

# Market Survey: Use of bisphenol A and its alternatives in thermal paper in the EU from 2014 to 2017

May 2018

A large, abstract white graphic consisting of several overlapping, curved shapes that resemble stylized petals or leaves, set against a dark blue background.

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## European Chemicals Agency

Mailing address: P.O. Box 400, FI-00121 Helsinki, Finland

Visiting address: Annankatu 18, Helsinki, Finland

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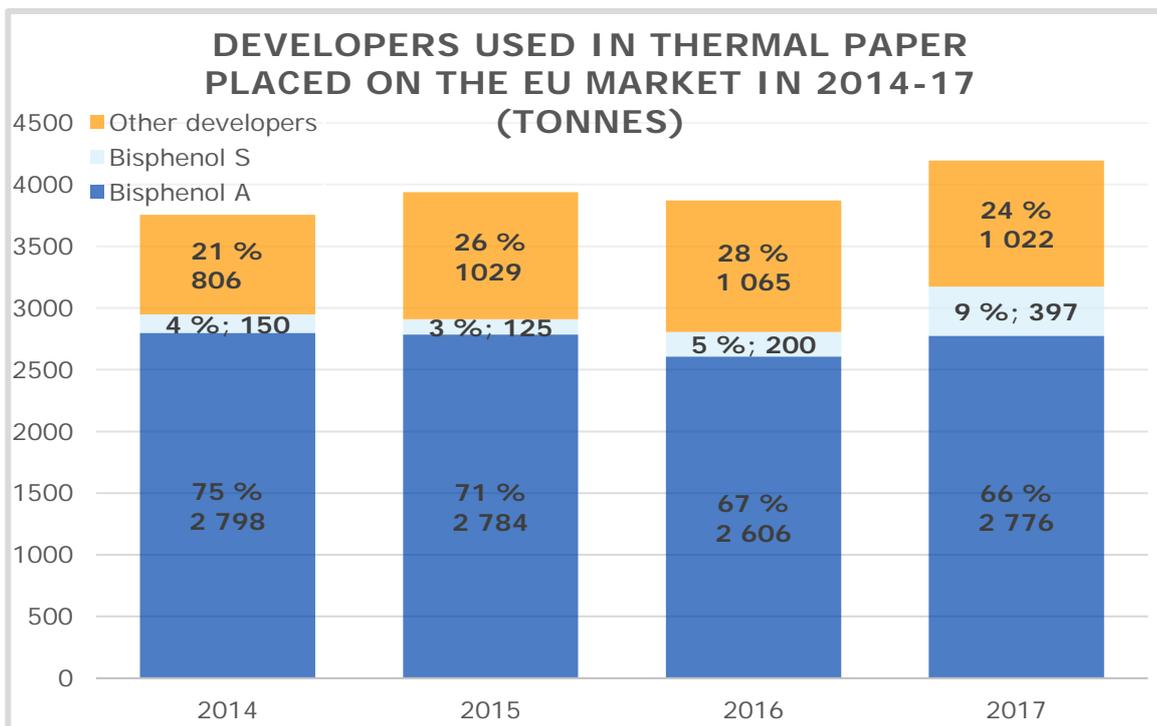
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## Use of bisphenol A and its alternatives in thermal paper in the EU from 2014 to 2017

This is the second report on the use of bisphenol A (BPA) and bisphenol S (BPS) and other developers in thermal paper in the EU<sup>1</sup>. Based on the European Commission’s request, ECHA surveyed manufacturers selling thermal paper in the EU on the use of bisphenol A. The purpose of the report is to monitor to what extent BPA is being replaced by BPS and other developers following the publication of the Commission Regulation (EU) 2016/2235 concerning the restriction of bisphenol A in thermal paper. The Commission decision about the restriction was published on 13 December 2016 and will enter into force on 2 January 2020.

### 1. Summary

The main development in 2017 was that the volume of BPS used as developer in thermal paper manufactured and placed on the market in the EU doubled from 15 kt to 34 kt. This represented about 9 % of the total share of the EU thermal paper market, an increase compared to the 5 % in the previous year. The other noteworthy trend was that the overall volume of thermal paper placed on the EU market by EU manufacturers (members of the European Thermal Paper Association, ETPA) was estimated to have increased by 7 % from 2016 to 2017. In absolute terms, the volume of BPA-based thermal paper placed on the EU market by EU manufacturers increased from 2016 to 2017, whereas that of other developers went down.



**Graph 1: Developers used in thermal paper placed on the EU market in 2014-2017 (ETPA members only).**

Source: ETPA

<sup>1</sup> The first report is available at: [https://echa.europa.eu/documents/10162/22863068/bpa\\_entry\\_en.pdf/6b1d66d4-6a1d-c1c4-e628-4a8a768f274a](https://echa.europa.eu/documents/10162/22863068/bpa_entry_en.pdf/6b1d66d4-6a1d-c1c4-e628-4a8a768f274a)

About 30 % of thermal paper used in the EU is imported from China, India, Japan, Korea and the US. Unfortunately, ECHA has not received information on the shares of developers used in imported thermal paper. Therefore, it has not been possible to verify whether the share of BPS or other developers in thermal paper has changed in imported paper.

In sum, there is an early indication that European paper manufacturers may have started to substitute BPA with BPS in 2017.

According to ETPA, it is expected that the share of BPS-based thermal papers will continue to increase in the coming years. The extent of this growth will depend on the price development of phenol-free developers. ECHA will repeat this market survey at the beginning of each year.

## 2. Thermal paper manufactured in and placed on the EU market

The volume of the BPS-based thermal paper placed on the EU market more than doubled from 2016 to 2017. In the same period, the shares of BPA and other developers were reduced by 1 and 4 percentage points respectively. However, given the overall increase in the volume of thermal papers placed on the EU market in 2017 by the EU manufacturers, the volume of BPA, when measured in absolute terms, also increased.

Table 1a: Developers used in thermal paper placed on the EU market, 2014-17 (tonnes).

Developer	2014	2015	2016	2017	% growth from 2016 to 2017
Bisphenol A	2 799	2 784	2 606	2 776	7 %
Bisphenol S	150	125	200	397	98 %
Other developers	806	1 029	1 065	1 022	-4 %
<b>Total</b>	<b>3 755</b>	<b>3 938</b>	<b>3 871</b>	<b>4 195</b>	<b>8 %</b>

Table 1b: Thermal paper placed on the EU market, 2014-17 (tonnes).

Developer	2014	2015	2016	2017	% growth from 2016 to 2017
Bisphenol A	208 466	208 652	191 025	204 378	7%
Bisphenol S	11 682	11 106	15 035	34 010	126%
Other developers	73 938	89 865	93 688	89 860	-4%
<b>Total</b>	<b>294 086</b>	<b>309 622</b>	<b>299 748</b>	<b>328 248</b>	<b>10%</b>

**Table 1c: Developers used in thermal paper placed on the EU market, 2014-17 (%).**

Developer	2014	2015	2016	2017
Bisphenol A	75 %	71 %	67 %	66 %
Bisphenol S	4 %	3 %	5 %	9 %
Other developers	21 %	26 %	28 %	24 %
<b>Total</b>	<b>100 %</b>	<b>100 %</b>	<b>100 %</b>	<b>100 %</b>

Source: ETPA

### 3. Information on the total amount of thermal paper placed on the market in the EU, including imports

This section summarises data obtained from ETPA, three EU companies that are not members of ETPA, four other companies, as well as information from Eurostat<sup>2</sup> on the import volumes from major thermal paper markets into the EU<sup>3</sup>.

The purpose of this section is to provide a fuller picture of the thermal paper market in the EU, at least with respect to the actual volumes of thermal papers placed on the market. ECHA has not received information on the shares of developers used in imported thermal paper. Thus, it is not possible to report whether the share of BPS or other developers in thermal paper has changed in imported paper. In the absence of such information, ECHA has made assumptions (see footnotes) based on consultations with European stakeholders with special expertise in the thermal paper market.

Based on these assumptions, it would seem that there was overall growth in the shares of both BPA and BPS used from 2016 to 2017, whereas the share of other developers went down in the same period. These results are, however, indicative. A more certain trend is that the overall volume of thermal paper placed on the EU market increased by an estimated 7 % in 2017.

Tables 2a, 2b and 2c incorporate data obtained from ETPA, directly contacted non-ETPA manufacturers (excluding Appvion), and Eurostat figures<sup>4</sup>.

<sup>2</sup> Eurostat data was obtained for imports of thermal paper into the EU from the US, India, China, South Korea and Japan. The necessary readjustments have been applied to avoid any double-counting or any other error of a similar kind. It is also worth noting that the Eurostat data was not looked at in 2017 update, save when investigating the figures for Hansol Paper. For the US, South Korea and Japan, the share of developers used was assumed to be 90 % for BPS and 10 % for other developers (for all four years). For China and India, the share of BPA was estimated to be 90 %, whereas that of BPS was set at 10 % (consulted European manufacturers, distributors, and associations).

<sup>3</sup> For Hansol Paper, the ratio of developers is assumed to be 90 % to 10 % for BPS and other developers (D8), respectively. This ratio was revised from that of 50 % to 50 % included in the first report, on the basis of consultations with various European and Asian stakeholders, such as thermal paper manufacturers and associations.

<sup>4</sup> Data on the three directly contacted Chinese manufacturers was subtracted from the Eurostat figures on China in order to avoid double-counting.

Table 2a: Developers used in thermal paper placed on the EU market, 2014-17 (tonnes).

Developer	2014	2015	2016	2017	% growth from 2016 to 2017
Bisphenol A	3 368	3 396	3 102	3 346	8 %
Bisphenol S	935	899	1 002	1 183	18 %
Other developers	1 460	1 681	1 719	1 674	-3 %
<b>Total</b>	<b>5 763</b>	<b>5 975</b>	<b>5 822</b>	<b>6 203</b>	<b>7 %</b>

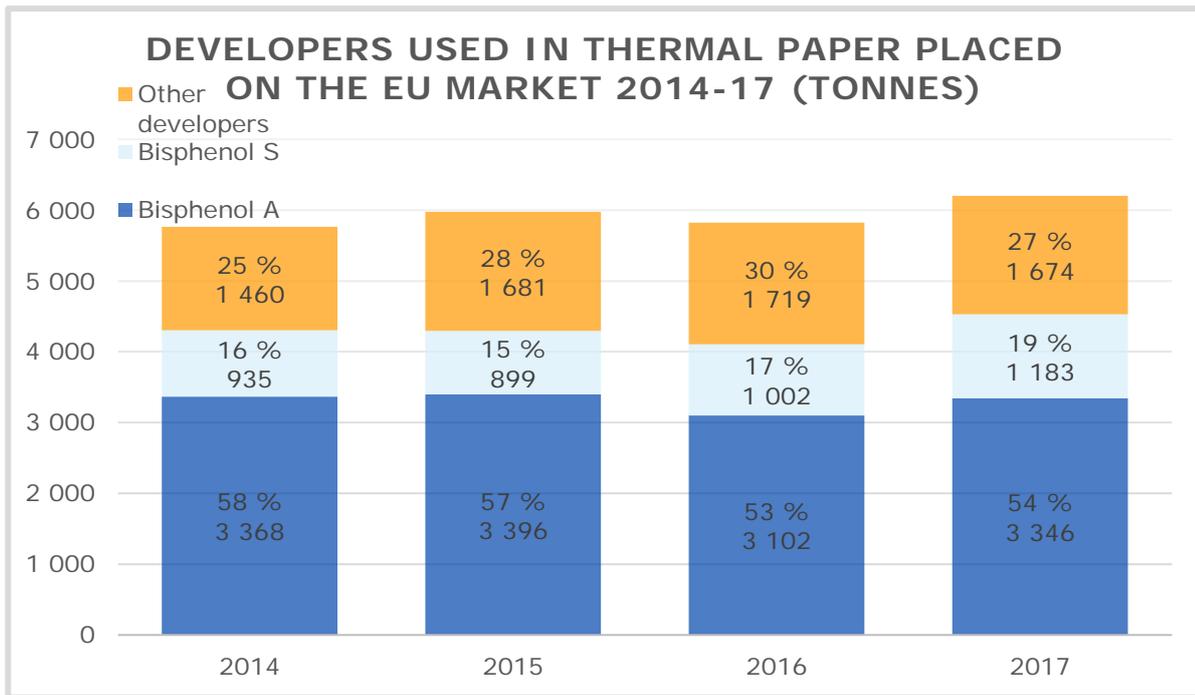
Table 2b: Thermal paper placed on the EU market, 2014-17 (tonnes).

Developer	2014	2015	2016	2017	% growth from 2016 to 2017
Bisphenol A	247 195	250 190	236 623	244 238	8%
Bisphenol S	58 105	56 813	65 840	81 238	26%
Other developers	121 521	140 766	150 530	154 232	-3%
<b>Total</b>	<b>426 821</b>	<b>447 769</b>	<b>452 993</b>	<b>479 708</b>	<b>7%</b>

Table 2c: Developers used in thermal paper placed on the EU market, 2014-17 (%).

Developer	2014	2015	2016	2017
Bisphenol A	58 %	57%	53%	54 %
Bisphenol S	16 %	15%	17%	19 %
Other developers	25 %	28%	30%	27 %
<b>Total</b>	<b>100 %</b>	<b>100 %</b>	<b>100 %</b>	<b>100 %</b>

Sources: ETPA, non-ETPA manufacturers and Eurostat.



**Graph 2: Developers used in thermal paper placed on the EU market in 2014-17 (total).**  
Sources: ETPA, non-ETPA manufacturers and Eurostat.

## Appendix 1. Data received from non-ETPA manufacturers contacted directly

Of the nine<sup>5</sup> non-ETPA manufactures contacted, seven agreed to share information on their use of BPA, BPS and other developers. Two manufacturers – Appvion Inc. (USA) and Hansol Paper (South Korea) – declined to share the information with ECHA. The former stated a lack of resources as the main reason for not sharing the information; the latter identified the confidential nature of such business information as their rationale.

The three Chinese manufacturers<sup>6</sup> informed ECHA that they currently use only BPA in the manufacture of thermal paper. They also said that they plan to use BPS as the developer once the restriction enters into force.

Table 3a: Developers used in thermal paper placed on the EU market, 2014-17 (tonnes)<sup>7</sup>.

Developer	2014	2015	2016	2017
Bisphenol A	14	16	193	182
Bisphenol S	6	8	2	2
Other developers	574	628	657	662
<b>Total</b>	<b>594</b>	<b>652</b>	<b>852</b>	<b>846</b>

Table 3b: Thermal paper placed on the EU market, 2014-17 (tonnes).

Developer	2014	2015	2016	2017
Bisphenol A	1 180	1 217	13 157	12 550
Bisphenol S	200	220	140	60
Other developers	35 891	39 257	41 068	49 301
<b>Total</b>	<b>37 271</b>	<b>40 694</b>	<b>54 365</b>	<b>61 911</b>

<sup>5</sup> China: GHS Gold HuaSheng Paper Co. Ltd, Chenming Paper, Guandong Guan hao High-Tech Co. Ltd; South Korea: Hansol Paper; Japan: Nippon Paper Industries Co., Ltd; US: Appvion, Inc.; EU: Ricoh Industrie SAS (France), Blumberg GmbH & CoKG (Germany), Smith and McLaurin Ltd (UK).

<sup>6</sup> Although all the directly contacted Chinese thermal paper manufacturers produce BPA-based thermal paper, other Chinese manufacturers, who were subsumed under Eurostat figures on China, reportedly also use BPS. Therefore, the ratio of 90 % to 10 % for BPA and BPS, respectively, was assumed.

<sup>7</sup> Whenever the information on the volume of developers used was not provided (e.g. in the case of GHS Gold HuaSheng Paper), the developer was assumed to be 1.48 % of the total weight of the thermal paper. This number has been obtained on the basis of literature review and consultation with European stakeholders with expertise in thermal paper. Generally speaking, the developer is usually about 1-1.5 % of paper weight.

**Table 3c: Developers used in thermal paper placed on the EU market, 2014-17 (%)<sup>8</sup>**

Developer	2014	2015	2016	2017
Bisphenol A	2 %	2 %	23 %	21 %
Bisphenol S	1 %	1 %	0 %	0 %
Other developers	97 %	96 %	77 %	78 %
Total	<b>100 %</b>	<b>100 %</b>	<b>100 %</b>	<b>100 %</b>

Source: Non-ETPA thermal paper manufacturers.

Tables 3d and 3e incorporate information gathered on Hansol Paper's imported volumes of thermal paper into the EU territory<sup>9</sup>.

**Table 3d: Developers used in thermal paper placed on the EU market, 2014-17 (tonnes).**

Developer	2014	2015	2016	2017
Bisphenol A	14	16	193	182
Bisphenol S	219	206	302	237
Other developers	598	650	690	688
Total	<b>830</b>	<b>872</b>	<b>1 185</b>	<b>1 106</b>

**Table 3e: Thermal paper placed on the EU market, 2014-17 (tonnes).**

Developer	2014	2015	2016	2017
Bisphenol A	1 180	1 217	13 157	12 550
Bisphenol S	14 561	13 629	20 392	15 910
Other developers	37 487	40 747	43 318	51 062
Total	<b>53 228</b>	<b>55 593</b>	<b>76 868</b>	<b>79 522</b>

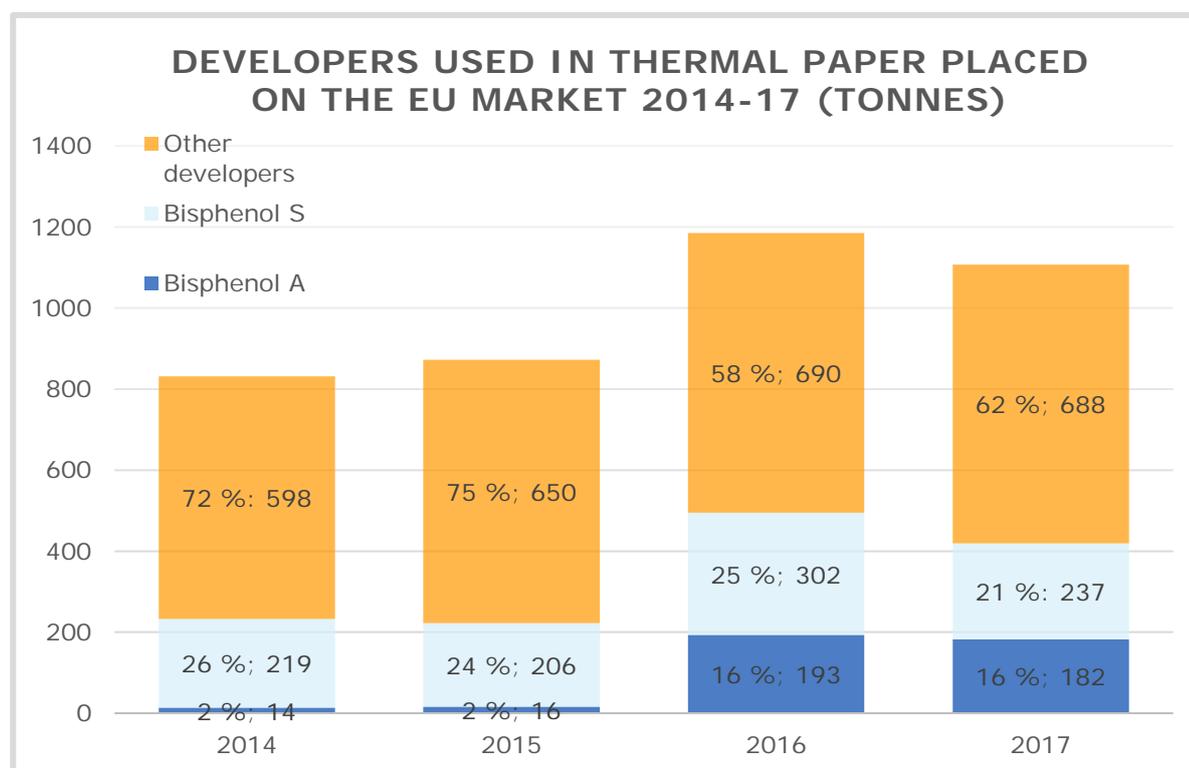
<sup>8</sup> No information available for GHS Gold HuaSheng Paper (China) for 2014-2015. For 2016 and 2017, their reported volumes amounted to 12 000 and 10 000 tonnes, respectively. The table incorporates the data from 2016-2017.

<sup>9</sup> The ratio of developers for Hansol Paper was assumed to be 90 % to 10 % for BPS and other developers, respectively. This ratio was revised on the basis of consultations with European and Asian thermal paper manufacturers, distributors, and associations.

**Table 3f: Developers used in thermal paper placed on the EU market, 2014-17 (%).**

Developer	2014	2015	2016	2017
Bisphenol A	2 %	2 %	16 %	16 %
Bisphenol S	26 %	24 %	25 %	21 %
Other developers	72 %	75 %	58 %	62 %
Total	<b>100 %</b>	<b>100 %</b>	<b>100%</b>	<b>100 %</b>

Source: Non-ETPA thermal paper manufacturers<sup>10</sup>.



**Graph 3: Developers used in thermal paper placed on the EU market in 2014-17 (non-ETPA manufacturers).**

Source: Non-ETPA thermal paper manufacturers.

<sup>10</sup> See Annex 1.

## Appendix 2. Thermal paper imported into the EU, 2014-17 (Eurostat)

Thermal paper imported into the EU, 2014-17 (tonnes) - Eurostat <sup>11</sup> .				
Country	2014	2015	2016	2017
USA	34 667	34 210	36 025	33 741
Japan	3 198	2 453	2 240	2 822
China	34 502	36 905	39 999	46 494
India	7 219	8 230	9 776	8 074
<b>Total</b>	<b>79 586</b>	<b>81 798</b>	<b>88 040</b>	<b>91 131</b>

Source: Eurostat.

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<sup>11</sup> CN codes 48119000, 48099000, 48239085, and 48169000.

EUROPEAN CHEMICALS AGENCY  
ANNANKATU 18, P.O. BOX 400,  
FI-00121 HELSINKI, FINLAND  
ECHA.EUROPA.EU