ASML HOLDING NV

FORM 6-K
(Report of Foreign Issuer)

Filed 02/29/16 for the Period Ending 02/29/16

Telephone 31402683000
CIK 0000937966
Symbol ASML
SIC Code 3559 - Special Industry Machinery, Not Elsewhere Classified
Industry Semiconductor Equipment & Testing
Sector Technology
Fiscal Year 12/31
Indicate by check mark whether the registrant files or will file annual reports under cover of Form 20-F or Form 40-F.

Form 20-F ☒ Form 40-F ☐

Indicate by check mark whether the registrant by furnishing the information contained in this Form is also thereby furnishing the information to the Commission pursuant to Rule 12g3-2(b) under the Securities Exchange Act of 1934.

Yes ☐ No ☒

If “Yes” is marked, indicate below the file number assigned to the registrant in connection with Rule 12g3-2(b):
<table>
<thead>
<tr>
<th>Exhibit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>99.3</td>
<td>Update on Share Buy-Back Program</td>
</tr>
</tbody>
</table>
Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

ASML HOLDING N.V. (Registrant)

Date: February 29, 2016

By: /s/ Peter T.F.M. Wennink
     Peter T.F.M. Wennink
     Chief Executive Officer
ASML Partners with Nippon Control System to Streamline Process Flow from Design to Mask Production

San Jose, California, 22 February 2016 – ASML Holding NV (ASML) today announced a partnership with Nippon Control System Corporation (NCS) to integrate their products from optical proximity correction (OPC) to mask data preparation (MDP) on a common platform, delivering improvements in mask tape-out productivity and patterning performance in wafer fabrication. Semiconductor manufacturers will now be able to deploy ASML’s computational lithography products and NCS’ MDP products into a seamless process flow for a faster and more accurate design to mask (D2M) solution.

The collaboration addresses the challenges customers are facing in mask tape-out and wafer patterning driven by growing mask complexity with shrinking process nodes in both multiple patterning and EUV applications. Specific integration examples and benefits include:

- A complete MDP flow to identify and improve mask accuracy required for pattern fidelity, critical dimension uniformity (CDU) and overlay performance;
- A seamless processing and handling of large volumes of data between OPC and MDP operations to reduce cycle time and optimize productivity, while maximizing utilization of available computing resources.

“By connecting ASML’s OPC and NCS’ MDP in an integrated tape-out flow, we have efficiently utilized computing clusters and greatly reduced our design to mask cycle time,” said Laurent Tuo, Fellow and Technical Director at TSMC. “Such connectivity also enables mask process enhancements based on OPC output to deliver better imaging performance and more robust process window.”

An integrated OPC and MDP solution is of greater importance for EUV lithography. “Mask proximity effects are stronger with electron back scattering from the multi-layer mask stack composed of heavy metal elements,” said Nobuyasu Horiuchi, President of NCS. “An integrated EUV MDP solution flow will help accurately model and correctly handle mask making and wafer imaging processes that impact CDU in EUV lithography.”

“Together with NCS, we are enabling complete solutions from design to mask and driving wafer patterning performance to support our customers’ roadmaps at leading-edge nodes,” said Christophe Fouquet, Executive Vice President of Applications at ASML. “This partnership will further extend the scanner imaging and overlay capabilities, by incorporating MDP in the holistic lithography solutions that consist of computational lithography, wafer lithography, metrology and process control.”
About Nippon Control System Corporation (NCS)

Nippon Control System Corporation (NCS) is a mask data preparation (MDP) software provider and has been providing MDP systems and fracturing tools to the semiconductor industry since 1990. NCS offers NDE Mask Manufacturable Suite (NDE-MS) which includes all applications required by mask manufacturers after OPC and before mask writing. The applications are NDE-Fracture, MRC, Select, Pattern-Match, SCRD, PEC, MPC, and View, supporting rule-based and model-based mask process correction (MPC), for both DUV and EUV mask applications. For more information: http://www.nippon-control-system.co.jp

About ASML

ASML is one of the world’s leading manufacturers of chip-making equipment. Our vision is to enable affordable microelectronics that improve the quality of life. To achieve this, our mission is to invent, develop, manufacture and service advanced technology for high-tech lithography, metrology and software solutions for the semiconductor industry. ASML’s guiding principle is continuing Moore’s Law towards ever smaller, cheaper, more powerful and energy-efficient semiconductors. This results in increasingly powerful and capable electronics that enable the world to progress within a multitude of fields, including healthcare, technology, communications, energy, mobility, and entertainment. We are a multinational company with over 70 locations in 16 countries, headquartered in Veldhoven, the Netherlands. We employ more than 14,000 people on payroll and flexible contracts (expressed in full time equivalents). ASML is traded on Euronext Amsterdam and NASDAQ under the symbol ASML. More information about ASML, our products and technology, and career opportunities is available on: www.asml.com

Forward Looking Statements

This document contains statements relating to certain projections and business trends that are forward-looking, including statements with respect to ASML’s partnership with NSC and the expected benefits from the partnership, including the expected performance and productivity improvements in semiconductor fabrication. You can generally identify these statements by the use of words like “may”, “will”, “could”, “should”, “project”, “believe”, “anticipate”, “expect”, “plan”, “estimate”, “forecast”, “potential”, “intend”, “continue” and variations of these words or comparable words. These statements are not historical facts, but rather are based on current expectations, estimates, assumptions and projections about the business and our future financial results and readers should not place undue reliance on them. Forward-looking statements do not guarantee future performance and involve risks and uncertainties. These risks and uncertainties include, without limitation, the risk that the expected benefits with respect to ASML’s partnership with NSC may not be realized and other risks indicated in the risk factors included in ASML’s Annual Report on Form 20-F and other filings with the US Securities and Exchange Commission. These forward-looking statements are made only as of the date of this document. We do not undertake to update or revise the forward-looking statements, whether as a result of new information, future events or otherwise.
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Forward Looking Statements

This document contains statements relating to certain projections and business trends that are forward-looking, including statements with respect to productivity of our tools and systems performance, EUV system performance, expected industry trends, and EUV targets (including availability, productivity and shipments) and roadmaps. You can generally identify these statements by the use of words like "may", "will", "could", "should", "project", "believe", "anticipate", "expect", "plan", "estimate", "forecast", "potential", "intend", "continue" and variations of these words or comparable words. These statements are not historical facts, but rather are based on current expectations, estimates, assumptions and projections about the business and our future financial results and readers should not place undue reliance on them. Forward-looking statements do not guarantee future performance and involve risks and uncertainties. These risks and uncertainties include, without limitation, the impact of manufacturing efficiencies and capacity constraints, performance of our systems, the continuing success of technology advances and the related pace of new product development and customer acceptance of new products, the number and timing of EUV systems expected to be shipped and recognized in revenue, delays in EUV systems production and development, our ability to enforce patents and protect intellectual property rights, the risk of intellectual property litigation, availability of raw materials and critical manufacturing equipment and other risks indicated in the risk factors included in ASML’s Annual Report on Form 20-F and other filings with the US Securities and Exchange Commission. These forward-looking statements are made only as of the date of this document. We do not undertake to update or revise the forward-looking statements, whether as a result of new information, future events or otherwise.
EUV lithography performance for manufacturing: status and outlook

Alberto Pirati

ASML Netherlands B.V., De Run 6501, 5504 DR Veldhoven, The Netherlands

SPIE 2016
Special appreciation to:

- Matthew Colburn of IBM
- Dan Corliss of IBM
- Danilo de Simone of IMEC
- Tony Yen of TSMC
- Britt Turkot of Intel corporation
- Chang Moon Lim of SK Hynix
- Seong Sue Kim of Samsung Electronics
- Andrew Grenville of Inpria
- Martin Lowisch of Zeiss

ASML:

- Rudy Pastors
- Daniel Smith
- Roderik van Es
- Eric Verhoeven
- Jo Finders
- Arthur Minnaert
- Marij Hermens
- Eelco van Setten
- Lisa Mohanty
- Jan-Willem van der Horst
- Jan van Schoot
- Jeannot Driedonkx
- Sander Hofman
- Nicklas Mika
- Bill Arnold
- Derk Brouns
- Joerg Mallmann
- Daniel Brown

- Christophe Smeets
- Kars Troost
- Rik Hoefnagels
- Gijsbert Rispens
- Raymond Maas
- Hans Meiling
- Judon Stoeldraijer
- Herman Boom
- Christian Wagner
- Sjoerd Lok
- Uwe Stamm
- Michael Purvis
- Alex Schafgans
- Igor Fomenkov
- Michael Lercel
- David Brandt
- Geert Fisser
EUV provides lower cost, higher yield, faster time to market

<table>
<thead>
<tr>
<th>Design</th>
<th>Critical litho</th>
<th>Wafer cost</th>
<th>Expected Yield</th>
<th>Expected Time-to-Market</th>
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<tbody>
<tr>
<td>1D</td>
<td>54x ArF immersion</td>
<td>Ref.</td>
<td>Ref.</td>
<td></td>
</tr>
<tr>
<td>1D</td>
<td>9x EUV + 21x ArFi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2D</td>
<td>9x EUV + 19x ArFi</td>
<td></td>
<td></td>
<td>Ref.</td>
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</tbody>
</table>
See: 9776-55, Jan van Schoot “EUV high-NA scanner and mask optimization for sub-8nm resolution”
• Throughput & Wafers per Day (WpD)
• Availability
• Defectivity, imaging and overlay
Wafers per day capability: multiple NXE:3300B above 1,000
NXE:3350B demonstrated 1,368

NXE:3300B at customers

- NXE:3300B today: 6 systems in 80W configuration, 2 in 40W
- One year ago: 1x80W, 5x40W

NXE:3350B at ASML factory

- NXE:3350B ATP test: 96 fields, 20mJ/cm2

WpD: maximum number of wafers exposed in a 24 hr period
NXE:3300B productivity at customer: average ~800 wafers per day over multiple weeks

Total Exposed wafers 11174
AVG WPD 798
AVG availability 85.7%
NXE:3350B productivity in ASML factory: ~950 wpd average over 8 days
Demonstrated 75 WpH on NXE:3350B
Further improvements with 125W settings

NXE:3300B, at customers

NXE:3350B, in the ASML factory

2014 Q1 2014 Q2 2014 Q3 2014 Q4

2015 Q3 2015 Q4

NXE:3500B ATP test: 26x33mm2, 96 fields, 20mJ/cm2
NXE:3350B: 125W settings qualified and ready for field roll out

Mean pulse energy at Intermediate Focus ~3mJ

EUV power at Intermediate Focus 125W

Energy control Overhead ~20%
NXE:3300B productivity supports customer process development

>300k wafers exposed on NXE:3300B at customer sites
Acceleration in power scaling towards >200W builds further confidence in EUV productivity

See: 9776-21, Michael Purvis “Advances in predictive plasma formation modelling”

See SPIE 2015, 9422-10, Alex Schafgans, “Performance optimization of MOPA pre-pulse LPP light source”
• Throughput & Wafers per Day (WpD)
• Availability
• Defectivity, imaging and overlay
Availability: capability beyond 75% proven on multiple field systems

2016 focus: reduce scheduled maintenance, reduce variability

~50% of downtime is scheduled down

Uptime = productive time + standby time + engineering time

Maximum 4 weeks average realized in the field
Droplet Generator: Principle of Operation

- Tin is loaded in a vessel & heated above melting point
- Pressure applied by an inert gas
- Tin flows through a filter prior to the nozzle
Droplet Generator: ~2x improvements in run time, swap time
Next generation DGen: demonstrated > 1 month lifetime capability

![Diagram showing run time and swap time improvements over quarters from 2015 Q3 to 2016 Q1 for different types of DGen.]
Continuous improvements in collector protection at increasing power
100 Gpulses capability demonstrated at 125W

Reflectivity [%]

40 W configuration
Degradation rate = 0.7% / Gpulse

80 W configuration
Degradation rate = 0.6% / Gpulse

125 W configuration
Degradation rate = 0.4% / Gpulse

Gigapulse
250W feasibility proven without increase in protective Hydrogen flow
No rapid collector contamination, allowing stable droplets and >125 w/hr@20 mJ/cm²
EUV productivity realization on track

<table>
<thead>
<tr>
<th>Timing</th>
<th>Source power [W]</th>
<th>Throughput [Wafers/hr]</th>
<th>System availability [%]</th>
<th>Productivity [Wafers/day]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>125 ✓</td>
<td>&gt;75 ✓</td>
<td>&gt;70% ✓</td>
<td>&gt;1000 ✓</td>
</tr>
<tr>
<td>2016</td>
<td>250 ✓</td>
<td>&gt;125 ✓</td>
<td>&gt;80% ✓</td>
<td>&gt;1500 ✓</td>
</tr>
</tbody>
</table>

✓ Done ✓ Capability demonstrated ✓ On track
• Throughput & Wafers per Day (WpD)

• Availability

• Defectivity, imaging and overlay
Front-side reticle defectivity: 10x reduction/year realized

Added particles > 92nm per reticle pass

<table>
<thead>
<tr>
<th>Test</th>
<th>Cycles</th>
<th># Added Particles</th>
<th>PRP Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>228</td>
<td>0</td>
<td>&lt;0.004</td>
</tr>
<tr>
<td>B</td>
<td>140</td>
<td>0</td>
<td>&lt;0.007</td>
</tr>
<tr>
<td>C</td>
<td>450</td>
<td>0</td>
<td>&lt;0.002</td>
</tr>
<tr>
<td>D</td>
<td>222</td>
<td>1</td>
<td>0.0045</td>
</tr>
<tr>
<td>E</td>
<td>133</td>
<td>0</td>
<td>&lt;0.007</td>
</tr>
<tr>
<td>Cumulative</td>
<td>1173</td>
<td>1</td>
<td>0.0008</td>
</tr>
</tbody>
</table>

Customer requirement for full production without pellicle
Collaborative effort between Intel and ASML

200 wafers exposed with NXE Pellicle

ASML

Wilton

Scanner modified with pellicle compatible loadlock

EUV defectivity reticle shipped

ASML Veldhoven

Global transport

Multiple location handling

ASML

Portland

ASML

Santa Clara

200 wafers exposed

with NXE Pellicle

Ref: 9776-1, Britt Turkot: “EUV progress towards HVM readiness”

Exposure testing will continue to 1000+ wafers with NXE Pellicle
200 wafers exposed using reticle with 40W pellicle

Collaborative effort between Intel and ASML

- NO RETICLE ADDERS OBSERVED IN WAFER PRINTS
- Particles on pellicle do not appear to migrate to reticle surface
- ASML pellicle frame design is mitigating adder rate
  - defectivity assessment continuing

EUV defectivity
reticle shipped

- Global transport
- Multiple location handling

Exposure testing will continue to 1000+ wafers with NXE Pellicle

Ref: 9776-1, Britt Turkot: “EUV progress towards HVM readiness”
Overlay impact with NXE pellicle < 0.17 nm
Mounted on preliminary tooling; New tooling will reduce overlay further

Overlay impact reticle + studs
99.7%
x: 0.07 nm
y: 0.08 nm
0.3 nm

See: 9776-71, Derk Brouns “ASML NXE pellicle update”

Overlap impact reticle + studs pellicle assy
99.7%
x: 0.17 nm
y: 0.07 nm
0.3 nm
NXE:3350B: 2x overlay improvement at 16nm resolution
Completed qualification for five systems in 2015

Overlay set up
Set-up and modeling improvements

SMASH sensor
Improved alignment sensor

Spotless NXE
Automated wafer table cleaning

Reticle Stage
Better thermal control
Increased servo bandwidth

Projection Optics
Higher lens transmission
Improved aberrations and distortion

Wafer Stage
Improved thermal control

New UV level sensor

Improved air mounts

Off-Axis Illuminator FlexPupil

<table>
<thead>
<tr>
<th>Resolution</th>
<th>16nm</th>
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</thead>
<tbody>
<tr>
<td>Full wafer CDU</td>
<td>≤ 1.3nm</td>
</tr>
<tr>
<td>DCO</td>
<td>≤ 1.5nm</td>
</tr>
<tr>
<td>MMO</td>
<td>≤ 2.5nm</td>
</tr>
<tr>
<td>Focus control</td>
<td>≤ 70nm</td>
</tr>
<tr>
<td>Productivity</td>
<td>≥ 125 WPH</td>
</tr>
</tbody>
</table>
Significant improvements in lens performance

Wavefront RMS (nm)

Optical transmission

NXE:3300B  NXE:3350B

0.4nm  0.2nm  0nm
Overlay and focus performance NXE:3350B
Well in specification due to Hardware improvements and new calibrations

Dedicated chuck overlay [nm]

Matched machine overlay [nm]

Focus uniformity [nm]
Matched machine overlay below 4.5nm for over a year
(NXE:3300B to ArF immersion)

Data collected over ~18 months, no calibrations executed

Courtesy of IBM
NXE:3350 Imaging: 16nm dense lines and 20nm iso space consistently achieve <1.0nm Full Wafer CDU

Illumination: Dipole 90 degrees. Dose ~45mJ/cm²
New resist materials: towards 16nm resolution at full throughput

<table>
<thead>
<tr>
<th>16nm Horizontal Dense lines/spaces</th>
<th>NXE:3350 Reference CAR</th>
<th>New formulation non-CAR</th>
<th>New formulation CAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEM image @BE/BF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dose</td>
<td>40 mJ/cm²</td>
<td>18.5 mJ/cm²</td>
<td>25 mJ/cm²</td>
</tr>
<tr>
<td>Exposure Latitude</td>
<td>16 %</td>
<td>19 %</td>
<td>16 %</td>
</tr>
<tr>
<td>DoF</td>
<td>145 nm</td>
<td>125 nm</td>
<td>100 nm</td>
</tr>
<tr>
<td>LWR</td>
<td>4.6 nm</td>
<td>4.4 nm</td>
<td>5.2 nm</td>
</tr>
</tbody>
</table>

Exposures done on NXE:3350B system with Dipole90Y illumination. LWR: Line Width Roughness
NXE:3400B: 13 nm resolution at full productivity
Supporting 5 nm logic, <15nm DRAM requirements

Reticle Stage
Improved clamp flatness for focus and overlay

Projection Optics
Continuously Improved aberration performance

New Flex-illuminator
Sigma 1.0 outer sigma, reduced PFR (0.20)

SMASH-X prepared
Metro frame prepared for Smash-x

Leveling (Optional)
Next generation UV LS reduced process dependency

Wafer Stage
Flatter clamps, improved dynamics and stability

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Resolution</strong></td>
<td>13 nm</td>
</tr>
<tr>
<td><strong>Full wafer CDU</strong></td>
<td>≤ 1.1 nm</td>
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<tr>
<td><strong>DCO</strong></td>
<td>≤ 1.4 nm</td>
</tr>
<tr>
<td><strong>MMO</strong></td>
<td>≤ 2.0 nm</td>
</tr>
<tr>
<td><strong>Focus control</strong></td>
<td>≤ 60 nm</td>
</tr>
<tr>
<td><strong>Productivity</strong></td>
<td>≥ 125 WPH</td>
</tr>
</tbody>
</table>

- Overlay
- Imaging/Focus
- Productivity
Reduction in Pupil Fill Ratio for Contact Holes contrast improvement
16 nm staggered holes resolved

NXE 3350, CAR hexapole illumination with Pupil Fill Ratio between 10% and 40%

See: 9776-52, Jo Finders “Contrast optimization for 0.33NA lithography”
2D clips: pitch 32nm in x- and y- direction, $k_1=0.39$

Better pattern fidelity with lower Pupil Fill Ratio

See: 97762, Jo Finders “Contrast optimization for 0.33NA lithography”
13nm Half Pitch resolved with non-CAR resist
17%EL and 4.2nm LWR @ 31mJ/cm² dose

<table>
<thead>
<tr>
<th>13nm Horizontal Dense lines</th>
<th>NXE:3350 Baseline CAR</th>
<th>New formulation non-CAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEM image @BE/BF</td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>~40 mJ/cm²</th>
<th>31 mJ/cm²</th>
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<tbody>
<tr>
<td>Dose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure Latitude</td>
<td>-</td>
<td>17 %</td>
</tr>
<tr>
<td>DoF</td>
<td>-</td>
<td>150 nm</td>
</tr>
<tr>
<td>LWR</td>
<td>4.5 nm</td>
<td>4.2 nm</td>
</tr>
</tbody>
</table>

Exposures done on NXE:3350B with dipole Y illumination
20nm Contact Holes: less than 30mJ/cm² dose with non-CAR resist

<table>
<thead>
<tr>
<th>20nm Regular contact holes</th>
<th>New formulation non-CAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEM image @BE/BF</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Dose</td>
<td>29.5 mJ/cm²</td>
</tr>
<tr>
<td>LCDU</td>
<td>3.8 nm</td>
</tr>
</tbody>
</table>

Exposures done on NXE:3350 with Quasar45 illumination
Summary: EUV readying for volume manufacturing

- Completed qualification of five NXE:3350B, the 4\textsuperscript{th} generation EUV exposure tool, one system qualified at 75 wph
- Multiple systems demonstrated >1,000 wafers per day capability, with one system exceeding 1,350 wpd
- 80W configuration operational in the field, 125W configuration qualification completed
- 80% system availability capability demonstrated
- Excellent NXE:3350B imaging and overlay performance at >80W power
- Continuous progress in resist formulation promising towards enabling 13nm half pitch at high throughput
ASML share buy back program

Repurchase up to € 1.5 billion in the 2016 - 2017 timeframe

Announced 20 January 2016

Repurchased of total program: 7.9%

<table>
<thead>
<tr>
<th>Date</th>
<th>Repurchased shares</th>
<th>Average price</th>
<th>Repurchased value</th>
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<tbody>
<tr>
<td>21 Jan - 22 Jan 2016</td>
<td>30,500</td>
<td>€ 80.03</td>
<td>€ 2,440,778</td>
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<tr>
<td>25 Jan - 29 Jan 2016</td>
<td>238,037</td>
<td>€ 82.35</td>
<td>€ 19,601,768</td>
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<tr>
<td>1 Feb - 5 Feb 2016</td>
<td>629,144</td>
<td>€ 80.94</td>
<td>€ 50,923,321</td>
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<td>8 Feb - 12 Feb 2016</td>
<td>455,063</td>
<td>€ 74.86</td>
<td>€ 34,066,035</td>
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<td>15 Feb - 19 Feb 2016</td>
<td>154,911</td>
<td>€ 75.58</td>
<td>€ 11,707,596</td>
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<td>1,507,655</td>
<td>€ 78.76</td>
<td>€ 118,739,497</td>
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