: _____			
- Duration of disinfection process in min.: _____			
* - by chemo-thermal disinfection of linen			
Scouring solution ratio: _____			
Type of detergent: _____			
- Amount of detergent g/l: _____			
Type of disinfectant: _____			
- Amount of disinfectant: _____			
Disinfection temperature in °C: _____			
- Duration of disinfection process in min.: _____			
*- by hot-rinsing rinsed linen above 60°C			

* Please delete as applicable!

Checklist for the plant inspection in accordance with RAL-GZ 992/2

	Evaluation Levels		
	++	+	-
* - by rinse disinfection			
Type of Disinfectant: _____			
- Amount of disinfectant g/l _____			
- Duration of disinfection process in min.: _____			
- Washing machine for linen in accordance with § 18 IfSG			
* - by thermal disinfection of linen			
Scouring solution ratio: _____			
Type of detergent: _____			
- Amount of detergent g/l: _____			
Disinfection temperature in °C: _____			
- Duration of disinfection process in min.: _____			
* - by chemo-thermal disinfection of linen			
Scouring solution ratio: _____			
Type of detergent: _____			
- Amount of detergent g/l: _____			
Type of disinfectant _____			
- Amount of disinfectant g/l _____			
Temperature of disinfection process in°C: _____			
- Duration of disinfection process in min.: _____			
* - by chemical disinfection of linen _____			
Type of Disinfectant: _____			
Dilution used in % _____			
Reaction time in hours: _____			
e) Work stations			
- Work stations functional and clearly laid out			
- Order and cleanliness evident			
Remarks:			

5. Clean linen area

a) Sections 5a) - 5f) of the checklist for the plant inspection in accordance with RAL-GZ 992/1 implemented			
b) Drying:			
- Further processing of damp linen is carried out without interruption			
c) Ironing:			
- When processing clean linen contact with hands clothing and other surfaces is kept to a minimum			

_____

Please delete as applicable!

Checklist for the plant inspection in accordance with RAL-GZ 992/2

	Evaluation Levels		
	++	+	-
d) Processing shaped items			
- When processing clean linen contact with hands, clothing and other surfaces is kept to a minimum			
e) Storage			
- Clean linen is packed almost germ-free for storage			
- Type and method of packing _____ _____ _____ _____			
f) Dispatch			
- Design of cargo holds in the transport vehicles (separate cargo holds for soiled linen and clean linen or no separate cargo holds) _____			
- Packaging is protected from mechanical damage during transportation			
- Transport vehicles are covered			
- Inner surfaces of the cargo hold are easy to clean and disinfect			

6. Linen completion

- **Section 6** of the checklist for the plant inspection in accordance with RAL-GZ 992/1 implemented			

7. Hygiene requirements

a) Work areas			
- Work area floors are regularly disinfected and cleaned			
- How often are the work areas cleaned? _____			
- The floors are scoured with disinfectant at least once a week			
- Walls are disinfected at least once a week			
- Washrooms and common rooms in clean condition			

Checklist for the plant inspection in accordance with RAL-GZ 992/2

	Evaluation Levels		
	++	+	-
b) Equipment			
- The cargo holds in the vehicles are			
- always disinfected after transporting soiled linen			
- always disinfected before transporting clean linen			
- Transportation facilities, receptacles, racks, shelves which come into contact with soiled linen are disinfected daily			
- Washing equipment components/surfaces which come into contact with linen in the wet wash area are disinfected daily			
- Drainge equipment which comes into contact with linen in the clean linen area is disinfected daily			
- Exterior surfaces of equipment and machines are disinfected at least once a week			
c) Personnel			
- Employees in the soil area are provided with protective clothing			
- Protective clothing is changed at least once a week			
- When leaving the soil area, protective clothing is changed			
- and hands are disinfected			
- The rule prohibiting eating and smoking in the clean area is obeyed			
- The rule prohibiting eating, drinking and smoking in the soil area is obeyed			
- Throw-away towels and disinfectant dispensers available for hand washing			
in the changing rooms			
in the break-rooms			
in the soiled linen area			
in the wet wash area			
in the clean linen area			
in the dispatch office			
in the toilets			
d) Clean linen			
- It must be free of pathogens and almost germ-free			

Remarks:

_____

Signature of the auditor

Completing the checklist

The actual condition ascertained is crossed or an entry is made in the appropriate evaluation column (otherwise analogous to RAL-GZ 992/1).

Evaluating the checklist

- The plant inspection is considered positive when all the requirements (at least) are implemented (evaluation level +).

Quality and Test Regulations Professional Textile Services for Food Processing Businesses · RAL-GZ 992/3

3-1 Area of application

The quality and test regulations RAL-GZ 992/3 apply to the professional care of laundry of manufactured textile goods from foodstuff companies laid down by industrial laundries.

3-2 Definitions

3-2.1 Manufactured textile goods

are products in accordance with DIN 60 000 which use textile fine trash, semi-manufactured and ready made articles which are manufactured, made up or otherwise prepared in a market-ready condition to be passed on to the processor, trade or the end-user.

3-2.2 Industrial care for linen

is given by laundries as opposed to private households.

3-2.3 Food processing businesses

Institutions in which foodstuffs are produced, treated or marketed, if applicable including the Foodstuffs Act.

3-2.4 Linen from food processing businesses

Manufactured textile goods which are used during the production, treatment and marketing of foodstuffs.

3-2.5 Rental linen

is linen which is not the property of the person using it.

3-2.6 Laundry machines

comprises machines used in the laundry for laundering, drainage, shaking, drying and finishing manufactured textile goods.

3-2.7 A washing cycle

according to this regulation comprises an entire washing programme according to the appropriate procedural rules.

3-2.8 Test pieces

according to this regulation are sample strips made of standard cotton fabric in accordance with DIN 53 919 part 1 which are subjected to normal operational conditions in laundering for washing cycle tests.

3-2.9 The soiled linen area

comprises the acceptance, sorting, storage, labelling and transport as far as the washing machine.

3-2.10 The clean linen area

comprises the washing, drying, ironing, finishing and storage of the clean laundry, including all related activities, control systems and tests

3-2.11 Disinfection

means the elimination or continual reduction of the number of causative agents to eliminate all risk of infection.

3-2.12 Disinfection of laundry

occurs in accordance with this regulation by disinfecting washing processes.

3-2.13 Disinfection of the hands

takes place using listed detergents in the soiled laundry area before washing hands and/or in the clean laundry area after hands have been washed. When disinfecting the hands, the skin, finger tips and space between the fingers must all be made thoroughly wet. Wiping or washing the disinfectant off afterwards reduces its effectiveness and should be avoided. The disinfectant should be vigorously spread over the hands and rubbed in for a period of 30 seconds until it dries.

3-2.14 Disinfection by abrasion

is a surface disinfection whereby the disinfectant is distributed on the surface using a scouring cloth, sponge or similar.

3-2.15 Spray disinfection

is a surface disinfection whereby the disinfectant is sprayed onto the surface to be disinfected.

3-3 Other applicable technical regulations and literature

The following Technical Regulations in the most recent version

apply to the models which refer to the area of application of these quality and test regulations. They are as follows:

DIN 5033-4	Colour measurement, spectrophotometric method
DIN 5033-6	Colour measurement, three area method
DIN 10514	Food hygiene - hygiene training
DIN 10524	Food hygiene "Working clothes in food processing businesses"
DIN 11900	Laundering and chemical cleaning machines; general definitions
DIN 11901	Laundering and chemical cleaning machines;measuring quantity, symbols, units, calculation formulae
DIN 11902	Laundering and chemical cleaning machines; testing the operational capacity of the machine, effect of treatment and consumption of operational materials, test conditions and procedures
DIN EN 14065	Textiles – Textiles processed in Industrial Laundries – Biocontamination Control System
DIN 38404-5	German standard method for examination of water, waste water and sediment - physical and physical-chemical parameters (group C) - part 5: determination of the pH-value (C5)
DIN 38404-10	German standard method for examination of water, waste water and sediment - physical and physical-chemical parameters (group C) - part 10: Calcite saturation of water (C10)
DIN EN 12 829	Surface active agents - production of water with standardized calcium and magnesium hardness
DIN EN ISO 13934-1	Textiles - Tensile properties of fabrics - Part 1: Determination of maximum force and elongation at maximum force using the strip method
DIN 53919-1	Standard cotton fabric for assessing the washing procedure;requirements
DIN 53919-2	Testing the washing procedure with test strips
DIN EN ISO 6330	Textiles - Domestic washing and drying procedures for textile testing
DIN 54270-2	Testing textiles; determination of intrinsic viscosity of cellulose; Cuen method
DIN 54270-3	Testing textiles; determination of intrinsic viscosity of cellulose; $EWNN_{mod(NACl)}$ method
DIN 60000	Textiles, basic definitions
DGUV	Accident prevention regulations – principles for prevention (previously VBG 1)
DGUV 203-084	Operating regulations for laundries (previously BGR 500)
DGUV	Accident prevention regulations – health service (previously BGR 500)
LFBG	Food, Feed and Commodities Code
LMHV	German Regulation about hygiene requirements during manufacturing, treatment and marketing of food
Company publication	CIBA-Geigy-Brochure No. 9334 D 1980 - Methods and possible applications for the colorimetric whiteness evaluation of textiles – R. GRIESSER

Biological Agents Ordinance

Regulations on the implementation of EU guidelines on protecting employees from risks posed by biological agents in the workplace (Biological Agents Ordinance – BioStoffVO)

VAH/DGHM-List

List of disinfectant agents approved by the VAH (Association for Applied Hygiene), mhp-Verlag GmbH, Wiesbaden, formerly the list of the disinfectant procedures that have been tested under the "Guidelines for testing chemical disinfectant agents" and found to be effective by the German Association for Hygiene and Microbiology, list for use in laundry disinfecting

RKI-List

"List of disinfectants and disinfection procedures, tested and approved by the Robert-Koch-Institut"

RKI Recommendation on Surface Cleaning and Disinfecting

Hygiene requirements when cleaning and disinfecting surfaces - Recommendation by the Commission for Hospital Hygiene and Infection Prevention at the Robert Koch Institute

Regulation on food hygiene and as amendment of the regulation for means of transport for food of 5 August 1997, Bundesgesetzblatt 1997, part 1 No. 56 of 8 August 1997 latest version

EU Guideline 93/43/EWG - Food hygiene of 14 June 1993

3-4 Quality regulations

3-4.1 Laundry plant

3-4.1.1 Building area

The soiled laundry area is to be separated from the normal area with suitable structural or air-conditioning measures.

3-4.1.2 Personnel are

The laundry must always have a minimum of one qualified and

relevantly experienced person responsible for the supervision of and compliance with all technical procedures. One person with a relevant qualification should be in charge of hygiene for linen from foodstuff companies. Personnel charged with the laundry care has to be trained regularly. Training has to be carried out and recorded according to DIN 10514.

3-4.1.3 Soiled linen area

3-4.1.3.1 Delivery of soiled linen

The linen should be delivered in suitable transport containers such as transport bags, containers etc.

3-4.1.3.2 Storage of soiled linen in the processing linen
The soiled linen should be stored dry until laundering. Storage time should not exceed 72 hours in normal circumstances.

3-4.1.3.3 Sorting

The soiled linen is sorted depending on the wash- ing process to be used.

3-4.1.3.4 Work places

The work places in the soiled laundry area should be organised suitably and clearly, should enable rational operation and should display order and cleanliness.

3-4.1.4 Clean linen area

3-4.1.4.1 Preparation of fresh water

If no natural water is available, water preparation should be carried out in a plant which provides water with a hardness of 0 to 3 mmol/lCa (0° German hardness to 3° German hardness), less than 0.1 mg/l of iron, less than 0.03 mg/l of manganese and less than 0.05 mg/l of copper; the daily monitoring of the water preparation plant in respect of the water equivalents is to be recorded in the inspection record book. Recontamination of the linen, especially by rinsing water, must be avoided.

3-4.1.4.2 Washing machines

The washing machines used together with the washer extractor/drainage machines including their controlling and check apparatus must function efficiently. It must be possible to remove washing liquor easily. It must be possible to disinfect all parts which come into contact with the linen and liquor.

3-4.1.4.3 Washing procedures

Disinfecting washing procedures must be used. Procedural rules must be easily accessible in the wet washing area. Information for the applicable washing processes must be given in the procedural rules: liquor ratio, loading ratio, detergent dosage, alkalinity, decolorant dosage, liquor temperature for pre-washes, clearing and rinsing; bleaching cycle.

3-4.1.4.4 Drainage

Presses/centrifuges must be able to be cleaned and disinfected. Further processing of the damp linen until dry should in normal circumstances be concluded within 3 hours.

3-4.1.4.5 Work places

The work places in the clean laundry area should be arranged suitably and clearly, should enable continual operation and should display order and cleanliness.

3-4.1.4.6 Drying

The drying machines used including their controlling and check apparatus must function efficiently.

3-4.1.4.7 Ironing

The ironers must operate perfectly, folding and creasing the ironed linen must be carried out properly.

3-4.1.4.8 Processing of shaped items

The presses, finishing cabinets and mannequins used must operate perfectly. During preparation of clean washing for ironing, contact with the linen must be limited to the minimum necessary.

3-4.1.4.9 Storage

Storage of the clean linen must be well arranged. Storage rooms and storage surfaces must indicate a high level of care as well as order and cleanliness. Suitable measures should be taken to protect against recontamination.

3-4.1.4.10 Dispatch of clean linen
Means of transport used must have a closed structure. Internal surfaces of the cargo hold must be able to be easily cleaned and disinfected. Care must be taken to avoid contamination of the clean linen by suitable measures.

3-4.2 Care of laundry

Every user of a quality mark receives relevant test pieces from the test institute according to section 3-6.1. These are made of standard cotton fabric of 100 cm in length and 80 cm in width in accordance with DIN 53919 part 1 corresponding to the number of washing procedure tests to be carried out annually as shown in table 1, section 3-9.1.

Each test piece should be washed without a net, unless the company predominantly washes with nets. If commercial laundry or official or large orders are being processed, test pieces must also be used.

The test piece must pass through the entire washing procedure, including all washing and rinsing procedures. It must be transmitted from washing cycle to washing cycle and line dried over night. Each washing cycle is marked on the list accompanying the test piece, whereby a second representative of the quality mark user is to be consulted as a control.

After 25 washing cycles have been completed, it should be noted that a corresponding smoothing of the test piece occurs; it is then sent to the test institute together with the explanation of the washing cycle control and the completed accompanying list concerning both the washing process and test piece (see section 1-9.5 of RAL-GZ 992/1).

While each washing cycle control is being carried out with test pieces, the washing procedure must not be altered (e.g.

hot washes for whites divided according to type, hot washes for terry linen, low temperature washes for coloureds, work and protective clothing). If several types of washing machine or washing procedures are in use, the annual wash cycle tests should be distributed proportionally throughout the individual machines and procedures. Commercial laundry, rental linen and official and large orders should also be taken into account. For the professional care of laundry, features to be assessed undergo testing on the test pieces in the test centre according to section 3-6.1.

3-4.2.1 Degree of whiteness (W_{GG})

The degree of whiteness represents a measure for impression of how the human eye perceives the whiteness of linen. It must not fall short of the value 170 after 25 washing cycles. Figures only given as whole numbers.

Tint value	Colour deviation	Coloristic significance
> -5.5	RR	coloured towards red-violet
- 5.5 to - 4.51 - 4.5 to - 3.51 - 3.5 to - 2.51 - 2.5 to - 1.51 - 1.5 to - 0.51	R5 R4 R3 R2 R1	very strong strong distinct slight trace } red-violet deviation from white standard
- 0.5 to - 0.49	N	negligible colour deviation from neutral white of the white standard
0.5 to 1.49 1.5 to 2.49 2.5 to 3.49 3.5 to 4.49 4.5 to 5.49	G1 G2 G3 G4 G5	trace slight distinct strong very strong } blue-green deviation from white standard
> 5.5	GG	coloured towards blue-green

3-4.2.2 Tint value (TV)

The tint value describes the colour deviation from neutral white given by the white standard. The TV must not exceed R 1.5 in the red-violet direction or G 2.49 in the blue-green direction after 25 washing cycles. Figures given to two decimal places. The relationship between colour deviation, TV and the coloristic reference can be seen from the table.
Table 1: Correlations between the tint value, colour deviation and coloristic reference compared with the degree of whiteness standard.

3-4.2.3 Basic whiteness value (Y_{420})

The basic whiteness value indicates the brightness of whiteness after the UV portion of the light source has been extracted by filtering and the brightening effect on the clean linen has been extinguished. It must not fall below the value 87 after 25 washing cycles. Figures only given as whole numbers.

3-4.2.4 Fabric incrustation

The inorganic fabric incrustation, defined as ash must not exceed 1.0 % after 25 washing cycles. Figures given to one decimal place according to the rounding rules taking the test tolerance of 5 % into account.

3-4.2.5 Reduction in tensile strength (guide values)

The relative strength reduction is calculated from the values for the maximum tensile force (wet) of the test piece in the pre-wash condition (3 washes in accordance with DIN 53 919 part 1, paragraph 5.2.2) and after 25 washing cycles (in accordance with section 3-4.2). This reduction in wet tear strength must not exceed 30 % after 25 washing cycles. Figures given to one decimal place according to the rounding rules taking into account the test tolerance of ± 3 % absolute, e.g. 30 % ± 13 %.

3-4.2.6 Chemical fibre deterioration (guide values)

The chemical fibre deterioration, identified as the deterioration factor (s), must not exceed 1.0 after 25 washing cycles.
Figures given to one decimal place in accordance with the rounding rules.

3-4.3 Distribution of finished linen

Cleanliness, a good degree of whiteness, dryness even in problem areas, a neutral smell and sufficient protection against recontamination is required for the clean linen which is to be delivered.
In addition, ironed linen must display optimal smoothness and be folded ready to be placed in a cupboard. Article-specific finish is required for shaped items.

3-4.4 Hygiene requirements

3-4.4.1 Rooms

Floors, and if possible also walls at working height, exterior surfaces of installations and machines must permit damp cleaning and disinfection. The floors of the work rooms are to be cleaned at least once per week and disinfected when necessary. Sanitary and communal rooms must be kept in a clean state which encourages the staff to be aware of hygiene.

3-4.4.2 Installations

Transport devices, containers, depositories, shelves etc. coming into contact with soiled linen must be regularly cleaned using disinfectant. Hand washing facilities and devices to disinfect the hands must be provided with a disinfectant-dispenser.

3-4.4.3 Personnel

People working in the clean laundry area must be provided with suitable protective clothing which should be changed daily if necessary.
After working in the soiled laundry area and before working in

the clean laundry area, hands must be disinfected. Staff must be instructed to disinfect their hands after going to the toilet in order to fulfil the hygiene requirements.
Eating and smoking are prohibited in the soiled and clean laundry areas, and drinking is also prohibited in the soiled laundry area.

3-4.4.4 Hygiene plans

Appropriate hygiene plans are to be drawn up for all areas where hygiene is important.

3-4.4.5 Clean linen

This linen must be free from pathogenic agents and low in germs. Checks on the clean washing must take place after completion by drying, ironing or finishing.
Linen is low in germs if at least 9 out of 10 samples show no more than 5 germ colonies per 10 cm^2 with bacteriological checks by means of soiled germ carriers on surfaces of at least 20 cm^2 in various places of different types of linen after incubation on a culture medium according to DIN 10113-3:07.1997. One third of the tests must be taken from the seam.

3-5 Test regulations

3-5.1 Laundries

Fulfilment of requirements is controlled by on-site inspections - at least once a year, by the representative from the test centre in accordance with section 3-6.1 by filling out the test list and by evaluating the inspection record book. The inspection record book must be filled in by an employee of the company (not by the owner or laundry operator).

3-5.2 Care of laundry

Fulfilment of requirements is especially controlled by washing cycle tests with test pieces in accordance with section 3-4.2 through evaluation by the test centre following section 3-6.1. The test pieces allow the determination of the following: W_{GG}, TV, Y_{420}, fabric incrustation, strength reduction and chemical fibre deterioration after 25 washes.

3-5.2.1 Degree of whiteness (W_{GG})

Determination with the spectrometric method in accordance with DIN 5033 part 4 or with the three area method in accordance with DIN 5033 part 6 under xenon lamp lighting and sufficient approximation to the standard illuminant D_{65}. Measurements are taken in duplicate using OBA-free filter paper as a base (e.g. Schleicher + Schüll No. 604) in opaque layer thickness and for adaptation to the given measuring device requirements with at least 4 levels of the textiles standard whiteness scale.
The measuring instruments are calibrated against the white standard supplied with the instrument, or against an opal glass or barium sulphate standard. Calculation of the standard colour value is to be carried out for the D_{65} illuminant and the 10° standard colormetric observer. After the formulae parameters have been determined, the WG value is calculated using Ganz's formula for the degree of whiteness:

$$W = (D \cdot Y) + (P \cdot x) + (Q \cdot y) + C$$

Y, x and y are the colorimetric measurements to be used for brightness and the standard colour value sections. D, P, Q and C are the formulae parameters whose size determine the "sense of whiteness".

(Literature: CIBA-Geigy-Brochure No. 9334 D 1980 - Methods and possible applications for the colorimetric whiteness evaluation of textiles – R. GRIESSER)

3-5.2.2 Tint value (TV)

Determination and evaluation as per section 3-5.2.1 and 1-5.2.2 of the RAL-GZ 992/1

3-5.2.3 Basic whiteness value (Y_{420})

Determination and evaluation as per section 3-5.2.1 and 1-5.2.3 of the RAL-GZ 992/1

3-5.2.4 Inorganic fabric incrustation

Determination in accordance with DIN 53919, part 2, section 8.4.1, in the muffle furnace for one hour at 800 °C as ash.

3-5.2.5 Reduction in tensile strength

Determination in accordance with DIN 53857, wet test. For reduction in closeness of below 12 %, only "below 12 %" will be shown; if it is higher than 12 %, the exact value ascertained will be given.

3-5.2.6 Deterioration Factor (s)

3-5.2.6.1 The deterioration factor will be calculated from the intrinsic viscosity figures (GVZ) in the initial state and after 25 washes in accordance with DIN 53919 part 2. (see RAL-GZ 992/1). The intrinsic viscosity in iron (III) tartaric acid - sodium complex is determined in accordance with DIN 54270 part 3, from the average of 2 tests on each.

3-5.2.6.2 Alternatively, the degree of deterioration (s) can be calculated from the average degree of polymerisation (degree of DP) in the initial state and after 25 washes using Eisenhut's formula, see RAL-GZ 992/1. The degree of DP is determined with cuoxam using the improved Fa-Chem-Fa-2 method. Production using solution in ammonia (25%).

3-5.3 Completion of linen

3.5.3.1 In accordance with section 3-6.2, random samples should be taken of 5 test samples of dry, ironed and shaped linen as an in-house test to check

a) visually for folding, finish of shaped parts, to check the packaging visually to ensure that it is clean, that there are no stains, greying and

b) smoothing sensory for smell.

The results should be recorded in a inspection record book, entering the supplier, order no. etc.. The frequency of the sample tests to be carried out and entered in the inspection record book is to be defined for each company by the appropriate inspector.

3.5.3.2 The findings from the tests a, b and c in accordance with section 3-5.3.1 for at least 10 test samples are recorded in the test list.

3-5.4 Hygiene requirements

The representative of the test institute checks fulfilment of the requirements during the inspection in accordance with section 3-6.1 by completing the test list. Bacteriological testing of the disinfecting washing process using soiled germ carriers, checks on the water, wet wash and technical installations. Bacteriological checks in the clean environment.

3-6 Monitoring

3-6.1 Initial test

The German Certification Association for Professional Textile Services shall commission an appropriate test institute for the initial and external monitoring tests.
The initial test as a prerequisite for granting of the quality mark in accordance with section 3-7.1 includes evidence that the quality and test regulations RAL-GZ 992/3 have been fulfilled.

3-6.2 In-house tests

Every quality mark user must carry out the necessary in-house tests to ensure compliance with the quality regulations, must record these, and must keep these records for at least 2 years.

3-6.3 External monitoring tests

External monitoring tests are carried out by on-site inspections in accordance with section 3-5.1 and 3-5.3, at least once a year, and by checks on washing cycles corresponding to section 3-5.2. The checks on washing cycles are graduated depending on the laundry's operational capacity and include evidence of sections 3-4.2 to 3-4.2.6.

3-7 Identification

3-7.1 Professional textile services for linen from food processing businesses which fulfills the quality and test regulations RAL-GZ 992/3 can be labelled using the quality mark depicted below with additional comments if at the same time the laundry is named with its full address and has proof from the German Certification Association corresponding to section 3-7.4 for the duration of application.

Linen from food processing businesses RAL-GZ 992/3

3-7.2 Only those statutory documents and trade mark documents from the Gütegemeinschaft sachgemäße Wäschepflege e.V. (German Certification Association for Professional Textile Services) are valid for the application of the quality mark.

3-7.3 The labelling must be complete and clearly legible.

3-7.4 The Certification Association will record fulfilment of the requirements for RAL-GZ 992/3 once a year.

3-8 Amendments

Any amendments to these quality and test regulations, even editorial changes, require prior written approval from RAL. They come into force when, after a reasonable transitional period, users of the quality mark are notified by the Board of the Certification Association.

3-9 Appendix

3-9.1 Number of washing cycle checks

Tons of processed linen per day	Number of annual washing cycle checks
up to 1	2
up to 2	3
up to 3	4
up to 4	5
up to 5	6
up to 7	7
up to 20	7
≥ 20	10

The number of annual tests to be carried out by the quality mark holder is determined on the basis of the calculated daily tonnages. The company is assigned to the relevant category by the test centre, which uses the usage data recorded by the certificate holder in the inspection record book to verify the calculated daily tonnages during its annual inspection. The number of washing cycle tests is based on this classification.

Quality and Test Regulations Professional Textile Services Clothing of Care Home Residents · RAL-GZ 992/4

4-1 Area of application

The quality and test regulations RAL-GZ 992/4 apply to the professional textile services for clothing of care home residents.

4-2 Definitions

4-2.1 Manufactured textile goods

are products in accordance with DIN 60 000 which use textile fine trash, semi-manufactured and ready made articles which are manufactured, made up or otherwise prepared in a market-ready condition to be passed on to the processor, trade or the end-user.

4-2.2 Industrial care for linen

is given by laundries as opposed to private households.

4-2.3 Care homes

The term "care home" is used in the RAL-GZ 992/4 to refer to an institution within the meaning of the Residential Home Act and also to comparable care facilities and retirement homes within the meaning of the Protection Against Infection Act.

4-2.4 Institutions within the meaning of the Residential Home Act

Within the meaning of the Residential Home Act, Section I Area of application, residential homes are institutions which serve to house older people or adults who are disabled or in need of nursing care, providing them with or offering accommodation, meals and nursing care, institutions which continue to exist regardless of changing numbers of residents, and which charge a fee for their services.

4-2.5 Clothing belonging to the residents of care homes

Residents' clothing within the meaning of this RAL-GZ 992/4 refers to the outerwear and underwear belonging to people living in care homes.

4-2.6 Rental linen

is linen which is not the property of the person using it.

4-2.7 Laundry machines

comprise machines used in the laundry for laundering, drainage, shaking, drying and finishing manufactured textile goods.

4-2.8 A washing cycle

according to this regulation comprises an entire washing programme according to the appropriate procedural rules.

4-2.9 Test pieces

according to this regulation are sample strips made of standard cotton fabric in accordance with DIN 53 919 part 1 which are subjected to normal operational conditions in laundering for washing cycle tests.

4-2.10 Woollen test fabrics

according to this regulation are sections of fabric as defined by DIN EN 60456 which are used for carrying out a washing cycle test of a wool wash in normal operating conditions.

4-2.11 Soiled linen area

comprises the acceptance, sorting, storage, labelling and transport as far as the washing machine.

4-2.12 Clean linen area

comprises the washing, drying, mangling, finishing and storage of the clean laundry, including all related activities, control systems and tests

4-2.13 Disinfection

means the elimination or continual reduction of the number of causative agents to eliminate all risk of infection.

4-2.14 Disinfection of laundry

occurs in accordance with this regulation by disinfecting washing processes.

4-2.15 Disinfection of the hands

takes place using listed detergents in the soiled laundry area before washing hands and/or in the clean laundry area after hands have been washed. When disinfecting the hands, the skin, finger tips and space between the fingers must all be made thoroughly wet. Wiping or washing the disinfectant off afterwards reduces its effectiveness and should be avoided. The disinfectant should be vigorously spread over the hands and rubbed in for a period of 30 seconds until it dries.

4-2.16 Disinfection by abrasion

is a surface disinfection whereby the disinfectant is distributed on the surface using a scouring cloth, sponge or similar.

4-2.17 Spray disinfection

is a surface disinfection whereby the disinfectant is sprayed onto the surface to be disinfected.

4-2.18 Solvent treatment

is the cleaning of textiles and similar materials in organic solvents (dry cleaning) in special dry cleaning machines.

4-2.19 Wet cleaning

is a procedure (also called wet care) which is intended as an alternative to traditional dry cleaning using perchloroethylene and other solvents. It was developed in 1991 by Kreussler, in partnership with Miele, and is also known as the LANADOL process (Miele System KREUSSLER).

4-3 Other applicable technical regulations and literature

The following Technical Regulations in the most recent version apply to the models which refer to the area of application of these quality and test regulations.

DIN 5033-4	Colour measurement, spectrophotometric method
DIN 5033-6	Colour measurement, three area method
DIN 11900	Laundering and chemical cleaning machines; general definitions
DIN 11901	Laundering and chemical cleaning machines; measuring quantity, symbols, units, calculation formulae
DIN 11902	Laundering and chemical cleaning machines; testing the operational capacity of the machine, effect of treatment and consumption of operational materials, test conditions and procedures
DIN 11915	Laundering and chemical cleaning machines; chemical dry cleaning machines, definitions, specifications
DIN EN 12 829	Surface active agents - production of water with standardized calcium and magnesium hardness
DIN EN ISO 13934-1	Textiles - Tensile properties of fabrics - Part 1: Determination of maximum force and elongation at maximum force using the strip method
DIN EN 14065	Textiles - Laundry processed textiles - Biocontamination control system
DIN 38404-5	German standard method for examination of water, waste water and sediment - physical and physical-chemical parameters (group C) - part 5: determination of the pH-value (C5)
DIN 38404-10	German standard method for examination of water, waste water and sediment - physical and physical-chemical parameters (group C) - part 10: Calcite saturation of water (C10)
DIN 53919-1	Standard cotton fabric for assessing the washing procedure;requirements
DIN 53919-2	Testing the washing procedure with test strips
DIN 54270-2	Testing textiles; determination of intrinsic viscosity of cellulose; Cuen method
DIN 54270-3	Testing textiles; determination of intrinsic viscosity of cellulose; $EWNN_{mod(NACl)}$ method
DIN 60000	Textiles, basic definitions
DIN EN 60 456	Washing machines for domestic use - Procedure for measuring properties during use
DIN EN ISO 3758	Textiles – Code of care labelling using symbols
DIN EN ISO 6330	Textiles - Domestic washing and drying procedures for textile testing
DGUV	Accident prevention regulations – principles for prevention (previously VBG 1)
DGUV 203-084	Operating regulations for laundries (previously BGR 500)
DGUV	Accident prevention regulations – health service (previously VBG 103)
DGUV 100-500	Operating regulations for dry cleaning (previously BGR 500)
BG Information TA 2048	Linen which poses a risk of infection for employees, assessing the risk, and guidance on the Biological Agents Ordinance for laundries
Company publication	CIBA-Geigy-Brochure No. 9334 D 1980 - Methods and possible applications for the colorimetric whiteness evaluation of textiles- R. GRIESSER
RKI-List	"List of disinfectants and disinfection pro cedures, tested and approved by the Robert-Koch-Institut"
VAH/DGHM-List	List of disinfectant agents approved by the VAH (Association for Applied Hygiene), mhp-Verlag GmbH, Wiesbaden, formerly the list of the disinfectant procedures that have been tested under the "Guidelines for testing chemical disinfectant agents" and found to be effective by the German Association for Hygiene and Microbiology, list for use in laundry disinfecting
RKI	Recommendation on Residential Homes Infection Prevention in Residential Homes - Recommendation by the Commission for Hospital Hygiene and Infection Prevention at the Robert Koch Institute

RKI	on Surface Cleaning and Disinfecting Recommendation Hygiene requirements when cleaning and disinfecting surfaces - Recommendation by the Commission for Hospital Hygiene and Infection Prevention at the Robert Koch Institute
IfSG	Law on preventing and controlling infectious diseases in humans (Protection against Infection Act IfGS).
Biological Agents Ordinance	Regulations on the implementation of EU guidelines on protecting employees from risks posed by biological agents in the workplace (Biological Agents Ordinance – BioStoffVO)

Literature

[1] BMBF 0339955 "Integrated environmental protection in the textile industry: Reducing the environmental impact of textiles from hospitals and old people's homes", Dr. Helmut MUCHA,

[2] Internal, previously unpublished results from the Elektro Textil Feinmechanik trade union, 86153 Augsburg, Prevention Department, specialising in the textile industry/shoes, Dr. Gerhard KRAUS.

4-4 Quality regulations

When processing textiles from care homes which include hospital linen and/or linen from food processing facilities, the certified laundry must be able to prove that its systems comply with the technical requirements of the quality standards under RAL-GZ 992/2 and/or GZ 992/3.

4-4.1 Laundry plant

4-4.1.1 Building area

The soiled linen area must be separated from other areas by appropriate structural or ventilation measures to avoid cross-contamination of textiles which are not being disinfected. Any unpleasant odours must be reduced by the use of appropriate ventilation systems, and climatic working conditions must be optimised.

4-4.1.2 Personnel area

The laundry must always have a minimum of one qualified and relevantly experienced person responsible for the supervision of and compliance with all technical procedures.
One individual must be appointed as the Hygiene Manager and one as the textile expert for laundry belonging to residents of care homes, and their qualifications must be verified.
Staff carrying out the laundry care must undergo regular training. The Hygiene Manager's most recent training must be no more than 3 years ago.

4-4.1.3 Soiled linen area

4-4.1.3.1 Delivery of the soiled linen

The linen must be delivered in sufficiently robust, sealed transport containers such as transport bags or containers complying with BGR 500 Section 2.6 on The operation of laundries etc.

4-.4.1.3.2 Storage of soiled linen

Residents' laundry must be kept dry and stored separately from all other soiled laundry.

4-4.1.3.3 Sorting

Residents' laundry must be sorted according to the care label (solvent processing, wet cleaning or washing) or by textile type and colour, and by the degree of soiling.

4-4.1.3.3.1 Sorting in accordance with special recommendations

Residents' laundry must be sorted according to the special recommendations which can be found in the guidelines on Textiles for Care Homes *(www.quality-laundry.com)*.

General requirements:
- Any unpleasant odours must be reduced by the use of appropriate ventilation systems, and climatic working conditions must be optimised.
- The employer must provide gloves and nose and mouth protection and instruct employees regularly, at least once a year, in their use.

Sorting in accordance with the following requirements:
- Wearing nose and mouth protection as protection against accidental contact is prescribed mainly to prevent colonisation by multi-resistant bacteria such as MRSA.
- Where there is greater soiling (e.g. textiles contaminated with faeces), gloves must be worn.

Reason for the sorting regulations:
The sorting requirement is based on investigations into how the air that is inhaled by employees is contaminated by textiles from care homes [1], normal washing and hospital laundry [2].

Nose and mouth protection is prescribed to prevent employees at the sorting station becoming symptomless carriers of multi-resistant bacteria such as MRSA, and so contributing to the spread of these bacteria.

4-4.1.3.4 Work places

The work places in the soiled laundry area should be organised suitably and clearly, should enable rational operation and should display order and cleanliness.

4-4.1.4 Clean linen area

4-4.1.4.1 Fresh water

If no natural water is available, water preparation should be carried out in a plant which provides water with a hardness of 0 to 3 mmol/lCa (0° German hardness to 3° German hardness), less than 0.1 mg/l of iron, less than 0.03 mg/l of manganese and less than 0.05 mg/l of copper; the daily monitoring of the water preparation plant in respect of the water equivalents is to be recorded in the control book. Recontamination of the linen, especially by rinsing water, must be avoided.

4-4.1.4.2 Washing machines

The washing machines used together with the washer extractor/drainage machines including their controlling and check apparatus must function efficiently. It must be possible to remove washing liquor easily. It must be possible to disinfect all parts which come into contact with the resident's clothing and liquor.

4-4.1.4.3 Care and washing procedures

The latest disinfectant care and washing processes should be used, depending on the properties of the textile items, e.g. the fibre type.

Procedural rules must be easily accessible in the wet washing area. Information for the applicable washing processes must be given in the procedural rules: liquor ratio, loading ratio, detergent dosage, alkalinity, dosage of bleaching agents, liquor temperature for pre-washes, clearing and rinsing; bleaching cycle.

4-4.1.4.4 Drainage

Presses/centrifuges must be able to be cleaned and disinfected. Further processing of the damp linen until dry should in normal circumstances be concluded within 3 hours.

4-4.1.4.5 Drying

The functionality of the drying machines used, including their controlling and check apparatus, must be guaranteed.

4-4.1.4.6 Processing of shaped items

The presses, finishing cabinets and mannequins used must operate perfectly. During preparation of clean linen for ironing, contact with the resident's clothing must be limited to the minimum necessary and handled as little as possible.

4-4.1.4.7 Storage

Storage of the clean linen must be well arranged. Storage rooms and storage surfaces must indicate a high level of care as well as order and cleanliness. Suitable measures with respect to storage and ventilation should be taken to protect against recontamination.

4-4.1.4.8 Dispatch of clean linen

Means of transport used must have a closed structure. Internal surfaces of the cargo hold must be able to be easily cleaned and disinfected. Care must be taken to avoid contamination of the clean linen by suitable measures.

4-4.1.4.9 Cleaning machines

The cleaning machines that are used, including all control and inspection devices, must be fully functional and comply with DGUV 100-500. It must be possible to disinfect all working parts coming into contact with the residents' laundry or with the washing liquor.

4-4.1.4.10 Solvent treatment

The solvent and care process to be used must be chosen according to the care label and DIN EN ISO 3758.

4-4.1.4.11 Wet cleaning

The processes to be used must be chosen according to the care label and DIN EN ISO 3758.

4-4.1.4.12 Work stations

The work stations in the clean linen area must be practical and well-organised, allow for a continuous flow of laundry and look clean and tidy.

4-4.2 Care of linen

Every user of a quality mark receives the relevant number of washing cycle controls according to table 2 and 3, section 4-9, from the test institute according to section 4-6.1.

4-4.2.1 Washing cycle tests for disinfectant washing processes

Every user of a quality mark receives the washing cycle controls from the test institute according to section 4-6.1, corresponding to the number of washing procedure tests to be carried out annually as shown in table 2 and 3, section 4-9. These are made of standard cotton fabric of 100 cm in length and 80 cm in width in accordance with DIN 53919 Part 1, suitable for washing underwear (normally cotton).

Each test piece should be washed without a net, unless the company predominantly washes with nets. If commercial laundry or official or large orders are being processed, test pieces must also be used.

The test piece must pass through the entire washing procedure, including all washing and rinsing procedures. It must be transmitted from washing cycle to washing cycle and line dried over night. Each washing cycle is marked on the list accompanying the test piece, whereby a second representative of the quality mark user is to be consulted as a control.

After 50 washing cycles have been completed, it should be noted that a corresponding smoothing of the test piece occurs; it is then sent to the test institute according to 4-6.1 together with the explanation of the washing cycle control and the completed accompanying list according to RAL-GZ 992/1 section 1-9.5. While each washing cycle control is being carried out with test pieces, the washing procedure must not be altered. If several types of washing machine or washing procedures are in use, the annual wash cycle tests should be distributed proportionally throughout the individual machines and procedures.

The features which have to be assessed for professional linen care are tested using control strips, at the test centre assigned as described in Section 4-6.1.

4-4.2.1.1 Degree of whiteness (W_{GG})

The degree of whiteness represents a measure for impression of how the human eye perceives the whiteness of linen. It

should not fall short of the value 170 after 50 washing cycles. Figures only given as whole numbers.

4-4.2.1.2 Tint value (TV)
The tint value describes the colour deviation from neutral white given by the white standard. The TV must not exceed R 1.5 in the red-violet direction or G 2.49 in the blue-green direction after 50 washing cycles. Figures given to two decimal places. The relationship between colour deviation, TV and the coloristic reference can be seen from the table.

Tint value	Colour deviation	Coloristic significance
> -5.5	RR	coloured towards red-violet
- 5.5 to - 4.51	R5	very strong
- 4.5 to - 3.51	R4	strong
- 3.5 to - 2.51	R3	distinct
- 2.5 to - 1.51	R2	slight
- 1.5 to - 0.51	R1	trace
		} red-violet deviation from white standard
- 0.5 to - 0.49	N	negligible colour deviation from neutral white of the white standard
0.5 to 1.49	G1	trace
1.5 to 2.49	G2	slight
2.5 to 3.49	G3	distinct
3.5 to 4.49	G4	strong
4.5 to 5.49	G5	very strong
		} blue-green deviation from white standard
> 5.5	GG	coloured towards blue-green

Tab. 1 Correlations between the tint value, colour deviation and coloristic reference compared with the degree of whiteness standard.

4-4.2.1.3 Basic whiteness value (Y_{420})
The basic whiteness value indicates the brightness of the linen after the UV portion of the light source has been extracted by filtering and the brightening effect on the clean linen has been extinguished. It must not fall below the value 87 after 50 washing cycles. Figures only given as whole numbers.

4-4.2.1.4 Fabric incrustation
The inorganic fabric incrustation, defined as ash must not exceed 1.0 % after 50 washing cycles. Figures given to one decimal place according to the rounding rules.

4-4.2.1.5 Reduction in tensile strength
The relative strength reduction is calculated from the values for the maximum tensile force (wet) of the test piece in the pre-wash condition (3 washes in accordance with DIN 53 919 part 1, paragraph 5.2.2) and after 50 washing cycles (in accordance with section 4-4.2.1). This reduction in wet tear strength must not exceed 30 % after 50 washing cycles. Figures given to one decimal place according to the rounding rules.

4-4.2.1.6 Chemical fibre deterioration
The chemical fibre deterioration, identified as the deterioration factor (s), must not exceed 1.0 after 50 washing cycles. Figures given to one decimal place in accordance with the rounding rules.

4-4.2.2 Washing cycle tests for wool washes including silk

Each certified laundry must carry out annual washing cycle tests as required by the test centre assigned as described in Section 4-6.1, with the frequency calculated using Tables 2 and 3 in Section 4-9. The tests consist of washing 3 pieces of IWS SM 12 woollen test fabric complying with DIN EN 60456, to calculate the dimensional and structural changes which take place during a wool wash, incl. silk.

The three pieces of woollen test fabric have to be washed in a washing cycle with no net, unless the laundry predominantly uses nets. The three pieces of woollen test fabric must pass through the complete washing process including all wash and rinse cycles. They have to be taken from one wash cycle to the next, and line dried overnight. There must be no finishing treatments (e.g. ironing), otherwise that particular washing cycle test has to be repeated, for which a charge is made. Each cycle must be marked on the check list, and a second employee of the certified laundry must be called in to check this.

At the end of 3 washing cycles, the three woollen test fabrics are sent to the assigned test centre as described in Section 4-6.1, along with the declaration that the inspection has been carried out, and the completed checklist in accordance with RAL-GZ 992/1, Section 1-9.5.

The washing process must not be modified at all during the washing cycle test. Where more than one washing process or system is in use, the annual washing cycle tests, consisting of 3 pieces of IWS SM 12 woollen test fabric in accordance with DIN EN 60456, must be shared out between the different systems and processes. The features which have to be assessed for professional linen care are tested using control strips, at the test centre assigned as described in Section 4-6.1.

4-4.2.2.1 Dimensional changes after 3 washing processes
The reference value for shrinkage per unit area for each batch of the woollen test fabric must be calculated in accordance with DIN EN 60456 and must not be exceeded after 3 washes, allowing for measuring inaccuracies.

4-4.2.2.2 Structural changes after 3 washing processes
The structural changes after 3 washes are assessed by the test centre assigned as described in Section 4-6.1, by comparing with the reference sample complying with DIN EN 60456 referred to in 4-4.2.2.1.

4-4.3 Distribution of finished linen

Cleanliness, a good degree of whiteness, dryness even in problem areas, a neutral smell and sufficient protection against recontamination are required for the clean linen which is to be delivered. Article-specific finish is required for shaped items.

4-4.4 Hygiene requirements

4-4.4.1 Rooms

Floors, and if possible also walls at working height, exterior surfaces of installations and machines must permit damp cleaning and disinfection. The floors of the work rooms are to be cleaned at least once per week and disinfected when necessary. Sanitary and communal rooms must be kept in a clean state which encourages the staff to be aware of hygiene.

4-4.4.2 Installations

Transport devices, containers, depositories, shelves etc. coming into contact with soiled linen must be regularly cleaned using disinfectant. Hand washing facilities and devices to disinfect the hands must be provided with a disinfectant-dispenser.

4-4.4.3 Personnel area

People must be provided with suitable protective clothing which should be changed daily if necessary.

After working in the soiled laundry area and before working in the clean laundry area, hands must be disinfected. Staff must be instructed to disinfect their hands after going to the toilet in order to fulfil the hygiene requirements.

Eating and smoking are prohibited in the soiled and clean laundry areas, and drinking is also prohibited in the soiled laundry area.

4-4.4.4 Hygiene plans

Appropriate hygiene plans are to be drawn up for all areas where hygiene is important.

4-4.4.5 Clean linen

This linen must have a low bacterial count.

The clean linen must be inspected after drying and finishing processes have been completed.

Clothing is regarded as having a low bacterial count if, when swab tests covering at least 20 cm² are taken from different places on different items of outerwear, and are incubated on a nutrient medium for 48 hours ± 2 hours at 36 °C ± 1 °C, no more than 5 bacterial colonies are found per 10 cm² area (50 per 100 cm²).

Underwear (generally made of cotton) is regarded as having a low bacterial count if, when swab tests covering at least 20 cm² are taken from different places on different items of underwear, and are incubated on a nutrient medium for 48 hours ± 2 hours at 36 °C ± 1 °C, no more than 2 bacterial colonies are found per 10 cm² area (20 per 100 cm²).

A total of 12 swab tests must be taken, 7 from clothing and 5 from underwear. Of these 12 tests, 10 must satisfy the requirements.

One third of the samples must be taken from seam areas.

4-5 Test conditions

When processing textiles from care homes which include hospital linen and/or linen from food processing facilities, the certified laundry must be able to prove that its systems comply with the technical requirements of the quality standards under RAL-GZ 992/2 and/or GZ 992/3.

4-5.1 Laundry plant

Fulfilment of requirements is controlled by on-site inspections – at least once a year, by the representative from the test centre in accordance with section 4-6.1 by filling out the test list in accordance with section 3-8.3 and by evaluating the control books. The control book must be filled in by an employee of the company (not by the owner or laundry operator).

4-5.2 Care of linen

Specifically, compliance with the requirements is monitored by washing cycle tests as described in Section 4-4.2, which are evaluated by the test centre assigned as described in Section 4-6.1.

Control strips as described in Section 4-4.2.1 are used to define:

- W_{GG}, TV, Y_{420}, fabric incrustation, loss of strength and chemical fibre damage after 50 washes.

Woollen test fabrics as described in Section 4-4.2.2 are used to define:

- Dimensional and structural changes after three wash cycles.

4-5.2.1 Degree of whiteness (W_{GG})

Determination with the spectrometric method in accordance with DIN 5033 part 4 or with the three area method in accordance with DIN 5033 part 6 under xenon lamp lighting and sufficient approximation to the standard illuminant D_{65}. Measurements are taken in duplicate using OBA-free filter paper as a base (e.g. Schleicher + Schüll No. 604) in opaque layer thickness and for adaptation to the given measuring device requirements with at least 4 levels of the textiles standard whiteness scale.

The measuring instruments are calibrated against barium sulphate. Calculation of the standard colour value is to be carried out for the D65 illuminant and the 10° standard colormetric observer. After the formulae parameters have been determined, the W_{GG} is calculated using Ganz's formula for the degree of whiteness:

$$W = (D \cdot Y) + (P \cdot x) + (Q \cdot y) + C$$

Y, x and y are the colorimetric measurements to be used for brightness and the standard colour value sections. D, P, Q and C are the formulae parameters whose size determine the "sense of whiteness".

(Literature: CIBA-Geigy-Brochure No. 9334 D 1980 - Methods and possible applications for the colorimetric whiteness evaluation of textiles – R. GRIESSER)

4-5.2.2 Tint value (TV)

Determination and evaluation as per section 4-5.2.1 and 1-5.2.2 of RAL GZ 992/1.

4-5.2.3 Basic whiteness value (Y_{420})

Determination and evaluation as per section 4-5.2.1 and 1-52.3 der RAL GZ 992/1.

4-5.2.4 Inorganic fabric incrustation

Determination in accordance with DIN 53919, part 2, section 8.4.1, in the muffle furnace for one hour at 800 °C as ash.

4-5.2.5 Reduction in tensile strength

Determination in accordance with DIN 13934-1, wet test. For reduction in closeness of below 12 %, only "below 12 %" will be shown; if it is higher than 12 %, the exact value ascertained will be given.

4-5.2.6 Deterioration Factor (s)

4-5.2.6.1 The deterioration factor will be calculated from the intrinsic viscosity figures (GVZ) in the initial state and after 50 washes in accordance with DIN 53919 part 2. (see RAL-GZ 992/1). The intrinsic viscosity in iron (III) tartaric acid - sodium complex is determined in accordance with DIN 54270 part 3, from the average of 2 tests on each.

4-5.2.6.2 Alternatively, the degree of deterioration (s) can be calculated from the average degree of polymerisation (degree of DP) in the initial state and after 50 washes using Eisenhut's formula according to section 1-5.2.6.1, see RAL-GZ 992/1. The degree of DP is determined with cuoxam using the improved Fa-Chem-Fa-2 method. Production using solution in ammonia (25%).

4-5.2.7 Dimensional changes

The reference value for shrinkage per unit area for each batch of the woollen test fabric must be calculated by the test centre assigned as described in Section 4-6.1 in accordance with Section 12.3.3 of DIN EN 60456.

4-5.2.8 Structural changes

The structural changes are visually assessed by the test centre assigned as described in Section 4-6.1 by comparing with the reference sample complying with DIN EN 60456 described in 4-4.2.2.1.

4-5.3 Completion of linen

4-5.3.1 In accordance with section 4-6.2, random samples should be taken of 5 test samples of the resident's clothing (outerwear and underwear) as an in-house test to check

a) visually for folding, finish of shaped parts, to check the packaging visually to ensure that it is clean, that there are no stains, greying

b) smoothing sensory for smell.

The results should be recorded in the inspection record book, entering the supplier, order no. etc. (sample see RAL-GZ 992/1, section 1-9.3). The frequency of the sample tests to be carried out and entered in the inspection record book is to be defined for each company by the appropriate inspector.

4-5.3.2 The findings from the tests a and b in accordance with section 4-5.3.1 for at least 10 test samples are recorded in the checklist.

4-5.4 Hygiene requirements

The representative of the test institute checks fulfilment of the requirements during the inspection in accordance with section 4-6.1 by completing the checklist. Microbiological testing of the disinfecting washing process using contaminated germ carriers, checks on the water and technical installations. Bacteriological checks in the clean environment.

4-6 Monitoring

The monitoring process is divided into
- initial testing,
- in-house monitoring and
- external monitoring.

4-6.1 Initial test

The German Certification Association for Professional Textile Services shall commission an appropriate test institute for the initial and supervisory tests.
The initial test as a prerequisite for granting of the quality mark in accordance with section 4-6.1 includes evidence that the quality and test regulations RAL-GZ 992/4 have been fulfilled.

4-6.2 In-house tests

Every quality mark user must carry out the necessary in-house tests to ensure compliance with the quality specifications, must record these, and must keep these records for at least 2 years.

4-6.3 External monitoring

External monitoring takes the form of both on-site inspections as described in Sections 4-5.1 and 4-5.3, at least once a year, and also the washing cycle tests described in Section 4-4.2. The washing cycle tests are graded as shown in Tables 2 and 3, Sections 4-9.1 and 4-9.2, and incorporate verification of Sections 4-4.2 to 4-4.2.2.2.

4-7 Identification

4-7.1 Professional care of Clothing of Care Home Residents which fulfills the quality and test regulations RAL-GZ 992/4 can be labelled using the quality mark depicted below with additional comments

Clothing of Care Home Residents
RAL-GZ 992/4

if at the same time the laundry is named with its full address and has proof from the German Certification Association corresponding to section 4-7.4 for the duration of application.

4-7.2 The application of the quality mark is regulated solely by the implementation conditions for awarding and managing the quality mark for Professional Textile Services imposed by the German Certification Association for Professional Textile Services.

4-7.3 The labelling must be complete and clearly legible

4-7.4 The Certification Association will certify fulfilment of the requirements for RAL-GZ 992/4 once a year.

4-8 Amendments

Any amendments to the quality and test regulations, even of an editorial nature, are not effective without prior written approval from RAL. They come into force when, after a reasonable transitional period, users of the quality mark are notified by the Board of the Certification Association.

4-9 Appendix

4-9.1 Table 2, overview washing cycle controls (WCC)

Resident's clothing	Type of processing	Testing criteria	Number per washing cycle	Frequency
Outerwear	Testing of the washing cycle for wool, including silk ≤ 40°C - disinfecting washing process according to RAL-GZ 992/2 *)	Dimensional and structural change after 3 washing cycles Assessment according to RAL-GZ 992/4 - Test fabric made of wool	3 items	2 times per year
Underwear	Disinfecting washing process according to RAL-GZ 992/2 - cotton	WCC according to RAL-GZ 992/1 after 50 washing cycles Assessment according to RAL-GZ 992/1 - standard cotton fabric	1 item	See table 3

*) The effectiveness against mycobacteria such as tuberculosis may be reduced in processes at < 60°C.

4-9.2 Table 3, Number of washing cycle controls (WCC)

Tons of processed linen per day	Outerwear Wool wash 40°C Test fabrics made of wool (3 pieces)	Underwear Disinfecting washing process according to RAL-GZ 992/2 Standard cotton fabric
up to 1	2	1
up to 2	2	2
up to 3	2	3
up to 4	2	4
up to 5	2	6
up to 7	2	7
up to 20	2	8
≥ 20	2	10

The number of annual tests to be carried out by the quality mark holder is determined on the basis of the calculated daily tonnages. The company is assigned to the relevant category by the test centre, which uses the usage data recorded by the certificate holder in the inspection book to verify the calculated daily tonnages during its annual inspection. The number of washing cycle tests is based on this classification.

Implementing regulations for the award and use of the RAL Quality Certification Mark for Professional Textile Services

1 Basis of Quality

The basis of quality for the quality mark consists of the quality and test regulations for professional textile services in commercial laundries and hospital laundries, nursing institutions, etc. This basis is being amended and developed to bring it up to date with advances in technology.

2 Award

2.1 The Gütegemeinschaft sachgemäße Wäschepflege e.V. authorizes laundries, on application, to use the quality mark for professional textile services.

2.2 The application is to be sent in writing to the administrative office of the Gütegemeinschaft sachgemäße Wäschepflege e.V., Schloss Hohenstein, 74357 Bönnigheim - Germany. A legally binding signed certificate of obligation (specimen 1) must be enclosed with the application.

2.3 The application is examined by the committee on quality. The committee checks the services of the applicant without prior notice in accordance with the quality and test regulations. The plant of the applicant may be inspected and samples taken from the services. Documents mentioned in the quality and test regulations may also be requested and checked. The committee issues a certificate on the result of the checks which is sent to the applicant and to the board of the German Certification Association. The committee on quality can appoint a testing laboratory which is accredited in accordance with ISO 17020 and ISO 17025 to carry out these tasks. The person in charge of testing must identify himself before carrying out his tests. The applicant pays for the tests to be carried out.

2.4 If the testing is positive, the board of the German Certification Association issues the applicant with the quality mark on the recommendation of the committee on quality. The award is certified (specimen 2). If the testing is negative, the committee on quality returns the application. The reason for the rejection must be stated in writing.

3 Use

3.1 Users may only use the quality mark for services connected with professional linen care as stipulated in the quality and test regulations.

3.2 Only the German Certification Association can authorize the manufacture of metal stamps, coining dies, printing blocks, lead seals, embossed seals, rubber stamps, etc. bearing the quality mark logo and only the German Certification Association can issue them or have them issued to users of the quality mark and specify precisely for what purpose they may be used.

3.3 The board may impose special rules for using the quality mark in advertising and joint advertising, in order to safeguard fair competition and prevent misuse of the mark. Individual advertising must not be hindered, however. The same maxim regarding fair competition applies to individual advertising.

3.4 If the right to use the quality mark is revoked, the award certificate and all stamps, etc. bearing the quality mark logo must be returned; applicants are not entitled to a refund. The same applies if the right to use the quality mark is withdrawn for any other reason.

4 Monitoring

4.1 The German Certification Association is entitled and obliged to monitor the use of the quality mark and the implementation of the quality and test regulations. The continuity of the monitoring procedure must be established with RAL by means of a monitoring agreement with a testing laboratory which is accredited in accordance with ISO 17020.

4.2 Each user of the quality mark has to make provisions for carrying out the quality and test regulations. It is the duty of the user to check statistical quality. The user must record the in-house tests accurately. The committee on quality or its representatives monitors the quality-protected services of the user as stated in the requirements of the quality and test regulations. The user pays for the tests.

4.3 Auditors can request or take samples at any time from the plant where the quality mark is used. Auditors can inspect the plant at any time during working hours.

4.4 If a test is negative or there is a query about a service for professional linen care, the committee on quality has the test repeated. The user of the quality mark can also demand a repeat test and he is obliged to care for the immediate correction of the shortcomings shown.

4.5 A report is issued by the appointed testing institute for every test result. The German Certification Association and the user of the quality mark each receive a copy. Test results are to be handled strictly confidentially.

4.6 If queries regarding the services for professional textile services are unfounded, the complainant pays the test costs; if the queries are justified, the user concerned pays the test costs.

5 Violation Penalties

5.1 If the committee on quality establishes defects in the quality assurance, a penalty is suggested to the board of the German Certification Association. These penalties depend on the serverity of the violation:

5.1.1 Additional conditions imposed with regard to in-house testing

5.1.2 Increase in monitoring by external auditors

5.1.3 Warning

5.1.4 Contractual penalty of up to EUR 25,000

5.1.5 Temporare or permanent revocation of quality mark

5.2 Users of the quality mark who violate section 3 or 4 may be cautioned.

5.3 Instead of a caution, a penalty of up to EUR 25,000 can be imposed for each violation. The fine must be payed within 14 days from the official date of notification to the Gütegemeinschaft sachgemäße Wäschepflege e.V.

5.4 The procedures stated in section 5.1. may be combined.

5.5 The quality mark is revoked temporarily or permanently from users who repeatedly or seriously violate section 3 or 4. The same applies to users who delay or avoid carrying out tests.

5.6 The party involved must be heard before any measures are taken.

5.7 Penalties are effective by force of law.

5.8 In urgent cases the chairman of the German Certification Association can provisionally withdraw the quality mark with immediate effect. This must be confirmed by the board of the German Certification Association within 14 days.

6 Lodging an Appeal

6.1 Users of the quality mark can appeal against a penalty within 4 weeks after its imposition.

6.2 If the committee on quality rejects the appeal, the appellant can then appeal to a court of arbitration within 4 weeks after the decision of the committee. Section 12 of the statutes of the Gütegemeinschaft sachgemäße Wäschepflege e.V. is significant with regard to arbitration.

7 Re-award

If the right to use the quality mark has been revoked it may only be re-applied for after a minimum period of six months. In the case of persistent violations, the board can extend this period. The procedure is determined by section 2. However, the board of the quality mark association can impose additional conditions.

8 Amendments

These implementing regulations together with specimens (certificate of obligation, award certificate) are recognized by RAL. Before any changes, even editorial, can be put into effect, RAL must give its consent in writing. They come into force at an appropriate time after they have been publicized by the board of the German Certification Association.

Certificate of Obligation

1. The undersigned/the undersigned firm* hereby applies to the Gütegemeinschaft sachgemäße Wäschepflege e.V.

   - for acceptance as a member*
   - for the award of the right to use
     the quality mark for „professional textile services“
     - ○ with the transcription „ Commercial Linen, RAL-GZ 992/1“**
     - ○ with the transcription „Healthcare Linen, RAL-GZ 992/2“**
     - ○ with the transcription „Linen from Food Processing Businesses, RAL-GZ 992/3“**
     - ○ with the transcription „Clothing of Care Home Residents, RAL-GZ 992/4“**

2. The undersigned confirms that

   - the quality and test regulations for
     - ○ Commercial Linen**
     - ○ Healthcare Linen**
     - ○ Linen from Food Processing Businesses**
     - ○ Clothing of Care Home Residents**

   - the Statutes of the Gütegemeinschaft sachgemäße Wäschepflege e.V.,
   - the Statutes of the Quality Certification Mark
   - the implementing regulations for the award and use of the Quality Certification Mark

   with specimens 1 and 2

   have been noted and hereby unconditionally accepted as binding.

_____ (Place and Date)

_____ (Stamp and signature of the applicant)

* Please delete as applicable!

** Please mark with a cross as applicable!

AWARD CERTIFICATE

The German Certification Association for Professional Textile Services hereby awards the Quality Mark RAL-GZ 992/1 Commercial Linen recognized by the RAL Official German Institute for Quality Assurance and Certification and protected under the trademark law by registration with the German Patent Office.

Mustermann
Wäscherei
Musterstraße 10
12345 Musterstadt

Commercial Linen
RAL Quality Mark RAL-GZ 992/1

The use of the quality mark demands that the compliance with the Quality and Test Regulations RAL-GZ 992/1 is controlled.

Bönnigheim, x month 2018

Karl-Rainer Dauer · 1. The President

Dr. Timo Hammer · The Managing Director

GÜTEGEMEINSCHAFT SACHGEMÄSSE WÄSCHEPFLEGE E.V. · 74357 Bönnigheim · GERMANY

History

The Reichsausschuss für Lieferbedingungen" (RAL) - Committee of the German Reich for Terms and Conditions of Sale - was founded in 1925 as a combined initiative of the German private sector and the German government of that time. The joint aim was the standardization and clear definition of precise technical terms of delivery. For this purpose, fixed quality standards and their control were needed - the system of quality assurance was born. Its implementation required the creation of an independent and neutral institution as a self-governing body of all parties active in the market. That was the moment of birth for RAL and ever since that time it has been the competent authority for the creation of quality labels.

RAL Today

RAL acts as an independent service provider in its fields of activity. It is recognized as a non-profit organization and organized in the legal form of a registered association. Its organs are Executive Committee, Board of Trustees, General Assembly of Members and the management.
RAL's independent and neutral position finds expression in the fact that the principles of its activities are established by the Board of Trustees which is composed of representatives from the leading organizations representing industry, consumers, agriculture, the federal ministries and other federal bodies. They have a permanent seat and vote on that body. In addition to them, the General Assembly of Members elects four quality assurance associations on the Board of Trustees as representatives of the RAL members.

RAL's Areas of Competence

- RAL creates quality labels
- RAL is responsible for registrations, agreements and RAL certificates

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