ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025:2006 of an average product that includes:

Polyester High Tenacity Yarn: 1100 dtex GLE, 1100 dtex VLS and 6600 dtex DST

from

Brilen S.A. (SAMCA Group)

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-07873
Publication date:	2023-05-08
Valid until:	2028-03-20

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com



THE INTERNATIONAL EPD® SYSTEM



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GENERAL INFORMATION

Programme:	The International EPD® System
Address:	EPD International AB
	Box 210 60
	SE-100 31 Stockholm
	Sweden
Website:	www.environdec.com
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Product Category Rule (PCR):

Product Category Rules 2013:12 Textile yarn and thread of natural fibres, man-made filaments or staple fibres, version 3.0. UN CPC 263 and 264. DATE 2022-02-25. VALID UNTIL: 2026-02-25.

PCR review was conducted by: The Technical Committee of the International EPD® System.

A full list of members is available at www.environdec.com.

Chair of the PCR review: Hüdai Kara.

The review panel may be contacted via info@environdec.com

Life Cycle Analysis (LCA)

LCA responsible: José Luis Canga Cabañes

Independent third-party verification:

Independent third-party verification of the declaration and data, according to ISO 14025: 2006:

 \otimes EPD verification by accredited certification body.

Third party verifier: Maria Feced, Tecnalia R&I Certificación, is an accredited certification body for third-party verification.

Certification body accredited by:

ENAC, accreditation Nº. 125/C-PR283

Procedure for follow-up of data during EPD validity involves third party verifier:

⊗ Yes O No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but from different programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison.







COMPANY INFORMATION



Owner of the EPD & location of production site:

Brilen S.A. (SAMCA Group)
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Apdo. 62 22300 Barbastro - Huesca
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Description of the organisation:

As part of a strong group of companies (SAMCA Group), BRILEN is one of the few European manufacturers dependent on private capital, with a strong commitment to the textile industry in Europe. Vertically integrated and sharing synergies with its sister company and its internal PET supplier, NOVAPET, BRILEN is able to control the entire chain, from raw materials, PET polymers, to high-tenacity polyester yarns.

Wide range of the most modern yarn production technology, with a production of 20,000 t/year of high tenacity polyester yarns, offering us sufficient production volume and flexibility to meet our customers' quick service requests. Our facilities have 11 spinning lines (1-step technology) with a production range of 280 dtex to 9900 dtex, 9 torsion units and other auxiliary equipment for winding and threading, with a highly automated and robotized process.

Quality is an essential part of our competitive advantage. We focus our efforts on exceeding expectations about our products, processes and performance. Total quality control is established throughout the industrial facility and is the basis of our daily work in all our departments, from manufacturing to sales, and from operators to clerks.

At BRILEN, we are convinced that we can only advance through transparency, curiosity and the exchange of information. We do not see ourselves as an individual company, but as a group of players from the same team, together with our suppliers and our customers.

We have our own pilot plants for polymerization and post-condensation, chemical and textile laboratories with state-of-the-art devices, more than 40 years of experience in the treatment and spinning of polyester, a business unit of R&D, etc.

This potential for development and innovation provides customers with an ideal platform for projects requiring high-quality technical support and products.

We integrate all the skills and knowledge needed to solve specific problems or improve strategic issues by creating multidisciplinary work teams.

As part of our growth and transformation programs started in 1996, our company BRILEN has always carried out several activities aimed at achieving business excellence.







COMPANY INFORMATION



Therefore, while the company's production capacity has been increasing, with the incorporation of the latest generation technology, it has also ensured, in all its activities, important achievements in other key areas such as: quality standards, environment, prevention of occupational risks, social commitment, best practices in the food sector, energy efficiency and good business practices.

At BRILEN we are committed to managing and integrating quality, environmental and energy efficiency management systems in accordance with our Integrated Management System Policy. We also aim to achieve excellence in our activities considering human rights, safety, environmental commitment and business integrity to respect our Code of Conduct and our Major Accident Prevention Policy.

As a result of this determination to achieve a sustainable enterprise, the initiatives resulted in the following achievements:

- Management based on an Integrated Process Management System.
- Certification according to the quality management standard EN ISO 9001:2015.
- Working in a LEAN MANUFACTURING environment (5S, SMED, methods and times, kaizen, Information Centers, etc.): Perfect quality the first time + Waste minimization + Continuous improvement.
- Continuous staff training to achieve quality objectives.

Best environmental practices

- Certification according to the environmental management standard EN ISO 14001:2015.
- 100% process water treatment by MBR technology.
- Analysis of the carbon footprint of our activities.
- · Assessment of environmental issues throughout the product life cycle.
- Control and follow-up of our processes for early detection of possible environmental effects.
- · Continuous staff training to achieve environmental objectives.

Certifications related to the product:

UNE-EN-ISO 9001: 2015, UNE-EN-ISO 14001: 2015, ISO 50001: 2018, ECOVADIS and OEKO-TEX® STANDARD 100.









Product name:

Polyester High Tenacity Yarn.

This EPD includes the manufacture of the following high tenacity polyester yarns: GLE 1100, VLS 1100 and DST 6600.

The intended use of yarns is for the textile industry. With applications in braided and knitted hoses, geotextiles and geogrids, lanyards, narrow fabrics, technical fabrics and PVC fabrics.

Product identification:

6600 dtex DST

DST MARINO[®] is a high tenacity yarn that was specifically designed and is currently being used in deep and ultra-deep-water mooring rope for offshore oil and gas production platforms such as FPSO (Float Storage and Production Dumping), as well as MODU (Mobile Offshore Drilling Unit).

All products can be certified according to DNV-GL, ABS, Bureau Veritas or other required standards.

DST MARINE can be used to withstand the rigors of the deep-water environment to make safe, secure and reliable mooring lines for ultra-deep waters.

Special constructions are available in collaboration with the most reliable processing companies, also approved by certifiers.

DST 6600 DATA

Filaments	768
Version	HT15/HT20
Linear Density (dtex)	6750

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1100 dtex VLS

One-step very low shrinkage yarn helps to maximize fabric width, yield and flatness.

Consistent and regular values make it reliable for wide fabrics manufacturers and coaters. A wide range of types offering the best balance between shrinkage and tensile strength.

BRILEN is committed to adapting yarn to your production process, having a made-to-measure range of products available, such as those for special finishes, twists spool weights, etc.

BRILEN yarns ensure:

- Low SHA values
- Stability at high temperatures
- Good moisture resistance
- High tensile and tear strength
- Ulster control guarantees proper consistency

VLS 1100 DATA

Filaments	192
Version	HT15/HT20
Linear Density (dtex)	1125









1100 dtex GLE

Polyester High Tenacity Yarn is used for high performance applications where tenacity is the key factor. Plastic hoses, construction, automotive industry, agriculture, mining and gardening are only some of the sectors this yarn gives the required behaviour.

BRILEN GLE is one of the most appreciated polyester yarn type due to:

- Consistent mechanical properties.
- Creep rupture and creep elongation.
- High resistance to UV.
- Molecular weight (Mw) and Carboxyl End Group Count (CEG).
- Proper dyeability.
- Ulster control.
- On-line spool length control.

BRILEN can provide its customers wih made-to-measure spools, with:

- Special length
- Specific weights
- Special twist or plied yarns
- Customised spool weights
- Special and personalized cylindric tubes or conical supports.

GLE 1100 DATA

Filaments	96/192	192	192	192	96	
Version	HT10	HT00	HT15	HT20	HT21	
Linear Density (dtex)	1125	1125	1125	1120	1125	

UN CPC code: 2643.

Geographical scope: Europe.









Product properties:

The calculations have been made for the three main products of our catalogue, the values presented being the average of these technical PET yarns.

Information	Explanation	Explanation	Explanatino	Test method
Commercial article description	GLE 1100 HT00	VLS 1100 HT20	DST 6600 HT20	Not applicable
Composition		100 polyester		ISO 2076: 2010
Type of fibre		Filament yarn		ISO 8159: 1987
Process type		Fully stretched yarn		BISFA
Intended use	Industrial coated Mooring ropes		Mooring ropes	Not applicable
Count (dtex)	1,125	1,125	6,750	BISFA 2004
Tenacity at break (cN/tex)	≥73.0	≥65.0	≥78.0	BISFA 2004
Elongation at break (%)	11.5	23	13.5	BISFA 2004
Elongation at specific force (%)	4.0	13.5	5.5	BISFA 2004
Shrinkage (%)	0.8	0.7	0.70	Not applicable
Filament number of the final product	192	192	768	Not applicable
Yarn on yarn abrasion performance (number of cycles)	N.A.	N.A.	>2,462	CI 2009P CI 1503 ASTM D6611 ISO 18692
Other properties		White or coloured yarn		Not applicable



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Name and	contact	information	of LCA	author:

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Declared unit:

1 kg of PET yarn, including packaging and distribution bobbin.

This EPD includes the weighted average product of the manufacture of three types of yarn: 6600 dtex DST, 1100 dtex VLS and 1100 dtex GLE.

Time representativeness:

The data used in the LCA are from the year 2020.

Databases and LCA software used:

Ecoinvent 3.8 database.

Software SimaPro 9.4.0.2.

The following criteria were used to select the most representative processes:

- The data must be representative of the technological development applied in the manufacturing processes. If no information was available, a data representative of an average technology has been chosen.
- Average regionalised data.
- The data should be as up to date as possible.

System diagram:

All upstream, core process and downstream stages of the production of PET yarns have been studied.

From PET pellets, the yarn is produced through a drying, extrusion and cooling process. When drawing the filament, it is lubricated with an emulsion of additives in water (sizing). Subsequently, the filaments are intertwined, giving rise to the yarn, and the final winding is produced.

Production of PET multifilament technical yarns starts with the pneumatic transport of the pellets to the dryers, where the residual humidity is removed by dry air at a temperature close to 160 °C. The dried pellets enter the extruder by gravity, where it is melted, heated and finally pressurized to be sent to the spinning positions.









At each of the spinning positions, the material is extruded by two dosing pumps with three holes that guide the material through the corresponding filters and extrude it through the capillaries of the spinnerets. The molten PET jets descending from the rows solidify in contact with the air blown into the cooling cabins. Each of these jets will convert into a filament and the set of filaments coming from the same row is what constitutes a yarn. A pair of traction pulleys drags these filament bundles, inducing a stretch in the part that has not yet solidified. This path is used to lubricate the yarns with a water emulsion of different additives, which improve their frictional and antistatic properties.

Yarns then pass through six pairs of rollers, whose temperatures increase and then decrease until the last one, which is at room temperature. Before winding, the yarns pass through intertwiners that intertwine the filaments more intensely. The winders, two per position and three bobbins each, collect the wires in the bobbins that are extracted by automatons and placed on trolleys.

The storage of these bobbins is carried out in other dependencies of the spinning section (warehouse areas). The system boundaries studied in the Life Cycle Analysis are shown below in the PET yarn production diagram.









UPSTREAM











Description of system boundaries:

The EPD is cradle to grave; covers the upstream, core process and downstream stages.

Upstream:

- Extraction of non-renewable resources used in yarn manufacturing processes.
- Production of renewable resources used in yarn manufacturing processes, its refining or processing and storage.
- Production of the raw material used.
- Production of additives used in yarn manufacturing processes.
- Production of primary and secondary packaging used for yarns.

Core process:

- All material and energy inputs to the core process, including electricity, fuel, compressed air, cooling system, etc.
- Water consumption.
- Impacts due to the production of the energy consumed in the core process.
- Transport of raw and auxiliary materials to the Brilen plant.
- All air, water and soil emissions.
- Treatment and transport to waste management and wastewater generated by all processes, in the core process.

Downstream:

- Transportation of the yarns to customers (corresponding to the expeditions of each yarn in the year 2020); the type of transport used is differentiated: truck or boat.
- End of life scenario, considering:
 - 50 km as the distance traveled by truck from the place where the yarns are used to the waste treatment site.
 - End-of-life management of PET yarn waste. It has been considered that 21% of the PET yarn waste goes to recycling and the remaining 79% goes to landfill, based on statistical data from Europe.











The polluter pays principle and the modularity principle have been followed (environmental charges are assigned to the stage where the impact occurs).

The DAP covers the cradle-to-grave phases.

Use of the product is not included.

Cut-off criteria:

No cut-off rule has been applied. There has been no exclusion of material and energy consumption.

Data quality assessment:

To assess the quality of the primary data used, the semi-quantitative data quality assessment criteria proposed by the European Union in its Guide to the Environmental Footprint of Products and Organisations were applied, resulting in a Data Quality Rating (DQR) = 1.5, indicating excellent data quality.







CONTENT DECLARATION

Product

The yarns for which this EPD is written have the following composition:

Item	0. ininht	0, us such a lus stanial	% recycled waste		
	% in weight	% recycled material	Pre-consumer	Post-consumer	
Main material: PET	> 98 %	0	0	0	
Sizing	< 2%	-	-	-	

Formulation used in yarn manufacture is considered a trade secret and therefore, is confidential information that cannot be made public.

No substances listed in *"Candidate List of Substances of Very High Concern (SVHC) for authorisation"* are used during the yarn cycle production in a percentage greater than 0.1% of the weight of the product.

Packaging

Primary and secondary packaging for the shipment of the product (distribution packaging), including the bobbin, has been included in the study.

Packaging type	kg packaging / kg PET yarn
Wood	2,58E-02
PET	1,81E-04
PE	8,97E-05
Cardboard, included bobbin	4,17E-02
PE film	1,77E-03
PE separator	1,21E-03

Recycled material

Brilen PET yarn do not contain any recycled material.







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The results are based on a weighted average product obtained from the manufacturing data of the three types of yarns.

The estimated impact results are relative and do not indicate the final value of the impact categories, nor do they refer to threshold values, safety margins or risks.

The characterisation factors used to convert life cycle inventory data into impact categories are indicated in the GENERAL PROGRAMME INSTRUCTIONS FOR THE INTERNATIONAL EPD. Version 4.0, and in the PCR "Product Category Rules 2013:12 Textile yarn and thread of natural fibres, man-made filaments or staple fibres", have been applied using SimaPro 9.4.0.2 software.

Average PET yarn							
PARAMETER		UNIT	Up-stream	Core	Down- stream	TOTAL	
	Fossil	kg CO ₂ eq.	2.39E+00	3.29E-01	1.76E-01	2.89E+00	
Clobal warming	Biogenic	kg CO ₂ eq.	5.78E-03	4.27E-03	1.08E-05	1.01E-02	
Global warming potential (GWP)	Land use and land use change	kg CO ₂ eq.	2.05E-03	1.61E-03	1.50E-06	3.66E-03	
	TOTAL	kg CO ₂ eq.	2.39E+00	3.35E-01	1.76E-01	2.90E+00	
Depletion potential of the stratospheric ozone layer (ODP)		kg CFC 11 eq.	1.45E-05	4.39E-08	4.18E-08	1.46E-05	
Acidification potent	ial (AP)	mol H+ eq.	7.54E-03	1.29E-03	6.27E-04	9.46E-03	
	Freshwater	kg P eq.	5.22E-05	3.94E-06	9.10E-08	5.63E-05	
Eutrophication potential (EP)	Marine	kg N eq.	1.56E-03	3.46E-04	2.03E-04	2.11E-03	
	Terrestrial	mol N eq.	1.49E-02	3.68E-03	2.23E-03	2.08E-02	
Photochemical oxidant formation potential (POFP)		kg NMVOC eq.	6.61E-03	1.01E-03	6.09E-04	8.22E-03	
	Minerals&metals	kg Sb eq.	2.86E-06	3.45E-08	7.68E-09	2.90E-06	
Abiotic depletion potential (ADP)	Fossil resources	MJ, net calorific value	6.05E+01	4.94E+00	2.49E+00	6.79E+01	
Water depletion potential (WDP)		m3 eq.	1.41E+00	3.72E-01	-2.27E-04	1.78E+00	

Potential environmental impacts





ENVIRONMENTAL INFORMATION



Use of resources

Average PET yarn							
PARAMETER		UNIT	Up-stream	Core	Down- stream	TOTAL	
	Use as energy carrier	MJ, net calorific value	3.18E+00	2.54E+00	4.51E-03	5.72E+00	
Primary energy resources - Renewable	Used as raw materials	MJ, net calorific value	9.40E-01	8.40E-01	8.91E-04	1.78E+00	
nellewable	TOTAL	MJ, net calorific value	4.12E+00	3.38E+00	5.40E-03	7.50E+00	
Primary energy resources - Non-renewable	Use as energy carrier	MJ, net calorific value	1.55E+00	5.22E+00	2.40E+00	9.17E+00	
	Used as raw materials	MJ, net calorific value	6.44E+01	5.27E+00	9.62E-02	6.98E+01	
	TOTAL	MJ, net calorific value	6.59E+01	1.05E+01	2.50E+00	7.89E+01	
Secondary materia	I	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Renewable secondary fuels		MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Non-renewable secondary fuels		MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Net use of fresh wa	ater	m ³	3.67E-02	4.80E-03	7.41E-06	4.15E-02	



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Waste production and output flows

Waste production

Average PET yarn								
PARAMETER	UNIT	Up-stream	Core	Down- stream	TOTAL			
Hazardous waste disposed	kg	2.42E-05	5.79E-06	6.57E-06	3.66E-05			
Non-hazardous waste disposed	kg	3.78E-02	6.29E-03	7.89E-01	8.33E-01			
Radioactive waste disposed	kg	8.50E-05	8.22E-05	1.79E-05	1.85E-04			

Nota: Los materiales generados durante el proceso productivo que se consideran residuos son los enviados a vertedero para su disposición final (materiales no reutilizados, reciclados y/o valorizados).

Output flows

Average PET yarn								
PARAMETER	UNIT	Up-stream	Core	Down- stream	TOTAL			
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
Material for recycling	kg	0.00E+00	3.68E-06	0.00E+00	3.68E-06			
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00			

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ENVIRONMENTAL INFORMATION



Other environmental indicators

Indoor air emissions: The manufacturer declares that the use of BRILEN PET yarn does not produce indoor air emissions during its service life.

Soil and water emissions: The manufacturer declares that the use of BRILEN PET yarn does not generate emissions to soil or water during its service life.

Additional environmental information

- Circular Economy Project: Project «POSTINDUSTRIAL REPROCESSING AND RECOVERY CENTER» for all waste generated in the plant, rPET generation project.
- Thanks to our TIM Intermodal Terminal, more than 80% of CO2 has been reduced as a result of the switch from road to rail between Barcelona and Bilbao ports and the Barbastro plant.
- Trigeneration station 14,140 kW (GAS-COLD-STEAM-ENERGY-EFFICIENT). With HTM heating with exhaust gases.
- Self-consumption photovoltaic park: An area of 305,500 m², 105,000 m² for solar panels, which will produce 15.2 GWh/year. It will be the largest self-consumption photovoltaic park in Spain.









- Product Category Rules 2013:12 Textile yarn and thread of natural fibres, man-made filaments or staple fibres, version 3.0. UN CPC 263 and 264. DATE 2022-02-25. VALID UNTIL: 2026-02-25.
- Life Cycle Analysis Report for the environmental product declaration of PET yarns from Brilen Tech S.A (SAMCA group), conducted by Abaleo S.L. Febrary 2023. Version 2.0.
- EPD International (2019). General Programme Instructions for the Internacional EPD® System. Version 4.0. Date 2021-03-29, based on ISO 14025 and ISO 14040/14044.
- Environmental databases and impact methodologies implemented using SimaPro 9.4.0.2.
- Standard UNE-EN ISO 14025:2010. Environmental labels and declarations Type III environmental declarations Principles and procedures. (ISO 14025:2006).











- Standard UNE-EN ISO 14040:2006/A1:2021. Environmental Management. Life Cycle Analysis. Principles and reference framework. Amendment 1. (ISO 14040:2006/Amd 1:2020).
- Standard UNE-EN ISO 14044:2006/A1:2021. Environmental management. Life cycle assessment. Requirements and guidelines. Amendment 2. (ISO 14044:2006/Amd 2:2020).
- Website www.statista.com: Recycling rates of polyethylene terephthalate (PET) in Europe in 2020, by manufacturing scope. Visited on 09/03/203.
- Report Plastics the Facts 2022. Plastics Europe. October 2022.















VERIFICATION STATEMENT CERTIFICATE *CERTIFICADO DE DECLARACIÓN DE VERIFICACIÓN*

Certificate No. / Certificado nº: EPD08201

TECNALIA R&I CERTIFICACION S.L., confirms that independent third-party verification has been conducted of the Environmental Product Declaration (EPD) on behalf of:

TECNALIA R&I CERTIFICACION S.L., confirma que se ha realizado verificación de tercera parte independiente de la Declaración Ambiental de Producto (DAP) en nombre de:

BRILEN, S.A. (grupo SAMCA) Paseo Independencia, 21, 3º 50001 ZARAGOZA - SPAIN

for the following product(s):
para el siguiente(s) producto(s):

Polyester High Tenacity Yarn: 1100 dtex GLE, 1100 dtex VLS and 6600 dtex DST.

Hilo de poliéster de alta tenacidad: 1100 dtex GLE, 1100 dtex VLS y 6600 dtex DST.

with registration number **S-P-07873** in the International EPD[®] System (www.environdec.com). con número de registro **S-P-07873** en el Sistema International EPD[®] (www.environdec.com).

it's in conformity with: *es conforme con:*

- ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations.
- General Programme Instructions for the International EPD[®] System v.4.0.
- PCR 2013:12 v3.0 Textile yarn and thread of natural fibres, man-made filaments or staple fibres.
- UN CPC 2643 Yarn (other than sewing thread) of synthetic staple fibres, containing 85% or more by weight of such fibres.

Issued date / Fecha de emisión: Update date / Fecha de actualización: Valid until / Válido hasta: Serial Nº / Nº Serie: 23/03/2023 23/03/2023 20/03/2028 EPD0820100-E tecnalia a

Carlos Nazabal Alsua Manager

FICA



This certificate is not valid without its related EPD. Este certificado no es válido sin su correspondiente EPD.

El presente certificado está sujeto a modificaciones, suspensiones temporales y retiradas por TECNALIA R&I CERTIFICACION. This certificate is subject to modifications, temporary suspensions and withdrawals by TECNALIA R&I CERTIFICACION. El estado de vigencia del certificado puede confirmarse mediante consulta en www.tecnaliacertificacion.com. The validity of this certificate can be checked through consultation in www.tecnaliacertificacion.com.

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