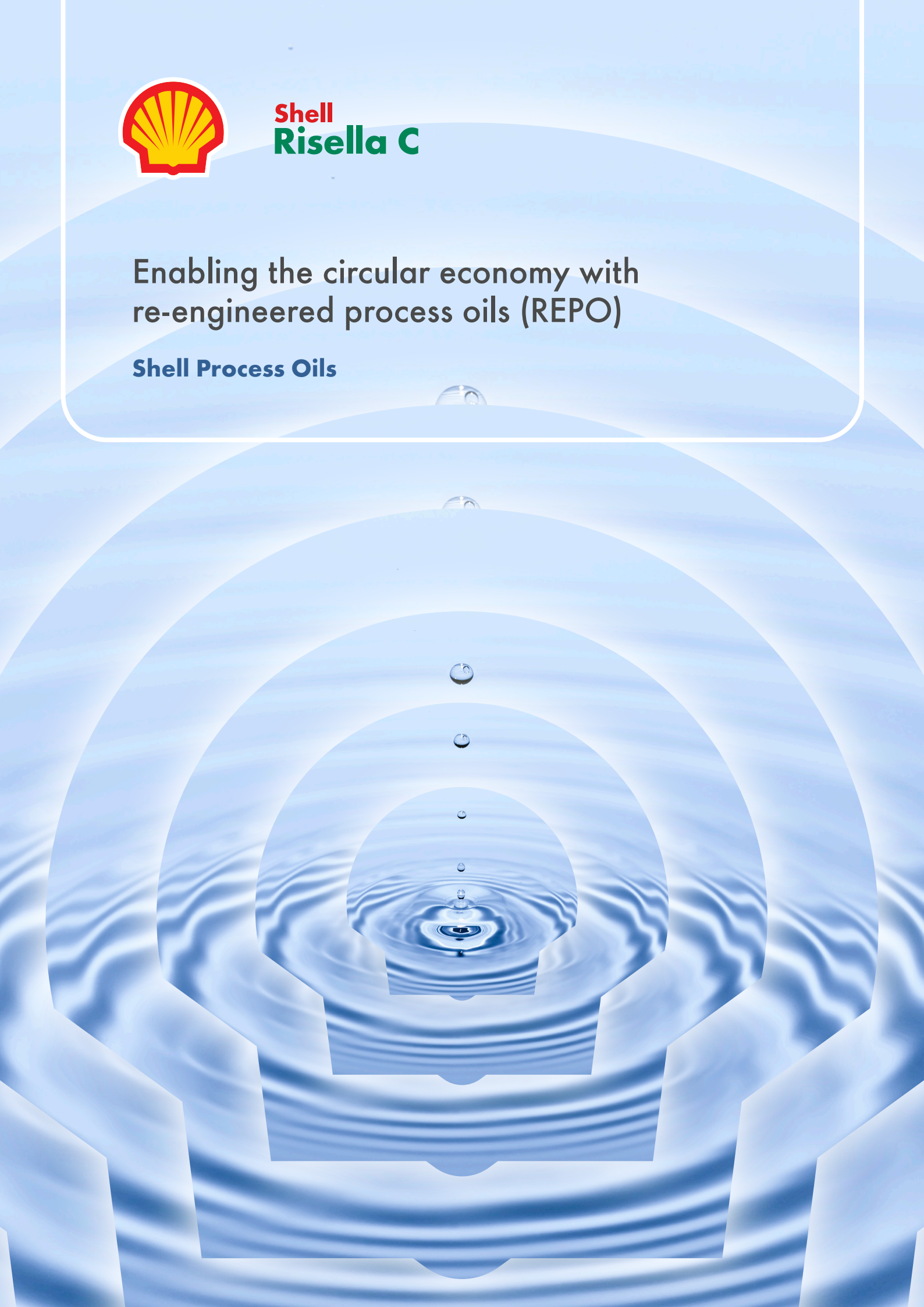




Shell
Risella C

Enabling the circular economy with
re-engineered process oils (REPO)

Shell Process Oils



Are your customers searching for a process oil that...

...contains recycled material?

...has a lower carbon footprint?

...does not compromise on quality and performance?

Sustainability and performance? Now you can have both.

Introducing Shell Risella C re-engineered process oils (REPO), our newest Group II+/III process oils that offer a more sustainable alternative that does not compromise on performance (Figure 1).

Shell Risella C process oils enable you to offer products with the sustainability credentials, performance and consistency that you and your customers are searching for.

Designed for the circular economy and re-engineered from waste oil, the Shell Risella C range offers performance comparable to our high-quality white oil portfolio and consistent quality every time.



Figure 1: Shell Risella C is our newest Group II+/III process oil.



Growing demand for circularity

With the global population growing, the demand for goods, natural resources and energy is putting more and more strain on the environment. Consequently, the shift to a circular economy is critical to separate economic growth from resource use and environmental impact.

Growth of the circular economy is driven by three key factors: market demand; environmental, social and governance (ESG) targets; and regulation.

Market demand for circularity

Tougher regulation means that circularity is becoming a key factor in the purchasing decisions of customers and is driving demand for oil-based products that contain more recycled molecules, such as recycled waste oil; have a lower carbon footprint; and do not compromise on quality and performance. As a result, by 2027, the global REPO market is expected to grow by as much as 6.5% (CAGR), reaching a value of almost \$9 billion.¹

What does this mean?

Customers are starting to search for formulators that offer more sustainable and/or circular products that can help them meet environmental targets.

Growing importance of ESG performance

Meeting environmental and disclosure targets is becoming more important for companies. According to recent research, 62% of institutional investors in Europe now attach greater significance to ESG credentials, and 21% of investors globally state that climate risk is a primary factor influencing investing decisions.² Consequently, businesses with higher environmental credentials often pay less for capital.³

What does this mean?

Switching to more sustainable process oils can help formulators and their customers achieve ESG targets, and, by taking a proactive approach to changing environmental regulation and market demands, they can enhance their long-term business resilience.

Regulating the circular economy

Governments around the world are starting to take action to reduce the generation of waste by introducing stricter policies that commit them to increasing the amount of recycled content in products and reducing waste. For example, the EU's Circular Economy Action Plan – a key building block of the European Green Deal – introduces initiatives throughout the entire life cycles of products made in or imported into the EU that target how those products are designed, manufactured and discarded.⁴

Additionally, in the USA, states such as California and Colorado are starting to incorporate circularity into state legislation. And in China, the circular economy is promoted as a top-down, national political objective.⁵

What does this mean?

Formulators and their customers are under increasing pressure to align with stricter regulation and enhance long-term business resilience.

The circular economy

The circular economy is an economic model of production and consumption in which – unlike the traditional linear economy, based on a system that takes, makes, consumes then discards – the aim is to keep end-of-life materials, such as used oil, within the economy by recycling. This means materials can be productively used again and again, creating further value while reducing waste, demand for raw materials and impact on the environment.⁶



¹Arizton | Re-refined Base Oils: A Step Towards Environment Sustainability (2022)

²Schroders | Institutional Investor Study: optimism surges for investor returns (2021)

³MSCI | ESG and the cost of capital (2020)

⁴European Union | EU Circular Economy Action Plan

⁵EY | Regulatory landscape of the circular economy (2022)

⁶European Parliament | Circular economy: definition, importance and benefits (2023)

Introducing Shell Risella C: Re-engineered for the circular economy

Shell Risella C paves the way for a new generation of circular process oils that can help you and your customers adapt and contribute to the circular economy, reduce embodied carbon emissions and meet the growing demand for more recycled molecules in oil-based products.

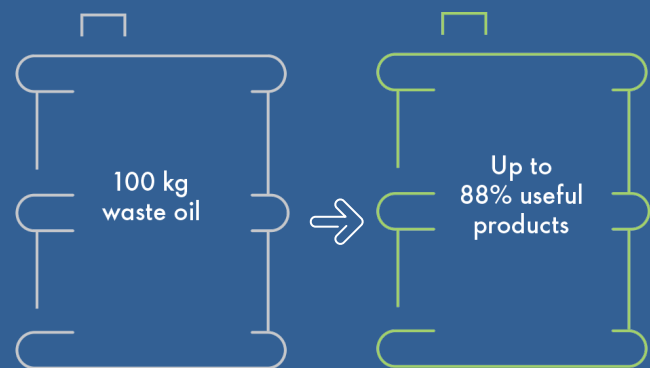
As our newest Group II+/III process oil, Shell Risella C has been specifically designed to guarantee circularity, performance and consistency.


Circularity

Shell Risella C is re-engineered from waste oil. This means it can help reduce the amount of waste oil sent to landfill or for incineration, thereby helping to reduce potential water and soil pollution, and carbon emissions. Additionally, using recycled feedstock can help reduce the use of virgin fossil fuels and emissions from their extraction and processing.

Did you know...

...re-refining technology can produce 88% useful products, including high-quality base oils.⁷




 About **35%**
 lower carbon footprint vs Group III virgin process oils.*

About **20%**
 lower carbon footprint vs Group II virgin process oils.*

* Comparison of recycled (re-engineered) and virgin base oil based on cradle-to-refinery-gate carbon intensities for a given API base stock group. Recycled base oil carbon intensity calculated based on primary activity data from producer following industry best practice guidance.

⁷ Infineum Insight: The rise of re-refining

Performance

Shell Risella C has been re-engineered with advanced physical properties that offer comparable performance to our portfolio-leading Shell Risella X process oils (Table 1). For example, Shell Risella C has exceptional thermal and UV stability, meaning that it will continue to deliver high performance (Figure 2).

Oil type	Method	ISO/DIN	Shell Risella C 415	Shell Risella C 420	Shell Risella C 425	Shell Risella X 409	Shell Risella X 411	Shell Risella X 415	Shell Risella X 420
ASTM colour	ASTM D1500	No data	L0.5	L0.5	L0.5	No data	No data	No data	No data
Saybolt colour	ASTM D156		+28	0.5 (ASTM)	0.5 (ASTM)	30	25	30	30
Density 15°C, kg/m ³	ISO 12185/ ASTM D4052	ISO 12185	834	832	839	785	800	806	816
Flash point COC, °C	ISO 2592/ ASTM D92	ISO 2592	190	228	243	136	168	200	230
Pour point, °C	ISO 3016/ ASTM D97	ISO 3016	-15	-18	-15	-15	-15	-39	-36
Kinematic viscosity									
at 20°C, mm ² /s	ASTM D445	ISO 3104	27	45	86	5.3	10.5	18	40
at 40°C, mm ² /s	ASTM D445	ISO 3104	12.6	19.5	33.6	3.3	6	9.3	18
at 100°C, mm ² /s	ASTM D445	ISO 3104	3.1	4.2	6.0	1.3	2.0	2.6	4.1
Viscosity index	ASTM D2270	ISO 2909	105	121	126	No data	133	118	130
Refractive index at 20°C	ASTM D1218		1.4606	1.4603	1.4636	1,438	1,445	1,450	1,454
NOACK volatility (1 h, 250°C), %m/m	ASTM D 5800	DIN 51581	37	12	7.4	94	74	40	12
Sulphur, mg/kg	ASTM D5453/ D2622	ISO 14596	< 3	< 3	< 3	< 1	< 1	< 1	< 1
Technical white oil	FDA 178.3620 (b)	No data	Pass	No data	No data	Pass	Pass	Pass	Pass
Carbon type distribution									
C/A (S-corr.) %	D 2140 m.	DIN 51378	0	0	0	No data	No data	No data	No data
C/N (S-corr.) %	D 2140 m.	DIN 51378	31	20	21	No data	No data	No data	No data
C/P (S-corr.) %	D 2140 m.	DIN 51378	69	80	79	No data	No data	No data	No data
SIM Dest. - °C -5 Vol-%	D 2887 e.	No data	333	388	404	No data	No data	No data	No data
SIM Dest. - °C -95 Vol-%	D 2887 e.	No data	433	462	516	No data	No data	No data	No data

Table 1: Shell Risella C offers comparable performance to our high-quality white-oil portfolio.

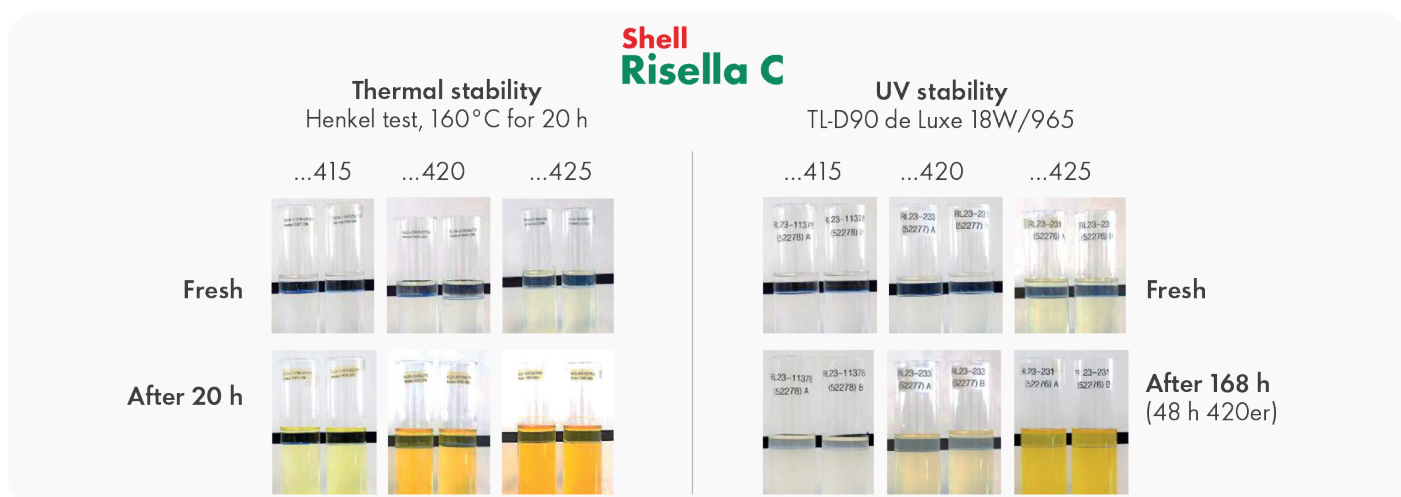


Figure 2: Shell Risella C has exceptional stability performance.

Consistency

Conventional recycled oils often vary in quality; however, Shell Risella C is produced by a multi-stage engineering process, which ensures that every molecule performs consistently, delivering the same quality, every time (Figure 3).

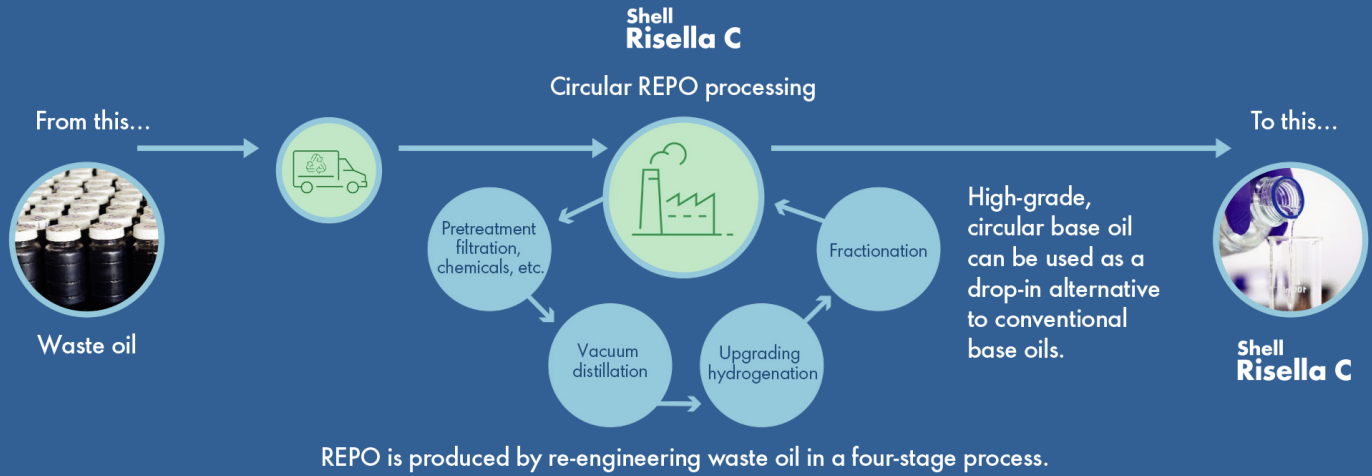


Figure 3: Shell Risella C is produced by re-engineering waste oil in a four-stage process.

Shell Risella C: The sustainable choice for you and your customers

Shell Risella C offers consistency and performance in formulations for a wide range of potential applications:



automotive components (e.g., seals and mats)



chemicals (e.g., paints, coatings, additives, silicone sealants and radiator fluids)



polymeric materials (e.g., TPE and EPDM)



explosives



metalworking



toys and heat transfer applications

...and many more.

Incorporating Shell Risella C into your formulations can help you and your customers

- **lower your supply chain carbon footprint.** Production of Shell Risella C emits less carbon dioxide than process oils made from virgin hydrocarbons. This means you can offer customers products with lower carbon footprints.

- **demonstrate sustainability leadership.** Switching to a circular REPO, such as Shell Risella C, can help give you competitive advantage with customers searching for more sustainable and circular products.
- **long-term business resilience.** Incorporating Shell Risella C into your products can help keep you and your customers aligned with an evolving regulatory landscape.

To learn more about Shell Risella C, visit [shell.com/RisellaC](https://www.shell.com/RisellaC).