Council Directive of 26 February 1973 on the approximation of the laws of the Member States relating to the quantitative analysis of ternary fibre mixtures (73/44/EEC) (repealed)

ANNEX II

EXAMPLES OF THE CALCULATION OF PERCENTAGES OF THE COMPONENTS OF CERTAIN TERNARY MIXTURES USING SOME OF THE VARIANTS DESCRIBED IN POINT I.8.1 OF ANNEX I

Consider the case of a fibre mixture which when qualitatively analysed gave the following components: 1. carded wool; 2. nylon (polyamide); 3. unbleached cotton.
VARIANT No 1

Using this variant, that is using two different specimens and removing one component (a = wool) by dissolution from the first specimen and a second component (b = polyamide) from the second specimen the following results can be obtained:

1.	Dry mass of the first specimen after pre-treatment	$(m_1) = 1{\cdot}6000$ g
2.	Dry mass of the residue after pre-treatment with alkaline sodium hypo-chlorite (polyamide + cotton)	$(r_1) = 1{\cdot}4166$ g
3.	Dry mass of the second specimen after pre-treatment	$(m_2) = 1{\cdot}8000$ g
4.	Dry mass of the residue after treatment with formic acid (wool + cotton)	$(r_2) = 0{\cdot}9000$ g

Treatment with alkaline sodium hypochlorite does not entail any loss in mass of polyamide, while unbleached cotton loses 3 %, therefore $d_1 = 1{\cdot}0$ and $d_2 = 1{\cdot}03$.

Treatment with formic acid does not entail any loss in mass of wool or unbleached cotton, therefore d_3 and $d_4 = 1{\cdot}0$.

If the values obtained by chemical analysis and the correction factors are substituted in the formula under point I.8.1.1 of Annex I, the following result is obtained:

$$P_1\%\ (\text{wool}) = \left[\frac{1{\cdot}03}{1{\cdot}0}\right] - 1{\cdot}03\frac{\times 1{\cdot}4166}{1{\cdot}6000} \div \frac{0{\cdot}9000}{1{\cdot}8000} \times \left(1 - \frac{1{\cdot}03}{1{\cdot}0}\right) \times 100 = 10{\cdot}30$$

$$P_2\%\ (\text{polyamide}) = \left[\frac{1{\cdot}0}{1{\cdot}0}\right] - 1{\cdot}0 \times \frac{0{\cdot}9000}{1{\cdot}8000} \div \frac{1{\cdot}4166}{1{\cdot}6000} \times \left(1 - \frac{1{\cdot}0}{1{\cdot}0}\right) \times 100 = 50{\cdot}00$$

$P_3\%$ (cotton) = 100 — (10·30 + 50·00) = 39·70

The percentages of the various clean dry fibres in the mixture are as follows:

Wool	10·30 %
Polyamide	50·00 %
Cotton	39·70 %

These percentages must be corrected according to the formulae under point I.8.2 of Annex I in order to take account also of the conventional recovery rates and of the correction factors for any losses in mass after pre-treatment.

As indicated in Annex II to the Directive relating to textile names, the conventional recovery rates are as follows: carded wool 17·0 %, polyamide 6·25 %, cotton 8·5 %, also, unbleached cotton shows a loss in mass of 4 % after pre-treatment with light petroleum and water, Thus:

$$P_1\text{A\% (wool)} = \frac{10\cdot30 \times \left(1 + \frac{17\cdot0 + 0\cdot0}{100}\right)}{10\cdot30 \times \left(1 + \frac{17\cdot0 + 0\cdot0}{100}\right)} + 50\cdot0 \times \left(1 + \frac{6\cdot25 + 0\cdot0}{100}\right) + 39\cdot70 \times \left(1 + \frac{8\cdot5 + 4\cdot0}{100}\right) \times 100 = 10\cdot97$$

$$P_2\text{A\% (polyamide)} = \frac{50\cdot00 \times \left(1 + \frac{6\cdot25 + 0\cdot0}{100}\right)}{109\cdot8385} \times 100 = 48\cdot37$$

P_3A% (cotton) = 100 — (10·97 + 48·37) = 40·66.

The composition of the yarn is therefore as follows:

Polyamide	48·4 %
Cotton	40·6 %
Wool	11·0 %
	100·0 %

VARIANT 4

Consider the case of a fibre mixture which when qualitatively analysed gave the following components: carded wool, viscose, unbleached cotton.

Suppose that using variant 4, that is successively removing two components from the mixture of one single specimen, the following results are obtained:

1.	Dry mass of the specimen after pre-treatment	(m_1) = 1·6000 g
2.	Dry mass of the residue after the first treatment with alkaline sodium hypochlorite (viscose + cotton):	(r_1) = 1·4166 g
3.	Dry mass of the residue after the second treatment of the residue r_1 with zinc chloride/formic acid (cotton):	(r_2) = 0·6630 g

Treatment with alkaline sodium hypochlorite does not entail any loss of mass in viscose, while unbleached cotton loses 3 %, therefore d_1 = 1·0 and d_2 = 1·03.

As a result of treatment with zinc chloride/formic acid, the mass of cotton increases by 4 %, so that d_3 = (1·03 × 0·96) = 0·9888 rounded to 0·99, (d_3 being the correction factor for the respective loss or increase in mass of the third component in the first and second reagents).

If the values obtained by chemical analysis and the correction factors are substituted in the formulae given in point I.8.1.4 of Annex I the following result is obtained:

$$P_{2\%}\,(\text{viscose}) = \frac{1{\cdot}0 \times 1{\cdot}4166}{1{\cdot}6000} \times 100 - \frac{1{\cdot}0}{1{\cdot}03} \times 40{\cdot}98 = 48{\cdot}75\ \%$$

$$P_3\%\ (\text{cotton}) = \frac{0{\cdot}99 \times 0{\cdot}6630}{1{\cdot}6000} \times 100 = 41{\cdot}02\ \%$$

P_1% (wool) = 100 — (48·75 + 41·02) = 10·23 %

As has already been indicated for variant 1, these percentages must be corrected by the formulae indicated in point I.8.2 of Annex I.

$$P_1\text{A}\%\ (\text{wool}) = \frac{10{\cdot}23 \times \left(1 + \frac{17{\cdot}00 + 0{\cdot}0}{100}\right)}{10{\cdot}23 \times \left(1 + \frac{17{\cdot}00 + 0{\cdot}0}{100}\right) + 48{\cdot}75 \times \left(1 + \frac{13 + 0{\cdot}0}{100}\right) + 41{\cdot}02 \times \left(1 + \frac{8{\cdot}5 + 4{\cdot}0}{100}\right)} \times 100 = 10{\cdot}57\%$$

$$P_2\text{A}\%\ (\text{viscose}) = \frac{48{\cdot}75 \times \left(1 + \frac{13 + 0{\cdot}0}{100}\right)}{113{\cdot}2041} \times 100 = 48{\cdot}65\ \%$$

P_3A% (cotton) = 100 — (1057 + 4865) = 4078 %

The composition of the mixture is therefore:

Viscose	48·6 %
Cotton	40·8 %
Wool	10·6 %
	100·0%