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APPENDIX A

SAMPLE CALCULATION

Calculation of Intrinsic Viscosity (ASTM 1601)

1. Relative Viscosity (viscosity ratio)

Calculation of the relative viscosity for each concentration is measured from the average efflux time as follows :

$$\eta_r = t / t_o$$

where η_r = relative viscosity (viscosity ratio)
t = average efflux time of solution
t_o = average efflux time of pure solvent

2. Intrinsic Viscosity (logarithmic viscosity number)

Calculation of the inherent viscosity for each concentration is measured as follows :

$$\eta_{inh} = (\ln \eta_r)/ C$$

where η_{inh} = inherent viscosity at concentration C
$\ln\eta_r$ = natural logarithm of the relative viscosity
C = concentration on grams/ ml of solution

3. Specific Viscosity

$$\eta_{sp} = \eta r - 1$$

where η_{sp} = specific viscosity

4. Reduced Viscosity

$$\eta_{red} = \eta_{sp}/C$$

where η_{red} = reduced viscosity

5. Intrinsic Viscosity

In four logarithmic viscosity numbers are plotted versus their respective concentrations on rectilinear graph paper and then the four reduced viscosity numbers are plotted versus their respective concentrations on the same graph. The slopes of these two lines will not be the same, but the converge to the same value at zero concentration. The intrinsic viscosity, $[\eta]$, is the intercept of the line at zero concentration.

Example. Find intrinsic viscosity of original LDPE films

Viscosity measurement of LDPE for original test sample at 70 °C

concentration (g/dl)	t_1	t_2	t_3	t_{avg}	η_r	η_{sp}	η_{sp}/C
solvent	88.29	88.41	88.41	88.37			
0.1246.	100.47	100.56	100.46	100.40	1.14	0.14	1.12
0.2491	113.21	113.08	113.04	113.11	1.28	0.28	1.14
0.3737	126.53	126.25	125.87	126.22	1.43	0.43	1.15
0.6228	153.32	153.28	153.25	153.25	1.73	0.73	1.17

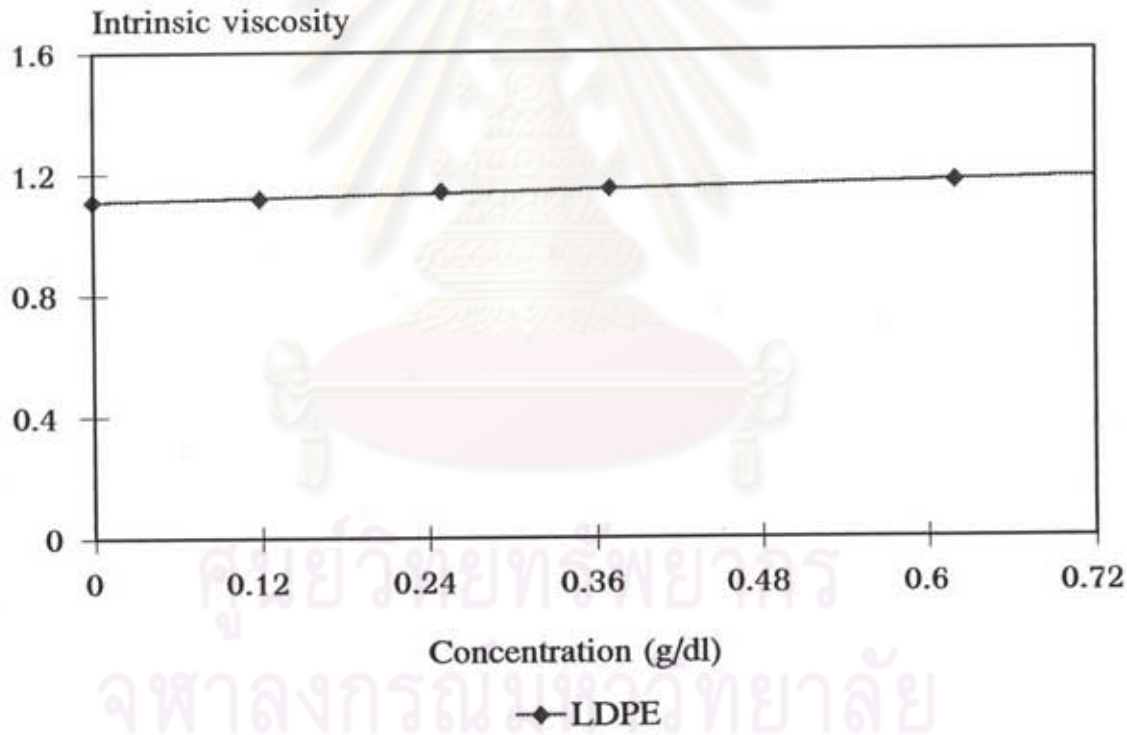

Figure A1. Intrinsic Viscosity of Original LDPE Sample
Intrinsic Viscosity = 1.11

APPENDIX B

COUNTING CHAMBER METHOD

The Helber counting chamber is a slide 2-3 mm thick with an area in the center called the platform and surrounded by a ditch, which is 0.02 mm lower than the reminder of the slide Figure B. The top of the slide is ground so that when an optically plane cover-glass is placed over the centre depression, the depth is uniform. On the platform an area of 1 mm^2 is ruled so that there are 400 small squares each 0.0025 mm^2 in the area. The volume over each small square is 0.02×0.0025 mm^3, i.e. 0.00005 ml.

Add a few drops of formalin to the well mixed suspension to be counted. Dilute the suspension so that when the counting chamber is filled there will be about five diluent is 0.1% peptone water containing 0.1% lauryl sulphate and (unless phase contrast or dark field is used for counting) 0.1% methylene blue. Always filter before used.

Place a loopful of suspension on the ruled area and apply the cover-glass, which must be clean and polished. The amount of suspension must be such that the space between the platform and the cover-glass is just filled and no fluid runs in to the ditch; again this requires practice. If the cover-glass is applied properly. Newton's rings will be seen. Allow 5 min for the bacteria to settle.

Examine with a 4-mm lens with reduced light, dark field or phase contrast if available. Count the bacteria in 50-100 squares selected at random so that the total count is about 500. Divide the count by number of squares counted. Multiply by 20,000,000 and by the original dilution factor to obtain the total number of bacterial/ml. Repeat twice more and take the average of the three counts. Clumps of bacteria, streptococci, etc., can be counted as units or each cell counted as one organism.

With experience, reasonably accurate counts can be obtained but the chamber and cover-glass must be scrupulously cleaned and examined microscopically to make sure bacteria are not left adhering either.

APPENDIX C

COMMERCIAL STARCH / PLASTIC BLEND

Table C1 Commercial Starch / Plastic Blend

Source	Type of Starch	Resin	Percent substitution
Coloroll Ltd.	rice/wheat/potato/ maize	LDPE	>50
Institute of Frankorf in West-Germany	vegetable extracted from peas	N/A	90
St.Lawrence Starch of Canada	maize	LDPE	6
St.Lawrence Starch(ECOSTAR)®	maize	LDPE	6
Wanner-Lambert (NOVON)®	rice/wheat/potato/maize/other agricultural product	N/A	almost entirely
Battelle : Frankfurt	peas	N/A	90 (10% natural additive)
Feruzzi : the Revenna based Italian constant	maize/vegetable based	N/A	10-70
Archer Daniels Midland (ADM) (POLYCLEAN)®	maize	LDPE	6
Agri-Tech, Champaign	N/A	N/A	20-70
Agro-Industrial group	N/A	PE	60
US department of Agriculture			

Note N/A = Not Applicable

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