

<b>PATENT ASSIGNMENT COVER SHEET</b>
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Electronic Version v1.1  
 Stylesheet Version v1.2

EPAS ID: PAT6530241

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	SECURITY INTEREST

**CONVEYING PARTY DATA**

Name	Execution Date
TPC GROUP LLC	02/02/2021

**RECEIVING PARTY DATA**

<b>Name:</b>	U.S. BANK NATIONAL ASSOCIATION, AS AGENT
<b>Street Address:</b>	13737 NOEL RD
<b>Internal Address:</b>	SUITE 800
<b>City:</b>	DALLAS
<b>State/Country:</b>	TEXAS
<b>Postal Code:</b>	75240

**PROPERTY NUMBERS Total: 43**

Property Type	Number
Patent Number:	10052608
Patent Number:	10035741
Patent Number:	9861976
Patent Number:	9650316
Patent Number:	9617366
Patent Number:	9617363
Patent Number:	9453089
Patent Number:	9856335
Patent Number:	9266980
Patent Number:	9908097
Patent Number:	8946361
Patent Number:	10035740
Patent Number:	10035136
Patent Number:	9902669
Patent Number:	9598655
Patent Number:	9505682
Patent Number:	9353025
Patent Number:	9309339
Patent Number:	9074026

PATENT

Property Type	Number
Patent Number:	9115038
Patent Number:	8524843
Patent Number:	9809665
Patent Number:	6858188
Patent Number:	6992152
Patent Number:	7037999
Patent Number:	7091285
Patent Number:	6683138
Patent Number:	6777506
Patent Number:	6844400
Patent Number:	6844401
Patent Number:	6884858
Patent Number:	7056990
Patent Number:	7329635
Patent Number:	7498396
Patent Number:	7645847
Patent Number:	10155704
Patent Number:	10538466
Patent Number:	10526259
Patent Number:	10544071
Patent Number:	10836690
Application Number:	16804265
Application Number:	16648488
Application Number:	16648580

**CORRESPONDENCE DATA**

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<b>ATTORNEY DOCKET NUMBER:</b>	007256/0002
<b>NAME OF SUBMITTER:</b>	JEFFREY MANN
<b>SIGNATURE:</b>	/Jeffrey Mann/
<b>DATE SIGNED:</b>	02/02/2021

**Total Attachments: 7**

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**PATENT SECURITY AGREEMENT**

**GRANT OF SECURITY INTEREST IN  
UNITED STATES PATENTS**

THIS GRANT OF SECURITY INTEREST IN UNITED STATES PATENTS (“**Patent Security Agreement**”) dated as of February 2, 2021 is made by, TPC Group LLC, a Texas corporation, (the “**Grantor**”), in favor of U.S. Bank National Association, as Agent (the “**Agent**”), with its corporate trust office located at 13737 Noel Rd, Suite 800, Dallas, TX 75240.

**WITNESSETH:**

WHEREAS, TPC Holdings, Inc., a Delaware corporation (“**Holdings**”) and TPC Group Inc., a Delaware corporation (“**Issuer**”), are a party to that certain Indenture, dated as of February 2, 2021 (as amended, restated, supplemented or otherwise modified from time to time, the “**Indenture**”), with the guarantors party thereto from time to time and U.S. Bank National Association, as trustee and agent;

WHEREAS, pursuant to the Indenture, the Grantor executed and delivered that certain Pledge and Security Agreement dated as of February 2, 2021 (as heretofore or hereafter amended, restated, supplemented or otherwise modified from time to time, the “**Security Agreement**”); and

WHEREAS, pursuant to the Security Agreement, the Grantor pledged and granted to the Agent for the benefit of the Agent and the Lenders a continuing security interest in all Intellectual Property Collateral, including the Patents (as defined below);

NOW THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Grantor hereby agrees as follows:

**Section 1. Definitions.** Each capitalized term used herein and not otherwise defined herein shall have the meaning assigned to such term in the Security Agreement or, if not defined herein or in the Security Agreement, in the Indenture.

**Section 2. Grant of Security Interest.** To secure the prompt and complete payment, performance and observance of all of the Secured Obligations, the Grantor hereby grants to the Agent a security interest in all of the Grantor’s right, title and interest in and to the United States patents set forth on Schedule A attached hereto (the “**Patents**”), together with all Proceeds therefrom.

**Section 3. Purpose.** This Patent Security Agreement is made to secure the full and prompt performance and payment of all the Secured Obligations. Upon the occurrence of the Termination Date or as otherwise provided in **Section Error! Reference source not found.** of the Security Agreement, the Agent shall, upon such satisfaction, execute, acknowledge, and deliver to the Grantor an instrument in writing releasing the security interest in and re-assigning the Patents acquired under this Patent Security Agreement to the Grantor.

**Section 4. Acknowledgement.** The rights and remedies of the Agent with respect to the security interest granted herein are more fully set forth in the Security Agreement. In the event

that any provisions of this Patent Security Agreement are deemed to conflict with the Security Agreement, the provisions of the Security Agreement shall govern.

**Section 5. Counterparts.** This Patent Security Agreement may be executed in any number of counterparts and by the different parties hereto on separate counterparts, each of which counterparts, when so executed and delivered, shall be deemed to be an original and all of which counterparts, taken together, shall constitute but one and the same original.

[Signature pages follow]

IN WITNESS WHEREOF, the undersigned have executed this Patent Security Agreement as of the date first written above.

**TPC GROUP LLC,**  
as Grantor

By: \_\_\_\_\_

Name: Andrew Grygier

Title: Vice President and Treasurer

*[Signature Page to Patent Security Agreement]*

**PATENT**  
**REEL: 055119 FRAME: 0163**

U.S. BANK NATIONAL ASSOCIATION, as  
Agent

By:   
Name: Michael K. Herberger  
Title: Vice President

*[Signature Page to Patent Security Agreement]*

**PATENT**  
**REEL: 055119 FRAME: 0164**

Schedule A

<b>Patent Number</b>	<b>Title</b>	<b>Owner</b>
10052608	Low emissions oxidative dehydrogenation apparatus for producing butadiene	TPC Group LLC
10035741	High throughput oxidative dehydrogenation process	TPC Group LLC
9861976	Regeneration of oxidative dehydrogenation catalyst in a reactor	TPC Group LLC
9650316	Low emissions oxidative dehydrogenation process for producing butadiene	TPC Group LLC
9617366	Low-fluoride, reactive polyisobutylene	TPC Group LLC
9617363	Low-fluoride, reactive polyisobutylene	TPC Group LLC
9453089	Production of highly reactive low molecular weight PIB oligomers	TPC Group LLC
9856335	Production of highly reactive low molecular weight PIB oligomers	TPC Group LLC
9266980	Polyisobutylene prepared at high velocity and circulation rate	TPC Group LLC
9908097	Controllability oxidative dehydrogenation process for producing butadiene	TPC Group LLC
8946361	Polyisobutylene prepared at high velocity and circulation rate	TPC Group LLC
10035740	Multi-stage oxidative dehydrogenation process with inter-stage cooling	TPC Group LLC
10035136	Catalyst for reduced nitrogen oxide (NO.sub.x) emissions in an oxodehydrogenation process	TPC Group LLC
9902669	Oxidative dehydrogenation process with hydrocarbon moderator gas and reduced nitrogen feed	TPC Group LLC
9598655	Adducts of low molecular weight PIB with low polydispersity and high vinylidene content	TPC Group LLC
9505682	Manufacture of butadiene from ethylene	TPC Group LLC
9353025	Process for selective removal of acetylenes from gaseous streams	TPC Group LLC
9309339	Mid-range vinylidene content, high viscosity polyisobutylene polymers	TPC Group LLC
9074026	Polyisobutylene prepared with low diluent content reaction medium	TPC Group LLC
9115038	Process for selective removal of acetylenes from gaseous streams	TPC Group LLC
8524843	Production of highly reactive low molecular weight PIB oligomers	TPC Group LLC



9809665	Polyisobutylene production process with improved efficiencies and/or for forming products having improved characteristics and polyisobutylene products produced thereby	TPC Group LLC
6858188	Apparatus for preparing polyolefin products and methodology for using the same	TPC Group LLC
6992152	Apparatus and method for controlling olefin polymerization process	TPC Group LLC
7037999	Mid-range vinylidene content polyisobutylene polymer product and process for producing the same	TPC Group LLC
7091285	Adducts of mid-range vinylidene content polyisobutylene polymer products and methods for making the same	TPC Group LLC
6683138	Process for producing high vinylidene polyisobutylene	TPC Group LLC
6777506	Apparatus for preparing polyolefin products and methodology for using the same	TPC Group LLC
6844400	Apparatus for preparing polyolefin products and methodology for using the same	TPC Group LLC
6844401	Apparatus for preparing polyolefin products and methodology for using the same	TPC Group LLC
6884858	Process for preparing polyolefin products	TPC Group LLC
7056990	Process for producing mid-range vinylidene content polyisobutylene polymer products	TPC Group LLC
7329635	Crude oil composition including dispersant material for mitigating fouling of process equipment and method for mitigating crude oil fouling	TPC Group LLC
7498396	Mid-range vinylidene content polyisobutylene polymer product produced by liquid phase polymerization process	TPC Group LLC
7645847	Process for preparing polyolefin products	TPC Group LLC
10155704	Processes and apparatuses for production of butadiene	UOP LLC and TPC Group LLC
10538466	Use of C4 absorber overhead for stripping aldehydes	UOP LLC and TPC Group LLC
10526259	Staged pressure for butadiene reactors to enhance energy recovery	UOP LLC and TPC Group LLC
10544071	Heat recovery in the process of production of butadiene	UOP LLC and TPC Group LLC
10836690	Dehydrogenation process and system with reactor re-sequencing	TPC Group LLC

16/804265	Flexible Manufacturing System for Selectively Producing Different Linear Alpha Olefins	TPC Group LLC
16/648488	Isobutylene Copolymers, Method for Making Isobutylene Copolymers and Isobutylene Copolymer Products	TPC Group LLC
16/648580	Non-Random Isobutylene Copolymers	TPC Group LLC