

## UBE NYLON 5033FDX57

### Technical Product Information: AIR-BLOWN – PA monolayer film properties

UBE NYLON 5033FDX57 is a high viscosity, lubricated Polyamide 6/6.6 copolymer. The grade is especially suitable as outer layer for water cooled processes. Typical applications are sausage casings and shrink bags. This material has the following features:

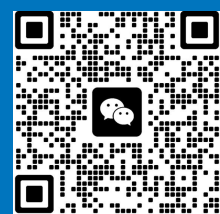
- Excellent processability
- Excellent mechanical properties
- Excellent transparency and gloss in water cooled processes
- Good slip properties

| Basic Properties <sup>(1)</sup>                          | Method    | Unit              | Value   |
|----------------------------------------------------------|-----------|-------------------|---------|
| Polymer                                                  | -         | -                 | PA6/6.6 |
| Melting Point                                            | ISO 11357 | °C                | 196     |
| Relative Viscosity (96% H <sub>2</sub> SO <sub>4</sub> ) | JIS K6810 | -                 | 4,05    |
| Density                                                  | DIN 53479 | g/cm <sup>3</sup> | 1,14    |

| Mechanical Properties <sup>(2)</sup>             | Method      | Unit                     | Value      |
|--------------------------------------------------|-------------|--------------------------|------------|
| Tensile strength at yield                        | ISO 527-3   | MPa                      | 24 - 28    |
| Tensile strength at break                        |             | MPa                      | 100 - 120  |
| Tensile elongation at break                      |             | %                        | 450 - 470  |
| Tensile modulus                                  |             | MPa                      | 500 - 600  |
| Tear resistance                                  | ASTM D 1922 | N                        | 1,6 - 1,8  |
| Puncture energy                                  | JAS P-1019  | mJ                       | 30 - 32    |
| Puncture deformation                             |             | mm                       | 8,5 - 9,5  |
| Spencer impact resistance                        | ASTM D 3420 | mJ                       | 850 - 950  |
| Flex crack (23°C, 1000 cycles / 5°C, 100 cycles) | Mil B-131C  | Holes/0,04m <sup>2</sup> | < 20 / < 5 |

| Optical Properties <sup>(2)</sup> | Method      | Unit | Value     |
|-----------------------------------|-------------|------|-----------|
| Haze                              | ASTM D 1003 | %    | 9 - 11    |
| Gloss                             | ASTM D 523  | %    | 110 - 130 |

| Gas Barrier <sup>(2)</sup>    | Method      | Unit                   | Value     |
|-------------------------------|-------------|------------------------|-----------|
| Oxygen (T=23°C, RH=0%)        | ASTM D 3985 | ml/m <sup>2</sup> .day | 29 - 31   |
| Water Vapour (T=40°C, RH=90%) | JIS Z-0208  | g/m <sup>2</sup> .day  | 160 - 180 |



| Slip Properties <sup>(2)</sup>    | Method      | Unit | Value       |
|-----------------------------------|-------------|------|-------------|
| Coefficient of friction (static)  | ASTM D 1894 | -    | 0,38 - 0,42 |
| Coefficient of friction (dynamic) |             | -    | 0,38 - 0,42 |

| Thermoforming Properties <sup>(2)</sup> | Method     | Unit | Value   |
|-----------------------------------------|------------|------|---------|
| Max. Thermoforming depth                | UBE METHOD | mm   | 80 - 90 |

| Regulation | Method | Unit | Value     |
|------------|--------|------|-----------|
| FDA / EC   | -      | -    | I&D / I&D |

I: Approved for indirect food contact D: Approved for direct food contact

(1) Measured on base resin

(2) All tests carried out with a 5 layers airblown line, Die diameter = 90 mm · Die gap=1,4 mm

Structure: PE (outer) / PE / PA (medium) / PE / PE (inner), PA layer delaminated for the tests

Layer thickness distribution: PE = 50 µm, PA = 50 µm, PE = 50 µm (Total film thickness = 150 µm) · Cooling conditions: Chiller temp. = 13 °C · Take off rolls = 35 °C

Film orientation: Blow-up ratio = 2,1 · Take-off speed = 6m min<sup>-1</sup> · Sample conditioning and testing conditions: T = 23°C, RH =50%

## Processing conditions

|                  | Extruder |           |           |           |           | Adaptor   | Die       |
|------------------|----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                  | Hopper   | Zone 1    | Zone 2    | Zone 3    | Zone 4    |           |           |
| Temperature (°C) | 40 - 120 | 180 - 200 | 220 - 240 | 230 - 250 | 225 - 245 | 230 - 250 | 230 - 250 |

## Drying conditions

UBE NYLON is supplied dry (moisture content < 0,1%) and packed in high barrier films. However, as polyamide is a hygroscopic material, the user should take a special care of the possible moisture absorption once the bag or liner box has been opened. In case of moisture absorption, the material should be dried with dehumidified air at 80°C for more than 4 hours.

## Storage

Well-sealed packages could be stored in cool and dry conditions over long periods of time. Protect the packages from heat and direct sunlight to prevent possible damages.

