

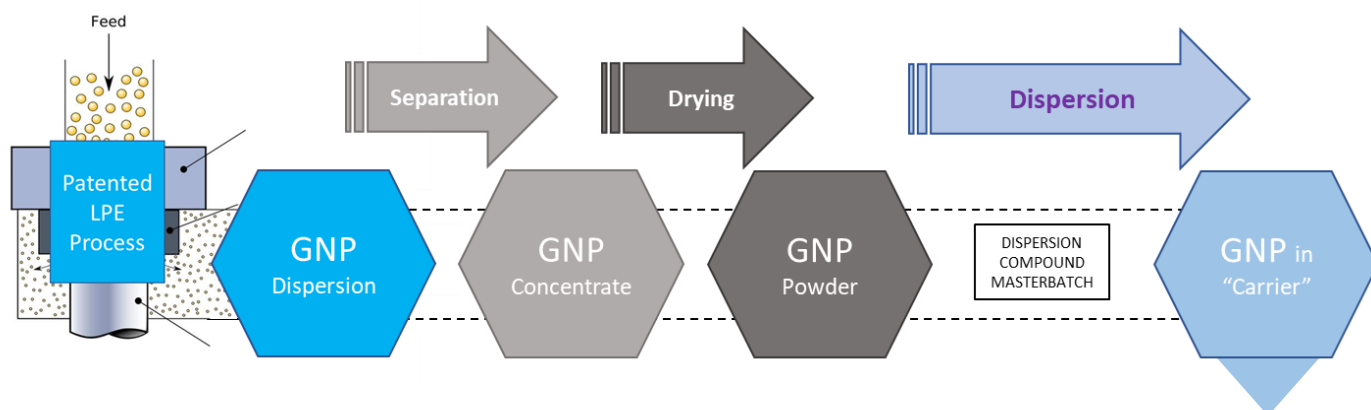
Technical Data Sheet

Product Name	GEM X23M
Product Code	GMH1223-X23M
Description	GraphCore™ 01 GEM 10% in PP (X23M)
Form	MB—10% in PP
Issue Date	V1 - April 01, 2024

Black Swan Graphene Inc. (“Black Swan”) (TSX-V: SWAN) (OTCQB: BSWGIF) (Frankfurt: R96), is focused on the large-scale production and commercialisation of patented high-performance and low-cost graphene products aimed at several industrial sectors, including concrete and polymers. Black Swan is a global leader in the development and supply of graphene nanoplatelets (GNP) for use in new and emerging technologies.

GEM-X23M (GMH1223-X23M) is a member of the **GraphCore™ 01** Family of graphene nanoplatelets. It is supplied in masterbatch form as 10% loaded in Polypropylene (PP). The product is manufactured using patented liquid phase exfoliation process incorporating ~3%wt non-ionic surface agent, and compounded using twin-screw extrusion.

The ISO-standard manufacturing process uses a carefully selected graphite being dispersed in a liquid medium (typically water) using our surface chemistry know-how. Our manufacturing process yields reliable quality GNPs in dispersion, powder or masterbatch forms.



MASTERBATCH	
Product Code	GMH1223-X23M
Surface agent	Non-ionic on GNP
Form	MB—10% in PP
Colour	Black

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Nominal Composition: Graphene Enhanced Masterbatch

Graphene Content:	10%
Polymer Carrier:	PP Homo
Additives:	None

General

GMH1223-x23M is a concentrate of Graphene nano platelets (10%) designed to be dosed at 1-10% in the final product.

Designed for use in extrusion, moulding and compounding.

Possible to Increase in Mechanical properties of Polypropylene articles by up to 30%

Typical processing temperatures are 230 – 250 °C.

Masterbatch manufactured by Hubron International Limited as GEMPP-12-10-001

Specification

Properties	Test Method	Units	Limits
Loading	TGA Under Nitrogen (HTM 17)	%	9.0 – 11
Filter Dispersion	HTM 40 (40/200/40)	---	30 max
Melt Flow Index	BS2782:720A 2.16kg at 190°C	g/10 min	TBC
Moisture Content	Weight loss at 105°C at time of packing (HTM 35)	%	0.4 max

Packaging

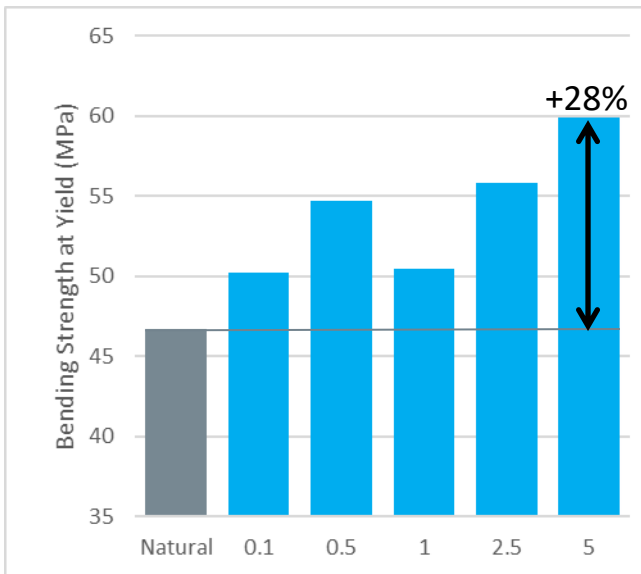
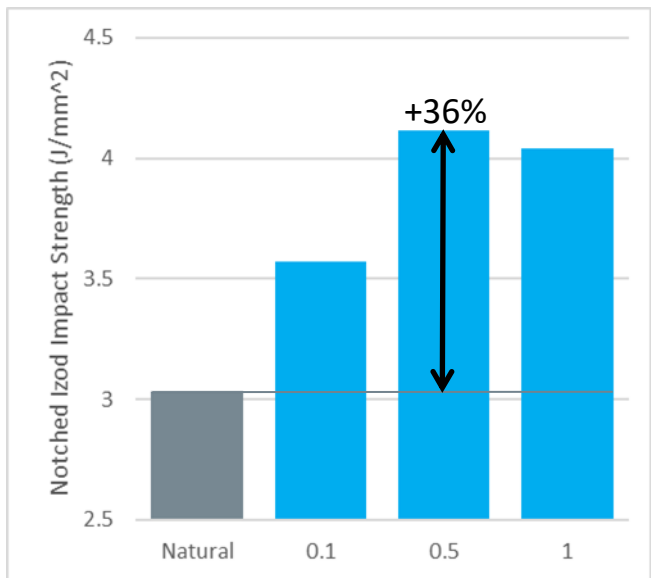
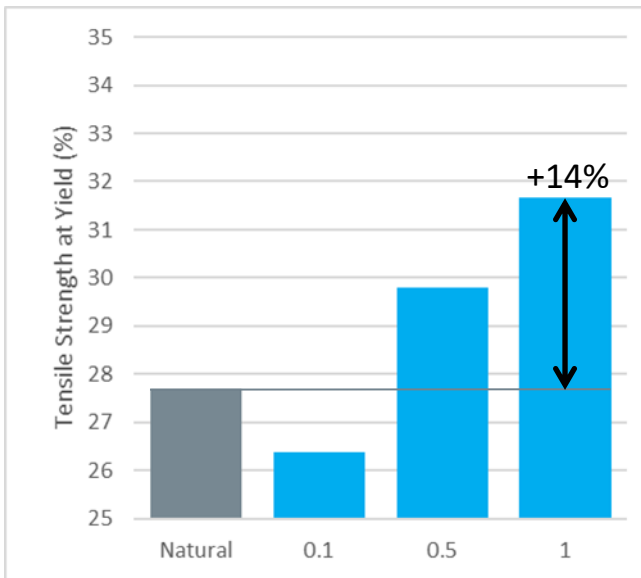
Black Swan **G**raphene **E**nhanced **M**asterbatches are typically available in sealed 25kg Polyethylene Bags. Other forms are available on request and include bulk packaging such as Big Bags, Octabins and Tankers

GEM Products must be stored in cool dry conditions.

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Material property enhancements

Polymers reinforced with our GNP (graphene nanoplatelets) show significant potential for lightweighting, barrier characteristics, and impact resistance. Black Swan offers cost-effective and high-performance polymer-based products, including sustainable EV solutions and other industrial applications.



Properties

When diluted with polypropylene, **GEM-X23M** can improve tensile, flexural, and impact characteristics.

The recommended dosage is <10% (equal to 1% GNP loading). A ladder study may be necessary to optimise performance based on the properties needed.

Performance may differ based on the grade of polymer utilised.