



SOLUTIONS FOR QUALITY IMPROVEMENT OF UPHOLSTERY AND INTERIOR DESIGN PRODUCTS

LUTIC Liliana

“Gh. Asachi” University, Faculty of Textile Leather and Industrial Management, Knitting and Ready – Made Clothing
Department, 29 Dimitrie Mangeron Street, 700050, Iasi, Romania, E-Mail: llutic@tex.tuiasi.ro

Corresponding author: Lutic Liliana, E-mail: llutic@tex.tuiasi.ro

Abstract: *Quality assurance by satisfying the demands of the beneficiaries is the prime objective of any commercial society. The demands of the beneficiary are at the root of the creative and design process, finalized by elaborating the product and process documentation. When designing a product it is necessary to take into account the real demands of the user, while establishing the final presentation will take into consideration the perceived requirements. Seeing as the customer demands regard both the presentation and the commercial product value, its functionality (wear behavior), as well as under duty response, the quality of a product can be perceived differently by competent customers and unadvised ones.*

For the knitted fabrics industry, raising the expectations and improving knitting and finishing technology, it could lead to producing knitted fabrics with upholstery specific features.

Any action towards quality (planning, controlling, improving, assessing) analyses the relationship between user requirements, functions and quality features of the products.

Starting from the analysis of the correspondence between the quality requirements of the beneficiaries and the functions of the knitted used in upholstery items and interior design, the purpose of this paper relies in presenting some applicable solutions in order to improve the quality level of these products. Similarly, some efforts of the producers are presented so that the beneficiaries can make fully aware decisions.

Key words: *quality, requirements, functions, knitted, mattress, solutions*

1. INTRODUCTION

Quality assurance by satisfying the demands of the beneficiaries is the prime objective of any commercial society. The demands of the beneficiary are at the root of the creative and design process, finalized by elaborating the product and process documentation. When designing a product it is necessary to take into account the real demands of the user, while establishing the final presentation will take into consideration the perceived requirements.

1.1 Quality requirements imposed by the beneficiary

Beneficiary requirements target both the presentation and the commercial value of the product, its functionality (behavior during usage), as well as its behavior under the action of the solicitation it is subjected to (availability).

Demands regarding the presentation value derive from the fact that any product in order to enter the sphere of interest of a potential customer must transmit an aesthetic message through



style, model, chromatic combinations, novelty elements, etc. These demands determine the degree of product amenity and implicitly its success on the market.

Demands targeting the commercial value apply to the presentation approach of the product for sales, as well as the information given by it (fibrous composition, dimensions, brand, maintenance etc.).

Availability requirements derive from the fact that a product must fulfill the functions for which it was created, in specific usage conditions, until the appearance of physical or moral ageing.

The functions of a product represent the interface between the beneficiary demands and the quality characteristics, expressing the way the product fulfills the role for which he was created, in the conditions imposed by society and the ambient. The optimal choice of quality characteristics for a certain product is especially difficult taking into consideration that these must meet the explicit and implicit requirements of the beneficiaries, found in a permanent change and evolution.

2. CORRESPONDENCE BETWEEN DEMANDS – FUNCTIONS – QUALITY CHARACTERISTICS FOR KNITTED USED IN MATTRESS MANUFACTURING

Traditionally the furniture and automobile industry has been using woven materials for upholstery. Lately, however, knitted fabrics are used on a larger scale; this was possible due to the following facts:

- ❖ the creation of knitted fabrics which show both woven fabrics features (mechanical stress resistance, limited elasticity) and knitted fabrics features (3D modelling capacity, high volume, wide choice of models, nice touch feeling, economical efficiency);
- ❖ new knitting technologies were developed;
- ❖ the production of knitting machines used specifically for upholstery knitted fabrics;
- ❖ using a wide variety of fibres with superior features.

2.1 Correspondence between demands – functions – quality characteristics

For upholstery and interior design items, the correspondence between the possible demands expressed by the beneficiary, renditioning them in technical terms, quality functions and characteristics determined [1], is presented in table 1.

Table 1: Correspondence demands – functions – quality characteristics for mattresses

Demand type	Demand description and its rendition in technical terms	Determined function	Examples of quality characteristics
Demands expressed by the customer			
Dimensional correspondence	Existence on the market of multiple mattresses sizes, so they can easily adapt to the imposed dimensions	Constructive function (composition, structure, auxiliary materials content, dimensional correspondence)	Dimensional characteristics (length, width, thickness) Physical characteristics (voluminosity, tightness) Structural parameters of the knitted
Pleasant aspect	Perception of the user when he analyses visually the model, aspect, used material, color or chromatic combination, aspect of used stitches etc.	Esthetic function	Design, chromatic combination, glossiness, shininess, manufacturing and assemblage aspect



Demand type	Demand description and its rendition in technical terms	Determined function	Examples of quality characteristics
Demands expressed by the customer			
Comfortable	User perception during mattress utilization	Comfort function (ensuring thermo-physiological and psycho-sensorial comfort)	Thermo-physiological comfort characteristics (thermo-isolation capacity, permeability to vapors, air, water, ventilation capacity etc.) Psycho-sensorial comfort characteristics (handle, electrostatic charge etc.)
Conservation of shape, aspect and colors	Necessity that the mattress be durable, not change shape, aspect, colors and dimension under the action of the solicitation it is subjected to during usage	Availability function – product capacity of being able and available to use for a pre-established time period (maintainability)	Characteristics regarding durability (resistance to static and dynamic solicitations – breaking, slashing, snapping, friction) Characteristics regarding usage behavior (dimensional stability, color resistance, light resistance etc.)
Easy maintenance	Product behavior in use and home-keeping maintenance		Characteristics targeting under usage behavior (resistance to microorganisms, chemical cleaning capacity, low soiling capacity, high efficiency cleaning –short time, low quantity of cleaning agents, capacity to remedy and reconditioning)
Cheapness	Product price in relation to its quality	Economical function	Economical characteristics (prime material consumption, price, efficiency, marketability)
Collateral demands			
Obtaining it through technological manufacturing	Manufacturing capacity of the mattress	Technological function	Space formation capacity, flexibility, extensibility, elasticity.
Not affecting the human health and protection of the ambient	Product influence on user (protection against harmful factors) and ambient	Ecological function	Content of harmful substances, inflammability, decay capacity in biological environment
Transmission of information to the user	Product capacity of being known before and during usage	Knowledge function	Content of tags, stamps, packaging type that contains information about the product (size, dimensions, fibrous composition, maintenance etc.) and the producer (brand).

2.2 Correspondence between demands – applicable solutions

For knitted used in upholstery items, it is shown in table 2 the correspondence between the user requirements and a couple of applicable solutions meant to respond concretely and efficiently to these [2, 3, 4].



Table 2: The relationship between requirements – functions – solutions which can be applied

No.	User requirements	Function	Solutions which can be applied
1.	Maintaining the shape and size while in use	Constructive technological function	➤ Producing integrated knitted fabrics with “padded” finish; the thickness comes by inserted filling fibres between the two knitted fabric layers;
			➤ Improving elastic rebound after normal use stress, by creating a Jacquard structure with high volume filling fibres, fixed between the knitted fabric’s two layers by connection points;
2.	Protecting the body from the elements	Protection function	➤ Using advanced technology fibers to protect the users against insects, fungus, bacteria and acarians;
			➤ Using fibers with a high fire ignition threshold, and finishing technologies to reduce fabrics flammability;
			➤ Creating composite materials to wick away moisture from the body contact zones and stopping its diffusion to the deeper layers of the mattress through applying a water proof layer.
3.	Ensuring sensorial and thermic comfort	Comfort function	➤ Using natural fibres which can absorb and wick away moisture, allow air circulation and regulate temperature feeling (warm or cool sensation according to the outside temperature);
			➤ Using technologically advanced synthetic fibres, which can create large volume structures and have a natural fibres feel;
			➤ Using fibres witch contain microcapsules to emanate a nice odour upon touching the knitted fabric;
4.	Maintaining and improving health	Ecological function	➤ Creating high purity materials with antibacterial functions;
			➤ Inserting carbon micro-fibres with antistatic, antibacterial and against dust functions within knitted structures;
			➤ Using smart fibers/knitted fabrics which could improve health by raising muscle tissue oxygen levels and change textile temperature according to the environment temperature;
			➤ Using an anti-allergens eco finish.
5.	Environmental protection	Ecological function	➤ Using recyclable materials, biodegradable materials and organic natural fibers;
			➤ Using non-polluting finishing technologies.
6.	Showing some new features – structure, colors, layer aspect	Esthetic function	➤ Making variate patterns and the 3D-effects according to the drawing pattern and the thickness of the fabric;
			➤ Making the drawing pattern of the connection points between the two fabric’s faces determines the quilted effect ;
			➤ Using fancy yarns;
			➤ Using a color pallet accoring to the domain trends;
7.	Stress resistance during use	Durability function	➤ Using fibers with a high mechanical stress endurance;
			➤ Using fibers with filaments and a pilling resistant material;
			➤ Producing knitted structures with high resistance against homogenous and heterogenous friction;
			➤ Using fibers and knitted structures with high endurance for cyclical stress (pull – return, repeated bending and compression).
8.	Dirt resistant and easy cleaning	Maintain-aility function	➤ Using advanced technolgies to produce dirt proof and moisture proof materials;
			➤ Using fibers and a finish technology to ensure a fast and efficient cleaning.



3. SOLUTIONS OFFERED BY THE PRODUCERS

Depending on the demands concept solicited by the beneficiaries, in proportion with the quality product, the producers can offer multiple variants of solutions of which descriptive presentation give notice to the user, so that he can choose according to his wishes the optimal variant. In table 3, is presented as example a model of offer by a material production firm (primary knitted) [3, 4, 5, 6, 7] intended for mattresses manufacturing:

Table 3: Offered solutions by the producer

No.	Function	Offered solutions	Solutions description
1.	Constructive technological function	QuickFit®	QuickFit® mattress covers are quilted and assembled at the desired dimensions. According to wishes, the producer can also offer mattresses with the border already quilted.
		Bungee®	Bungee® is an extremely elastic knitted, that unlike other materials, will keep its thickness and nice handling (softness) even when stretched. With Bungee® the filling and quilting of the mattress becomes unnecessary. The versatility of the material is given by its elasticity, making it fit for any mattress production. Bungee® can be also used for making pillow cases.
2.	Comfort function	ThermoCool™	ThermoCool™ is designed in order to optimize the thermo-regulation capacity of the human body during the night. Realized from an unique and intelligent blend of natural fibers, it adapts shape and temperature according to the sleeping person, enhancing as such the comfort during sleep. ThermoCool™ is a multifunctional and ecological knitted.
		CoolMax®	CoolMax® has a hexagonal structure of the component fibers, sweat being transferred to the exterior surface of them where it evaporates very fast. The CoolMax® material is obtained through the DuPont fabrication process. In the humidity control tests, this type of knitted is perfectly dry after approximately 30 minutes. The structure of the fibers prevents forming stains. Because it is not chemically or electrostatically treated, these proprieties are still active even after a high number or washings.
		REBORN®	REBORN® is a polyester fiber obtained through the recycling of PET bottles. Materials fabricated with REBORN® fibers are easy to dye, resistant to UV radiations, extremely soft and flexible, ameliorating comfort during sleep.
		Tencel®	Tencel® has excellent humidity dissipation quality and a good air permeability. Thus Tencel® dries fast.
3.	Ecological function	Bodyfit®	The „intelligent” knitted Bodyfit® takes into consideration the different pressure exerted by body parts and adjusts its elasticity accordingly, ensuring the desired comfort. The client can choose the design and color of the knitted used in the mattress production.
		Bamboo	Bamboo yarns are fabricated with 100% bamboo pulp. Being totally biodegradable and sustainable, bamboo is the most ecologic material of the XXI century. The bamboo obtained knitted has antibacterial and antifungal proprieties and are exceptional absorbent.
		Silk	Silk fiber proteins are similar to the human skin ones. Silk can absorb up to 30% of its weight in water without seeming moist. The silk yarn is resistant compared to it thickness, rarely being attacked by moths.



**ANNALS OF THE UNIVERSITY OF ORADEA
FASCICLE OF TEXTILES, LEATHERWORK**

No.	Function	Offered solutions	Solutions description
		Soia	Soy fiber are gained from the discards resulted following the soy oil extraction, mainly from crushed beans and husks. Soy fibers have a high breaking resistance and good thermo-insulation proprieties. The resulted material retains heath during winter and is cool during summer, having a special texture because of the yarn count. It is also cheap, compared to othe natural materials.
		Argentum+ [®]	Materials from the selection Argentum+ [®] combine humidity regulating technologies with an inovative finishing based on Silver ions. The mattress remains cool and dry during sleed and the silver ions destroy bacteria that can cause unpleasent smells.
4.	Durability function Maintain-ability function	Flax	Flax is a natural fiber that resists very well to wear. The realized materials have a soft texture and are easy to dye. Out of the natural fibers, flax is the most resistant (its break resistance is 11 times higher than cotton). Flax fibers have a natural soiling resistance and they absorb a high quantity of water (20%) before becoming moist to the touch.
		Lotus Advanced	Lotus Advanced is a material soiling and wet resistant with proprieties alike Teflon. The effect was obtained using nanotechnology. The dirt traces can be wiped out with a moist cloth, similar to shiny surfaces. Although theoretically the material doesn't need washing, this is possible because the treatment is applied only on fiber level and not to the entire material, so that it can "breathe" and not affect comfort during sleep.

4. CONCLUSIONS

Quality insurance by satisfying the demands of the beneficiaries is the prime objective of any commercial society. These demands target both the presentation and the commercial value of the product, its functionality, as well as its behavior under the action of the solicitation it is subjected to. The activity of creation, design and improvement of product quality, always begin with the analysis of their functions and are finalized by the compilation of the technical documentation for product and process. This fact implies the translation of the requirements expressed through the voice of the beneficiary in technical notions specific for the production.

This paper presents different solutions meant to respond as efficiently as possible to the beneficiary requirements and offered models of the producers. Depending on the concept of the solicited requirements, in rapport to the product quality, manufacturers offer various solutions whose descriptive presentation informs the users. The purpose relies in making fully aware decisions and adopting according to desire the optimal variant.

REFERENCES

- [1] E. Moisescu, "Asigurarea calității", Ed. Performantica, Iași, 2007
- [2] <http://www.online-home.ro>
- [3] <http://www.desleeclama.com>
- [4] <http://www.ramedepat.ro/saltele>
- [5] <http://www.ikea.com/ro/ro/catalog/categories/departments/bedroom/10609/>
- [6] <http://www.deslee-interior.com/functions/content>.
- [7] <http://www.dormeo.ro/>