# EXHIBIT 6

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

**UNITED STATES DISTRICT COURT**
**CENTRAL DISTRICT OF CALIFORNIA**

Kolon Industries, Inc.,

*Plaintiff*,

v.

Hyosung Advanced Materials Corp. and Hyosung USA, Inc.,

*Defendants*.

Case No. 8:24-cv-00415-JVS-JDE

**DEFENDANT HYOSUNG ADVANCED MATERIALS CORP.'S INVALIDITY CONTENTIONS**

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

Pursuant to the Court's June 26, 2024, Order Setting Scheduling Conference (Dkt. 57), the Court's August 21, 2024, Order Re Scheduling Dates (Dkt. 68), and the parties' October 22, 2024, Joint Stipulation Staying Discovery and Amending Case Schedule, Hyosung Advanced Materials Corp. ("HAMC" or "Defendant") hereby submits its Invalidity Contentions ("Contentions") for U.S. Patent Nos. 9,617,663 ("'663 patent"), 9,789,731 ("'731 patent"), and 10,196,765 ("'765 patent") (collectively, "Asserted Patents").

## I. PRELIMINARY STATEMENT AND RESERVATION OF RIGHTS

In its Infringement Contentions dated September 9, 2024, Kolon asserted the following claims (the "Asserted Claims"):

- the '663 patent: 1-3;
- the '731 patent: 4-7;
- the '765 patent: 1-6.

HAMC does not provide any Contentions directed to claims that Kolon has not asserted for purposes of infringement. To the extent Kolon may be permitted to assert additional claims in the future, HAMC reserves all rights to disclose new or supplemental contentions regarding such claims.

Because the same claim scope must apply for both infringement and invalidity, these Contentions are based on Kolon's assertions in its Infringement Contentions. HAMC does not thereby implicitly or explicitly agree with Kolon's construction of the claims. HAMC reserves all rights to disclose new or supplemental invalidity contentions, including to address any construction of the claims rendered by the Court, changed theories of infringement, and any evidence obtained during the course of discovery.

Subject to the rights reserved in these Contentions, all Asserted Claims are invalid under at least one or more of 35 U.S.C. §§ 102, 103, and/or 112. The Asserted Claims are invalid because they are anticipated and/or rendered obvious under 35 U.S.C. §§ 102 and 103. If Kolon contends or a fact-finder finds that one or more limitations of the Asserted Claims are not disclosed in the prior art identified as anticipatory, HAMC reserves the right to assert obviousness based on the identified references and/or to identify other references that would have rendered obvious the

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

allegedly missing limitation. Furthermore, the obviousness combinations of references provided below and in the accompanying claim charts under 35 U.S.C. § 103 are exemplary only and are not intended to be exhaustive. If or when Kolon challenges the disclosure of any of these references with respect to particular limitations of the Asserted Claims, HAMC reserves the right to supplement these Contentions to assert additional or different bases for obviousness. HAMC reserves the right to use any combination of the references set forth in these Contentions to demonstrate the obviousness of the Asserted Claims. Additionally, certain claims of the Asserted Patents are invalid for failure to comply with the written description, enablement, and definiteness requirements of 35 U.S.C. § 112.

HAMC expressly reserves the right to amend, correct, and/or supplement these Contentions in accordance with the scheduling order governing this case.

* * *

These Contentions reflect HAMC's knowledge, investigation, and discovery as of the date of service. HAMC reserves the right to supplement these Contentions as appropriate and for any permissible reason. For example, pursuant to the Court's scheduling order, HAMC reserves the right to supplement these Contentions after subsequent case events, including any disclosure by Kolon of amended or supplemental infringement contentions, any ruling by the Court on claim construction, or in response to arguments made and positions taken by Kolon during fact and expert discovery. HAMC also reserves the right to supplement these Contentions if it becomes aware of additional prior art, becomes aware of additional features of the prior art references cited below, or becomes aware of any other relevant information through discovery, including non-party discovery, or otherwise. HAMC also reserves the right to modify or supplement its Contentions based on the Court's construction of the claims.

In addition to the charts attached hereto, HAMC expressly incorporates by reference, as if expressly set forth in these Contentions, all invalidity positions, prior art, and claim charts asserted against Kolon in any Kolon lawsuit or IPR proceeding by HAMC, prior defendants, petitioners, and potential or actual licensees to the Asserted Patents. HAMC also incorporates any future discovery responses and expert reports in such litigations or proceedings.

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

HAMC's citations to disclosures in any particular prior art reference are not (and are not intended to be) exhaustive but rather illustrative. HAMC reserves the right to rely on uncited portions of the prior art references and on other publications and expert testimony as aids in understanding and interpreting the cited portions, as providing context thereto, as additional evidence that the prior art discloses a claim limitation or the alleged invention as a whole, as evidence of the state of the art at a particular time, as evidence of the obviousness factor of contemporaneous development by others, and as evidence of motivation to combine. HAMC also reserves the right to rely on uncited portions of the prior art references, other publications, and testimony, including expert testimony, to establish bases for combination of prior art references that render the charted claims obvious. Due to the related nature of the Asserted Patents, HAMC also reserves the right to rely on any cited portions of a prior art reference for one Asserted Patent against all Asserted Patents. HAMC also reserves the right to rely upon any documentary or testimonial evidence of the existence of any systems that embodied or practiced the disclosures found in the accompanying invalidity charts, for example as discussed in the prior art references cited herein, as such systems may qualify as prior art under 35 U.S.C. § 102(g).[1]

HAMC intends to rely on admissions concerning the scope of the prior art relevant to the Asserted Patents found in, *inter alia*: the patent prosecution histories for the Asserted Patents and related patents and/or patent applications (including all prior art cited therein); any deposition testimony of the named inventors on the Asserted Patents and related patents and/or patent applications in this matter or any other matter; evidence and testimony relating to the level of skill in the art; and the papers filed and any evidence submitted by Kolon in connection with this matter.

HAMC reserves the right to assert that the Asserted Claims are invalid under 35 U.S.C. § 102(f) in the event HAMC obtains additional evidence that the inventors named in any of the Asserted Patents did not invent the subject matter claimed therein. Should HAMC obtain such

[1] Citations herein refer to the pre-AIA version of Title 35 of the U.S. Code.

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

evidence, it will provide the name of the person(s) from whom and the circumstances under which the alleged invention or any part of it was derived.

These Contentions are not intended to include or otherwise reflect HAMC's claim interpretations. Because the Court has not yet construed any of the claims in this litigation, HAMC bases these Contentions at least on its present understanding of Kolon's view and application of the claim scope, to the extent that view can be inferred from Kolon's actual and/or apparent application of those claims. But HAMC does not adopt any constructions or interpretations impliedly or expressly in these Contentions. Moreover, HAMC's Contentions may reflect alternative positions as to claim construction and scope.

For the purposes of these Contentions, HAMC has made assumptions regarding possible meanings of indefinite claim terms. By making these assumptions, HAMC does not admit that any claim language satisfies 35 U.S.C. § 112. Similarly, the use of asserted claim terms herein should not be understood to mean that such terms, as used in the Asserted Patents or claims thereof, are definite or otherwise comply with the conditions of patentability under 35 U.S.C. § 112. Likewise, the use of asserted claim terms herein should not be understood to suggest or imply a common, usual, ordinary, customary, plain, or accepted meaning in the art for any such terms.

By providing these Contentions, HAMC is not waiving nor limiting its rights to make arguments in the future about the proper scope of the claims or to advance alternative constructions to those Kolon advocates. HAMC expressly reserves the right to argue for such alternative claim constructions during this litigation and to supplement these Contentions after the Court has issued a claim construction ruling.

HAMC's factual investigations, including its investigation of prior art and grounds for invalidity, is ongoing. Further, HAMC's invalidity positions will be the subject of expert testimony. HAMC reserves the right to supplement these Contentions, including, without limitation, adding additional prior art and grounds of invalidity in accordance with the Federal Rules of Civil Procedure and Court's scheduling order in this case, or otherwise.

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

## II. IDENTIFICATION OF RELEVANT PRIOR ART

### A. Priority Dates

Kolon has alleged but not yet shown that the Asserted Claims in some of the Asserted Patent are entitled to a priority date earlier than the filing date of each Asserted Patent. To the extent that Kolon attempts to assert an earlier priority date for any Asserted Claim, HAMC reserves the right to amend this disclosure to address any such claim.

### B. Prior Art Patent Publications

Based on their investigation to date, HAMC has provided in the list below the prior art patent publications presently known to HAMC that it contends anticipate and/or render obvious the Asserted Claims. The prior art identified in these Contentions discloses (i.e., anticipates and/or renders obvious) the elements of the Asserted Claims either explicitly or inherently. HAMC reserves the right to rely on any prior art identified in these Contentions against any of the Asserted Patents. Similarly, the prior art patent publications listed on the face of the Asserted Patents discloses (i.e., anticipates and/or renders obvious) the elements of the Asserted Claims either explicitly or inherently, and HAMC reserves the right to rely on any such reference.

Prior-art patents or publications included in these Contentions may be related (such as a divisional, continuation, continuation-in-part, parent, or child) to earlier or later-filed patents or publications, may have counterparts filed in other jurisdictions, or may incorporate (or be incorporated by) other patents or publications by reference. The listed patents or publications are intended to be representative of these other patents or publications to the extent they exist. HAMC accordingly reserves the right to modify, amend, or supplement these Contentions with these related patents or publications, as well as other prior art references, upon further investigation. Additionally, any reference in these Contentions, including the appendices and exhibits thereto, to a specific subsection or subsections of 35 U.S.C. § 102, is merely exemplary, and HAMC expressly reserves the right to rely on additional or other sections of 35 U.S.C. § 102, as appropriate. If Kolon asserts that one or more of these references or systems fails to disclose one or more elements of a claim, HAMC reserves the right to also use those references to invalidate the claim under 35 U.S.C. § 103.

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

Discovery is ongoing, and HAMC's prior art investigation and third-party discovery is therefore not yet complete. HAMC reserves the right to present additional items of prior art under 35 U.S.C. §§ 102 and/or 103 that are located during the course of discovery or further investigation. For example, HAMC expects to receive documents from additional third parties either through informal requests or under subpoenas that are believed to have knowledge, documentation, and/or corroborating evidence concerning some of the prior art listed and discussed below. These third parties include without limitation the authors, inventors, or assignees of the references listed in these disclosures.

| Name | Country of Origin | Publication/Issue Date |
|---|---|---|
| U.S. Pat. No. 5,558,144 ("Nakayasu") | United States | September 24, 1996 |
| U.S. Patent Application Publication No. 2003/0159768 ("Fritsch") | United States | August 28, 2003 |
| Korean Patent Application Publication No. 101272692B-1 ("Choi") | Korea | December 5, 2012 |
| Korean Patent Application Publication No. 20060126101A ("Chung") | Korea | December 7, 2006 |
| Chinese Patent No. 103498231A ("Li") | China | January 8, 2014 |
| European Patent No. 1878591B-1 ("Reese") | European Union | March 23, 2011 |
| U.S. Patent Application Publication No. 2014/0237983 ("Love") | United States | August 28, 2014 |
| U.S. Patent No. 4,155,394 ("Shepherd") | United States | May 22, 1979 |
| Korean Patent Application Publication No. 1020140090307A ("Lee") | Korea | July 17, 2014 |
| Japanese Patent Application Publication No. 2009068549A ("Tamura") | Japan | April 2, 2009 |
| U.S. Patent No. 3,977,172 ("Kerawalla") | United States | August 31, 1976 |
| Japanese Patent Application Publication No. 61071204A ("Imai") | Japan | April 12, 1986 |

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

| Name | Country of Origin | Publication/Issue Date |
|---|---|---|
| Japanese Patent Application Publication JP2009-91713 ("Baldwin") | Japan | April 30, 2009 |
| Korean Patent KR100687048B-1 ("Bang") | Korea | February 26, 2007 |
| PCT Application WO2003060212A-1 ("Esnault") | PCT | July 24, 2003 |
| Japanese Patent Application Publication JP2007216778A ("Harikae") | Japan | August 30, 2007 |
| German Patent Application Publication DE102011053264A-1 ("Justine") | Germany | March 7, 2013 |
| Japanese Patent Application Publication JP2008223200A ("Ohora") | Japan | September 25, 2008 |
| United States Patent Application Publication US 2005/0249949 Al ("Rowan") | United States | November 10, 2005 |
| Korean Patent Application Publication No. KR19990026654A ("Baek") | Korea | April 15, 1999 |
| U.S. Patent Application Publication No. 2014/0238524A-1 ("Love II") | United States | August 28, 2014 |
| U.S. Patent Application Publication No. 2012/0186218 ("Westgate") | United States | July 26, 2012 |
| Swiss Patent No. CH325044A ("Schrenk") | Switzerland | December 14, 1954 |
| Korean Patent Application Publication No. KR20040057550A ("Lee II") | Korea | July 2, 2004 |
| U.S. Patent No. 8,584,724 ("Yokokura") | United States | November 19, 2013 |
| Japanese Patent Application No. JPH06136630 ("Matsui") | Japan | May 17, 1994 |
| PCT Application WO 2009/134063 ("Kwon") | WIPO | November 5, 2009 |
| European Patent Application No. EP 0295147 ("Takahashi") | European Union | December 14, 1988 |

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

| Name | Country of Origin | Publication/Issue Date |
|---|---|---|
| U.S. Patent Application No. 2009/0124149 ("Barnes") | United States | May 14, 2009 |
| U.S. Patent Application No. 2004/0108037 ("Osborne") | United States | June 10, 2004 |
| U.S. Patent No. 4,652,252 ("Westhoff") | United States | March 24, 1987 |

C. **Prior Art Non-Patent Publications**[2,3]

| Name | Publication Date |
|---|---|
| Onbilger, Derya Gulsen, et al. "Aramid yarn as a tensile member in products" Rubber & Plastics News ("Onbilger") | Feb 25, 2008 |
| "Yarns of Aramid/Polyamid for High Performance Tires and Hoses 'Hybrid Yarn'" ("Olsson"). | 2009 |
| "Law of Critical Yarn Diameter and Twist Influence on Yarn Characteristics" *Textile Research Journal* ("Barella"). | April 1950 |
| "CC3 User Manual and Service Information" ("Oerlikon"). | November 13, 2002 |
| "Allma CC4" ("Allma") | March 2011 |
| "Aramid-Nylon 6.6 Hybrid Cords and Investigation of Their Properties" ("Yilmaz") | 2012 |
| "Processing Mechanics of Alternate Twist Ply (ATP) Yarn Technology" ("Elkhamy") | September 2007 |
| Chul, Kim, "Tire Cord" *Textile Technology and Industry*, Vol. 11, No. 1 ("Chul") | 2007 |
| "Allma CableCorder CC3" ("Oerlikon Saurer") | August 2007 |
| "Technical documentation CC3 Operating Manual and Service Information" ("Allma SaurerGroup") | February 26, 2002 |

[2] Any discussion of a non-patent publication in either Section II.C or in one of the claim charts included herewith that discloses a corresponding product or system shall also apply with equal force to the underlying product or system. In other words, both the non-patent publication and the underlying product or system themselves qualify as prior art in the context that they are used herein.

[3] Discovery is currently ongoing, and HAMC will supplement these Contentions with respect to the public availability, as necessary, of any non-patent publication if and when more information becomes available. HAMC may also supplement the contentions based on documents received from third parties believed to have knowledge, documentation, and/or corroborating evidence concerning the public availability of the identified non-patent publications.

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

Moreover, the prior art non-patent publications listed on the faces of the Asserted Patents disclose (i.e., anticipate and/or renders obvious) the elements of the Asserted Claims either explicitly or inherently, and HAMC reserves the right to rely on any such reference. HAMC reserves the right to rely on any prior art reference listed on the face of any one of the Asserted Patents against any of the Asserted Patents.

**D. Prior Art Systems and/or Knowledge**

The Asserted Claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on prior art items offered for sale or publicly used or known or prior inventions, such as prior art products, including systems embodying any alleged inventions or structures described in, and/or any knowledge disclosed by or referred to in, any of the prior art patents or prior art publications identified above in Sections II.B and II.C. Because HAMC has not yet completed discovery in this case, HAMC reserves the right to supplement theses Contentions with facts, documents, or other information learned at a later point through third-party discovery or further investigation. For example, HAMC expects to receive documents from additional third parties either through informal requests or under subpoenas that are believed to have knowledge, documentation, and/or corroborating evidence concerning some of the prior art listed above and below and/or additional prior art. These third parties include without limitation the authors, inventors, or assignees of the references listed in these Contentions. In addition, HAMC reserves the right to assert invalidity under other sections of 35 U.S.C. § 102 to the extent that discovery or further investigation yield information forming the basis for such invalidity.

Moreover, all of the systems and products listed below qualify as prior art to each of the Asserted Patents under at least pre-AIA 35 U.S.C. §§ 102(a)/(b). Such systems and products were known, used, offered for sale, and/or sold in the United States prior to the appropriate priority date corresponding to each of the Asserted Patents.

| **Products** |
| --- |
| HAMC's Aramid/Nylon Product (2010-2011) |

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

| |
|---|
| Oerlikon Saurer Allma CableCorder CC3 (2007) |
| Oerlikon Saurer Allma CableCorder CC4 (2011) |
| Svenskt Konstsilke High performance Technical Yarns (2009) |

The Federal Circuit has held that "[t]he proper test for the public use prong of the [pre-AIA] § 102(b) statutory bar is whether the purported use: (1) was accessible to the public; or (2) was commercially exploited." *See Invitrogen Corp. v. Biocrest Mfg. L.P.*, 424 F.3d 1374, 1380 (Fed. Cir. 2005). Additionally, the on-sale bar of § 102(b) is triggered when the invention is both (1) the subject of a commercial offer for sale not primarily for experimental purposes and (2) ready for patenting. *Pfaff v. Wells Elecs., Inc*., 525 U.S. 55, 67 (1998). Each of the systems and products listed above meets these criteria.

The above discussion is not exclusive. HAMC reserves the right to rely on both the listed products as well as other products that may become known and/or relevant during the course of this matter.

Any citation to one or more of these prior art references, or other prior art references regarding any method or system, should be construed to constitute not only a citation to the prior art reference itself but also a reference to the system itself. Discovery is ongoing in this case, and HAMC will supplement these Contentions if and when more information becomes available. Accordingly, HAMC reserve the right to modify, amend, and/or supplement these contentions as information becomes available from non-parties.

**E. Prior Art Under 35 U.S.C. §§ 102(f) and 102(g)**

Each prior art patent, publication, or product identified above was either effectively filed or issued (for patents), published (for publications) or known, used, offered for sale or sold (for products) before the earliest claimed priority date of the Asserted Patents to which it is applied for invalidity, and none was abandoned, suppressed, or concealed, so each such reference also constitutes evidence of prior invention pursuant to 35 U.S.C. § 102(g), if it is in the U.S. The persons or entities involved with each such invention include the named inventors on the above-

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

identified patents, the authors listed on the above-identified publications, and the entities and individuals identified in connection with the above-identified products.

Because HAMC has not yet completed discovery in this case, including taking depositions of the named inventors of the Asserted Patents, reviewing Kolon's productions, and seeking discovery of prior inventions by third parties, HAMC reserves the right to supplement these Contentions with facts, documents, or other information learned at a later point through discovery or further investigation.

## III. ANTICIPATION AND OBVIOUSNESS (35 U.S.C. §§ 102 AND 103)

The Asserted Claims are anticipated by and/or rendered obvious in view of one or more items of prior art identified in these Contentions, alone and/or in combination. Based on its investigation to date, HAMC has provided in the lists above the prior art presently known to HAMC that anticipates and/or renders obvious the Asserted Claims under at least Kolon's actual and/or apparent application of those claims. The prior art identified in these Contentions discloses (i.e., anticipates and/or renders obvious) the elements of the Asserted Claims either explicitly or inherently.

Prior art patents or publications included in these Contentions may be related (such as a divisional, continuation, continuation-in-part, parent, or child) to earlier or later-filed patents or publications, may have counterparts filed in other jurisdictions, or may incorporate (or be incorporated by) other patents or publications by reference. The listed patents or publications are intended to be representative of these other patents or publications to the extent they exist. HAMC accordingly reserves the right to modify, amend, or supplement these Contentions with these related patents or publications, as well as other prior art references, upon further investigation. Additionally, any reference in these Contentions, including the appendices and/or exhibits thereto, to a specific subsection or subsections of 35 U.S.C. § 102, is merely exemplary, and HAMC expressly reserves the right to rely on additional or other sections of 35 U.S.C. § 102, as appropriate.

Although HAMC's investigation is ongoing, information available to date indicates that each prior art system disclosed above was at least (1) known or used in this country before the

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

alleged invention of the claimed subject matter of the Asserted Patents; (2) in public use, on sale, or offered for sale in this country more than one year before the effective filing date for the Asserted Patents; or (3) invented and not abandoned, suppressed, or concealed prior to the alleged invention of the Asserted Patents.

Much of the art identified in these Contentions reflects common knowledge and the state of the art prior to the filing or asserted priority dates of the Asserted Patents. As such, the obviousness combinations in these Contentions are intended to be exemplary. There are many possible combinations of the disclosed prior art, and the inclusion of certain exemplary combinations does not exclude other combinations. For example, where a particular contention calls for combining references, any of a number of references can be combined.

Depending on the construction of the claims of the Asserted Patents, and/or positions that Kolon or its expert witnesses may take concerning claim interpretation, infringement, and/or invalidity issues, different ones of the charted prior art references in the Exhibits may be of greater or lesser relevance and different combinations of these references may be implicated. Given the uncertainty, the charts may reflect alternative applications of the prior art against the Asserted Claims.

Citations to particular excerpts from the prior art are likewise exemplary and not exhaustive of the evidentiary support for the invalidity of the Asserted Patents contained in and/or concerning a particular piece of prior art. HAMC may rely on uncited portions of the prior art references, other documents or operational systems, the "Background of the Invention" and other relevant portions of the Asserted Patents, the prosecution histories of the Asserted Patents (including all cited references) and their related patents and applications, and forthcoming fact and expert testimony to provide context to aid in understanding the prior art reference and/or the cited portions of the references. Where HAMC cites to a particular figure in a reference, the citation encompasses the caption and description of the figure and any text relating to or discussing the figure. Likewise, where HAMC cites text referring to a figure, the citation includes the figure as well (and vice versa).

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

**A. Prior Art Under 35 U.S.C. § 102**

HAMC contends that at least the primary prior art references (Exs. A-1 through C-39) identified below, by themselves, anticipate one or more of the Asserted Claims:

| Exhibits | Primary References and/or Systems |
|---|---|
| A-1 | U.S. Pat. No. 5,558,144 ("Nakayasu") |
| A-2 | U.S. Patent Application Publication No. 2003/0159768 ("Fritsch") |
| A-3 | Korean Patent Application Publication No. 101272692B-1 ("Choi") |
| A-4 | Korean Patent Application Publication No. 20060126101A ("Chung") |
| A-5 | Chinese Patent No. 103498231A ("Li") |
| A-6 | European Patent No. 1878591B-1 ("Reese") |
| A-7 | U.S. Patent Application Publication No. 2014/0237983 ("Love") |
| A-8 | U.S. Patent No. 4,155,394 ("Shepherd") |
| A-9 | Korean Patent Application Publication No. 1020140090307A ("Lee") |
| A-10 | Japanese Patent Application Publication No. 2009068549A ("Tamura") |
| A-11 | U.S. Patent No. 3,977,172 ("Kerawalla") |
| A-12 | Japanese Patent Application Publication No. 61071204A ("Imai") |
| A-13 | "Allma CC4" ("Allma") |
| A-14 | Korean Patent Application Publication No. KR19990026654A ("Baek") |
| A-15 | Onbilger, Derya Gulsen, et al. "Aramid yarn as a tensile member in products" Rubber & Plastics News ("Onbilger") |
| A-16 | "Aramid-Nylon 6.6 Hybrid Cords and Investigation of Their Properties" ("Yilmaz") |
| A-17 | U.S. Patent Application Publication No. 2014/0238524A-1 ("Love II") |
| A-18 | U.S. Patent Application Publication No. 2012/0186218 ("Westgate") |
| A-19 | "Processing Mechanics of Alternate Twist Ply (ATP) Yarn Technology" ("Elkhamy") |
| A-20 | Japanese Patent Application Publication JP2009-91713 ("Baldwin") |
| A-21 | Korean Patent KR100687048B-1 ("Bang") |

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

| Exhibits | Primary References and/or Systems |
|---|---|
| A-22 | "Law of Critical Yarn Diameter and Twist Influence on Yarn Characteristics" *Textile Research Journal* ("Barella"). |
| A-23 | PCT Application WO2003060212A-1 ("Esnault") |
| A-24 | Japanese Patent Application Publication JP2007216778A ("Harikae") |
| A-25 | German Patent Application Publication DE102011053264A-1 ("Justine") |
| A-26 | "CC3 User Manual and Service Information" ("Oerlikon") |
| A-27 | Japanese Patent Application Publication JP2008223200A ("Ohora") |
| A-28 | "Yarns of Aramid/Polyamid for High Performance Tires and Hoses 'Hybrid Yarn'" ("Olsson") |
| A-29 | United States Patent Application Publication US 2005/0249949 Al ("Rowan") |
| A-30 | HAMC's Aramid/Nylon Product (2010-2011) |
| A-31 | Swiss Patent No. CH325044A ("Schrenk") |
| A-32 | Korean Patent Application Publication No. KR20040057550A ("Lee II") |
| A-33 | Chul, Kim, "Tire Cord" *Textile Technology and Industry*, Vol. 11, No. 1 ("Chul") |
| A-34 | "Allma CableCorder CC3" ("Oerlikon Saurer") |
| A-35 | U.S. Patent No. 8,584,724 ("Yokokura") |
| A-36 | Japanese Patent Application No. JPH06136630 ("Matsui") |
| A-37 | PCT Application WO 2009/134063 ("Kwon") |
| A-38 | European Patent Application No. EP 0295147 ("Takahashi") |
| A-39 | U.S. Patent No. 9,789,731 |
| B-1 | U.S. Pat. No. 5,558,144 ("Nakayasu") |
| B-2 | U.S. Patent Application Publication No. 2003/0159768 ("Fritsch") |
| B-3 | Korean Patent Application Publication No. 101272692B-1 ("Choi") |
| B-4 | Korean Patent Application Publication No. 20060126101A ("Chung") |
| B-5 | Chinese Patent No. 103498231A ("Li") |
| B-6 | European Patent No. 1878591B-1 ("Reese") |
| B-7 | U.S. Patent Application Publication No. 2014/0237983 ("Love") |

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

| Exhibits | Primary References and/or Systems |
|---|---|
| B-8 | U.S. Patent No. 4,155,394 ("Shepherd") |
| B-9 | Korean Patent Application Publication No. 1020140090307A ("Lee") |
| B-10 | Japanese Patent Application Publication No. 2009068549A ("Tamura") |
| B-11 | U.S. Patent No. 3,977,172 ("Kerawalla") |
| B-12 | Japanese Patent Application Publication No. 61071204A ("Imai") |
| B-13 | "Allma CC4" ("Allma") |
| B-14 | Korean Patent Application Publication No. KR19990026654A ("Baek") |
| B-15 | Onbilger, Derya Gulsen, et al. "Aramid yarn as a tensile member in products" Rubber & Plastics News ("Onbilger") |
| B-16 | "Aramid-Nylon 6.6 Hybrid Cords and Investigation of Their Properties" ("Yilmaz") |
| B-17 | U.S. Patent Application Publication No. 2014/0238524A-1 ("Love II") |
| B-18 | U.S. Patent Application Publication No. 2012/0186218 ("Westgate") |
| B-19 | "Processing Mechanics of Alternate Twist Ply (ATP) Yarn Technology" ("Elkhamy") |
| B-20 | Japanese Patent Application Publication JP2009-91713 ("Baldwin") |
| B-21 | Korean Patent KR100687048B-1 ("Bang") |
| B-22 | "Law of Critical Yarn Diameter and Twist Influence on Yarn Characteristics" *Textile Research Journal* ("Barella"). |
| B-23 | PCT Application WO2003060212A-1 ("Esnault") |
| B-24 | Japanese Patent Application Publication JP2007216778A ("Harikae") |
| B-25 | German Patent Application Publication DE102011053264A-1 ("Justine") |
| B-26 | "CC3 User Manual and Service Information" ("Oerlikon") |
| B-27 | Japanese Patent Application Publication JP2008223200A ("Ohora") |
| B-28 | "Yarns of Aramid/Polyamid for High Performance Tires and Hoses 'Hybrid Yarn'" ("Olsson") |
| B-29 | United States Patent Application Publication US 2005/0249949 Al ("Rowan") |
| B-30 | HAMC's Aramid/Nylon Product (2010-2011) |

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

| Exhibits | Primary References and/or Systems |
|---|---|
| B-31 | Swiss Patent No. CH325044A ("Schrenk") |
| B-32 | Korean Patent Application Publication No. KR20040057550A ("Lee II") |
| B-33 | Chul, Kim, "Tire Cord" *Textile Technology and Industry*, Vol. 11, No. 1 ("Chul") |
| B-34 | "Allma CableCorder CC3" ("Oerlikon Saurer") |
| B-35 | U.S. Patent No. 8,584,724 ("Yokokura") |
| B-36 | Japanese Patent Application No. JPH06136630 ("Matsui") |
| B-37 | PCT Application WO 2009/134063 ("Kwon") |
| B-38 | European Patent Application No. EP 0295147 ("Takahashi") |
| C-1 | U.S. Pat. No. 5,558,144 ("Nakayasu") |
| C-2 | U.S. Patent Application Publication No. 2003/0159768 ("Fritsch") |
| C-3 | Korean Patent Application Publication No. 101272692B-1 ("Choi") |
| C-4 | Korean Patent Application Publication No. 20060126101A ("Chung") |
| C-5 | Chinese Patent No. 103498231A ("Li") |
| C-6 | European Patent No. 1878591B-1 ("Reese") |
| C-7 | U.S. Patent Application Publication No. 2014/0237983 ("Love") |
| C-8 | U.S. Patent No. 4,155,394 ("Shepherd") |
| C-9 | Korean Patent Application Publication No. 1020140090307A ("Lee") |
| C-10 | Japanese Patent Application Publication No. 2009068549A ("Tamura") |
| C-11 | U.S. Patent No. 3,977,172 ("Kerawalla") |
| C-12 | Japanese Patent Application Publication No. 61071204A ("Imai") |
| C-13 | "Allma CC4" ("Allma") |
| C-14 | Korean Patent Application Publication No. KR19990026654A ("Baek") |
| C-15 | Onbilger, Derya Gulsen, et al. "Aramid yarn as a tensile member in products" Rubber & Plastics News ("Onbilger") |
| C-16 | "Aramid-Nylon 6.6 Hybrid Cords and Investigation of Their Properties" ("Yilmaz") |
| C-17 | U.S. Patent Application Publication No. 2014/0238524A-1 ("Love II") |

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

| Exhibits | Primary References and/or Systems |
|---|---|
| C-18 | U.S. Patent Application Publication No. 2012/0186218 ("Westgate") |
| C-19 | "Processing Mechanics of Alternate Twist Ply (ATP) Yarn Technology" ("Elkhamy") |
| C-20 | Japanese Patent Application Publication JP2009-91713 ("Baldwin") |
| C-21 | Korean Patent KR100687048B-1 ("Bang") |
| C-22 | "Law of Critical Yarn Diameter and Twist Influence on Yarn Characteristics" *Textile Research Journal* ("Barella"). |
| C-23 | PCT Application WO2003060212A-1 ("Esnault") |
| C-24 | Japanese Patent Application Publication JP2007216778A ("Harikae") |
| C-25 | German Patent Application Publication DE102011053264A-1 ("Justine") |
| C-26 | "CC3 User Manual and Service Informsation" ("Oerlikon") |
| C-27 | Japanese Patent Application Publication JP2008223200A ("Ohora") |
| C-28 | "Yarns of Aramid/Polyamid for High Performance Tires and Hoses 'Hybrid Yarn'" ("Olsson") |
| C-29 | United States Patent Application Publication US 2005/0249949 Al ("Rowan") |
| C-30 | HAMC's Aramid/Nylon Product (2010-2011) |
| C-31 | Swiss Patent No. CH325044A ("Schrenk") |
| C-32 | Korean Patent Application Publication No. KR20040057550A ("Lee II") |
| C-33 | Chul, Kim, "Tire Cord" *Textile Technology and Industry*, Vol. 11, No. 1 ("Chul") |
| C-34 | "Allma CableCorder CC3" ("Oerlikon Saurer") |
| C-35 | U.S. Patent No. 8,584,724 ("Yokokura") |
| C-36 | Japanese Patent Application No. JPH06136630 ("Matsui") |
| C-37 | PCT Application WO 2009/134063 ("Kwon") |
| C-38 | European Patent Application No. EP 0295147 ("Takahashi") |
| A-39 | U.S. Patent No. 9,789,731 |

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

Specifically, HAMC contends that at least the references and/or systems in the table above independently anticipate the Asserted Claims under 35 U.S.C. §§ 102(a), (b), (e), (f), and/or (g), as set forth in the charts attached as:

- Exhibits A-1 through Exhibits A-39 for the asserted claims of the '663 patent;
- Exhibits B-1 through Exhibits B-38 for the asserted claims of the '731 patent;
- Exhibits C-1 through Exhibits C-39 for the asserted claims of the '765 patent.

HAMC's claim charts provide exemplary citations to the prior art references that teach or suggest every element of each of the Asserted Claims of the Asserted Patent. To the extent that an element of an Asserted Claim is not shown in a chart, the Asserted Claims would have been obvious based on a combination of one or more other prior art references, as set forth below and in Exhibits A-C.

These charts, however, are exemplary. The claimed features are similarly described and suggested in other places (including in all of the documents cited during prosecution of each piece of prior art), and also were present when prior-art systems practicing the described prior art were used before the application that ultimately led to the Asserted Patents. Thus, where patents or other printed materials are disclosed, HAMC reserves the right to also rely on those materials as descriptions of systems, devices, or methods referenced therein, publicly used, and/or on sale or known in the United States. Further, HAMC reserves the right to rely on other evidence of the prior art beyond merely the exemplary references cited in the charts attached as Exhibits.

Where patents or other printed materials are disclosed, HAMC reserves the right to also rely on those materials as descriptions of systems, devices, or methods referenced therein, publicly used, and/or on sale or known in the United States. HAMC reserves the right to also use those references to invalidate the claim under 35 U.S.C. § 103.

**B. Prior Art Under 35 U.S.C. § 103**

To the extent that a primary reference is deemed, by itself, not to anticipate or render obvious a claim for failing to teach one or more limitations, the claim would nonetheless have been obvious to a POSITA at the time of the invention by the combination of the primary

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

reference with one or more other primary references and/or the knowledge of someone skilled in the art.

Moreover, Exhibits A-Obviousness, B-Obviousness, and C-Obviousness list secondary prior art references and identify, on limitation-by-limitation bases, exemplary disclosures where each secondary reference teaches the limitations of the asserted claims. To the extent that a primary reference is deemed, by itself, not to anticipate or render obvious a claim for failing to teach one or more limitations, the claim would nonetheless have been obvious to a POSITA at the time of the invention by the additional combination of the primary reference with one or more of the references listed as disclosing those alleged missing limitations in Exhibits A-Obviousness, B-Obviousness, or C-Obviousness. To the extent that an element of an Asserted Claim is not shown in a chart, the Asserted Claims would have been obvious based on a combination of one or more other prior art references, as set forth below and in Exhibits A-C.

As such, a POSITA would have been motivated to combine any reference set forth in at least the following charts:

- Exhibit A-1 through Exhibit A-39 and Exhibit A-Obviousness for the asserted claims of the ’663 patent;
- Exhibit B-1 through Exhibit B-38 and Exhibit B-Obviousness for the asserted claims of the ’731 patent; and
- Exhibit C-1 through Exhibit C-39 and Exhibit C-Obviousness for the asserted claims of the ’765 patent.

Such combinations would be achieved, for example, by merely combining the disclosures described in the respective claim charts for each reference.

These charts, however, are exemplary. The claimed features are similarly described and suggested in other places (including in all of the documents cited during prosecution of each piece of prior art), and also were present when prior-art systems practicing the described prior art were used before the application that ultimately led to the Asserted Patents. Where patents or other printed materials are disclosed, HAMC reserves the right to also rely on those materials as descriptions of systems, devices, or methods referenced therein, publicly used, and/or on sale or

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

known in the United States. Further, HAMC reserves the right to rely on other evidence of the prior art beyond merely the exemplary references cited in the charts attached as Exhibits.

HAMC's assertion that the combinations above render the asserted claims obvious under 35 U.S.C. § 103 is not, and is not intended to be, an admission or suggestion that each reference does not independently anticipate the Asserted Claims under 35 U.S.C. § 102. *See Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983) ("'[A]nticipation is the epitome of obviousness.'") (quoting *In re Fracalossi*, 681 F.2d 792, 794 (CCPA 1982)). Further, the fact that certain secondary references are listed solely in Exhibits A-Obviousness, B-Obviousness, or C-Obviousness is not intended to be an admission or suggestion that each individual reference cited therein does not also independently anticipate and/or render obvious the Asserted Claims under 35 U.S.C. §§ 102 and 103. HAMC expressly reserves the right to rely on any secondary reference cited in Exhibits A-Obviousness, B-Obviousness, or C-Obviousness as if it were set forth as a primary reference in Section II.A, *supra*. Finally, the inclusion of the exemplary combinations in the attached Exhibits does not exclude other combinations of prior art disclosed in this or previous sections.

**C. Exemplary Combinations**

Exemplary combinations of prior art references that render the Asserted Claims invalid as obvious under 35 U.S.C. § 103 are described in:

- Exhibit A-Obviousness for the asserted claims of the '663 patent;
- Exhibit B-Obviousness for the asserted claims of the '731 patent;
- Exhibit C-Obviousness for the asserted claims of the '765 patent.

Moreover, each prior art reference or system may be combined with (1) information known to persons skilled in the art at the time of the alleged invention; (2) any other anticipatory prior art references or systems; and (3) any of the additional prior art identified above or in the prosecution of the Asserted Patents and related applications.

Below are examples of prior art references and/or systems that would have been combined by one of ordinary skill in the art at the time of the alleged invention. These combinations are merely examples.

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

**1. '663 Patent**

The Asserted Claims of the '389 patent are rendered obvious by:

- Nakayasu alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Fritsch alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Choi alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Chung alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Li alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Reese alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Love alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Shepherd alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Lee alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Tamura alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Kerawalla alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Imai alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Allma alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Baek alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Onbilger alone or in combination with one or more of the references identified in Exhibits A-1-A-39;

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

- Yilmaz alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Love II alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Westgate alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Elkhamy alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Baldwin alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Bang alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Barella alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Esnault alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Harikae alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Justine alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Oerlikon alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Ohora alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Olsson alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Rowan alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- HAMC's Aramid/Nylon Product (2010-2011) alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Schrenk alone or in combination with one or more of the references identified in Exhibits A-1-A-39;

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

- Lee II alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Chul alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Oerlikon Saurer alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Yokokura alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Matsui alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Kwon alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Takahashi alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Lee III alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Any combination of one or more of the references and/or systems identified in Exhibit A-Obviousness.

**2. '731 Patent**

- Nakayasu alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Fritsch alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Choi alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Chung alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Li alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Reese alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Love alone or in combination with one or more of the references identified in Exhibits B-1-B-38;

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

- Shepherd alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Lee alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Tamura alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Kerawalla alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Imai alone or in combination with one or more of the references identified in Exhibits B-1-B-38B-38;
- Allma alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Baek alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Onbilger alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Yilmaz alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Love II alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Westgate alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Elkhamy alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Baldwin alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Bang alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Barella alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Esnault alone or in combination with one or more of the references identified in Exhibits B-1-B-38;

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

- Harikae alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Justine alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Oerlikon alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Ohora alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Olsson alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Rowan alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- HAMC's Aramid/Nylon Product (2010-2011) alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Schrenk alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Lee II alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Chul alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Oerlikon Saurer alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Yokokura alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Matsui alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Kwon alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Takahashi alone or in combination with one or more of the references identified in Exhibits B-1-B-38;
- Any combination of one or more of the references and/or systems identified in Exhibit B-Obviousness.

**3. '765 Patent**

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

- Nakayasu alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Fritsch alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Choi alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Chung alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Li alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Reese alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Love alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Shepherd alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Lee alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Tamura alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Kerawalla alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Imai alone or in combination with one or more of the references identified in Exhibits C-1-C-39C-39;
- Allma alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Baek alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Onbilger alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Yilmaz alone or in combination with one or more of the references identified in Exhibits C-1-C-39;

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

- Love II alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Westgate alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Elkhamy alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Baldwin alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Bang alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Barella alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Esnault alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Harikae alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Justine alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Oerlikon alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Ohora alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Olsson alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Rowan alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- HAMC's Aramid/Nylon Product (2010-2011) alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Schrenk alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Lee II alone or in combination with one or more of the references identified in Exhibits C-1-C-39;

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

- Chul alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Oerlikon Saurer alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Yokokura alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Matsui alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Kwon alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Takahashi alone or in combination with one or more of the references identified in Exhibits C-1-C-39;
- Lee III alone or in combination with one or more of the references identified in Exhibits A-1-A-39;
- Any combination of one or more of the references and/or systems identified in Exhibit C-Obviousness.

**D. Motivations to Combine**

To the extent a finder of fact finds that any primary prior art reference does not disclose one or more limitations of an asserted claim, the asserted claim is nevertheless obvious because the allegedly missing limitations contain nothing beyond ordinary improvements. In other words, the asserted claim combines known elements to achieve predictable results or chooses between clear alternatives known to those of skill in the art, particularly in view of the state of the art as reflected in the relevant prior art.

Moreover, as explained above, it would have been obvious to a person of skill in the art at the time of the alleged invention of the asserted claims to combine any primary reference with any combination of other primary references or secondary references so as to practice the asserted claims. To the extent that Kolon argues that any concept claimed in the asserted claims is not disclosed in a primary reference, it would, at a minimum, have been obvious to adapt the primary reference to include the concept or combine it with other primary references or secondary references that disclose the concept. Each concept described and claimed in the Asserted Patents

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

was known to those of skill in the art as available design choices for various network data saving features, battery saving features, and network connectivity management functions.

The Supreme Court has held that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR Int'l Co. v. Teleflex Inc*., 550 U.S. 398, 416 (2007). "When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one." *Id*. at 417. As the Supreme Court made clear, "[f]or the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." *Id*.

To determine whether there is an apparent reason to combine the known elements in the fashion claimed by the patent at issue, a court can "look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art." *Id*. at 418. For example, obviousness can be demonstrated by showing "there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims." *Id*. at 420. "[A]ny need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id*. Common sense also teaches that "familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id*.

However, the Supreme Court in *KSR* held that a claimed invention can be obvious even if there is no explicit teaching, suggestion, or motivation for combining the prior art to produce that invention. In summary, *KSR* holds that patents that are based on new combinations of elements or components already known in a technical field may be found to be obvious. *See, generally*, *KSR*, 127 S.Ct. 1727. Specifically, the Court in *KSR* rejected a rigid application of the "teaching, suggestion, or motivation [to combine]" test. *Id*. at 1741. "In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

the patentee controls. What matters is the objective reach of the claim." *Id*. at 1741-1742. "Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id*. at 1742. A key inquiry is whether the "improvement is more than the predictable use of prior art elements according to their established functions." *Id*. at 1740.

The rationale to combine or modify prior art references is significantly stronger when, as here, the references seek to solve the same problem, come from the same field, and correspond well to each other. *In re Inland Steel Co*., 265 F.3d 1354, 1362 (Fed. Cir. 2001). The Federal Circuit has held that two references may be combined as invalidating art under similar circumstances, namely "[the prior art] focus[es] on the same problem that the . . . patent addresses: enhancing the magnetic properties of . . . steel. Moreover, both [prior art references] come from the same field . . . . Finally, the solutions to the identified problems found in the two references correspond well." *Id*. at 1364 (concerning patents and prior art relating to improving the magnetic and electrical properties of steel).

In view of the Supreme Court's *KSR* decision, the PTO issued a set of Examination Guidelines. Examination Guidelines for Determining Obviousness Under 35 U.S.C. §103 in view of the Supreme Court Decision in *KSR International Co. v. Teleflex, Inc*., 72 Fed. Reg. 57526 (October 10, 2007). Those Guidelines summarized the *KSR* decision and identified various rationales for finding a claim obvious, including those based on other precedents. Those rationales include:

> (A) Combining prior art elements according to known methods to yield predictable results;
> (B) Simple substitution of one known element for another to obtain predictable results;
> (C) Use of known technique to improve similar devices (methods, or products) in the same way;
> (D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
> (E) "Obvious to try" – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
> (F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art;

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

> (G) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

*Id*. at 57529. The above rationales likewise apply in rendering obvious the asserted claims of the Asserted Patents.

The references disclosed herein, alone or in combination, contain an explicit and/or implicit teaching or motivation to combine them due to the following: (1) the knowledge generally available to a POSITA; (2) the prior art references as understood by a POSITA; (3) the nature of the problem to be solved; (4) the fact that each prior art reference addresses similar problems; and (5) the knowledge of a POSITA that the disclosed elements had been or could be used together.

As an example of those reasons and motivations to combine, the cited prior art generally relates to hybrid tire cords and thus constitutes analogous art within the same field of endeavor. The prior art references depict, disclose, and discuss similar components, techniques and systems for twisting of component cords, impregnation with adhesive, and thermal treatment of ply cords as claimed in the Asserted Patents. Thus, a person of ordinary skill in the art would understand the teachings of the references to be applicable to one another. A POSITA would have also found it obvious to implement (i.e., obvious to try) such combinations to utilize these well-known twisting techniques in production of hybrid tire cord. *Id.* A person of ordinary skill in the art would have been motivated to make such combinations based on, for example, the below. The below list of motivations to combine is exemplary and representative, and is not an exhaustive list of motivations to combine, nor potential combinations.

For example, a POSITA would look to the primary and secondary references discussed above to improve or tailor the disclosures thereof to help tire cord manufacturers reduce disc fatigue and dry heat shrinkage, and extend strength and elongation at break. Accordingly, a POSITA would seek to combine or modify the disclosure of any given primary and secondary references to achieve those goals, and would have readily understood that doing so could increase tire performance and reliability, and reduce costs for users and manufacturers. See also Exs. A-1–C-32; Exs. A-Obviousness–C-Obviousness.

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

One of skill in the art would also have been motivated to combine the different publications and patents that were authored by employees of a given company or assigned to the same assignee and/or related to the same subject matter. Additionally, one of skill in the art would have been motivated to combine different references that were authored, developed, or invented by the same individual(s) related to the same subject matter. The common inventor/author/architect of the references demonstrate that they relate to continued work in a common field of effort and continued related developments in that field. One of skill in the art would, therefore, combine the references related to each individual. Additionally, based on the teachings of the references and/or the knowledge of one of ordinary skill, one of skill in the art would have been motivated to combine different references from the same company. For example, a POSITA would have been motivated to combine prior art systems or products with any related or applicable patent or non-patent documentation or literature relating to that system or owned by the same entity, including for the reason that these materials are related.

Further, below are additional motivations to combine prior art for particular claim limitations. The following discussions of specific claim limitations are merely examples and are not limiting. For example, where a POSITA would have been motivated to combine references which together render obvious limitations from the independent claims, a POSITA would have also been motivated to combine said references in such a way as to render obvious various asserted dependent claims. The motivations identified with respect to any one Asserted Patent apply with equal force to any of the other Asserted Patents by virtue of their relationship and similarities.

**1. ’663 patent**

**(a) Background and State of the Art**

HAMC sets forth below a summary of their current understanding of the state of the art as understood as of the asserted priority date of the ’663 patent for the general subject matter of the ’663 patent. The information discussed in this section may have formed the background knowledge of a person of ordinary skill in the art at the time the ’663 patent was filed and may have been used in determining whether and how to combine references to achieve the claimed

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

inventions. *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013) (stating that "the knowledge [of a person of ordinary skill in the art] is part of the store of public knowledge that must be consulted when considering whether a claimed invention would have been obvious"). HAMC expressly reserve the right to rely on each of the prior art references, systems, concepts, and technologies discussed in this Section with respect to the Asserted Patent.

HAMC contends that, to the extent the primary references identified in these Preliminary Invalidity Contentions do not anticipate the Asserted Claims of the '663 patent, it would have been obvious to combine any of the references, systems, concepts, or technologies discussed in this Section or in HAMC's obviousness charts with those primary references. HAMC also reserves the right to rely on the discussions of the state of the art and prior art in the '663 patent specification and its file history including file histories of related patents and foreign file histories of related patents in explaining the state of the art. HAMC further expressly reserve the right to supplement its summary of the background and state of the art, including, for example, with information from any of the authors or named inventors on any of the prior art references, by personnel familiar with systems based on any of the prior art references, or any prior art systems related to prior art references, or by technical experts retained on behalf of any party. HAMC also expressly reserves the right to rely on any admissions by any of the named inventors, institutions with which they were associated, and Plaintiff, regarding the state of the art.

It was well known as of the priority date of the '663 patent to use "tire cords, especially, tire cords treated with an adhesive agent" and well known "materials for tire cords include nylon fibers, polyester fibers, rayon fibers and the like." *See, e.g.*, '663 Patent at 1:15-20. It was also well known as of the priority date of the '663 patent to use "nylon and aramid" "materials for … tire cords for cap ply." *Id*. at 1:38-39. Additionally, it was well known to use "a hybrid cord to which both nylon and aramid are applied." *Id*. at 1:59-60. "In particular, a hybrid cord having a structure in which a nylon primarily twisted yarn is covered with an aramid primarily twisted yarn" was also well known. *Id*. at 1:60-63. Additionally, it was well known to use "a hybrid cord having a merge structure which is produced by secondarily twisting a nylon primarily twisted yarn and an aramid primarily twisted yarn, which have been primarily twisted in the same direction, in

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

a direction opposite to the direction, wherein secondary twisting is conducted such that the nylon and aramid primarily twisted yarns have an identical structure." *Id*. at 2:44-50.

**(b) Motivation to Combine**

A person of ordinary skill in the art would have been motivated to combine any of the references in its obviousness chart as they all discuss methods for making a hybrid cord and hybrid cords. A POSITA would have had a reasonable expectation of success in making any such modifications. A POSITA would have understood that these references, as well as the POSITA's knowledge, disclose interrelated teachings based on routine technologies and would have been amenable to various well-understood and predictable combinations.

Moreover, these references are analogous because they all discuss hybrid tire cords, twisting the yarn, and using predetermined lengths of the yarn in a hybrid tire cord. A POSITA would have been motivated to combine any of the references in A-1 to A-39 and in A-Obviousness, because the references all disclose techniques for making a hybrid tire cord and therefore all relate to the same technological field. Moreover, these references reflect improvements over and contributions to the field of hybrid tire cords, a compact field of study. The '663 Patent further admits that its hybrid tire cord methods were known in the art. '663 Patent at 1:15-2:50. It is the nature of standardized fields such as this to combine ideas from different references to achieve the best solution, as the resulting solution is widely implemented if the relevant tire cord method is commercially successful. Accordingly, a POSITA would be motivated to combine the above-identified contributions, and variations thereof, to identify acceptable solutions taking into account cost, efficiency and complexity. These combinations would also have been a combination of prior art elements according to known methods and obvious to try given that there were a finite number of identified, predictable solutions in the prior art. Moreover, these combinations would have been the result of applying known techniques to a known method – that was ready for improvement – to yield predictable results.

These features are inherent or obvious parts of methods for making a hybrid cord, and a POSITA would have been motivated to implement them as one of a limited number of options available when developing methods of manufacturing cords. The dependent claims only add trivial

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

variations to the claimed method. A person of ordinary skill would have been motivated to add each of these features to any of the charted references as part of a limited number of design options that confer known benefits while yielding predictable results. Exemplary motivations to combine each of these features with any of the charted references are described below.

Independent claim 1 of the '663 patent recites "[a] method of manufacturing a hybrid tire cord[.]" The limitations of claim 1 and dependent claims in the '663 patent are supported by both primary references and motivations to combine multiple references. As one representative motivation to combine, multiple combinations of art support claim 1 of the '663 patent that further recites "wherein the first, second, and third steps are conducted by one twister[.]" To the extent that any primary reference is deemed not to disclose a method of manufacturing a hybrid tire cord "wherein the first, second, and third steps are conducted by one twister[,]" it would have been obvious to a POSITA at the time of the invention to combine a primary reference with any of the other references discussed in the charts attached as exhibits herein, all of which disclose the claimed method. For example, U.S. Patent No. 5,558,144 ("Nakayasu") describes the process to "form a high elastic modulus thread 21, one or more aramid fibers are first-twisted together in a certain direction. Similarly, to form a low elastic modulus thread 22, one or more nylon fibers are first-twisted together in the same direction as the aramid fibers" (5:10-6:61). U.S. Patent Application 2005/0249949A1 ("Rowan") describes one operation being performed without intermediate take-up and demonstrates a single output (Paragraphs [0007], [0011], [0012], [0018], [0025], and [0039]; Figures 4 and 5). In particular, "[t]he steps are performed on one machine without intermediate take-up" (Paragraph 11). *See also* U.S. Patent Application Publication No. 2014/0237983 ("Love") Claim 12 ("A method of providing a hybrid cord with predetermined twist and component ply lengths comprising the steps of . . . providing a cabling machine"); Paragraphs [0020], [0031]. Combining any of these references with Nakayasu provides a method in which the manufacturing steps are conducted by one twister. The proposed combination would have been obvious because the materials produced by single machines in the secondary references are within the same field of endeavor, e.g., manufacturing of a tire cord, as those discussed in the primary reference, providing a predictable application. It would also have been obvious to try.

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

Performing the first, second, and third twisting in a single step would have been readily attempted using tools that were readily available, e.g., a direct cabler. Rowan at Paragraph [0039] ("equipment that combines both steps into a single machine, commonly referred to as a direct cable unit ('DCU')"; Korean Patent No. KR101272692B1 ("Choi") at Paragraph [0014] (applying different TPMs adds complexity to the manufacturing process). As one another representative motivation to combine, multiple combinations of art support claim 1 of the '663 patent that further recites "tension applied to the nylon filament yarn in the second step is higher than tension applied to the aramid filament yarn in the first step in such an amount that, if the secondary twist of the hybrid tire cord with a predetermined length were untwisted, the aramid primarily twisted yarn would be 1.005 to 1.025 times longer than the nylon primarily twisted yarn." To the extent that any primary reference is deemed not to disclose a method of manufacturing a hybrid tire cord wherein tension applied to the nylon filament yarn in the second step is higher than tension applied to the aramid filament yarn in the first step in such an amount that, if the secondary twist of the hybrid tire cord with a predetermined length were untwisted, the aramid primarily twisted yarn would be 1.005 to 1.025 times longer than the nylon primarily twisted yarn[,]" it would have been obvious to a POSITA at the time of the invention to combine a primary reference with any of the other references discussed in the charts attached as exhibits herein, all of which disclose the claimed method. For example, Nakayasu discloses "the hybrid cord 23 comprises at least one high elastic modulus thread 21 and at least one low elastic modulus thread 22 which are twisted together." (5:4-5:7). U.S. Patent Application Publication No. 2003/0159768A1 ("Fritsch") further discloses "unbalanced configurations" with non-zero coring level, where the yarns have different lengths. *See* Fritsch at [0019]-[0020]. Specifically, Fritsch discloses a cord with a coring level of 0.9% (Fritsch at Table 1) and suggests a coring level between 3% and 15% (Fritsch at Abstract) which corresponds to a ratio between the length of the high modulus yarn and the length of the low modulus yarn within or close to the claimed range. Combining Fritsch with Nakayasu provides a method of manufacturing a hybrid tire cord in which tension applied to the nylon filament yarn in the second step is higher than tension applied to the aramid filament yarn in the first step in such an amount that, if the secondary twist of the hybrid tire cord with a

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

predetermined length were untwisted, the aramid primarily twisted yarn would be 1.005 to 1.025 times longer than the nylon primarily twisted yarn. The proposed combination would have been obvious because both Fritsch and Nakayasu relate to a method of manufacturing a hybrid tire cord out of aramid and nylon yarns.

The dependent claims of claim 1 recite trivial features that naturally result from the processing of tire cords. For example, claim 2 and 3 recite dipping, drying and thermal treatment steps. To implement these steps as disclosed by the prior art disclosed herein, it would have been obvious in view of these references to apply these steps in the processing of the tire cord. These steps are commonly known in the industry, as disclosed by at least Rowan. For example, Rowan discloses "industry developments in . . . machines [that] combine the ply and twisting step into one operation" (Paragraph [0007]). This would have been obvious to a POSITA because they are foundational materials science concepts that are applicable to analysis of any yarn formation.

The motivations set forth here are exemplary, and HAMC reserves the right to supplement these contentions as its understanding of the scope and content of prior art develops.

**2. '731 patent**

**(a) Background And State Of The Art**

HAMC sets forth below a summary of their current understanding of the state of the art as understood as of the asserted priority date of the '731 patent for the general subject matter of the '731 patent. The information discussed in this section may have formed the background knowledge of a person of ordinary skill in the art at the time the '731 patent was filed and may have been used in determining whether and how to combine references to achieve the claimed inventions. *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013) (stating that "the knowledge [of a person of ordinary skill in the art] is part of the store of public knowledge that must be consulted when considering whether a claimed invention would have been obvious"). HAMC expressly reserve the right to rely on each of the prior art references, systems, concepts, and technologies discussed in this Section with respect to the Asserted Patent.

HAMC contends that, to the extent the primary references identified in these Preliminary Invalidity Contentions do not anticipate the Asserted Claims of the '731 patent, it would have been

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

obvious to combine any of the references, systems, concepts, or technologies discussed in this Section or in HAMC's obviousness charts with those primary references. HAMC also reserves the right to rely on the discussions of the state of the art and prior art in the '731 patent specification and its file history including file histories of related patents and foreign file histories of related patents in explaining the state of the art. HAMC further expressly reserve the right to supplement its summary of the background and state of the art, including, for example, with information from any of the authors or named inventors on any of the prior art references, by personnel familiar with systems based on any of the prior art references, or any prior art systems related to prior art references, or by technical experts retained on behalf of any party. HAMC also expressly reserves the right to rely on any admissions by any of the named inventors, institutions with which they were associated, and Plaintiff, regarding the state of the art.

It was well known as of the priority date of the '731 patent to use "tire cords, especially, tire cords treated with an adhesive agent" and well known "materials for tire cords include nylon fibers, polyester fibers, rayon fibers and the like." *See, e.g.*, '731 Patent at 1:15-20. It was also well known as of the priority date of the '731 patent to use "nylon and aramid" "materials for … tire cords for cap ply." *Id*. at 1:38-39. Additionally, it was well known to use "a hybrid cord to which both nylon and aramid are applied." *Id*. at 1:59-60. A "hybrid cord" having a structure in which a nylon primarily twisted yarn is covered with an aramid primarily twisted yarn was also well known. *Id*. at 2:1-36. Additionally, it was well known to use a hybrid cord having a merge structure which is produced by secondarily twisting a nylon primarily twisted yarn and an aramid primarily twisted yarn, which have been primarily twisted in the same direction, in a direction opposite to the direction, wherein secondary twisting is conducted such that the nylon and aramid primarily twisted yarns have an identical structure. *Id*. at 2:17-36.

**(b) Motivation to Combine**

A person of ordinary skill in the art would have been motivated to combine any of the references in its obviousness chart as they all discuss methods for making a hybrid cord and hybrid cords. A POSITA would have had a reasonable expectation of success in making any such modifications. A POSITA would have understood that these references, as well as the POSITA's

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

knowledge, disclose interrelated teachings based on routine technologies and would have been amenable to various well-understood and predictable combinations.

Moreover, these references are analogous because they all discuss hybrid tire cords, twisting the yarn, and using predetermined lengths of the yarn in a hybrid tire cord. A POSITA would have been motivated to combine any of the references in B-1 to B-38 and in B-Obviousness, because the references all disclose techniques for making a hybrid tire cord and therefore all relate to the same technological field. Moreover, these references reflect improvements over and contributions to the field of hybrid tire cords, a compact field of study. The '731 Patent further admits that its hybrid tire cord methods were known in the art. '731 Patent at 1:15-2:50. It is the nature of standardized fields such as this to combine ideas from different references to achieve the best solution, as the resulting solution is widely implemented if the relevant tire cord method is commercially successful. Accordingly, a POSITA would be motivated to combine the above-identified contributions, and variations thereof, to identify acceptable solutions taking into account cost, efficiency and complexity. These combinations would also have been a combination of prior art elements according to known methods and obvious to try given that there were a finite number of identified, predictable solutions in the prior art. Moreover, these combinations would have been the result of applying known techniques to a known method – that was ready for improvement – to yield predictable results.

Independent claim 4 of the '731 patent recites "[a] method of manufacturing a hybrid fiber cord[.]" The dependent claims of claim 4 recite trivial features that naturally result from the processing of tire cords. The limitations of claim 4 in the '731 patent and dependent claims are supported by both primary references and motivations to combine multiple references. As one representative motivation to combine, multiple combinations of art support claim 4 and dependent claims of the '731 patent, including dependent claim 5 that further recites that in the twisting process, "the first, second and third steps are performed simultaneously and continuously." To the extent that any primary reference is deemed not to disclose "the first, second and third steps are performed simultaneously and continuously[,]" it would have been obvious to a POSITA at the time of the invention to combine a primary reference with any of the other references discussed in

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

the charts attached as exhibits herein, all of which disclose the claimed method. For example, Japanese Patent Application JP2009/068549 ("Tamura") describes a rubber hose which is reinforced by fiber cords made up of nylon and aramid, which are primarily twisted and are then twisted together to form a hybrid cord. Specifically, "the aramid fiber and the nylon fiber are combined to form an aramid / nylon composite fiber cord and a composite fiber fabric. The composite fiber cord is obtained by twisting together a predetermined number of aramid fibers and nylon fibers, each of which is individually twisted, and the composite fiber fabric is usually formed using the composite fiber cord" (Tamura). Korean Patent Application KR20060126101A ("Chung") describes a hybrid tire cord manufactured using nylon and aramid filaments, and simultaneous manufacturing steps. In particular, "the lower edge process before or enshrinement process simultaneously nylon filaments and aramid filaments after the, inferior border process by performing a process the lower edge or lower edge and then braided perform process braided at the same time as the lower edge live obtained have the same fineness" (Chung). *See also* U.S. Patent Application No. 2005/0249949 ("Rowan") ([0045] "The one-machine cabled and treated cord unit ("OCT") 310 . . . cables and treats the cord in a continuous process without intermediate take-up . . . . "). Any of these secondary references combined with the primary reference provides a method in which the twisting and processing steps are conducted simultaneously because performing simultaneous and continuous processing of yarn generally would apply to specific materials such as an aramid or nylon. Further, it is obvious that the steps are performed continuously as they are conducted with intermediate steps of taking up the processed material. This would have been obvious to a POSITA because the steps are foundational concepts of material science and are in the same field of endeavor applicable to any yarn twisting process. *See also In re Dilnot*, 50 C.C.P.A. 1446, 1453 (CCPA 1963) ("It is, however, well within the expected skill of a technician to operate a process continuously."); *NL Indus. v. Exploration Logging, Inc.*, 1990 U.S. App. LEXIS 16841, *7 (Fed. Cir. 1990) ("No technical modification would be necessary, because the same operation is just repeated. The evidence in the record supports the conclusion that repeating the comparing process would have been obvious to one of ordinary skill

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

in the art."). The proposed combination would have also achieved a predictable benefit of making the yarn formation process more efficient.

The motivations set forth here are exemplary, and HAMC reserves the right to supplement these contentions as its understanding of the scope and content of prior art develops.

**3. '765 patent**

**(a) Background and State of the Art**

HAMC sets forth below a summary of their current understanding of the state of the art as understood as of the asserted priority date of the '765 patent for the general subject matter of the '731 patent. The information discussed in this section may have formed the background knowledge of a person of ordinary skill in the art at the time the '765 patent was filed and may have been used in determining whether and how to combine references to achieve the claimed inventions. *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013) (stating that "the knowledge [of a person of ordinary skill in the art] is part of the store of public knowledge that must be consulted when considering whether a claimed invention would have been obvious"). HAMC expressly reserve the right to rely on each of the prior art references, systems, concepts, and technologies discussed in this Section with respect to the Asserted Patent.

HAMC contends that, to the extent the primary references identified in these Preliminary Invalidity Contentions do not anticipate the Asserted Claims of the '765 patent, it would have been obvious to combine any of the references, systems, concepts, or technologies discussed in this Section or in HAMC's obviousness charts with those primary references. HAMC also reserves the right to rely on the discussions of the state of the art and prior art in the '765 patent specification and its file history including file histories of related patents and foreign file histories of related patents in explaining the state of the art. HAMC further expressly reserve the right to supplement its summary of the background and state of the art, including, for example, with information from any of the authors or named inventors on any of the prior art references, by personnel familiar with systems based on any of the prior art references, or any prior art systems related to prior art references, or by technical experts retained on behalf of any party. HAMC also expressly reserves

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

the right to rely on any admissions by any of the named inventors, institutions with which they were associated, and Plaintiff, regarding the state of the art.

It was well known as of the priority date of the '765 patent to use "tire cords, especially, tire cords treated with an adhesive agent" and well known "materials for tire cords include nylon fibers, polyester fibers, rayon fibers and the like." *See, e.g.*, '765 Patent at 1:26-33. It was also well known as of the priority date of the '765 patent to use "nylon and aramid" "materials for … tire cords for cap ply." *Id*. at 1:48-56. Additionally, it was well known to use "a hybrid cord to which both nylon and aramid are applied." *Id*. at 1:59-60. "In particular, a hybrid cord having a structure in which a nylon primarily twisted yarn is covered with an aramid primarily twisted yarn" was also well known. *Id*. at 2:3-6. Additionally, it was well known to use "a hybrid cord having a merge structure which is produced by secondarily twisting a nylon primarily twisted yarn and an aramid primarily twisted yarn, which have been primarily twisted in the same direction, in a direction opposite to the direction, wherein secondary twisting is conducted such that the nylon and aramid primarily twisted yarns have an identical structure." *Id*. at 2:53-63.

**(b) Motivation to Combine**

A person of ordinary skill in the art would have been motivated to combine any of the references in its obviousness chart as they all discuss methods for making a hybrid cord and hybrid cords. A POSITA would have had a reasonable expectation of success in making any such modifications. A POSITA would have understood that these references, as well as the POSITA's knowledge, disclose interrelated teachings based on routine technologies and would have been amenable to various well-understood and predictable combinations.

Moreover, these references are analogous because they all discuss hybrid tire cords, twisting the yarn, and using predetermined lengths of the yarn in a hybrid tire cord. A POSITA would have been motivated to combine any of the references in C-1 to C-39 and in C-Obviousness, because the references all disclose techniques for making a hybrid tire cord and therefore all relate to the same technological field. Moreover, these references reflect improvements over and contributions to the field of hybrid tire cords, a compact field of study. The '765 Patent further admits that its hybrid tire cord methods were known in the art. '765 Patent

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

at 1:26-2:63. It is the nature of standardized fields such as this to combine ideas from different references to achieve the best solution, as the resulting solution is widely implemented if the relevant tire cord method is commercially successful. Accordingly, a POSITA would be motivated to combine the above-identified contributions, and variations thereof, to identify acceptable solutions taking into account cost, efficiency and complexity. These combinations would also have been a combination of prior art elements according to known methods and obvious to try given that there were a finite number of identified, predictable solutions in the prior art. Moreover, these combinations would have been the result of applying known techniques to a known method – that was ready for improvement – to yield predictable results.

Independent claim 1 of the '765 patent recites "[a] hybrid tire cord[.]" The limitations of claim 1 and dependent claims in the '765 patent are supported by both primary references and motivations to combine multiple references. As one representative motivation to combine, multiple combinations of art support claim 1 of the '663 patent that further recites "if the secondary twist of the hybrid tire cord with a predetermined length were untwisted, a length of the aramid primarily twisted yarn would be 1.005 to 1.025 times a length of the nylon primarily twisted yarn[.]" To the extent that any primary reference is deemed not to disclose "if the secondary twist of the hybrid tire cord with a predetermined length were untwisted, a length of the aramid primarily twisted yarn would be 1.005 to 1.025 times a length of the nylon primarily twisted yarn[,]" it would have been obvious to a POSITA at the time of the invention to combine a primary reference with any of the other references discussed in the charts attached as exhibits herein, all of which disclose the claimed method. For example, U.S. Patent No. 5,558,144 ("Nakayasu") describes the process to "form a high elastic modulus thread 21, one or more aramid fibers are first-twisted together in a certain direction. Similarly, to form a low elastic modulus thread 22, one or more nylon fibers are first-twisted together in the same direction as the aramid fibers" (5:10-6:61). U.S. Patent Application 2003/0159768A1 ("Fritsch") describes that "[t]he so-separated yarns are then untwisted by the same number of turns as it took to separate the cable, and in the opposite direction, to yield the two yarns in their as-fed state. The length of each constituent yarn is then measured on the yarn in its as-fed state, and the coring level calculated

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

using the following equation: Coring=(A−B)/(B)" (Paragraph [0019]). Additionally, Fritsch provides "[t]he hybrid cabled cord . . . wherein said coring level is equal to or greater than 3% up to and no greater than 15%" (Claim 6). Substituting these values into the coring equation in Fritsch calculates a length ratio close to that disclosed in claim 1 of the '765 patent. Combining this reference with Nakayasu provides a method in which the manufacturing steps are conducted by one twister. The proposed combination would have been obvious because the difference in length expressed in Fritsch is a natural result of the direction twists described in both Fritsch and Nakayasu in the same field of endeavor of hybrid cord formation.

The dependent claims of claim 1 recite trivial features that naturally result from the processing of tire cords. For example, claim 4 recites "an adhesive agent coated on the nylon primarily twisted yarn and the aramid primarily twisted yarn[.]" To implement this step as disclosed by the prior art disclosed herein, it would have been obvious in view of these references to apply this step in the processing of the tire cord. This step is commonly known in the industry, as disclosed by at least Japanese Patent Application JP2009/068549 ("Tamura"). For example, Tamura discloses that "[b]efore the composite fiber fabric and / or the composite fiber cord is coated on both sides with the adhesive rubber as described above, the method is not particularly limited, but in the present invention, the composite fiber fabric and / or the composite fiber cord is used. It is possible to employ a method of dipping in an adhesive, drying, and heat treatment." This would have been obvious to a POSITA because this step is a foundational concept in material science applicable to any yarn formation processing. The proposed combination would have also achieved a predictable benefit of strengthening cord reinforcement, particularly beneficial for tire application.

The motivations set forth here are exemplary, and HAMC reserves the right to supplement these contentions as its understanding of the scope and content of prior art develops.

**E. Lack of Secondary Indicia of Nonobviousness**

HAMC is not aware of any evidence that would tend to establish any secondary considerations of non-obviousness. This lack of evidence further renders the Asserted Claims obvious. Proving any such secondary considerations is Kolon's burden. *See, e.g., ZUP, LLC v.*

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

*Nach Mfg., Inc.*, 896 F.3d 1365, 1373 (Fed. Cir. 2018) ("[A] patentee bears the burden of production with respect to evidence of secondary considerations of nonobviousness."). Accordingly, HAMC reserves all rights regarding its full contention in this respect until after Kolon completes its final and binding disclosure of any such evidence and contentions. In the meantime, HAMC note the complete lack of any such evidence in the record.

Kolon has disclosed no evidence of, and HAMC knows of no viable evidence to suggest:

- **The alleged invention's commercial success**. Indeed, no products are known to practice the Asserted Claims. To the extent Kolon asserts that HAMC's products practice the Asserted Patents, HAMC denies that assertion and incorporates its responses to date and any future contentions, expert reports, and testimony. Further, HAMC knows of no nexus between any commercial success and the Asserted Claims. *See, e.g., Windsurfing Int'l Inc. v. AMF* , 782 F.2d 995 (Fed. Cir. 1986) (considerations such as intervening, non-covered technological innovations, popularity of accessories, and advertising expense are all relevant to the nexus determination). If any commercial success is due to any of the concepts discussed in the Asserted Patents, those concepts are also present in the prior art, as described above, and thus do not support any commercial success that is relevant to the question of obviousness. *See Tokai Corp. v. Easton Enters, Inc.* , 632 F.3d 1358, 1369–70 (Fed. Cir. 2011) ("If commercial success is due to an element in the prior art, no nexus exists."); *In re Huai-Hung Kao* , 639 F.3d 1057, 1068 (Fed. Cir. 2011) ("Where the offered secondary consideration actually results from something other than what is both claimed and *novel* in the claim, there is no nexus to the merits of the claimed invention."); *Ormco Corp. v. Align Tech., Inc.* , 463 F.3d 1299, 1312 (Fed. Cir. 2006) ("[I]f the feature that creates the commercial success was known in the prior art, the success is not pertinent.").
- **Alleged commercial success via licensing**. Kolon has presented no evidence of commercial success via a licensing program.

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

- **Long felt but unresolved needs**. Kolon has presented no evidence of any long felt and unresolved need.
- **No industry praise.** There is also no evidence of industry praise for the alleged invention of the Asserted Patents or any functionality that allegedly practices the Asserted Patents. To the extent any praise is related to any functionality that allegedly practices the Asserted Patents, that praise is not due to the allegedly novel features of the Asserted Patents, but instead only to features present in the prior art, which is not a sufficient nexus to be relevant to the question of industry praise for purposes of obviousness. *See Muniauction, Inc. v. Thomson Corp.*, 532 F.3d 1318, 1328 (Fed. Cir. 2008). Praise of HAMC's mobile phones or other HAMC products is not praise of the Asserted Patents.
- **Unexpected results**: No evidence of any such unexpected results is known. As discussed above, the concepts contained in the Asserted Claims were already combined in the same manner as the asserted. These prior art systems, as described in the above-referenced exhibits, disclosed the same combination of elements, and the same result of that combination, that is recited in the claim. Thus, there were no unexpected results that arose from combining the well-known elements in the Asserted Claims.
- **The failure of others**. No evidence of any such failure is known.
- **Skepticism by experts**. No experts or person of skill expressed skepticism about implementing the alleged inventions.
- **Teaching away by others**. No evidence of any such teaching is known.
- **Recognition of a problem**. As discussed above, the industry recognized the problem and had already discussed multiple approaches that implemented the Asserted Claims to solve that problem.
- **Copying of the alleged invention by competitors**. No evidence of any such copying is known. *See Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

1343, 1366 (Fed. Cir. 2001) (allegedly copied feature must be an embodiment of the patented claims).

## IV. INVALIDITY UNDER 35 U.S.C. § 112

Kolon has not yet provided a claim construction for many of the terms and phrases that HAMC anticipates will be in dispute. HAMC, therefore, cannot provide a complete list of its § 112 defenses because HAMC does not know whether Kolon will proffer a construction for certain terms and phrases that is broader than, or inconsistent with, the construction that would be supportable by the disclosure set forth in the specification.

Nevertheless, HAMC contends that, at least under Kolon's actual and/or apparent application of the claims, the Asserted Claims are invalid based on inadequate written description and/or a lack of enablement under 35 U.S.C. § 112 ¶ 1, and/or based on indefiniteness under 35 U.S.C. § 112 ¶ 2.

HAMC's aforementioned identification of prior art that anticipates and/or renders obvious particular claim elements, including the attached claim charts, should not be deemed as an admission that any claim element satisfies the requirements of 35 U.S.C. § 112. While HAMC asserts below that a claim is invalid under 35 U.S.C. § 112 (such as because of a failure to particularly point out and distinctly claim the alleged invention, failure to provide written description support in the specification, and/or failure to enable one of ordinary skill in the art to make and use the alleged invention), HAMC has nonetheless provided prior art disclosures that anticipate or render obvious the claim on the assumption that Kolon will contend those claims are definite, are supported by an adequate written description, and are adequately enabled.

### A. Lack of Written Description and Enablement Under 35 U.S.C. § 112 ¶ 1

Certain claims in the Asserted Patents are invalid for lack of written description. Section 112 requires that a patent specification "contain a written description . . . of the manner and process of making and using [the invention] in such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same." 35 U.S.C. § 112 ¶ 1. A patent's written description "must clearly

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed." *Ariad Pharms., Inc. v. Eli Lilly & Co*., 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). The disclosure must "convey to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Id.* The level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology, but a "mere wish or plan" for obtaining the alleged invention does not satisfy the written description requirement. *Novozymes A/S v. DuPont Nutrition Biosciences APS*, 723 F.3d 1336, 1344 (Fed. Cir. 2013). Put another way, "a description that merely renders the invention obvious does not satisfy the requirement." *Ariad*, 598 F.3d at 1351. Instead, "all the limitations must appear in the specification." *Lockwood v. Am. Airlines, Inc*., 107 F.3d 1565, 1572 (Fed. Cir. 1997). HAMC contends that, at least under Kolon's actual and/or apparent application of the claims, the specifications of at least one or more of the Asserted Patents do not include a sufficient written description supporting the claims. Moreover, HAMC contends that Kolon's actual and/or apparent application of the Asserted Claims covers a broader scope than is justified and/or supported by the written description provided in the specifications of at least one or more of the Asserted Patents. *Tronzo v. Biomet, Inc.*, 156 F.3d 1154, 1159 (Fed. Cir. 1998); *LizardTech, Inc. v. Earth Res. Mapping, Inc*., 424 F.3d 1336, 1346 (Fed. Cir. 2005); *ICU Med., Inc. v. Alaris Med. Sys., Inc*., 558 F.3d 1368 (Fed. Cir. 2009).

Section 112 likewise requires that the specification "enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the" alleged invention. 35 U.S.C. § 112 ¶ 1. A claim is not enabled if, "at the effective filing date of the patent, one of ordinary skill in the art could not practice their full scope without undue experimentation." *Wyeth and Cordis Corp. v. Abbott Labs.*, 720 F.3d 1380, 1384 (Fed. Cir. 2013). "This important doctrine prevents both inadequate disclosure of an invention and overbroad claiming that might otherwise attempt to cover more than was actually invented." *MagSil Corp. v. Hitachi Global Storage Techs., Inc.*, 687 F.3d 1377, 1381 (Fed. Cir. 2012). HAMC contends that, at least under Kolon's actual and/or apparent application of the claims, the specifications of at

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

least one or more of the Asserted Patents do not enable any person skilled in the relevant art to make and use the alleged inventions of the Asserted Claims without undue experimentation.

Furthermore, under Kolon's actual and/or apparent application of the claims, the specifications of at least one or more of the Asserted Patents do not enable the broad scope of the Asserted Claims as Kolon asserts. HAMC contends that Kolon's actual and/or apparent application of the Asserted Claims covers a broader scope than is justified, and certainly broader than is enabled in the specifications. As explained below, the specifications of at least one or more of the Asserted Patents have not enabled a person of ordinary skill in the art at the time of the alleged invention to perform the full scope of all Asserted Claims.

Each of the asserted claims below are invalid because, at least to the extent Kolon contends any of the following limitations should be construed to encompass HAMC's accused instrumentalities, the specifications fail to provide written description and/or an enabling disclosure of at least the following limitations:

**1. '663 patent (claims 1-3)**

- **Claim 1:** "a first step of primarily twisting an aramid filament yarn in a first direction to form an aramid primarily twisted yarn"
- **Claim 1:** "a second step of primarily twisting a nylon filament yarn in a second direction to form a nylon primarily twisted yarn, the second step and the first step being conducted simultaneously"
- **Claim 1:** "a third step of secondarily twisting the aramid primarily twisted yarn and the nylon primarily twisted yarn in a third direction to form a plied yarn, the third step being conducted continuously with the first and second steps"
- **Claim 1:** "wherein the first, second and third steps are conducted by one twister"
- **Claim 1:** "the second direction is the same as the first direction"
- **Claim 1:** "the third direction is opposite to the first direction"
- **Claim 1:** "tension applied to the nylon filament yarn in the second step is higher than tension applied to the aramid filament yarn in the first step in such an amount that, if the secondary twist of the hybrid tire cord with a predetermined length were

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

untwisted, the aramid primarily twisted yarn would be 1.005 to 1.025 times longer than the nylon primarily twisted yarn"

- **Claim 2:** "dipping the plied yarn in an adhesive agent solution"
- **Claim 2:** "drying the adhesive agent solution-impregnated plied yarn"
- **Claim 2:** "thermally treating the dried plied yarn"
- **Claim 3:** " wherein the dipping, drying and thermal treatment steps are continuously conducted, and tension applied to the plied yarn in the dipping, drying and thermal treatment steps is 0.4 g/d or less per cord"

**2. '731 patent (claims 4-7)**

- **Claim 4:** "a first step for primarily-twisting a nylon filament at a first twist number of 300 to 500 TPM to produce a nylon primarily-twisted yarn"
- **Claim 4:** "a second step for primarily-twisting an aramid filament at a second twist number of 300 to 500 TPM to produce an aramid primarily-twisted yarn"
- **Claim 4:** "a third step for secondarily-twisting the nylon and aramid primarily-twisted yarns together at a third twist number to produce a ply yarn in such a way that the nylon and aramid primarily-twisted yarns have identical structures with each other"
- **Claim 4:** "coating the ply yarn with an adhesive, and the ply yarn coated with the adhesive has a strength retention rate of 80% or more after a disc fatigue test is performed according to JIS-L 1017 method of Japanese Standard Association, and has a dry heat shrinkage of 1.5 to 2.5%"
- **Claim 4:** "wherein the first, second and third twist numbers are identical with each other"
- **Claim 4:** "wherein the third step produces a 2-ply secondarily-twisted yarn consisting of 1-ply of nylon primarily-twisted yarn and 1-ply of aramid primarily-twisted yarn"
- **Claim 5:** "wherein the first, second and third steps are performed simultaneously and continuously"

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

- **Claim 6:** "submerging the ply yarn into an adhesive solution"
- **Claim 6:** "drying the ply yarn having the adhesive solution impregnated therein"
- **Claim 6:** "heat-treating the dried ply yarn"
- **Claim 7:** "wherein the adhesive solution comprises Resorcinol-Formaldehyde-Latex adhesive"

**3. '765 patent (claims 1-6)**

- **Claim 1:** "a nylon primarily twisted yarn"
- **Claim 1:** "wherein the nylon primarily twisted yarn and the aramid primarily twisted yarn are secondarily twisted together"
- primarily twisted yarn are secondarily twisted together"
- **Claim 1:** "if the secondary twist of the hybrid tire cord with a predetermined length were untwisted, a length of the aramid primarily twisted yarn would be 1.005 to 1.025 times a length of the nylon primarily twisted yarn,"
- **Claim 1:** "the aramid primarily twisted yarn has a 0.1 to 5% lower twist number than a twist number of the nylon primarily twisted yarn"
- **Claim 1:** "the hybrid tire cord has a merge structure having a partial covering structure"
- **Claim 2:** "wherein the nylon primarily twisted yarn has a first twist direction"
- **Claim 2:** "the aramid primarily twisted yarn has a second twist direction"
- **Claim 2:** "the nylon primarily twisted yarn and the aramid primarily twisted yarn are secondarily twisted together in a third twist direction"
- **Claim 2:** "the second twist direction is the same as the first twist direction"
- **Claim 2:** "the third twist direction is opposite to the first twist direction"
- **Claim 3:** "wherein a weight ratio of the nylon primarily twisted yarn to the aramid primarily twisted yarn is 20:80 to 80:20"
- **Claim 4:** "an adhesive agent coated on the nylon primarily twisted yarn and the aramid primarily twisted yarn"

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

- **Claim 4:** "wherein strength at break and elongation at break measured by ASTM D885 (2004) are 8.0 to 15.0 g/d and 7 to 15%, respectively"
- **Claim 4:** "a strength maintenance percentage after disk fatigue test conducted by JIS-L 1017 (2008) of Japanese Standard Association (JSA) is 90% or higher"
- **Claim 5:** "wherein the hybrid tire cord has 3% LASE, 5% LASE, and 7% LASE measured by ASTM D885 (2004), of 0.8 to 2.0 g/d, 1.5 to 4.0 g/d, and 3.0 to 6.0 g/d, respectively"
- **Claim 6:** "wherein the hybrid tire cord has a shrinkage of 1.5 to 2.5%, wherein the shrinkage is measured under a primary load of 0.01 g/denier at 180 ° C. for 2 minutes"

**B. Indefiniteness Under 35 U.S.C. § 112 ¶ 2**

35 U.S.C. § 112, ¶ 2 requires that a patent claim "particularly point[] out and distinctly claim[] the subject matter which the applicant regards as his invention." 35 U.S.C. § 112, ¶ 2. Claim terms that fail to inform those skilled in the art "with reasonable certainty . . . about the scope of the invention" fail the definiteness requirement of 35 U.S.C. § 112, ¶ 2. *Nautilus, Inc. v. Biosig Instruments, Inc*., 572 U.S. 898, 901 (2014). HAMC contends that, at least under Kolon's actual and/or apparent application of the claims, the Asserted Claims of the Asserted Patents fail to distinctly claim what the inventors regard as their alleged invention.

Each of the asserted claims are invalid as indefinite under 35 U.S.C. § 112 because they fail to particularly point out and distinctly claim the subject matter which the applicant regards as his invention. In particular, the following limitations, read in light of the intrinsic evidence, fail to inform those skilled in the art with reasonable certainty about the scope of the claimed inventions:

**4. '663 patent (claims 1-3)**

- **Claim 1:** "a first step of primarily twisting an aramid filament yarn in a first direction to form an aramid primarily twisted yarn"
- **Claim 1:** "a second step of primarily twisting a nylon filament yarn in a second direction to form a nylon primarily twisted yarn, the second step and the first step being conducted simultaneously"

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

- **Claim 1:** "a third step of secondarily twisting the aramid primarily twisted yarn and the nylon primarily twisted yarn in a third direction to form a plied yarn, the third step being conducted continuously with the first and second steps"
- **Claim 1:** "wherein the first, second and third steps are conducted by one twister"
- **Claim 1:** "the second direction is the same as the first direction"
- **Claim 1:** "the third direction is opposite to the first direction"
- **Claim 1:** "tension applied to the nylon filament yarn in the second step is higher than tension applied to the aramid filament yarn in the first step in such an amount that, if the secondary twist of the hybrid tire cord with a predetermined length were untwisted, the aramid primarily twisted yarn would be 1.005 to 1.025 times longer than the nylon primarily twisted yarn"
- **Claim 2:** "dipping the plied yarn in an adhesive agent solution"
- **Claim 2:** "drying the adhesive agent solution-impregnated plied yarn"
- **Claim 2:** "thermally treating the dried plied yarn"
- **Claim 3:** " wherein the dipping, drying and thermal treatment steps are continuously conducted, and tension applied to the plied yarn in the dipping, drying and thermal treatment steps is 0.4 g/d or less per cord"

**5. '731 patent (claims 4-7)**

- **Claim 4:** "a first step for primarily-twisting a nylon filament at a first twist number of 300 to 500 TPM to produce a nylon primarily-twisted yarn"
- **Claim 4:** "a second step for primarily-twisting an aramid filament at a second twist number of 300 to 500 TPM to produce an aramid primarily-twisted yarn"
- **Claim 4:** "a third step for secondarily-twisting the nylon and aramid primarily-twisted yarns together at a third twist number to produce a ply yarn in such a way that the nylon and aramid primarily-twisted yarns have identical structures with each other"
- **Claim 4:** "coating the ply yarn with an adhesive, and the ply yarn coated with the adhesive has a strength retention rate of 80% or more after a disc fatigue test is

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

performed according to JIS-L 1017 method of Japanese Standard Association, and has a dry heat shrinkage of 1.5 to 2.5%"

- **Claim 4:** "wherein the first, second and third twist numbers are identical with each other"
- **Claim 4:** "wherein the third step produces a 2-ply secondarily-twisted yarn consisting of 1-ply of nylon primarily-twisted yarn and 1-ply of aramid primarily-twisted yarn"
- **Claim 5:** "wherein the first, second and third steps are performed simultaneously and continuously"
- **Claim 6:** "submerging the ply yarn into an adhesive solution"
- **Claim 6:** "drying the ply yarn having the adhesive solution impregnated therein"
- **Claim 6:** "heat-treating the dried ply yarn"
- **Claim 7:** "wherein the adhesive solution comprises Resorcinol-Formaldehyde-Latex adhesive"

**6. '765 patent (claims 1-6)**

- **Claim 1:** "a nylon primarily twisted yarn"
- **Claim 1:** "wherein the nylon primarily twisted yarn and the aramid primarily twisted yarn are secondarily twisted together"
- primarily twisted yarn are secondarily twisted together"
- **Claim 1:** "if the secondary twist of the hybrid tire cord with a predetermined length were untwisted, a length of the aramid primarily twisted yarn would be 1.005 to 1.025 times a length of the nylon primarily twisted yarn,"
- **Claim 1:** "the aramid primarily twisted yarn has a 0.1 to 5% lower twist number than a twist number of the nylon primarily twisted yarn"
- **Claim 1:** "the hybrid tire cord has a merge structure having a partial covering structure"
- **Claim 2:** "wherein the nylon primarily twisted yarn has a first twist direction"
- **Claim 2:** "the aramid primarily twisted yarn has a second twist direction"

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

- **Claim 2:** "the nylon primarily twisted yarn and the aramid primarily twisted yarn are secondarily twisted together in a third twist direction"
- **Claim 2:** "the second twist direction is the same as the first twist direction"
- **Claim 2:** "the third twist direction is opposite to the first twist direction"
- **Claim 3:** "wherein a weight ratio of the nylon primarily twisted yarn to the aramid primarily twisted yarn is 20:80 to 80:20"
- **Claim 4:** "an adhesive agent coated on the nylon primarily twisted yarn and the aramid primarily twisted yarn"
- **Claim 4:** "wherein strength at break and elongation at break measured by ASTM D885 (2004) are 8.0 to 15.0 g/d and 7 to 15%, respectively"
- **Claim 4:** "a strength maintenance percentage after disk fatigue test conducted by JIS-L 1017 (2008) of Japanese Standard Association (JSA) is 90% or higher"
- **Claim 5:** "wherein the hybrid tire cord has 3% LASE, 5% LASE, and 7% LASE measured by ASTM D885 (2004), of 0.8 to 2.0 g/d, 1.5 to 4.0 g/d, and 3.0 to 6.0 g/d, respectively"
- **Claim 6:** "wherein the hybrid tire cord has a shrinkage of 1.5 to 2.5%, wherein the shrinkage is measured under a primary load of 0.01 g/denier at 180 ° C. for 2 minutes"

## V. DOCUMENT PRODUCTION

HAMC is producing the prior art identified in these Invalidity Contentions.

In addition, based on investigations to date, HAMC is concurrently collecting documentation sufficient to show the operation of any aspects or elements of the Accused Instrumentalities identified by Kolon.

HAMC reserves the right to supplement these productions with additional documentation, in accordance with the Federal Rules of Civil Procedure, the Local Rules, the Court's orders and other applicable rules and statutes. HAMC's document production includes:

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

(a) Source code, specifications, schematics, flow charts, artwork, formulas, or other documentation sufficient to show the operation of any aspects or elements of an Accused Instrumentality identified by the patent claimant in its Patent L.R. 3-1(c) chart;

(b) A copy or sample of the prior art identified pursuant to Patent L.R. 3-3(a) which does not appear in the file history of the patent(s) at issue;

(c) All agreements that may be related to the accused instrumentality or may be comparable to a license that would result from a hypothetical reasonable royalty negotiation;

(d) Documents sufficient to show the sales, revenue, cost, and profits for accused instrumentalities identified pursuant to Patent L.R. 3-1(b) for any period of alleged infringement; and

(e) All agreements that may be used to support the party denying infringement's damages case.

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

DATED: December 13, 2024

Respectfully submitted,

*/s/ D. James Pak*

David A. Nelson, *admitted pro hac vice*
davenelson@quinnemanuel.com
**QUINN EMANUEL URQUHART & SULLIVAN, LLP**
191 N. Wacker Drive, Suite 2700
Chicago, Illinois 60606
Tel: (312) 705-7400
Fax: (312) 705-7401

D. James Pak
djamespak@quinnemanuel.com
**QUINN EMANUEL URQUHART & SULLIVAN, LLP**
865 S. Figueroa St, 10th Floor
Los Angeles, CA 90017
Tel: (213) 443-3000
Fax: (213) 443-3100

Kevin (Gyushik) Jang
kevinjang@quinnemanuel.com
**QUINN EMANUEL URQUHART & SULLIVAN, LLP**
50 California Street, 22nd Floor
San Francisco, California 94111
Tel: (415) 875-6600
Fax: (415) 875-6700

*Attorneys for Hyosung Advanced Materials Corp.*

**De-designated by HAMC; see 12/18/2024 email from K. Jang**

[redacted]

**CERTIFICATE OF SERVICE**

The undersigned hereby certifies that on December 13, 2024, a true and correct copy of the above and foregoing document has been served upon all counsel of record.

DATED: December 13, 2024

Respectfully submitted,

*/s/ Ashle Page*

Ashle Page