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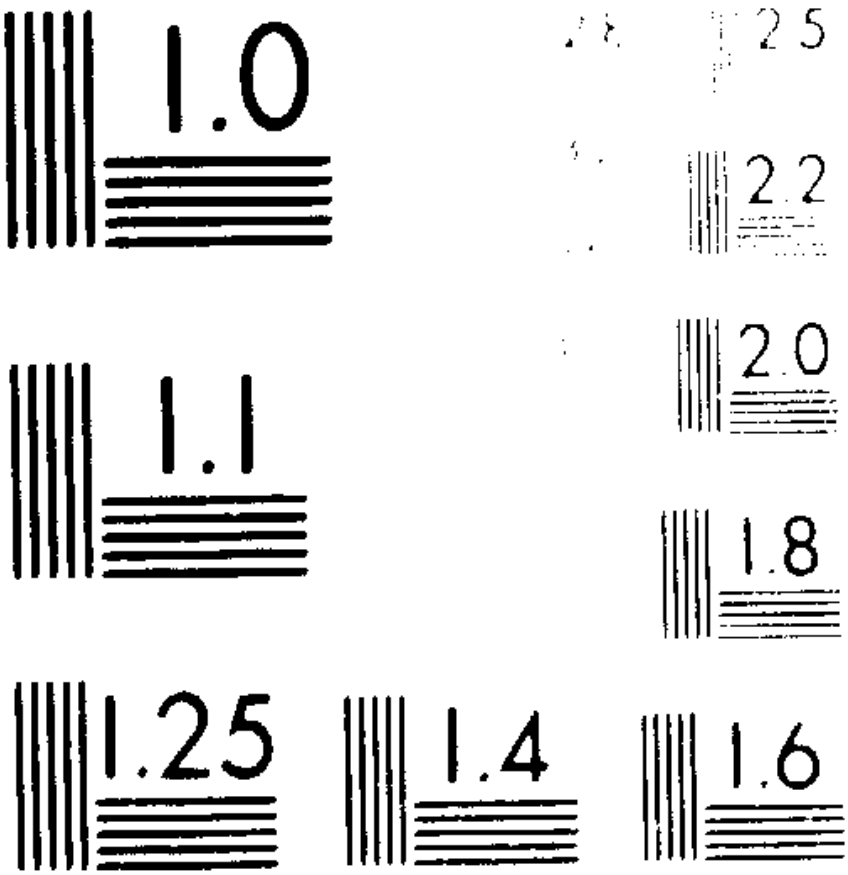
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DP/ID/SER.A/280
12 February 1981
English

DEVELOPMENT OF THE FURNITURE AND JOINERY INDUSTRIES AND CREATION OF A CENTRE

DP/YUG/73/006

YUGOSLAVIA

Report of the Seminar in Furniture Quality Control, Sarajevo, Yugoslavia, 14-18 April 1980

Based on the work of Björn Rundqvist, technical manager

United Nations Industrial Development Organization
Vienna

V.81-21554

Explanatory notes

References to "dollars" ($) indicates United States dollars, unless otherwise stated.

The monetary unit in Yugoslavia is the dinar (Din). During the period covered by the report the value of the dinar in relation to the United States dollar was $US 1 = 18.3 Din.

A full stop (.) is used to indicate decimals.

A comma (,) is used to distinguish thousands and millions.

The following abbreviations have been used in this report:

ERC Elektronski Računski Centar (Electronic Computer Centre)

IRC Istraživački Razvojni Centar (Research and Development Centre)

GEIMS General Electric Inventory Management System

OOUR Osnovna Organizacija Udruzestvenog Rada (Basic Associated Labour Organization)

RO Radna Organizacija (Work. Organization - association of OOURs)

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ABSTRACT

As part of the project "Development of the Furniture and Joinery Industries and Creation of a Centre" (DP/YUG/73/006) that is being carried out by the United Nations Industrial Development Organization (UNIDO) acting as executing agency for the United Nations Development Programme (UNDP) in response to a request from the Government of Yugoslavia, a seminar dealing with furniture testing and quality control was held at Sarajevo from 14 to 18 April 1980. The seminar was organized by SIPAD-IRC in Sarajevo.

The purpose of the seminar was to improve quality control in the furniture industry in the Republic of Bosnia and Herzegovina.

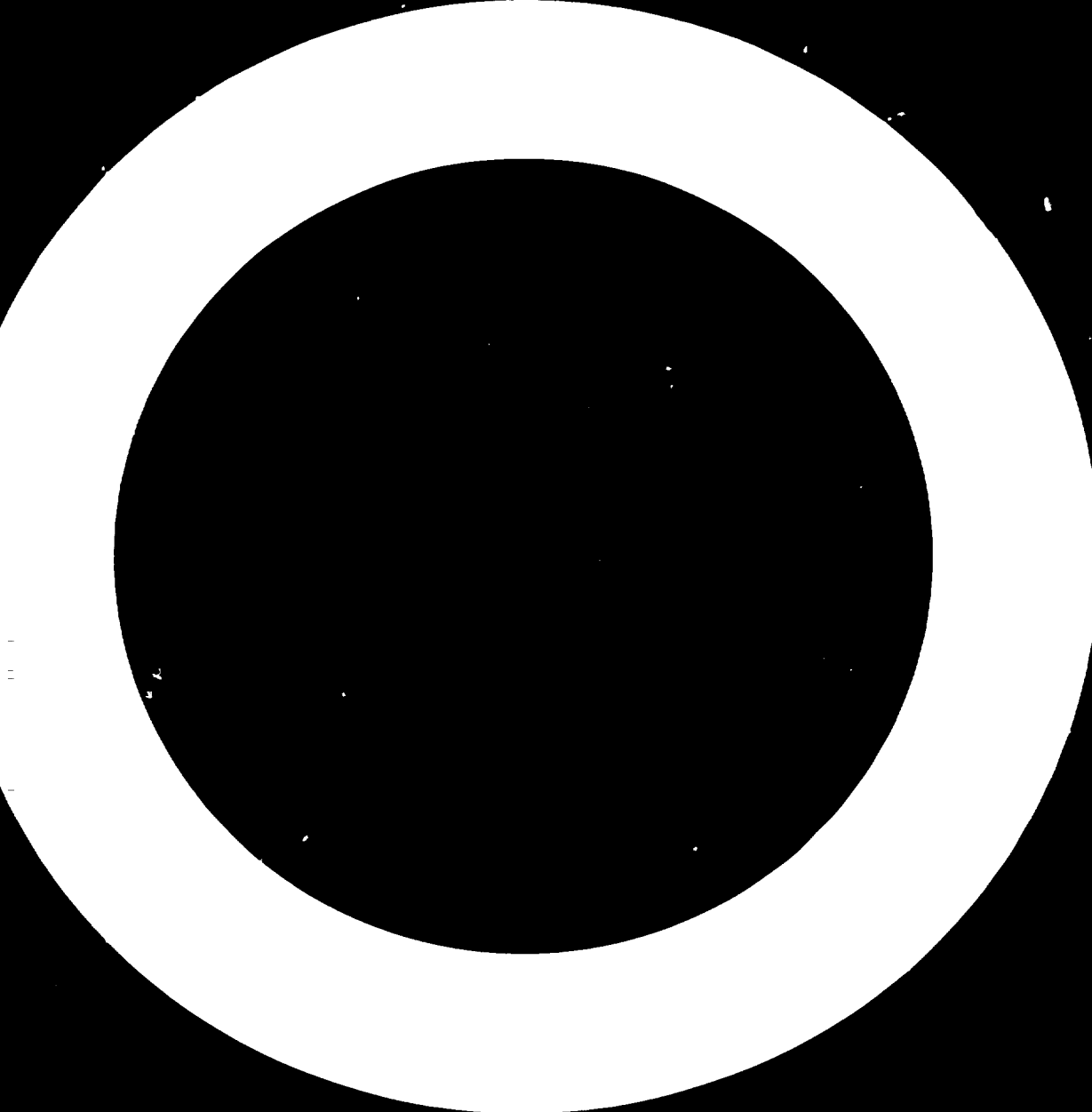
The specific aims of the seminar were:

(a) To introduce production personnel to aspects of quality control and testing of the assembled final product;

(b) To brief and train counterparts in the SIPAD Institute on testing procedures;

(c) To clarify the differences between production control and quality control.

The seminar concluded that all factors influencing the quality of the final product--materials, design, construction and production--should be better co-ordinated within the SIPAD organization. It recommended that a furniture quality centre be established to achieve this goal. However, it was strongly emphasized that the quality of the final product was the responsibility of the manufacturer.



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INTRODUCTION

As part of the project "Development of the Furniture and Joinery Industries and Creation of a Centre" (DP/YUG/73/006) that is being carried out by the United Nations Industrial Development Organization (UNIDO) acting as executing agency for the United Nations Development Programme (UNDP) in response to a request from the Government of Yugoslavia, a seminar dealing with furniture testing and quality control was held at Sarajevo from 14 to 18 April 1980. The seminar was organized by SIPAD-IRC in Sarajevo.

The purpose of the seminar was to improve quality control in the furniture industry in the Republic of Bosnia and Herzegovina.

The specific aims of the seminar were:

(a) To introduce production personnel to aspects of quality control and testing of the assembled final product as supplied to the end user;

(b) To brief and train counterparts in the SIPAD Institute on testing procedures;

(c) To clarify the differences between production control and quality control.

The programme of the seminar included:

Lectures on test methods and quality specifications for furniture

Discussions on practical methods of furniture testing and evaluation of test results

Visits to furniture manufacturing plants, study and discussion of production control and quality control

Discussions on the application of quality control within SIPAD

The material presented at the seminar was based on documents prepared by the Swedish Furniture Research Institute (Möbelinstitut) in Stockholm.

I. ORGANIZATION OF THE SEMINAR

About 15 engineers dealing with production and quality control in factories within ŠIPAD and from the research and development organization ŠIPAD-IRC took part in the seminar. The participants were drawn about equally from production and research. Annex I lists the work organizations of ŠIPAD.

The documentation "Furniture testing and quality control", which was presented during the seminar, was prepared by the lecturer, Björn Rundqvist, Technical Manager of the Swedish Furniture Research Institute. It is listed in annex II and is attached to this report. Other documents used were mainly excerpts from test method manuals, quality specifications and other technical materials provided by the Institute. Some of the information was presented using slides and films. In addition to lectures, demonstrations were performed in the laboratory.

The seminar was opened and closed by Murat Backović, Vice-president of ŠIPAD-IRC.

II. PROGRAMME

First and second days

After an introductory session on the first day, the seminar took up at its second session factors important in assessing the quality of furniture. A lecture was given on methods of classifying and determining the quality of materials and the workmanship of the finished product. The close relationship between quality and retail price was stressed. Thus, whether the profitability of production increased or decreased depended on the quality of the materials and the workmanship. The participants learned about methods of determining surface resistance and of testing upholstered furniture, chairs and case-good furniture. Then they were divided into three groups and trained in the laboratory on testing procedures for easy chairs, chairs and case-good furniture.

Third day

Test results were discussed as well as the organization of a control and test department. Information was given on the work of national and international standardization authorities. The participants took measurements on test-run furniture and had to evaluate the results.

A lecture and discussion followed on quality control of finished, assembled products and the difference between production control and quality control. The link between the quality of the finished product and design, construction and production techniques was also discussed.

Fourth day

The participants visited two furniture factories to study production and production control in connection with quality. These subjects were discussed with supervisors of the factory.

At the Standard factory, in Sarajevo, the participants found that the quality and quantity of material and components were thoroughly controlled. Factory representatives mentioned that the responsibility for the quality of the final product at present lay with the ŠIPAD central organization.

At the new and modern Vranica factory in Fojnica the participants concentrated on the same subjects as those discussed at the Standard factory.

After the factory visits, an intermediate check was made on the furniture test run at the ŠIPAD-IRC laboratory.

Fifth day

Work started in the laboratory on tested furniture. Measuring and the evaluation of the test results followed by a one-week test run. The results were then discussed in relation to the construction of the chair, easy chair and case goods.

Final session

All questions concerning quality were summarized:

Possibilities of quality control of the finished product

Link between control of production and material and quality control

Other factors influencing the properties of the finished product, such as design, construction and production techniques

Expectations of product users

III. FINDINGS

General and organizational matters

The participants found that the quality of the assembled furniture should be stressed to a greater extent than hitherto within the SIPAD industries. They found that SIPAD had qualified personnel and that the production technology and production control were at a high level. The laboratories within SIPAD-IRC included testing facilities for materials and furniture products.

The participants were of the opinion that those concerned with production should pay greater attention to the quality control of the product. Attention should be paid not only to details such as surface treatment but also to proper functional dimensions (based on ergonomic data), stability, strength, durability and functionality. Quality control was different from production control in factories. At present, it was not clear who, within the SIPAD organization, was responsible for the quality of the finished product when shipping it from the manufacturing plant to the consumer.

The strong link between construction, production and design was emphasized. Design was based not only on aesthetic factors, but also on the quality of the finished product in relation to the prospective market; and construction should take the most rational methods of production into account.

To strengthen the link between the quality of the product and the various stages of production, it was suggested that a furniture quality centre be established within SIPAD-IRC. The centre would provide consulting services and, in the long run, be able to administer a SIPAD quality approval system based on specifications and other documentation on quality. However, each manufacturer should be responsible for the quality of the finished product, since each production stage affected the quality of the product. Consequently, it was suggested that each manufacturer have test equipment to carry out simple and quick tests on assembled products and components to avoid production errors, since the proposed furniture quality centre could deal only with samples.

The participants were of the opinion that a furniture quality centre could assist in linking all factors influencing the finished product, i.e. material, design, construction and production. The quality aspect was also connected with marketing because of the relation between quality and market price. The aims of such a furniture quality centre should be concentrated on applied techniques more than is the case at present at the Scientific Research Centre within SIPAD-IRC.

Development of the furniture testing laboratory

It was found that, regardless of how the quality control for furniture was administered experience gained from furniture testing in Sweden showed that minor adjustments and calibrations of the test equipment in the SIPAD-IRC laboratory needed to be made. Also, certain additional equipment needed to be acquired. Simple administrative routines had to be worked out for the laboratory, with a register for the various tests and records, test certificates etc. Forms for use within the laboratory when calculating and assessing test values would have to be prepared and also forms for reporting the test results to the manufacturer and test certificates. Test methods should be published and quality specifications worked out, preferably for various levels to select a level suitable for a given market.

IV. RECOMMENDATIONS

1. Responsibility within SIPAD has to be fixed for the quality of the finished, assembled product in relation to levels of quality for which the manufacturer is responsible. When establishing different levels that will form the basis of the design and manufacture of furniture, functions and operations leading to a desired quality level should be co-ordinated, i.e., design, technical construction, quantitative and qualitative production capabilities and testing.

2. The level of quality of the end-product must be balanced against the expected marketing situation and the retail price to make manufacturing profitable. This is the task of the marketing analyses to be done by the central SIPAD organization.

3. The levels of quality must be specified together with test methods and quality classification schemes. This procedure makes it possible to test and assess furniture before production and to test samples from production runs to compare the desired levels of quality and to make suggestions to the production department for improvements. Furniture components may be produced at a high quality level compared with the average level chosen for the assembled furniture unit.

4. The testing of a furniture unit is more applied than scientific research work. A furniture quality group should be established to detail the quality specifications and test methods.

5. The labour force should be encouraged to assume some of the responsibility for the end-product and not only for certain steps in the process.

6. Seminars on subjects concerned with quality control should be organized for workers. These seminars might deal with specific problems within a manufacturing organization or with general problems in the central organization.

7. Manufacturers should install test facilities within the factory to carry out simplified checks on materials and products.

8. To guarantee a proper functioning of the present SIPAD-IRC furniture test laboratory, additional items of equipment are necessary, together with calibration and adjustment of existing equipment as described below.

9. The testing equipment for case goods and tables should be relocated to a corner in the laboratory so that the test rig can be braced to the wall, which then also can be used as a reference for measuring. After the testing equipment has been positioned it has to be fixed to the floor.

10. Adjustment means controlling and balancing the load (mass), forces, frequency, measures and air pressure. Adjustment of the control system of the air pressure circuit by pressure meter.

11. The following equipment is needed:

Textile (sheeting) and thin polyesther for protection of the sample

Camera for registering tested furniture and results of testing

Balance for calibrating test weight (masses)

Air pressure control gauge

Force measuring device, dynamometer

1-kg steel bars for testing of shelves

Steel weight for impact testing of shelves

Glass bowls, filtering paper, liquids and light sources according to ISO 4211 for surface testing.

Annex I

WORK ORGANIZATIONS OF ŠIPAD

incorporated (compound) organization of associated labour for forestry, wood processing and trade

ŠIPAD

71000 SARAJEVO, Maršala Tita 15, Yugoslavia
Telex: 41-140 yu šipad and 41-212 yu šipad
Cable: ŠIPAD SARAJEVO
Telephone: (071) 33-188 and (071) 35-170
Post Office Box: 213

1. Radna organizacija **ŠIPAD — BIRAČ** 75440 VLASENICA, Toplička bb.	Telephone (075) 86-033; Telex:
2. Radna organizacija **ŠIPAD — CELPAK** 78300 PRIJEDOR, Save Kovačevića bb.	Telephone: (079) 21-022 Telex: 45-413
3. Radna organizacija **ŠIPAD — EXPORT-IMPORT** 71000 SARAJEVO, Maršala Tita 15	Telephone: (071) 33-188 Telex: 41-140
4. Radna organizacija **ŠIPAD — GRMEČ** 77260 DRVAR, Marka Oreškovića bb.	Telephone: (077) 85-102 Telex: 75-875
5. Radna organizacija **ŠIPAD — INŽENJERING** 75400 ZVORNIK, Filipa Kljajića 11	Telephone: (075) 81-222 Telex: 44-220
6. Radna organizacija **ŠIPAD — IRC** 71000 SARAJEVO, Maršala Tita 64	Telephone: (071) 22-131 Telex: 41-350
7. Radna organizacija **ŠIPAD — IGO** 78257 KUPRES	Telephone: (070) 84-025 Telex:
8. Radna organizacija **ŠIPAD — JAHORINA** 71000 SARAJEVO, Hamze Hume 1	Telephone: (071) 512-000 Telex: 41-298
9. Radna organizacija **ŠIPAD — JANJ** 78245 DONJI VAKUF, 1. maja bb.	Telephone: (070) 83-104 Telex: 45-647
10. Radna organizacija **ŠIPAD — KLJUČ** 78280 KLJUČ, Maršala Tita 42	Telephone: (079) 77-066 Telex: 45-437
11. Radna organizacija **ŠIPAD — KOZARA** 78400 BOSANSKA GRADIŠKA, Partizanska 1	Telephone: (078) 81-600 Telex: 45-139
12. Radna organizacija **ŠIPAD — KOMERC** 71000 SARAJEVO, Trampina 14	Telephone: (071) 33-188 Telex: 41-140
13. Radna organizacija **ŠIPAD — KONJUH** 75270 ŽIVINICE, Pionirska bb	Telephone: (075) 74-220 Telex: 44-170
14. Radna organizacija **ŠIPAD — MAGLIĆ** 71480 FOČA, 29. novembra 6	Telephone: (073) 72-102 Telex: 41-279
15. Radna organizacija **ŠIPAD — MAJEVICA** 75300 BREČKO, Braće Suljagić 4	Telephone: (076) 25-408 Telex: 44-785
16. Radna organizacija **ŠIPAD — OŠTRELJ** 77250 BOSANSKI PETROVAC, Marka Jokića 14	Telephone: (077) 81-048 Telex: 45-818
17. Radna organizacija **ŠIPAD — ROMANIJA** 71350 SOKOLAC, Slaviše Vajnera-Čiče 3	Telephone: (071) 83-044 Telex: 41-254
18. Radna organizacija **ŠIPAD — SANA** 78300 SANSKI MOST, V. Miljevića 3	Telephone: (079) 86-022 Telex: 45-457
19. Radna organizacija **ŠIPAD — SEBEŠIĆ** 72270 TRAVNIK, Maršala Tita 43	Telephone: (072) 81-955 Telex: 43-144
20. Radna organizacija **ŠIPAD — ŠATOR** 78279 GLAMOČ, Trg žrtava fašizma 33	Telephone: (080) 74-022 Telex: 74-042
21. Radna organizacija **ŠIPAD — UNA** 77240 BOSANSKA KRUPA, Proleterska bb	Telephone: (077) 72-022 Telex: 45-815
22. Radna organizacija **ŠIPAD — VELEŽ** 79000 MOSTAR, Rude Hrozničeka bb	Telephone: (088) 32-447 37-540 Telex: 46-187 and 54-203

Annex II

LIST OF DOCUMENTS ON FURNITURE TESTING AND QUALITY CONTROL
PREPARED BY THE SWEDISH FURNITURE RESEARCH INSTITUTE

Attachment

1. Furniture testing and quality control

2. Inventory of strains on different types of furniture during actual use

   Based on ISO/TC 136-41E

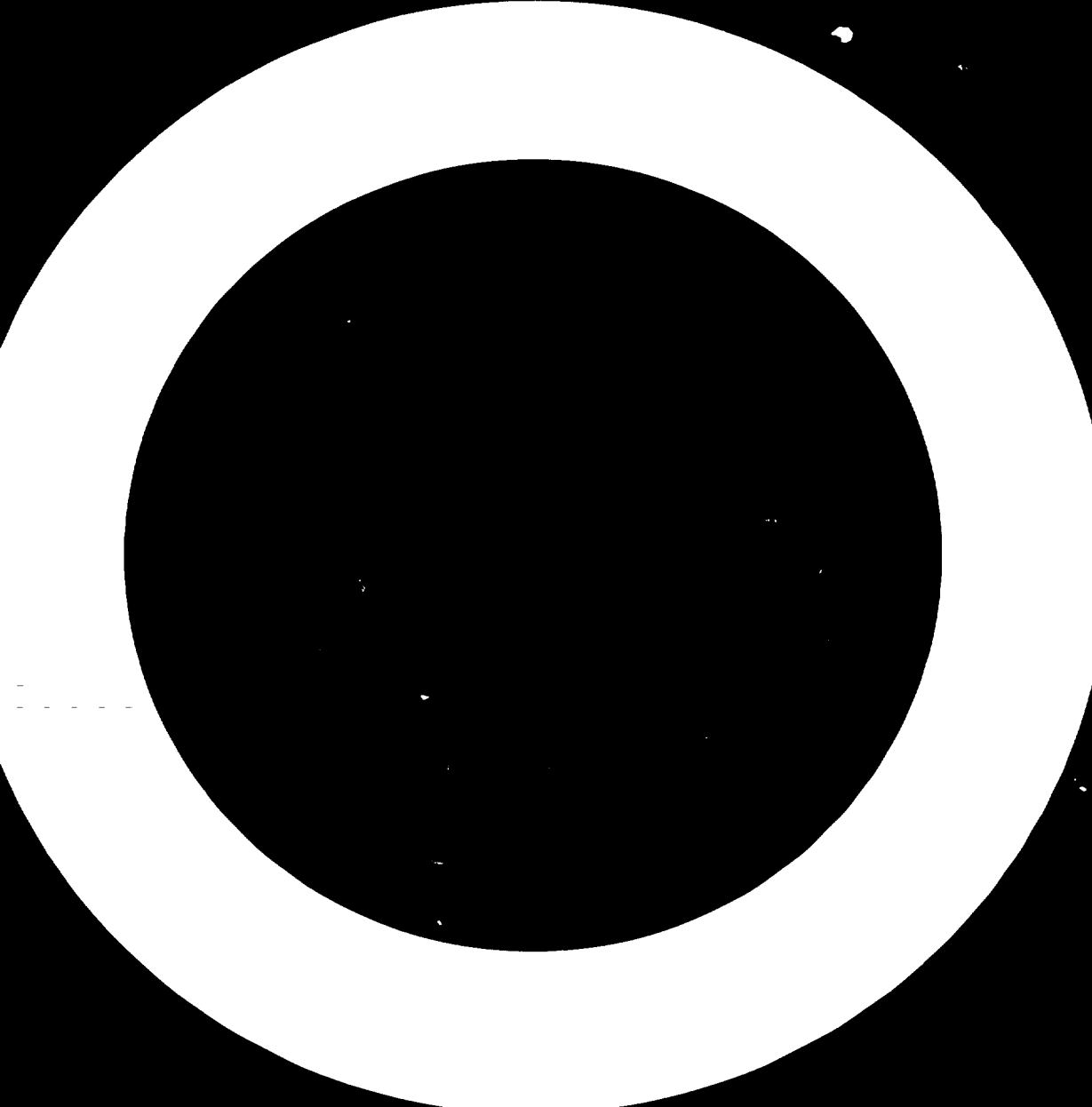
3. Classification of quality of material and workmanship

   Based on ISO/TC 136-N13

4. Quality of materials and workmanship based on SIS 839030

5. Test certificate forms from Möbel Fakta and the Swedish Furniture Research Institute

6. Organization chart for the Technical Committee TC 136 on furniture



Attachment I

möbelinstitutet

Furniture Testing and Quality Control

0 Scope
1 Furniture Research in Sweden
2 Quality Control
3 Consumer Information
4 Requirements and Test methods, Survey
5 Workmanship
6 Surface Resistance
7 Chairs
8 Sofas, Settees
9 Beds and Mattresses
10 Tables
11 Storage Furniture
12 Kitchen Furniture
13 Childrens High Chairs
14 Cots
15 Office Furniture

Appendixes: Sonderdruck, Holz 38-1980
Guide to test methods
"Möbelfakta"-booklet (special print)
The Swedish Furniture Research Institute, Introd.
Specification A2:22 Cots

Copies of Swedish standards can be obtained from the national Standards Institutions in various countries.

Möbelinstitutet
Box 27 198
S-102 52 STOCKHOLM -Sweden
Tel: 08/ 67 92 45

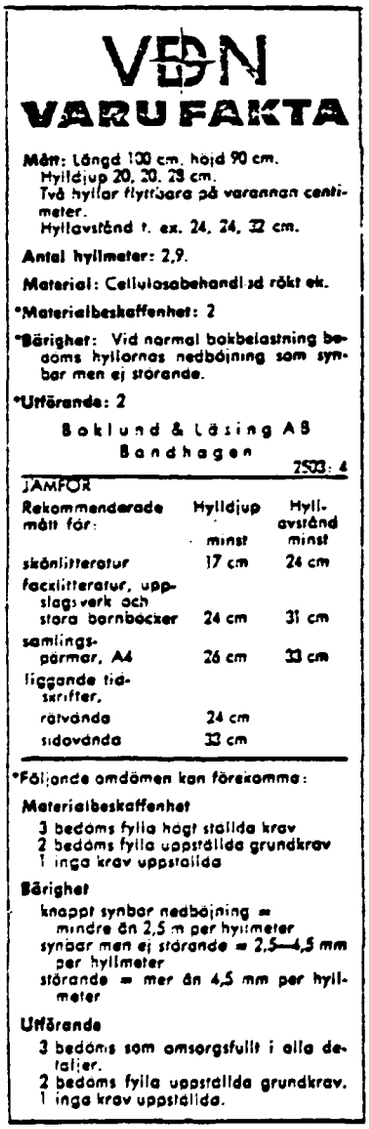
0 Scope

This document deals with testing and requirements of furniture. It is mainly based on 30 years of experience in Sweden concerning testing and assessment of the assembled piece of furniture (as it appears to the final user) in connection with quality control and consumer information. The aim of the paper is to give the reader an idea of how the user approach to the assembled furniture is applicable in furniture testing and quality control.

1 Furniture Research in Sweden

At the beginning of this century attempts were made in Sweden by progressive designers to create sets of furniture for the working classes. These efforts turned out to be of minor success but were the source of inspiration for young students who later in the twenties and thirties became the first generation of designers working in the famous Scandinavian Design style. During the thirties there aroused an interest among these architects to study the function of the houses and the furniture. This had a strong influence on housing and city planning after the Second War. In 1930 a great exhitibion in Stockholm introduced the ideas of "functionalism", mainly based on the principles of the German "Bauhaus"-school. These ideas gained ground during the following decades and are still important in the Swedish approach to design problems.

At the end of the 1940's projects started for research of functions of household equipment within the Swedish Society of Industrial Design. Furniture recommendations of functional dimensions and design were elaborated and published with Mr Erik Berglund as main author. In the middle of the 1950's there started a work with informative labelling, test methods were developed and the first labels appeared in the furniture shops.



VÄRU FAKTA

Mått: Längd 100 cm, höjd 90 cm.
Hylldjup 20, 20, 28 cm.
Två hyllor flyttbara på varannan centimeter.
Hyllavstånd t. ex. 24, 24, 32 cm.

Antal hyllmeter: 2,9.

Material: Cellulosabehandlad rökt ek.

*Materialbeskaffenhet: 2

*Bärighet: Vid normal bokbelastning bedöms hyllornas nedböjning som synbar men ej störande.

*Utförande: 2

Boklund & Läsing AB
Bandhagen
7503: 4

JÄMFÖR

Rekommenderade mått för:	Hylldjup minst	Hyllavstånd minst
skönlitteratur	17 cm	24 cm
facklitteratur, uppslagsverk och stora barnböcker	24 cm	31 cm
samlingspärmar, A4	26 cm	33 cm
liggande tidskrifter,		
rätvända	24 cm	
sidovända	33 cm	

*Följande omdömen kan förekomma:

Materialbeskaffenhet
3 bedöms fylla högt ställda krav
2 bedöms fylla uppställda grundkrav
1 inga krav uppställda

Bärighet
knappt synbar nedböjning = mindre än 2,5 m per hyllmeter
synbar men ej störande = 2,5—4,5 mm per hyllmeter
störande = mer än 4,5 mm per hyllmeter

Utförande
3 bedöms som omsorgsfullt i alla detaljer.
2 bedöms fylla uppställda grundkrav.
1 inga krav uppställda.

At the end of the sixties a new organization was established by furniture manufacturers, retailers together with consumers organization as founders with support from the Government. Möbelinstitutet (MI) - The Swedish Furniture Research Institute - took over the responsibility for test methods and consumer information and improved the informative labelling system "Möbelfakta". This activity is described in an article by Mr Berglund in the appendix "Holz als Roh- und Werkstoff" 38 (1980).

In the programme of work for MI, testing of furniture and components is a considerable part. Other fields are research of functions and properties, information to schools, journalists, manufacturers, etc.

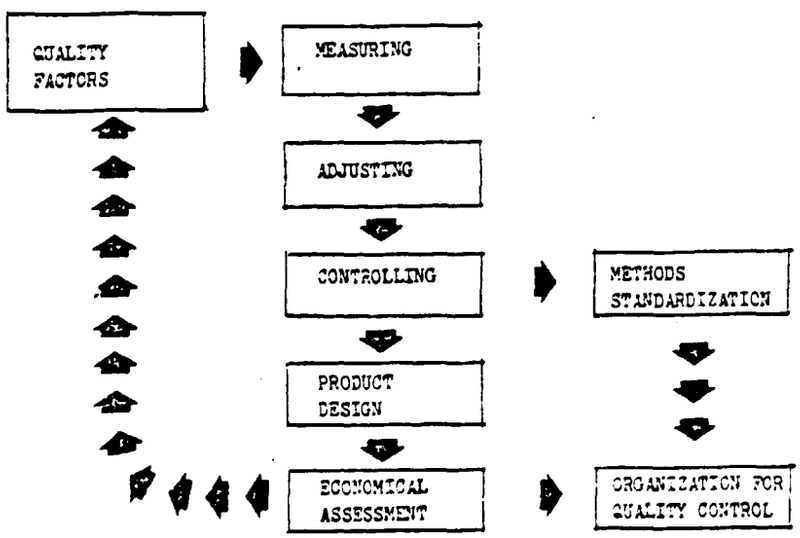
References: E Berglund: Die Standardisierung der Gebrauchseigenschaften von Möbeln in Schweden-Holz 38 (1980)
E Berglund: Bord, Stockholm 1957
E Berglund: Skåp, Stockholm 1960
The Swedish Furniture Research Institute. Presentation and working programme, 1979-09-13
List of reports from MI.

2 Quality control

For the consumer, quality means that a products fulfils his expectations in function and design. It may also be a symbol of his social situation. Unfortunately, quality aspects can be different for the consumer and for the manufacturer.

The level of quality is an important factor when value analyzing the production of a manufacturer. This makes quality methodology and quality control necessary. An active quality policy is necessary in order to improve the products and to reduce faults and waste, but it is also necessary in order to prevent from manufacturing details - or the whole product - at a too high quality level, which can be very costly for all parties.

The quality control is based on knowledge of variations in material and production, making statistics necessary for an effective quality control. Also a value analysis of the quality policy and level is necessary when considering the expected market and final byers.



To choose and maintain a certain quality level is the responsibility for all departments of a manufacturer. The quality control section thus has a tricky situation as the control work has a good chance to irritate some other departments.

It is thus very important that the control department in a factory has an independent position with a skilled head. The department must have good knowledge and experience of production and also of materials and components in use. Furthermore, statistical experience is essential as well as some knowledge of value analysis and economics. It is advisable that the control assistants have the rank of a foreman.

Quality control as such is described in hundreds of books in different languages and is also a subject in many schools.

The organizing of a laboratory for furniture is depending on how extensive the testing will be. At Möbelinstitutet ca. 1 000 pieces of furniture are tested per year. The laboratory is in two parts. The first part ca 100 m^2 is humidfied where the furniture is to be conditioned, measured, inspected and surface tested. The second part where mechanical testing is done is a room of 200 m^2 and after testing, the furniture is placed in a storage, 100 m^2, prior to transportation etc. The office facilities covers ca 60 m^2; a workshop 50 m^2 and in the basement of ca 30 m^2 air compressors etc are sited.

3 Consumer information

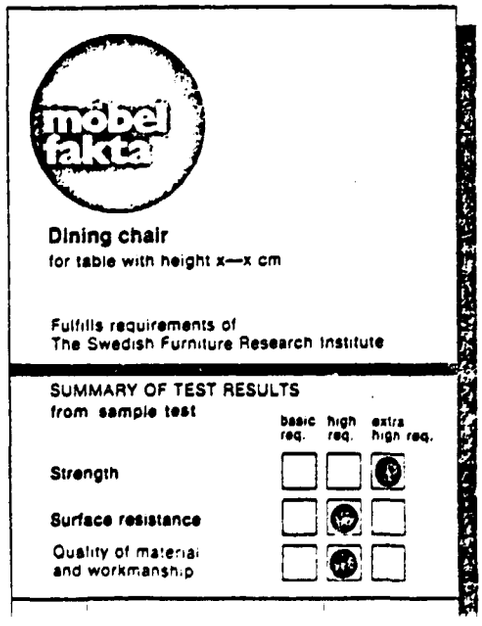
The consumer information can be made in different ways.

Comparative tests means that e g a consumer organization tests and compares a number of different products on the market and publishes the results so that the buyer can be guided in his choice for a "best buy" by comparing these results in the publication.

Informative labelling is when a label is attached to the product, giving information about some vital properties. This makes it possible for the buyer to compare the different products in the shop, together with the price tag.

Quality standards and marks indicating conformity with certain standards. This is applicable when a product must fulfil some minimum requirements for a quality marking. This is often the case with electric appliances, which must fulfil minimum safety requirements.

The Swedish "Möbelfakta" system combines a quality mark and an informative label. The piece of furniture must be type tested and must fulfil some vital functional and safety requirements as well as minimum strength, durability and workmanship requirements. If the latter three properties are higher than the minimum requirements, then the label can inform about this. The label is issued under supervision of the Swedish Furniture Research Institute.



Control samples from production or from retailers are later tested to ensure that the piece of furniture is in conformity with stated merits on the label. It is the responsibility of the manufacturer or importer to see to it that the properties of the labelled furniture are the same as in the tested piece.

References: Möbelfakta, The Swedish Quality Marking System. Möbelinstitutet, Stockholm

An informative brochure is available in English, French, German or Swedish. See appendix.

4 Requirements and test methods

The Swedish policy has been to test the assembled furniture. Test methods can also be developed for testing of materials and components. For the user, the choice of material may be important when buying furniture, but he has a limited possibility to assess the function or durability of the separate material or construction. The total durability and resistance of the furniture can be objectively tested independent of material etc.

When developing these test methods the starting point has been to simulate the human stresses and forces on a furniture. There are many test methods around the world based on the same ergonomical datas, but the aspect that has been given special consideration when developing the Swedish methods is to simplify the methods so that they easily can be used for routine testing and quality control in the factories. This means that there may exist other methods with higher accuracy but mostly they tend to be so complicated that they hardly can be used for routine testing outside a research laboratory.

These two different approaches have been considered within ISO - The International Organization for Standardization - when trying to work out international standards for furniture. However, within Scandinavia the Swedish philosophy has been accepted, and a number of methods have been de-

veloped in cooperation between the Scandinavian countries.

A number of requirements have been established for different types of furniture. Behind these requirements there is ergonomical research work and also experience from manufacturers, retailers, consumers and from series of tests.

The requirements and associated test methods which are used in the "Möbelfakta" system are described in principle in the following chapters.

References: ISO/TC 136 No 41. Inventory of strains on different types of furniture during actual use. ISO 1974
Survey of test methods for "Möbelfakta".
Survey of requirements for "Möbelfakta".

5 Workmanship

In order to assess the accuracy of the furniture, requirements and methods have been elaborated for classification of the quality of material and level of workmanship.

The basic requirements do not allow large defects, but some minor defects are allowed and defined. They are graded depending on level of requirements and on the predominance of the assessed part of the furniture.

The table on the next page will give an example of how defects in solid wood may be classified. "I" means that the defect is not allowed.

Solid wood and Surface Veneer

Defects	Level A	B	C	D	E
Bark, insect damage Decay, unsound knots Pitch pockets	I	I	I	I	I
Knotholes, loose knots wane, bole scar	I	I	I	I	IV
Inbark, bark-ringed knot	I	I	I	II	IV
Filled knots (out of colour)	I	I	I	II	IV
Visible pith of max width	I	I	II 3 mm	II	IV
Open checks and splits	I	I	II	II	IV
Filled checks and splits (not in colour)	I	I	II	III	IV
Drilled and plugged knots					
Knot groups 1/					
Streaks of sapwood in oak, teak, palisander and other types of wood with distinct heart wood formations 1/	I	II	II	III	IV
Discolouration					
Filled knots (in colour) size max		6 mm	12 mm		
Filled checks and splits (in colour)	I	II	II	III	IV
Small surface checks (e.g. in turned veneer)					
Cross-grained 1/ or Slope-grained wood 2/	I	II	III	IV	IV
Streaks of heartwood contrasting to the general appearance 1/	II	II	III	IV	IV
Sound knots or firmly attached dead knots 1/	II	III / II	III	III	IV
knot size not exceeding	6 mm	6 mm / 12 mm	20 mm	30 mm	

Note 1/ If the defect is employed deliberately and occur throughout a full production run the next higher level may be quoted.

2/ If the defect is employed deliberately with a decorative effect (e.g. root veneer) level "A" may be quoted.

Large defects may affect the function or safety of the furniture or may injure the user or damage his clothes. Smaller defects, e.g. discolorations, do affect the appearance and are not allowed on a piece of furniture intended to be of a high quality. The accuracy when selecting material and a careful manufacturing have a heavy influence on the price of the furniture.

References:
ISO/TC 136/SC 3 No 13, Classification of quality of material and workmanship. ISO 1977
Swedish Standard SIS 83 90 30.

TO SET THREE CLASSES OF QUALITY
(High, Medium, Low)
FIVE GRADING LEVELS OF WORKMANSHIP (A - E):

	Quality Class		
	HIGH	MEDIUM	LOW
Exposed parts	A	B	C
Less exposed parts	B	C	D
Concealed parts	E	E	E

6 Surface resistance

The surface of a piece of furniture is subject to different stresses depending on the type of use. The following table gives information of the requirements in the "Möbelfakta" system.

Möbelinstitutet
The Swedish Furniture Research Institute

SURFACE RESISTANCE Survey of requirements

möbelfakta

Requirements for the completed surface, not only the lacquer

Note:

1/ Change in appearance should not be worse than 4 in the numerical rating described in SIS 83 91 18, for all tests and categories, except for category 1 and 2 where rating 5 is required. For aceton tests however, rating 4 is accepted.

2/ The acetonetest is applied only on interior and flaps of toilet cabinets.

3/ The heat test is rated according to the same numerical rating system as in SIS 83 91 18, and the same rating scale as mentioned above in note 1/ is valid here.

4/ Working top adjacent to a kitchen stove or oven, and shelves in pan cabinet shall withstand 200°C according to SIS 24 58 20, para 5.5.

		SURFACE CATEGORIES 1			2			3			4			5		
		Top of working desk, toilet table *)Minimum req. for working tops of kitchen units			Top of dining table, coffee table, side table			Storage furniture top of cupboard and similar below the height of 1,25 m. Working top, interior of bar and toilet cabinets *)Minimum req. for external parts of kitchen units other than working tops			Storage furniture open shelves Seating furniture seats and armrests Recline furniture bedsteads and panels Children's High Chairs and Cots			Other less exposed parts of furniture of all categories		
		REQUIREMENTS: Basic	High	Extra high	Basic	High	Extra high	Basic	High	Extra high	Basic	High	Extra high	Basic	High	Extra high
a	Water (acc. to SIS 83 91 18) 1/	6 h	24 h	24 h*	6 h	24 h	24 h	6 h	24 h*	24 h	1 h	6 h	24 h	1 h	1 h	1 h
b	Oil (acc. to SIS 83 91 18, paraf.oil, scratch acc. to MI P 0-41) 1/	24 h	24 h+ scr. 8 N	24 h* scr. 12 N	24 h	24 h+ scr. 8 N	24 h+ scr. 12 N	24 h	24 h* scr. 8 N	24 h+ scr. 12 N	24 h	24 h+ scr. 8 N	24 h+ scr. 12 N	24 h	24 h	24 h
c	Scratching (acc. to SIS 83 91 17)	-	4 N	8 N*	-	3 N	7 N	-	3 N*	7 N	-	3 N	7 N	-	-	-
d	Alcohol (acc. to SIS 83 91 18) 1/	1 h	6 h	16 h*	1 h	6 h	16 h	1 h	6 h*	16 h	-	-	-	-	-	-
e	Coffee (acc. to SIS 83 91 18) 1/	1 h	6 h	16 h*	1 h	6 h	16 h	1 h	6 h*	16 h	-	-	-	-	-	-
f	Heat (acc. to SIS 18 41 79) 3)	85°	85°	85°.* damp 4/	85°	85°	85°. damp	85°	85°	85°. damp	-	-	-	-	-	-
g	Acetone (acc. to SIS 83 91 18) 1/	-	2 min	2 min*	-	-	-	-	(2 min) see note 2/	(2 min)	-	-	-	-	-	-
h	Detergent and Black Current juice respectively (only for A1:45-Kitchen units)	-	-	16 h*	-	-	-	-	6 h*	-	-	-	-	-	-	-

h = hours N = Newton

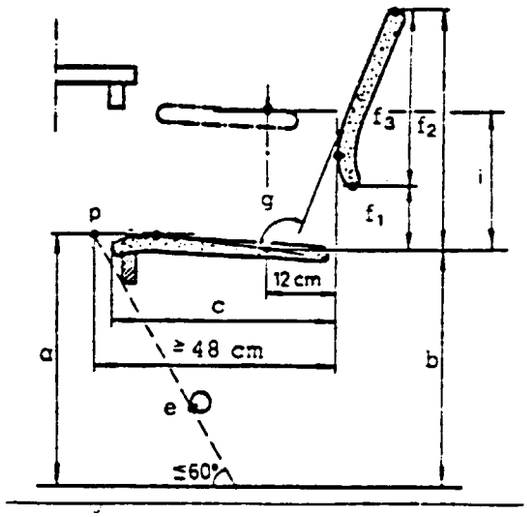
The test principle for cold liquids is to soak a filtering paper with the relevant liquid. The paper is placed on the surface for a specified time and covered with a bowl. This method is now agreed upon as an international method, ISO 42 11.

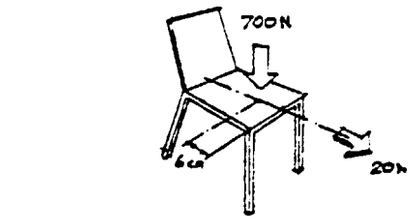
Scratches are made with a 1 mm diameter point loaded with a force and moved on the surface. The width of the scratch is measured and shall not exceed 0,5 mm.

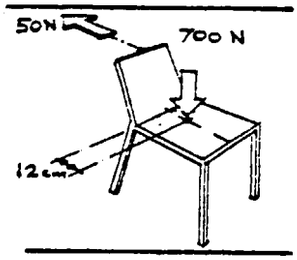
References: Swedish Standards SIS 18 41 79,
83 91 17-18 and 19;
MI-method MI PO-41
ISO 4211, Surface resistance.

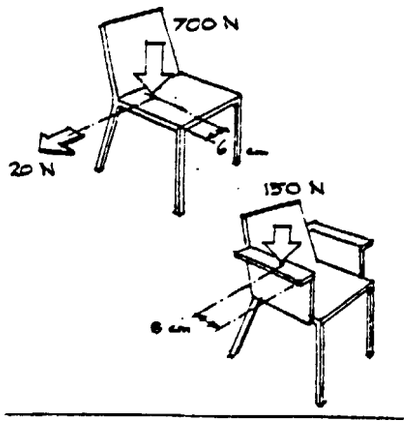
7 Chairs A1:10

(upright sitting)









The functional requirements are related to measurements and stability. The measurements are described with highest accuracy for the types of chairs which will be used at desks for longer periods.

The principle for determining stability is as shown in the figure. It also includes the limits (150 N, 50 N and 20 N).

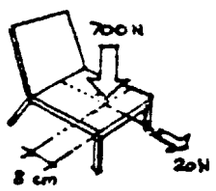
For the durability test a mass of 70 kg is attached to the seat. A force is applied to the back until the front legs are lifted 30 mm from the floor. From this position the chair is allowed to fall back freely. A force of 250 N is applied towards the armrests, 45° outwards.
The testing is carried out up to 60 000 cycles; minimum requirements being 5 000 cycles

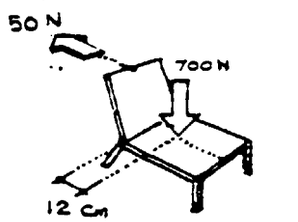
References:
Swedish Standards SIS 83 95 03 and 05
Specification A1:10, Möbelinstitutet.

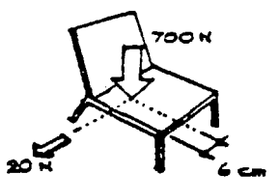
8 Sofas, easy chairs A1:15 (Bed settees A1:25)

(reclined sitting)

The functional requirements are stability and measurements. The principle for stability is shown in the figure.

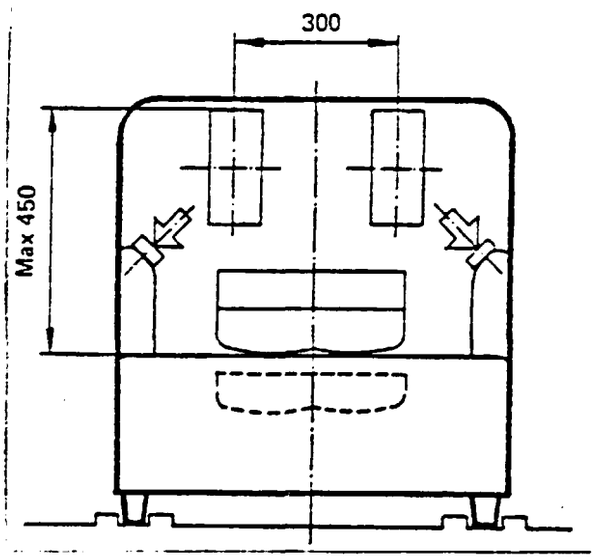






For durability, a dummy with a mass of 50 kg is working the cushioning up to 130 000 cycles; minimum requirement 20 000. The change of the cushioning is measured.

Armrests are tested as for chairs, the back of chairs with a force of 300 N.

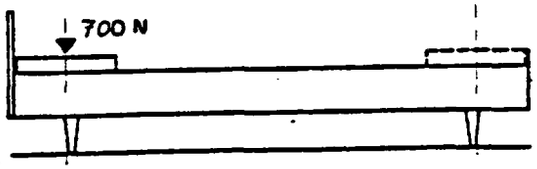


The requirements for bed-settees is a combination of those for settees in A1:15 and for beds in A1:20.

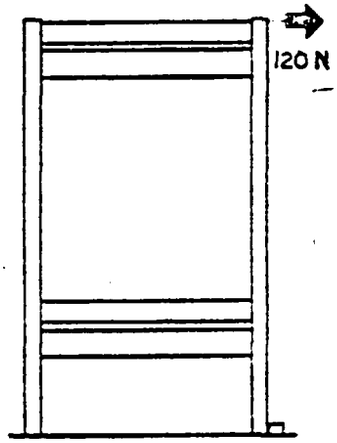
References: Swedish standards
SIS 83 95 05 and 08
Specifications A1:15 and A1:20, Möbelinstitutet.

9 Beds and mattresses A1:20

The functional requirements are stability and softness.

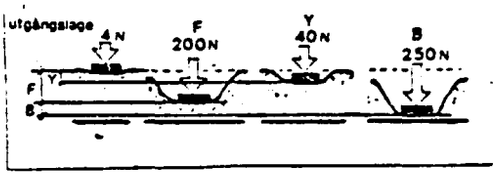


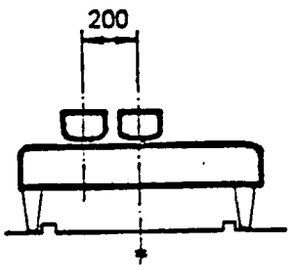
The principle for stability for ordinary beds and bunk beds are as shown.



The softness is determined by pressing an indentor with 100 mm diameter into the mattress.

The dept in mm at given forces classifies the mattress.





The durability is determined by working the upholstery (mattress) with two dummies, each with a mass of 50 kg, up to 130 000 cycles (minimum 25 000) and by measuring the change in softness.

A supplementary test is a chock-test, that is carried out up to 40 cycles with a 50 kg mass, falling freely from 80 mm above the surface. For legs and headboards supplementary tests are also done.

References: Swedish standards SIS 83 96 21,22 and 23.
Specification A1:20, Möbelinstitutet.

10 Tables A1:30

For tables some measurements are vital for the function, particular together with chairs. The dimension of the table top and placing of the legs of the table give the number of persons who can use the table. The requirements for stability may be important in some applications.

The strength and durability is determined by applying horizontal forces (150 N) in all four directions up to 12 500 cycles and by measuring the increase in movement.

The surface resistance is important for tables, especially for dressing rooms and worktops, where acetone from glue or nail polish may occur. See chapter 6 for surface resistance.

Plats för antal pers.	Bredd min. cm										Typ/användningsområde betecknas
	75 1/ "Smalt"	80	85	90	95	100	105		110	135	
	Längd min. cm										
2	75										för 2 pers.
3		90	85								3 pers.
4(3) 2/			105	100	95	90	85				3-4 pers.
4	115	110	110	110	110	110	110				4 pers.
5	135	135	130	130	125	120	110		110		5 pers.
6(5) 2/	155	155	150	145	140	125	125		120		5-6 pers.
6	170	170	170	170	170	170	170				6 pers.
7	185	180	175	175	170	170	170		130		7 pers.
8(7) 2/	195	190	185	175	170	170	170				7-8 pers.
8	230	230	230	230	230	230	230		160	135	8 pers.
9	240	240	240	235	230	230	230		190		9 pers.
10(9) 2/	255	250	240	235	230	230	230				9-10 pers.
10	285	285	285	285	285	285	285		210	195	10 pers.
11	300	295	290	285	285	285	285		245		11 pers.
12(11) 2/	310	305	300	290	285	285	285				11-12 pers.
12	345	345	345	345	345	345	345		265	255	12 pers.

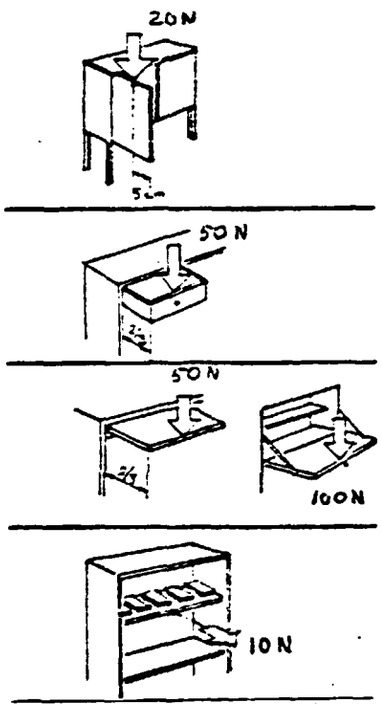
Anm: 1/ Bord med bredd 75-79 cm deklareras: "Smalt matbord för.... personer"

2/ Beteckningen "3-4 pers" avser sittplatser vid båda eller, när bordet står mot vägg, ena kortsidan.

References: Swedish standards 83 94 01, 02 and 03
Specification A1:30, Möbelinstitutet

11 Storage furniture

For storage furniture a number of functional measurements are given for different types of storage. There are also certain stability requirements as shown.



The durability of the framework is determined by applying horizontal forces (150 N) up to 12 500 cycles and by measuring the increase in movement.

The drawers are tested by running 4/5 of their depth, with a load of 0,3 kg/dm^3. The load has a clearance of 20 mm and is fitted with small wheels, slamming the front and back of the drawer every cycle.
The drawer and runners are inspected after certain intervals up to 20 000 cycles, the minimum requirement being 5 000 cycles.

A chock test is applied to the shelves, near the supports, with an inertia of 0,625 or 1,25 Nm.

The deflection of shelves is tested by applying a load for 28 days. The magnitude of the load is depending on both the dimension of the shelf and the free space above.

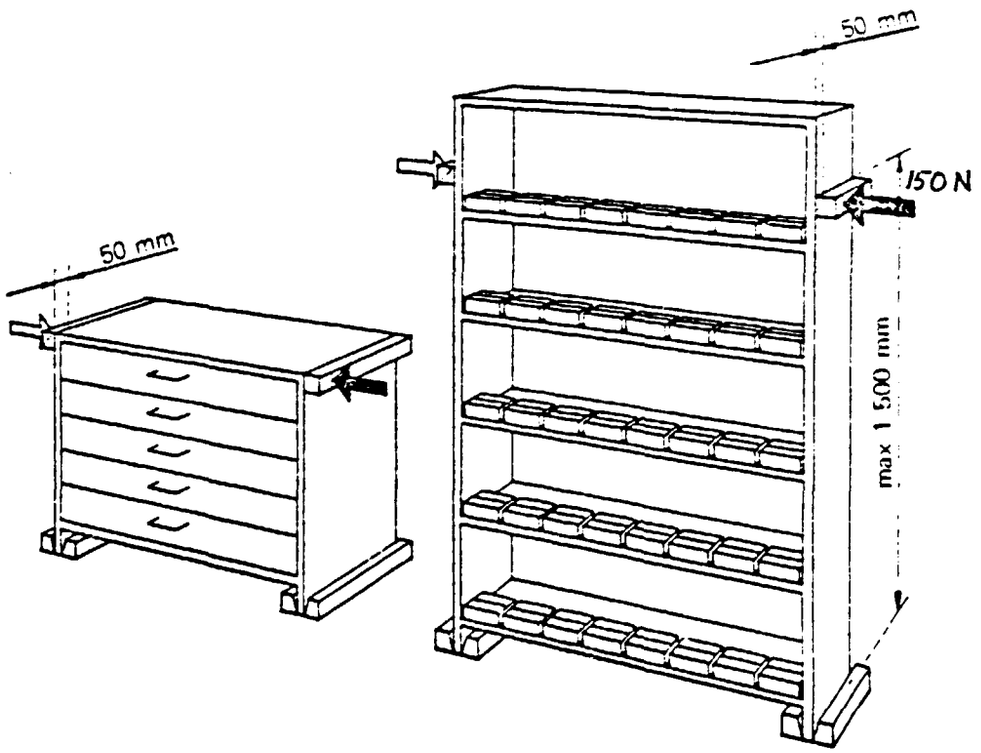
Loads in Kg/100mm

Depth mm	Free space above shelf, mm – 210	(210) – 250	(250) – 300	(300) –
– 170	2	2	2	2
(170) – 240	2	2	3	4
(240) –	2	3	4	5

The deflection of the shelf after 28 days is not to exceed 0,6 % for the minimum requirements or 0,3 % for the highest.

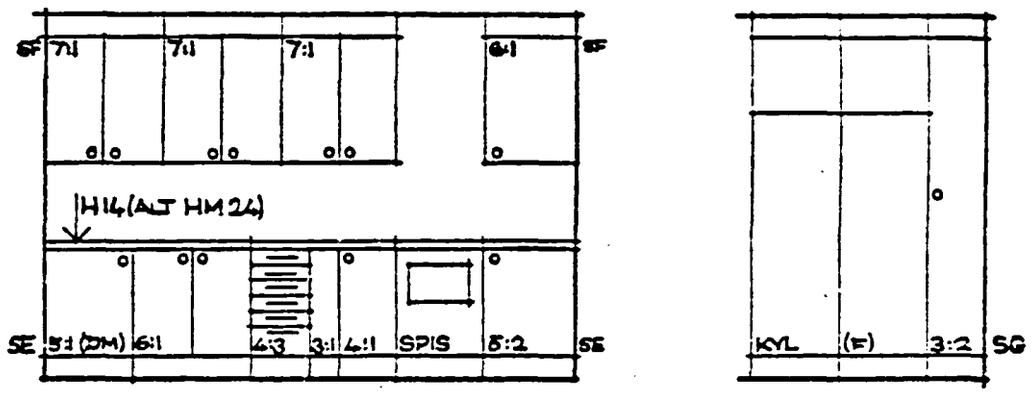
The surface resistance is for some parts in principle the same as for tables. See chapter 6.

References: Swedish standards SIS 83 60 20,
83 91 11,
83 97 01-02 and 03
Specification A1:40, Möbelinstitutet



12 Kitchen units A1:45

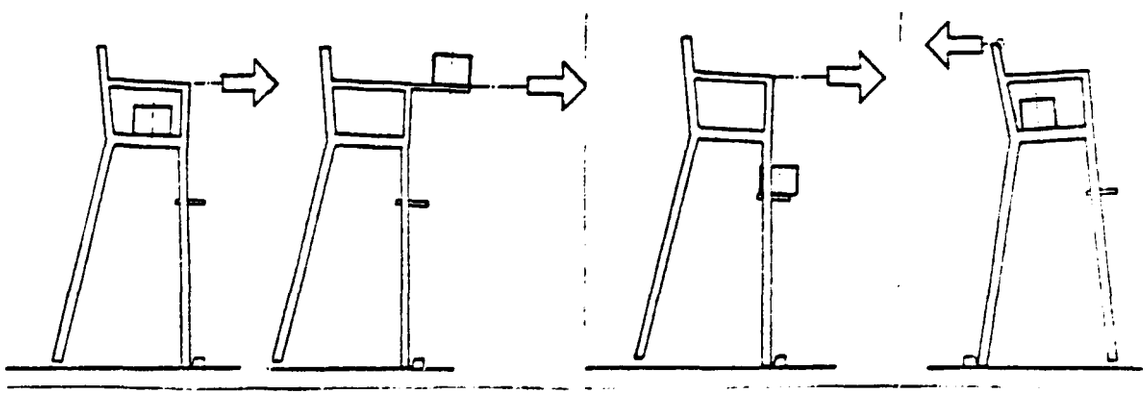
For these types apply special requirements according to Swedish standards. The test methods are in principle the same as for storage furniture. See chapter 11.



References: Swedish standards 83 41 11, 28, 30 and others.
Specification A1:45, Möbelinstitutet

13 Childrens high chairs A2:13

Here the functional measurements and stability are essential for a safe function in connection with a table. The principle for stability is as illustrated. With a load of 5 kg, the tilting force shall be minimum 20 N.

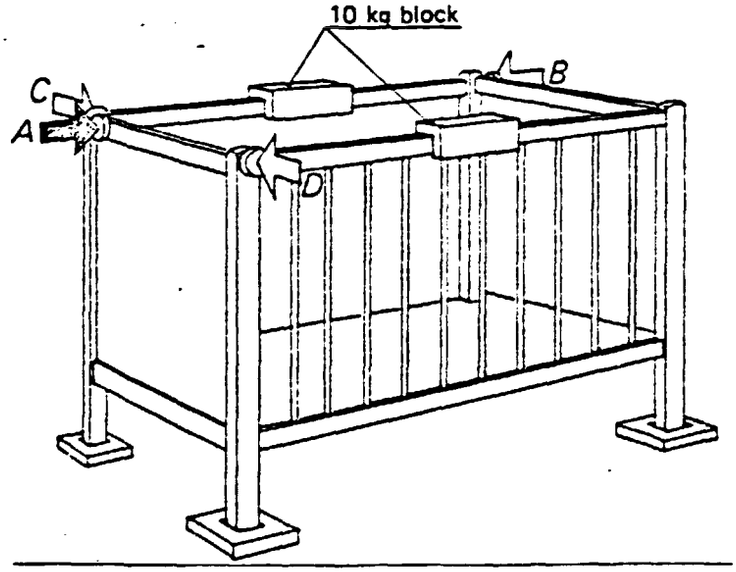


In this requirement a reference is made to the Swedish legislation concerning use of poisonous materials.

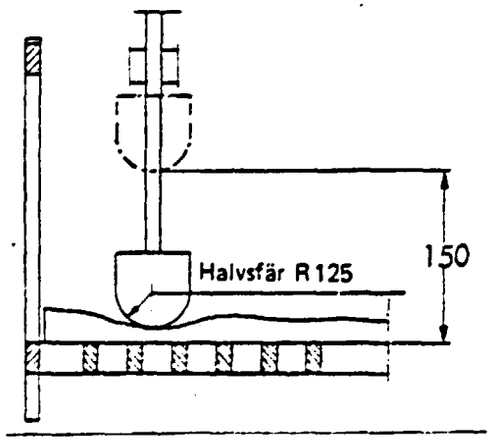
References: Swedish standards SIS 83 95 06 and 07
Specification A2:13
Swedish legislation 1973:329 §§ 1 and 5.

14 Cots A2:22

For requirements, see attached copy of A2:22 in English.



Testing of durability of framework is done by applying horizontal forces (100 N) in all four directions and by measuring the increase in movement.



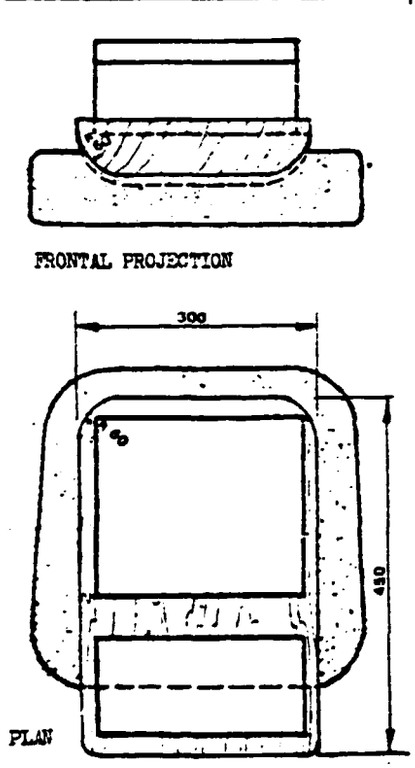
The strength and durability of the bed bottom is tested with a 10 kg striker with a free fall of 150 mm at 5 points, 1 000 cycles at each (total 5 000).

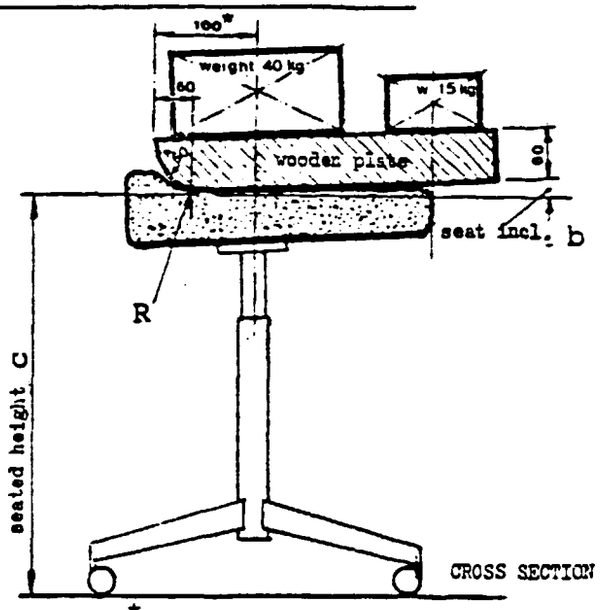
References: Swedish standard SIS 83 96 41
Specification A2:22
Swedish legislation 1973:329 §§ 1 and 5

15 Office furniture B4:10-30 and 40

These new specifications refer in principle to the same test methods as for domestic furniture. However, occasionally the requirements are a little higher.

Method of measuring "seated height" and inclination of seat





*As for chair without swivel base according to the picture, the rear edge of the wooden compression plate shall be placed 60 mm horizontally in front of the foremost lumbar support point (s) of the backrest.

Forschung und Praxis

Holz als Roh- und Werkstoff

Holz als Roh- und Werkstoff 38 (1980) 5-10

Die Standardisierung der Gebrauchseigenschaften von Möbeln in Schweden

E. Berglund
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Bereits Mitte der 50er Jahre konnte man in Schweden die ersten informativen Aufkleber an Möbeln sehen, die aufgrund von Gebrauchseignungstests verliehen wurden. Die Notwendigkeit objektiver Kriterien für die Qualitätsbeurteilung von Möbeln war der Anlaß für die Entwicklung und Standardisierung einer Reihe von Prüfverfahren. Von entscheidender Bedeutung war hierbei, daß die Funktionstüchtigkeit des fertigen Möbelstückes, und nicht das Material oder die Konstruktion, unter Praxis-Verhältnissen geprüft werden sollte. Es hat sehr lange gedauert, bis diese Art der Möbelprüfung allgemeine Anerkennung gefunden hat. Heute allerdings sind alle Länder an der Möbelprüfung interessiert, und an der Weiterentwicklung der bisherigen Prüfverfahren sind Fachleute aus aller Welt beteiligt.

Standardizing the Performance Quality of Swedish Furniture

In Sweden as early as in the middle of the 1950's the first informative labels appeared on furniture, based on performance testing. The need for objective bases for quality assessment was the incentive for the development and standardization of a great number of test methods. An important point was that the complete piece of furniture - not its separate materials or construction - should be submitted to a test which aimed at simulating its practical use. It took a surprisingly long time until this view on furniture testing was generally accepted. But today all countries are showing an interest in performance testing; the development is continuing and based on international collaboration.

1 Die erste Entwicklung

In Schweden liegen heute für das Gebiet des Möbelbaues und Möbelgebrauches eine größere Anzahl Standards und Spezifikationen für die Gebrauchstüchtigkeit vor. Sie wurden seit Beginn der 50er Jahre aufgrund des starken Interesses von Industrie und Verbrauchern entwickelt mit dem Ziel, dem Verbraucher vollwertige Produkte zu garantieren. Schon hier sei aber darauf hingewiesen, daß sich die heutigen Fertigprodukt-Normen nur auf die Eigenschaftsanforderungen und auf die Prüfverfahren beziehen und keine Vorschriften bezüglich der Materialien oder der Konstruktionen beinhalten. Hierin spiegelt sich die grundsätzliche Einstellung gegenüber der Aufgabe der Normung wider, die sich im Laufe der Jahre herausgebildet hat.

Die erste Möbelnorm Schwedens bestand aus Zeichnungen für Krankenhausmöbel. Sie waren das Ergebnis der Arbeit eines Komitees, aufgrund dessen ein Möbelarchitekt den Auftrag erhielt, eine Sammlung mit Zeichnungen für geeignete Möbel herzustellen. Die Zeichnungen beinhalteten detaillierte Herstellungsbeschreibungen, welche auch Materialien, Konstruktion und Formgebung umfaßten. Diese Möbel zeigten eine vorbildliche Formgebung und verteidigen auch heute noch ihren Platz.

Bald stellten sich aber diese Unterlagen als Beispiel heraus, wie eine Standardisierung nicht durchgeführt werden soll. Es zeigte sich nämlich, daß bald Raum um Raum mit den gleichen Möbeln eingerichtet wurde, nur unbedeutende Änderungen an Stoffen und Farben waren erlaubt. Die Räume wurden monoton, langweilig, und der erarbeitete Standard verhinderte weitere Entwicklungen.

Das gleiche Problem entstand mit dem ersten Standard für Küchenmöbel, wo Abmessungen und Konstruktionen festgelegt wurden. Die Schränke sollten z.B. aus harten Holzfaserplatten auf Rahmen konstruiert werden und auch die Konstruktion der Schubkästen war detailliert angegeben. Bald aber gaben neue Materialien und Verfahren bessere Möglichkeiten Schrankeinheiten zu konstruieren und dem Standard konnte nicht mehr gefolgt werden.

2 Die neue Einstellung zu Standards und Fertigprodukten

Durch diese Erfahrungen reicher geworden, hat man heute in Schweden eine andere Einstellung zur Schaffung von Standards für fertige Möbel. Sie sollen die Wahl des Materials, der Konstruktion oder der Formgebung nicht mehr festlegen. Anstelle dessen ist es aber notwendig, Anforderungen an die gewünschten Gebrauchseigenschaften zu stellen: an Funktion, Sicherheit, Festigkeit und Genauigkeit bei der Herstellung. Es müssen also jene Forderungen befriedigt werden, die ein Käufer zurecht stellen kann. Jedem Hersteller steht es dann frei, diese Forderungen auf geeignete Weise zu erfüllen. Diese Grundeinstellung ist wichtig. Sie hat zu einem neuen Typ von Normen geführt, der die Eigenschaften des Fertigproduktes angibt. Neben diesen Produkt-Normen gibt es eigene Standards für Materialien, z.B. für Plastlaminate, Spanplatten, Faserplatten, Sperrholz usw. Die Zielsetzung dieser Standards ist aber eine andere. Sie sind wichtig für die Herstellung, für den Einkauf und die Kontrolle, aber nicht heranzuziehen, wenn Forderungen an Fertigprodukte gestellt werden. Ein Möbel kann schließlich aus den besten Materialien hergestellt sein. Die Kombination dieser Materialien kann aber dennoch zu einem Möbel mit schlechten Eigenschaften führen.

Es war erstaunlich, wie lange es dauerte, bis sich diese Einstellung durchsetzte. Noch immer versucht man vielerorts, die Qualität eines Möbels dadurch zu beschreiben, daß man z.B. angibt, welcher Kunststoff oder welcher Lack verwendet wurden oder welche Faserzusammensetzung die Möbelstoffe aufweisen. Ein Möbelkäufer ist aber in der Regel außer-

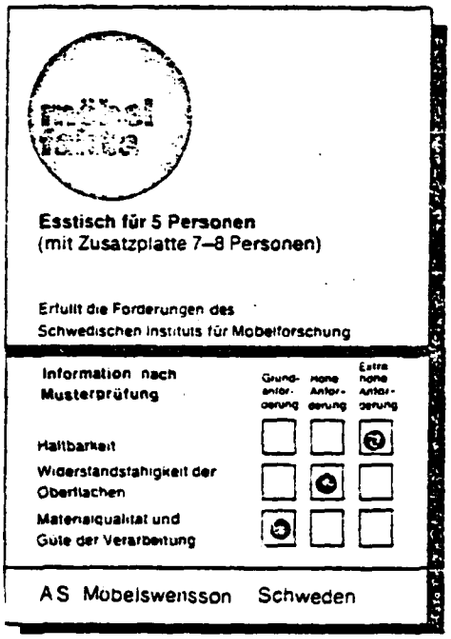

Bild 1. Produktkennzeichnung mit dem „Möbelfakta-System"
Fig. 1. Certificate of product quality "Möbelfakta"

stande, sich ein Bild über die Haltbarkeit oder Funktionstüchtigkeit eines Möbels auf Grund solcher Material- oder Konstruktionsbeschreibungen zu machen.

3 Zwei Norm-Kategorien

Es gibt in Schweden zwei Kategorien von Normen für Fertigprodukte:

1. Spezifikationen der Gebrauchsanforderungen, die angeben, welche Forderungen an die Dimensionierung, Stabilität, Sicherheit, Festigkeit, Oberflächen-Beständigkeit, Materialgüte und Herstellgenauigkeit zu stellen sind.

2. Prüfverfahren, mit denen die Gebrauchseigenschaften von Möbeln bestimmt werden. Anforderungen an Gebrauchseigenschaften und Spezifikationen können nicht beschrieben werden, wenn keine objektiven Prüfverfahren angegeben sind.

Diese Diskussionen wurden in Schweden Mitte der 50er Jahre sehr ernsthaft und intensiv geführt, als die Verbraucherorganisationen die Forderung nach Warendeklaration bei Möbeln stellten. Zuerst wollte man den Käufern Angaben über die Haltbarkeit von Möbeln machen. Aber wie sollte diese Haltbarkeit bestimmt und bezeichnet werden? Es gab zu dieser Zeit praktisch noch kein Verfahren für die Prüfung der Haltbarkeit, mit Ausnahme einiger Methoden, die vom Furniture Development Council in England entwickelt worden waren.

Die Verantwortung hierfür lag in Schweden beim Amt für Warendeklarationen, einem kooperativen Organ von Herstellern und Verbrauchern. Unter der Regie dieses Amtes wurde eine Entwicklungsarbeit eingeleitet, mit dem Ziel Prüfverfahren zu finden, mit denen fertige Möbel in ihrer Gesamtheit geprüft werden können; die Belastungen sollten auf die gleiche Weise erfolgen wie beim praktischen Gebrauch. So wurden einige einfache Verfahren ermittelt: Fachbretter in Bücherregalen wurden mit Eisenstücken mit dem Gewicht von Büchern belastet, Stühle wurden auf die gleiche Weise gekippt, wie man es tut, wenn man auf einem Stuhl schaukelt, Kinderbetten wurden geschüttelt und Druckplatten „hüpften" auf dem Bettenboden, wie Kinder es abends gewöhnlich tun.

Im Laufe der Jahre wurden diese Prüfverfahren immer weiter verfeinert bzw. vervollkommnet und immer höhere Anforderungen wurden an Gültigkeit und Reproduzierbarkeit der Tests gestellt. Nicht zuletzt wurde diese Entwicklung durch Zusammenarbeit mit Technikern aus anderen Ländern, die vor den gleichen Fragen standen, beschleunigt.

4 Was wird von einem Möbel gefordert?

Die Entwicklung von Prüfverfahren enthält mehrere Probleme. Zu den Forderungen, die grundsätzlich an jedes objektive Prüfverfahren gestellt werden müssen, kommt hier die Frage hinzu, um welchen Festigkeitsgrad es sich handelt und welche Dauerfestigkeit ein Möbel haben muß. Wieviele Male kann man einen Stuhl kippen? Um wieviel darf sich ein Regalbrett durchbiegen? Wie oft und wie hoch hüpft ein Kind im Kinderbettchen? Fragen dieser Art müssen durch Studien beim Gebrauch von Möbeln geklärt werden. Aus Erfahrung weiß man, daß bestimmte Möbelkonstruktionen schwächer, andere stabiler sind. Durch Prüfen einer großen Anzahl von Möbeln, über die langzeitige Erfahrungen vorliegen, kann man sich eine Auffassung über Lasthöhe und Lastart, über die Anzahl von Belastungsvorgängen usw. bilden und daraus ein objektives Verfahren entwickeln.

Ein anderes Vorgehen ist, eine Anzahl von Möbeln für den praktischen Gebrauch bei verschiedenen Verbrauchern einzusetzen und laufend zu bestimmen, wie sie sich im Gebrauch verhalten. Diese Methode ist aber teuer und zeitraubend und kann deshalb nicht in größerem Umfang eingesetzt werden. Einfacher ist es, Studien in Räumen zu machen, wo Möbel während einer bekannten Periode benutzt wurden, entstandene Schäden aufzuzeichnen und festzustellen, ob diese Schäden von gleicher Art sind wie sie mit den vorgeschlagenen Prüfverfahren erzeugt werden. Man kann auch Informationen aus Reklamationsschäden sammeln und daraus Rückschlüsse auf die schwachen Punkte der Möbel ziehen.

Eine Methode, die in England und in Schweden verwendet wird, ist die Untersuchung der Kräfte, die auf die verschiedenen Teile von Möbeln einwirken. Ein Stuhl z.B. wird mit elektrischen Verformungsmeßeinrichtungen ausgerüstet, die, wenn der Stuhl benützt wird, alle Kräfte aufzeichnen, die während der Belastung auftreten. Danach wird der Stuhl in eine Stuhlprüfmaschine gestellt und die Registrierung wird erneut durchgeführt. Diese Prozedur ergibt Unterlagen zur Verbesserung des Prüfverfahrens. Eine umfassende Arbeit mit Berechnungen der auf Möbel einwirkenden Kräfte wurde von C. A. Eckelman an der Purdue University durchgeführt[1].

5 Prüfverfahren in Standards und Anforderungen in Anweisungen zur Warendeklaration

In Schweden wurden in erster Linie die Prüfverfahren standardisiert. Heute liegen etwa 30 Prüfverfahren als Schwedische Standards vor. Hingegen wurden die Spezifikationen für Gebrauchsanforderungen, in denen angegeben wird, wie viele Zyklen ein Möbel aushalten oder wieviele Stunden eine Oberfläche bestimmten Flüssigkeiten widerstehen oder welche Last ein Regalbrett aushalten muß, nicht als schwedischer Standard verabschiedet. Anstelle dessen wurde

1 Zum Beispiel: Eckelman, C. A. and Ferguson, D. A. 1976. Computer analysis of chair frames. Research Bulletin No. 937. 1976. Purdue University, West Lafayette, Ind. USA

Tabelle 1. Überblick über die Möbelfakta-Anforderungen
Table 1. Survey of requirements for Möbelfakta

[illegible]	Furniture type	Functionality	Durability	Surface resistance	Workmanship
A1:10	FURNITURE FOR UPRIGHT SITTING	Stability: SIS 83 9[illegible] 05	Seat, back: SIS 83 9[illegible] 02 Chair, armchair: SIS 83 96 03 Upholstered seats: As below A1:15	Resistance to liquids: SIS 83 91 13 - 83 91 19 Resistance to scratches: SIS 83 91 17 Oil on scratched surface ; NI P 0-41	Classification of quality of material and workmanship SIS 83 90 30
A1:15	FURNITURE FOR RECLINED SITTING	Determination of functional sizes: NI P 0-60 Stability: See above A1:10	Seat, backrest, armrest: SIS 83 96 08	See above	See above
A1:20	BEDS AND MATTRESSES	Standard dimensions: SIS 83 96 61 Determination of resilience: SIS 83 96 21 and NI P 20-9 Stability: SIS 83 96 23	Frame: SIS 83 96 22 Bed: SIS 83 96 21	See above	See above
A1:25	CONVERTIBLE FURNITURE FOR BOTH SITTING AND SLEEPING FUNCTIONS	Sizes and stability for the sitting function: See above A1:15 Sizes and resilience of the bed function: See above A1:20	Legs, bed ends: See above A1:20 frame Back, seat, armrest: See above A1:15 Bed: See above A1:20	See above	See above
A1:30	TABLES	Rigidity: SIS 83 97 01 Stability: SIS 83 94 02	SIS 84 94 03 Drawers, trays: SIS 83 91 11	See above Resistance to heat: SIS 18 41 79	See above
A1:40	STORAGE FURNITURE	Rigidity: SIS 83 97 01 Stability: SIS 83 97 03 Safety (lightfittings): NI P 0-12 with ref. to SEMKO doc. no 7651	SIS 83 97 02 Drawers, trays: See above A1:30 Shelves: SIS 83 60 20	See above A1:30	See above
A1:45	STORAGE FURNITURE FOR BUILT-IN PURPOSE (kitchen units etc)	Standard dimensions: SIS 83 41 13 - 17, 27 - 45, 50 - 57 Rigidity: See above A1:40 Stability: See above A1:40 Safety (built-in lightf.): See above A1:40	Drawers, trays and shelves: See above A1:40	See above A1:30	See above + SIS 83 40 11
A2:13	CHILDREN'S HIGH CHAIRS	Stability: SIS 83 95 07	SIS 83 95 06	See above A1:10	See above A1:10
A2:22	CYCLES	Rigidity: SIS 83 96 41	Same document as for "Rigidity" (SIS 83 96 41)	See above A1:10	See above A1:10

SIS-methods can be obtained from Sveriges Standardiseringskommission P O Box 3295, S-103 66 Stockholm. NI-methods obtainable from
möbel nstitutet

N.B.
These methods and standards do not include any performance requirements, which instead are specified in the Möbelfakta-document for each furniture category, as well as directions for labelling.

Tabelle 2. Zusammenstellung der Möbelfakta-Prüfverfahren
Table 2. Guide to Möbelfakta test methods

Möbelfakta Document No	Furniture Type	Functionality	Durability	Surface resistance	Workmanship
		Only BASIC REQUIREMENTS	Req. levels: BASIC - HIGH - EXTRA	HIGH	HIGH
A1:10 A1:15	FURNITURE FOR UPRIGHT SITTING (chair, armchair, stool, bench) FURNITURE FOR RECLINED SITTING (easy chair, sofa etc)	Dimensional and other functional requirements Stability	Strength of frame for A1:10 - tilting, overturning, strength of armrest for A1:15 - test of back-and armrests and loading strenght of sofas Seat, consistency of shape (upholstered, of a certain compression capicity)	to water and scratching; (scratching only for HIGH and EXTRA HIGH requirements)	For all categories: Quality of material and workmanship is differentiated into grading levels A - E for differently exposed parts, classified as "well exposed" "less exposed" "concealed parts" and incorporates: 1. Quality of material (wood, metal, plastic, stone, glass). 2. Accuracy and workmanship in general. 3. Precision and function of movable (loose) parts. 4. Precision of joints and assemblies. 5. Evenness and smoothness of surfaces, edges etc. 6. Quality of upholstery and covering work.
A1:20 A1:25	BEDS AND MATTRESSES CONVERTIBLE FURNITURE FOR BOTH SITTING AND SLEEPING FUNCTIONS (bed settees etc)	Dimensional req. (for beds:standard sizes acc. to Swedish Standard) Safety Stability Resilience ("firm, medium, soft")	Durability of bed/bed base/mattress Loading strength of bedstead Strength of legs and bed ends as well as seat, back- and armrests (in applicable cases of A1:25)	As above	
A1:30	TABLES	Dimensional req. Stability Rigidity	Strength of frame Strength of drawers	to water and oil. On table tops also to alcohol, coffee, heat (80°) and scratching (even to acetone on some. Scratching and acetone only for HIGH and EXTRA HIGH requirements. Damp heat in EXTRA HIGH)	
A1:40 A1:45	STORAGE FURNITURE STORAGE UNITS FOR BUILT-IN PURPOSE (kitchen units etc)	Dimensional req. Stability Safety For A1:45 - spec. requirements acc. to Swedish Standard	Strength and rigidity of frame Strength of drawers and trays Loading capacity and rigidity of shelves and shelf guides. For A1:45 also: Strength of clothesbar and doors	to water and oil. On shelves also to scratching. On tops lower than 1,25 m, working tops etc -requirements as for table tops above (scratching only for HIGH and EXTRA HIGH requirements) For A1:45 - also to some more test liquids, acc. to Swedish Standard.	
A2:13	CHILDREN'S HIGH CHAIRS	Dimensional req. Stability Safety	Strength at overturning Impact test on table, tray etc.	to water, oil and scratching (scratching only for HIGH and EXTRA HIGH requirements)	
A2:22	COTS	Dimensional and other functional requirements	Shake test Impact test (base) Impact test (sides)		
B4:	OFFICE FURNITURE	New specifications are being developed			

See separate guide to test methods

June 1975

dies als Anforderung in die „Anweisungen zur Warendeklaration oder Qualitätskennzeichnung" aufgenommen. Dort dienen sie als Bedingung dafür, daß eine bestimmte Qualität ausgezeichnet werden kann. Das Motiv für die Unterscheidung zwischen Verfahren und Anforderung ist, daß bekannt ist, daß verschiedene Anwendungsgebiete verschiedene Anforderungen an Möbel stellen und damit die Möglichkeit bleibt, sich rasch an erforderliche Revisionen oder Verbesserungen anpassen zu können.

6 Möbelfakta

Es war also der Wunsch der Verbraucher, daß Möbel „warendeklariert" werden sollten. Dieser Wunsch war die Triebfeder zur Entwicklung von Prüfverfahren und Gebrauchsanforderungen. Es dauerte jedoch 15 Jahre, bevor eine hinreichend große Anzahl Prüfverfahren vorlag, um zu einer sinnvollen Warendeklaration zu gelangen. Anfang der 70er Jahre führte das Schwedische Institut für Möbelforschung das „Möbelfakta-System" ein, welches das bisher am weitesten entwickelte System zur Qualitätsbezeichnung und Warendeklaration darstellt.

Um ein Möbel mit einer Möbelfakta-Deklaration (Bild 1) versehen zu können, muß dieses dem Schwedischen Standard entsprechend geprüft sein und dabei mindestens die Forderungen erfüllen, die in der Deklarationsanweisung für den vorliegenden Möbeltyp angegeben sind. Die Forderungen, die in den Anweisungen gestellt werden, sind aus den beiden Zusammenstellungen ersichtlich. Sie zeigen, welche Eigenschaftsanforderungen die Anweisungen enthalten und welche Prüfverfahren anzuwenden sind.

Eine Frage, die intensiv diskutiert wird, über die man aber bisher noch kein Übereinkommen erzielen konnte, ist die, ob die Ergebnisse einer Möbelprüfung in einer gradierten Skala angegeben werden sollen oder ob lediglich ausgewiesen werden soll, daß ein Möbel gewisse Minimalforderungen erfüllt.

Werden Möbel entsprechend den schwedischen Prüfverfahren geprüft, so können die Ergebnisse grundsätzlich in einer gradierten Skala angegeben werden. Dies liegt daran, daß die Verfahren in der Regel so gestaltet sind, daß sie an Möbeln mit sehr unterschiedlichen Verwendungsbereichen und bei sehr unterschiedlichen Festigkeitsanforderungen angewendet werden können. Ein Stuhl kann also mit dem gleichen Verfahren geprüft werden, unabhängig davon, ob er für eine Wohnung, eine Schule oder in einer Kaserne gebraucht wird. Jedes Anwendungsgebiet kann hingegen seine besonderen Qualitätsanforderungen haben, die einzige Minimalforderung, wenn man so will.

7 Welche Information vermittelt Möbelfakta

Im schwedischen „Möbelfakta-System" werden Haltbarkeit und Ausführung mit drei Qualitätsniveaus angegeben, d. h. die Möbel können in dieser Hinsicht „Grundanforderungen", „hohe Anforderungen" und „extra hohe Anforderungen" erfüllen. Die Ursache hierfür ist, daß das System anfänglich für Möbel ohne bestimmte Verwendungsgebiete entwickelt wurde. Ein einfacher Tisch kann z. B. in einer Küche oder einem Eßzimmer, in einem Restaurant oder einem Schulspeiseraum verwendet werden. Mit dem entsprechenden Hinweis auf dem Zeugnis der Deklaration kann also der Käufer selbst entscheiden, für welche Verwendung der Tisch geeignet ist. Für die normale Verwendung in Wohnungen kann z. B. die „Grundanforderung" ausreichend sein, bei einer Familie mit Kindern kann der Kunde „hohe Anforderungen" wünschen. Zeigt eine Prüfung schlechtere Ergebnisse als „Grundanforderungen", so wird das Möbelstück nicht deklariert. Was die verschiedenen Anforderungsniveaus beinhalten, wird im Informationsmaterial, das vom Möbelinstitut herausgegeben wird, erklärt.

Während der letzten Jahre wurden die Verwendungsgebiete der Möbel in den Deklarationsanweisungen präzisiert. Gleichzeitig gab man sich dadurch mit einem bestimmten Anforderungsniveau zufrieden. Dies gilt z. B. für Tische und Stühle für Büros, Schränke in Küchen.

Möbelfakta gibt Informationen über Funktion und Sicherheit von Möbeln, Festigkeit und Haltbarkeit, Widerstandsfähigkeit von Oberflächen, Materialqualität und Genauigkeit der Herstellung. Zur richtigen Funktion eines Möbels gehört eine Dimensionierung, die den Körpermaßen von Menschen oder, wenn es sich z. B. um Schränke handelt, den Gegenständen, die darin aufbewahrt werden sollen, entspricht. Die Anzahl der Maßanforderungen variiert von Möbeltyp zu Möbeltyp. An einen Arbeitsstuhl z. B., der für langes Sitzen geeignet sein soll, werden viele Maßanforderungen gestellt, um eine möglichst gute Arbeitshaltung zu erreichen. An einen Sessel oder eine Couch, auf denen man auf verschiedene Weise sitzen kann, ist es nicht notwendig, viele Maßanforderungen zu stellen. Einige Maße müssen jedoch in jedem Fall kontrolliert werden, z. B. die Sitzhöhe, die Sitztiefe und die Neigung des Rückenteiles. Zu den Funktionsanforderungen gehören auch die Anforderungen an die Sicherheit, die immer erfüllt werden müssen. Ein Möbel darf z. B. bei normaler Verwendung nicht umkippen. Deshalb wurden besondere Prüfverfahren zur Bestimmung der Stabilität von Möbeln entwickelt.

Die Anforderungen an die Haltbarkeit von Möbeln wurden aufgrund der praktischen Verwendung, in welche sie vermutlich kommen werden, formuliert. Die Möbel werden bei der Prüfung Belastungen ausgesetzt, die den tatsächlichen, praktischen Belastungen möglichst nahekommen sollen. Das gleiche gilt für Oberflächen, die realistisch mit Flüssigkeiten verschiedener Art geprüft werden, berührt durch Ritzen, Wärmebeanspruchung usw.

Möbelmaterialien und Herstellungsgüte werden in 5 Klassen in Relation zu einem Standard, der Material und Ausführung beschreibt, eingeteilt. In jeder der 5 Qualitätsklassen wird definiert, welche Defekte vorkommen dürfen. Unter Zuhilfenahme dieses Standards können die verschiedenen Teile eines Möbels ein Zeugnis erhalten, wobei die höchsten Anforderungen an die sichtbaren Oberflächen, geringere Anforderungen an wenig sichtbare oder unsichtbare Teile gestellt werden. Der Käufer trifft jedoch nur auf die Angabe, daß das Möbel den „Grundanforderungen", den „hohen Anforderungen" oder den „extra hohen Anforderungen" entspricht. Welche Qualitätsklasse er wählt, beruht auf seinen Ansprüchen und auf dem Preis, den er bezahlen will. Materialqualität und Herstellgenauigkeit stehen bekanntlich in Relation zum Preis.

8 Die Kontrolle

Die Zeugnisse in einer „Möbelfakta-Deklaration" werden auf Grund von Typenprüfungen an einem oder mehreren Exemplaren eines Möbeltyps im Laboratorium des Schwedischen Instituts für Möbelforschung oder in Laboratorien, die unter der Kontrolle dieses Institutes stehen, ausgestellt. Hat ein Hersteller einen Prüfungsbericht mit anerkannten Werten erhalten, so darf er „Möbelfakta" mit einer Zusammenfassung der Prüfergebnisse verwenden, unter der Voraussetzung, daß er erklärt, daß sämtliche deklarierte Möbel

mindestens gleich gute Werte aufweisen wie das typgeprüfte Exemplar. Der Hersteller selbst hat also die Verantwortung für die Richtigkeit der Deklaration. Das Möbelinstitut prüft durch Stichproben, daß den Regeln des Systems gefolgt wird. Findet ein Käufer, daß ein Möbel nicht der versprochenen Qualität entspricht, so kann dies leicht z.B. an einem neuen Möbelstück gleichen Typs vergleichend überprüft werden.

Eine Typ-Deklaration, die Möbelfakta enthält, gibt dem Käufer Informationen über die Eigenschaften, die er selbst nicht beurteilen kann, wie z.B. Festigkeit, Widerstandsfähigkeit der Oberflächen usw. Es gibt aber auch viele Eigenschaften, die nicht auf diese Weise beschrieben werden können und zu denen der Käufer selbst Stellung nehmen muß. In welchem Raum soll das Möbel aufgestellt werden, und welcher Platz steht für das Möbel zur Verfügung? Natürlich muß man auch selbst probesitzen, um die Bequemlichkeit eines Sitzmöbels zu beurteilen. Form und Farbe muß man selbst bewerten. Außerhalb der eigenen Beurteilung aber müssen Angaben über Sicherheit, Haltbarkeit und Ausführung zur Verfügung stehen. Dort kann eine Deklaration, die auf objektiven Prüfverfahren aufgebaut ist, helfen.

9 Prüflaboratorien

Heute gibt es Prüflaboratorien in den meisten europäischen Ländern und in anderen Teilen der Welt. Immer größer wird die Einsicht, daß die Eigenschaften von Fertigprodukten geprüft werden müssen. Dies geschieht gleichzeitig mit dem Ziel, der Industrie Unterlagen für die weitere Produktentwicklung oder für die eigene Qualitätskontrolle zu geben, aber auch mit dem Ziel, Unterlagen für die Qualitätskennzeichnung oder andere Informationen für Verkäufer und Verbraucher zu schaffen. Viele Gründe sprechen dafür, daß es immer wichtiger wird, jene Informationen, die aus Prüfungsergebnissen hervorgehen, weiterzugeben. Man kann hier z.B. die Entwicklung von für die Möbelherstellung neuen Materialien, wie z.B. Kunststoffe, Folien, Laminate, Kombinationen mit Metallen, neue Textilien- und Polstermaterialien nennen. Mit diesen Materialien hat man nicht die jahrhundertelangen Erfahrungen wie z.B. mit Holz. In der Industrie findet eine fortlaufende technische Entwicklung statt, um Produktionsverfahren zu verbessern. Entsprechende Anstrengungen führen zur Fertigungs-Rationalisierung und zur Preissenkung von Produkten. Dies darf aber nur geschehen, wenn die Eigenschaften der Produkte dadurch nicht verschlechtert werden. Viele Entwickler von neuen Produkten sehen deshalb die Möbelprüfung auch als Mittel dafür an, das bestmögliche Produkt zum geringstmöglichen Preis herzustellen.

Auch der umfassende Handel über die Grenzen hinweg erfordert eine effektive Qualitätskontrolle, denn Reklamationen größeren Umfanges sind für den Produzenten eine teure Angelegenheit.

Die immer höheren Anforderungen der Konsumenten an die Sicherheit von Produkten stellen natürlich ebenso hohe Anforderungen an die Prüfung. Die Produkte sollen brandsicher sein, Kinder sollen sich nicht an ihnen verletzen, Oberflächenstoffe dürfen nicht giftig sein und Möbel sollen nicht umkippen. Der Käufer will eine Garantie dafür haben, daß Risiken dieser Art nicht vorliegen.

Die Entwicklung neuer Möbelkonstruktionen, z.B. zerlegbare Möbel oder andere transportkostensenkende Konstruktionen, muß ohne Verschlechterung der Haltbarkeit und Funktion ermöglicht werden. Auch hierfür ist die Möbelprüfung wichtig.

10 Internationale Zusammenarbeit

Die Notwendigkeit der Übereinstimmung von Anforderungs-Spezifikationen und Prüfverfahren in verschiedenen Ländern nimmt zu. Entsprechende Bemühungen sind durch die Arbeit im Rahmen der ISO (International Standardisierungsorganisation) bereits im Gange. Schweden hat hier das Sekretariat T 136 (Möbel) inne. Die Arbeiten zur Standardisierung von Prüfverfahren sind bereits ein gutes Stück vorangekommen.

Ein Problem hierbei ist, daß in vielen Ländern bereits Prüfsysteme und Systeme für die Qualitätskennzeichnung festgelegt sind. Umso wichtiger ist es deshalb, daß die anstehenden Fragen rasch aber gründlich behandelt werden und die Techniker ohne Prestigefragen und ohne Rücksicht auf kurzfristige Handelsvorteile die Grundprobleme lösen. Die gesamte Frage der Funktionsprüfung von Möbeln ist andererseits noch so jung, daß noch viel Arbeit zu leisten ist, bis man einen gemeinsamen Weg zur besten und praxisnahen Prüfung von Möbeln gefunden hat. Kein Land kann heute von sich sagen, daß es alle hierzu erforderlichen Kenntnisse bereits besitzt.

...methods can be obtained from
...for Standardiseringskommission
...box 5 292, S-103 61 Stockholm.
...sheet can be obtained from
möbelinstitutet

GUIDE TO MÖBELFAKTA TEST METHODS

N.B.
The test methods and standards do not in any way pretend to be performance requirements, which instead are specified in the Möbelfakta-document for each furniture category, as well as directions for labelling.

MARCH 1980

Möbelfakta document	Furniture type	Functionality	Durability	Surface resistance	Workmanship
A1:10	FURNITURE FOR UPRIGHT SITTING	Stability: SIS 83 95 05	Steel, legs: SIS 83 95 02 Chair, armchair: SIS 83 95 03 Upholstered seats: As below A1:15	Resistance to liquids: SIS 83 91 18 - 83 91 19 Resistance to scratches: SIS 83 91 17 Oil on scratched surface ; MI P 0-41	Classification of quality of material and workmanship SIS 83 90 30
A1:15	FURNITURE FOR RECLINED SITTING	Determination of functional sizes: MI P 0-60 Stability: See above A1:10	Seat, backrest, armrest: SIS 83 95 08	See above	See above
A1:20	BEDS AND MATTRESSES	Standard dimensions: SIS 83 96 61 Determination of resilience: SIS 83 96 21 and MI P 30-9 Stability: SIS 83 96 23	Frame: SIS 83 96 22 Bed: SIS 83 96 21	See above	See above
A1:25	CONVERTIBLE FURNITURE FOR BOTH SITTING AND SLEEPING FUNCTIONS	Sizes and stability for the sitting function: See above A1:15 Sizes and resilience of the bed function: See above A1:20	Legs, bed ends: See above A1:20 frame Back, seat, armrest: See above A1:15 Bed: See above A1:20	See above	See above
A1:30	TABLES	Rigidity: SIS 83 94 01 Stability: SIS 83 94 02	SIS 84 94 03 (Fatigue) Drawers, trays: SIS 83 91 11	See above Resistance to heat: SIS 18 41 79	See above
A1:40	STORAGE FURNITURE	Rigidity: SIS 83 97 01 Stability: SIS 83 97 03 Safety (lightfittings): MI P 0-12 with ref. to SEMKO doc. no 7631	SIS 83 97 02 Drawers, trays: See above A1:30 Shelves: SIS 83 60 20	See above A1:30	See above
A1:45	STORAGE FURNITURE FOR BUILT-IN FURNITURE (kitchen units etc)	Standard dimensions: SIS 83 41 30-43, 50-57 etc Rigidity: See above A1:40 Stability: See above A1:40 Safety (built-in lightfit.): See above A1:40	Drawers, trays and shelves: See above A1:30	See above A1:30	See above + SIS 83 90 31
A2:13	CHILDREN'S HIGH CHAIR	Stability: SIS 83 9[illegible]	SIS 83 95 06	See above A1:10	See above A1:10
A2:22	[illegible]	Rigidity: SIS 83 90 42	Same demands as for "Rigidity" (SIS 83 90 41)	See above A1:30	See above A1:10
B4:10	CHAIRS FOR OFFICES	Stability: See above A1:10	Strength of frame: See above A1:10 "Chair" Strength of back: MI P 10-2 Upholstered seat: See above A1:15	See above A1:10	See above A1:10
B4:30	TABLES FOR OFFICES	Worktop gloss: SIS 19 41 04 Worktop lightness: SIS 41 91 00 - the same scale	Static load: MI P 37-1 Fatigue (frame): see above A1:30 + SIS 83 94 03	See above A1:30 + Impact see to SIS 84 58 10	See above A1:10

NUMERICAL LIST OVER TAI

March 1980

möbelinstitutet
The Swedish Furniture Research Institute

TEST METHODS AND STANDARDS referred to in **möbelfakta**

Numerical List

SS -Swedish Standards (obtainable from Sveriges Standardiseringskommission, Box 3295, S-103 66 Stockholm or from your National Standards Authority)

SS No	Edition No	Title/content
01 91 00	1	Colour Index System, NCS. Shade Grade Scale.
16 92 11	1	Flexible cellular materials. Determination of tensile strength and elongation at break.
18 41 79	2	Paints. Estimation of heat resistance of organic finishes.
18 41 84	1	Paints and Varnishes. Determination of specular gloss.
24 58 20	1	Plastic Laminated decorative sheets. Quality and testing.
83 40 11	1	Storage units. Quality requirements.
83 41 28	3	" Summary and general requirements.
83 41 30-43		" Dimensions and equipment.
83 41 50-57		" "
83 42 13-17		" Work tops, pull-out leaves, drawers.
83 60 20	2	Determination and load capacity of shelves and shelf carriers.
83 90 30	2	Classification of quality of material and workmanship.
83 91 11	3	Drawers. Determination of push-in force and durability.
83 91 17	1	Determination of surface resistance to scratches.
83 91 18	1	Estimation of surface resistance to liquids.
83 91 19	1	Liquids for testing surfaces.
83 94 01	2	Tables. Determination of rigidity.
83 94 02	1	" Determination of stability.
83 94 03	1	" Determination of strength.
83 95 02	2	Stools/benches Determination of strength.
83 95 03	2	Chairs/armchairs Determination of strength.
83 95 05	2	" Determination of stability.
83 95 06	2	Children's dining stools(high chairs). Determ. of strength.
83 95 07	2	" Determ. of stability.
83 95 08	2	Easy chairs/sofas. Determination of durability.
83 96 21	2	Beds. Determination of resilience and durability.
83 96 22	1	" Determination of strength of frame and legs.
83 96 23	1	" Determination of stability.
83 96 41	2	Children's cots. Determination of strength, rigidity and spacing of openings.
83 96 61	1	Bedsteads for adults. Mattress and bottom dimensions.
83 97 01	1	Storage units. Determination of rigidity.
83 97 02	1	" Determination of strength.
83 97 03	1	" Determination of stability.

MI-methods (Obtainable from Möbelinstitutet, constituting supplementary standards or pending methods awaiting national standards)

No	Edition	Title/content
MI P 0-12	1	Estimation of heat from electrical light sources.
MI P 0-41	1	Estimation of resistance to fats on surfaces with scratches.
MI P 0-60		Easy chairs/sofas. Determination of functional sizes.
MI P 10-2		Chairs. Static load.
MI P 20-9		Beds. Comfort valuation of cushioning.
MI P 37-1		Office tables. Static load.
MI P 49-6		Hinges. Security risk valuation.

THE SWEDISH FURNITURE RESEARCH INSTITUTE

Presentation

and

Working Programme

The Swedish Furniture Research Institute is founded and financed jointly by the Swedish government and the furniture industry, represented by trade organisations as well as private and cooperative companies. Five of the ten members of the Institute's Board are appointed by the Government and the other five by the Swedish Foundation for furniture Research, which represents the interests of consumers, manufacturers and distributors.

The research is mainly concerned with studies of functions and durability, and constitutes a basis for the improvement of the standard of Swedish furniture. A great number of research reports have been issued during the last years several dealing with subjects on usability, e.g. adaption of dimensioning of furniture to anthropometric measurements.

Another aspect of the work is the development of test methods.

The results of the activity of the Institute are utilized by manufacturers, buyers and consumers.

The most important contribution to consumer information is the new Swedish information labelling system MÖBELFAKTA (furniture facts). This quality marking system provides easily understood information on essential properties of the furniture.

In 1979 the Swedish Furniture Research Institute has a staff of 18 people and a budget amounting to 3 Million Swedish Crowns.

Chairman of the Board is Professor Sven Thiberg.
Head of the Institute is Architect Erik Berglund.

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Box 27 198
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THE SWEDISH FURNITURE RESEARCH INSTITUTE

WORKING PROGRAMME

Studies of functions and properties of furniture

The aim is to promote development of functional products of good quality. As a result of the investigations we anticipate a decrease in accidents with furniture for adults and children and a better adjustment to anatomical and physiological requirements.

Design of furniture for different environments is not only a question of comfort and safety. E.g. back insufficiencies being one of our most common complaints, give rise to social and economical implications.

The studies are now particularly concentrated on chairs, with special regard to adjusting their dimensions to man's anthropometry and his physical condition.

Another project is determining the strains and stresses on different parts of the furniture during practical use.

The Möbelfakta specifications have made it necessary to establish a great number of functional requirements for different types of furniture.

Development of methods and equipment for determining properties of furniture.

The aim is to establish reproduceable methods for determining properties relevant to furniture manufacturers, buyers and consumers. These methods are to be used in production control as well as a means of delivery control and informative labelling.

Furniture of too low durability will mean higher costs for maintenance, and too high quality standard results in unnecessary production costs. Control methods of durability and other properties facilitate maintaining a consistent production quality.

The programme includes methods for determining strengths of chairs, armchairs, sofas, beds, tables, cupboards and children's furniture, methods of determining shape consistency of seats and mattresses, surface resistance to chemical and mechanical damage, etc.

Principles for product development and quality marking.

The aim is to provide manufacturers and designers with specifications and guide-lines for their product development work and establish criteria for different levels of quality. The specifications are to be used as a basis for labelling and trading. Specifications for furniture of different types and field of use leads to considerable savings for all concerned. The possibilities to specify a quality niveau gives the buyers a means of comparing characteristics and prices.

The most important project in this field is to issue specifications and requirements for the Swedish Quality Marking Scheme Möbelfakta. These contain information about usability, durability and workmanship.

Another project is to collaborate with the national and international standardization organizations with reference to standardized methods. The secretariat of ISO Technical Committee 136 Furniture is located in Sweden.

Components of furniture

Initially the programme of the Institute was limited to dealing only with the functions and properties of furniture. However, technical questions from industry have increasingly been concerned with components in new materials, plastic, foams, etc.

The laboratory tests have provided a considerable knowledge about the performance of meterials and components.

Based on this experience systematic research of certain components has been initiated, e.g. shelves, drawers and trays, hinges lacquers, textiles, etc. Results of these studies will be presented at conferences arranged by the Institute.

Information

The aim is to inform producers, dealers and consumers about results from furniture research. From the viewpoint of the industry this leads to improvning their competitive position owing to possibilities to modify quality to the needs of the consumers.

From the buyers' point of view an increased knowledge enables a more price-worth purchase.

Courses are held for sales personnel in furniture shops. Information to consumers is conveyed through teachers and journalists.

Extensive information is given about manufacturers and products of the Swedish furniture industry and also information about tested pieces of furniture.

Examples of information to producers are test reports, and recommendations of functional and technical characteristics of furniture for different users and surroundings.

Information to the buyer about properties of furniture on the market is given directly from the manufacturer, by help of the labelling system Möbelfakta, developed by the Institute.

Liaisons and consultant activities

Close contact is kept with furniture experts all over the world.

The Institute collaborates with institutes in the field of material research, and also with several institutes abroad, to follow up the international developments.

The technical services from the institute are very much in demand by other institutes in the field of building research, standardization, consumer associations, etc. and members of the staff are often invited to take part in conferences, committees and lectures.

Other assignments

Furniture testing at the request of manufacturers is one of the main activities of the Institute. The test results form the basis for product improvements and informative labelling. The laboratory has been extended and several test machines have been duplicated. The testing capacity is at present about 1 000 pieces a year.

Other assignments are investigations of special functional and technical problems.

In some fields the Institute has undertaken comparative tests of all products on the market, e.g. baby cots and high chairs for children, where furniture may be a safety hazard.

möbelinstitutet
The Swedish Furniture Research Institute

DIRECTIONS FOR MÖBELFAKTA LABELLING

June 1978
edition 5

cots

A2:22

Valid only if having same edition no as the latest in Swedish

1. SCOPE

This specification is applicable to cots (drop side cots and cribs) for ages up to 2½ years and primarily for domestic use.

> The requirements stated in this specification will give reasonable security and comfort for children up to 2½ years of age when the cot is used normally.

2. STATEMENTS IN THE MÖBELFAKTA LABELLING

The informative labelling is done by means of a MÖBELFAKTA-label or by a test certificate. In either case, the manufacturer guarantees that the marked items conform with the stated facts.

In the Möbelfakta-labelling the following facts shall be stated:

2.1 specific furniture type and field of use,

2.2 summary of test results,

2.3 information as who is responsible for the Möbelfakta-marking and

2.4 label type no or code no of the model.

2.1 Specific furniture type/use

The specific type of furniture and the field of use shall be stated as:

"Cot for children up to appr. 2½ years of age"

For cots and similar beds that have any kind of opening on the sides, 20 cm up from the bottom, the following text should be included on labels and in other informative state of facts:

"For babies under 6 months, the cot should be equipped with padded fabric screens, 20 cm high."

2.1 Cont.

Extra information may be added concerning such existing properties that are of special significance to the use:

"with dropsides"
"with bottom adjustable in height"
"with removable sides"
"collapsible"

Other properties than these here mentioned may be considered after application for approval.

In connection with the statement of specific furniture type/use, the following text shall be used:

"Fulfills the Requirements of the Swedish Furniture Research Institute"

2.2 Summary of test results

The summary of test results shall include the following information (Cf. the example of label, p. 3)

- "Strength"
- "Surface Resistance"
- "Quality of material and workmanship"

As well as a statement according to which each of these performances correspond to either:

BASIC REQUIREMENTS, HIGH REQUIREMENTS or EXTRA HIGH REQUIREMENTS.

2.3 Statement of who is responsible for the marking

The statement of who is responsible for the marking shall mention the name or firm of the manufacturer, the importer or the seller. Instead of the name of the firm, commonly known abbreviations thereof or the licencee's code no. in the Register of the Swedish Furniture Research Institute are allowed.

The retailer's name or firm may be mentioned though he is not the licencee. Even in such cases, the licencee's name or permit-no. must be shown.

See also "Permission to use Möbelfakta-marking" under par. 5.

3. REQUIREMENTS

Cots covered by the Möbelfakta-label have to conform with all the requirements laid out in the following specifications:

No **1** DIMENSIONS AND FUNCTIONAL REQUIREMENTS

and conform at least with the Basic Requirements in accordance with the following specifications:

No **2** STRENGTH

No **3** SURFACE RESISTANCE

No **4** QUALITY OF MATERIAL AND WORKMANSHIP

4. REFERENCES

A separate list of the different standards and test methods referred to in this document is enclosed as Appendix No 1.

The appendix can be revised without any consequential revision of the main document.

5. PERMISSION TO USE MÖBEL-FAKTA MARKING

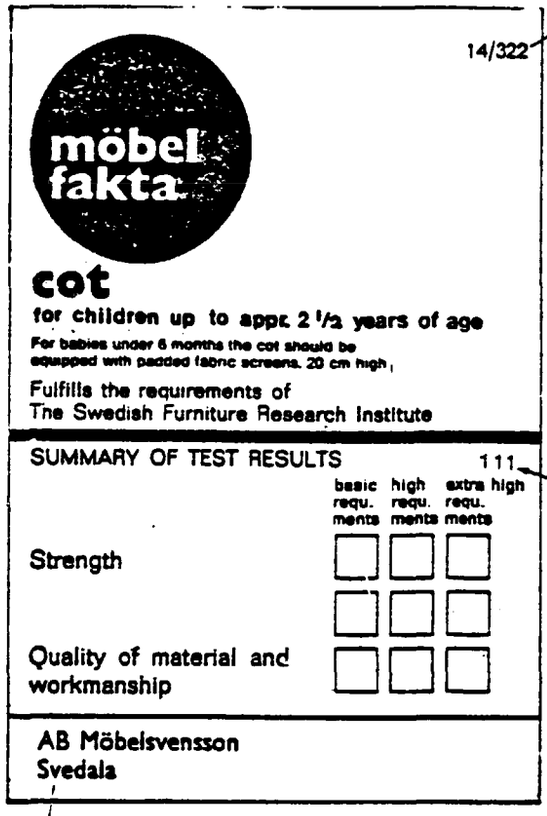
A written permit from the Swedish Furniture Research Institute (SFRI) is necessary if the Möbelfakta-mark is used.

It can only be granted to the members of the Swedish Foundation for Furniture Research and under the conditions stipulated in "General provisions for Möbelfakta".

The declaration shall be based on a test report. Owing to the safety requirements, the declaration for cots shall be based on a test report from SFRI only.

Before printing the MÖBELFAKTA informative labelling, the manuscript shall have the approval of the SFRI.

6. EXAMPLE OF MÖBELFAKTA LABEL OR SWING TICKET



Designation of the bed or tag-No. (from test report)

Licencee's code No.

Here the name or company of the licencee can be stated (volontary information, or be replaced by licencee's code no. In such case even the retailer's name/company can be shown without beeing the licencee).

On the label, the Möbelfakta-Mark shall be printed in red colour with black text.

In catalogues or similar, the Mark may be printed as mentioned above or printed in black with white lettering.

The typography should otherwise follow the example above.

7. EXAMPLE OF TEST CERTIFICATE

See Appendix 2.

möbelfakta

SPECIFICATION OF REQUIREMENTS NO I

to directions for Möbelfakta-labelling

DIMENSIONS AND FUNCTIONAL REQUIREMENTS

MEASUREMENTS

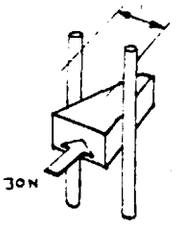
(a)	Internal length	For beds with soft sides (textile or similar) the requirements are fulfilled if a mattress of the stipulated size can be inserted.	min 110 cm
(b)	Internal width		min 55 cm
(c)	Internal height of sides	Calculated from the bottom, at its lowest position (without mattress) or from part of the sides on which the child can stand.	min 60 cm
(d)	Clearance between side slats	The spacing between adjacent members in the sides or ends of the cot measured accordingly to SIS 83 96 41. See illustration d	max 8,5 cm
(e)	Clearance between bottom slats	Or other similar openings in bottom (Cf. point f below)	max 2,5 cm

OTHER FUNCTIONAL REQUIREMENTS

(f) The sides of the bed shall be smooth inside or be made of vertical slats or have such a design that makes it impossible for the child to climb on. Holes, chinks or the construction in other respects must be so made that it is not possible for any parts of the body to become wedged.

Nor shall the bed have such a design that can result in the baby's clothing getting stuck, e g fittings or projecting parts, such as corner posts (see illustr. f) or net sides that could catch buttons in the clothes. Bed sides made all of fabric must be possible to strip off and wash.

max 8,5 cm

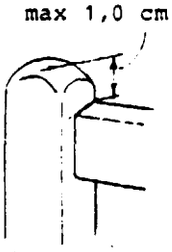


illustr. d

(g) Fastening devices used for controlling dropsides, bottom, etc shall be so arranged that small children cannot dislodge them with the result that sides and bottom fall out of their correct position (to be inspected even after the strength test).

Corners, edges and metallfittings shall be smooth, well fixed or out of reach in order to avoid injury.

max 1,0 cm



illustr. f

(h) Assembling instructions shall be enclosed with knockdown beds. The directions shall be clearly formulated to avoid all mistakes.

Fittings and arrangements for assembling shall be adjusted and so well done that the assembling work can be done without difficulty.

SPECIFICATION OF REQUIREMENTS NO **2-3**

to directions for Möbelfakta-labelling

2 STRENGTH

Test according to SIS 83 96 41	Basic requirements	High requirements	Extra high requirements
(a) Shake test acceptable movement in longitudinal as well as in lateral direction without damage 1/ max	50 mm	40 mm	20 mm
after number of cycles	2000	2000	5000
(b) Impact test on bed bottom (same for all requirements)	Undamaged after 1000 impacts on 5 places each (see SIS 83 96 41) 1/		
(c) Impact test on bedsides (same for all requirements)	Undamaged after 10 blows per test spot 1/		

Note: 1/ Such damages are if any part or component comes loose, cracks or splits or functions less satisfactory.
Examples of such damages:
- loosened or broken ribs in bottom
- broken bottom frame
- crack in bottom fibreboard
- faulty suspension fittings
- faulty dropside locking

3 SURFACE RESISTANCE

	Basic requirements	High requirements	Extra high requirements
Surface resistance of uncovered parts:			
(a) against water acc. to SIS 83 91 18	1 h	6 h	24 h
(b) against oil acc. to SIS 83 91 18 (paraff.oil)	24 h	-	-
and to MI P 0-41 (scratched surface)	-	24 h + scratch 8 N	24 h + scratch 12 N
(c) against scratching acc. to SIS 83 91 17	-	3 N	7 N

Note: When applying the numerical rating of 'change in appearance' according to SIS 83 91 18, rating 4 is allowed, that is
-"small change of gloss visible only when luminous source reflects in test surface or quite near the mark and is reflected back towards the eyes of the observer".

möbelfakta

SPECIFICATION OF REQUIREMENTS NO 4

to directions for Möbelfakta-labelling

QUALITY OF MATERIAL AND WORKMANSHIP

The requirements for the quality of material and workmanship are differentiated for the following separate parts of the furniture:

EXPOSED PARTS	=	Parts that are clearly visible by normal use of the furniture (e g out- and inside of bed-sides)
LESS EXPOSED PARTS	=	Visible, but less conspicuous parts (e g inside of legs)
CONCEALED PARTS	=	Parts, which by normal use of furniture are invisible (e g underside of bottom)

The requirements are graded into levels **A - E**

(defects allowed within each requirement level are defined and specified in SIS 83 90 30, 2nd edition)

A - No defects affecting good functioning and the designed appearance are allowed.

B - No defects affecting good functioning are allowed, whereas scarcely noticeable defects (as defined in SIS 83 90 30) affecting the designed appearance are allowed.

C - No defects affecting good functioning are allowed, whereas a few clearly noticeable defects (as defined in SIS 83 90 30) affecting the designed appearance are allowed.

D - No defects affecting good functioning are allowed, whereas defects affecting the designed appearance are allowed to a larger extent (as specified in SIS 83 90 30).

E - Reasonable hygienic and normal safety requirements shall be fulfilled. No broken parts are allowed, but other defects affecting only the appearance are accepted.

Requirements of Quality of material and workmanship according to SIS 83 90 30	Basic requirements	High requirements	Extra high requirements
Exposed parts	C	B	A
Less exposed parts	D	C	B
Concealed parts	E	E	E

Note: Concerning material for surface treatment:
The surface treatment may not imply any risk for the child when using the bed. Finishes that are dangerous to health must not be used. (Ref.: Law on Goods dangerous to health and environment, SFS 1973:329, § 1 and § 5).

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APPENDIX 1

REFERENCES

1979-07-01

List of test methods and other references in the

DIRECTIONS OF DECLARATIONS FOR MÖBELFAKTA LABELLING FOR BABY COTS A2:22, 5th edit.

The list may be revised without special notice

Designation Edition	Title	Remarks
SIS 83 90 30 2nd edition 1976-07-01	Quality of materials and workmanship	
MI P 0-41	Estimation of resistance to fats on surface with scratches	New method where scratching is in accordance with SIS 83 91 17. (SIS 18 41 63 may be used as well, pending issue of the new standard)
SIS 83 91 17 1st edition 1973-01-01	Determination of surface resistance to scratches	
SIS 83 91 18 1st edition 1973-11-10	Estimination of surface resistance to liquids	
SIS 83 96 41 2nd edition 1979-07-01	Children's cots Test methods	
SFS 1973:329 § 1 § 5	Svensk Författnings-samling (Swedish Statue Book) Law on Goods Dangerous to Health and Enviroment	§ 1: "Goods dangerous to health and environment referred to in this law are: 1. A substance or preparation whose chemical or physical characteristics and use can damage people and environment". § 5: "Anybody that makes use of or imports goods dangerous to health and environment, shall take all measures and precautions needed in order to prevent or neutralize damage on people and environment. In this connection all the manufacturers and importers shall carefylly investigate the composition of the goods as well as their other characteristics in order to protect health and environment". If any doubt arises about the dangerous character of the product for surface treatment, please call on the Product Inspection Board, Phone: 08/730 09 10 (Produktkontrollnämnden).

APPENDIX 2

Date

Test certificate No

Test requested by	Furniture type/identification of model
Test made in accordance with test methods stated in the instruction A2:22/5. Test results classified in accordance with the specification for the following specific furniture type/use:	Manufacturer
	Material

	test results		requirements not fulfilled	requirements fulfilled		
Function						
1 a Length (inside)		cm				
b Width (inside)		cm				
c Height of sides (measured inside)		cm				
d Distance between slats in sides		cm				
e Distance between ribs or openings in base		cm				
f Construction of sides						
g Fittings, edges						
h Assembling instruction						
				basic require-ments	high require-ments	extra high require-ments
Strength						
2 a Strength of frame. Movements after test 2x cycles		mm				
b Strength of bottom. Impact test						
c Strength of side slats						
Surface resistance						
3 a Resistance to water		h				
b oil		h				
oil on scratched surface	24 h	N				
c scratching		N				
	exposed parts	less exp. parts	concealed parts			
Quality of material and workmanship						
4 a Quality of material: wood, metal, plastic						
b upholstery & covering material						
c Flatness						
d Straightness						
e Assemblies, joints						
f Veneering						
g Edges						
h Bent parts						
i Fittings, hardware						
j Surface evenness, smoothness						
k Finished coating on surfaces						
l Tailoring of cover, sewing						

This test certificate may be published in its complete form. For publication of excerpts a written permission from the Institute is required. The test refers to one sample provided by the client.

The Swedish Furniture Research Institute

For furniture with corresponding properties the declaration below can be used.

möbel fakta

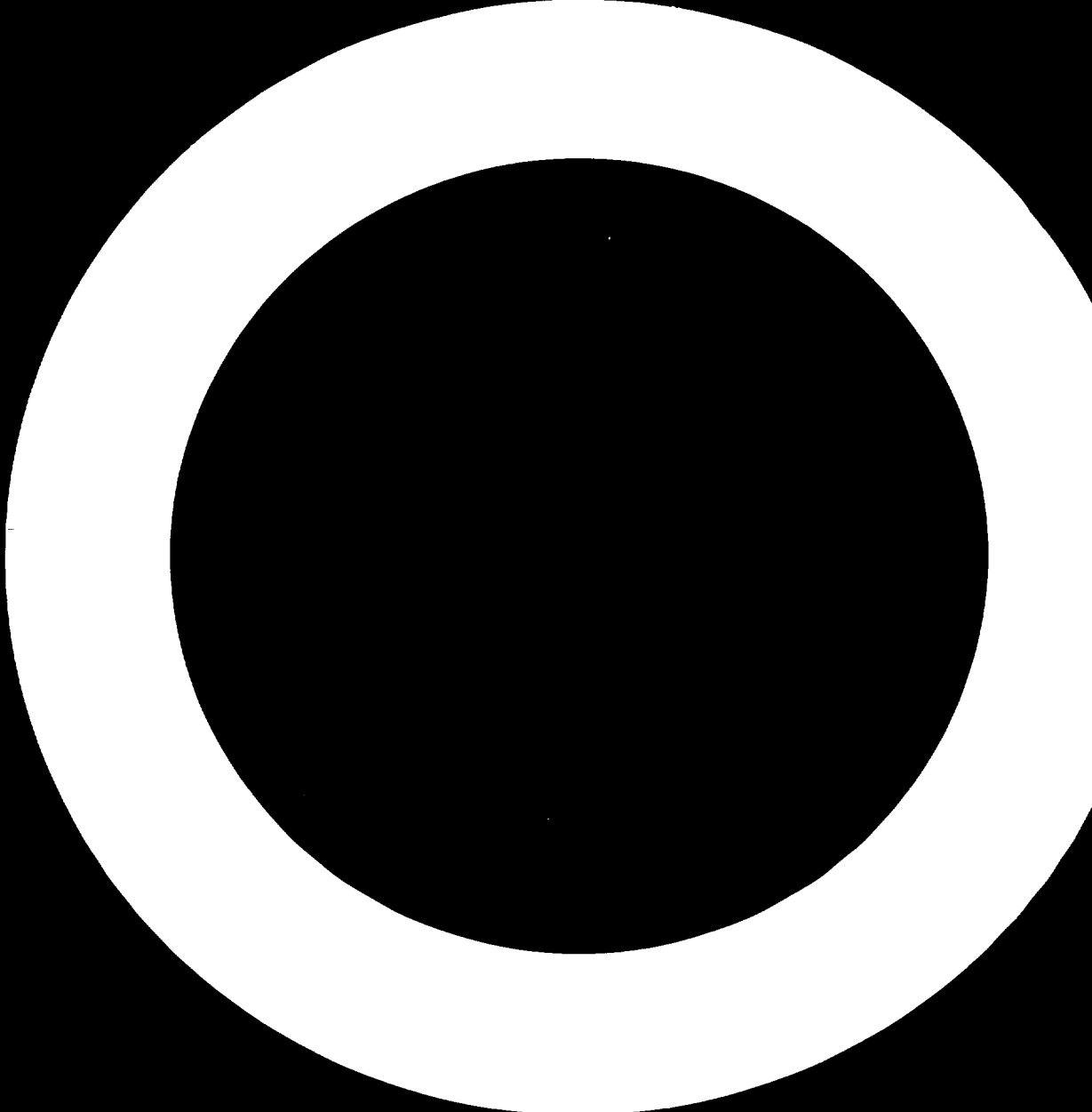
(tag code no)

Fulfils the requirements of the Swedish Furniture Research Institute

SUMMARY OF TEST RESULTS

	basic require-ments	high require-ments	extra high require-ments
Strength	☐	☐	☐
Surface resistance	☐	☐	☐
Quality of material and workmanship	☐	☐	☐

77-06-23



International
Organization for
Standardization

Attachment II

TECHNICAL COMMITTEE 136

FURNITURE

Secretariat

Sweden

INVENTORY OF STRAINS ON DIFFERENT TYPES OF FURNITURE DURING ACTUAL USE

(agreed upon by ISO/TC 136/SC 1 - Furniture/Test Methods, at its meeting in Stockholm, February 1974)

ISO/TC 136
Belgrade 1974-11-20--22

Resolution No 18

The delegations present accepted document 136 N 41 as a base for further work of SC 1.

Inventory of strains on different type of furniture during actual use

Determination of the service and strenght characteristics of furniture can be made using laboratory-scale test methods. It is essential in this connection that the methods are such that the furniture is subjected to treatment as nearly as possible the same as that which it will receive in actual use.

The choice of test method must therefore be based on an analysis of the way in which the furniture is used and the stages during use which place particular demands on the furniture.

In order that the furniture should function it must satisfy requirements of different kinds. It must, for instance, be sufficiently steady and stable, i.e. it must not be so rickety that its use is made difficult or so unstable that there is a risk of its overturning and thus an accident hazard.

The "life" of a piece of furniture is determined by its ability to retain the characteristics it has when new. This applies both to appearance and service-ability and it is necessary that the furniture should have a strength which is maintained even after long use involving many and repeated applications of load.

Other requirements which furniture must satisfy are that its surfaces have such resistance that it does not become stained or scratched far too easily or have its appearance impaired in some other way.

Seats and beds must have satisfactory comfort characteristics so that the furniture can provide the rest for which it is intended, and these characteristics must also be retained and not reduced due to fatigue over a long period of use.

A review of most of the relevant properties and related test methods is given on pp 3-5. The way in which each partial characteristic must be determined is discussed on the figures attached to this document. It is essential in this connection that the forces acting on the furniture are chosen as realistically as possible.

Knowledge of the stresses acting on a piece of furniture in practical use is essential. Investigations in this field have been performed among others by the FIRA in the UK and by the Swedish Forest Products Research Laboratory in conjunction with the Swedish Furniture Research Institute.

The typical sketches relating to testing which are provided are based on this material and on experience concerning the way furniture is used.

Another objective is that the test methods should be as simple as possible and be capable of reproduction not only in laboratories but also by industry.

Item number	Item	Figure attached
1.1	General methods	
1.1.1	Estimation of resistance of surfaces	
1.1.1.1	Resistance to cold liquids (e g alcohol, coffee, oil)	
1.1.1.2	Resistance to staining materials other than liquids (ink paste, rubber feet on office machines etc)	
1.1.1.3	Resistance to light and ambient atmosphere (sunlight, gases etc)	
1.1.1.4	Resistance to changes of climates (change of temperature and humidity etc)	
1.1.1.5	Resistance to mechanical damage (scratches, wear, impact etc)	
1.1.1.6	Resistance to heat(warm pots and hot frying pans etc)	
1.1.1.7	Resistance to hot liquids	
1.2	Determination of strength	
1.2.1	Storage units	
1.2.1.1	Strength of framework (when subjected to external load)	x
1.2.1.2	Load capacity (of framework, shelves, shelf carriers, lockers and drawers)	x
1.2.1.3	Strength of drawers (during repeated pushing and pulling)	x
1.2.1.4	Strength of doors, flaps and fittings (during repeated opening and closing)	x
1.2.2	Beds	
1.2.2.1	Strength of bottom (against impacts) Note - For durability of beds, see 1.5.1.1	x
1.2.2.2	Strength of bed-ends and legs	x
1.2.2.3	Load capacity of framework	x
1.2.3	Furniture for seating	
1.2.3.1	Strength of upright chairs and armchairs	x
1.2.3.2	Strength of easy chairs and settees Note - For durability of seats, see 1.5.2.1	x x
1.2.4	Tables	
1.2.4.1	Strength of framework (jointings)	x
1.2.4.2	Load capacity (with load on table top and extension leaf	

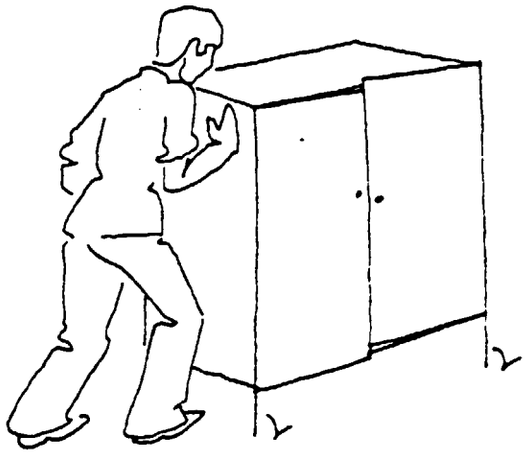
Item number	Item	Figure attache
1.3	Determination of stability	
1.3.1	Storage units	
1.3.1.1	Stability when loaded on shelves	x
1.3.1.2	Stability when loaded in drawers	x
1.3.1.3	Stability when loaded on doors	x
1.3.1.4	Stability when loaded on flaps	x
1.3.2	Beds	
1.3.2.1	Stability when loaded on the top	x
1.3.2.2	Stability when loaded on the side (for bunkbeds, beds for children)	x
1.3.3	Furniture for seating	
1.3.3.1	Stability when loaded on seats	x
1.3.3.2	Stability when loaded on back	x
1.3.2.3	Stability when loades on arm rest	x
1.3.4	Tables	
1.3.4.1	Stability when loaded on table top and extension leaf	x
1.4	Determination of rigidity	
1.4.1	Storage units	
1.4.1.1	Rigidity of framework (when loaded from different directions)	x
1.4.2	Tables	
1.4.2.1	Rigidity when loaded on the top	x
1.4.2.2	Rigidity when loaded from the side (towards table top or extension leaf)	x
1.5	Determination of durability	
1.5.1	Beds	
1.5.1.1	Durability of beds (against fatigue of mattress and bottom of the bed)	x
1.5.2	Furniture for seating	
1.5.2.1	Durability of seats (against fatigue)	x

Item number	Item	Figure attached
1.6	Determination of comfort characteristics	
1.6.1	Beds	
1.6.1.1	Characteristics of elasticity, resilance, spring feel etc	x
1.6.1.2	Heat and humidity	x
1.6.2	Furniture for seating	
1.6.2.1	Characteristics of elasticity, resilance, spring feel etc	x
1.6.2.2	Heat and humidity	x

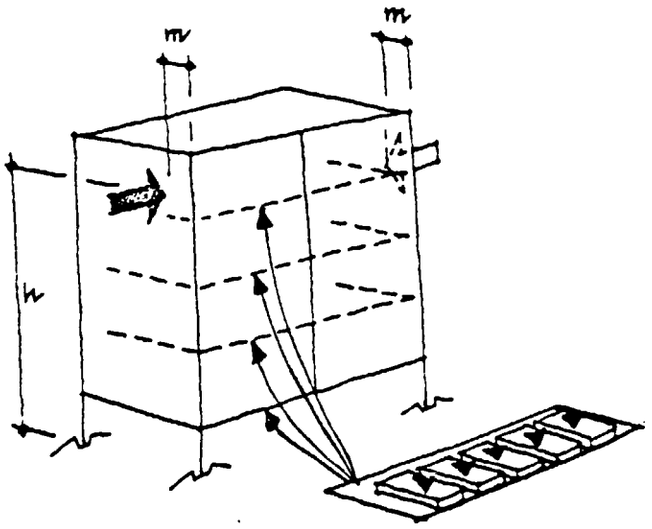
Item

1.2 Determination of strength
1.2.1 Storage units
1.2.1.1 Strength of framework

Situation to be simulated



Principle of testing



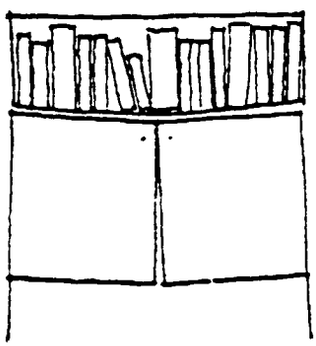
▼ = ... kg/.... mm, ... mm^2 or .... dm^3

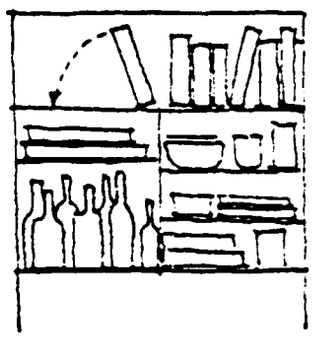
h = max .... mm m = ... mm ➡ = ... N

⇨ ⇦ ⇨ ⇦ ⇨ .....

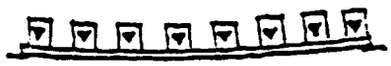
Item	1.2	Determination of strength
	1.2.1	Storage units
	1.2.1.2	Load capacity

Situation to be simulated

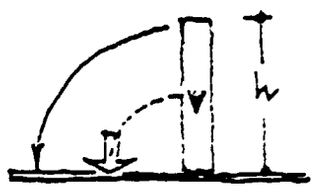




Principle of testing



▼ = ... kg/.... mm,
.... mm^2
or .... dm^3

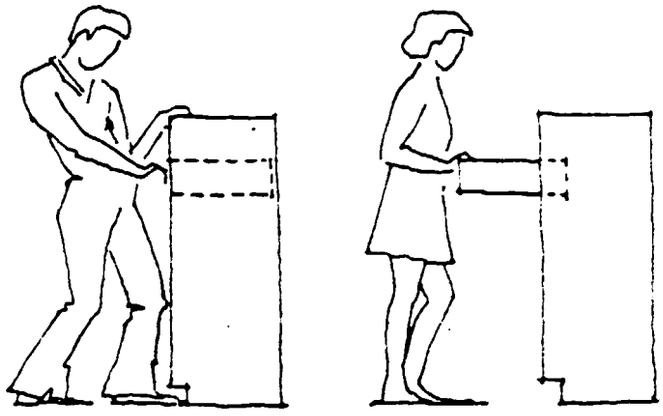


▼ = ... kg h = ...mm

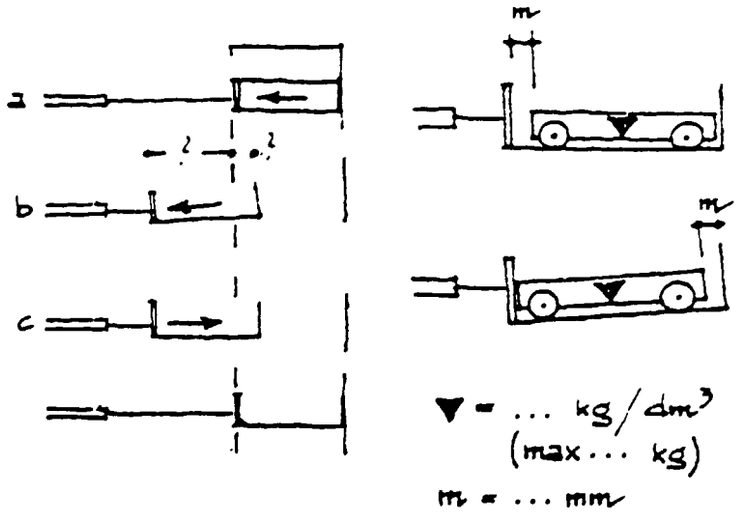
Item

1.2 Determination of strength
1.2.1 Storage units
1.2.1.3 Strength of drawers

Situation to be simulated



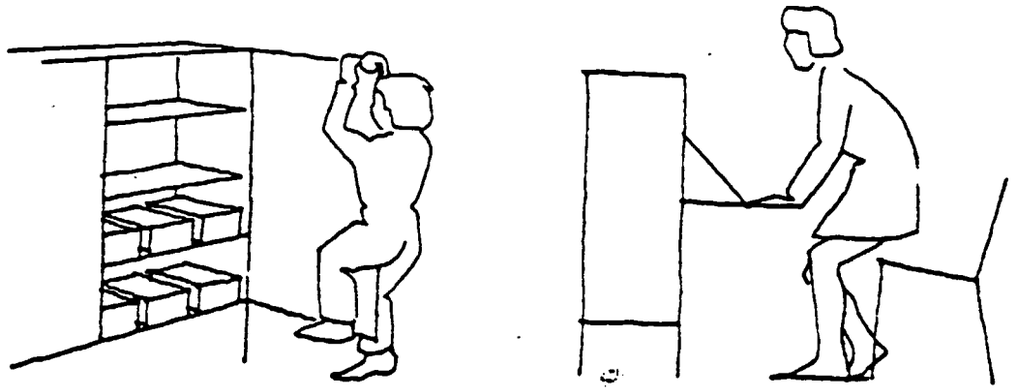
Principle of testing



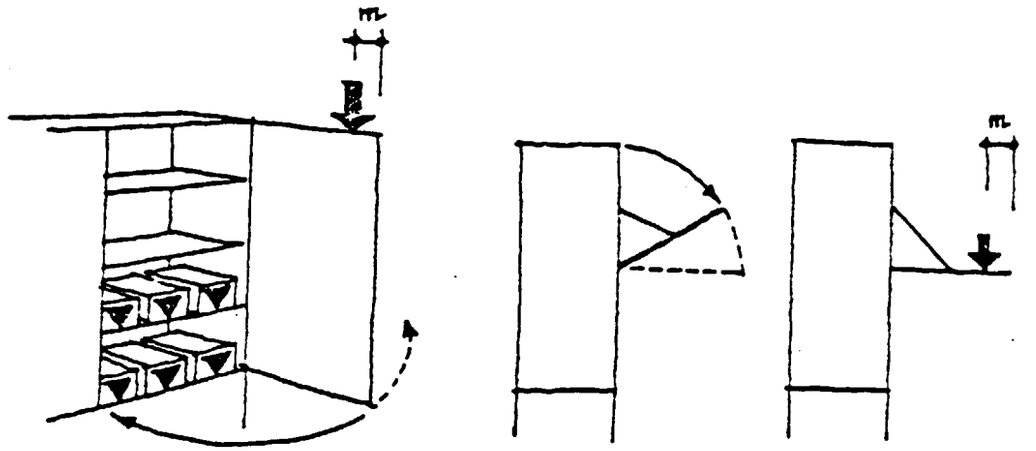
Item

1.2 Determination of strength
1.2.1 Storage units
1.2.1.4 Strength of doors, flaps and fittings

Situation to be simulated

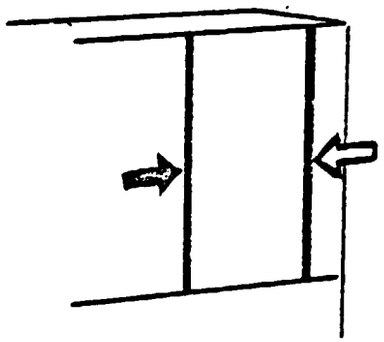


Principle of testing



▼ = ... kg / ... mm , ...mm^2 or ... dm^3
m = ...mm
⇩ = max ... N

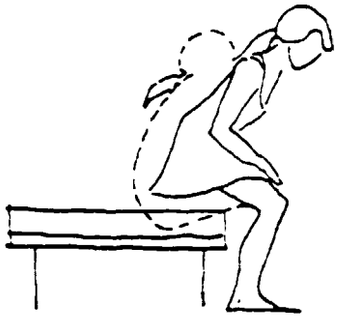
▼ = ... kg
m = ... mm



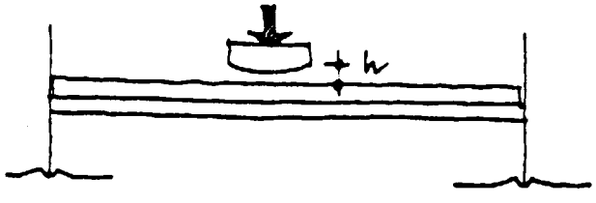
Item

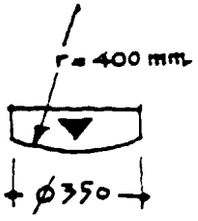
1.2 Determination of strength
1.2.2 Beds
1.2.2.1 Strength of bottom

Situation to be simulated

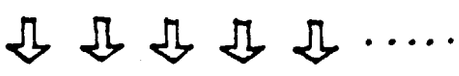


Principle of testing





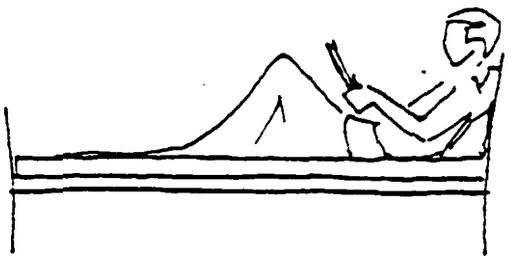
▼ = ... kg h = ... mm



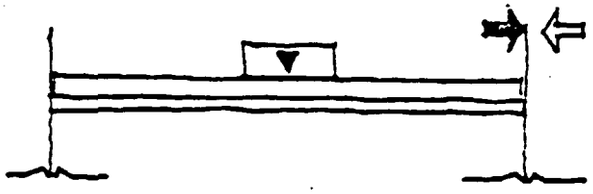
Item

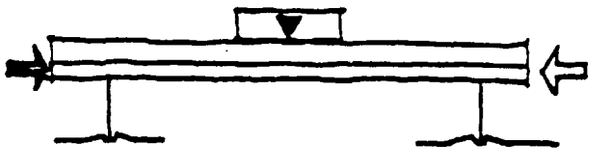
1.2 Determination of strength
1.2.2 Beds
1.2.2.2 Strength of bed-ends and legs

Situation to be simulated



Principle of testing





▼= ... kg ⇨ = ... N

⇨ ⇦ ⇨ ⇦ ⇨ .....

Item

1.2 Determination of strength
1.2.2 Beds
1.2.2.3 Load capacity of framework

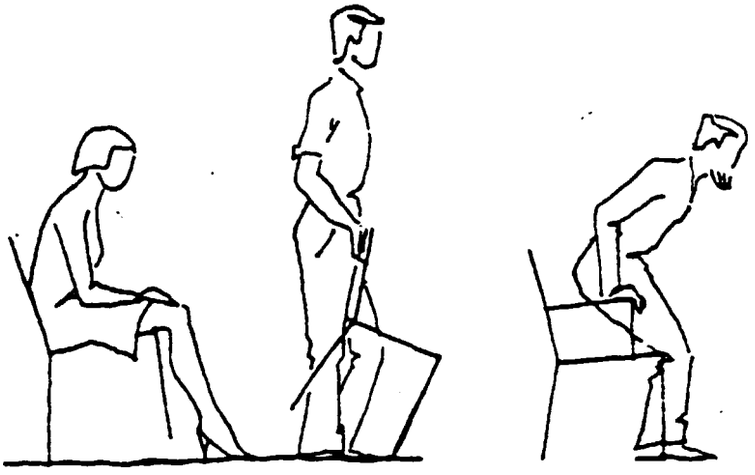
Situation to be simulated

Principle of testing

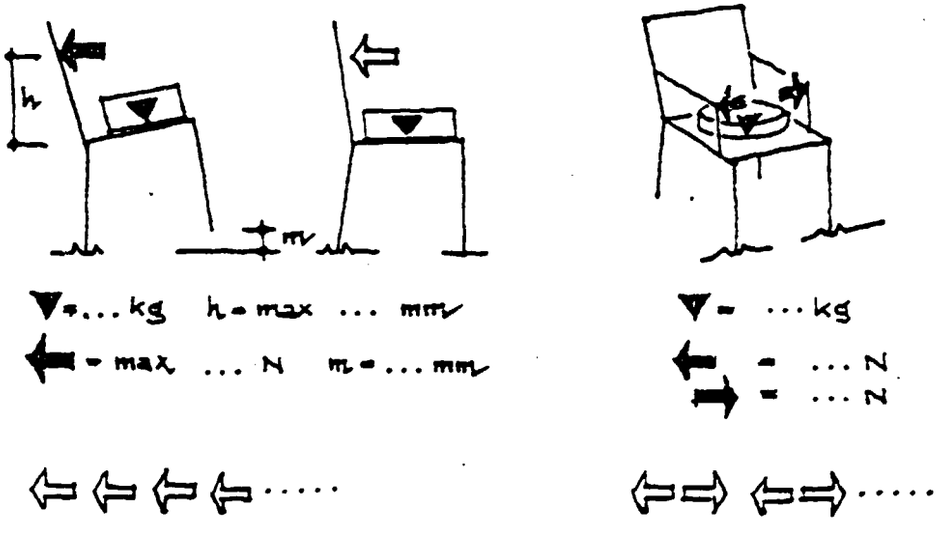
Item

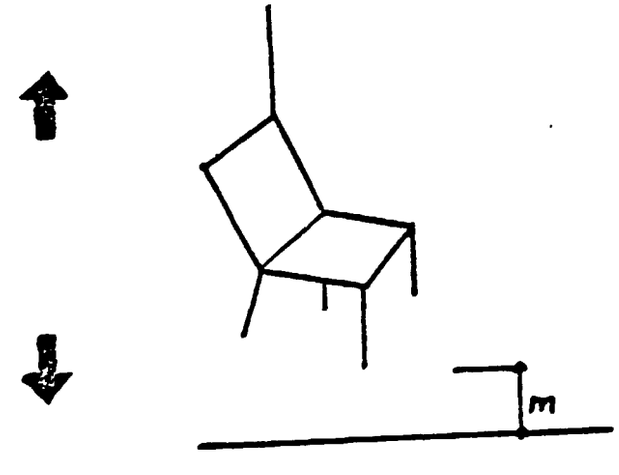
1.2 Determination of strength
1.2.3 Furniture for seating
1.2.3.1 Strength of upright chairs and armchairs

Situation to be simulated



Principle of testing



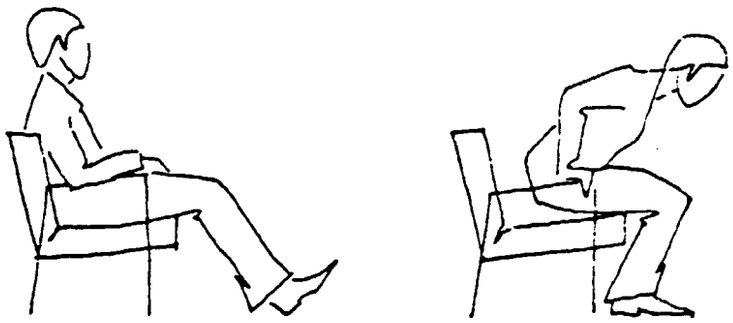


m .... m m

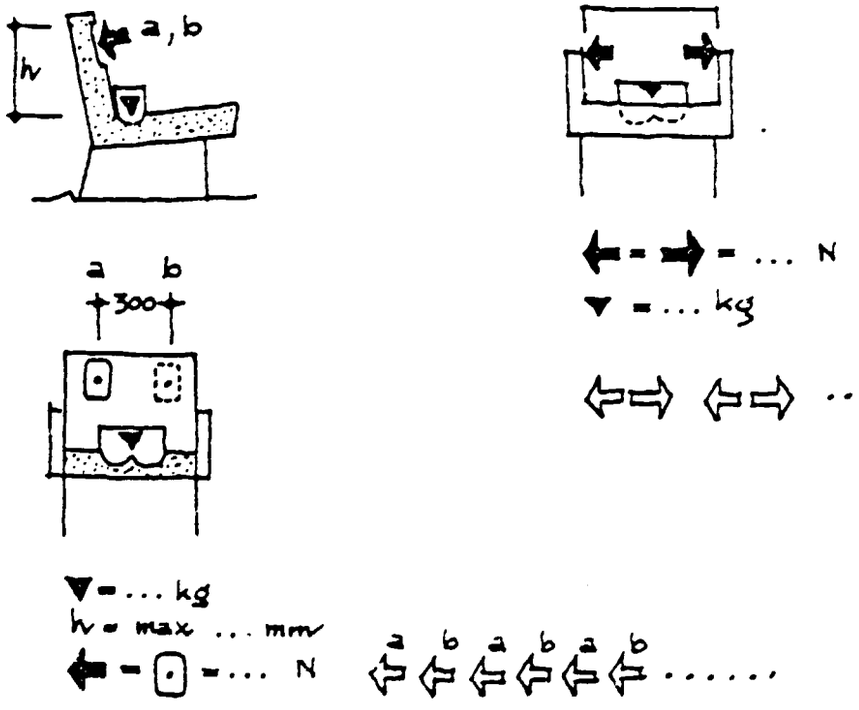
Item

1.2 Determination of strength
1.2.3 Furniture for seating
1.2.3.2 Strength of easy chairs and settees

Situation to be simulated



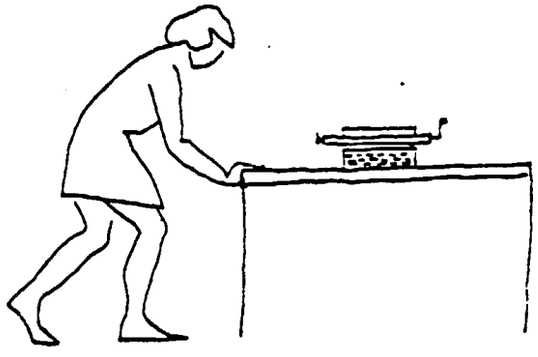
Principle of testing



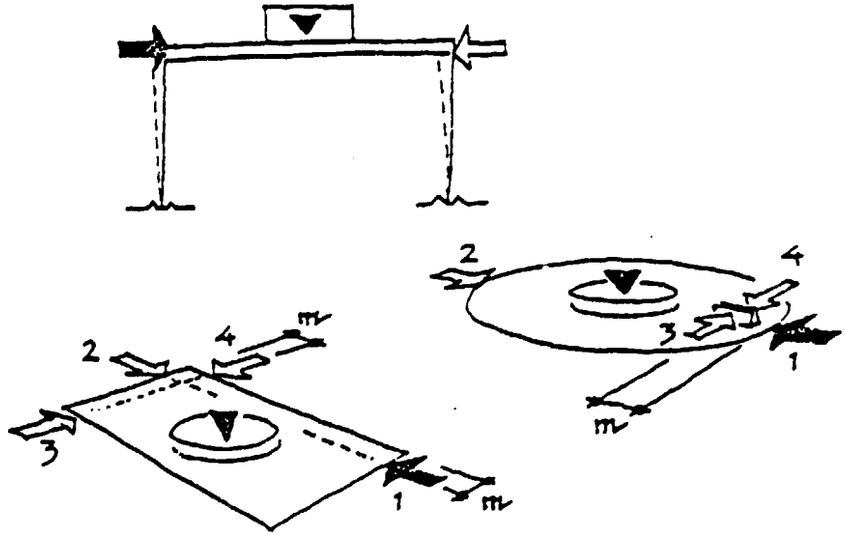
Item

1.2 Determination of strength
1.2.4 Tables
1.2.4.1 Strength of framework

Situation to be simulated



Principle of testing



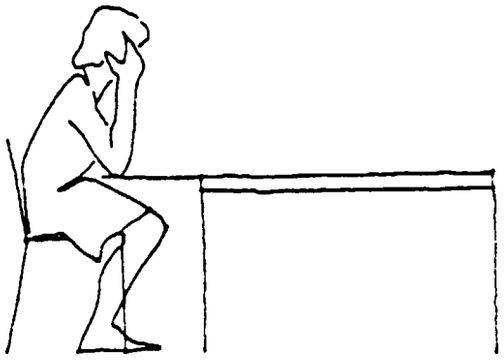
▼= ...kg m= ... mm ➡ = ... N

⇨ ⇦ ⇨ ⇦ ⇨ .....
1 2 3 4 1

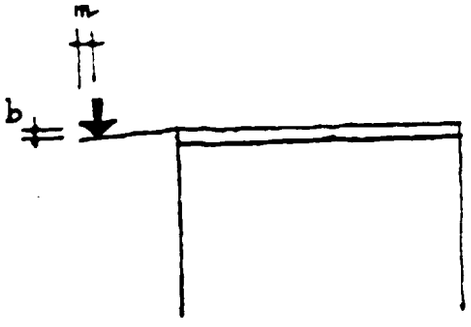
Item

1.2 Determination of strength
1.2.4 Tables
1.2.4.2 Load capacity

Situation to be simulated



Principle of testing

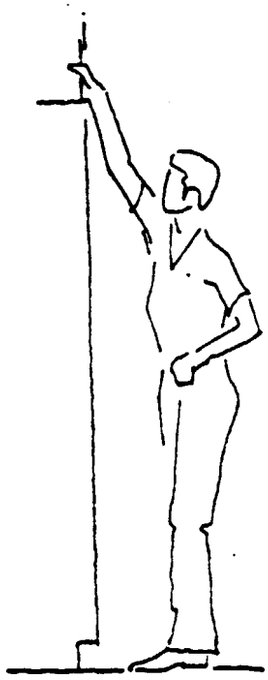


b = ... mm
m = ... mm
↓ = ? N

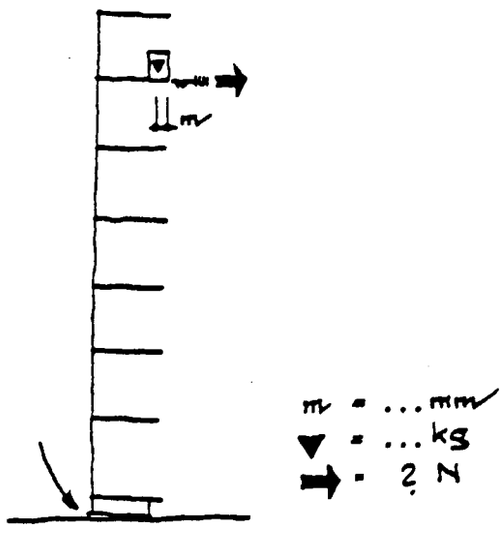
Item

1.3 Determination of stability
1.3.1 Storage units
1.3.1.1 Stability when loaded on shelves

Situation to be simulated



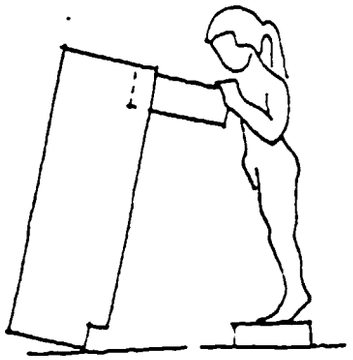
Principle of testing



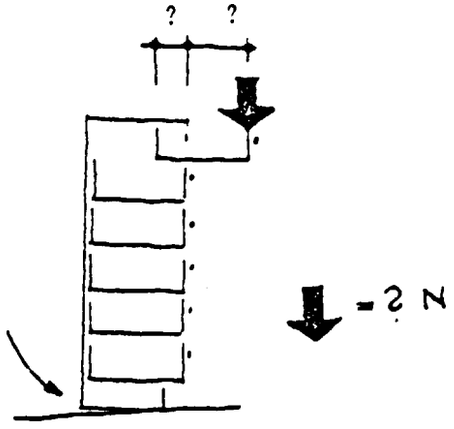
Item

1.3 Determination of stability
1.3.1 Storage units
1.3.1.2 Stability when loaded in drawers

Situation to be simulated



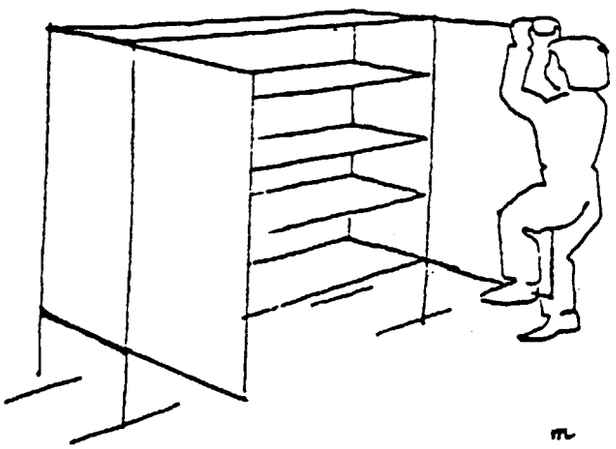
Principle of testing



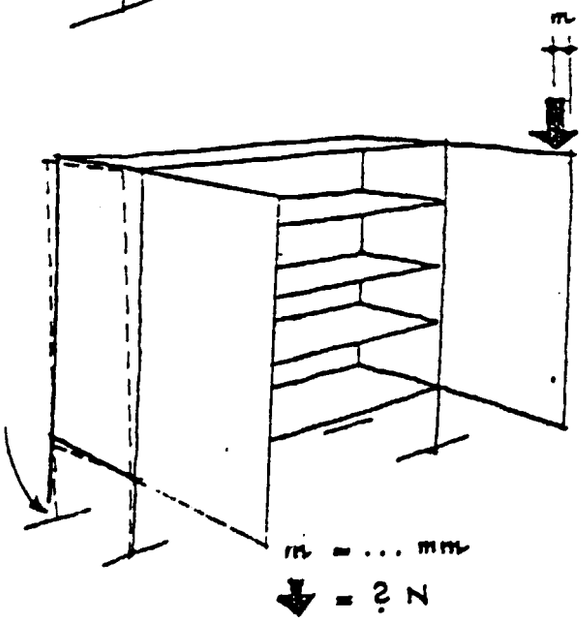
Item

1.3 Determination of stability
1.3.1 Storage units
1.3.1.3 Stability when loaded on doors

Situation to be simulated



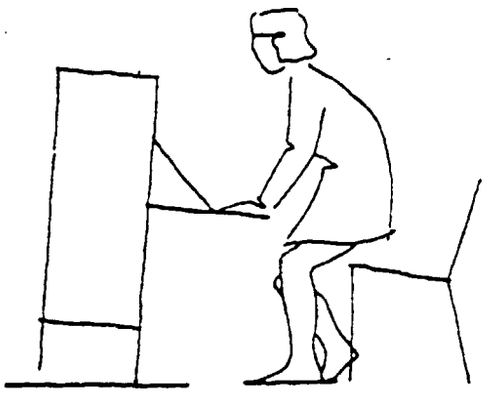
Principle of testing



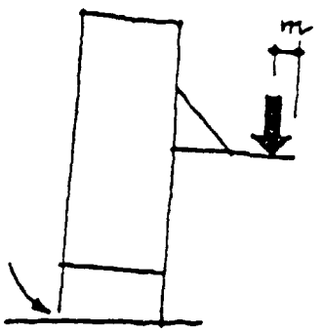
Item

1.3 Determination of stability
1.3.1 Storage units
1.3.1.4 Stability when loaded on flaps

Situation to be simulated



Principle of testing



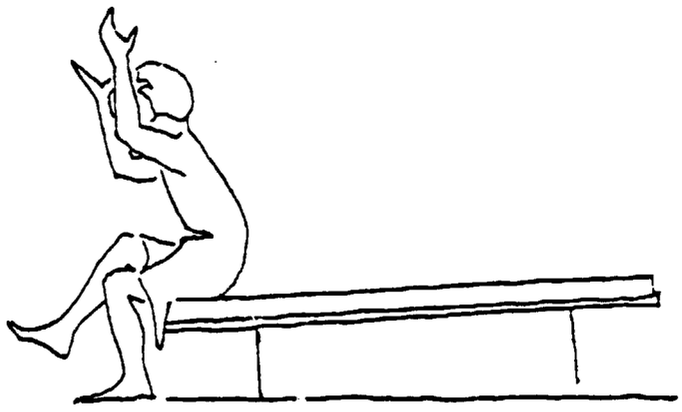
m = ... mm

= 2 N

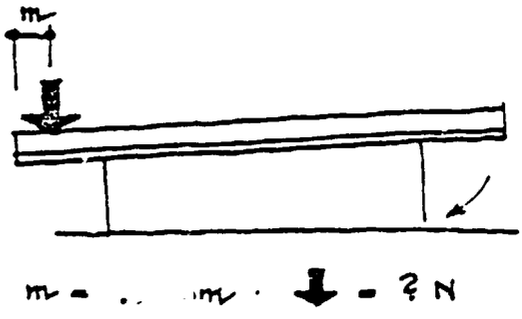
Item

1.3 Determination of stability
1.3.2 Beds
1.3.2.1 Stability when loaded on the top

Situation to be simulated



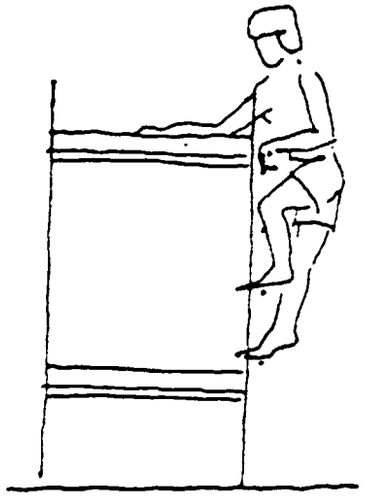
Principle of testing



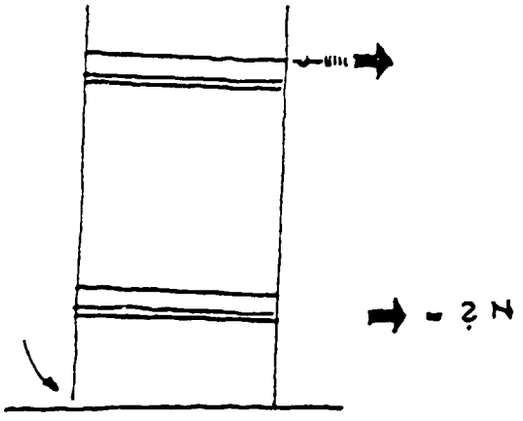
Item

1.3 Determination of stability
1.3.2 Beds
1.3.2.2 Stability when loaded on the side

Situation to be simulated



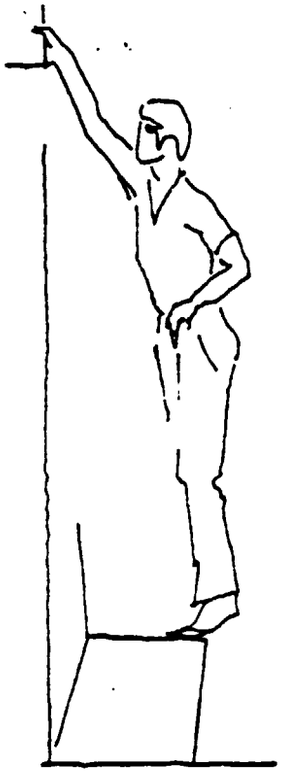
Principle of testing

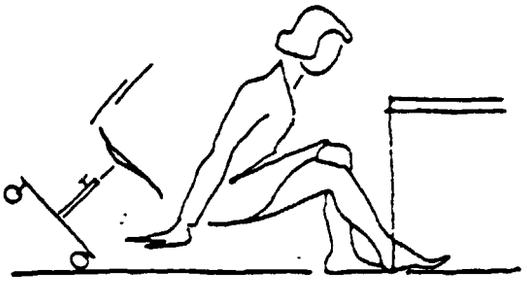


Item

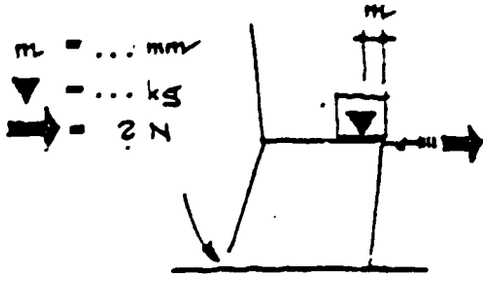
1.3 Determination of stability
1.3.3 Furniture for seating
1.3.3.1 Stability when loaded on seats

Situation to be simulated





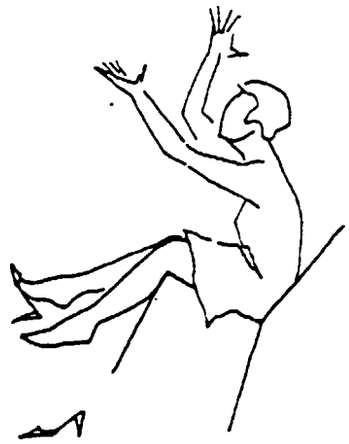
Principle of testing



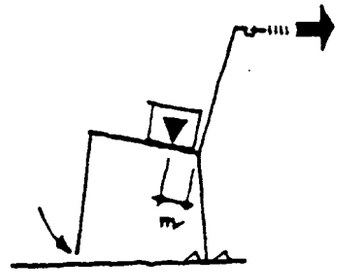
Item

1.3 Determination of stability
1.3.3 Furniture for seating
1.3.3.2 Stability when loaded on back

Situation to be simulated



Principle of testing

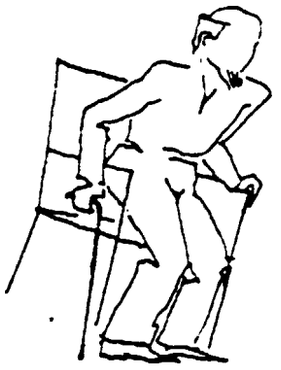


▼ = ... kg m = ... mm
➡ = ? N.

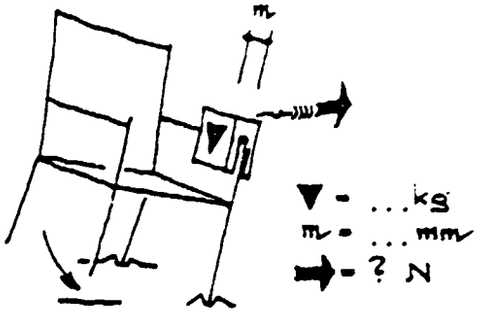
Item

1.3 Determination to stability
1.3.3 Furniture for seating;
1.3.3.3 Stability when loaded on arm rest

Situation to be simulated



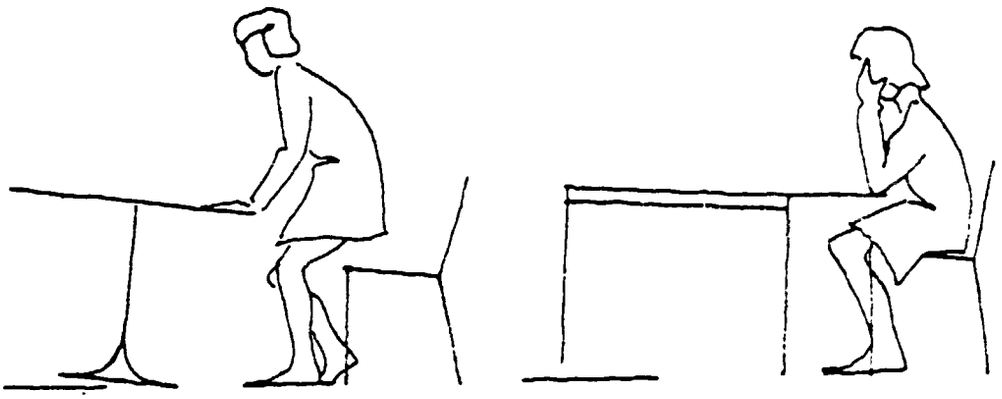
Principle of testing



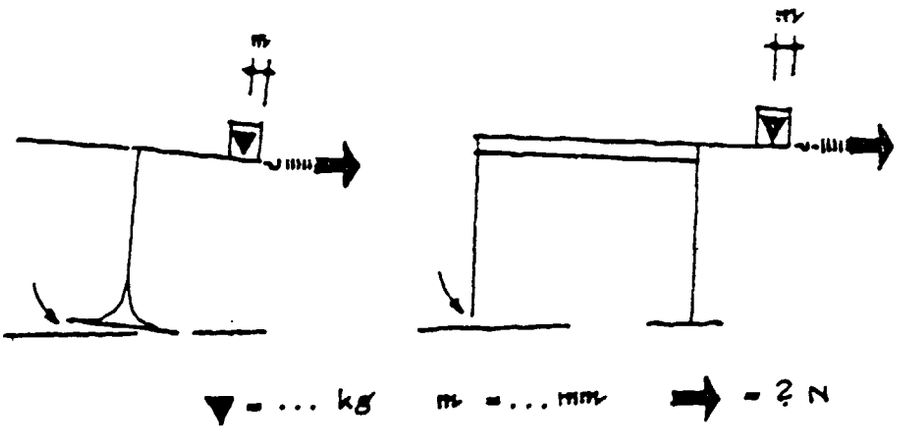
Item

1.3 Determination of stability
1.3.4 Tables
1.3.4.1 Stability when loaded on table top and extension leaf

Situation to be simulated



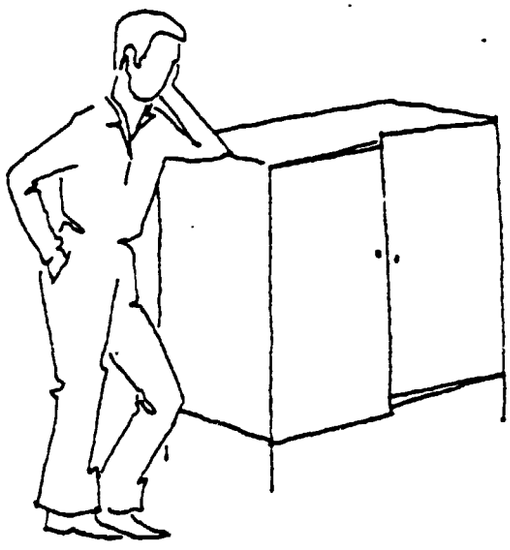
Principle of testing

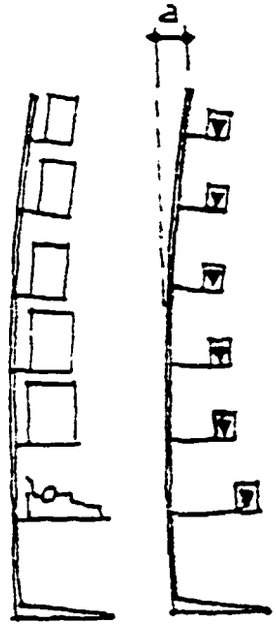


Item

1.4 Determination of rigidity
1.4.1 Storage units
1.4.1.1 Rigidity of framework

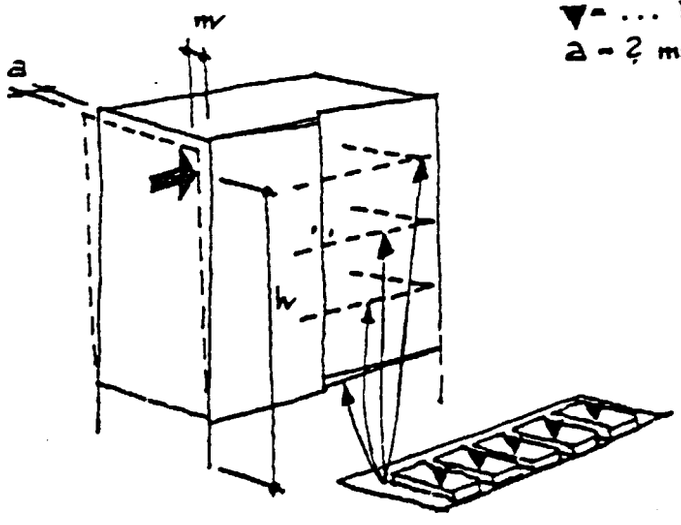
Situation to be simulated





▼ = ... kg / ... mm, ... mm^2
a = ? mm or ... dm^3

Principle of testing

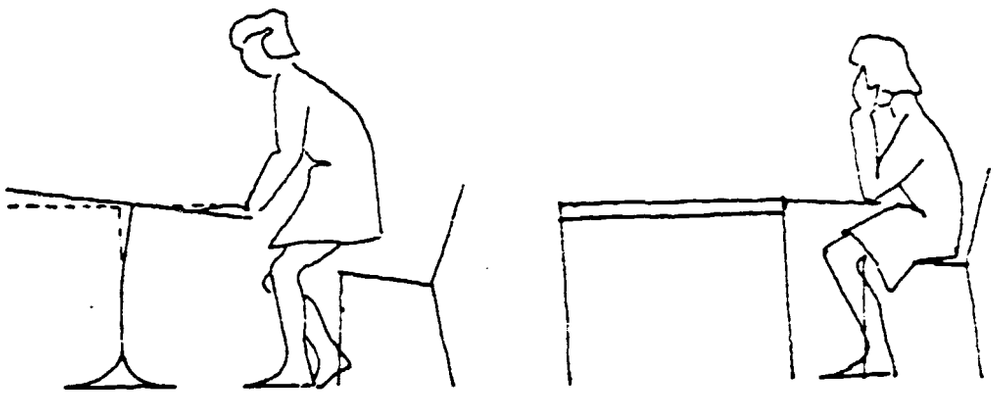


▼ = ... kg / .... mm
h = max ... mm m = ... mm ➡ = ... N a = ? mm

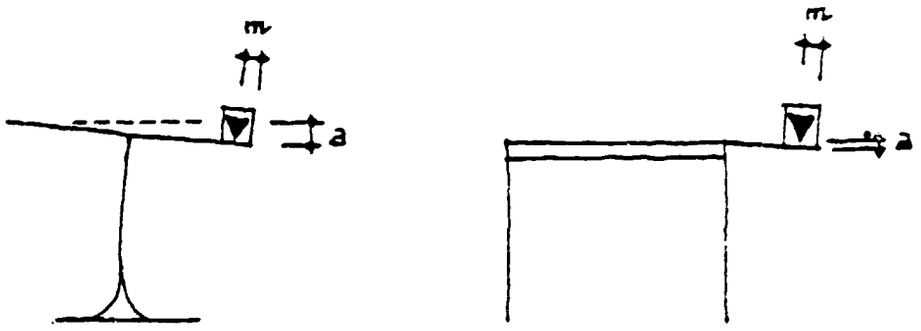
Item

1.4 Determination of rigidity
1.4.2 Tables
1.4.2.1 Rigidity when loaded on table top

Situation to be simulated



Principle of testing



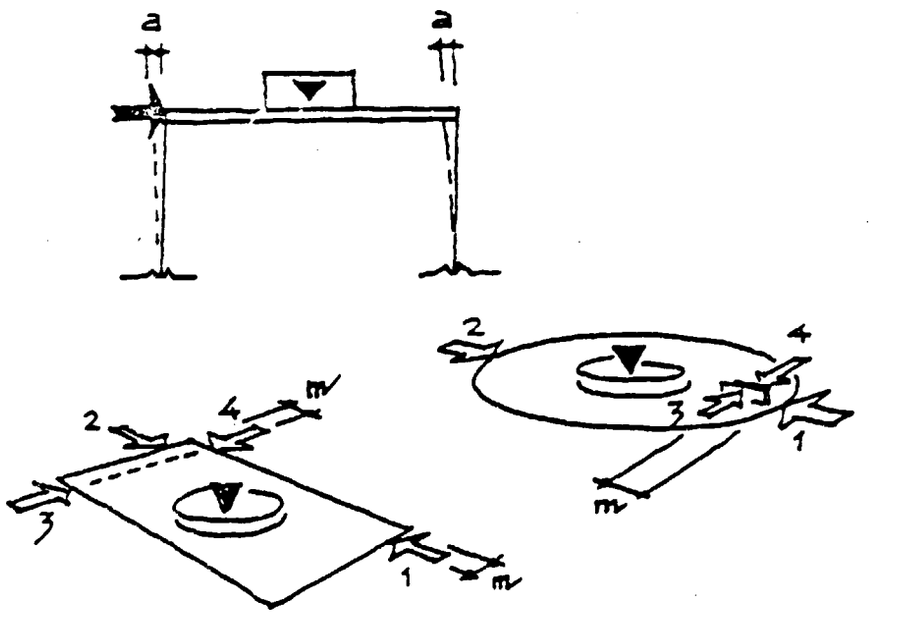
▼= ...kg m = ... mm a = ? mm

Item

1.4. Determination of rigidity
1.4.2 Tables
1.4.2.2 Rigidity when loaded from the side

Situation to be simulated

Principle of testing

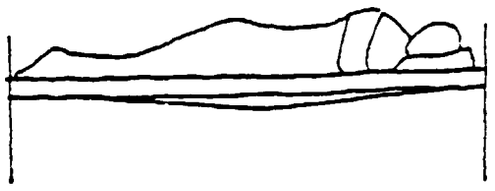


▼= ....kg m = ...mm ➡ = ... N a = ? mm

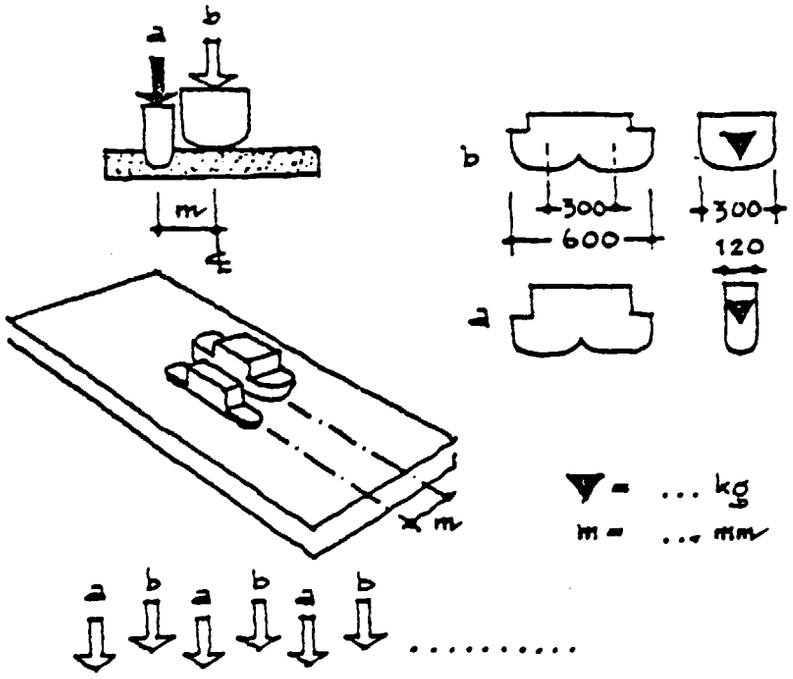
Item

1.5 Determination of durability
1.5.1 Beds
1.5.1.1 Durability of beds

Situation to be simulated



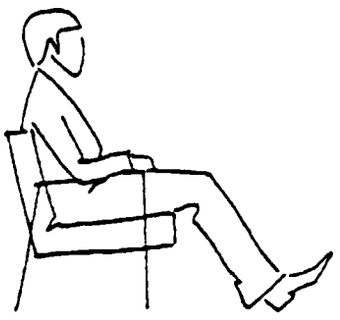
Principle of testing



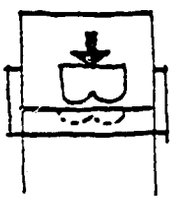
Item

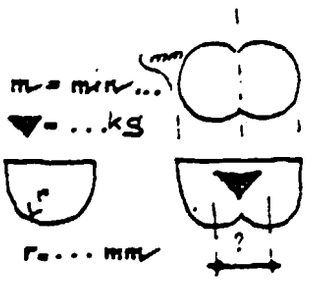
1.5 Determination of durability
1.5.2 Furniture for seating
1.5.2.1 Durability of seats

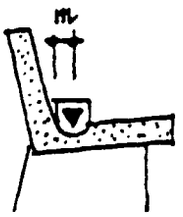
Situation to be simulated



Principle of testing



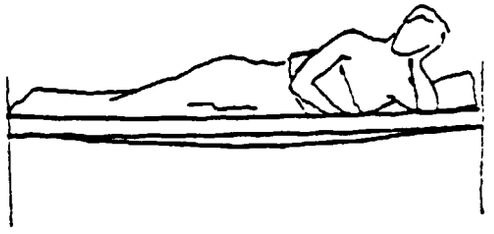




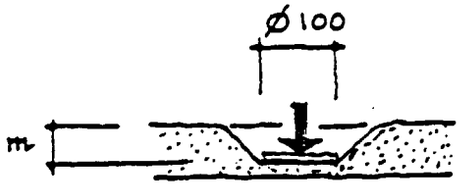
Item

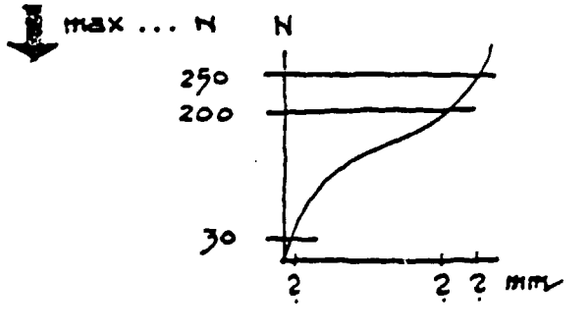
1.6 Determination of comfort characteristics
1.6.1 Beds
1.6.1.1 Characteristics of spring feel and surface feel

Situation to be simulated



Principle of testing

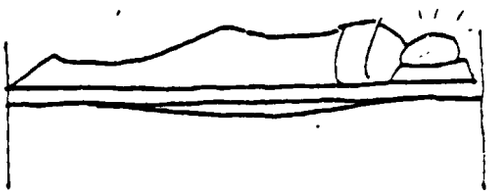




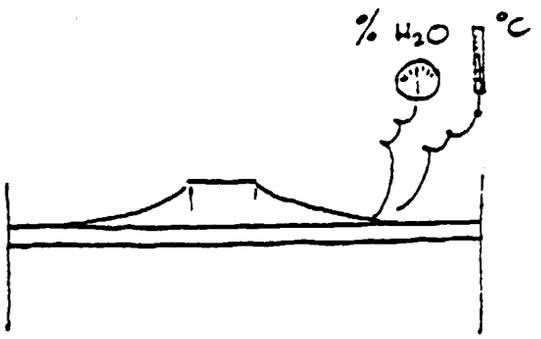
Item

1.6 Determination of comfort characteristics
1.6.1 Beds
1.6.1.2 Heat and humidity

Situation to be simulated



Principle of testing



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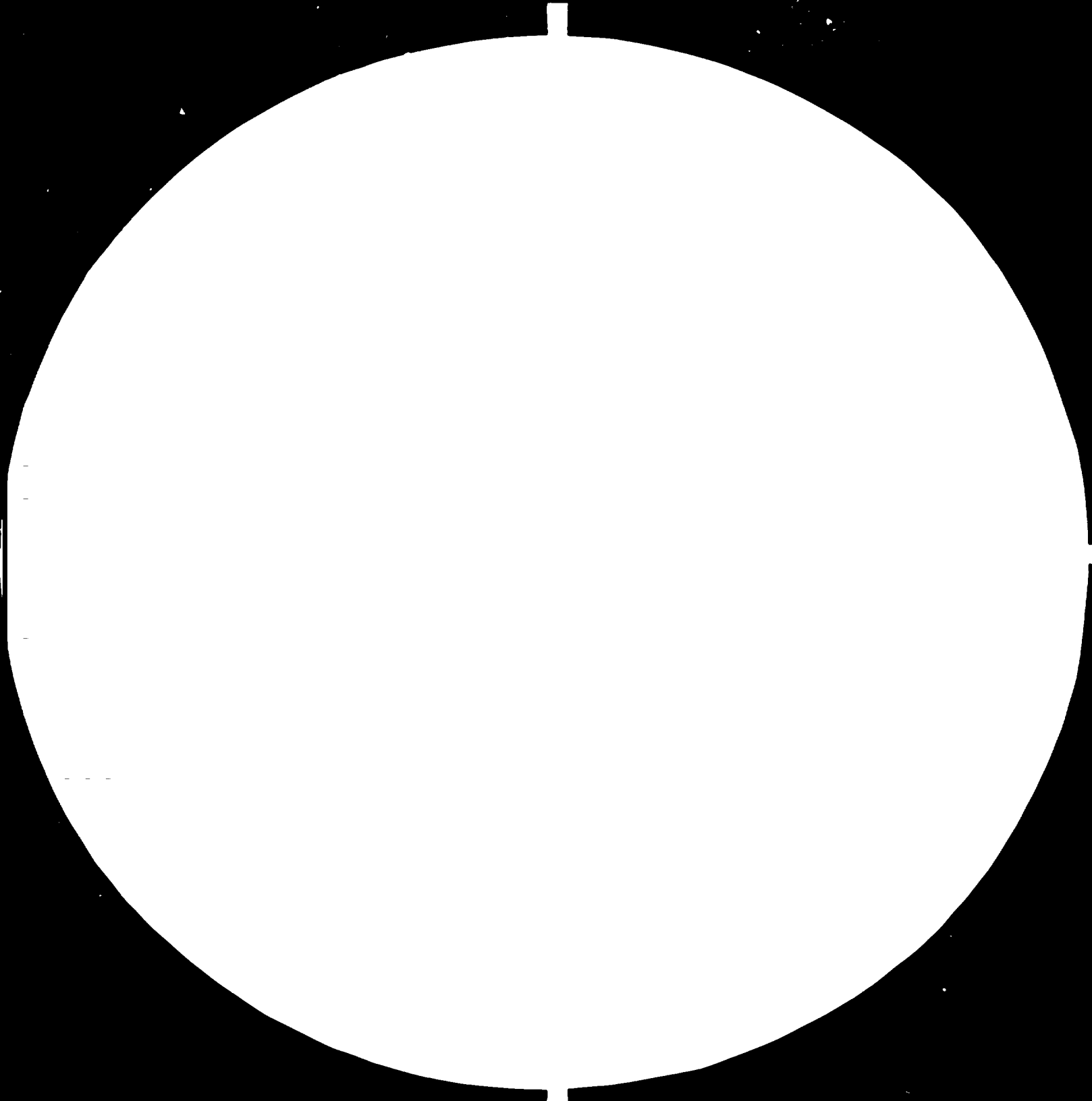
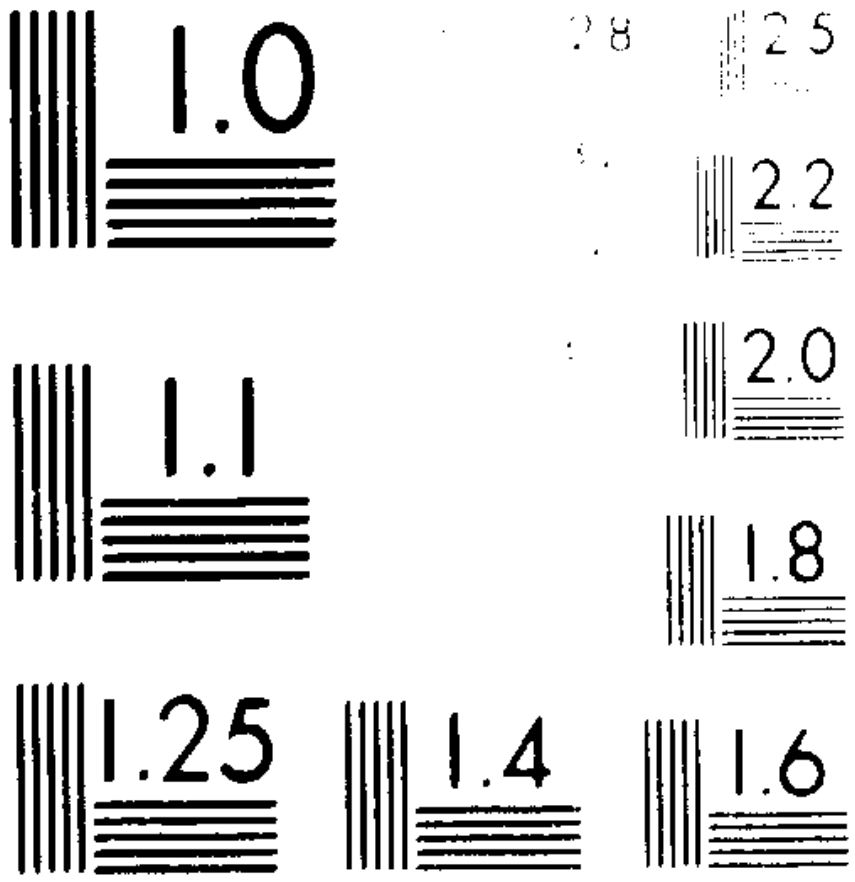
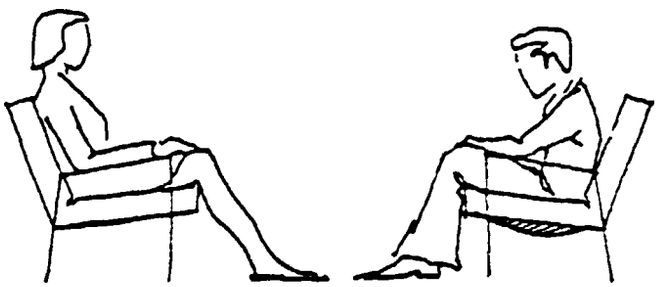



1.0
2.8
2.5
2.2
1.1
2.0
1.8
1.25
1.4
1.6

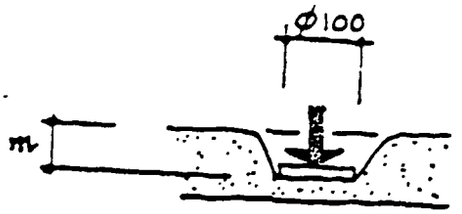
Item

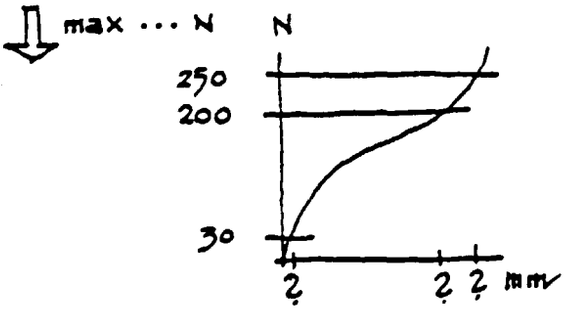
1.6 Determination of comfort characteristics
1.6.2 Furniture for seating
1.6.2.1 Characteristics of spring feel and surface feel

Situation to be simulated



Principle of testing



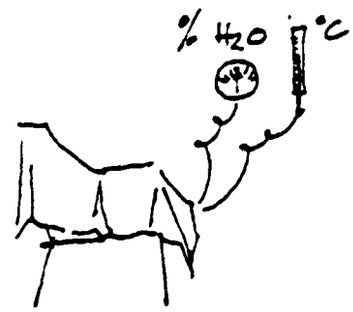


Item

1.6 Determination of comfort characteristics
1.6.2 Furniture for seating
1.6.2.2 Heat and humidity

Situation to be simulated

Principle of testing



TECHNICAL COMMITTEE 136 — Furniture

SUB-COMMITTEE 3 — Specifications for properties of material and for workmanship

SECRETARIAT — DIN, Germany

CLASSIFICATION OF QUALITY OF MATERIAL AND WORKMANSHIP

Contents

1. Introduction

In this standard the quality of material and workmanship graded into five levels. The grading is mainly based on the visual and tactile determination of material properties and precision of making, which could affect the utility and appearance of the complete and finished product.

The durability (strength of frame, permanency of shape, surface resistance, etc) is determined according to other standards.

This standard is applicable to furniture and built-in units (fitments).

2. Definition of Grading Levels

A complete and finished piece of furniture or fitment or parts thereof are classified according to requirement levels. (A - E as specified in para. 4 and 5, see ex. below)

In this standard the word "defect" is understood as any kind of deviation or failing in the material and manufacture of the product.

Level

A - No defects affecting desired function and designed (intended) appearance are allowed.

B - No defects affecting desired function are allowed, whereas scarcely noticeable defects (as defined in para. 4 - 5) affecting the designed appearance are allowed.

C - No defects affecting desired function are allowed, whereas a few clearly noticeable defects (as defined in para. 4-5) affecting the designed appearance are allowed.

D - No defects affecting desired function are allowed, whereas defects affecting the designed appearance are allowed to a larger extent (as specified in para. 4-5).

E - Reasonable hygienic and normal safety requirements shall be fulfilled. No broken parts are allowed, but other defects affecting only the appearance are accepted.

Example

A manufacturer or contractor can prescribe the quality required for the different parts of the furniture in the following manner:

	Furniture			Fitments in basements, attics, storage rooms
	Very high requir.	High requir.	Low requir.	
WELL EXPOSED PARTS	A	B	C	D
LESS EXPOSED PARTS	B	C	D	E
CONCEALED PARTS	E	E	E	E

Well exposed parts - Table tops, doors of cupboards, armrests, etc.

Less exposed parts - legs, insides of drawers and cupboards, shelves, etc.

Concealed parts - undersides of drawers, backsides of cupboards, undersides of seats, bottoms, etc.

3. Guide to the use of the tables in para. 4 and 5

In para 4 and 5 the requirements are stated as maximum measures (mm) or percent (when possible). The measuring instructions should be according to ISO-standard no 000. However most of the requirements are stated as defect severity grades I, II, III or IV (as defined below) when assessment is carried out without any measuring aids.

The defect severity grades:

I Defect indicated is not permitted.

II The defect can only appear at one place and should be very small or form a hardly noticable contrast against the surrounding surface.

III The defect can appear clearly visible either as a single large defect or a number of smaller defects.

IV Defects can appear to an unlimited extent unless they affect the function of the furniture or provide any injury or damage risk.

4. Quality of material

4.1 Solid Wood and Surface Veneer

Defects	Level A	B		C	D	E
Bark, insect damage Decay, unsound knots Pitch pockets	I	I		I	I	I
Knotholes, loose knots Wane, bole scar	I	I		I	I	IV
Inbark, bark-ringed knot	I	I		I	II	IV
Filled knots (out of colour)	I	I		I	II	IV
Visible pith of max width	I	I		II 3 mm	II	IV
Open checks and splits	I	I		II	II	IV
Filled checks and splits (not in colour)	I	I		II	III	IV
Drilled and plugged knots						
Knot groups 1/						
Streaks of sapwood in oak, teak, palisander and other types of wood with distinct heart wood formations 1/	I	II		II	III	IV
Discolouration						
Filled knots (in colour) size max		6 mm		12 mm		
Filled checks and splits (in colour)	I	II		II	III	IV
Small surface checks (e.g. in turned veneer)						
Cross-grained 1/ or Slope-grained wood 2/	I	II		III	IV	IV
Streaks of heartwood contrasting to the general appearance 1/	II	II		III	IV	IV
Sound knots or firmly attached dead knots 1/	II	III	II	III	III	IV
knot size not exceeding	6 mm	6 mm	12 mm	20 mm	30 mm	

Note 1/ If the defect is employed deliberately and occur throughout a full production run the next higher level may be quoted.

2/ If the defect is employed deliberately with a decorative effect (e.g. root veneer) level "A" may be quoted.

4.2 Hardboard and Chipboard

The requirements are valid only for boards used visibly in the construction.

Wood fibre boards shall be of type hardboard according to ISO ooo. Wood chipboards within the requirements A - D shall be of a quality equal to class 1 according to ISO ooo.

	Level				
	A	B	C	D	E
Discolouration Cavities, unevenness Filled cracks in the material	I	I	II	III	IV

4.3 Metals

	A	B	C	D	E
Visible parts with corrosion attacks or without any kind of corrosion protection	I	I	I	I	IV
Mill scale, offside scale	I	I	I	II	IV
Cavities and hollows	I	II	II	III	IV
Porous welds or solders	II	II	III	III	IV

4.4 Plastics

	A	B	C	D	E
Cracks in the material, open	I	I	I	II	IV
,filled	I	I	II	III	IV
Discolourations	I	I	II	III	IV
Colour differences between parts intended to be alike	I	II	II	III	IV

4.5 Stone Materials

	A	B	C	D	E
Loose fossil	I	I	I	I	IV
Crack indications	I	I	I	II	IV
Colour and structure deviations from the general appearance of the material	I	II	II	III	IV

4.6 Glass (panes for doors and alike, but not in mirrors)

	A	B	C	D	E
Structural faults 1/ (cavities, threads, sand or other particles)	I	II	III	III	IV
Flatness irregularities 1/ (bulges, waves)	I	I	II	III	IV
Scratches 1/					
Tarnish					

Note 1/ If the defect is employed deliberately with a decorative effect, level "A" may be quoted.

4.7 Upholstery filling materials

	A	B	C	D	E
Filling materials containing metallic parts, wooden chips, paper, strings etc.	I	I	I	I	I
Filling material of animal nature not cleaned and disinfected.					
Material giving off a penetrating smell.					
Cavities, bulges and alike clearly detectable through the covering material (e.g. in flexible cellular materials)	I	I	II	III	IV
Uneven springiness detectable through the covering material.	I	I	II	III	IV
Hard-quilled feathers detectable through the cover.	I	I	II	IV	IV
Irregularities of filling material detectable through the cover.	I	II	III	IV	IV

4.8 Upholstery Cover Material

	A	B	C	D	E
Slippage and tearing in the material.	I	I	I	II	III
Weaving defects.	I	I	I	II	IV
Major defects in leather (such as open scratches, discolourings, rough or coarse grain, grain ruptures, etc)	I	II	II	III	IV
Irregularities in leather 1/ (such as healed wounds, healed surface scratches etc)	II	II	III	IV	IV

Note 1/ If the irregularities are employed deliberately the next higher level may be quoted.

5. Quality of Workmanship

5.1 Dimensions

Method of measuring acc. to ISO 000

	A	B	C	D	E
Deviation from stated total linear dimension, max The requirements are only valid in case the dimensioned deviations might have any effect on the proper fitting of one unit to another or to a building, e.g. built-in fitments.	1 mm	1,5 mm	2 mm	3 mm	IV

5.2 Angles

Method of measuring acc. to ISO 000

	A	B	C	D	E
Deviation from the right angle, when sides are max 400 mm max dev.	0,4 mm	0,6 mm	0,8 mm	1 mm	IV
For any length thereafter deviation is measured in % of the total length between corners, max	0,1%	0,15%	0,2%	0,3%	IV
but not exceeding	1 mm	1,5 mm	2 mm	3 mm	IV
Deviation from intended shape, parallelism, symmetry etc (legs, armrests, etc)	II	II	III	IV	IV

5.3 Flatness

Method of measuring acc. to ISO 000

	A	B	C	D	E
Uneven contact with supporting flat surface (rocking)	I	III	III	III	IV
Gap between leg end or plinth and floor, Not exceeding		1 mm	2 mm	3 mm	
Deviation from flatness (bow, cup, twist etc)					
in % of the length of the edge or diagonal where the deviation appears must	0,2%	0,4%	0,6%	IV	IV
but not exceeding	1 mm	2 mm	4 mm		

5.4 Straightness

Method of measuring acc. to ISO 000

	A	B	C	D	E
Deviation from intended straightness in % of the length of crossbars, slots, rods, etc. max	0,2%	0,4%	0,6%	1 %	IV

5.5 Paralellism of Gaps

Method of measuring acc. to ISO 000

	A	B	C	D	E
Deviation from paralellism of gaps (e.g. clearance gaps between or around drawers and hinged doors)					
of gaps shorter than 400 mm max	0,5mm	1 mm	2 mm	3 mm	IV
of gaps longer than 400 mm in % of the length, max	0,15%	0,25%	0,5 %	0,75%	IV
but not exceeding	1 mm	2 mm	4 mm	6 mm	

5.6 Width Differences of Gaps

Method of measuring acc. to ISO 000

	A	B	C	D	E
Difference of width between gaps intended to be equal (e.g. clearance gaps between or around drawers and hinged doors) max	1 mm	2 mm	3 mm	4 mm	IV

5.7 Alignment of Drawers and Doors

Method of measuring acc. to ISO 000

	A	B	C	D	E
Deviation from edges alignment, max	1 mm	1,5mm	3 mm	4 mm	IV
Deviation from front plane alignment, max	1 mm	1,5 mm	3 mm	4 mm	IV

5.8 Action of Drawers

Valid also for pull-out leaves, trays and alike

Method of measuring acc. to ISO 000

	A	B	C	D	E
Unsmooth sliding action closing force max (prior to performance test)	30 N	50 N	50 N	70 N	IV

5.9 Action of Doors

	A	B	C	D	E
Unsmooth action	I	I	II	III	IV

5.10 Action and Sagging of Extension Leaves, Flaps and Folding Table Tops

	A	B	C	D	E
Unsmooth running of extensions and sliding gear	I	II	III	III	IV
Level deviation of unloaded leaf (flap)					
in % of the protruding length, max 1/	0,4 %	0,7%	1 %	1,5%	IV
Level deviation in the table centre when extended with inserted leaves					
in % of the total table length, max	0,4 %	0,7%	1 %	1,5 %	IV
Height difference between table top and leaf at the junction, max	1 mm	1,5 mm	2 mm	4 mm	IV

Note 1/ Pull-out extension in cupboards to be measured when extended 2/3.

5.11 Assemblies, Joints

	A	B	C	D	E
Penetration through the material by fasteners - nails, screws, dowels, etc.	I	I	I	I	IV
Bulge caused (but no penetration) by the same reason Cracks due to forced assembling or to expanding (contracting) of materials	I	I	I	II	IV
Filling or repairs not in colour Glue drippings	I	I	II	III	IV
Fillings or repairs in colour Visible glue or discolouration from glue.	I	II	II	III	IV
Gaps in joints or assemblies	I	II	III	III	IV
but not exceeding		0,2mm	0,5 mm	0,8 mm	
Porous welds or solders Gaps in joints between sides and bottoms of drawers,	II	II	III	III	IV
but not exceeding	0,3 mm	0,5 mm	0,8 mm	1 mm	

5.12 Veneering

	A	B	C	D	E
Blister delamination	I	I	I	I	III
Repairs in deviating colour	I	I	I	II	IV
Chippings or fractures	I	I	II	II	III
Repairs in same colour	I	I	II	III	IV
Bleed through	I	I	II	III	IV
Glue visible in veneer seams	I	I	II	III	IV
Gaps in veneer seams	I	II	II	III	IV

5.13 Edges

	A	B	C	D	E
Unprotected edge on chipboard and hardboard	I	I	allowed when there is no risk of chipping		IV
Lippings not uniformly level with connected plane	I	I	II	III	IV
max deviation			0,2 mm		
Chipping of edge material	I	I	II	II	IV
Colour of lipping deviating from connected material 1/					
Concealed lipping appears as shadowing or irregularity (under ver)	I	II	II	III	IV
Edge rounding not uniform along one and the same given edge					

Note 1/ If the defect is employed deliberately with a decorative effect level "A" may be quoted.

5.14 Bent Parts

	A	B	C	D	E
Fractures	I	I	I	II	III
Surface chipping	I	I	I	II	III
Glueing failure	I	I	II	III	IV
Unequal bends on parts intended to be identical	II	II	III	III	IV
Unevenness in the bending (tubular steel)					

5.15 Fittings, Hardware

	A	B	C	D	E
Fittings with sharp edges	I	I	I	II	IV
Screws not matching in size Sunk fittings not flush with the surface (e.g. hinges and locks) Major gaps between (around) fitting and connecting material	I	II	II	III	IV
Screws not correctly driven home or with damaged screw-head slot.	I	II	III	III	IV

5.16 Surface Evenness and Smoothness

	A	B	C	D	E
Surface not cleaned from pencilmarks etc.	I	I	I	II	IV
Leg ends and bottom edge of plinth rough and not chamfered	I	I	I	IV	IV
Pungent or uneven arrises Ragged surface	I	I	II 1/	II 1/	IV 1/
Scratches, dents, depression marks Undulated and uneven surface Cuttermarks, rollermarks, saw traces Sanding-through of surface veneer or other surface material (before coated) Flat areas on parts intended to be round or other deviations from intended shape. Uneven sanding, grinding or sandblasting	I	I	II	III	IV
Fibre swelling	I	II	II	III	IV
Uneven welding	II	II	II 1/	III 1/	IV 1/
Transversal sanding marks	II	II	II	IV	IV

Note 1/ Parts accessible to touch when the user handles the furniture in a normal way, must be smooth.

	A	B	C	D	E
Corners of springcores on projecting seats not reinforced	I	I	I	I	IV
Unevenness felt through upholstery(e.g. the springsystem)	I	I	II	III	IV
Distance between cover material and spring less than 25 mm (measured halfway between top-edge of spring cage and top of seat frame) when there is no wear protection behind seat-front cover	I	I	IV	IV	IV
Squeaking and creaking noises	II	II	II	II	II
Unintentional unevenness of top and edge fillings Irregular corners Loose cushions badly fitted in size to the furniture Gaps or incorrect alignment between cushions and between cushions and furniture	II	II	III	III	IV

5.20 Mattresses and Box Spring Beds

	A	B	C	D	E
Underside of box spring not covered with close-weave fabric or similar Noise absorbent material missing between spring-cage and base	I	I	I	I	I
Reinforcement of corner spring missing in box spring	I	I	I	I	IV
Unintentioned unevenness of reclining surface upholstery	I	I	II	II	IV
Unevenness of supporting spring system felt through upholstery on the reclining surface	I	I	II	III	IV
Distance between side cover material and spring less than 25 mm (measured halfway between top edge of spring cage and top of frame) when there is no wear protection behind side cover material	I	I	IV	IV	IV
Uneven filling in edge upholstery Irregular corners	I	II	III	III	IV
Squeaking and creaking noises	II	II	II	II	II

5.19 Seats, loose cushions or Bolsters, Padded Armrests

	A	B	C	D	E
Corners of springcores on projecting seats not reinforced	I	I	I	I	IV
Unevenness felt through upholstery(e.g. the springsystem)	I	I	II	III	IV
Distance between cover material and spring less than 25 mm (measured halfway between top-edge of spring cage and top of seat frame) when there is no wear protection behind seat-front cover	I	I	IV	IV	IV
Squeaking and creaking noises	II	II	II	II	II
Unintentional unevenness of top and edge fillings Irregular corners Loose cushions badly fitted in size to the furniture Gaps or incorrect alignment between cushions and between cushions and furniture	II	II	III	III	IV

5.20 Mattresses and Box Spring Beds

	A	B	C	D	E
Underside of box spring not covered with close-weave fabric or similar Noise absorbent material missing between spring-cage and base	I	I	I	I	I
Reinforcement of corner spring missing in box spring	I	I	I	I	IV
Unintentioned unevenness of reclining surface upholstery	I	I	II	II	IV
Unevenness of supporting spring system felt through upholstery on the reclining surface	I	I	II	III	IV
Distance between side cover material and spring less than 25 mm (measured halfway between top edge of spring cage and top of frame) when there is no wear protection behind side cover material	I	I	IV	IV	IV
Uneven filling in edge upholstery Irregular corners	I	II	III	III	IV
Squeaking and creaking noises	II	II	II	II	II

5.21 Sewing and Making of Upholstery

	A	B	C	D	E
Visible cut ends of the material with loose threads	I	I	I	I	IV
Seam slippage	I	I	I	I	III
Upholstery cover made without due consideration to pattern and weave direction	I	I	I	III	IV
Loose threads visible from seams Nails or staples visible (when not for decorative purpose)	I	I	II	III	IV
Not symmetrically cut and fitted cover pattern on seat, backrest, armrest, frontside (not applicable on material with non-symmetrical pattern) Unequal gathering of fabric on parts intended to be alike Unequal seat- or back cushions intended to be alike	I	II	III	III	IV
Colour of thread in seams deviating from surrounding material (if not on purpose for decorative reasons) Cover not stretched sufficiently (not when deliberately applied for a desired appearance) Seams unequally placed Buttoning or tufting non-symmetrical or uneven	I	II	III	IV	IV
Covered armrests not uniform in pattern Varying thickness on pipings Stitching flaws. Unevenness of parts of the upholstery that are specially intricate to make correctly	II	II	III	III	IV
Crooked and irregular seams Uneven or unequal radius on corner seams	II	II	III	IV	IV
Buttons with diverging pattern directions	II	III	III	IV	IV

6. Definitions (proposal to be delt with by Sc 4)

6.1 Wood

Bark-ringed knot	A dead knot surrounded with bark
Bole scar	A surface wound that has been enclosed by the growth of the tree
Cross-grained wood	Wood in which the grain alignment is irregular
Dead knot	A knot which has more or less completely broken off its growth connection with the rest of the wood
Decay	Decomposition by fungi
Inbark	Bark which is partially or completely enclosed in the wood
Insect damage	Mark or hole caused by insects
Pitch pocket	Cavity containing resin
Sap stains	Discolouration appearing under the action of wood-colouring fungi
Sapwood	The outer layers of wood in the tree, outside the heartwood
Slope of grain	The divergence of the grain from the direction of the longitudinal axis of the wood
Sound knot	Knot showing no indication of decay and intergrown with the surrounding wood
Unsound knot	Knot attacked by fungi
Visible pith	Appearance of pith on the cut surface of the timber
Wane	Surface of the wood untouched by the saw

6.2 Glass, Metals, Stone

Tarnish	Film of colour formed on surface of glass or metal
Crack indication (in stone)	Irregular, almost invisible fissures in the stone material
Fossil	Remains of plant or animal of past intergrated in the stone material
Mill scale	Flakes of metal derivating from mill rolling
Offside scale	Flakes of metal formed under heatrolling or welding.

6.3 Other Definitions

Defect	See definition under para. 2
Bow, Cup, Bulge Wave	An unintentional surface curvature occuring in wood or other materials
Twist	Spiral distortion
Flatness Deviation	The degree of bow, cup, bulge, wave is measured as the biggest distance between the surface and a media plane for all four corners The degree of twist is measured as the distance between one corner and the media plane for the other three corners.
Clearance Gaps	Visible openings around doors, drawers etc.
Exposed Parts	Parts that are clearly visible by normal use of the furniture (e.g. tops, fronts, sides)
Less Exposed Parts	Visible, but less conspicious parts (e.g. crossbars, rebated rails, inside of cupboards, legs, surfaces hidden by cushion or mattress, etc.)
Concealed Parts	Parts which by normal use of furniture are invisible or hidden (e.g. reverse side of seat, table top or cupboard, parts covered by upholstery, etc.)

Attachment IV

SVENSK STANDARD

SVERIGES STANDARDISERINGSKOMMISSION
STANDARDKOMMITTEN FÖR KONSUMENT- OCH SÄKERHETSTEKNIK

SIS 83 90 30

Utgåva 2 Sida 1 (11)

Första giltighetsdag 1976 - 07 - 01

FASTSTÄLLD OCH UTGIVEN AV SVERIGES STANDARDISERINGSKOMMISSION · STOCKHOLM · EFTERTRYCK UTAN TILLSTÅND FÖRBJUDS

Möbler och inredningsenheter

UDK 645.4:684.5

MATERIALKVALITET OCH NOGGRANNHET I TILLVERKNING KLASSIFICERING

Quality of materials and workmanship

Innehåll

1 Orientering

I denna standard indelas materialkvalitet och noggrannhet i tillverkning hos färdiga möbler och inredningsenheter i fem klasser. Indelningen är gjord med avseende på huvudsakligen visuella och taktila egenskaper som har betydelse för brukbarhet och utseende hos den färdiga produkten.

Hållbarhet (stomhållfasthet, formbeständighet, ythärdighet m m) bestäms enligt andra standarder.

I förhållande till utgåva 1 har standarden dels kompletterats med klassificering av andra material än trä, dels omarbetats efter vunnen erfarenhet.

2. Klassindelning. Översikt

En färdig möbel eller inredningsenhet eller olika delar därav skall vid bedömning enligt avsnitt 3 kunna hänföras till någon av de fem klasser, A – E, som specificeras i avsnitten 4 och 5. Klasserna kan sammanfattningsvis beskrivas på följande sätt.

Med **defekt** förstås i denna standard varje avvikelse, störning eller felaktighet i fråga om material och utförande i förhållande till motsvarande bästa material eller utförande.

Klass A: Inga defekter som påverkar brukbarhet och avsett utseende får finnas.

Klass B: Inga defekter som påverkar brukbarhet får finnas. Däremot tillåts knappt märkbara defekter som inverkar på avsett utseende.

Klass C: Inga defekter som påverkar brukbarhet får finnas. Däremot tillåts ett fåtal tydligt märkbara defekter som inverkar på avsett utseende.

Klass D: Inga defekter som påverkar brukbarhet får finnas. Däremot tillåts ett flertal utseendedefekter.

Klass E: Rimliga hygieniska krav och normala säkerhetskrav skall vara uppfyllda. Inga trasiga delar tillåts men väl utseendedefekter i obegränsad omfattning.

Exempel

På enstaka enheter eller på grupper av enheter kan en producent tillämpa exempelvis följande klasser enligt denna standard. Likaså kan en beställare föreskriva att exempelvis följande klasser skall tillämpas.

	Möbler och inredningsenheter			Lager och källarinredning
	Mycket höga krav	Höga krav	Grundkrav	
Framträdande delar	A	B	C	D
Skymda delar	B	C	D	E
Dolda delar	E	E	E	E

3 Förklaringar till tabellerna i avsnitt 4 och 5

I avsnitt 4 och 5 är när så är möjligt kraven uttryckta med maxvärden i mm eller %. I sådana fall skall vid bedömning och kontroll så långt möjligt anvisningarna i avsnitt 7 iakttas.

I de flesta fall är emellertid de krav som i olika avseenden gäller för de olika klasserna markerade med någon av graderna I, II, III och IV. I sådana fall skall granskning (visuellt, taktilt etc) göras utan hjälpmedel eller mätdon. Graderna skall tolkas på följande sätt.

I = Angiven defekt tillåts ej.

II = Defekten tillåts på enstaka ställen och har antingen liten utsträckning eller bildar en knappt märkbar kontrast mot omgivande yta.

III = Defekten tillåts även om den är tydligt märkbar. Den kan utgöras av enstaka större eller flera mindre.

IV = Defekten tillåts i obegränsad omfattning, förutsatt att risk för personskador och skador på kläder eller på enheten själv är utesluten och att enhetens funktion inte nämnvärt försämras.

4 Materialkvalitet

4.1 Massivt trä och ytfanér

Defekt	Klass A	B	C	D	E
Bark, insektsskador	I	I	I	I	I
Röta, rötkvist	I	I	I	I	I
Kådlåpor	I	I	I	I	I
Kvisthål, lösa kvistar	I	I	I	I	IV
Vankant, lyror	I	I	I	I	IV
Barkflag	I	I	I	II	IV
Barkringskvist	I	I	I	II	IV
Ifyllda kvisthål (avvikande färg)	I	I	I	II	IV
Märgränder	I	I	II	II	IV
bredd dock högst			3 mm		
Öppna sprickor	I	I	II	II	IV
Ifyllda sprickor (avvikande färg)	I	I	II	III	IV
Urborrade och proppade kvistar	I	I	II	III	IV
Kvistgrupper[1]	I	I	II	III	IV
Vattved	I	I	II	III	IV
Splintstrimmor i ek, teak, palisander m fl träslag med tydlig kärnbildning[1]	I	II	II	III	IV
Svarta inslag i fanér	I	II	II	III	IV
Missfärgning[1]	I	II	II	III	IV
Ifyllda kvisthål (samma färg)	I	II	II	III	IV
storlek dock högst		6 mm	12 mm		
Ifyllda sprickor (samma färg)	I	II	II	III	IV
Små ytsprickor (t ex av fanérsvarvning)	I	II	II	III	IV
Vresved[1]	I	II	III	IV	IV
Inslag av mörkare kärnpartier[1]	II	II	III	IV	IV
Snedfibrighet[2]	I	II	III	IV	IV
Fastsittande kvistar[1]	II	II[3]	III	III	IV
storlek dock högst	6 mm	12 mm	20 mm	30 mm	

1) Om förekomsten av defekter är avsedd och tillämpad konsekvent i hela tillverkningsserien anges närmast högre klass.
2) Om dekorativ effekt avses, t ex rotfaner (masurbjörk), anges A
3) Grad III tillåts om storleken är högst 6 mm.

4.2 Träfiberskivor och spånskivor

Kraven gäller skivor som används som synligt konstruktionsmaterial. Träfiberskivor skall, där ej annat anges, vara av hård typ enligt SIS 23 51 11. Spånskivor för klass A – D skall vara klass 1 enligt SIS 23 48 01.

	A	B	C	D	E
Missfärgningar	I	I	II	III	IV
Håligheter, gropar	I	I	II	III	IV
Fyllda materialsprickor	I	I	II	III	IV

4.3 Metall

	A	B	C	D	E
Synliga delar utan korrosionsskydd eller med korrosionsangrepp	I	I	I	I	IV
Valshud, glödskal	I	I	I	II	IV
Poriga svetsar och lödningar	II	II	III	III	IV
Håligheter och gropar	I	II	II	III	IV

4.4 Plast

	A	B	C	D	E
Materialsprickor, öppna	I	I	I	II	IV
ifyllda	I	I	II	III	IV
Missfärgningar	I	I	II	III	IV
Färgskillnader mellan delar som avses vara lika	I	II	II	III	IV

4.5 Sten

	A	B	C	D	E
Löst fossil	I	I	I	I	IV
Sprickanvisningar	I	I	I	II	IV
Avvikelser från stenens naturliga färg och struktur	I	II	II	III	IV

4.6 Glas (i vitriner o d, ej i speglar)

	A	B	C	D	E
Strukturfel[1] (håligheter, stenar, trådar, främmande partiklar)	I	II	III	III	IV
Planhetsfel[1] (bucklor, vågor, oregelbunden reflexverkan, variation i tjocklek)	I	I	II	III	IV
Repor[1]	I	I	II	III	IV
Anlöpning (grå eller färgskiftande)	I	I	II	III	IV

1) Om dekorativ effekt avses anges A.

4.7 Stoppningsmaterial

	A	B	C	D	E
Stoppningsmaterial som innehåller metalldelar, träflisor, papper, snören o d	I	I	I	I	I
Animaliskt stoppningsmaterial som ej är tvättat och desinfekterat	I	I	I	I	I
Material med skarp lukt	I	I	I	I	I
Hål, blåsor o dyl som känns genom klädsel (t ex i polyeter)	I	I	II	III	IV
Fågelfjäder (hårda pennor) som känns	I	I	II	IV	IV
Ojämnheter i fjädring som känns genom klädseln	I	I	II	III	IV
Knottrighet som känns genom klädseln	I	II	III	IV	IV

4.8 Klädselmaterial

	A	B	C	D	E
Hål och revor i klädseln	I	I	I	II	III
Vävfel	I	I	I	II	IV
Grova fel i läder (öppna repor, fläckar, rå eller grov narv, brott i narven etc)	I	II	II	III	IV
Ojämnheter i läder[1] (läkta sår, helade repor etc)	II	II	III	IV	IV

1) Om ojämnheterna är avsedda anges närmast högre klass.

5 Noggrannhet i tillverkning

5.1 Mått

Beträffande mätning, se SIS 83 01 10, avsnitt 5.2

	A	B	C	D	E
Avvikelser från föreskrivet eller angivet linjärt totalmått, max Kraven gäller endast där måttavvikelser kan inverka på anpassning till andra enheter eller till byggnad, t ex hos byggbara skåp.	1 mm	1,5 mm	2,0 mm	3,0 mm	IV

5.2 Vinklar

Beträffande mätning, se SIS 83 01 10, avsnitt 5.4

	A	B	C	D	E
Avvikelse från rätvinklighet					
kantlängd upp till 400 mm, max	0,4 mm	0,6 mm	0,8 mm	1,0 mm	IV
därutöver i % av hela längden mellan hörn, max	0,1 %	0,15 %	0,2 %	0,3 %	IV
dock högst	1 mm	1,5 mm	2 mm	3 mm	
Avvikelse från avsedd form, parallellitet, symmetri o d (ben, armstöd m m)	II	II	III	IV	IV

5.3 Planhet

Beträffande mätning, se SIS 83 01 10, avsnitt 5.5.1 och 5.5.2

	A	B	C	D	E
Avvikelse från planhet (buktighet enligt metod 2 och skevhet)					
i % av avståndet mellan två hörn eller av skivans längsta kant	0,2 %	0,4 %	0,8 %	IV	IV
dock högst	1 mm	2 mm	4 mm		
Ojämn anliggning mot plant underlag	I	III	III	III	IV
dock avstånd ben (sockel) – golv, max		1 mm	2 mm	3 mm	

5.4 Rakhet

	A	B	C	D	E
Krokighet hos spjälor, slåar, pinnar som är avsedda att vara raka, i % av längden, max	0,2 %	0,4 %	0,6 %	1,0 %	IV

5.5 Parallellitet hos springor

Beträffande mätning, se SIS 83 01 10, avsnitt 5.6

	A	B	C	D	E
Avvikelse från parallellitet (t ex mellan eller omkring lådor och luckor)					
springans längd högst 400 mm, max	0,5 mm	1 mm	2 mm	3 mm	IV
springans längd mer än 400 mm i % av längden, max	0,15 %	0,25 %	0,5 %	0,75 %	IV
dock högst	1 mm	2 mm	4 mm	6 mm	

5.6 Springbredd

Beträffande mätning, se SIS 83 01 10, avsnitt 5.7

	A	B	C	D	E
Breddskillnad mellan springor av samma slag t ex mellan eller omkring lådor eller luckor, max	1 mm	2 mm	3 mm	4 mm	IV

5.7 Lådors och luckors linjering

Beträffande mätning, se SIS 83 01 10, avsnitt 5.8

	A	B	C	D	E
Avvikelse i kant, max	1 mm	1,5 mm	3 mm	4 mm	IV
Avvikelse i liv, max	1 mm	1,5 mm	3 mm	4 mm	IV

5.8 Lådors gång

Gäller även utdragbara backar och hyllor.

Beträffande mätning, se SIS 83 91 11

	A	B	C	D	E
Kärvhet i lådor inskjutningskraft, max (före eventuell hållbarhetsprovning)	30N	50N	50N	70N	IV

5.9 Luckors gång

	A	B	C	D	E
Kärvhet i luckor	I	I	II	II	IV

5.10 Utdrags- och iläggsskivor, klaffar

	A	B	C	D	E
Avvikelse hos obelastad skiva (klaff) från horisontalplanet i % av den utskjutande längden[1], max	0,4 %	0,7 %	1 %	1,5 %	IV
Nedböjning vid mitten av bordsskivan inkl iläggsskivor i % av totala längden, max	0,4 %	0,7 %	1 %	1,5 %	IV
Höjdavvikelse i anslutningen mellan utdragsskiva (klaff) och angränsande yta, max	1 mm	1,5 mm	2 mm	4 mm	IV
Kärvhet i skivor och utdragsreglar	I	II	III	III	IV

1) Utdragsskiva i skåp mäts när skivan är utdragen 2/3.

5.11 Sammansättningar

	A	B	C	D	E
Fästelement – spik, skruv, tappar o d som					
tränger igenom på motsatt sida	I	I	I	I	IV
orsakar ojämnhet på motsatt sida	I	I	I	II	IV
Sprickor av sprängningar i sammansättningar					
eller av rörlighet i material	I	I	I	II	IV
Ilagningar med avvikande material och färg	I	I	II	III	IV
Limrinningar	I	I	II	III	IV
Ilagningar med samma material och färg	I	II	II	III	IV
Synligt lim och missfärgning av lim	I	II	II	III	IV
Otätheter i sammansättningar	I	II	III	III	IV
bredd dock högst		0,2 mm	0,5 mm	0,8 mm	
Poriga svetsar och lödningar	II	II	III	III	IV
Springor mellan lådsidor och lådbottnar	II	II	III	III	IV
bredd dock högst	0,3 mm	0,5 mm	0,8 mm	1 mm	

5.12 Fanering

	A	B	C	D	E
Blåsor i faner	I	I	I	I	III
Ilagningar (avvikande färg)	I	I	I	II	IV
Ilagningar (samma färg)	I	I	II	III	IV
Uppflisningar och brott i faner	I	I	II	II	III
Limgenomslag	I	I	II	III	IV
Synligt lim i fanerfog	I	I	II	III	IV
Otäthet i fanerfog	I	II	II	III	IV

5.13 Kanter

	A	B	C	D	E
Oskyddad kant på spånskivor			Tillåts där ingen risk för		
och trafiberskivor	I	I	uppflisning finns		IV
Ojämnhet mellan kantlist och skiva	I	I	II	III	IV
dock högst			0,2 mm		
Uppflisning i kantmaterial	I	I	II	II	IV
Kantlist i avvikande färg från material					
i övrigt[1]	I	II	II	III	IV
Kantpålimning som framträder som skuggor					
eller ojämnheter under fanér	I	II	II	III	IV
Kantrundning ej likformig utmed en och					
samma kant	I	II	III	III	IV

1) Om dekorativ effekt avses anges A.

5.14 Böjda delar

	A	B	C	D	E
Brott	I	I	I	II	III
Limsläpp mellan skikt	I	I	II	III	IV
Uppflisningar i ytan	I	I	II	II	III
Delar avsedda att vara likformigt böjda					
märkbart olika	II	II	III	III	IV
Ojämnheter av bockning (rör)	II	II	III	III	IV

5.15 Beslagning

	A	B	C	D	E
Vassa beslag (även handtag)	I	I	I	II	IV
Skruvar av ej passande storlek	I	II	II	III	IV
Infällda beslag ej helt i plan med ytan (t ex gångjärn och lås)	I	II	II	III	IV
Otäthet i anslutning mellan beslag och omkringvarande material	I	II	II	III	IV
Skruvar snett idragna eller med skadat skruvspår	I	II	III	III	IV

.16 Ytjämnhet och putsning

	A	B	C	D	E
Klisterremsor och påritningar ej bortputsade	I	I	I	II	IV
Ben och socklar ej fasade nertill	I	I	I	IV	IV
Vassa (obrutna) eller knottriga kanter	I	I	II[1)]	II[1)]	IV[1)]
Flisiga ytor	I	I	II[1)]	II[1)]	IV[1)]
Ränder, slagmärken, fördjupningar (t ex pressränder)	I	I	II	III	IV
Vågighet och ojämnhet i ytor	I	I	II	III	IV
Kutterslag och valstryck (i trä) och andra tryckmärken, sågyta	I	I	II	III	IV
Genomslipning av faner eller annat ytskikt (under lack)	I	I	II	III	IV
Flata partier på runda pinnar, spjälor och slåar eller annan avvikelse från avsedd form	I	I	II	III	IV
Ojämn putsning, slipning eller blästring	I	I	II	III	IV
Ojämnheter på ändträ	I	II	III	III	IV
Fiberresning	I	II	III	III	IV
Ojämnheter i svetsar	II	II	III[1)]	III[1)]	IV[1)]
Tvärgående sliprepor	II	II	III	IV	IV

[1)] Åtkomliga delar skall vara släta.

5.17 Ytbehandling

	A	B	C	D	E
Smetande eller klibbande ytskikt	I	I	I	I	I
Delar som avses vara täckta med lack el annat material ej helt täckta	I	I	I	II	III
Genomslipning av ytskikt	I	I	II	II	IV
Avfärgande ytskikt	I	I	I	II	IV
Rinningar (lack, bets, lasyr, metallskikt)	I	I	II	III	IV
Repor i ytskikt	I	II	II	III	IV
Ytsprickor, krakelering, ytsplittring	I	I	II	III	IV
Vitning, orenhter, blåsor	I	I	II	III	IV
Synbara skillnader i ytskiktstjocklek	I	I	II	III	IV
Knottrighet, kratrar, apelsinskalsyta och andra ojämnheter	I	II	II	III	IV
Nyansskillnader i pigmenterad lack, cloxering m m	I	II	II	III	IV
Ojämnheter i underlag eller spackling (märkbara på den färdiga ytan)	I	II	II	III	IV
Glansskillnader	II	II	III	IV	IV

5.18 Klädda stommar

Avsnittet gäller:

1) del av stomme överklädd med stoppning och (eller) klädsel

2) del av stomme på vilken lösa dynor, plymåer, ryggkuddar e d skall vila.

	A	B	C	D	E
Komponenter som kan orsaka nötning, eller andra skador (skruvar, beslag, fjäderelement)	I	I	I	I	I
Korrosion på detaljer av metall	I	I	I	I	III
Ventilationshål eller andra öppningar saknas där klädseln utgörs av luftätt material	I	I	I	I	IV
Kanter (i beröring med klädseln) som ej är rundade, fasade eller stoppade	I	I	I	IV	IV
Ej likformigt anbringade fjädrar, klammer, fästelement e d (under lösa plymåer)	I	II	III	IV	IV
Stomdetaljer som känns ojämna genom klädsel och stoppning	II	II	III	III	IV
Ojämna kanter i sammansättningar och övergångar på stomme under lösa plymåer	I	II	III	III	IV

5.19 Sitsar, sitsplymåer, armstöd

	A	B	C	D	E
Hörnens bärighet ej förstärkt (gäller utskjutande hörn på resår- eller spiralsits)	I	I	I	I	IV
Gnissel och knarr	II	II	II	II	II
Ojämnheter i underliggande fjädersystem som känns genom överstoppning	I	I	II	III	IV
Resårer (spiraler) som mitt emellan ram och ten (motsvarande) är närmare framsidan än 25 mm utan att nötskydd finns innanför klädseln	I	I	IV	IV	IV
Ojämnheter i överstoppning och kantstoppning (här avses ej ojämnheter som förorsakas av puskor o d)	II	II	III	III	IV
Ojämna hörn	II	II	III	III	IV
Dålig passning mellan lösa dynor och möbelns stomme	II	II	III	III	IV
Springor mellan lösa dynor och underdynor (ojämna passningar/ springor mellan dynor och underdynors framkant eller mellan dynor)	II	II	III	III	IV

5.20 Madrasser, sängar, dagbäddar

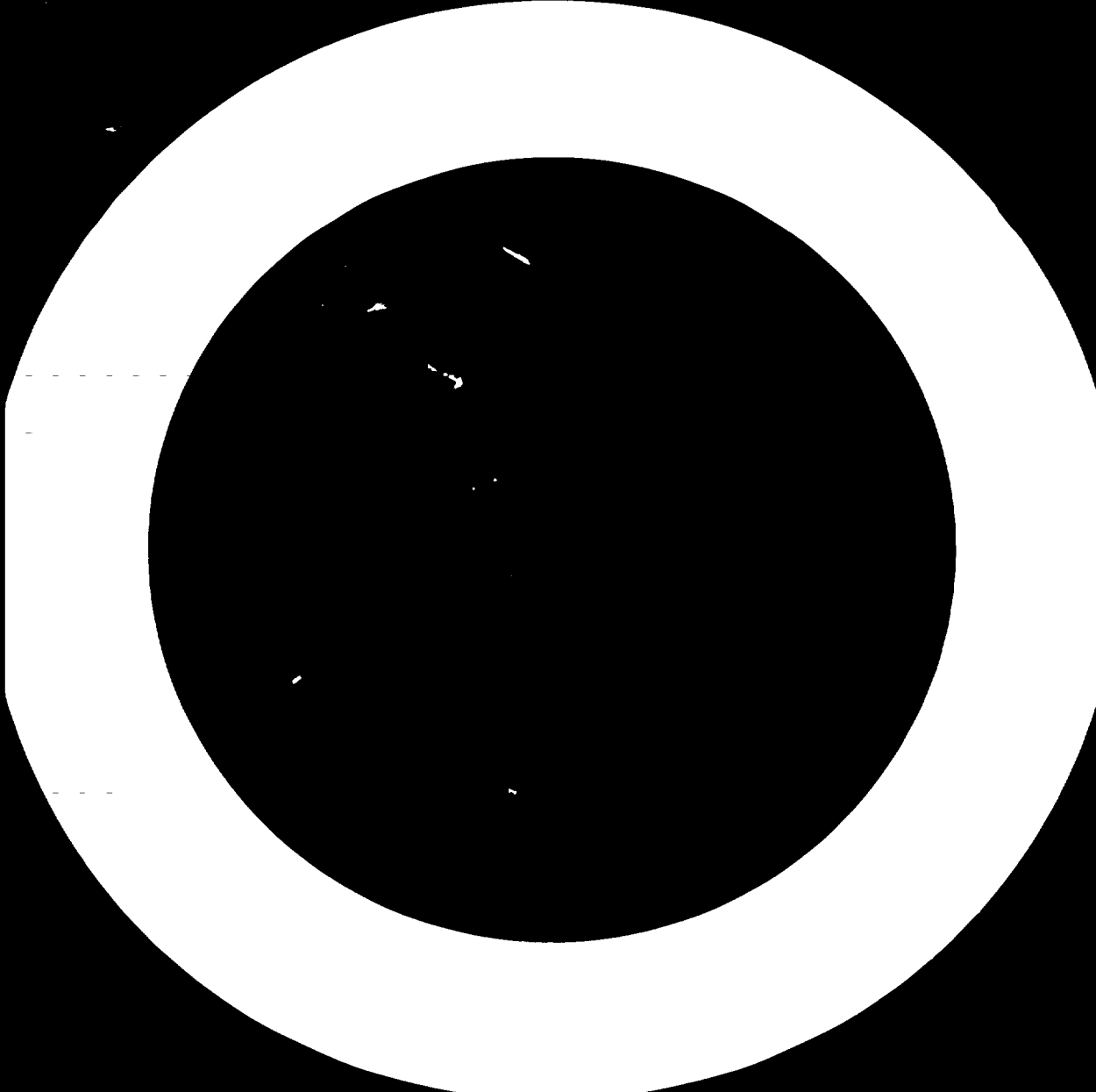
	A	B	C	D	E
Hörnens bärighet ej förstärkt (resår- och spiralmadrasser)	I	I	I	I	IV
Undersidan på resår- (spiral) madrasser ej klädd med material som hindrar smulor och damm att tränga ut	I	I	I	I	I
Gnissel och knarr	II	II	II	II	II
Ljuddämpande material saknas mellan resårhus och botten	I	I	I	I	I
Ojämnheter i underliggande fjädersystem som känns genom stoppning på liggyta	I	I	II	III	IV
Resårer (spiraler) som mitt emellan ram och ten (motsvarande) är närmare långsida eller kortsida än 25 mm utan att nötskydd finns innanför klädseln	I	I	IV	IV	IV
Ojämnheter på liggyta (här avses ej ojämnheter som förorsakas av puskor, stickning o d)	I	I	II	II	IV
Ojämnheter i kantstoppning	I	II	III	III	IV
Ojämna hörn	I	II	III	III	IV

5.21 Klädsel- och sömnadsarbete

	A	B	C	D	E
Avskt kanter med lösa trådar	I	I	I	I	IV
Tygkanter ej utformade för att förhindra skridning	I	I	I	I	III
Klädsel utan hänsyn till tråd- eller mönsterriktning	I	I	I	III	IV
Lösa trådar i sömmar	I	I	II	III	IV
Synlig spikning eller häftning (gäller ej dekorationsspik)	I	I	II	III	IV
Mönsterpassning ej utgående från mittlinjen på sits, rygg, armledare, framkant (gäller ej tyg med osymmetriskt mönster)	I	II	III	III	IV
Olika rynkning på delar av samma typ	I	II	III	III	IV
Sits- och ryggplymåer ej inbördes lika utförda	I	II	III	III	IV
Sytrådens färg ej samma som klädselns (gäller ej när dekorativ effekt avses)	I	II	III	IV	IV
Klädsel ej stramt utspänd (gäller ej avsiktligt rynkig klädsel)	I	II	III	IV	IV
Sömmar olikformigt placerade	I	II	III	IV	IV
Puskor, knappar, häftningar ej likformiga eller ej symmetriskt placerade	I	II	III	IV	IV
Sömmar krokiga	II	II	III	IV	IV
Sömmar runt hörn med ojämn radie	II	II	III	IV	IV
Sömmar runt hörn ej likformiga på delar av samma slag	II	II	III	IV	IV
Ej likformig placering av mönster på armstöden	II	II	III	III	IV
Kåder e d med ojämn tjocklek	II	II	III	III	IV
Dubbelstygn (överlappande sömmar)	II	II	III	III	IV
Ojämnheter i klädseln på från klädselsynpunkt besvärliga partier	II	II	III	III	IV
Klädda knappar med olika mönsterriktning	II	III	III	IV	IV

6 Definitioner

6.1	Trä	barkflag	i trädet inväxt bark
		barkringskvist	helt eller delvis av bark omsluten kvist
		bast	trådartat skikt på barkens insida
		kådlåpor	öppning innehållande kåda
		lyra	öppning innesluten i stammen genom överväxning
		missfärgning	färgförändring genom angrepp av blånadssvamp e d
		märgrand	på virkets yta framträdande del av trädets märg
		röta	angrepp av rötsvamp
		rötkvist	av röta helt eller delvis angripen kvist
		snedfibrighet	total eller lokal avvikelse i fråga om fiberriktning i förhållande till virkets längdriktning
		splint	trädstammens yttre del utanför kärnan
		vankant	virkesyta som ej berörts av sågbladet
		vattved	försvagning av vedens sammanhållning
		vresved	ved med oregelbundna fiberriktningar
		frisk kvist	kvist som ej uppvisar angrepp av röta och som är fast förbunden med omgivande trä
		torr kvist	kvist som i det växande trädet upphört med sin livsfunktion
6.2	Glas, metall och sten	anlöpning	gråaktig eller färgskiftande beläggning på glas- eller metallyta
		sprickanvisningar (i sten)	oregelbundna, nästan osynliga sprickor i sten
		fossil	fragment av djurskal i kalksten
		valshud	flagor av metall som bildas vid valsning
		glödskal	flagor av metall som bildas vid varmvalsning eller svetsning
6.3	Övrigt	defekt	Beträffande ordets betydelse i denna standard se avsnitt 2.
		buktighet	det största avståndet från en punkt på en yta till medelplanet för ytans fyra hörn
		skevhet	ett hörns hos en rektangulär yta avvikelse från ett plan genom de tre andra hörnen
		springor	öppningar kring luckor, lådor och liknande samt mellan panelelement
		framträdande, skymda och dolda delar	definitioner ges i standarder som ställer krav på inredningsenheters utförande och i t ex anvisningar för Möbelfakta.



Attachment V

Date

Test certificate

Test requested by	Furniture type/identification of model
Test made in accordance with test methods stated in the instruction A1:10. Test results compared with requirements for the following specific furniture type/use:	Manufacturer
	Material

	test results			requirements not fulfilled	requirements fulfilled		
Function							
1 a Height of seat			cm				
b Sitting height			cm				
c Sitting depth/depth of seat			cm				
d Sitting width/width of seat			cm				
e Clearance under front edge of seat			o				
f 1 Height to lower edge of backrest			cm				
f 2 Height to upper edge of backrest			cm				
f 3 Height of backrest			cm				
g Sitting angle			o				
h Width between armrests			cm				
i Appropriate table height			cm				
2 a-c Stability forwards/backwards/sideways	N/	N/	N				
					basic requirements	high requirements	extra high requirements
Strength							
3 a Strength of frame: tilting			cycles				
overturning			turns				
b Seat, consistency of shape			cycles				
Durability of surfaces							
c Resistance to water: seat, armrest			h				
other parts			h				
d fats/fats on scratched							
surface: seat, armrest	h/		h				
fats: other parts			h				
e scratching: seat, armrest			N				
	fully exposed parts	less exposed parts					
Quality of material and workmanship							
4 a Quality of material: wood							
b upholstery material							
c finishing material							
d Measurements and angles							
e Bended parts							
f Joinery							
g Veneering							
h Sanding							
i Finish							
j Frame and bottom for upholstery							
k Seat: Upholstery							
l Back- and armrest: Upholstery							
m Tailoring of cover, sewing							

This test certificate may be published in its completeness. For publication of excerpts a written permission from the Institute is required. The test refers to one sample provided by the client.
For furniture with corresponding properties the declaration below can be used.

The Swedish Furniture Research Institute

möbelfakta

Fulfils the requirements of the Swedish Furniture Research Institute

SUMMARY OF TEST RESULTS

	basic requirements	high requirements	extra high requirements
Strength	☐	☐	☐
Durability of surfaces	☐	☐	☐
Quality of material and workmanship	☐	☐	☐

2

Date

Test certificate Nr

Test requested by	Furniture type/identification of model
Test made in accordance with test methods stated in the instruction A1:15. Test results compared with requirements for the following specific furniture type/use:	Manufacturer
	Material

		test results		requirements not fulfilled	requirements fulfilled		
Function							
1 a	Height of seat		cm				
b	Sitting height		cm				
c	Sitting depth		cm				
d-e	Sitting width/width between armrests		cm				
f	Seat, depth of springaction		cm				
g	Tilt of backrest		°				
h	Height of backrest		cm				
i	Loose cusions						
2 a	Stability forwards		N				
b	backwards		N				
c	sideways		N				
					basic requirements	high requirements	extra high requirements
Durability, frame							
3 a	Strength of back- and armrests		cycles				
	Durability of surfaces:						
b	Resistance to water: seat, armrests		h				
	other parts		h				
c	fats/fats on scratched surface:						
	seat, armrests	h/	h				
	fats: other parts		h				
d	scratching		N				
Durability, seat							
e	Consistency of shape		cycles				
		fully exposed parts	less exposed parts				
Quality of material and workmanship							
4 a	Quality of material: wood						
b	upholstery material						
c	finishing material						
d	Measurements and angles						
e	Bended parts						
f	Joinery						
g	Veneering						
h	Sanding						
i	Finish						
j	Frame and bottom for upholstering						
k	Seat. Upholstering						
l	Back- and armrest. Upholstering						
m	Tailoring of cover, sewing						

This test certificate may be published in its completeness. For publication of excerpts a written permission from the Institute is required. The test refers to one sample provided by the client.
For furniture with corresponding properties the declaration below can be used.

The Swedish Furniture Research Institute

möbelfakta

Fulfils the requirements of the Swedish Furniture Research Institute

SUMMARY OF TEST RESULTS

	basic requirements	high requirements	extra high requirements
Durability, frame	☐	☐	☐
Durability, seat	☐	☐	☐
Quality of material and workmanship	☐	☐	☐

Tryckeriet AB Skåne

Datum

Prüfungsbericht Nr

Prüfung im Auftrag von	Möbeltyp/Modellbezeichnung
Die Prüfung wurde nach den in der Deklationsanweisung A1.40 angegebenen Methoden durchgeführt. Prüfungsergebnisse verglichen mit den Forderungen gelten für den Möbeltyp/Anwendungsgebiet:	Fabrikant
	Material

	Funktion	Prüfungsergebnis		Forderungen nicht erfüllt	Forderungen erfüllt		
1	Verwarungsfächer						
	St. mit Massen (T.×B.×H.)		cm				
	St.		cm				
	St.		cm				
	St.		cm				
2 a	Stabilität, gemessen an offenen Hüllen		N				
	Schubladen, Auszie-fächern/Klaffen, Türen	N /	N				
					Grund-forderung	Hohe Forderung	Extra hohe Forderung
	Haltbarkeit						
3 a	Haltbarkeit des Rahmens		Zyklen				
b	Haltbarkeit der Schubladen, Ausziefächer		Zyklen				
c	Tragfähigkeit der Hüllen. Stossproben						
d	Durchbiegung, offene Hüllen/Hüllen hinter Türen	%	%				
	Widerstandsfähigkeit der Oberflächen						
4 a	Wasser: Oberflächen 3/4/5	h/ h/	h				
b	Fett: 3/4/5	h/ h/	h				
	Fett auf geritzter Oberfläche: 3/4	h/	h				
c	Alkohol		h				
d	Kaffee		h				
e	Wärme/Wärme+Feuchtigkeit	o/	o				
f	Azeton		min				
g	Ritzung: 3/4		N				
		voll sichtbare Teile	weniger sichtbare Teile				
	Materialqualität und Genauigkeit der Herstellung						
5 a	Materialqualität: Holz						
b	Behandlungsmaterial der Oberflächen						
c	Masse und Winkel						
d	Gebogene Teile						
e	Verbindungen						
f	Furnierung						
g	Kanten						
h	Schubladen						
i	Ebene Flächen. Krümmung und Verzerrung						
j	Verlängerungsplatten und Klaffen						
k	Ebenheit der Oberflächen						
l	Schleifung						
m	Oberflächenbehandlung						
n	Beschlag						

Der Prüfungsbericht kann in seiner Gesamtheit veröffentlicht werden. Zur Veröffentlichung von Auszügen bedarf es einer schriftlichen Bewilligung vom Institut. Die Prüfung betrifft ein vom Auftraggeber geliefertes Exemplar.
Für Möbel mit entsprechenden Eigenschaften kann die unten angeführte Deklaration angewendet werden.

Schwedisches Institut für Möbelforschung

möbel fakta

Erfüllt die Forderungen des Schwedischen Instituts für Möbelforschung

Zusammenfassung der Prüfungsergebnisse

	Grund-forderung	Hohe Forderung	Extra hohe Forderung
Haltbarkeit	☐	☐	☐
Widerstandsfähigkeit der Oberflächen	☐	☐	☐
Materialqualität und Genauigkeit der Herstellung	☐	☐	☐

Date **Test certificate** No

Test requested by	Surface test according to methods SIS 83 91 17, 83 91 18, SIS 18 41 79 and MI P 0-41
Surface description (material and finish coating)	

SUMMARY OF TEST RESULTS

Surface resistance according to the requirements for Möbelfakta quality marking Surface category:	Req.not fulfilled	Req. fulfilled		
		Basic req.	High req.	Extra high req.
1 Top of working desks, dressing tables, flaps	☐	☐	☐	☐
2 Top of dining tables, coffee tables or other occasional tables	☐	☐	☐	☐
3 Top of storage furniture, below the height of 125 cm, writing tops of storage furniture and interiors of bar and toilet cabinets	☐	☐	☐	☐
4 Open shelves (not behind doors), seats and armrests of seating furniture, bedsteads, childrens high chairs and cots	☐	☐	☐	☐
5 Other less exposed parts of all the above categories	☐	☐	☐	☐

Test results according to SIS 83 91 18 numerical rating 1 - 5				Fulfillment of the requirements for a Möbelfakta quality marking				
	No damage (rate 5)	Change of lustre (rate 4)	Damage (3-1)	Surface category	Requirem. not fulfilled	Basic req.	High req.	Extra high req.
Water 1 h				1				
6 h				2				
24 h				3				
				4				
				5				
Oil 24 h				1				
Oil on scratched surface 24 h 8 N				2				
12 N				3				
				4				
				5				
Alcohol 1 h				1				
48 % 6 h				2				
16 h				3				
1 h				1				
Coffee 6 h				2				
16 h				3				
				1				
Heat dry				2				
+85° C damp				3				
Acetone 2 min				1				
Scratching	no damage at N			1				
	scratch ≥ 0.5 mm at N			2				
	crack at N			3				
				4				

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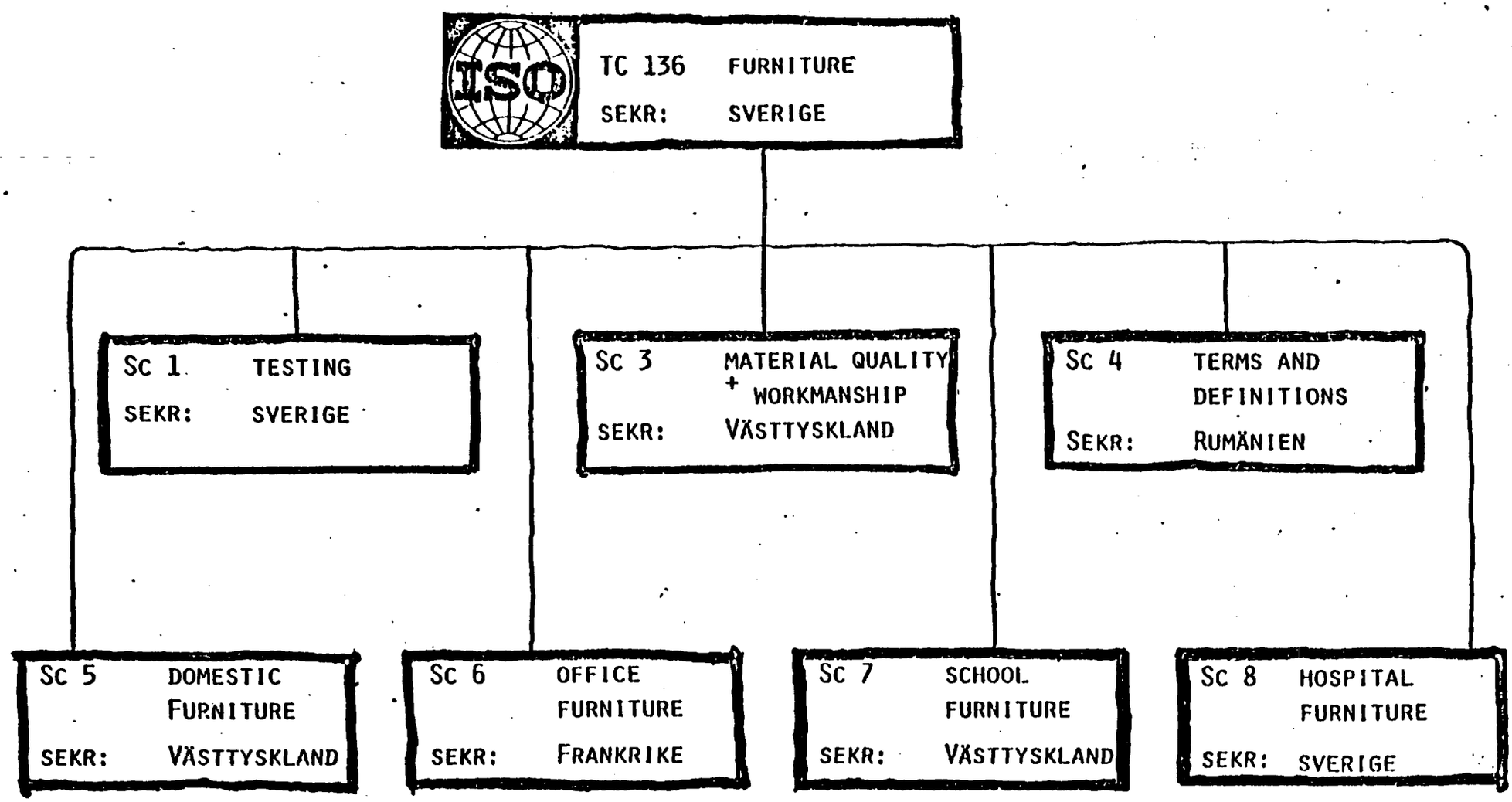
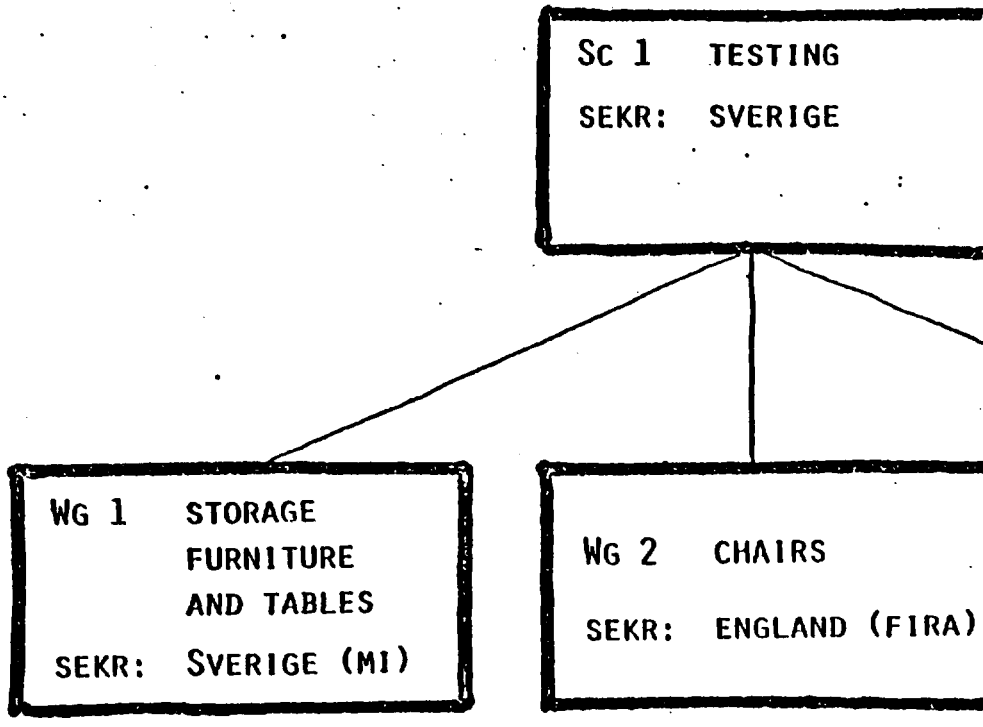
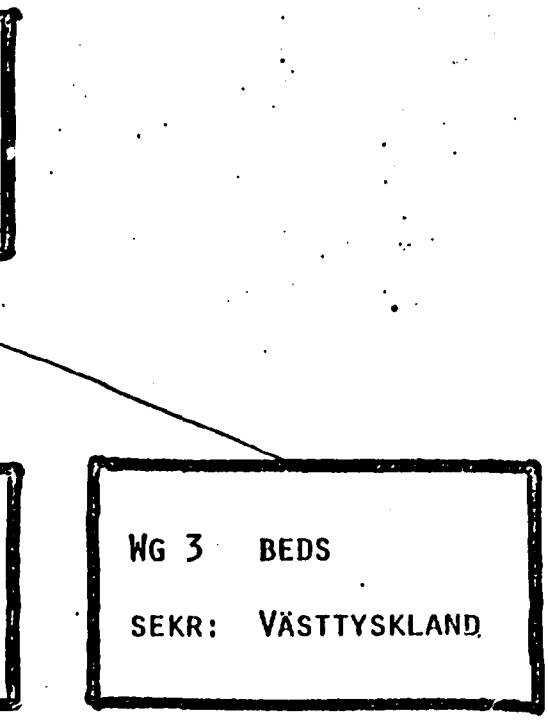

ISO
TC 136 FURNITURE
SEKR: SVERIGE
Sc 1 TESTING
SEKR: SVERIGE
Sc 3 MATERIAL QUALITY + WORKMANSHIP
SEKR: VÄSTTYSKLAND
Sc 4 TERMS AND DEFINITIONS
SEKR: RUMÄNIEN
Sc 5 DOMESTIC FURNITURE
SEKR: VÄSTTYSKLAND
Sc 6 OFFICE FURNITURE
SEKR: FRANKRIKE
Sc 7 SCHOOL FURNITURE
SEKR: VÄSTTYSKLAND
Sc 8 HOSPITAL FURNITURE
SEKR: SVERIGE


Sc 1 TESTING
SEKR: SVERIGE
WG 1 STORAGE FURNITURE AND TABLES
SEKR: SVERIGE (MI)
WG 2 CHAIRS
SEKR: ENGLAND (FIRA)


WG 3 BEDS
SEKR: VÄSTTYSKLAND

Möbelfakta

- The Swedish Quality Marking Scheme

What möbel fakta means

- Möbelfakta is a Swedish word meaning "Furniture facts". The Möbelfakta-sign is a guarantee of high quality. The basic requirements of function, safety and durability are fulfilled, but no demands are made on shape or colour.
- The Möbelfakta-label gives important facts about the piece of furniture such as strength and resistance, qualities which are very difficult for the buyer to assess.
- Möbelfakta is a very important aid to the seller making it easier for him to give the consumer correct information.
- Furniture with the Möbelfakta-label has been thoroughly tested.
- Möbelfakta makes it possible to compare price with quality. The label presents straightforward, easily understood information.
- An increasing number of manufacturers are beginning to test their furniture. Möbelfakta thus stimulates the production of good furniture.

Only a piece of furniture that fulfills requirements laid down by The Swedish Furniture Research Institute of

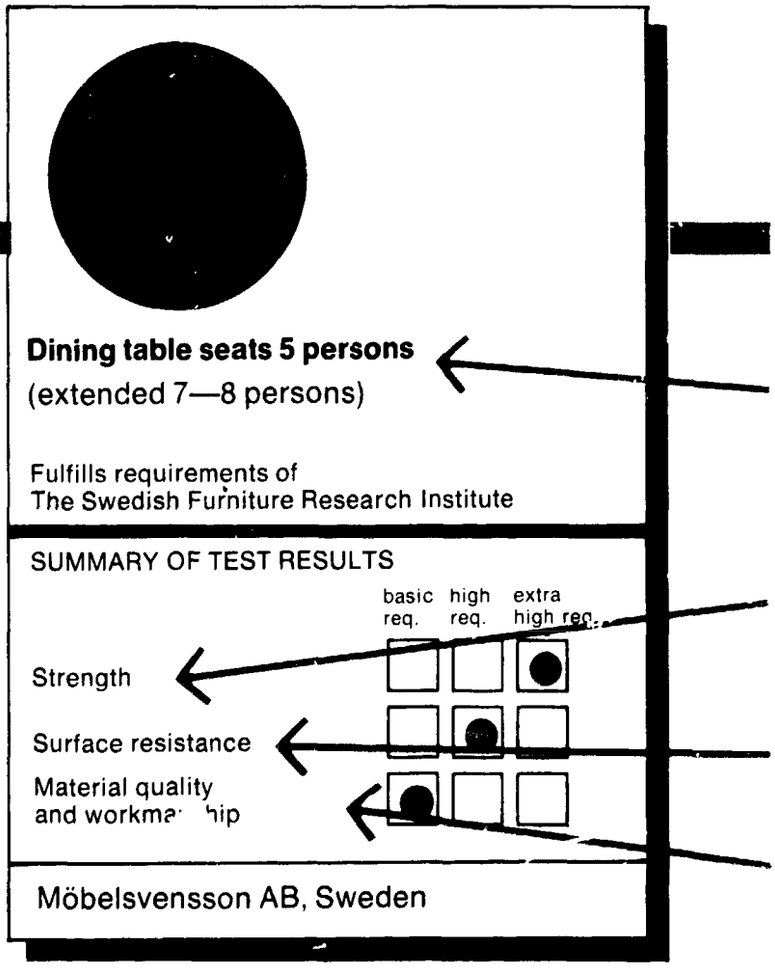
Functionality

Durability

Surface resistance

Workmanship

is allowed to have the Möbelfakta-label. The manufacturer issuing the declaration guarantees that the properties of the furniture correspond to the declaration.



Consumers have different demands for quality and performance due to how and where the furniture will be used. Therefore durability, surface resistance, material quality and workmanship are stated in three different grades:

Basic requirements

Fundamental demands are fulfilled. Durability and surface resistance are quite sufficient for ordinary home use. As to quality of materials and workmanship no defects will influence usage.

High requirements

Durability and surface resistance satisfy requirements in public environments and in homes where the use is particularly heavy. Material quality and workmanship of a high level of precision.

Extra high requirements

Strength and surface resistance stand up to extreme wear and tear. Material quality is the very best and workmanship is of the highest precision.

The different levels of requirements are exemplified in the tables on the following pages. More complete information is given in specifications for labelling, issued by The Swedish Furniture Research Institute.

FUNCTIONALITY means
that dimensions and other practical characteristics have been chosen to fit the function of the furniture.

DURABILITY means
that framework, seats, bases, shelves etc. stand up to normal strains.

SURFACE RESISTANCE means
that the surfaces will not be damaged by liquids, heat, grease, scratching etc.

Good **WORKMANSHIP** means
that the furniture is carefully made of good material and with high precision.

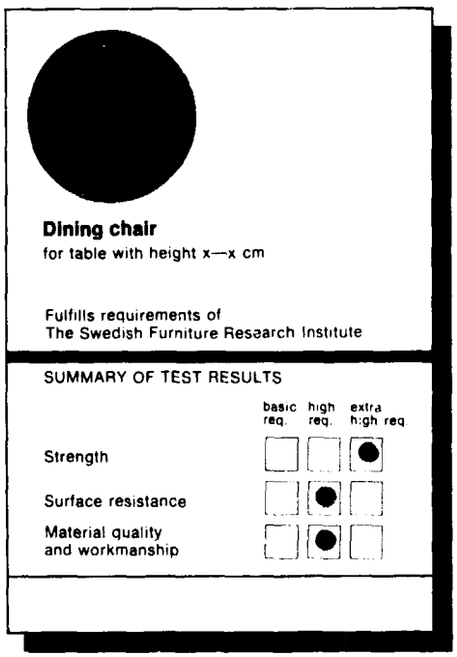
Stool
Chair
Armchair
Bench

Furniture type and its intended use is stated on the label, for instance: **Dining chair for table with height x—x cm**
Armchair for desk with height x—x cm

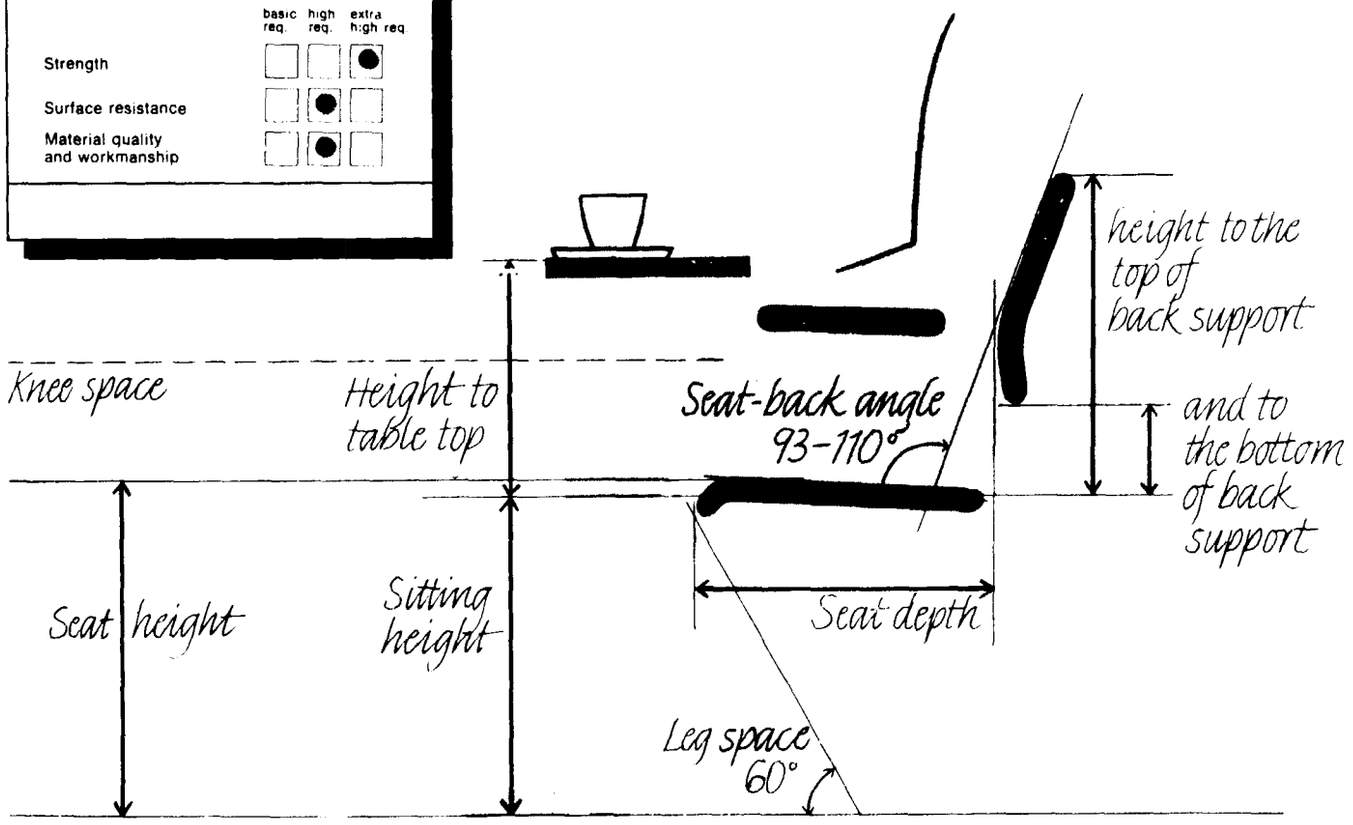
Furniture with Möbelfakta-label is suited to the indicated usage. Its dimensions are adjusted to fit the majority of people.

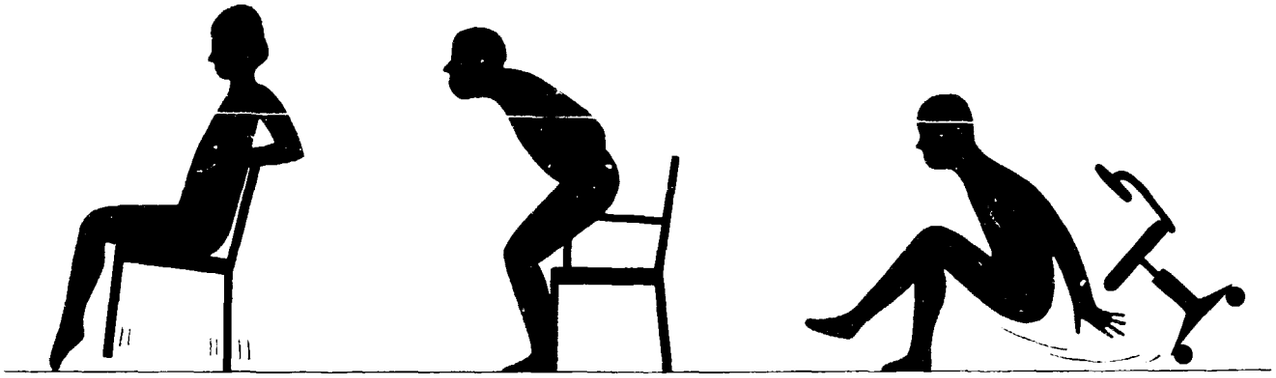
If the piece of furniture has unusual seat height or seat depth, this is indicated with: "High seat", "Deep seat" or similar wording. That shows that the furniture is comfortable only for tall persons.

The requirements of stability reduce risks of accidents. A chair does not overbalance in normal use or if it is used as a step-ladder.

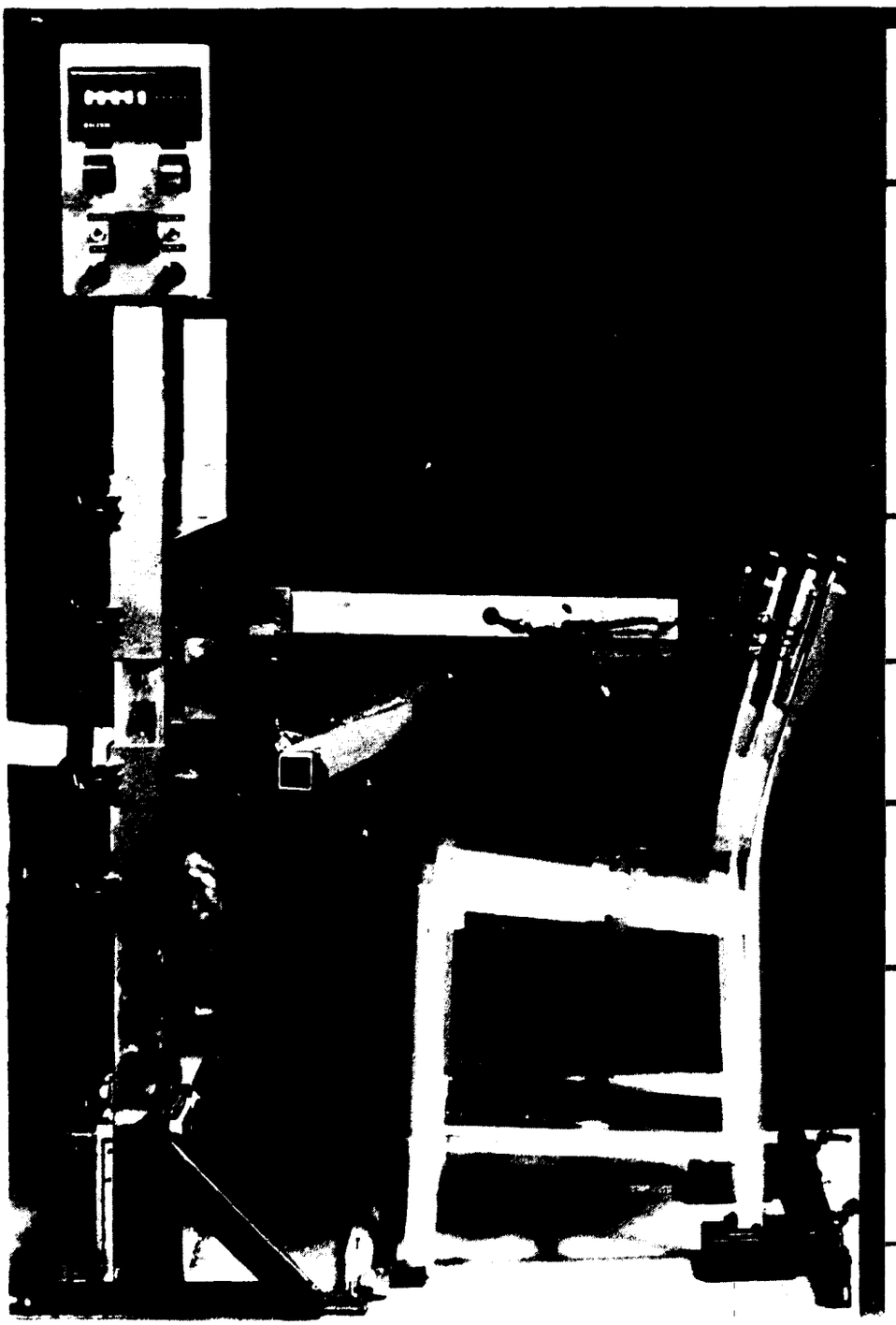


The label guarantees that dimensions, stability, strength, surface resistance, quality of materials and workmanship fulfill the requirements stated in the table on the next page.





In testing, the furniture is submitted to strain corresponding to realistic use.



EXAMPLES OF REQUIREMENTS

A dining chair is to fulfill the following:

Dimensions

Seat height 40—45 cm (over 45 "High seat")
Sitting height 1—5 cm lower
Seat depth 37—46 (over 46 "Deep seat")
Seat width min. 36 cm
Leg space 60
Height to back support
to the top max. 22 cm
to the bottom min. 30 cm
Height of back support min. 10 cm
Seat angle 93—110
Suitable table height
add 27—31 cm to sitting height

Stability

Forwards min. 20 N
Backwards min. 50 N
Sideways min. 20 N

N = Newton, e.g. the force needed to overbalance the chair

Strength	rocking test	overturning
Basic req.	5000 cycles	5 × 4 times
High req.	25000 cycles	5 × 4 times
Extra high req.	60000 cycles	10 × 4 times

Surface resistance	water	grease	scratching
Basic req.	1 hr	24 hrs	—
High req.	6 hrs	24 hrs*)	3 N
Extra high req.	24 hrs	24 hrs*)	7 N

*) grease applied to scratched surface.

Workmanship

Basic req.	Several defects in material and construction but none affecting the performance
High req.	A few defects in material and construction but none affecting the performance
Extra high req.	*No defects of any kind in* material and construction

Complete specifications are to be found in document A1:10 issued by The Swedish Furniture Research Inst

Easy chair

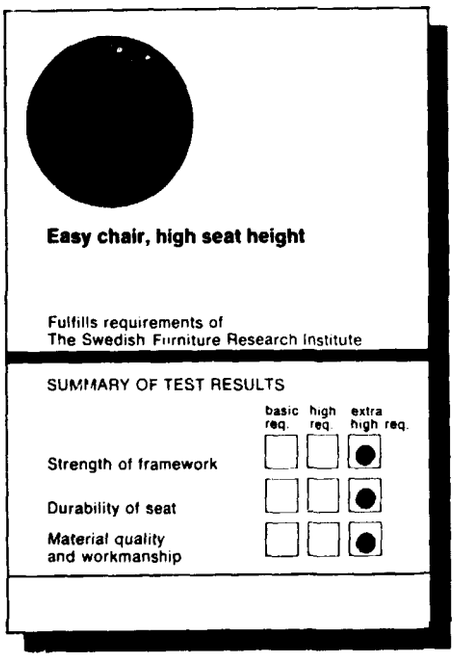
Sofa

Bed settee

People sit in reclining chairs and sofas in different ways, for reading, talking or watching TV. Therefore it is difficult to establish comfort requirements for the piece of furniture. In the Möbelfakta-label the only information about the use of furniture is for instance "Easy chair" or "Sofa seats 3 persons" and only some dimensions are laid down.

If the piece of furniture is especially high, low or deep this is indicated. An easy chair with the information "low seat height" may be difficult to get out of, and is seldom suitable for disabled or elderly persons.

For bed settees there are also requirements for sizes and softness of beds.



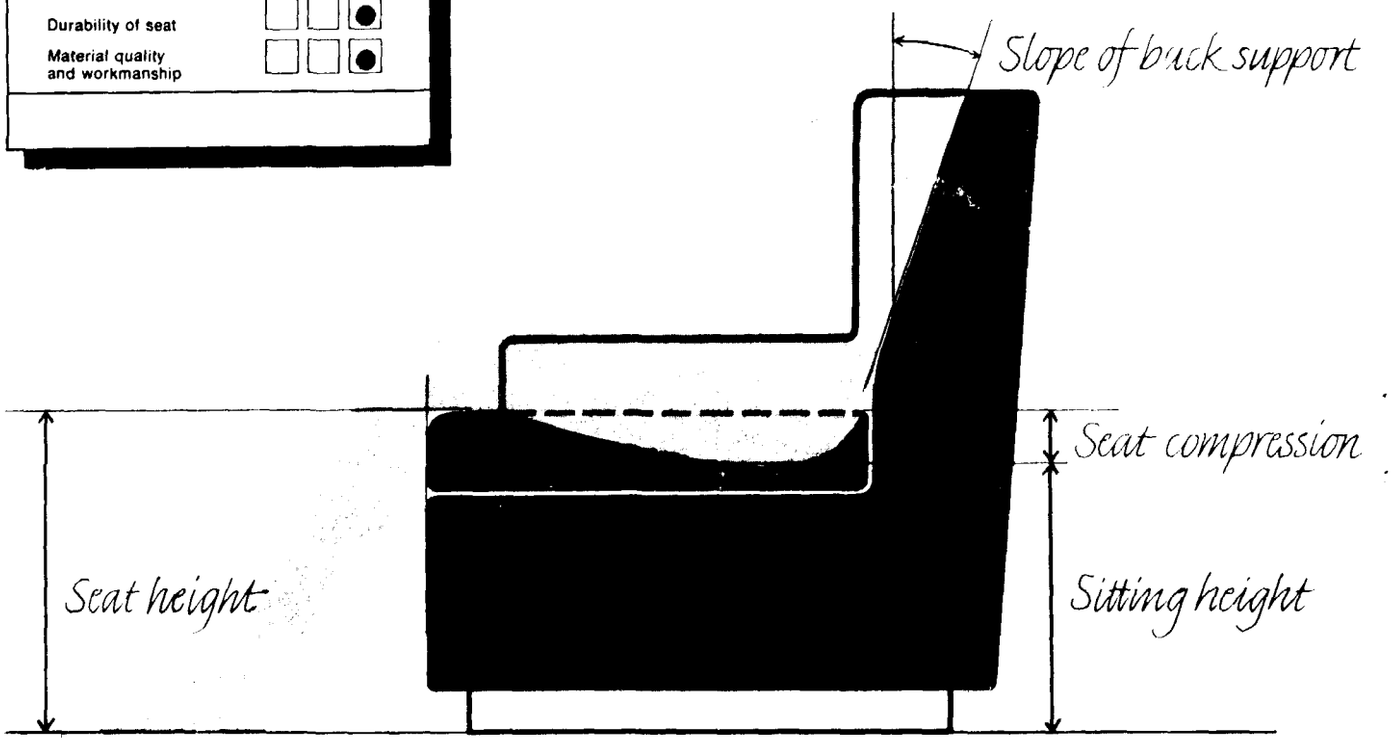
Easy chair, high seat height

Fulfills requirements of
The Swedish Furniture Research Institute

SUMMARY OF TEST RESULTS

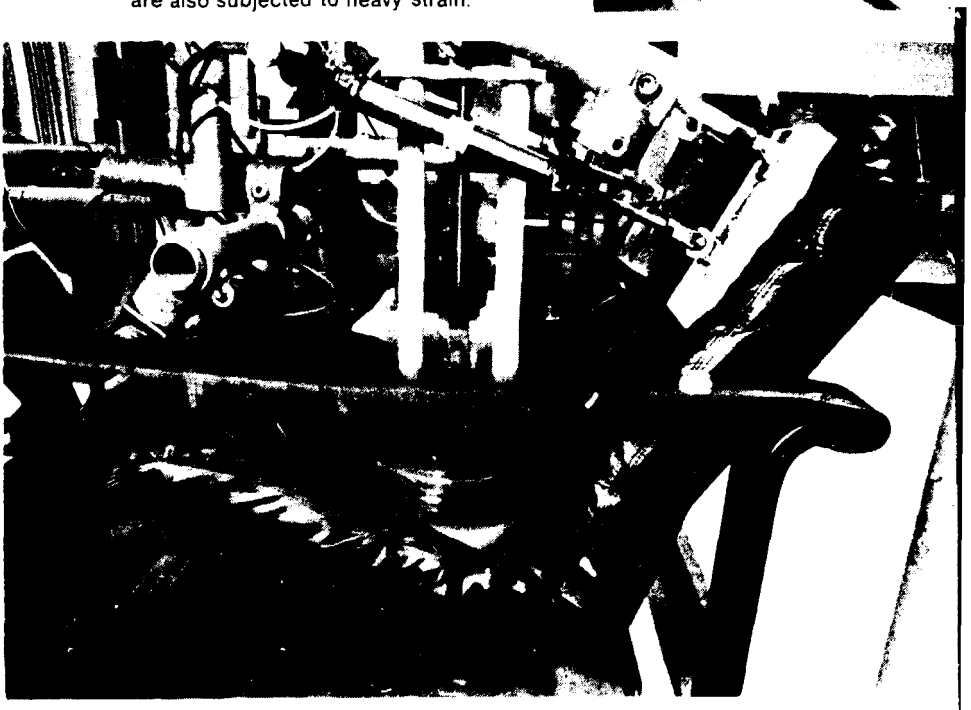
	basic req.	high req.	extra high req.
Strength of framework	☐	☐	●
Durability of seat	☐	☐	●
Material quality and workmanship	☐	☐	●

The label guarantees that dimensions, stability, durability in framework and seat, material quality and workmanship fulfill the requirements stated in the table on the next page.

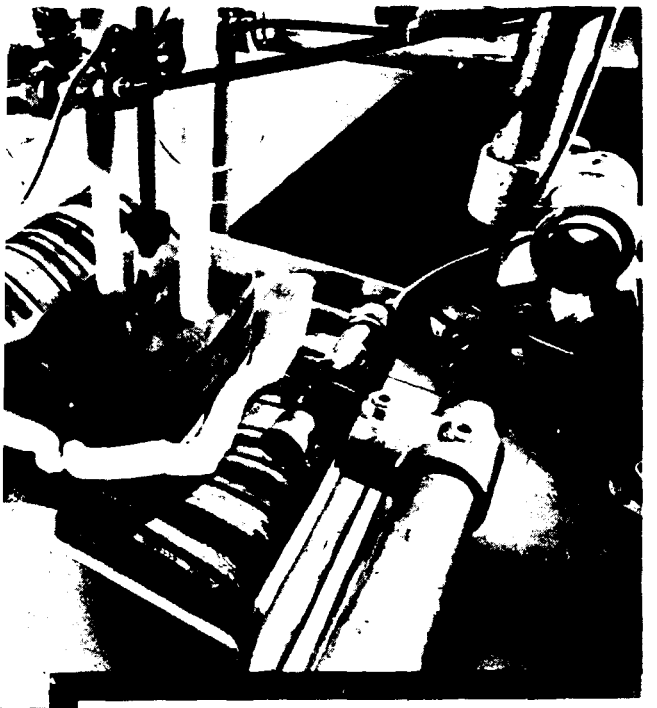


The seat is loaded thousands of times in ways that are similar to a person sitting down in the seat.

Arm rests and back supports are also subjected to heavy strain.



Lacquered surfaces are tested with water, grease and by scratching.



EXAMPLES OF REQUIREMENTS

An easy chair is to fulfill the following:

Dimensions

Seat height max. 43 cm (over 43 "High seat")
Sitting height min. 25 cm (below 25 "Low sitting height")
Seat depth max. 58 cm
Seat width min. 48 cm
Seat compression max. 15 cm
Slope of low back support max. 35°

Stability

Forwards	min. 20 N	N Newton, e.g. the force needed to overbalance the easy chair
Backwards	min. 50 N	
Sideways	min. 20 N	

Durability

	framework	seat
Basic req.	5000	25000
High req.	25000	60000
Extra high req.	60000	130000

Surface resistance

	water	grease	scratching
Basic req.	1 hr	24 hrs	—
High req.	6 hrs	24 hrs*)	3 N
Extra high req.	*24 hrs*	*24 hrs**)	7 N

*) grease applied to scratched surface.

Workmanship

Basic req.	Several defects in material and construction but none affecting the performance
High req.	A few defects in material and construction but none affecting the performance
Extra high req.	No defects of any kind in material and construction

Complete specifications are to be found in document A1:15 issued by The Swedish Furniture Research Inst.

Bed
Bed base
Mattress

Möbelfakta guarantees that the length and the width of the bed are large enough.

Möbelfakta states that the softness of the bed, i e base and mattress in combination,is **firm, medium** or **soft.**

For bedsteads and bases without mattress a suitable mattress is recommended on the label, sometimes with several alternatives.

Mattresses for different bases are classified in type A, B, D and E.

F = Body compression (softness) is indicating how deep one sinks down in the bed. It is important that the spine can keep its natural shape.

Y = hand compression. The surface is to be smooth and pleasant.

The softness is determined
by base and mattress in combination

Type of mattress	Type of base: Hard	Sprung	Deeply sprung
A	Soft	—	—
B	Firm or medium	Medium or soft	—
D	—	Firm or medium	Soft
E	—	—	Medium

B = sitting compression. A hard base must not be felt through the mattress.

Bedstead without mattress

Suitable mattress type A or B
See Möbelfakta on mattresses

Fulfills requirements of
The Swedish Furniture Research Institute

SUMMARY OF TEST RESULTS

	basic req.	high req.	extra high req.
Durability, framework	☐	☐	●
Durability, base	☐	☐	●
Material quality and workmanship	☐	●	☐

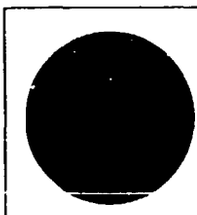
Mattress Type B

Use A or B for hard base
B or D for sprung base
D or E for deeply sprung base

Fulfills requirements of
The Swedish Furniture Research Institute

SUMMARY OF TEST RESULTS

	basic req.	high req.	extra high req.
Durability	☐	☐	●
Material quality and workmanship	☐	●	☐



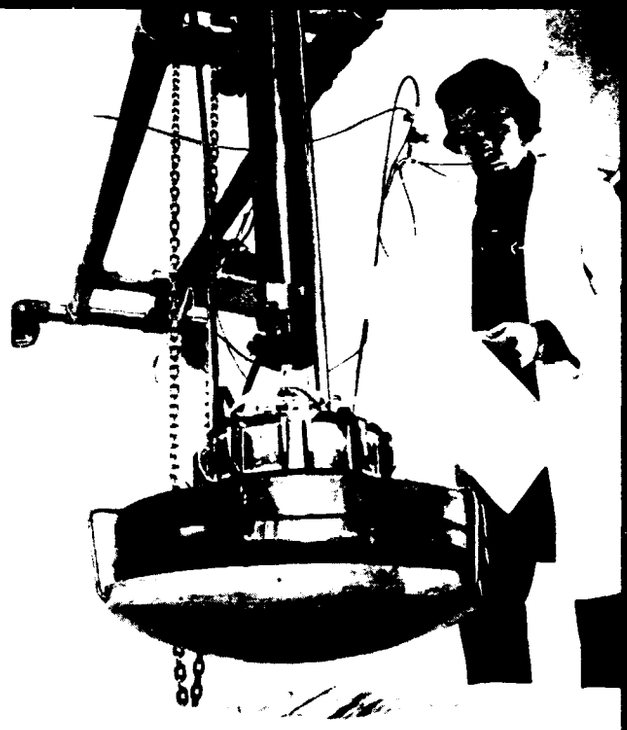
Bed with mattress

Medium softness
(firm, medium and soft are to be found)

Fulfills requirements of
The Swedish Furniture Research Institute

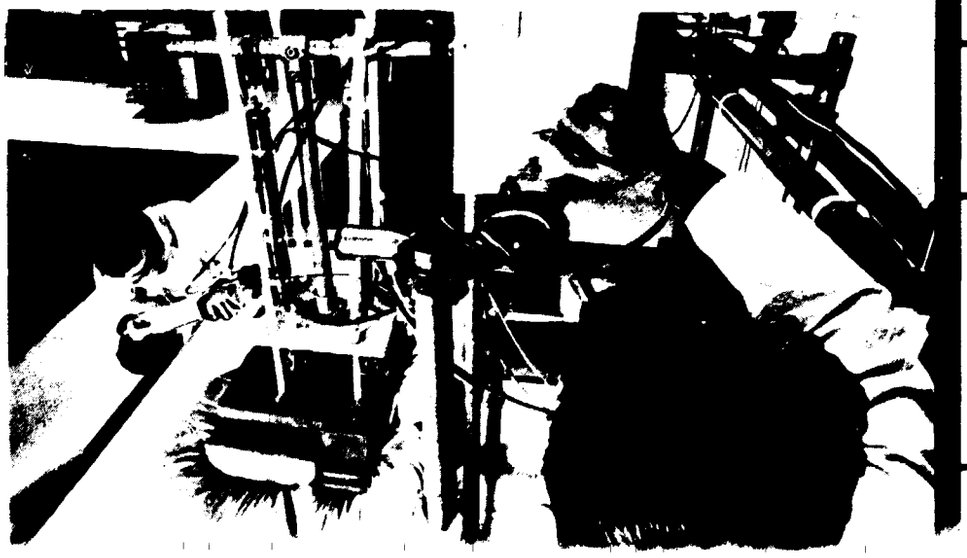
SUMMARY OF TEST RESULTS

	basic req.	high req.	extra high req.
Durability:			
framework	☐	☐	●
base and mattress	☐	●	☐
Material quality and workmanship	☐	●	☐



Bedstead, legs and ends are submitted to loading and fatigue tests.

Fatigue test simulates practical usage during many years.



EXAMPLES OF REQUIREMENTS

A bed is to fulfill the following:

Dimensions

Width	80, 90, 105 cm and wider
Length	195, 200, 210 cm

Stability

The bed will not overbalance when loaded with 70 kg at one end.

Body (F), Hand (Y), Sitting compression (B)

Complete bed	F	Y	B
Firm	60— 75 mm	10	F : 6
Medium	75—100 mm	10	F : 8
Soft	100—160 mm	10	F : 8

Mattress (alone)

Type A	90—140 mm
B	60— 90 mm
D	40— 60 mm
E	10— 40 mm

The measurements indicate F determined on a hard base

Base

Hard	0—20 mm
Sprung	20—60 mm
Deeply sprung	more than 60 mm

Durability	legs	ends	bed
Basic req.	1000	1000	50000 cycles
High req.	5000	3000	100000 cycles
Extra high req.	*10000*	*4000*	*150000 cycles*

Workmanship

Basic req.	Several defects in material and construction but none affecting the performance
High req.	A few defects in material and construction but none affecting the performance
Extra high req.	No defects of any kind in material and construction

Complete specifications are to be found in document A1:20 issued by the Swedish Furniture Research Inst.

Dining table

Desk

Sofa table

Occasional table

Möbelfakta indicates the intended use of the furniture. There are several questions concerning tables:

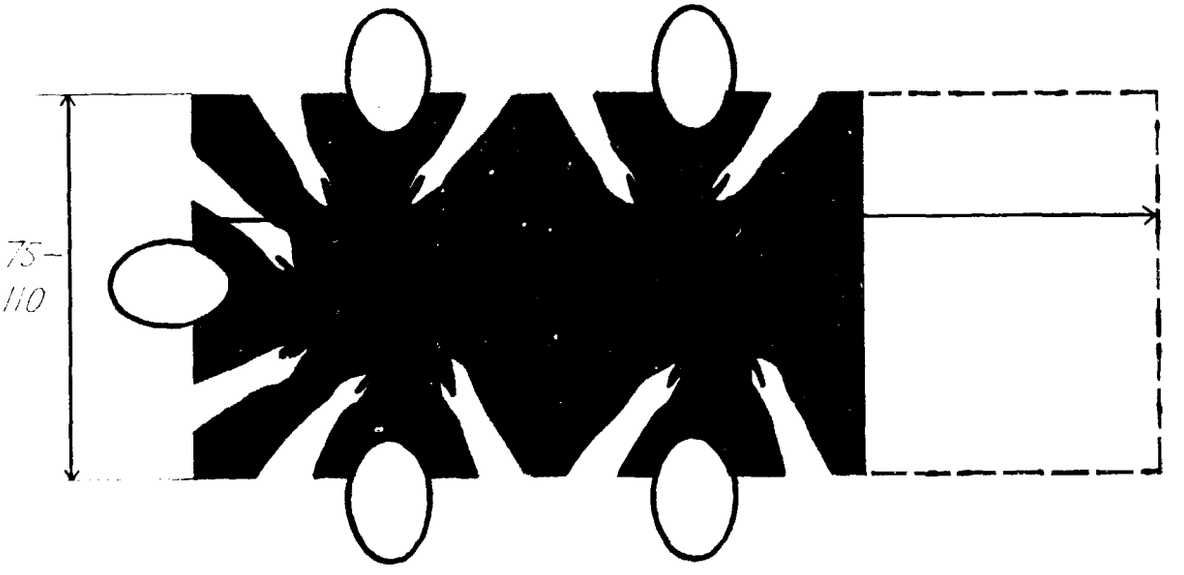
What are we going to use the table for?

How many persons can sit around it?

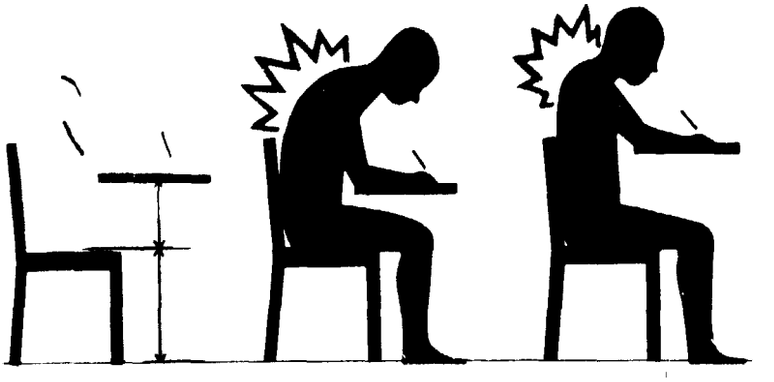
Is it rigid and stable enough?

What about the surface?

Möbelfakta gives the answers.
But there is also some information we have to find ourselves. For instance: How much space is there for the table?
Is the height suitable to the chairs?



Möbelfakta guarantees space for shoulders, elbows and legs.
And is there room for dishes?

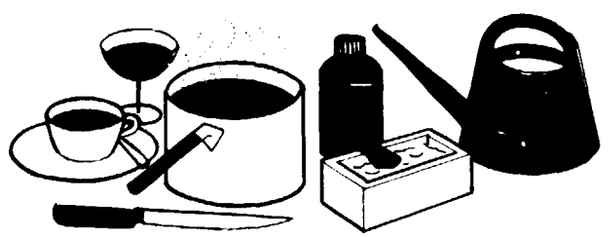


Correct desk height in relation to sitting height is important. Wrong dimensions give aches in the back and shoulders.

The label guarantees that dimensions, stability, rigidity, strength, surface resistance, material quality and workmanship fulfill the requirements stated in the list shown below.

Joint strength is determined by an apparatus which pushes the table in different directions.

The table top is tested with
water
coffee
alcohol
acetone (desks)
grease
heat
scratching



Dining table seats 5 persons
(extended 7—8 persons)

Fulfills requirements of
The Swedish Furniture Research Institute

SUMMARY OF TEST RESULTS

	basic req	high req	extra high req
Strength	☐	☐	●
Surface resistance	☐	●	☐
Material quality and workmanship	●	☐	☐

EXAMPLES OF REQUIREMENTS

A dining table for 5 persons
(extended 7—8) is to fulfill the following:

Dimensions

Table height 65—74 cm
Underside clearance min. 63 cm
Width min. 75 cm
Length 110—135cm (depending on width)
Extended 145—195 cm (depending on width)

Stability

Not extended	min. 50 N	Newton, e.g. the force needed to overbalance the table
Extended	min. 40 N	

Rigidity

Horizontal movement	max. 12 mm
Vertical movement	max. 5 mm

Strength

Basic req.	500 cycles
High req.	2500 cycles
Extra high req.	12500 cycles

Surface resistance (table top)

	water	grease	grease on scr surf.
Basic req.	6 hrs	24 hrs	—
High req.	24 hrs	—	24 hrs
Extra high req.	24 hrs	—	24 hrs

	alcohol	coffee	heat	scratching
Basic req.	1 hr	1 hr	85°C	—
High req.	6 hrs	6 hrs	85°C	3 N
Extra high req.	16 hrs	16 hrs	85° + damp	7 N

Workmanship

Basic req.	Several defects in material and construction but none affecting the performance
High req.	A few defects in material and construction but none affecting the performance
Extra high req.	No defects of any kind in material and construction

Complete specifications are to be found in document A1:30 issued by The Swedish Furniture Research Inst

Shelf

Chest of drawers

Cup-board

Möbelfakta guarantees that the dimensions required by different storage purposes are fullfilled, and that the furniture stands up to normal tear and wear.

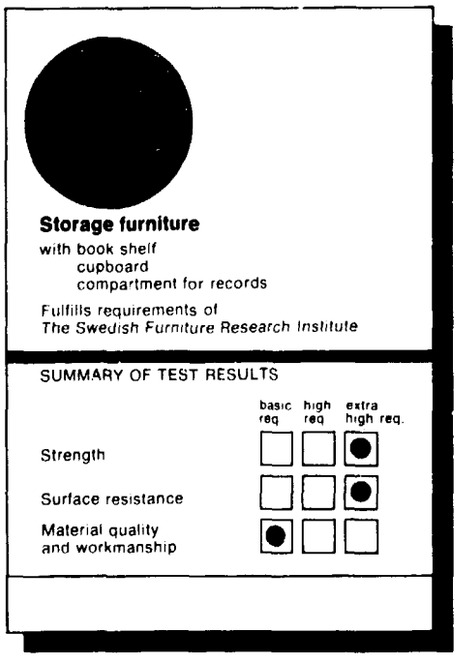
The label states the type of furniture, for instance: **shelf, chest of drawers, cupboard.**

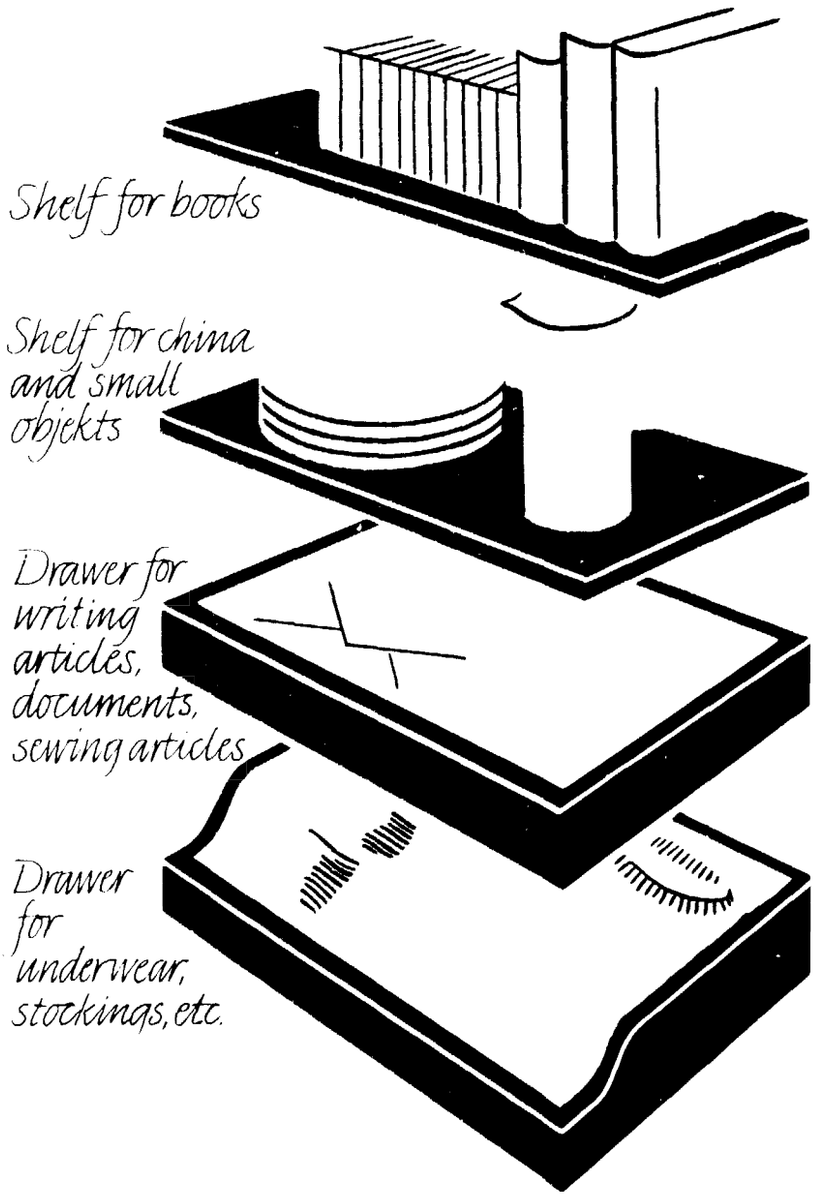
For every type of furniture different requirements are laid down for their dimensions relating to the intended use of the furniture.

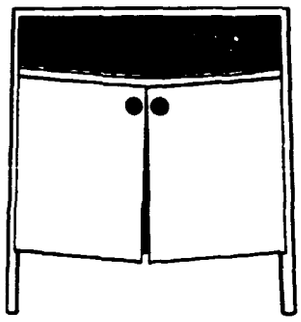
Sometimes the usage is more precisely described, for instance: **Book shelf, Shelf for small books, Document cupboard, Linen cupboard.**

The furniture should not overbalance in normal use, but there can be no guarantee against overbalancing if for instance a child climbs on a bookshelf or hangs on a door.

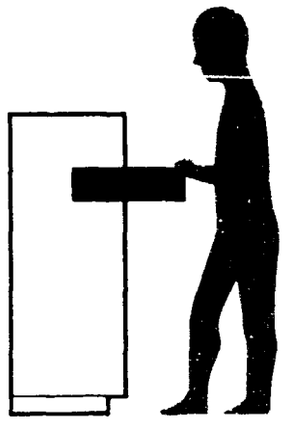
The label guarantees that dimensions, stability, strength, surface resistance, material quality and workmanship fulfill the requirements stated in the table on the next page.



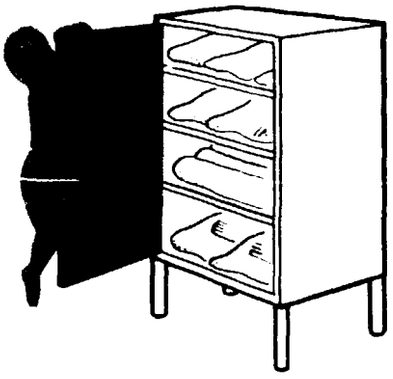




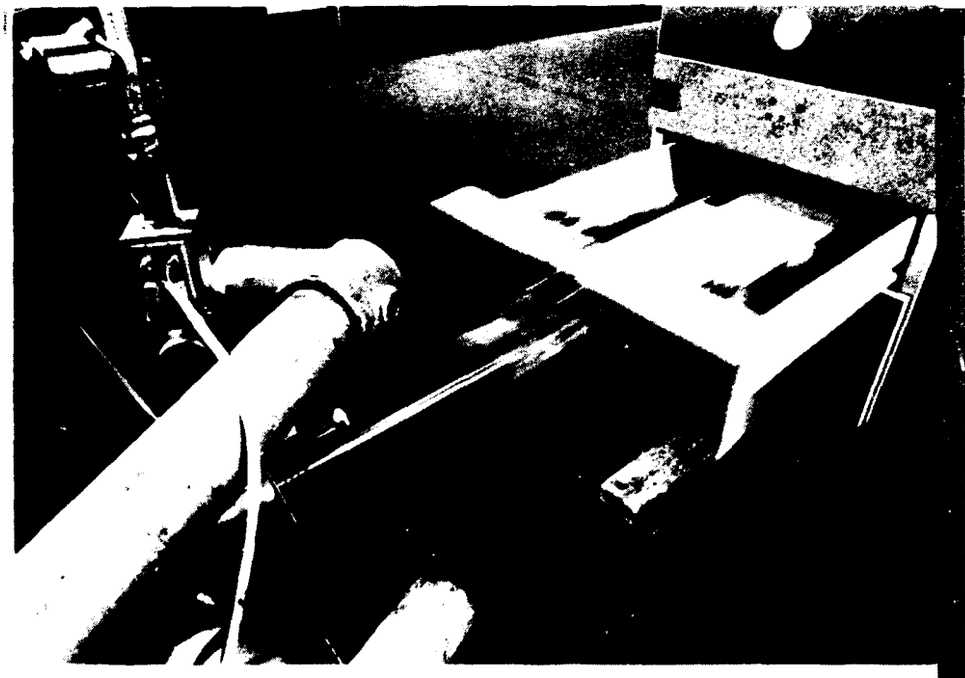
In testing, the shelves are loaded with weights similar to books.



Drawers are pushed in and out thousands of times.



Framework is tested from different angles. Doors are loaded from above.



Surfaces are tested with water grease alcohol coffee heat scratching

EXAMPLES OF REQUIREMENTS

Dimensions

Internal measurements	depth × width × height
cupboard, chest of drawers	30 × 45 × 14 cm
bookshelf	24 × — × 31 cm
small chest of drawers	20 × 30 × 7 cm
desk drawer	24 × 33 × 9 cm

Stability

Furniture with open shelves	10 N (horizontally)
Furniture with drawers	50 N (vertically)
Furniture with flap	100 N (vertically)
Furniture with doors	20 N (vertically)

Strength	framework	drawers	shelves (deflection)
Basic req.	500 cyc.	5000 cyc.	0.6 %
High req.	2500 cyc.	10000 cyc.	0.45 %
Extra high req.	12500 cyc	20000 cyc.	0.3 %

Surface resistance	water	grease	scratching
Basic req.			
Top side: see "Tables"			
Shelves	1 hr	24 hrs	—
High req.			
Top side: see "Tables"			
Shelves	6 hrs	24 hrs*)	3 N
Extra high req.			
Top side: see "Tables"			
Shelves	24 hrs	24 hrs*)	7 N

*) *grease applied to scratched surface*

Workmanship

Basic req.	Several defects in material and construction but none affecting the performance
High req.	*A few defects in material and construction but none affecting the performance*
Extra high req.	No defects of any kind in material and construction

Complete specifications are to be found in document A1:40 issued by The Swedish Furniture Research Inst

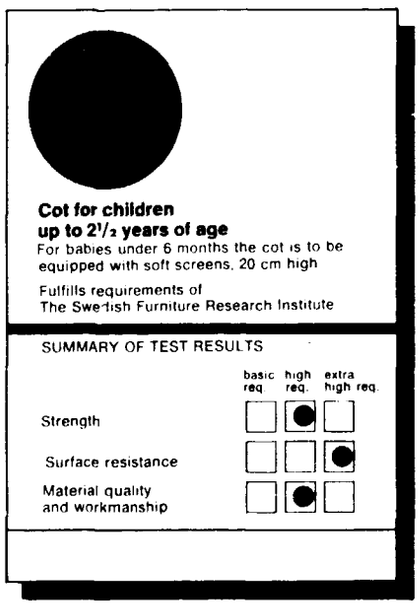
Childrens' cots

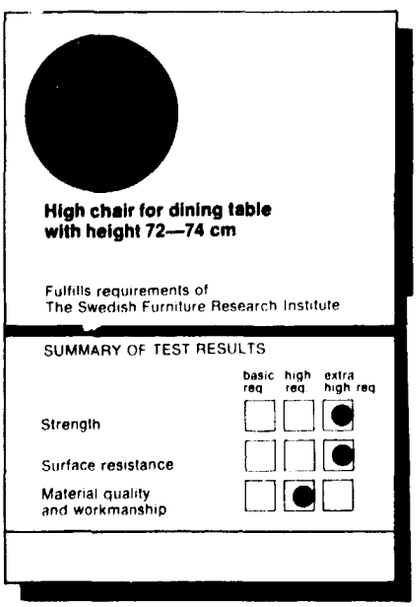
Cots with Möbelfakta-labels fulfill several safety requirements:

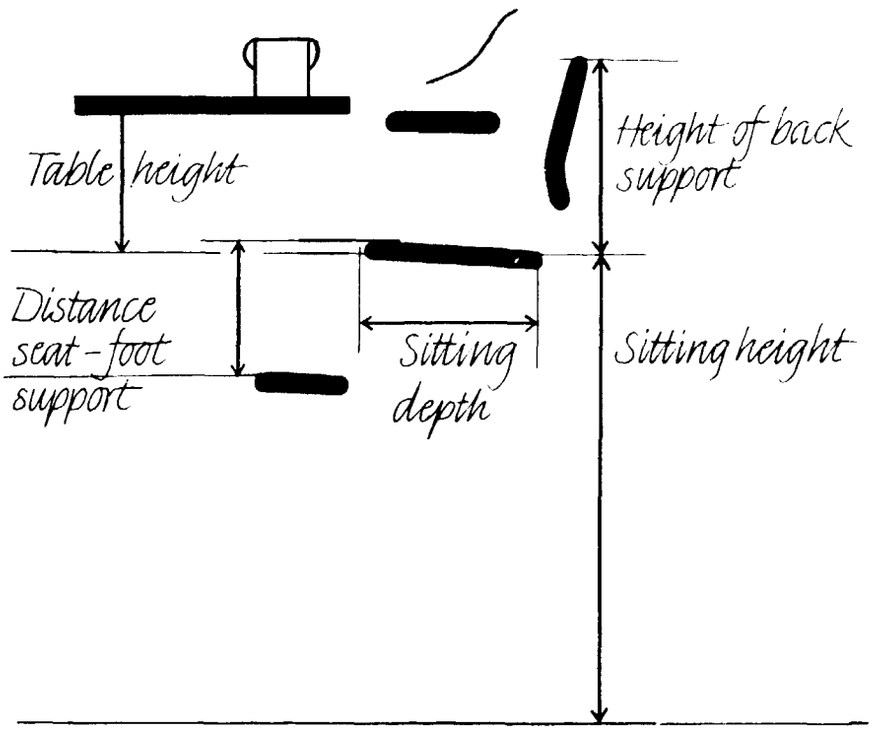
gaps between slats adjusted so that the child will not get wedged,
no openings in the base to be caught in,
sides of sufficient height,
good rigidity and strength,
length and width suitable for children up to 2 1/2 years of age
no sharp screws or fittings that can cause injury.

High chairs

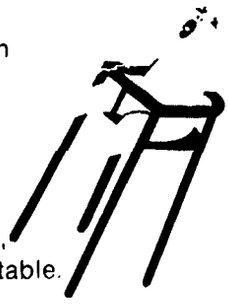
High chairs with Möbelfakta have
good stability,
correct dimensions,
no fittings that can cause injury.



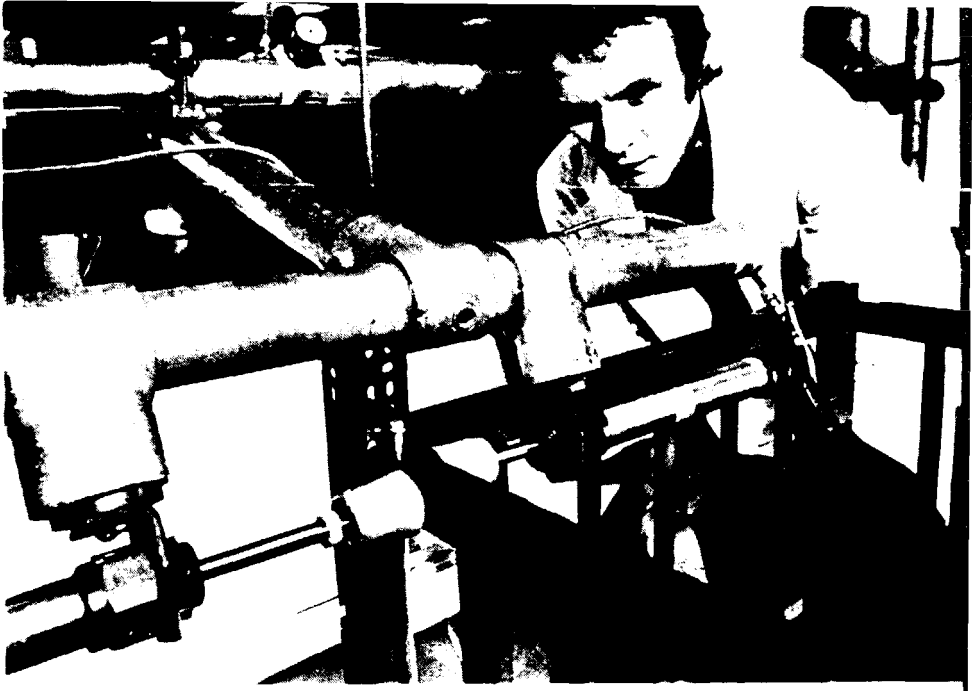




It must not be possible for a child to be caught between the slats in the sides or bottom.



The chair must be stable.

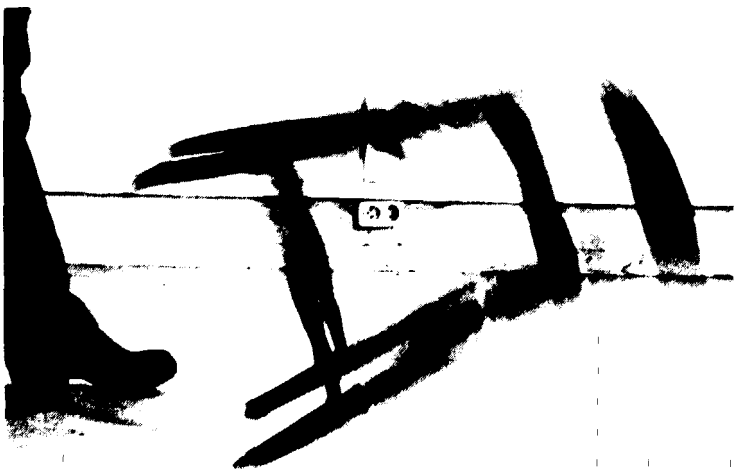


The strength of the bed is tested by this apparatus which pushes the sides in two directions.

The bed base is tested by impact test corresponding to a child jumping up and down.

Distance between slats is tested with a wedge. The strength of the slats is tested by impact test.

Stability and strength are tested when the chair is submitted to over-balancing.



EXAMPLES OF REQUIREMENTS

A cot is to fulfill the following:

Dimensions

Internal length min. 110 cm
Internal width min. 55 cm
Internal side height min. 60 cm
(from base in lowest position)
Distance between slats in sides max. 8.5 cm
Distance between slats in bottom max. 2.5 cm

Strength of cots

Shake test

Basic req.	max. 50 mm movement after 2000 cycles
High req.	max. 40 mm movement after 2000 cycles
Extra high req.	max. 20 mm movement after 5000 cycles
Impact test base (The same req. for all levels)	*No damage after* 1000 impacts on 5 different places
Impact test, sides (The same req. *for all levels*)	No damage after 10 impacts on each slat

A high chair is to fulfill the following:

Dimensions

Distance sitting height-table top 52—57 cm
Distance seat-foot support 16—19 cm
Width between side supports 24—30 cm
Seat depth 20—26 cm
Height of back support min. 16 cm
Suitable table height:
add 16—18 cm to sitting height

Strength of high chairs

	overturning	impacts on to table
Basic req.	10	5
High req.	15	10
Extra high req.	20	15

Both types of furniture are to fulfill the following:

Surface resistance	water	grease	scratching
Basic req.	1 hr	24 hrs	---
High req.	6 hrs	24 hrs*)	3 N
Extra high req.	24 hrs	24 hrs*)	7 N

*) grease applied to scratched surface

Workmanship

Basic req.	Several defects in material *and construction but none* affecting the performance
High req.	A few defects in material and construction but none affecting the performance
Extra high req.	No defects of any kind in material and construction

Complete specifications are to be found in document A2:22 and A2:13 issued by The Swedish Furniture *Research Institute*

Test certificate

The Möbelfakta-declaration is based on a detailed test report showing all different parts of the test.

The furniture manufacturer can on request send the test report. Sometimes it is reproduced in the catalogue.

Professional buyers such as furniture dealers and architects should always ask for a test report that presents facts as a basis for comparing price with quality.

The test report might be too long and technical as information to the consumer. The test results therefore are condensed into an easily understood Möbelfakta-label.

Date 1976-04-20 **Test certificate** Nr 832-10:6

Test requested by: Axel Linial, arch MAA

Furniture type / identification of model: Armchair 4711

Test made in accordance with test methods stated in the instruction A1:10. Test results compared with requirements for the following specific furniture type:

Use: Armchair for dining table with height 70-74 cm

Manufacturer: Möbel-Svensson, Sweden

Material: Beech, moulded seat, plastic lacquer

		test results		requirements not fulfilled	requirements fulfilled
Function					
1 a	Height of seat	44	cm		x
b	Sitting height	43	cm		x
c	Sitting depth depth of seat	38	cm		x
d	Sitting width width of seat	39	cm		x
e	Clearance under front edge of seat	≥ 60			x
f 1	Height to lower edge of backrest	0	cm		x
f 2	Height to upper edge of backrest	34	cm		x
f 3	Height of backrest	34	cm		x
g	Sitting angle	100			x
h	Width between armrests	43	cm		x
i	Appropriate table height	70-74	cm		x
2 a-c	Stability forwards backwards sideways	≥20 N	≥50 N ≥20 N		x
Strength					
3 a	Strength of frame tilting	25.000	cycles		x
	overturning	4x5	turns		x
b	Seat, consistency of shape	-	cycles		
Durability of surfaces					
c	Resistance to water seat, armrest	24	h		x
	other parts	1	h		x
d	fats fats on scratched surface seat, armrest	24 h	- h	x	
	fats other parts	24	h		x
e	scratching seat, armrest	3	N	x	
Quality of material and workmanship					
4 a	Quality of material wood	B	C	x	
b	upholstery material	-	-		
c	finishing material	C	C	x	
d	Measurements and angles	-	-		
e	Bent parts	C	C	x	
f	Joinery	C	C	x	
g	Veneering	C	C	x	
h	Sanding	C	C	x	
i	Finish	C	C	x	
j	Frame and bottom for upholstery	-			
k	Seat Upholstery	-			
l	Back- and armrest Upholstery	-			
m	Tailoring of cover, sewing	-			

This test certificate may be published in its complete form. For publication of extracts a written permission from the Institute is required. The test object is a sample provided by the client.
For furniture with corresponding properties the declaration below can be used.

The Swedish Furniture Research Institute

55fj:211

SUMMARY OF TEST RESULTS 832

möbel fakta

Armchair for dining table with height 70-74 cm

Fulfils the requirements of the Swedish Furniture Research Institute

	fulfils requirements	does not fulfil requirements
Strength	●	
Durability of surfaces	●	
Quality of material and workmanship	●	

Möbelinstitutet– The Swedish Furniture Research Institute

is founded and financed jointly by the Swedish government and the furniture industry, represented by trade organizations, as well as private and cooperative companies.

The Institute

- carries out search and development work
- develops test methods for furniture and fittings
- is responsible for the quality marking system Möbelfakta in collaboration with the National Board of Consumers Policies.

Möbelinstitutet
Box 27 198 102 52 Stockholm Telephone 08-67 92 45

This brochure is produced by The Swedish Furniture Research Institute in collaboration with the National Board of Consumers Policies

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