

dryflex[®] xl

TPV


ELASTO
A HEXPOL COMPANY

THE THERMOPLASTIC VULCANISATE

A whole range of possibilities...

Dryflex® XL are a range of thermoplastic vulcanisates compounds (TPVs) developed by ELASTO for the plastics and rubber processing industries.

The range consists of several series of high-performance compounds that contain a highly cross-linked elastomeric phase dispersed in a thermoplastic matrix. The cross-linked phase provides improved elasticity and thermal stability and the thermoplastic phase provides the melt-processability.

All Dryflex® XL TPV compounds offer superior weathering and ozone resistance characteristics; they display excellent colour and property retention after excessive exposure to UV. The combination of vulcanised rubber characteristics, such as heat and chemical resistance and low compression set, together with the processing ease and recyclability of a thermoplastic, results in lower production costs, consistent quality and greater product performance.

Key Benefits of Dryflex® XL TPVs

- All grades are available in black, natural and specified colours on request.
 - No pre-drying of compound required (with the exception of 400 Series).
 - TPV compounds can be tailor made to specific customer requests.
- All compounds listed are examples of standard compounds, however, variants of intermediate hardness are available.
- Fully qualified and highly experienced technical support team offering practical advice from concept to application.

Grade Reference System: First 2 digits refer to the hardness of the compound. The next three digits refer to the specific series it belongs to.

Tailor made for you

In this guide we show typical properties for our most common grades, these tables are not exhaustive, and by no means list all available properties and materials. Our aim is to supply material that precisely matches application requirements and where an existing grade cannot satisfy the specific demands of your application, we have the proven expertise to customise a material that will.

We have developed endless formulations to fulfil different properties and application requirements to optimise the finished component. Use this guide as an introduction to our Dryflex® XL series and contact us to discuss your specific requirements.

Injection Moulding Grades

High Flow

The 100 Series are designed for long or complex flow paths, which require a material with excellent flow properties. They can also be used for general mouldings and are available as non-filled grades where easy colourability is required. The 100 series also display excellent bonding to polypropylene, EPDM and other Olefinic polymers.

100 SERIES:High Flow

| Material | Hardness | S.G. | Modulus 100% | Tensile Strength | Strain at Break | Tear Strength | Compression Set | |
|----------|--------------------|-------------------------------|--------------------------|--------------------------|------------------------|--------------------------------------|-----------------------|--------------|
| | Shore A ISO 868 | g/cm ³ ISO 2781 | MPa ISO 37 Average | MPa ISO 37 Average | % ISO 37 Average | N/mm ISO 34 (method C) Average | % ISO 815 (type B) | |
| | | | | | | | 24h at 23°C | 24h at 100°C |
| XL 40100 | 40 | 0.91 | 1.0 | 2.0 | 400 | 12 | 17 | 40 |
| XL 50100 | 50 | 0.92 | 1.5 | 2.5 | 380 | 13 | 19 | 42 |
| XL 60100 | 60 | 0.92 | 2.0 | 4.0 | 400 | 19 | 23 | 43 |
| XL 70100 | 70 | 0.93 | 2.5 | 5.8 | 480 | 25 | 29 | 46 |
| XL 80100 | 80 | 0.93 | 3.4 | 6.9 | 540 | 32 | 32 | 50 |
| XL 90100 | 90 | 0.93 | 4.8 | 7.6 | 400 | 45 | 37 | 60 |

General Purpose

The 200 Series has been designed as a lower cost alternative to the 100 Series for injection moulding articles. These grades are very clean, easy to colour and also display very good bonding to polypropylene and Olefinic polymers.

200 SERIES: General Purpose

| Material | Hardness | S.G. | Modulus 100% | Tensile Strength | Strain at Break | Tear Strength | Compression Set | |
|----------|--------------------|-------------------------------|--------------------------|--------------------------|------------------------|--------------------------------------|-----------------------|--------------|
| | Shore A ISO 868 | g/cm ³ ISO 2781 | MPa ISO 37 Average | MPa ISO 37 Average | % ISO 37 Average | N/mm ISO 34 (method C) Average | % ISO 815 (type B) | |
| | | | | | | | 24h at 23°C | 24h at 100°C |
| XL 50200 | 50 | 0.88 | 1.7 | 2.6 | 200 | 11 | 20 | 37 |
| XL 60200 | 60 | 0.88 | 2.3 | 3.5 | 240 | 19 | 24 | 39 |
| XL 70200 | 70 | 0.89 | 3.8 | 5.0 | 200 | 26 | 26 | 40 |
| XL 80200 | 80 | 0.89 | 4.8 | 6.6 | 230 | 35 | 34 | 46 |
| XL 90200 | 90 | 0.89 | 7.8 | 10.0 | 270 | 64 | 38 | 60 |

Superior Strength

The 900 Series are ELASTO's original range of TPVs. They have good all round general properties giving a balance of compression set values against strength properties.

900 SERIES:Superior Strength

| Material | Hardness | S.G. | Modulus 100% | Tensile Strength | Strain at Break | Tear Strength | Compression Set | |
|----------|--------------------|-------------------------------|--------------------------|--------------------------|------------------------|--------------------------------------|-----------------------|--------------|
| | Shore A ISO 868 | g/cm ³ ISO 2781 | MPa ISO 37 Average | MPa ISO 37 Average | % ISO 37 Average | N/mm ISO 34 (method C) Average | % ISO 815 (type B) | |
| | | | | | | | 24h at 23°C | 24h at 100°C |
| XL 45900 | 45 | 0.95 | 1.4 | 3.1 | 330 | 12 | 15 | 39 |
| XL 55900 | 55 | 0.96 | 2.0 | 4.2 | 370 | 18 | 18 | 38 |
| XL 63900 | 63 | 0.96 | 2.5 | 5.3 | 420 | 22 | 20 | 40 |
| XL 68900 | 68 | 0.96 | 2.8 | 6.5 | 500 | 26 | 20 | 45 |
| XL 73901 | 73 | 0.97 | 3.2 | 7.6 | 500 | 32 | 23 | 45 |
| XL 80900 | 80 | 0.95 | 3.7 | 8.5 | 520 | 36 | 30 | 48 |
| XL 87900 | 87 | 0.96 | 5.0 | 8.7 | 470 | 44 | 35 | 55 |

Improved Heat and Oil Resistance Grades

The 300 Series has been specially designed to offer improved resistance to degradation at elevated temperatures and an increased resistance to fluids such as hydrocarbons, chemicals and solvents.

300 SERIES: Good Heat and Oil Resistance

| Material | Hardness | S.G. | Modulus 100% | Tensile Strength | Strain at Break | Tear Strength | Compression Set | |
|----------|----------|------|-----------------|---------------------|--------------------|------------------|--------------------|-------------------------------|
| | | | | | | | Shore A ISO 868 | g/cm ³ ISO 2781 |
| XL 50300 | 50 | 0.91 | 1.8 | 2.8 | 260 | 14 | 16 | 38 |
| XL 60300 | 60 | 0.92 | 2.3 | 3.5 | 280 | 17 | 19 | 38 |
| XL 70300 | 70 | 0.93 | 3.2 | 5.4 | 380 | 28 | 25 | 43 |
| XL 80300 | 80 | 0.93 | 4.8 | 7.4 | 380 | 38 | 27 | 48 |
| XL 90300 | 90 | 0.93 | 6.0 | 8.6 | 380 | 50 | 36 | 53 |

| Material | Change in Properties after Heat Ageing | | | Change in Properties after Submission in Fluid | | | | | | | |
|----------|--|-------------------|------------------------------|--|-------------------|------------------------------|-------------------------|----------------------------|-------------------|------------------------------|-------------------------|
| | 7 days at 130°C | | | 7 days in ASTM No. 1 at 125°C | | | | 7 days in IRM 903 at 125°C | | | |
| | Hardness ISO 868 | Tensile ISO 37 | Strain at Break ISO 37 | Hardness ISO 868 | Tensile ISO 37 | Strain at Break ISO 37 | Volume ASTM D-471 | Hardness ISO 868 | Tensile ISO 37 | Strain at Break ISO 37 | Volume ASTM D-471 |
| XL 50300 | -1 | -5% | -9% | -11 | -29% | -50% | 35% | -35 | -55% | -75% | 90% |
| XL 60300 | -2 | -4% | -8% | -15 | -22% | -43% | 40% | -35 | -50% | -68% | 96% |
| XL 70300 | -3 | 3% | -3% | -20 | -25% | -55% | 44% | -28 | -48% | -73% | 100% |
| XL 80300 | -2 | 1% | -9% | -20 | -21% | -55% | 45% | -28 | -40% | -71% | 100% |
| XL 90300 | 0 | -4% | -9% | -17 | -15% | -55% | 43% | -30 | -37% | -70% | 98% |

Overmoulding Grades

The 400 Series are designed to offer a good chemical bond onto both glass filled and unfilled polyamide substrates (PA6 and PA6,6). Bond failure can occur by two methods; cohesive, this is where material fails before the bond and adhesive, where the bond fails and the two materials peel apart. If adhesive failure occurs then the force required to peel apart the two materials is indicated.

400 SERIES: Overmoulding

| Adhesion to Polyamide (typical result) | | | | | | | | | Peel Force N/mm | |
|--|-----------------|---------------|--------------------|--------------------|------------------|--------------------------------|--|----|-------------------------|-----------------|
| Material | Hardness | S.G. | Modulus 100% | Tensile Strength | Strain at Break | Tear Strength | Compression Set | | ASTM D903 ¹⁾ | |
| | Shore A ISO 868 | g/cm ISO 2781 | MPa ISO 37 Average | MPa ISO 37 Average | % ISO 37 Average | N/mm ISO 34 (method C) Average | % ISO 815 (type B) 24h at 23°C 24h at 100°C | | 90° peel angle Unfilled | 30% glassfilled |
| XL 45400 | 45 | 0.91 | 1.2 | 2.0 | 260 | 10 | 19 | 44 | Cohesive ¹⁾ | Cohesive |
| XL 50400 | 50 | 0.91 | 1.4 | 2.2 | 300 | 11 | 21 | 46 | Cohesive | Cohesive |
| XL 60400 | 60 | 0.92 | 1.8 | 3.0 | 330 | 15 | 23 | 47 | Cohesive | Cohesive |
| XL 70400 | 70 | 0.92 | 2.6 | 5.1 | 450 | 26 | 27 | 50 | 6.8 | 5.0 |
| XL 80400 | 80 | 0.94 | 3.5 | 7.6 | 490 | 33 | 30 | 55 | 6.8 | 5.2 |

¹⁾ Cohesive = the bonding strength is greater than the tensile strength

Flame Retardant Grades

The 500 Series has been designed to meet a range of UL94 flame retardancy standards and other customer specific needs. Both halogenated and halogen free grades have been developed to meet all compounding requirements.

500 SERIES: Flame Retardant

| Material | Hardness | S.G. | Modulus 100% | Tensile Strength | Strain at Break | Tear Strength | Compression Set | | Flame Retardancy | | |
|---------------------|-----------------|----------------------------|--------------------|--------------------|------------------|--------------------------------|--|----|------------------|--------|--------|
| | Shore A ISO 868 | g/cm ³ ISO 2781 | MPa ISO 37 Average | MPa ISO 37 Average | % ISO 37 Average | N/mm ISO 34 (method C) Average | % ISO 815 (type B) 24h at 23°C 24h at 100°C | | UL94 | | |
| Halogen Free | | | | | | | | | 1.5 mm | 2.0 mm | 3.0 mm |
| XL 60500 | 60 | 1.06 | 2.3 | 2.8 | 170 | 18 | 31 | 37 | V1 | V0 | V0 |
| XL 70500 | 70 | 1.07 | 2.9 | 3.4 | 175 | 21 | 33 | 40 | V1 | V0 | V0 |
| XL 80500 | 80 | 1.07 | 4.6 | 5.3 | 180 | 34 | 37 | 42 | V0 | V0 | V0 |
| XL 90500 | 90 | 1.08 | 8.0 | 8.8 | 220 | 51 | 45 | 50 | V0 | V0 | V0 |
| Halogenated | | | | | | | | | 1.5 mm | 2.0 mm | 3.0 mm |
| XL 60510 | 60 | 1.23 | 1.7 | 1.9 | 180 | 13 | 40 | 42 | V1 | V0 | V0 |
| XL 70510 | 70 | 1.25 | 2.6 | 3.2 | 200 | 19 | 40 | 43 | V1 | V0 | V0 |
| XL 80510 | 80 | 1.31 | 3.7 | 4.7 | 190 | 28 | 40 | 41 | V0 | V0 | V0 |
| XL 90510 | 90 | 1.35 | 5.5 | 7.2 | 230 | 44 | 48 | 50 | V0 | V0 | V0 |

Extrusion Quality

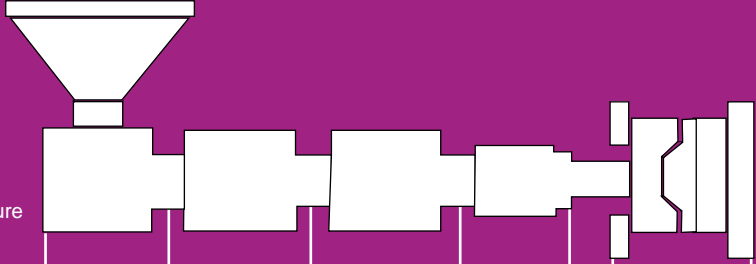
The 600 series compounds have been developed for articles that are produced using an extrusion process. They have been developed to offer a higher viscosity to allow efficient filling of the die and a smooth finish on the extruded profile. These grades are also suitable for co-extrusion with polypropylene and other olefinic polymers where a strong bond is required.

600 SERIES: Extrusion Quality

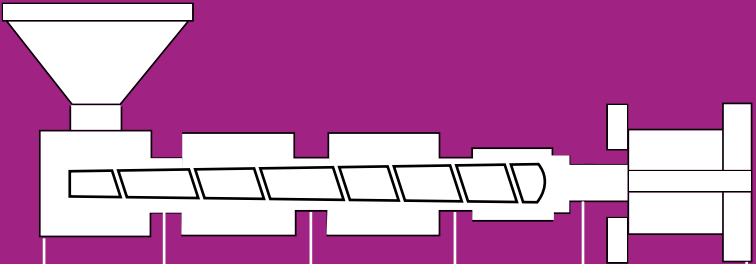
| Material | Hardness | S.G. | Modulus 100% | Tensile Strength | Strain at Break | Tear Strength | Compression Set | |
|----------|----------|------|-----------------|---------------------|--------------------|------------------|--------------------------|--------------------------|
| | | | | | | | MPa ISO 37 Average | MPa ISO 37 Average |
| XL 50600 | 50 | 0.92 | 1.4 | 3.4 | 450 | 15 | 21 | 42 |
| XL 60600 | 60 | 0.93 | 2.2 | 4.0 | 480 | 21 | 24 | 44 |
| XL 70600 | 70 | 0.94 | 3.0 | 6.0 | 450 | 28 | 24 | 50 |
| XL 80600 | 80 | 0.94 | 3.6 | 6.8 | 480 | 34 | 32 | 58 |
| XL 90600 | 90 | 0.94 | 5.0 | 8.0 | 450 | 48 | 36 | 62 |

All the above information about chemical and physical properties consists of values measured in tests on injection moulded test specimens. All Tensile and Tear properties are the average of both the flow and across the flow directions. UL94 testing performed at ELASTO and not officially approved by UL. We provide written and illustrated advice in good faith. This should only be regarded as being advisory and does not absolve the customer from doing their own tests and trials to determine the suitability of the material for the intended applications. We retain the right to make changes without prior notice. All figures are indicative and may vary depending on specific grade selected and production site.

Injection Moulding Guidelines

| | | | | | | | |
|---|--|--|-----------|-----------|-----------|---------|--|
| Gates and Runners: | Fully round allowing easy flow |  | | | | | |
| Venting: | 0.02 – 0.05 mm deep at final fill point | | | | | | |
| Injection Speed: | Medium - Fast | | | | | | |
| Injection Pressure: | Medium | | | | | | |
| Back Pressure: | Low - Medium | | | | | | |
| Holding Pressure: | Sufficient to pack the mould | | | | | | |
| Cooling: | Parts can be demoulded once temperature drops to approx. 100°C | | | | | | |
| Temperature °C | 100 Series | 160 - 180 | 170 - 190 | 180 - 200 | 180 - 210 | 20 - 60 | |
| | 200 Series | 160 - 180 | 170 - 190 | 180 - 200 | 180 - 210 | 20 - 60 | |
| | 900 Series | 160 - 190 | 170 - 200 | 180 - 210 | 200 - 220 | 20 - 60 | |
| | 300 Series | 160 - 180 | 170 - 190 | 180 - 200 | 180 - 210 | 20 - 60 | |
| | 400 Series | 180 - 200 | 190 - 210 | 200 - 220 | 220 - 230 | 20 - 60 | |
| | (Overmoulding) | | | | | | |
| Substrate should be moulded as hot as possible (> 100 °C) to provide best chemical bond | | | | | | | |
| | 500 Series | 160 - 180 | 170 - 190 | 180 - 200 | 190 - 210 | 30 - 60 | |

Extrusion Guidelines

| | | | | | | | |
|-------------------------|---------------------|--|--|--|--|--|--|
| L/D Ratio: | 20:1 - 25:1 |  | | | | | |
| Compression Ratio: | 2.5 - 3.0 | | | | | | |
| Breaker Plate / Screen: | Both should be used | | | | | | |
| Draw Down: | 5 - 10% | | | | | | |
| Cooling: | Cold water bath | | | | | | |
| Temperature °C | 600 Series | | | | | | |

General Information:

In general these grades do not require predrying. However, after periods of prolonged storage predrying may be necessary. Venting of extrusion lines may be used to prevent the build-up of volatiles during continuous processing.

This processing information is only intended as a guide. The actual parameters will depend on the machine used and the moulding being produced.

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