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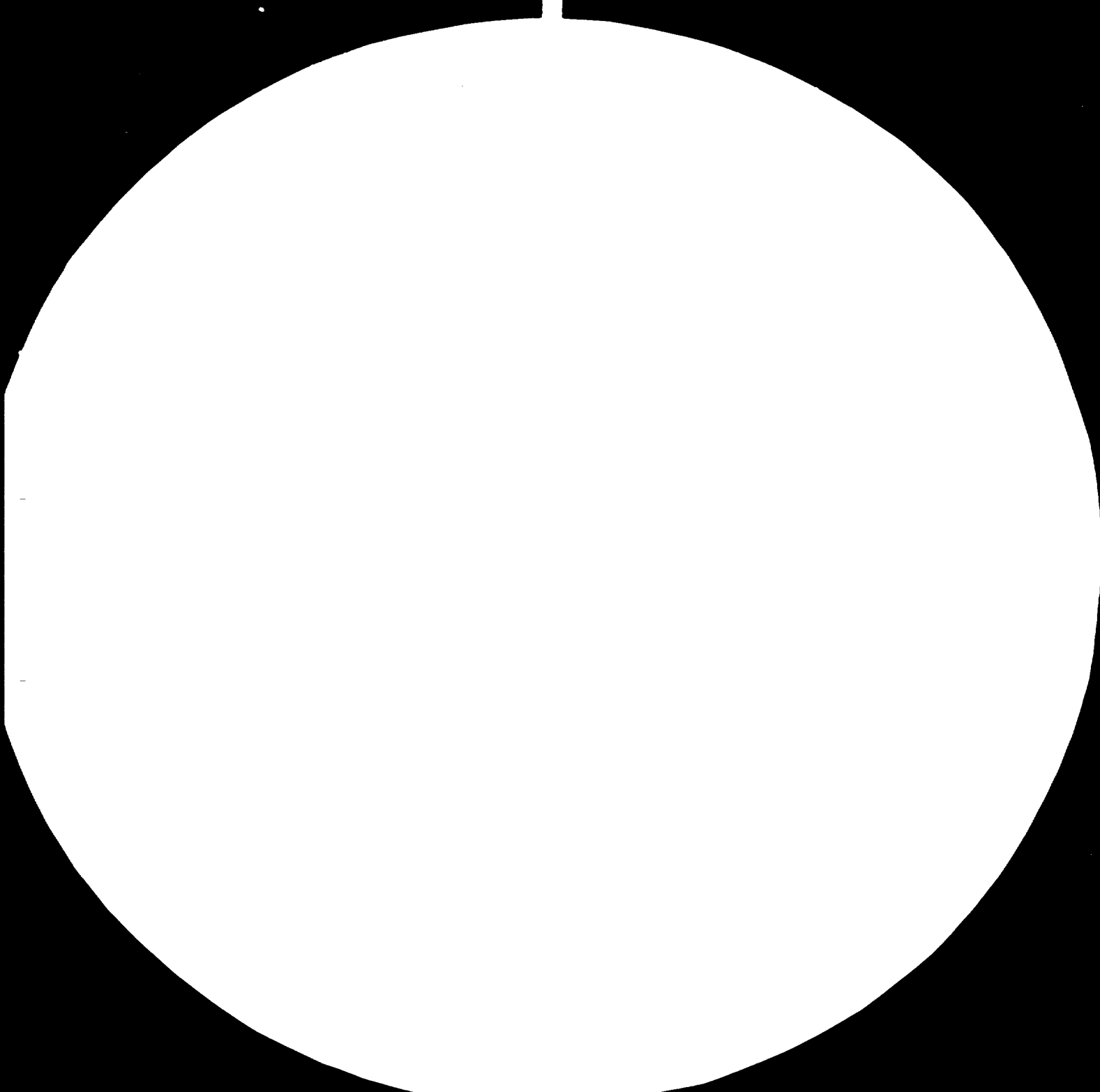

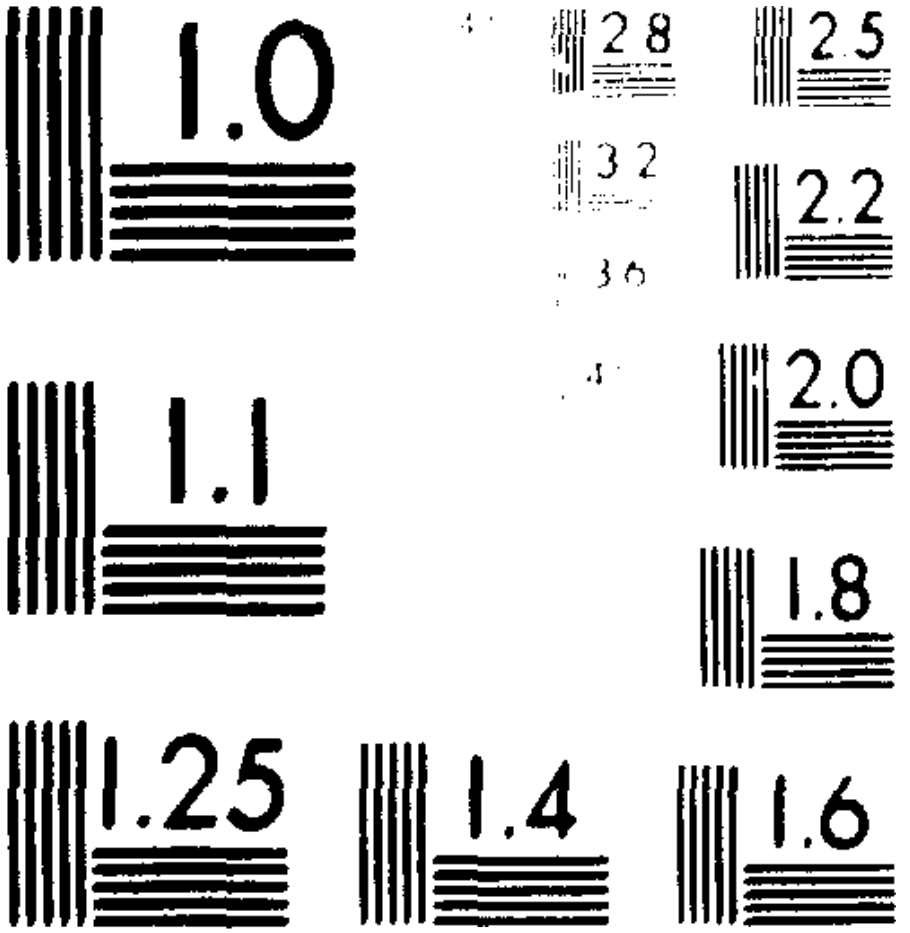

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EXTENSION OF THE POLISH PACKAGING CENTRE

DP/POL/77/001

POLAND

Technical report: Paper and Board Consumer and Transport Packages *

Prepared for the Government of Poland
by the United Nations Industrial Development Organization
executing agency for the United Nations Development Programme

Based on the work of Longin Placzek, expert in paper and board Consumer and Transport Packages

United Nations Industrial Development Organization
Vienna

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INTRODUCTION

Background Information

Paper and fibreboard packages are in Poland of great importance for the national economy. Research problems connected with production technology of laminates based on paper and treated board especially for the food industry.

The Government has given priority to the improvement of packaging materials and packages to meet the growing demand to supply the market.

The Packaging Department of the Institute is involved in a wide range fo testing and development.

Conduct of the Mission

Basis and duty station was the Pulp and Paper Research Institute in Lódź.

Main duties:

- advise in mamufacturing, testing and application of packaging materials made of treated board mainly for consumer and transport packages, especially for food-stuffs,
- advise in anti corrosion treatment of board,
- treatment and testing of different packaging materials as fixed in a list of UN-UNDP Programme Bureau in Warsaw (See Annex 1 and 2)

Visits were made to Kielce - Zaklady Wyrobów Papierowych, Chojnów - DOLPAKART, Gnaszyńskie Zaklady Wyrobów Papierowych, Pakpol in Bialystok (Annex 5).

SUMMARY

Polish paper and board packaging and converting industry is about to enter a higher level. There is an excellent knowledge of materials, machines and technology applicable in this field. Nevertheless some advice is needed in new tests methods of international standards. As to

converting paper and board there is a demand of assistance in finding out the right technology to be used in the near future also with regard to material, energy and pollution problems. Training of Polish specialists will be helptful.

FINDINGS

- Manufacturing, testing and application of packaging materials made of treated board.

The discussions took place in the Institute in Lódź and were broadened by visits to various mills.

In Poland they produce rigid fibre board, several pigment coated boards, and they are about to start with PE and PP coated food board. Problems arise from properties of raw materials used and from the technical state of the converting machines. It seems, therefore, not always practicable to ameliorate testing methods with highly sophisticated equipment as long as quality conditions in the production will not be improved.

With rigid fibre board they have problems in production, conversion and testing. The conversion problem is worst. (Annex 2, 11-13)

Raw materials for corrugated board are too weak, so the end product mostly fails in stability. A reinforcement by hotmelt coated nylen fibre shall help.

Pigment coatings of board give trouble due to the lift off of the coating layer. New formulations are wanted (Annex 4).

PE coasted board for milk packaging can be produced, yet it is doubtful whether it can be made economically. A similar situation can be stated with PP coated board for trays (Annex 2/2).

- Anticorrosion treatment

Problems arising only from the container transport and only with locally made papers (liners). Changes in properties of locally made papers were rejected. (Annex 2/10)

- Different packaging materials

The production of paper sacks is very important. Therefore, more care should be taken for a better and homogenous quality of raw paper (Annex 2/15).

Hotmelt coatings of paper and board can be used especially for making blister packages suitable for sterilization by radiation and with the easy open effect. Hotmelts can also be used as a barrier coating for food packages with a short shelf life (Annex 2/6,8).

Aluminium foil is not always the cheapest packaging material. The use of aluminium for long shelf life packaging was discussed. As seen from other countries the price of foils rises faster than other materials on account of the high share of energy costs in the production of foils (Annex 2/3).

Therefore, pigmenting of plastics with aluminium powder (Annex 4) will be studied, also the techniques of vacuum coating with aluminium (Annex 3).

Generally speaking raw papers for converting are of no good quality. This was proved on the extruder in Kielce, in the siliconizing plant and in the pigment coating plant in Chojnow.

- Cushioning of transport packages

It seems that no local products are available for this purpose. The application of polyurethane foam seems reasonable.

- Different products

There is a certain demand of more information for up to date converting methods, for instance with cover papers, cheap copy papers, special pigment coated papers like dull finish, cast coating, chromo paper for disc labels etc. (Annex 4).

RECOMMENDATIONS

There will be a demand of facilities for paper and board coating in the near future. Such equipments should apply basic plastic materials used for packaging, i. e. polyethylene and PVDC. For this purpose the combination of an extruder with a coating unit is recommended. The extruder and the coating unit should be able to work in line and separately. The coating unit should have two heads for coating with PVDC emulsions and drying tunnels.

Costs of machines are estimated at 3 million US$; manufacturers of machines are: Bachofen und Meier, Bülach, Switzerland, Polytype - Fribourg, Switzerland; Pagendarm-Hamburg, Federal Republic of Germany.

For special packaging materials like peel coat covers of blister packs respectively coated papers or glassine for packing snacks, cereals, gelatine, etc. hot melt coatings are of interest.

Though hotmelt is more expensive than polyethylene and PVDC, coating with hotmelt has the advantage of needing far less energy than with emulsions. Therefore, one coating machine for hotmelts and waxes with facilities for prelacquering and for lamination is recommended. Costs of the machine is estimated about 1 million US$ (when using a continuous mixing and melting unit).

Manufacturer of suitable machines are:
Könert/Hamburg/Federal Republic of Germany,
Pagendarm/Hamburg/Federal Republic of Germany,
Polytype/Fribourg/Switzerland,
Holweg/Strasbourg/France.

Metallizing can be used in order to save materials and costs in the production of wrappings with low light transmission. The technology of metallizing films and papers works with one unit for aluminium evaporation under vacuum and with one unit for lacquering respecitvely laminating.

Each unit can be used separately. Instead of laminating aluminium foils to paper and films in most cases metallizing can and will be used.

Metallizing can be made directly on the substrate or indirectly by transferring the metall layer /laminating it/ from a polyester film to the substrate. It is recommended to study both possibilities and select the right one (Annex 3). If metallizing will be applied mostly on plastic films the direct method is more economical. If metallizing will be mostly applied to paper the transfer of technology gives better results and can be calculated more economical.

It is, therefore, recommended to install (after decision of technology) one production unit.

Costs are estimated at 2 - 3 million US$ according to the different technologies.

Manufacturer of machines are for instance:
Leybold - Heraeus /Hanau - Federal Republic of Germany,
Metaplast - Lauenburg - Federal Republic of Germany.

The development of fasson coating and lacquering will be useful, therefore a pilot plant is recommended for developing and introducing new techniques for the production in small scale as well. Considering the tendency of combining printing and coating respectively laminating units it should be an equipment with facilities for the three operations.

Costs of one machine will roughly be about 1 million US$.

Manufacturers of machines are:
Windmöller und Hörscher - Lengerich - FRG.
Holweg - Strasbourg - France,
Polytype - Fribourg - Switzerland.

Recommendations for training can be summarized in few words: New technologies like metallizing, applying of solvent free adhesives or high solids application need a special training. The training can be successful when the producers of raw materials and machine operators take part. Therefore, it is advisable to train personnel producing the paper or film used in converting together with the converters themselves.

Recommendations for the raw papers used in the packaging industry.

As to the raw papers and boards in the converting industry there is an urgent need of amelioation in quality.

This concerns raw papers for art printing, siliconizing, corrugated board and fibre board. Better properties will help to save /imported/ coating materials and lead to a higher performance of end products.

ACCOUNT OF MAIN TOPICS OBSERVED

1. Lamination of different packaging materials was discussed in Lodz, Kielce, Warsaw and Bialystok. Most interest was shown in using aluminium foil with paper, with board or plastic films. There is a tendency to use hotmelts for lamination. Regarding the cost situation and possible development in the next future there is a lack of new informations. The trend of substitution of aluminium foils has not been recognized. As for adhesives they consider the use of hotmelts and other expensive materials neglecting economical materials like plastic emulsions, starch, and waterglass.

2. The use of (carton)boards coated with polyethylene for milk is wanted based on the fact that glass bottles need too much water for cleaning and water is rare. From this point of view the extension of coating by extrusion can be understood as a compromise, though milk in cartons will be more expensive than in glass bottles.
   The coating of board with polypropylene for reay made meals is another wish. The urgent need is proved by the number of meals distributed in canteens but not in calculation of costs.

3. Manufacture of packaging materials like board laminated with aluminium foil for fruit and vegetable juices is wanted and seems reasonable in the conception. This might also be valid for aseptic milk packages.

4. In Kielce it was told that the reuse of polyethylene - that is the regramulation of trimmed edges - is not allowed in Poland. This fact could not be proved in the discussions in the packaging institute of Warsaw and in the packaging factory of Laskarzew. Therefore, regramulation of polyethylene scraps should be started in order to save about 8% of coating material. Differences in the properities of coated paper and board are due to the properties of substrates.

5. The hygienc -sanitary conditions in production give no reasons for complaintes.

6. Coating paper and board with hotmelt seems more reasonable in good quality in Poland. It will be necessary to import hotmelts for a couple of years.

7. Out of the synthetic plastics in water dispersions PVDC is the most important also for Poland. The barrier properties of coated papers can give protection nearly to all sensitive goods. Nevertheless, the supporting paper must be of good quality. If it is not the case a so called precoating can be used. In Poland it will be useful to precoat local made paper and board with polyethylene and apply a top coating with PVDC-dispersions.

8. The question of sealing problems in packaging systems was thoroughly discussed on the basis of hotmelt. Special application will be the production of covers for blister packages with easy-to-open effect. This development seems reasonable and needed also when using lacquers instead of hotmelts for the so called "peel coating".

9. The use of multilayers should be regarded more critical in the calculation of costs than too highly technical performance as it is done in Poland now. For ready made meals used in households the film complexes polyethylene and polyamide respectively, or polyester will cover the preliminary demand, and they will be used for many other applications. The most important multilayer made of paper will be Paper/PE/PVDC, Paper/PVDC and Paper/PE. With the three complexes mentioned most of the food can be well protected. In several cases Paper/Wax and Paper/Hotmelt can be used as well. Complexes made of aluminium foil are important for a long shelf life.

10. Corrosion of metal products in corrugated board boxes takes place only with locally made board. It was said that changes in properties of locally made board are not possible.

11. There is a certain demand of carton boxes of deep frozen poultry. They use fibre board of 1400 g/m2 basis weight. The fibre board is made of several layers glued with waterglass. Under humid condiations adhesion is poor and delamination takes place. The application of water resistant starch adhesives was refused in consideration of higher costs.

12. The discussion upon testing of creasibility showed that the problem arises from outworn converting machines. Nevertheless, new methods of testing could be introduced.

13. Stiffness and creasibility are the most important properties for board to be converted to carton (boxes).
Amelioration of the local products cannot be expected. Therefore, any advice was in vain.

14. Strength properties of paper inclusive kraft paper seem to be unsteady. In this way efforts for testing are enlarged but rather unnecessary as there is no effect on quality improvement of the paper and board.

15. The organization of testing kraft paper and paper sacks was elaborated but it is doubtful whether recommendations made for amelioration of the kraft paper itself will be realized.

16. Properties of paper materials with regard to packing methods were studied and compared with locally made papers. Recommendations regarding smoothness and surface properties has been acknowledged.

17. Influence of gamma radiation on packaging material in the dosis used for sterilisation is not expected to be detrimental.

ANNEX 1

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Project in Poland

Job Description

DP/POL/77/001/11-06/31.7.E

POST TITLE	Expert in paper and board consumer and transport packages
DURATION	1 month
DATE REQUIRED	March 1980
DUTY STATION	Lódź
PURPOSE OF PROJECT	To advise in manufacturing and testing problems of packages of treated board
DUTIES	The expert will be attached to the Ministry for Materials Economy and will closely co-operate with the Pulp and Paper Research Institute in Lódź. Under the overall supervision of the Senior Expert, he will be expected to: - advise in manufacturing, testing and application of packaging materials made of treated board mainly for consumer and transport packages, especially for food-stuffs; - advise in anti-corrosion treatment of board.
QUALIFICATIONS	High grade technologist with wide and fundamental knowledges and experiences in the field of fibre board manufacturing, testing and converting of treated board packages.
LANGUAGE	German/English

ANNEX 2

Questions sent to the expert additionally to the job description prepared by the Pulp and Paper Research Institute.

1. Lamination of different packaging materials /papers, aluminium foil, plastics films/ using adhesives, polyethylene, hot melts etc. – profitability and possibility of laminates application.
2. Coating papers and carton board with polyethylene, polypropylene and other plastics by extrusion and co-extrusion.
3. Manufacture of packaging materials and carton board packages for milk and fruit-vegetable juices.
4. Criteria for assessment of treated paper board materials for packaging purpose and methods of testing their functional protective and strength properties.
5. Criteria for assessment of suitability of packaging materials for foodstuffs and methods of testing the hygenic-sanitary properties of these packages.
6. Coating paper board and carton board with hot-melts. Prevention against hot-melts migration into the paper board base. Trends in the application of new polymers and resins for preparation of hot-melts and their suitability for coating paper board with barrier properties.
7. Coating paper boards with synthetic dispersions and their application in packing processes.
8. Problems of sealing, gluing with dispersive and hot-melts adhesives.
9. Manufacture of multilayers and their application.
10. Anticorrosive packaging materials and their application for the manufacture of consumer and transport packages for metal products.
11. Manufacture of packages made of solid fibreboard 1,5-2,5mm.
12. Testing of creasability and machinery for creasing.
13. Testing methods of consumer and transport packages /paper sacks included/.
14. Conversion process of packaging materials relating to strength properties of ready made packages.
15. Organization of testing laboratory /testing packaging materials and packages/.
16. Criteria of assessment and selection principles of paper pouches with regard to packing method and their content.
17. Influence of gamma radiation on packaging materials.

ANNEX 3

Comparison of Costs

for Metallizing Paper and Board

directly or by transfer

This calculation shall give assistance when selecting the right technology. The costs of machines for production mentioned herein are not the end costs of a whole equipment.

Vergleich: Direkte Metallisierung / Übertragungsverfahren

Übertragungsverfahren I.

I.1 (Seite 3)	Kosten des Grundlackes für Folie	DM 0,037 /qm
I.2 (Seite 4)	Kosten der Metallisierung	DM 0,012 /qm
I.3 (Seite 5)	Kosten der Metallübertragung	DM 0,030 /qm
I.4 (Seite 6)	Kosten für das Nachwickeln der Folie und Amortisation der Umspulmaschine (die Folie ist schutzlackiert)	DM 0,0165/qm
		DM 0,0955/qm

Direkte Metallisierung II.

II.1 (Seite 7)	Kosten an der Lackier-maschine	DM 0,066 /qm
II.2 (Seite 8)	Kosten für Metallisierung	DM 0,053 /qm
		DM 0,119 /qm

zu diesem Preis muß bei Bedarf ein Mehrpreis für Schutzlack berücksichtigt werden.

Monatliche Kapazität:

Direkte Metallisierung per Monat: 1.650.000 qm 70gr/qm 110
Übertragungsverfahren per Monat: 1.980.000 qm 70gr/qm 140

Investitionskosten:

Direkte Metallisierung: DM 2.710.000,--
Übertragungsverfahren: DM 1.820.000,--

In diesen Preisen sind für beide Verfahren die Kosten für KNOW HOW oder Patentlizenzen nicht berücksichtigt.

I.1 Übertragungsverfahren

Kalkulation des Releaselackes auf Folie

Preis der Lackiermaschine		DM 440.000,--
Abschreibung über 10 Jahre	DM 44.000,--	
Zinsen 7%	DM 16.940,--	
p. a.	DM 60.940,--	
p. Monat DM 5.078,33		
zu 2 Schichten p. Monat 330 Std.	DM 15,38	
1 Person p/Std.	DM 15,--	
Elektrizitätsverbrauch		
35 KW à DM 0,15 /KW	DM 5,25	
Heizöl 12 Ltr = 90.000 Kcal		
Preis per Liter = DM 0,55	DM 6,60	
Kühlwasser	DM 0,80	
	DM 43,03	
Geschwindigkeit = 100 /Min.		
Wechsel f.Rollen 5 Min.		
Länge der Rollen 6.000 m		
Leistung bei 120 cm Breite = 6.000 qm/Std.		
Bearbeitungskosten per qm	DM 0,007 /qm	
Kosten für Lack 1kg = DM 2,03		
15 g naß = 66 qm per kg	DM 0,03	
I.1 Kosten des Releaslackes	DM 0,037 /qm	

I 2. Übertragungsverfahren

Kalkulation für die Metallisierung

Preis der Metallisierungs-Anlage		DM 700.000,--
Abschreibung über 10 Jahre		DM 70,000,--
Zinsen 7%		DM 26.950.--
p. a.		DM 96.950,--
per Monat	DM 8.079,--	
per Std. 2 Personen à DM 15,--		DM 30,--
Investition		DM 24,48
Kühlwasser		DM 0,80
Elektrizitätsverbrauch 100KW per KW DM 0,15		DM 15.--
per Stunde		DM 70,28

Theoretische Leistung der Maschine = 8.816 qm/Std.
(7200 qm per Walze)

Rollenwechsel	5 Min.
Pumpzeit	10 Min.
Geschwindigkeit 180/m/Min=6000m	34 Min.
Gesamt	49 Min.

Maschine	DM 0.007
Verdampfer + Alu	DM 0,005
Kosten der Metallisierung per qm.	DM 0,012

I 3. Übertragungsverfahren

Kalkulation der Metallübertragung

Übertragungsanlage		DM 850.000,--
Abschreibung über 10 Jahre	DM 85.000,--	
Zinsen 7 %	DM 32.725,--	
	DM 117.725,--	
per Monat	DM 9.810,41	
2 Schichten, per Monat 330 Std.		
per Stunde		DM 29,73
Energiekosten:		
Elektrizitätsverbrauch		
35 KW à DM -,15 KW		DM 5,25
Heizöl (60.000 kcal)		
Wirkungsgrad 85 % = 90.000 Kcal.		
12 Ltr., per Liter DM -,55		DM 6,60
2 Personen à DM 15,--		DM 30,--
		DM 71,58

Papierrolle 12.000 m = 14.400 qm
(z.B. 1 m Ø = bei 60 g - Papier)
Geschwindigkeit 100 m/Min.
Papier-Rollenwechsel 10 Min.
Folienrollenwechsel ca. 6000 laufende Meter Folie
= 2 x 5 Mind = 10 Min.

Gesamtzeit zum Wechsel	20 Min.
Laufzeit	120 Min.
Gesamt	140 Min.

Gesamte Kapazität per Stunde = 6.000 qm
DM 71,58 : 6.000 qm = DM 0,012 / qm
1 kg Kleber = DM 5,--/kg
Auftrag 5 g naß DM 0,018 / qm
I 3. Preis für Übertragung DM 0,030 / qm

I. 4 Übertragungsverfahren

Kalkulation

Umwickeln/Kontrolle der Übertragungsfolie u. Amortisation d. Folie

Maschine		DM 50.000,--
Abschreibung über 10 Jahre	DM 5.000,--	
Zinsen 7%	DM 1.925,--	
	DM 6.925,--	
per Monat	DM 577,--	

1 Person	DM 15,--
Investition	DM 0,02
Elektrizitäts-verbrauch 5 KW	DM 0,75
	DM 15,77

Amortisation der Übertragungsfolie:

Polyester Folie 19 my - Preis per kg DM 9,90
(1 kg = 38 qm) Folie
Laufzeit: 15 Arbeitsgänge

Preis p. qm	DM 0,014
Umwicklung 6.000 m/Std.	DM 0,0025 / qm
Amortisation der Folie	DM 0,014 / qm
p. a.	DM 0,0165 / qm

II. 1 Direkte Metallisierung

Kalkulation der Grundlackierung

Anlage zur Grundlackierung mit 2 Auftragungswerken

Preis der Anlage	DM	1.300.000,--
Abschreibung über 10 Jahre	DM	207.750,--
7% Zinsen p.a. p. Monat	DM	17.312,50
2 Schichten 332 Std. p. Monat p. Std.	DM	52,15
Papierabmessungen 1,2 m Breite = 14.000 laufende Meter Laufzeit für 1 Rolle 93 Min. bei 150 m /Min. Breite der Walze 1200 mm - 9700 qm/Std.		
3 Personen à DM 15--	DM	45.--
Energiekosten Heizöl (1.000.000 kcal) 85% Wirkungsgrad = 200 Ltr./p. Std.		
per Liter DM -,55	DM	110.--,
Elektrische Energie d. Motore 70 KW DM 0,15 p.KW	DM	10,50,
Kühlwasser	DM	0,80
	DM	218,45,

Preis per qm

Kosten der Lackiermaschine	DM	0,023/qm
Kosten des Grundlackes 5,1 g naß 2 x Lack 43% voll, per kg = DM 3,--	DM	0,051/qm
Rückbefeuchtung (keine Energie)	DM	0,012/qm
II.1 Gesamtkosten für Grundlackierung	DM	0,086/qm

II.2 Direkte Metallisierung

Kalkulation für die Metallisierung

Maschine		DM 990.000,--
Abschreibung über 10 Jahre	DM 99.000,--	
7% Zinsen	DM 38.108,--	
Investitionskosten p.a.	DM 137.108,--	
p. Monat	DM 11.426,--	
2 Schichten 332 Std./Monat	DM 34,41	
2 Personen à DM 15,-- p. Std.	DM 30,--	
Elektrizitätsverbrauch 200 KW à DM -,15 p.KW	DM 30,--	
Stickstoff f. Pumpen p/Std. (Cryovac Pumpen)	DM 20,--	
	DM 114,41	

Abgenommene Produktionsziffern p. Std.

5.000 qm = DM 114,41 : 5.000 qm		DM 0,023/qm
Verdampfer + Alu		DM 0,01 /qm
Metallisierungskosten p. qm	=	DM 0,033/qm

ANNEX 4

DISCUSSED FORMULAS

Kunstdruck-Streichmasse

Ziel der Formulierung: Niedrigen Bindemittelverbrauch und bessere Satinierbarkeit. Der Strich benetzt und verankert auf der Kartonoberfläche gut, so dass ein Abheben der Schicht beim Offsetdruck nicht mehr auftreten kann, ein Fehler der in Chojnow auftritt.

300 l	Wasser, 50°	In den Kneter eintragen und ca.
50 kg	Casein, trocken	20 Min. laufen lassen.
700 kg	China Clay SPS, trocken	Wasser und SPS in den Kneter nach und
50 kg	Socal P II, trocken	nach eintragen und die anderen Zusätze
20 kg	Satinweiss, nass	einmischen. Etingal und Calgon werden
2,5 kg	Etingal S	vorher im Wasser verteilt.
420 l	Wasser	Zum Schluss noch mindestens 15 Min.
1 kg	Calgon	kneten.
3,5 l	Natronlauge (45%)	werden in 40 l Wasser verdünnt und ebenfalls zugegeben. Daraufhin nochmals 20 Min. laufen lassen.
200 l	1 DOW Latex 636	Viskosität 14 sec F_4-Becher
200 l	Wasser	pH 9,5 - 10

Chromo-Streichmasse

Ziel der Formulierung: Ein flach liegendes, verklebbares Chromopapier, das auch für Schallplatten-Etiketten verwendet werden kann.

144 kg	China Clay SPS, trocken	
140 kg	Blancfixe	Mit 160 l Wasser kneten
20 kg	Satinweiss	
220 l	Casein-Lösung 1:5 44 kg Casein, atro)	
30 l	Mobilcer RV	
20 l	Acronal 57o D	
0,8 l	Blancophor PSR flüssig	
0,5 l	Etingal S	Viskosität 16 sec F_4 - Becher
		pH 9 - 9,5

Einfärbungen werden mit 2 - 10% helioecht-Feinteigfarben vorgenommen.

Kunstdruckpapier matt (Dull Finish)

Ziel der Formulierung: Es wird ein Kunstdruckpapier mit einem dauerhaften Mattstrich gefordert.

250 l	Wasser 50°C	
46 kg	Casein, trocken	
150 kg	EWO-Pulver	
150 kg	Socal P	
77 kg	Sillitin N	
2,25 kg	Calgon P	
200 l	Wasser	
6,5 kg	Tri-Natriumphosphat	in 20 l Wasser lösen
8,0 kg	Soda	
9,0 kg	Ammoniak	
2,4 kg	Urecoll A	In 60 l Wasser bei 50° C lösen, abkühlen und langsam zugeben
		Viskosität 14 sec F_4 - Becher
		ph 9 - 9,5

Gestrichenes Bezugspapier für Kartonagen

Ziel der Formulierung: Es wird ein glänzendes, eingefärbtes verklebbares Bezugspapier verlangt.

Vorstrich:	75 kg Blancfixe-Teig (75%ig)
Auftrag 10 g/m2	125 kg China Clay SPS-Teig (66%ig)
	60 l Caseinlösung 1 : 4
	52,5 kg Acronal 500 D
	10 kg Helioechtorange GR Feinteig
	2 kg Helioechtrot FG Feinteig
	Nettolavol nach Bedarf
	25 kg Lutofan 200 D
Schlusstrich:	75 kg Lutofan 100 D
Auftrag 2-3 g/m2	5 kg Polywachs 6000 in Wasser gelöst

Gusstrich für Papier und Karton (Cast Coating)

Ziel der Formulierung: Es wird ein Vorstrich verlangt, der durch Wasser erweicht werden kann und anschlissend auf einem heissen Trockenzylinder trocknet und ohne kleben zu bleiben abspringt.

120	l	Wasser	
1,8	kg	Calgon PTH	
1,8	kg	Contraspum	
270	kg	China Clay SPS	
37,5	kg	Socal P	
15	kg	Casein, trocken	
5	l	Ammoniak 25%ig	
120	l	Wasser	
0,3	kg	Natriumhydroxid	
66	kg	Acronal 500 D	
3	l	Blancophor P G	
7,8	kg	Marseiller Seife	warm lösen
50	l	Wasser	
250	l	Wasser	
1,2	l	Etingal S	Auftrag ca. 25 g/m2

Durchschreibepapiere (Copy Papers - Autoscript)

Ziel der Formulierung: Es werden Beschichtungen für einfache Autoscriptpapiere verlangt.

Geberschicht:

80 l Isoporopanol/Wasser im Verhältnis 7:3
3 kg Flammruss 101
2 kg Rohagit S hv
30 kg Talkum

Auftrag: 7 - 10 g/m2

Nehmerschicht:

3 kg Acronal 500 L
0,8 kg Magnesiumsilikat
3 l Äthylacetat

Auftrag: ca. 2 g/m2

Folgende Formulierung ist als Durchschreibepapier (Autoscript) und als Registrierpapier (Recording Paper) einsetzbar.

Grundstrich:

Lösung aus 1 % Helioechtfarbstoff (rot, blau, schwarz)
1 % Baysynthol AL
5 % Amisol 05 590
93 % Wasser

Damit wird ein Grundstrich ausgeführt, wobei das Rohpapier 50 - 75 der Lösung aufnimmt.

Deckstrich:

1000 T PVC-Pulver E 7003
760 T Diotylphthalat
400 T Anatas A2 oder Rutil RFKD
70-40 T Porofor TR

Auftrag: 5 - 10 g/m2
Geliertempe.atur 180°C ca. 2 Min. lang

PVDC-Beschichtung mit Aluminium pigmentiert.

Ziel der Formulierung: Durch Zusatz von Aluminiumschliff kann eine Abschwächung der Transmission von Lichtstrahlen um 95-98% bei einer Beschichtung erreicht werden. Der pigmentierte Ansatz gilt für den Grundstrich und dieser wird durch Diofan 193D abgedeckt.

30 l	Wasser	Al-schliff im warmen Wasser
30 kg	Aluminiumschliff 1111	dispergieren
1,5 l	Rapidnetzer	
30 l	Wasser	
7 l	Collacral VL (10%ig)	Stabilisieren
100 kg	Diofan 233 D	

Bei Al-schliff wird das Diofan mit Ammoniak auf ph 9-10 eingestellt.

Schwarz Kambrik

Ziel der Formulierung: Es wird ein mit Russ eingefärbtes Bezugspapier verlangt.

130 kg	Russ TD Teig (29%ig)
60 kg	Echtschwarz 1967 Teig
1 l	Etingal S
3 l	Ammoniaklösung (28%ig)
25 kg	Casein, trocken
15 kg	Acronal 500 D
10 l	Mobilcer RV
15 l	Glyzerin
1 l	Formalin (30%ig)

Zur Nuancierung und für andere Einfärbungen werden Helioecht- oder Permanentfarben eingesetzt.

1. Strich: ca. 15 g/qm Diofan 230 D
auf 2300 g Diofan 230 D 3 g Permanentgelb

2. Strich: ca. 15 g/qm S-Gold
250 Teile Wasser
5 Teile Nekal
500 Teile Goldschliff
1.500 Teile Diofan 230 D (PH-lo)
50 Teile Wasser
3 Teile Permanentgelb
6 Teile Collacral

3. Strich: ca. 10 g/qm Vinnol 50

Ansatz von S-Gold:

Lösung 1) 5 Teile Nekal BX werden in 250 Teilen Wasser restlos gelöst. Um das Nekal BX schneller zu lösen, ist es vorteilhaft, 60 - 80°C warmes Wasser zu nehmen. In diese Lösung werden 500 Teile Goldschliff dispergiert.

Lösung 2) 1.500 Teile Diofan 230 D werden mit 10%-iger Natronlauge unter kräftigem Rühren auf PH - 10 eingestellt. Für 100 kg Diofan benötigt man etwa 1,5 l Natronlauge "10%ig".

Lösung 3) 3 Teile Permanentgelb werden in 50 Teile Wasser gegeben und unter Rühren mit 6 Teilen Collacral versetzt.

ANNEX 5

Travels, visits and meetings made in connection with the mission and approved by UNDP Warsaw

City	Factory	Interviewed	Subject
Chojnow	Dolpakart	M. Wozniak T. Kaminski	Siliconizing Pigment coating
Kielce	Kieleckie Zakl. Wyrob.Papierow.	J. Wcislik	PE and PP coating of paper and board
Gnaszyn	Gnasz. Zakl. Wyrob. Papierow.	S.Kroczynski	Cover papers
Bialystok	Pakpol	A. Hulpowski J. Zegarski	Metallizing and Laminating
Laskarzew	Pollena Fabr.Opakowan Kosmet.	K. Iwanicki	Packaging and Transports of plastic cups
Lodz	Pulp and Paper Institut	K. Palenik K. Subicki B. Lukowski	Paper converting Packagings Radiation systems
		Mrs. Marcinskowa	Organisation of paper sack testing laboratory
		Mrs. Wojciechowska	Carton boxes for deep frozen poultry
		Mrs. Bednarek	General development of packaging
		K. Gluchowski	Hotmelt coating of PA-strings
		Mrs. Drzewinska Mr. Grabczyk Mr. Niedzielski	Pigment coating Hotmelt Copy papers
Warsaw	Packaging RandD Center	A. Nassalski	Laminating and coating, metallizing
		Mrs. Wroblewska J. Remin	Anticorrosion Cushioning materials