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**Market Analysis of Textile Products Protecting Against UV
Radiation (Used for Equipping Interiors, Construction
and in Protective Clothing)**

Abstract

The aim of this article is to present the results of our analysis of the European market in the field of protective textile products, based on the EUROSTAT database and our own research. The market volumes of curtains and inner roller blinds, marquees and anti-solar curtains, male clothing accessories and female clothing accessories are presented and analyzed. Initial research of supply and demand in the Polish market of textile products protecting against UV radiation is also presented and discussed.

1. Introduction

Despite a partial decrease in the emission of harmful greenhouse gasses, the World Meteorological Organization has issued an increasing number of announcements and warnings about the widening ozone hole over the Arctic, as well as about a very thin ozone layer over Middle and Eastern Europe, including Poland. These warnings bring to light a mounting problem - that of finding protective materials against phenomena harmful to human health and life.

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The international organizations, especially the World Health Organization (WHO) and the European Union, pay particular attention to the necessity to reduce the dangers to health and life of all people, especially of workers exposed to risk caused by physical agents, including harmful UV radiation. This concern is reflected in both the Directive of the European Parliament and of the Council on the necessity of formulating minimum requirements in this field, as well as in the publications of WHO experts¹.

In the European Union more and more attention is being paid to protective clothing, including UV protective clothing, which protects against harmful solar radiation. In the year 2008 the European Commission developed the so-called *Lead Markets Initiative for Europe*, within which the sector of intelligent protective clothing was specified as one of the most important, next to five other market sectors (the so-called pioneering markets), based on the contribution of high knowledge and encouraging the creation of high added-value².

Innovative textiles, with special reference to technical textiles for intelligent personal protective clothing and equipment, belong to the most supportive sectors in the EU internal market since 2007/2008, also within the 7th Framework Programme of the EU³.

This market sector is comprised of clothing and other textile-based systems' accessories and related services having as their main function user protection. These high-tech products are used under variety of circumstances, such as by professionals and emergency services operating in hazardous environments or dangerous situations.

The current size of the Personal Protective Clothing and Equipment (PPE) market in the EU is estimated at 9.5 billion to 10 billion EUR, accounting, directly or indirectly, for around 200,000 jobs. The rapid growth forecast for certain parts of the world suggests that EU exports of PPE could grow by about 50% over the next few years. Advances in this area include novel speciality fibres, the use of nanoparticles, and the integration of micro-electronic components into fabrics and garments. EU industry expertise in the fields of polymer technology, specialty yarn and fabric manufactures, textile finishing

¹ DIRECTIVE 2006/25/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 5 April 2006 on the minimum health and safety requirements regarding the exposure of workers to risks arising from physical agents (artificial optical radiation) (19th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC), published in: Official Journal of the European Union, 27.4.2006;

² LEAD MARKET INITIATIVE FOR EUROPE;
<http://ec.europa.eu/enterprise/policies/innovation/policy/lead-market-initiative/>

³http://ec.europa.eu/enterprise/policies/innovation/policy/lead-market-initiative/protective-textiles/index_en.htm#h2-4

and service supply will play a pivotal role in reinforcing the EU's industrial leadership in the new generation PPE products. Technological developments, originating from high-tech domains such as the space and military industries, have a well-known potential for transfer to the PPE market, including non-wearable interior textiles (for buildings or transport vehicles) and consumer products (such as garments for sports, outdoor wear, or fashion). Thus, new applications in these fields have the potential to make a clear positive impact on the modernization, competitiveness, and structural adjustment of the sector⁴.

One of the most important branches within the protective T&C sector is the production of UV radiation protective textiles and clothing.

The materials which constitute the basis for UV radiation protective clothing are included in the classification group of nano-materials based on high technology. Many fabrics presently require enhancements which offer protection against harmful solar radiation. This regards mainly protective clothing, including, *inter alia*, sweatshirts, protectors for wrists and shoulders, headgear for people working in open grounds where they are exposed to solar radiation, different types of covers and curtains, inner roller blinds, and materials protecting books in libraries or collections in museums and cultural centers against harmful UV radiation, etc.

On the basis of the literature on the subject one can note an increased interest in analysis of the dangers caused to humans by ultraviolet radiation, not only in open surface areas particularly exposed to UV radiation, but also in the working environment. Ultraviolet radiation also generates dangers for library, archive and museum collections, which require more and more effective protections (see: Owczarek G., Lewartowska J., 2010, Hemka L., et. al, 2010, Bartkowiak G., et. al, 2010).

2. Results of analysis of the European market based on the Eurostat-database

The analysis carried out with respect to the market shows that the Western European countries have a very high share in the European market of both female and male shirts, sweatshirts and other clothing accessories and headgear containing protective functions, including against UV radiation, as well as textile protective gloves, curtains and inner roller blinds, marquees and anti-solar curtains, anti-solar umbrellas, covers for museum and library collections, etc.

⁴ Protective Textiles Market, http://ec.europa.eu/enterprise/policies/innovation/policy/lead-market-initiative/protective-textiles/index_en.htm

More and more significant competition is emerging however from suppliers from outside the EU, mainly including those from China and other South Asian countries. This market is among the most highly developmental segments of both the Single European Market and the global market.

The new member states of the EU, including Poland, are still relatively weakly represented on the European market in this intensely developmental and prospective production. Admittedly, as can be seen from the compilations in the tables, Poland is among the largest producers, exporters and importers of these products in the new EU member states, but its position in comparison to the Western European participants in the European market is still minor.

This leads to the conclusion that emphasis should be put on increasing Poland's developmental potential in the investigated field by, *inter alia*, supporting the scientific-research institutes elaborating new achievements in the field of protective clothing, protecting both the human organism and valuable artworks and other material objects against harmful UV radiation.

The market volume of curtains and inner roller blinds – structure of their production, imports and exports, and market volume in 2007-2010

As a result of our analysis, the most significant position among the inter EU producers, in the case of suppliers, was determined to be held by Germany (over 5% of supplies), Poland (respectively – around 2.5%-3%), Holland (about 2%), the Czech Republic and Hungary (respectively about 1.5-1.7% and 1.6%).

The suppliers from France, Denmark and Belgium held a position at the level of about a 1.4% share in 2010.

Altogether, the main EU suppliers had about a 20-22% share in the European market volume with respect to curtains and inner roller blinds, while the share of the main suppliers from outside the EU in the investigated period was at the level of 28-31%, with China definitely holding the highest position (about 18% in 2010), followed by Turkey, India and Pakistan (about 2-4%). The detailed results of the research related to the market volume of curtains and inner roller blinds are presented in the Annex, Table 1.

Marquees and anti-solar curtains – structure of their production, imports and exports, and market volume in 2007-2010

The shares of the EU producers in the Single European Market reached a level of about 80%, while the supplies of the producers from outside the EU achieved the level of about 20-21%, again with the dominant position among outside suppliers held by China, having about 6% share in the market volume of marquees and anti-solar curtains in the investigated years. Among the producers from the EU, France had the highest position (over 38% in 2010), followed by

Germany (almost 19%), Italy (11%), Spain (over 8%), Portugal and Belgium (over 4.5%) and Austria (about 3%).

The position of Poland in the market volume of these investigated products was marginal in the years 2009 and 2010, having declined significantly after the period of 2007-2008, when it reached the level of 2.5%. The Czech Republic's share in the market volume was at the level of about 1.4%, also exhibiting a decreasing trend in comparison to the year 2008. The detailed results of the research related to the market volume of marquees and anti-solar curtains are presented in the Annex, Table 2.

Male clothing accessories – structure of their production, imports and exports, and market volume in 2007-2010

In case of the market volume of male clothing accessories, in 2010 the dominance of suppliers from outside the EU could be noticed. Their share in the market was at the level of 51,3%, while the suppliers from the EU accounted for 48.7%. Among the outside suppliers once again the definite leader position was attained by China (about 33% in 2010). The shares of suppliers from Vietnam were at the level of about 2.4-2.8%, while the suppliers from Turkey, Pakistan and Tunisia did not even reach a 2% share in the EU market volume.

Among the EU leaders in the EU's market share volume in the investigated period were Spain (20-28% share), Great Britain (21-27% share), Portugal (12-16% share, with a decreasing trend), Romania (8-12%), Germany (7-11% share), and Austria (over 3% share). The position of the Czech Republic in 2010 was at the level of 2.3%, and the position of Poland at the level of about 1.1%, which was a decrease in comparison to the year 2009, in which Poland held an almost 2% share in the overall EU market volume.

Female clothing accessories – structure of their production, imports and exports, and market volume in 2007-2010

In case of market volume of female clothing accessories, the dominance of suppliers from outside the EU was also noticed in 2010, at the level of 56.1% in comparison to the suppliers from the EU, whose position was equal to 43.9%. Among the outside suppliers the definite leader position was once again achieved by China (about 30% in 2010). The subsequent positions with respect to outside suppliers of female clothing accessories to the European market were taken up by India (about 8%), Morocco (about 3%), and Turkey, Vietnam and Tunisia.

Among the EU suppliers, the definite leader in the market was France, whose share was at the level of over 41%, albeit with decreasing trend in comparison to the year 2007, when its share was at the level of almost 49%. Italy was in second place (about 25% share), also a decline from its highest level

achieved in 2008 (at the level of 30%). A relatively high position was also taken up by exporters from Germany (about 6-7%), followed by Belgium and Great Britain (about 2% each) and Poland (about 1.4-1.5%, which was triple its share in exports of female clothing accessories in 2007)⁵.

3. Initial research into supply and demand on the Polish market

During our research a questionnaire was prepared and sent to 8 companies from the investigated field (protective textiles and clothing). We received 7 responses which contained the required information. The initial attempt to assess the demand for such products was also carried out by phone interviews with companies and institutions which were assumed to be interested in such products. This involved an initial needs' investigation for an ENVIROTEX project, which is coordinated by the Textile Research Institute and deals with, among other issues, that of textiles protecting against UV radiation.

The research performed among the companies from the Łódź region showed that they are highly interested in the production of products protecting against UV radiation. Three of the investigated companies already produce such items, while three others desire to do so in the future. Only one of the companies was not interested in this market. As for the type of the products which are already produced, or which are about to be implemented for market production by the investigated companies, we discovered that they mainly deal with materials and clothing products for individual consumers (three companies) and with materials and clothing products for companies and industry (also three companies). Materials and products for equipping interiors and for construction are produced by only one company, as well as materials and products for protecting museum and library collections. It is worth noting that two of the investigated companies have already established connections outside Poland and are already exporting their products which offer protection against UV radiation. Three of the investigated companies declared that they are desirous of exporting such products in the future.

The companies were also asked about the market demand for textile products offering protection against UV radiation. The respondents estimated that in Poland the demand for those products is either steady or slightly increasing at the present time, but in the future they expect it to grow

⁵ All of the calculations of the market volume of the investigated products in the investigated period were calculated on the basis of the equation: P(roduction) + I(mports) – E(xports), based on data from the *Eurostat* database.

significantly, while abroad this demand is already growing moderately or significantly (depending on the country).

As for the demand side of the market, our research revealed an interest on the part of many companies and institutions for textile products offering protection against UV radiation. We should mention, among others, companies dealing with transportation, construction and agriculture. These companies were interested in protective clothes for their workers, who spend a lot of time in the open air and are susceptible to UV radiation. However, they indicated that they would have to evaluate whether the price of those products might not be too high for them. In addition, we also noticed a marked interest from many public institutions, such as national museums, university and national libraries and archives, in textile products (for example curtains or roller blinds) that would protect their collections and artifacts from UV radiation. These institutions declared that if the positive effects of protective textiles would be high, then they would be willing to pay more for such products than for products that do not offer protection against UV radiation (the names of both the companies and institutions must remain confidential due to the fact that they only agreed to take part in the research under such conditions).

4. Conclusions

The performed market analysis revealed very high shares of the Western European countries in the European market of both female and male T-shirts, sweatshirts, and other clothing accessories and headgear fulfilling protective functions, including protecting against UV radiation, as well as textile protective gloves, curtains and inner roller blinds, marquees and anti-solar curtains, anti-solar umbrellas, covers for library and museum valuables, etc.

Ever more significant competition of suppliers from outside the EU is also observable, especially from China and other South-East Asian countries. This market sector belongs currently to the highly developmental segments of both the Single European Market and the global market.

The new member states of the EU, including Poland, remain relatively weakly represented on the European market in this highly developmental field of production. While our analyses showed that Poland is one of the biggest producers, exporters and importers of these products among the new member states of the EU, its position is still not significant in comparison to that of the key players of the European market in this field (i.e. those from Western Europe).

Therefore, it may be concluded that emphasis should be given to increasing the developmental potential in the investigated field and providing support for the scientific-research institutes offering new achievements in the field of protective clothing, protecting both the human organism as well as library and museum valuables and artifacts against harmful UV radiation.

Substitution of the traditional fabrics used in the production of all the analyzed market segments with fabrics which offer protection against the harmful effects of UV radiation can contribute not only to overall significant positive health gains for individual consumers of those products (among others, workers using protective clothing, tourists, etc.), but also to the protection of valuables and artifacts in museums, libraries and archives. The initial analysis of the Polish market which we carried out shows that the demand side may already be significant. Our initial analysis of the supply side of the Polish market, on the other hand, revealed that the companies that were investigated by us continue to be mostly interested in producing different types of clothing products.

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of 5 April 2006 on the minimum health and safety requirements regarding the exposure of workers to risks arising from physical agents (artificial optical radiation) (19th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC), published in: Official Journal of the European Union, 27.4.2006

Annex I: Results of market volume analyses of selected products protecting against UV radiation

Table 1. Market volume of curtains and inner roller blinds in the EU (2007-2010)

Year	Market volume/ mln Euros				Market Shares (%)			
	2007	2008	2009	2010	2007	2008	2009	2010
EU/27/ total	2529,5	2426,6	2248,5	2251,0	100,00	100,00	100,00	100,00
I. Internal producers and suppliers from the EU	1289,9	1276,6	1161,3	1065,3	50,99	52,61	51,65	47,33
A. Main internal producers and suppliers from the EU	501,9	480,7	451,1	500,2	19,84	19,81	20,06	22,22
1. Germany	115,2	117,0	130,4	125,9	4,56	4,82	5,80	5,59
2. Poland	57,5	57,2	53,4	66,9	2,27	2,36	2,38	2,97
3. Netherlands	44,1	47,3	43,7	46,0	1,74	1,95	1,94	2,04
4. Czech Republic	33,2	35,3	32,3	38,7	1,31	1,46	1,44	1,72
5. Hungary	8,9	7,9	17,4	35,9	0,35	0,32	0,77	1,60
6. France	30,0	29,3	27,2	32,2	1,18	1,21	1,21	1,43
7. Denmark	35,2	31,3	28,1	32,0	1,39	1,29	1,25	1,42
8. Belgium	41,0	37,8	24,0	31,5	1,62	1,56	1,07	1,40
9. Spain	23,4	23,5	20,6	18,1	0,93	0,97	0,91	0,81

10. United Kingdom	22,2	17,4	13,6	14,4	0,88	0,72	0,60	0,64
11. Sweden	20,2	18,4	14,6	14,0	0,80	0,76	0,65	0,62
12. Italy	15,4	13,4	9,8	10,2	0,61	0,55	0,44	0,45
II. External producers and exporters from the third countries	1239,6	1150,0	1087,2	1185,7	49,01	47,39	48,35	52,67
B. Main external exporters to the EU	737,7	669,3	636,1	696,2	29,16	27,58	28,29	30,93
1. China	347,7	335,1	334,5	400,5	13,75	13,81	14,88	17,79
2. Turkey	123,5	117,0	89,7	88,3	4,88	4,82	3,99	3,92
2. India	99,0	80,2	79,5	85,0	3,92	3,30	3,53	3,77
3. Pakistan	72,0	56,1	51,4	44,2	2,85	2,31	2,28	1,96
4. Tunisia	29,1	14,8	15,3	14,7	1,15	0,61	0,68	0,65
5. Taiwan	9,8	11,4	11,9	13,7	0,39	0,47	0,53	0,61
6. Bangladesh	13,7	14,4	10,7	10,6	0,54	0,59	0,47	0,47

Source: Own calculations based on: Eurostat data base. epp.eurostat.ec.europa.eu - Industry, Trade and Services and External Trade.

Table 2. Market volume of marquees and anti-solar curtains in the EU (2007-2010)

Year	Market volume/ mln Euros				Market Shares (%)			
	2007	2008	2009	2010	2007	2008	2009	2010
EU/27/total	1154,6	1168,1	1091,3	1013,6	100,00	100,00	100,00	100,00
I. Internal producers and suppliers from the EU	908,4	915,8	889,3	811,1	78,67	78,41	81,48	80,03
A. Main internal producers and	169,4	169,1	132,6	130,8	14,67	14,47	12,15	12,91
1. Germany	51,1	53,8	43,7	46,4	4,43	4,61	4,00	4,58
2. Belgium	18,5	18,6	16,3	17,2	1,61	1,59	1,49	1,70
3. Italy	19,7	16,1	12,8	14,4	1,71	1,38	1,17	1,42
4. Austria	7,8	7,1	8,5	9,5	0,67	0,61	0,78	0,93
5. Netherlands	13,1	11,0	7,0	7,3	1,13	0,94	0,64	0,72
6. Poland	15,8	16,1	6,4	7,3	1,36	1,38	0,58	0,72
7. Denmark	2,3	7,1	6,5	6,7	0,20	0,61	0,60	0,67
8. France	16,8	13,9	9,2	5,5	1,46	1,19	0,85	0,54
9. United Kingdom	4,6	5,0	9,7	3,4	0,40	0,43	0,89	0,33
10. Spain	5,2	5,5	2,3	3,3	0,45	0,47	0,21	0,32
11. Portugal	1,1	1,0	2,7	3,1	0,10	0,09	0,25	0,31
II. External producers and	246,3	252,2	202,1	202,5	21,33	21,59	18,52	19,97

B. Main external suppliers to the EU	76,9	83,2	69,5	71,6	6,66	7,12	6,37	7,07
1. China	65,1	72,3	60,6	64,5	5,64	6,19	5,55	6,36
2. Vietnam	1,2	1,2	1,9	2,8	0,10	0,10	0,18	0,28
3. Switzerland	1,5	1,5	1,2	1,4	0,13	0,12	0,11	0,14
4. USA	1,1	1,5	0,9	1,3	0,09	0,13	0,09	0,13

Source: Own calculations based on: Eurostat data base. epp.eurostat.ec.europa.eu - Industry, Trade and Services and External Trade.

Streszczenie

ANALIZA RYNKU PRODUKTÓW TEKSTYLNYCH CHRONIĄCYCH PRZED PROMIENIOWANIEM UV STOSOWANYCH DO WYPOSAŻANIA WNETRZ I DO BUDOWNICTWA ORAZ NA ODZIEŻ OCHRONNĄ

Celem artykułu jest zaprezentowanie wyników analizy rynku europejskiego w obszarze tekstyliów ochronnych opartej na bazie danych EUROSTAT. Zaprezentowane i przeanalizowane są wolumeny rynkowe zasłon i rolet wewnętrznych, markiz i zasłon przeciwśłonecznych oraz damskich i męskich dodatków odzieżowych. Przedstawione i omówione jest także wstępne badanie popytu i podaży na polskim rynku produktów tekstylnych chroniących przed promieniowaniem UV.