

ROYAL BANK OF CANADA  
Form 424B2  
January 16, 2018

RBC Capital Markets® Filed Pursuant to Rule 424(b)(2)  
Registration Statement No. 333-208507

Pricing Supplement

Dated January 12, 2018

To the Product

Prospectus Supplement \$1,000,000

TP-2, January 11, 2016, Contingent Coupon Barrier Notes Linked to  
and the Prospectus the S&P 500® Index,  
Supplement and due January 18, 2023

Prospectus, Each Dated Royal Bank of Canada

January 8, 2016

Royal Bank of Canada is offering Contingent Coupon Barrier Notes (the “Notes”) linked to the performance of the S&P 500® Index (the “Reference Index”). The Notes offered are senior unsecured obligations of Royal Bank of Canada, and will pay a quarterly Contingent Coupon at the annual rate of 4.20% if the level of the Reference Index is equal to or greater than its Coupon Barrier. The CUSIP number for the Notes is 78013XDY1.

At maturity, we will pay the principal amount of the Notes, unless the Final Level of the Reference Index is less than its Trigger Level. If the Final Level of the Reference Index is less than its Trigger Level, instead of the principal amount, you will receive an amount of cash which will be less than the principal amount, based upon the percentage decrease of the Reference Index. Investors could lose some or all of their investment at maturity if there has been a decline in the level of the Reference Index.

Any payments on the Notes are subject to our credit risk.

Issue Date: January 18, 2018

Maturity Date: January 18, 2023

The Notes will not be listed on any securities exchange.

Investing in the Notes involves a number of risks. See “Selected Risk Factors” beginning on page P-7 of this pricing supplement, “Risk Factors” beginning on page S-1 of the prospectus supplement dated January 8, 2016, and “Risk Factors” beginning on page PS-4 of the product prospectus supplement dated January 11, 2016.

The Notes will not constitute deposits insured by the Canada Deposit Insurance Corporation, the U.S. Federal Deposit Insurance Corporation or any other Canadian or U.S. government agency or instrumentality.

Neither the Securities and Exchange Commission (the “SEC”) nor any state securities commission has approved or disapproved of the Notes or determined that this pricing supplement is truthful or complete. Any representation to the contrary is a criminal offense.

	<u>Per Note</u>	<u>Total</u>
Price to public <sup>(1)</sup>	100.00%	\$1,000,000.00
Underwriting discounts and commissions <sup>(1)</sup>	1.25%	\$12,500.00
Proceeds to Royal Bank of Canada	98.75%	\$987,500.00

<sup>(1)</sup> Certain dealers who purchase the Notes for sale to certain fee-based advisory accounts may forego some or all of their underwriting discount or selling concessions. The public offering price for investors purchasing the Notes in these accounts may be between \$987.50 and \$1,000 per \$1,000 in principal amount.

RBC Capital Markets, LLC, which we refer to as RBCCM, acting as agent for Royal Bank of Canada, received a commission of \$12.50 per \$1,000 in principal amount of the Notes and used all or a portion of that commission to allow selling concessions to other dealers of up to \$12.50 per \$1,000 in principal amount of the Notes. The other

dealers may forgo, in their sole discretion, some or all of their selling concessions. See “Supplemental Plan of Distribution (Conflicts of Interest)” on page P-15 below.

The initial estimated value of the Notes as of the date of this pricing supplement is \$942.21 per \$1,000 in principal amount, which is less than the price to public. The actual value of the Notes at any time will reflect many factors, cannot be predicted with accuracy, and may be less than this amount. We describe our determination of the initial estimated value in more detail below.

We may use this pricing supplement in the initial sale of the Notes. In addition, RBCCM or another of our affiliates may use this pricing supplement in a market-making transaction in the Notes after their initial sale. Unless we or our agent informs the purchaser otherwise in the confirmation of sale, this pricing supplement is being used in a market-making transaction.

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Contingent Coupon Barrier Notes  
 Linked to the S&P 500® Index  
 Due January 18, 2023

**SUMMARY**

The information in this “Summary” section is qualified by the more detailed information set forth in this pricing supplement, the product prospectus supplement, the prospectus supplement and the prospectus. As used in this pricing supplement, the “Company,” “we,” “us,” or “our” refers to Royal Bank of Canada.

Issuer: Royal Bank of Canada (“Royal Bank”)  
 Issue: Senior Global Medium-Term Notes, Series G  
 Currency: U.S. Dollars  
 Minimum Investment: \$1,000 and minimum denominations of \$1,000 in excess thereof  
 Trade Date: January 12, 2018  
 Issue Date: January 18, 2018  
 CUSIP: 78013XDY1  
 Valuation Date: January 12, 2023  
 Maturity Date: January 18, 2023

Contingent Coupon: We will pay you a Contingent Coupon during the term of the Notes, periodically in arrears on each Coupon Payment Date, under the conditions described below:  
 If the closing level of the Reference Index is greater than or equal to its Coupon Barrier on the applicable Observation Date, we will pay the Contingent Coupon applicable to that Observation Date. However, if the closing level of the Reference Index is less than its Coupon Barrier on the applicable Observation Date, we will not pay you the Contingent Coupon applicable to that Observation Date. You may not receive a Contingent Coupon for one or more quarterly periods during the term of the Notes.

Contingent Coupon Rate: 4.20% per annum (1.05% per quarter).

Observation Dates: Quarterly on April 12, 2018, July 12, 2018, October 12, 2018, January 14, 2019, April 12, 2019, July 12, 2019, October 14, 2019, January 13, 2020, April 13, 2020, July 13, 2020, October 12, 2020, January 12, 2021, April 12, 2021, July 12, 2021, October 12, 2021, January 12, 2022, April 12, 2022, July 12, 2022, October 12, 2022 and the Valuation Date, subject to postponement as described in the product prospectus supplement.

Coupon Payment Dates: Three business days following each Observation Date, subject to postponement as described in the product prospectus supplement.

Initial Level: 2,786.24, which was the closing level of the Reference Index on the Trade Date.

Final Level: The closing level of the Reference Index on the Valuation Date.

Trigger Level and Coupon Barrier: 1650.85, which is 59.25% of the Initial Level (rounded to two decimal places).

Payment at Maturity: We will pay you at maturity an amount based on the Final Level of the Reference Index:



Contingent Coupon Barrier Notes

Linked to the S&P 500® Index

Due January 18, 2023

- If the Final Level is greater than or equal to its Trigger Level, we will pay you a cash payment equal to the principal amount plus the Contingent Coupon otherwise due on the Maturity Date.
- If the Final Level is below its Trigger Level, you will receive at maturity, for each \$1,000 in principal amount, a cash payment equal to:  
Principal Amount + (Principal Amount x Percentage Change)  
For the Reference Index, an amount, expressed as a percentage, equal to:  
Final Level- Initial Level  
Initial Level
- Percentage Change: We will not have the option to redeem the Notes prior to maturity, and the Notes are not automatically callable prior to maturity.
- Call Prior to Maturity: RBC Capital Markets, LLC (“RBCCM”)
- Calculation Agent: By purchasing a Note, each holder agrees (in the absence of a change in law, an administrative determination or a judicial ruling to the contrary) to treat the Note as a pre-paid cash settled contingent income-bearing derivative contract for U.S. federal income tax purposes. However, the U.S. federal income tax consequences of your investment in the Notes are uncertain and the Internal Revenue Service could assert that the Notes should be taxed in a manner that is different from that described in the preceding sentence. Please see the section below, “Supplemental Discussion of U.S. Federal Income Tax Consequences” and the discussion (including the opinion of our counsel Morrison & Foerster LLP) in the product prospectus supplement under “Supplemental Discussion of U.S. Federal Income Tax Consequences,” which apply to the Notes.
- U.S. Tax Treatment: RBCCM (or one of its affiliates), though not obligated to do so, may maintain a secondary market in the Notes after the Issue Date. The amount that you may receive upon sale of your Notes prior to maturity may be less than the principal amount of your Notes.
- Secondary Market: The Notes will not be listed on any securities exchange.
- Listing: DTC global (including through its indirect participants Euroclear and Clearstream, Luxembourg as described under “Description of Debt Securities—Ownership and Book-Entry Issuance” in the prospectus).
- Settlement: All of the terms appearing above the item captioned “Secondary Market” on pages P-2 and P-3 of this pricing supplement and the terms appearing under the caption “General Terms of the Notes” in the product prospectus supplement, as modified by this pricing supplement.
- Terms Incorporated in the Master Note:

P-3 RBC Capital Markets, LLC

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Contingent Coupon Barrier Notes  
Linked to the S&P 500® Index  
Due January 18, 2023

#### ADDITIONAL TERMS OF YOUR NOTES

You should read this pricing supplement together with the prospectus dated January 8, 2016, as supplemented by the prospectus supplement dated January 8, 2016 and the product prospectus supplement dated January 11, 2016, relating to our Senior Global Medium-Term Notes, Series G, of which these Notes are a part. Capitalized terms used but not defined in this pricing supplement will have the meanings given to them in the product prospectus supplement. In the event of any conflict, this pricing supplement will control. The Notes vary from the terms described in the product prospectus supplement in several important ways. For example, the Notes are not callable prior to maturity. You should read this pricing supplement carefully.

This pricing supplement, together with the documents listed below, contains the terms of the Notes and supersedes all prior or contemporaneous oral statements as well as any other written materials including preliminary or indicative pricing terms, correspondence, trade ideas, structures for implementation, sample structures, brochures or other educational materials of ours. You should carefully consider, among other things, the matters set forth in “Risk Factors” in the prospectus supplement dated January 8, 2016 and in the product prospectus supplement dated January 11, 2016, as the Notes involve risks not associated with conventional debt securities. We urge you to consult your investment, legal, tax, accounting and other advisors before you invest in the Notes. You may access these documents on the SEC website at [www.sec.gov](http://www.sec.gov) as follows (or if that address has changed, by reviewing our filings for the relevant date on the SEC website):

Prospectus dated January 8, 2016:

<http://www.sec.gov/Archives/edgar/data/1000275/000121465916008810/j18160424b3.htm>

Prospectus Supplement dated January 8, 2016:

<https://www.sec.gov/Archives/edgar/data/1000275/000121465916008811/p14150424b3.htm>

Product Prospectus Supplement TP-2 dated January 11, 2016:

<https://www.sec.gov/Archives/edgar/data/1000275/000114036116047489/form424b5.htm>

Our Central Index Key, or CIK, on the SEC website is 1000275. As used in this pricing supplement, “we,” “us,” or “our” refers to Royal Bank of Canada.

P-4 RBC Capital Markets, LLC

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Contingent Coupon Barrier Notes  
 Linked to the S&P 500® Index  
 Due January 18, 2023

#### HYPOTHETICAL EXAMPLES

The table set out below is included for illustration purposes only. The table illustrates the Payment at Maturity of the Notes (excluding the final Contingent Coupon, if payable) for a hypothetical range of performance for the Reference Index, assuming an Initial Level of 100.00, a Trigger Level of 59.25 and an initial investment of \$1,000. Hypothetical Final Levels are shown in the first column on the left. The actual Initial Level and Trigger Level of the Reference Index are set forth on P-2 of this pricing supplement. The second column shows the Payment at Maturity for a range of Final Levels on the Valuation Date. The third column shows the amount of cash to be paid on the Notes per \$1,000 in principal amount. It is possible that the Final Level will be less than its Initial Level.

Hypothetical Final Level	Payment at Maturity as Percentage of Principal Amount	Cash Payment Amount per \$1,000 in Principal Amount
130.00	100.00%	\$1,000.00
120.00	100.00%	\$1,000.00
110.00	100.00%	\$1,000.00
100.00	100.00%	\$1,000.00
85.00	100.00%	\$1,000.00
70.00	100.00%	\$1,000.00
60.00	60.00%	\$1,000.00
59.25	59.25%	\$1,000.00
59.00	59.00%	\$590.00
50.00	50.00%	\$500.00
25.00	25.00%	\$250.00
0.00	0.00%	\$0.00

P-5 RBC Capital Markets, LLC

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Contingent Coupon Barrier Notes  
Linked to the S&P 500® Index  
Due January 18, 2023

#### Hypothetical Examples of Amounts Payable at Maturity

The following hypothetical examples illustrate how the total returns set forth in the table above are calculated.

Example 1: The level of the Reference Index increases by 25% from the Initial Level of 100.00 to the Final Level of 125.00. Because the level of the Reference Index is greater than the Trigger Level and its Coupon Barrier of 59.25, the investor receives at maturity, in addition to any Contingent Coupon otherwise due on the Notes, a cash payment of \$1,000 per Note, despite the 25% appreciation in the level of the Reference Index.

Example 2: The level of the Reference Index decreases by 15% from the Initial Level of 100.00 to the Final Level of 85.00. Because the level of the Final Level greater than the Trigger Level and its Coupon Barrier of 59.25, the investor receives at maturity, in addition to any Contingent Coupon otherwise due on the Notes, a cash payment of \$1,000 per Note, despite the 15% decline in the level of Reference Index.

Example 3: The level of the Reference Asset decreases by 50% from the Initial Level of 100.00 to the Final Level of 50.00. Because the closing level of the Reference Index is less than the Trigger Level of 59.25, the final Contingent Coupon will not be payable on the Maturity Date, and we will pay only \$500.00 for each \$1,000 in the principal amount of the Notes, calculated as follows:

Principal Amount + (Principal Amount x Percentage Change)

$$=\$1,000 + (\$1,000 \times -50.00\%) = \$1,000 - \$500.00 = \$500.00$$

The Payments at Maturity shown above are entirely hypothetical; they are based on levels of the Reference Index that may not be achieved on the Valuation Date and on assumptions that may prove to be erroneous. The actual market value of your Notes on the Maturity Date or at any other time, including any time you may wish to sell your Notes, may bear little relation to the hypothetical Payments at Maturity shown above, and those amounts should not be viewed as an indication of the financial return on an investment in the Notes or on an investment in the securities included in the Reference Index.

P-6 RBC Capital Markets, LLC

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Contingent Coupon Barrier Notes  
Linked to the S&P 500® Index  
Due January 18, 2023

#### SELECTED RISK FACTORS

An investment in the Notes involves significant risks. Investing in the Notes is not equivalent to investing directly in the securities included in the Reference Index. These risks are explained in more detail in the section “Risk Factors,” the product prospectus supplement. In addition to the risks described in the prospectus supplement and the product prospectus supplement, you should consider the following:

**Principal at Risk** — Investors in the Notes could lose some or all of their principal amount if there is a decline in the level of the Reference Index between the Trade Date and the Valuation Date. If the Final Level of the Reference Index on the Valuation Date is less than the Trigger Level, the amount of cash that you receive at maturity will represent a loss of your principal that is proportionate to the decline in the closing level of the Reference Index. Any Contingent Coupons received on the Notes prior to the maturity date may not be sufficient to compensate for any such loss.

**You May Not Receive any Contingent Coupons** — We will not necessarily make any coupon payments on the Notes. If the closing level of the Reference Index on an Observation Date is less than the Coupon Barrier, we will not pay you the Contingent Coupon applicable to that Observation Date. If the closing level of any of the Reference Index is less than the Coupon Barrier on each of the Observation Dates and on the Valuation Date, we will not pay you any Contingent Coupons during the term of, and you will not receive a positive return on, your Notes. Generally, this non-payment of the Contingent Coupon coincides with a period of greater risk of principal loss on your Notes. Accordingly, if we do not pay the Contingent Coupon for the final Observation Date on the Maturity Date, you will also incur a loss of principal, because the Final Level will be less than the Trigger Level.

**The Contingent Coupon Feature Limits Your Potential Return** — The return potential of the Notes is limited to the pre-specified Contingent Coupon Rate, regardless of the appreciation of the Reference Index. The total return on the Notes will vary based on the number of Observation Dates on which the Contingent Coupon becomes payable prior to maturity. You may be subject to the full downside performance of the Reference Index even though your potential return is limited to the Contingent Coupon Rate. As a result, the return on an investment in the Notes could be less than the return on a direct investment in the securities represented by the Reference Index.

**Your Return May Be Lower than the Return on a Conventional Debt Security of Comparable Maturity** — The return that you will receive on the Notes, which could be negative, may be less than the return you could earn on other investments. Even if your return is positive, your return may be less than the return you would earn if you bought a conventional senior interest bearing debt security of Royal Bank.

**Payments on the Notes Are Subject to Our Credit Risk, and Changes in Our Credit Ratings Are Expected to Affect the Market Value of the Notes** — The Notes are Royal Bank’s senior unsecured debt securities. As a result, your receipt of the Contingent Coupon payments, if payable, and the amount due on the maturity date is dependent upon Royal Bank’s ability to repay its obligations on the applicable payment dates. This will be the case even if the level of the Reference Index increases after the Trade Date. No assurance can be given as to what our financial condition will be at any time during the term of the Notes.

**There May Not Be an Active Trading Market for the Notes—Sales in the Secondary Market May Result in Significant Losses** — There may be little or no secondary market for the Notes. The Notes will not be listed on any securities exchange. RBCCM and other affiliates of Royal Bank may make a market for the Notes; however, they are not required to do so. RBCCM or any other affiliate of Royal Bank may stop any market-making activities at any time. Even if a secondary market for the Notes develops, it may not provide significant liquidity or trade at prices advantageous to you. We expect that transaction costs in any secondary market would be high. As a result, the difference between bid and asked prices for your Notes in any secondary market could be substantial.

**You Will Not Have Any Rights to the Securities Included in the Reference Index** — Investing in the Notes will not make you a holder of any of the securities included in the Reference Index. As a holder of the Notes, you will not

have voting rights or rights to receive cash dividends or other distributions or other rights that holders of the  
P-7 RBC Capital Markets, LLC

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Contingent Coupon Barrier Notes  
Linked to the S&P 500® Index  
Due January 18, 2023

constituent stocks included in the Reference Index would have. The payments on the Notes will not reflect any dividends paid on the securities included in the Reference Index.

**The Initial Estimated Value of the Notes Is Less than the Price to the Public –** The initial estimated value set forth on the cover page of this pricing supplement does not represent a minimum price at which we, RBCCM or any of our affiliates would be willing to purchase the Notes in any secondary market (if any exists) at any time. If you attempt to sell the Notes prior to maturity, their market value may be lower than the price you paid for them and the initial estimated value. This is due to, among other things, changes in the level of the Reference Index, the borrowing rate we pay to issue securities of this kind, and the inclusion in the price to the public of the underwriting discount and the estimated costs relating to our hedging of the Notes. These factors, together with various credit, market and economic factors over the term of the Notes, are expected to reduce the price at which you may be able to sell the Notes in any secondary market and will affect the value of the Notes in complex and unpredictable ways. Assuming no change in market conditions or any other relevant factors, the price, if any, at which you may be able to sell your Notes prior to maturity may be less than your original purchase price, as any such sale price would not be expected to include the underwriting discount and the hedging costs relating to the Notes. In addition to bid-ask spreads, the value of the Notes determined for any secondary market price is expected to be based on the secondary rate rather than the internal funding rate used to price the Notes and determine the initial estimated value. As a result, the secondary price will be less than if the internal funding rate was used. The Notes are not designed to be short-term trading instruments. Accordingly, you should be able and willing to hold your Notes to maturity.

**The Initial Estimated Value of the Notes on the Cover Page Is an Estimate Only, Calculated as of the Time the Terms of the Notes Were Set –** The initial estimated value of the Notes is based on the value of our obligation to make the payments on the Notes, together with the mid-market value of the derivative embedded in the terms of the Notes. See “Structuring the Notes” below. Our estimate is based on a variety of assumptions, including our credit spreads, expectations as to dividends, interest rates and volatility, and the expected term of the Notes. These assumptions are based on certain forecasts about future events, which may prove to be incorrect. Other entities may value the Notes or similar securities at a price that is significantly different than we do.

The value of the Notes at any time after the Trade Date will vary based on many factors, including changes in market conditions, and cannot be predicted with accuracy. As a result, the actual value you would receive if you sold the Notes in any secondary market, if any, should be expected to differ materially from the initial estimated value of your Notes.

**Inconsistent Research –** Royal Bank or its affiliates may issue research reports on securities that are, or may become, components of the Reference Index. We may also publish research from time to time on financial markets and other matters that may influence the levels of the Reference Index or the value of the Notes, or express opinions or provide recommendations that may be inconsistent with purchasing or holding the Notes or with the investment view implicit in the Notes or the Reference Index. You should make your own independent investigation of the merits of investing in the Notes and the Reference Index.

**Market Disruption Events and Adjustments –** The payment dates are subject to adjustment as described in the product prospectus supplement. For a description of what constitutes a market disruption event as well as the consequences of that market disruption event, see “General Terms of the Notes—Market Disruption Events” in the product prospectus supplement.

P-8 RBC Capital Markets, LLC

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Contingent Coupon Barrier Notes  
Linked to the S&P 500® Index  
Due January 18, 2023

#### INFORMATION REGARDING THE REFERENCE INDEX

All disclosures contained in this pricing supplement regarding the Reference Index, including, without limitation, its make-up, method of calculation, and changes in their components, have been derived from publicly available sources. The information reflects the policies of, and is subject to change S&P Dow Jones Indices LLC (“S&P”). S&P, which owns the copyright and all other rights to the Reference Index, has no obligation to continue to publish, and may discontinue publication of, the Reference Index. The consequences of S&P discontinuing publication of the Reference Index are discussed in the section of the product prospectus supplement entitled “General Terms of the Notes—Unavailability of the Level of a Reference Index.” Neither we nor RBCCM accepts any responsibility for the calculation, maintenance or publication of the Reference Index or any successor index.

#### The SPX

The Reference Index is intended to provide an indication of the pattern of common stock price movement. The calculation of the level of the Reference Index is based on the relative value of the aggregate market value of the common stocks of 500 companies as of a particular time compared to the aggregate average market value of the common stocks of 500 similar companies during the base period of the years 1941 through 1943.

S&P Dow Jones Indices LLC (“S&P”) calculates the Reference Index by reference to the prices of the constituent stocks of the SPX without taking account of the value of dividends paid on those stocks. As a result, the return on the Notes will not reflect the return you would realize if you actually owned the Reference Index constituent stocks and received the dividends paid on those stocks.

Effective with the September 2015 rebalance, consolidated share class lines will no longer be included in the Reference Index. Each share class line will be subject to public float and liquidity criteria individually, but the company’s total market capitalization will be used to evaluate each share class line. This may result in one listed share class line of a company being included in the Reference Index while a second listed share class line of the same company is excluded.

#### Computation of the Reference Index

While S&P currently employs the following methodology to calculate the Reference Index, no assurance can be given that S&P will not modify or change this methodology in a manner that may affect the payments on the Notes. Historically, the market value of any component stock of the Reference Index was calculated as the product of the market price per share and the number of then outstanding shares of such component stock. In March 2005, S&P began shifting the SPX halfway from a market capitalization weighted formula to a float-adjusted formula, before moving the SPX to full float adjustment on September 16, 2005. S&P criteria for selecting stocks for the Reference Index did not change with the shift to float adjustment. However, the adjustment affects each company’s weight in the Reference Index.

Under float adjustment, the share counts used in calculating the Reference Index reflect only those shares that are available to investors, not all of a company’s outstanding shares. Float adjustment excludes shares that are closely held by control groups, other publicly traded companies or government agencies.

In September 2012, all shareholdings representing more than 5% of a stock’s outstanding shares, other than holdings by “block owners,” were removed from the float for purposes of calculating the SPX. Generally, these “control holders” will include officers and directors, private equity, venture capital and special equity firms, other publicly traded companies that hold shares for control, strategic partners, holders of restricted shares, ESOPs, employee and family trusts, foundations associated with the company, holders of unlisted share classes of stock, government entities at all levels (other than government retirement/pension funds) and any individual person who controls a 5% or greater stake in a company as reported in regulatory filings. However, holdings by block owners, such as depository banks, pension funds, mutual funds and ETF providers, 401(k) plans of the company, government retirement/pension funds, investment funds of insurance companies, asset managers and investment funds, independent foundations and savings and investment plans, will ordinarily be considered part of the float.

P-9 RBC Capital Markets, LLC

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Contingent Coupon Barrier Notes

Linked to the S&P 500® Index

Due January 18, 2023

Treasury stock, stock options, equity participation units, warrants, preferred stock, convertible stock, and rights are not part of the float. Shares held in a trust to allow investors in countries outside the country of domicile, such as depositary shares and Canadian exchangeable shares are normally part of the float unless those shares form a control block.

For each stock, an investable weight factor (“IWF”) is calculated by dividing the available float shares by the total shares outstanding. Available float shares are defined as the total shares outstanding less shares held by control holders. This calculation is subject to a 5% minimum threshold for control blocks. For example, if a company’s officers and directors hold 3% of the company’s shares, and no other control group holds 5% of the company’s shares, S&P would assign that company an IWF of 1.00, as no control group meets the 5% threshold. However, if a company’s officers and directors hold 3% of the company’s shares and another control group holds 20% of the company’s shares, S&P would assign an IWF of 0.77, reflecting the fact that 23% of the company’s outstanding shares are considered to be held for control. As of July 31, 2017, companies with multiple share class lines are no longer eligible for inclusion in the Reference Index. Constituents of the Reference Index prior to July 31, 2017 with multiple share class lines will be grandfathered in and continue to be included in the Reference Index. If a constituent company of the Reference Index reorganizes into a multiple share class line structure, that company will remain in the Reference Index at the discretion of the S&P Index Committee in order to minimize turnover

The Reference Index is calculated using a base-weighted aggregate methodology. The level of the Reference Index reflects the total market value of all 500 component stocks relative to the base period of the years 1941 through 1943. An indexed number is used to represent the results of this calculation in order to make the level easier to use and track over time. The actual total market value of the component stocks during the base period of the years 1941 through 1943 has been set to an indexed level of 10. This is often indicated by the notation 1941-43 = 10. In practice, the daily calculation of the SPX is computed by dividing the total market value of the component stocks by the “index divisor.” By itself, the index divisor is an arbitrary number. However, in the context of the calculation of the SPX, it serves as a link to the original base period level of the Reference Index. The index divisor keeps the Reference Index comparable over time and is the manipulation point for all adjustments to the Reference Index, which is index maintenance.

Index Maintenance

Index maintenance includes monitoring and completing the adjustments for company additions and deletions, share changes, stock splits, stock dividends, and stock price adjustments due to company restructuring or spinoffs. Some corporate actions, such as stock splits and stock dividends, require changes in the common shares outstanding and the stock prices of the companies in the Reference Index, and do not require index divisor adjustments.

To prevent the level of the Reference Index from changing due to corporate actions, corporate actions which affect the total market value of the Reference Index require an index divisor adjustment. By adjusting the index divisor for the change in market value, the level of the SPX remains constant and does not reflect the corporate actions of individual companies in the Reference Index. Index divisor adjustments are made after the close of trading and after the calculation of the SPX closing level.

Changes in a company’s total shares outstanding of 5% or more due to public offerings are made as soon as reasonably possible. Other changes of 5% or more (for example, due to tender offers, Dutch auctions, voluntary exchange offers, company stock repurchases, private placements, acquisitions of private companies or non-index companies that do not trade on a major exchange, redemptions, exercise of options, warrants, conversion of preferred stock, notes, debt, equity participations, at-the-market stock offerings or other recapitalizations) are made weekly, and are generally announced on Fridays for implementation after the close of trading the following Friday (one week later). If a 5% or more share change causes a company’s IWF to change by five percentage points or more, the IWF is updated at the same time as the share change. IWF changes resulting from partial tender offers are considered on a case-by-case basis.

License Agreement

S&P® is a registered trademark of Standard & Poor's Financial Services LLC and Dow Jones® is a registered trademark of Dow Jones Trademark Holdings LLC ("Dow Jones"). These trademarks have been licensed for use by S&P. "Standard & Poor's", "S&P 500" and "S&P" are trademarks of Standard & Poor's Financial Services LLC. These trademarks have been sublicensed for certain purposes by us. The Reference Index is a product of S&P and/or its affiliates and has been licensed for use by us.

P-10 RBC Capital Markets, LLC

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Contingent Coupon Barrier Notes  
Linked to the S&P 500® Index  
Due January 18, 2023

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P-11 RBC Capital Markets, LLC

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Contingent Coupon Barrier Notes

Linked to the S&P 500<sup>®</sup> Index

Due January 18, 2023

Historical Information

The graph below sets forth the information relating to the historical performance of the Reference Index. In addition, below the graph is a table setting forth the intra-day high, intra-day low and period-end closing levels of the Reference Index. The information provided in these tables is for the four calendar quarters of 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017 and the first calendar quarter of 2018 for the period from January 1, 2018 through January 12, 2018.

We obtained the information regarding the historical performance of the Reference Index in the graph and table below from Bloomberg Financial Markets.

We have not independently verified the accuracy or completeness of the information obtained from Bloomberg Financial Markets. The historical performance of the Reference Index should not be taken as an indication of its future performance, and no assurance can be given as to its Final Level. We cannot give you assurance that the performance of the Reference Index will result in any positive return on your initial investment.

S&P 500<sup>®</sup> Index (“SPX”)

P-12 RBC Capital Markets, LLC

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Contingent Coupon Barrier Notes  
 Linked to the S&P 500® Index  
 Due January 18, 2023

Period-Start Date	Period-End Date	High Intra-Day Level of the Reference Index	Low Intra-Day Level of the Reference Index	Period-End Closing Level of the Reference Index
1/1/2008	3/31/2008	1,471.77	1,256.98	1,322.70
4/1/2008	6/30/2008	1,440.24	1,272.00	1,280.00
7/1/2008	9/30/2008	1,313.15	1,106.39	1,166.36
10/1/2008	12/31/2008	1,167.03	741.02	903.25
1/1/2009	3/31/2009	943.85	666.79	797.87
4/1/2009	6/30/2009	956.23	783.32	919.32
7/1/2009	9/30/2009	1,080.15	869.32	1,057.08
10/1/2009	12/31/2009	1,130.38	1,019.95	1,115.10
1/1/2010	3/31/2010	1,180.69	1,044.50	1,169.43
4/1/2010	6/30/2010	1,219.80	1,028.33	1,030.71
7/1/2010	9/30/2010	1,157.16	1,010.91	1,141.20
10/1/2010	12/31/2010	1,262.60	1,131.87	1,257.64
1/1/2011	3/31/2011	1,344.07	1,249.05	1,325.83
4/1/2011	6/30/2011	1,370.58	1,258.07	1,320.64
7/1/2011	9/30/2011	1,356.48	1,101.54	1,131.42
10/1/2011	12/31/2011	1,292.66	1,074.77	1,257.60
1/1/2012	3/31/2012	1,419.15	1,258.86	1,408.47
4/1/2012	6/30/2012	1,422.38	1,266.74	1,362.16
7/1/2012	9/30/2012	1,474.51	1,325.41	1,440.67
10/1/2012	12/31/2012	1,470.96	1,343.35	1,426.19
1/1/2013	3/31/2013	1,570.28	1,426.19	1,569.19
4/1/2013	6/30/2013	1,687.18	1,536.03	1,606.28
7/1/2013	9/30/2013	1,729.86	1,604.57	1,681.55
10/1/2013	12/31/2013	1,849.44	1,646.47	1,848.36
1/1/2014	3/31/2014	1,883.97	1,737.92	1,872.34
4/1/2014	6/30/2014	1,968.17	1,814.36	1,960.23
7/1/2014	9/30/2014	2,019.26	1,904.78	1,972.29
10/1/2014	12/31/2014	2,093.55	1,820.66	2,058.90
1/1/2015	3/31/2015	2,119.59	1,980.90	2,067.89
4/1/2015	6/30/2015	2,134.72	2,048.38	2,063.11
7/1/2015	9/30/2015	2,132.82	1,867.01	1,920.03
10/1/2015	12/31/2015	2,116.48	1,893.70	2,043.94
1/1/2016	3/31/2016	2,072.21	1,810.10	2,059.74
4/1/2016	6/30/2016	2,120.55	1,991.68	2,098.86
7/1/2016	9/30/2016	2,193.81	2,074.02	2,168.27
10/1/2016	12/31/2016	2,277.53	2,083.79	2,238.83
1/1/2017	3/31/2017	2,400.98	2,245.13	2,362.72
4/1/2017	6/30/2017	2,453.82	2,328.95	2,423.41
7/1/2017	9/30/2017	2,519.44	2,407.70	2,519.36
10/1/2017	10/27/2017	2,582.98	2,520.40	25,81.07
10/1/2016	12/31/2016	2,277.53	2,083.79	2,238.83
1/1/2017	3/31/2017	2,400.98	2,245.13	2,362.72

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4/1/2017	6/30/2017	2,453.82	2,328.95	2,423.41
7/1/2017	9/30/2017	2,519.44	2,407.70	2,519.36
10/1/2017	12/31/2017	2,694.97	2,520.40	2,673.61
1/1/2018	1/12/2018	2,787.85	2,682.36	2,786.24

PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE RESULTS.

P-13 RBC Capital Markets, LLC

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Contingent Coupon Barrier Notes  
Linked to the S&P 500® Index  
Due January 18, 2023

**SUPPLEMENTAL DISCUSSION OF  
U.S. FEDERAL INCOME TAX CONSEQUENCES**

The following disclosure supplements, and to the extent inconsistent supersedes, the discussion in the product prospectus supplement dated January 11, 2016 under “Supplemental Discussion of U.S. Federal Income Tax Consequences.”

Under Section 871(m) of the Code, a “dividend equivalent” payment is treated as a dividend from sources within the United States. Such payments generally would be subject to a 30% U.S. withholding tax if paid to a non-U.S. holder. Under U.S. Treasury Department regulations, payments (including deemed payments) with respect to equity-linked instruments (“ELIs”) that are “specified ELIs” may be treated as dividend equivalents if such specified ELIs reference an interest in an “underlying security,” which is generally any interest in an entity taxable as a corporation for U.S. federal income tax purposes if a payment with respect to such interest could give rise to a U.S. source dividend. However, the IRS has issued guidance that states that the U.S. Treasury Department and the IRS intend to amend the effective dates of the U.S. Treasury Department regulations to provide that withholding on dividend equivalent payments will not apply to specified ELIs that are not delta-one instruments and that are issued before January 1, 2019. Based on our determination that the Notes are not delta-one instruments, non-U.S. holders should not be subject to withholding on dividend equivalent payments, if any, under the Notes. However, it is possible that the Notes could be treated as deemed reissued for U.S. federal income tax purposes upon the occurrence of certain events affecting the Reference Index or the Notes (for example, upon a Reference Index rebalancing) and following such occurrence the Notes could be treated as subject to withholding on dividend equivalent payments. Non-U.S. holders that enter, or have entered, into other transactions in respect of the Reference Index or the Notes should consult their tax advisors as to the application of the dividend equivalent withholding tax in the context of the Notes and their other transactions. If any payments are treated as dividend equivalents subject to withholding, we (or the applicable withholding agent) would be entitled to withhold taxes without being required to pay any additional amounts with respect to amounts so withheld.

P-14 RBC Capital Markets, LLC

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Contingent Coupon Barrier Notes  
Linked to the S&P 500® Index  
Due January 18, 2023

#### SUPPLEMENTAL PLAN OF DISTRIBUTION (CONFLICTS OF INTEREST)

Delivery of the Notes will be made against payment for the Notes on January 18, 2018, which is the third (3rd) business day following the Trade Date (this settlement cycle being referred to as “T+3”). See “Plan of Distribution” in the prospectus dated January 8, 2016. For additional information as to the relationship between us and RBCCM, please see the section “Plan of Distribution—Conflicts of Interest” in the prospectus dated January 8, 2016.

We expect to deliver the Notes on a date that is greater than two business days following the Trade Date. Under Rule 15c6-1 of the Exchange Act, trades in the secondary market generally are required to settle in two business days, unless the parties to any such trade expressly agree otherwise. Accordingly, purchasers who wish to trade the Notes more than two business days prior to the original issue date will be required to specify alternative arrangements to prevent a failed settlement.

In the initial offering of the Notes, they will be offered to investors at a purchase price equal to par, except with respect to certain accounts as indicated on the cover page of this document.

The value of the Notes shown on your account statement may be based on RBCCM’s estimate of the value of the Notes if RBCCM or another of our affiliates were to make a market in the Notes (which it is not obligated to do). That estimate will be based upon the price that RBCCM may pay for the Notes in light of then prevailing market conditions, our creditworthiness and transaction costs. For a period of approximately 12 months after the issue date of the Notes, the value of the Notes that may be shown on your account statement may be higher than RBCCM’s estimated value of the Notes at that time. This is because the estimated value of the Notes will not include the underwriting discount and our hedging costs and profits; however, the value of the Notes shown on your account statement during that period may be a higher amount, reflecting the addition of RBCCM’s underwriting discount and our estimated costs and profits from hedging the Notes. This excess is expected to decrease over time until the end of this period. After this period, if RBCCM repurchases your Notes, it expects to do so at prices that reflect their estimated value.

We may use this pricing supplement in the initial sale of the Notes. In addition, RBCCM or another of our affiliates may use this pricing supplement in a market-making transaction in the Notes after their initial sale. Unless we or our agent informs the purchaser otherwise in the confirmation of sale, this pricing supplement is being used in a market-making transaction.

No Prospectus (as defined in Directive 2003/71/EC (as amended, the “Prospectus Directive”)) will be prepared in connection with the Notes. Accordingly, the Notes may not be offered to the public in any member state of the European Economic Area (the “EEA”), and any purchaser of the Notes who subsequently sells any of the Notes in any EEA member state must do so only in accordance with the requirements of the Prospectus Directive, as implemented in that member state.

The Notes are not intended to be offered, sold or otherwise made available to, and should not be offered, sold or otherwise made available to, any retail investor in the EEA. For these purposes, the expression “offer” includes the communication in any form and by any means of sufficient information on the terms of the offer and the Notes to be offered so as to enable an investor to decide to purchase or subscribe the Notes, and a “retail investor” means a person who is one (or more) of: (a) a retail client, as defined in point (11) of Article 4(1) of Directive 2014/65/EU (as amended, “MiFID II”); or (b) a customer, within the meaning of Insurance Distribution Directive 2016/97/EU, as amended, where that customer would not qualify as a professional client as defined in point (10) of Article 4(1) of MiFID II; or (c) not a qualified investor as defined in the Prospectus Directive. Consequently, no key information document required by Regulation (EU) No 1286/2014 (as amended, the “PRIIPs Regulation”) for offering or selling the Notes or otherwise making them available to retail investors in the EEA has been prepared, and therefore, offering or selling the Notes or otherwise making them available to any retail investor in the EEA may be unlawful under the

PRIIPs Regulation.

P-15 RBC Capital Markets, LLC

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Contingent Coupon Barrier Notes  
Linked to the S&P 500® Index  
Due January 18, 2023

## STRUCTURING THE NOTES

The Notes are our debt securities, the return on which is linked to the performance of the Reference Index. As is the case for all of our debt securities, including our structured notes, the economic terms of the Notes reflect our actual or perceived creditworthiness at the time of pricing. In addition, because structured notes result in increased operational, funding and liability management costs to us, we typically borrow the funds under these Notes at a rate that is more favorable to us than the rate that we might pay for a conventional fixed or floating rate debt security of comparable maturity. Using this relatively lower implied borrowing rate rather than the secondary market rate, is a factor that reduced the initial estimated value of the Notes at the time their terms were set. Unlike the estimated value included in this pricing supplement, any value of the Notes determined for purposes of a secondary market transaction may be based on a different funding rate, which may result in a lower value for the Notes than if our initial internal funding rate were used.

In order to satisfy our payment obligations under the Notes, we may choose to enter into certain hedging arrangements (which may include call options, put options or other derivatives) on the issue date with RBCCM or one of our other subsidiaries. The terms of these hedging arrangements take into account a number of factors, including our creditworthiness, interest rate movements, the volatility of the Reference Index and the tenor of the Notes. The economic terms of the Notes and their initial estimated value depend in part on the terms of these hedging arrangements.

The lower implied borrowing rate is a factor that reduced the economic terms of the Notes to you. The initial offering price of the Notes also reflects the underwriting commission and our estimated hedging costs. These factors resulted in the initial estimated value for the Notes on the Trade Date being less than their public offering price. See “Selected Risk Factors—The Initial Estimated Value of the Notes Is Less than the Price to the Public” above.

## VALIDITY OF THE NOTES

In the opinion of Norton Rose Fulbright Canada LLP, the issue and sale of the Notes has been duly authorized by all necessary corporate action of the Bank in conformity with the Indenture, and when the Notes have been duly executed, authenticated and issued in accordance with the Indenture and delivered against payment therefor, the Notes will be validly issued and, to the extent validity of the Notes is a matter governed by the laws of the Province of Ontario or Québec, or the laws of Canada applicable therein, and will be valid obligations of the Bank, subject to equitable remedies which may only be granted at the discretion of a court of competent authority, subject to applicable bankruptcy, to rights to indemnity and contribution under the Notes or the Indenture which may be limited by applicable law; to insolvency and other laws of general application affecting creditors’ rights, to limitations under applicable limitations statutes, and to limitations as to the currency in which judgments in Canada may be rendered, as prescribed by the Currency Act (Canada). This opinion is given as of the date hereof and is limited to the laws of the Provinces of Ontario and Québec and the federal laws of Canada applicable thereto. In addition, this opinion is subject to customary assumptions about the Trustee’s authorization, execution and delivery of the Indenture and the genuineness of signatures and certain factual matters, all as stated in the letter of such counsel dated January 8, 2016, which has been filed as Exhibit 5.1 to Royal Bank’s Form 6-K filed with the SEC dated January 8, 2016.

In the opinion of Morrison & Foerster LLP, when the Notes have been duly completed in accordance with the Indenture and issued and sold as contemplated by the prospectus supplement and the prospectus, the Notes will be valid, binding and enforceable obligations of the Bank, entitled to the benefits of the Indenture, subject to applicable bankruptcy, insolvency and similar laws affecting creditors’ rights generally, concepts of reasonableness and equitable principles of general applicability (including, without limitation, concepts of good faith, fair dealing and the lack of bad faith). This opinion is given as of the date hereof and is limited to the laws of the State of New York. This opinion is subject to customary assumptions about the Trustee’s authorization, execution and delivery of the Indenture and the

genuineness of signatures and to such counsel's reliance on the Bank and other sources as to certain factual matters, all as stated in the legal opinion dated January 8, 2016, which has been filed as Exhibit 5.2 to the Bank's Form 6-K dated January 8, 2016.

P-16 RBC Capital Markets, LLC

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