

FORM PTO-1619A  
Expires 08/30/99  
OMB 0651-0027

U.S. Department of Commerce  
Patent and Trademark Office  
**PATENT**

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**TO: The Commissioner of Patents and Trademarks: Please record the attached original document(s) or copy(ies).**

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Reel #  Frame #

**Corrective Document**  
Reel #  Frame #

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FORM PTO-1619B  
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Page 2

U.S. Department of Commerce  
Patent and Trademark Office  
**PATENT**

**Correspondent Name and Address** Area Code and Telephone Number

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Address (line 1)

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**Application Number(s) or Patent Number(s)**  Mark if additional numbers attached

Enter either the Patent Application Number or the Patent Number (DO NOT ENTER BOTH numbers for the same property).

Patent Application Number(s)			Patent Number(s)		
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="4997991"/>	<input type="text" value="4656207"/>	<input type="text" value="4863787"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="4946908"/>	<input type="text" value="4656208"/>	<input type="text" value="4999238"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="4962161"/>	<input type="text" value="4822832"/>	<input type="text" value="4783506"/>

If this document is being filed together with a new Patent Application, enter the date the patent application was signed by the first named executing inventor. Month Day Year

**Patent Cooperation Treaty (PCT)**  
Enter PCT application number  PCT  PCT   
only if a U.S. Application Number has not been assigned. PCT  PCT  PCT

**Number of Properties** Enter the total number of properties involved. #

**Fee Amount** Fee Amount for Properties Listed (37 CFR 3.41): \$

Method of Payment: Enclosed  Deposit Account

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**Statement and Signature**

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document. Charges to deposit account are authorized, as indicated herein.

W. Mark Bielawski  
Name of Person Signing

  
Signature

10/31/2000  
Date

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# RECORDATION FORM COVER SHEET CONTINUATION PATENTS ONLY

U.S. Department of Commerce  
Patent and Trademark Office  
**PATENT**

## Conveying Party(ies)

Mark if additional names of conveying parties attached

Enter additional Conveying Parties

Name (line 1)

Execution Date  
Month Day Year

Name (line 2)

Execution Date  
Month Day Year

Name (line 1)

Name (line 2)

Execution Date  
Month Day Year

Name (line 1)

Name (line 2)

## Receiving Party(ies)

Mark if additional names of receiving parties attached

Enter additional Receiving Party(ies)

Name (line 1)

Name (line 2)

Address (line 1)

Address (line 2)

Address (line 3)     
City State/Country Zip Code

Name (line 1)

Name (line 2)

Address (line 1)

Address (line 2)

Address (line 3)     
City State/Country Zip Code

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## Application Number(s) or Patent Number(s)

Mark if additional numbers attached

Enter either the Patent Application Number or the Patent Number (DO NOT ENTER BOTH numbers for the same property).

### Patent Application Number(s)

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### Patent Number(s)

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5025045	5066433	<input type="text"/>
4789722	5268158	<input type="text"/>
4853442	5525180	<input type="text"/>
5004590	5256344	<input type="text"/>
5098688	5299926	<input type="text"/>

## PATENT AND INVENTION ASSIGNMENT

6/24/96

**THIS PATENT AND INVENTION ASSIGNMENT** (the "Assignment") is made and entered into as of this 27<sup>th</sup> day of June, 1996 (the "Effective Date"), by and between **Hercules Incorporated**, a Delaware corporation (the "**Assignor**") and Hexcel Corporation, a Delaware corporation (herein "**Assignee**"). Capitalized terms used and not otherwise defined herein shall have the respective meanings ascribed to such terms in the Sale and Purchase Agreement, dated as of April 15, 1996, by and among the parties hereto and certain other parties (the "Agreement").

**WHEREAS**, pursuant to the Agreement, **Assignor** agreed to assign to **Assignee** (a) all right, title and interest in and to all letters patent, applications for letters patent and records of invention included within the definition of CPD Intellectual Property, including those identified and set forth on **Schedule 1.1.18 A, B, C, D and F**, attached hereto, ("Patents"), (b) all of **Assignor**'s right and interest in and to those letters patents, applications for letters patent and records of invention licensed to **Assignor** by Alliant Techsystems Inc. identified and set forth on **Schedule 1.1.18 E**, attached hereto ("Alliant Patents") and (c) all right, title and interest in and to those letters patents, application for letters patent and patent rights obtained pursuant to the Sumika-Hercules Joint Venture Dissolution Agreement dated December 9, 1994 between Hercules Incorporated and Sumitomo Chemical Company, Limited identified and set forth on **Schedule 1.1.18 O**, attached hereto, ("JV Patents").

**NOW, THEREFORE**, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, **Assignor** does hereby sell, assign, transfer, and set over to **Assignee** its successors and assigns all right, title, and interest throughout the world in and to the Patents, Alliant Patents and JV Patents (including any substitutions, continuations, divisions, continuations-in-part, reissues, reexaminations, extensions, or foreign equivalents thereof or priority rights in other countries arising therefrom and including the subject matter of all claims which may be obtained therefrom and the inventions disclosed therein and any and all letters patent which may issue from any applications included therein);

together with all income, royalties, damages, or payments due or payable for the Patents and JV Patents as of or after the date hereof, including without limitation, all claims for damages by reason of past, present, or future infringement or other unauthorized use of the Patents and JV Patents together with the right to sue for, and collect the same for its own use and enjoyment and for the use and enjoyment of its successors, assigns, or other legal representatives.

**Assignor** authorizes and requests the Commissioner of Patents and Trademarks, or, in the case of countries other than the United States, the analogous individual of agency responsible for patents, to record **Assignee** as owner of the Patents and JV Patents, including any substitutions, continuations, divisions, continuations-in-part, reissues, reexaminations, or extensions thereof, and to issue any and all letters patent thereon to **Assignee**, as **Assignee** of the entire right, title, and interest in, to, and under the same, for the sole use and enjoyment of **Assignee**, its successors, assigns, or other legal representatives.

**Assignor** does hereby covenant and agree, for itself, its successors and assigns and for its legal representatives, with **Assignee**, its successors and assigns or other legal representatives, that, upon request, it will execute and deliver substitute, continuing, divisional, reissue, or reexamination applications, amended specifications, or rightful oaths and declarations; communicate to **Assignee**, its successors and assigns, any facts known to it relating to the letters patent, applications for letter patent and inventions included in the Patents and JV Patents or the history thereof; execute preliminary statements; testify in any interference or other legal proceedings as to any facts relating to the patent rights assigned herein, the letters patent, inventions and applications for letters patent included in the Patents or JV Patents and this Assignment; execute and deliver any application papers, assignments or other instruments, and do all the above acts and such other acts to the extent that, in the opinion of counsel for **Assignee**, such acts are reasonably necessary to secure the grant of letters patent to **Assignee**, its successors and assigns or its nominees, or any additional patent protection that **Assignee** may deem appropriate, in the United States, and in all other countries where **Assignee** may desire to have the inventions, applications for letters patent or letters

patent included in the Patents or JV Patents patented, with specifications and claims in such form as shall be approved by counsel for Assignee; to vest and confirm in Assignee, its successors and assigns, or its nominees, the full and complete legal and equitable title to all the inventions, applications for letters patent and letters patent included in the Patents and JV Patents; to enable it to record such title; and to enable it to prosecute or defend any interference, opposition, reexamination, reissue, infringement, or other proceedings that may arise in connection with any of the patent rights assigned herein, it being understood that all of the documents referred to above shall be prepared by Assignee.

The reasonable costs and expenses associated with Assignor's provision of the services set forth above shall, to the extent that such services are not otherwise required to be provided without additional remuneration pursuant to the terms of the Agreement, be paid by Assignee.

IN WITNESS WHEREOF, the parties hereto have executed this Patent and Invention Assignment and caused the same to be duly delivered on their behalf as of the day and year first written above.

**HERCULES INCORPORATED**

By: *Geoffrey E. Meyer*  
Name Printed: Geoffrey E. Meyer  
Title: Chief Counsel, Int'l  
Date: 27 June '96

Witness:  
By: *Alan J. Kim*  
Name Printed: Alan J. Kim

**HEXCEL CORPORATION**

By: *S. S. Forsyth*  
Name Printed: Stephen S. Forsyth  
Title: SVP  
Date: 27 June 1996

Witness:  
By: *Alan J. Kim*  
Name Printed: Alan J. Kim

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**1.1.18 CPD Intellectual Property**  
**A. Hercules Incorporated Patents and Patent Applications in Composite Products Area**  
 page 1 of 4

Case	Subject	Patent Application & Filing Date	Patent Number & Grant Date	Remarks
JK Bard 1	Multiphase Epoxy Thermosets Having Rubber Within Disperse Phase	US* 06/901097 - 08/28/86 BE* 87307585.7 - 08/27/87 CA 540491 - 06/25/87 DE* 87307585.7 - 08/27/87 ES* 87307585.7 - 08/27/87 FR* 87307585.7 - 08/27/87 GB* 87307585.7 - 08/27/87 IL 82917 - 06/18/87 IT* 87307585.7 - 08/27/87 JP 87210019 - 08/24/87	US 4680076 - 07/14/87 BE 0259100 - 11/11/92 CA 1278631 - 01/02/91 DE 3782589.5 - 11/11/92 ES 0259100 - 11/11/92 FR 0259100 - 11/11/92 GB 0259100 - 11/11/92 IL 901097 - 03/24/91 IT 0259100 - 11/11/92	*licensed to HAESA COM-860341B
A Biswas, AN Chan, RJC Huang, H Jabloner, BJ Swetlin & AB Woodside 1	Degradation of Polymers to Functionally End-Capped Oligomers & Use of These Oligomers in Thermoset Compositions	CA 2075576.8 - 08/07/92 EP 92113440.9 - 08/06/92 JP 92213072 - 08/10/92		EP designates BE,DE,ES,FR,GB,IT
LE Carosino & DC Herak 1	Synthesis of Diethynylbenzene	US 07/498679 - 03/26/90 JP 91037551 - 03/04/91	US 4997991 - 03/05/91	
AN Chan, BJ Swetlin, SA Thompson, CR Willis, AB Woodside 1	Epoxy Resin Compositions with Improved Storage Stability	US 07/997803 - 12/29/92 EP 93120800.3 - 12/23/93 JP 93337905 - 12/28/93	US 5360840 - 11/01/94	EP designates DE,ES,FR,GB,IT
AN Chan, SA Thompson & MA White 1	Damage Tolerant Composites Containing Infusible Particles	JP 91300898 - 11/16/91		
SG Chu, H Jabloner & TT Nguyen 1	Bismaleimide Compositions Containing High Glass Transition Temperature and Soluble Reactive Oligomers and Composites Prepared Therefrom	US 07/073667 - 07/15/87	US 4946908 - 08/07/90	

<sup>1</sup> Patent and patent application countries in this schedule are identified by WIPO two-letter codes. All dates are reported month-day-year. Where no patent number is reported, no patent has been granted in the jurisdiction to date.

**A. Hercules Incorporated Patents and Patent Applications in Composite Products Area**  
page 2 of 4

Case	Subject	Patent Application & Filing Date	Patent Number & Grant Date	Remarks
SG Chu, H Jabloner & TT Nguyen 1-7	Bismaleimide Compositions Containing High Glass Transition Temperature and Soluble Reactive Oligomers and Composites Prepared Therefrom	US 07/559479 - 07/30/90	US 5096766 - 03/17/92	
SG Chu, H Jabloner & TT Nguyen 1-8	Bismaleimide Compositions Containing High Glass Transition Temperature and Soluble Reactive Oligomers and Composites Prepared Therefrom	US 07/559478 - 07/30/90	US 5112924 - 05/12/92	
SG Chu, H Jabloner & TT Nguyen 2	Thermosettable Resin Compositions	US 07/086137 - 08/17/87	US 4962161 - 10/09/90	
SG Chu, H Jabloner & TT Nguyen 2-6	Thermosettable Resin Compositions	US 07/503023 - 04/02/90	US 5095074 - 03/10/92	
SG Chu, H Jabloner & BJ Swetlin 1	Epoxy Thermosets Having Improved Toughness	US 06/702518 - 02/19/85	US 4656207 - 04/07/87	licensed to HAESA COM-860341B
SG Chu, H Jabloner & BJ Swetlin 1-2	Thermosetting Epoxy Resin Compositions and Thermosets Therefrom	US 06/724133 - 04/16/85	US 4656208 - 04/07/87	licensed to HAESA COM-860341B
SG Chu, H Jabloner & BJ Swetlin 1+1-2	Thermosetting Epoxy Resin Compositions and Thermosets Therefrom	BE 86102074.1 - 02/18/86 CA 501997 - 02/17/86 CA 559048 - 02/15/88 DE 86102074.1 - 02/18/86 ES* 552137 - 02/18/86 ES* 557453 - 03/16/87 FR 86102074.1 - 02/18/86 GB 86102074.1 - 02/18/86 IT 86102074.1 - 02/18/86 JP 86034924 - 03/12/86 JP 88147911 - 06/15/88 KR 86001135 - 02/19/86	BE 0193082 - 03/21/90 CA 1246294 - 12/06/88 CA 1283241 - 04/16/91 DE 3669724.9 - 03/21/90 ES 552137 - 07/14/87 ES 557453 - 04/11/88 FR 0193082 - 03/21/90 GB 0193082 - 03/21/90 IT 0193082 - 03/21/90 JP 1937343 - 06/09/95 JP 2039026 - 03/28/96 KR 84644 - 05/09/95	*licensed to HAESA COM-860341B



A. Hercules Incorporated Patents and Patent Applications in Composite Products Area  
page 3 of 4

Case	Subject	Patent Application & Filing Date	Patent Number & Grant Date	Remarks
SG Chu, H Jabloner & BJ Swetlin 1-2-3-4	Thermosetting Epoxy Resin Compositions and Thermosets Therefrom	US 07/035525 - 04/07/87	US 4822832 - 04/18/89	
I Gawin 1	Damage Tolerant Composites Containing Infusible Particles	US 06/884139 - 07/09/86	US 4863787 - 09/05/89	
I Gawin 1-2-5	Damage Tolerant Composites Containing Infusible Particles	US 07/338520 - 04/03/89	US 4999238 - 03/12/91	
I Gawin 1-3	Damage Tolerant Composites Containing Infusible Particles	US 07/031959 - 03/30/87	US 4783506 - 11/08/88	
I Gawin 1 + TT Nguyen 3	Amine-Terminated Polysulfone Sulfide	CA 541744 - 07/09/87 IL 82967 - 06/23/87 JP 87172021 - 07/09/87	CA 1325227 - 12/14/93 IL 82967 - 06/11/91	
I Gawin & BJ Swetlin 1	Damage Tolerant Composites Containing Infusible Particles	AT* 87306010.7 - 07/08/87 BE* 87306010.7 - 07/08/87 CA 540492 - 06/25/87 CA 616092 - 06/14/91 CA 616093 - 06/14/91 CH* 87306010.7 - 07/08/87 DE* 87306010.7 - 07/08/87 ES* 87306010.7 - 07/08/87 FR* 87306010.7 - 07/08/87 GB* 87306010.7 - 07/08/87 IL 82916 - 06/18/87 IT* 87306010.7 - 07/08/87 JP 87172020 - 07/09/87 NL* 87306010.7 - 07/08/87 SE* 87306010.7 - 07/08/87	AT 96817 - 11/03/93 BE 0252725 - 11/03/93 CA 1300783 - 05/12/92 CA 1326176 - 01/18/94 CA 1322948 - 10/12/93 CH 0252725 - 11/03/93 DE 37880071 - 11/03/93 ES FR 0252725 - 11/03/93 GB 0252725 - 11/03/93 IL 884139 - 03/24/91 IT 0252725 - 11/03/93 NL 0252725 - 11/03/93 SE 87306010.7 - 11/03/93	*licensed to HAESA COM-860341B
I Gawin & BJ Swetlin 1-2-3	Damage Tolerant Composites Containing Infusible Particles	US 07/286840 - 12/20/88	US 5025045 - 06/18/91	

**A. Hercules Incorporated Patents and Patent Applications in Composite Products Area**  
page 4 of 4

Case	Subject	Patent Application & Filing Date	Patent Number & Grant Date	Remarks
H Jabloner & TT Nguyen 1	Polyarylene Polyether Made Using Mixed Base System	CA 501996 - 02/17/86 JP 86034923 - 02/19/86 JP 94002248 - 01/13/94 JP 94002249 - 01/13/94 KR 86001134 - 02/19/86	CA 1250996 - 03/07/89 JP 2501421 - 03/13/96 JP 2501422 - 03/13/96 KR 54296 - 09/01/92	
H Jabloner & TT Nguyen 1-2	Polyarylene Polyether Made Using Mixed Base System	US 07/080144 - 07/29/87	US 4789722 - 12/06/88	
H Jabloner & MA White 1	High Modulus Matrix Resins for High Compressive Strength Composites	US 08/579509 - 12/17/95		
TT Nguyen 3	Amine-Terminated Polysulfone Sulfide, Useful as Epoxy Curing Agent	US 07/033563 - 04/03/87	US 4853442 - 08/01/89	

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**1.1.18 CPD Intellectual Property  
B. Hercules Incorporated Records of Invention Related to Composite Products**  
Page 1 of 1

Case	Subject	Submitted by	Date Submitted
COM 3674	HYPERION Graphite Fibrils in Carbon Fiber/Epoxy Composites	WC Schimpf	02/02/89
COM 3861	Cyanate Ester-Epoxy Curable Composition Containing Soluble Polyimide thermoplastics	TT Nguyen	05/05/89
COM 4462	Additives that Reduce Epoxy resin Water Sensitivity	AB Woodside	07/12/91
COM 4666	Chain Extension of Multifunctional Epoxy Resins Using Biscarboxylic Acids Derived from Wood Rosin	A Biswas, AN Chan & DW Klosiewicz	06/05/92

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**1.1.18 CPD Intellectual Property**  
**C. Hercules Incorporated Patents and Patent Applications Related to Graphite Fibers**  
 page 1 of 2

Case	Subject	Patent Application & Filing Date	Patent Number & Grant Date	Remarks
NW Hansen, JT Paul, SE Russell & WC Schimpf 1	Carbon Fibers	US <sup>1</sup> 06/520785 - 08/05/83	US 5004590 - 04/02/91	
NW Hansen, JT Paul, SE Russell & WC Schimpf 1-2	Carbon Fibers	US 07/765776 - 03/21/91	US 5098688 - 03/24/92	Terminal Disclaimer
K Manuyama & R Koide 1	Finishing Oil for Precursor for High Performance Carbon Fibers and Precursor	JP 93029722 - 01/25/93		
K Manuyama & R Koide 1-2	Finishing Oil for Precursor for High Performance Carbon Fibers and Precursor	US 08/477627 - 06/07/95		
JT Paul 12	Method of Manufacturing Carbon Fiber Using Preliminary stretch	CA 590558 - 02/09/89 EP 89102638.7 - 02/16/89 IL 89271 - 02/13/89 JP 89037316 - 02/16/89	CA 1327258 - 03/01/94 IL 89271 - 03/31/93	EP designates AT, BE, CH, DE, ES, FR, GB, IT, L X, SE
JT Paul 12-13	Method of Manufacturing Carbon Fiber Using Preliminary Stretch	US 07/366393 - 06/15/89	US 5066433 - 11/19/91	
JT Paul & WC Schimpf 2	High Modulus PAN-Based Carbon Fiber	US 07/391073 - 08/09/89	US 5268158 - 12/07/93	
JT Paul & WC Schimpf 3	Dense Packed Chopped Carbon Fiber	EP 94100778.3 - 01/20/94 JP 94013376 - 02/07/94		EP designates DE, ES, FR, GB, IT
JT Paul & WC Schimpf 3-4	Dense Packed Chopped Carbon Fiber	US 08/263494 - 06/20/94	US 5525180 - 06/11/96	

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**C. Hercules Incorporated Patents and Patent Applications Related to Graphite Fibers**  
page 2 of 2

Case	Subject	Patent Application & Filing Date	Patent Number & Grant Date	Remarks
JT Paul & WE Weldy 1	Surface Modification of Graphite Fiber	US 05/580501 - 05/23/75 CA 252762 - 05/18/76 CA 314058 - 10/24/78 GB 76021079 - 05/21/76	US 4163003 - 07/31/79 CA 1073282 - 03/11/80 CA 1082391 - 07/22/80 GB 1527154 - 05/21/76	licensed to CRT GRF-780006
WC Schimpf 1	Process of Thermally Stabilizing PAN Fibers	CA 2009546.6 - 02/07/90 EP 90102972.8 - 02/15/90 IL 93475 - 02/21/90 JP 90044245 - 02/23/90 KR 90002219 - 02/22/90	IL 93475 - 11/19/92	EP designates DE, ES, FR, GB,
WC Schimpf 1-2	Process of Thermally Stabilizing PAN Fibers	US 07/908720 - 05/07/92	US 5256944 - 10/26/93	

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**1.1.18 CPD Intellectual Property**  
**D. Hercules Incorporated Records of Invention Related to Graphite Fibers**  
Page 1 of 1

Case	Subject	Submitted by	Date Submitted
GRF 3609	Hybrid Fibers Using HYPERION Graphite Fibrils	WC Schimpf	12/14/88
GRF 4009	Carbon Fiber Surface Modification	JT Paul, Jr.	01/30/90
GRF 4012	Countercurrent Gas Flow Process for Preparing High Modulus Carbon Fiber	JT Paul, Jr. and WC Schimpf	02/05/90

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**1.1.18 CPD Intellectual Property**  
**E. Patents, Patent Applications and Unfiled Record of Invention Licensed to Hercules by Alliant - Page 1 of 2**

Case	Subject	Patent Application & Filing Date	Patent Number & Grant Date	Remarks
DJ Boll, KA Lowe, WT McCarvill & MR McCloy 1	Cure-on-the Fly® System	CA 2075013.8 - 07/30/92 EP 92112943.3 - 07/29/92 JP 92205165 - 07/31/92		EP designates CH, DE, ES, FR, GB, IT, SE.
DJ Boll, KA Lowe, WT McCarvill & MR McCloy 1-2l	Cure-on-the Fly® System	US 08/122344 - 09/15/93		
DA Crosby & KA Lowe 1	Bisphenol and Neopentyl Glycol Diglycidyl Ethers with Glycidyl Methacrylate Copolymer	US 07/613421 - 11/15/90 CA 2053439.7 - 10/15/91 EP 91119169.0 - 11/11/91 JP 91300752 - 11/15/91	US 5075356 - 12/24/91	EP designates BE, DE, ES, FR, GB, IT, NL, SE.
DR Gill & RB Marks 1	Manufacture of Filamentary Composites and Apparatus Therefor	CA 430871 - 06/21/83 CA 514909 (DIV) - 07/29/86 CA 514910 (DIV) - 07/29/86 CA 514911 (DIV) - 07/29/86 DE 83303964.7 - 07/08/83 GB 83303964.7 - 07/08/83 JP 83124550 - 07/08/83 JP 90412097 (DIV) - 12/19/90	CA 1212529 - 06/21/86 CA 1232434 - 02/09/88 CA 1232146 - 02/02/88 CA 1232435 - 02/09/88 DE 3371611.0 - 05/26/87 GB 0099245 - 05/20/87 JP 1691193 - 08/27/92	
DR Gill & RB Marks 1-2	Manufacture of Filamentary Composites and Apparatus Therefor	US 06/567446 - 12/30/83	US 4528060 - 07/09/85	
DR Gill & RB Marks 1-3	Manufacture of Filamentary Composites and Apparatus Therefor	US 06/567444 - 12/30/83	US 4519869 - 05/28/85	
DR Gill & RB Marks 1-3-5	Manufacture of Filamentary Composites and Apparatus Therefor	US 755516 - 07/16/85 CA 513654 - 07/11/86 DE 86305381.5 - 07/14/86 FR 86305381.5 - 07/14/86 GB 86305381.5 - 07/14/86 IT 86305381.5 - 07/14/86 JP 86166538 - 07/15/86	US 4867824 - 09/19/89 CA 1263593 - 12/05/89 DE 3674964.8 - 11/22/90 FR 0211535 - 10/17/90 GB 0211535 - 10/17/90 IT 0211535 - 10/17/90	

**E. Patents, Patent Applications and Unfiled Record of Invention Licensed to Hercules by Alliant - Page 2 of 2**

Case	Subject	Patent Application & Filing Date	Patent Number & Grant Date	Remarks
BT Lundy 1	Metal to Composite Tubular Joints	US 06/810702 - 12/10/85 CA 525462 - 12/16/86 GB 86117491.1 - 12/15/86 JP 86301118 - 12/17/86	US 4647078 - 03/03/87 CA 1283139 - 04/16/91 GB 0226996 - 02/27/91 JP 1648507 - 03/13/92	
FJ Policelli 4-6	End Connectors for Filament Wound Tubes	US 07/015825 - 02/17/87	US 4875717 - 10/24/89	
FJ Policelli 4+4-6	End Connectors for Filament Wound Tubes	CA 532863 - 03/24/87 DE 87302458.2 - 03/23/87 FR 87302458.2 - 03/23/87 GB 87302458.2 - 03/23/87 JP 87067752 - 03/20/87 NO 87001201 - 03/23/87	CA 1293525 - 12/24/91 DE 3773968.9 - 10/31/91 FR 0239338 - 10/23/91 GB 0239338 - 10/23/91 NO 171034 - 01/13/93	
FJ Policelli 7	Filament Wound Threaded Tube Connection	US 07/782954 - 10/25/91 CA 2081302.4 - 10/23/92 CH 92118015.4 - 10/21/92 DE 92118015.4 - 10/21/92 ES 92118015.4 - 10/21/92 FR 92118015.4 - 10/21/92 GB 92118015.4 - 10/21/92 IT 92118015.4 - 10/21/92 JP 92287918 - 10/26/92	US 5233737 - 08/10/93 CH 0538832 - 05/17/95 DE 6920254.2 - 06/22/95 ES 2075570 - 10/01/95 FR 0538832 - 05/17/95 GB 0538832 - 05/17/95 IT 0538832 - 05/17/95	

Record of Invention Identification	Subject	Submitted by	Date
COM (FPT) 4817	Composite Coiled Tube for Use in Oilpatch	MD Nelson	12/12/92

PATENT A: license 04/16/96



**1.1.18 CPD Intellectual Property  
O. Hercules Incorporated Patents, Patent Applications and Patent Rights Obtained Pursuant to  
Dissolution of Sumika-Hercules  
Page 1 of 3**

Inventor(s)	Subject (Title)	Patent Application & Filing Date (or Priority Number & Date)	Patent Number & Grant Date	Remarks
K Fukushima, T Kusunos & Y Nosaka	Process for Producing Carbon Fibers; Acrylonitrile Copolymers	US 05/719504 - 09/01/76	US 4113847 - 09/12/78	
-	Process for Manufacturing Carbon Fiber	JP 76152645 - 12/17/76	JP 1144535 - 11/26/81	JP 8150009B (publication number) 16th annuity due 11/26/96
S Kishimoto & I Obama	Process for the Production of Carbon Fibers	US 05/884183 - 03/07/78 JP 7732524 - 03/23/77	US 4154807 - 05/15/79 JP 1289533	
K Arai & N Sugai	Treatment of Carbon Fibers	US 05/882890 - 03/01/78 JP 7736839 - 03/30/77	US 4130465 - 12/19/78 JP 1139998	15th annuity due 07/16/96 for JP patent paid
I Obama & Y Yamamoto	Carbon Fibers and Process for Producing the Same	US 06/460554 - 01/24/83 JP 77154650 - 11/27/78	US 4452860 - 06/05/84 GB 2011364 JP 1442538 -	
K Maruyama	Process for Producing Carbon Fibers	US 06/115275 - 01/25/80 JP 79008456 - 01/26/79	US 4259307 - 03/31/81 JP 1516284 - GB 2041901	GB & JP cases jointly owned with Sumitomo US case assigned to HI
-	Manufacturing Carbon Fiber Having High Tenacity & Elasticity	JP 7924121 - 03/01/79	JP 1191770 - 10/12/82	JP 8247764B (publication number) currently jointly owned with Sumitomo; will be assigned to Hercules

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 Page 2 of 3

Inventor(s)	Subject (Title)	Patent Application & Filing Date (or Priority Number & Date)	Patent Number & Grant Date	Remarks
K Maruyama	Process for the Production of Carbon Fibers	US 06/127980 - 03/06/80	US 4284615 - 08/18/81 JP 1496024 <sup>1</sup>	US & JP cases assigned to Sumitomo Chemical
-	Carbon Fiber Production from Acrylonitrile Copolymers	JP 7943412 - 04/09/79	JP 1440792 - 01/10/87	JP 871010B (publication number) currently jointly owned with Sumitomo; will be assigned to Hercules
-	Process for Manufacturing Carbon Fibers Having Excellent Properties	JP 7963015 - 05/21/79	JP 1506899 <sup>1</sup> - 04/15/88	JP 8817928B (publication number) assigned to Sumitomo Chemical
-	Process for Producing Carbon Fibers	JP 7963015 - 05/21/79	JP 1514076 - 04/15/88	JP 88017929 B (publication number) jointly owned with Sumitomo
K Maruyama & A Okazaki	Process for Producing Carbon Fibers	US 06/182611 - 08/29/80	US 4335089 - 06/15/82	jointly owned with Sumitomo
A Sugiura, S Sawanishi & K Maruyama	Process for Producing Carbon Fiber Tows	US 06/366414 - 04/07/82 JP 79123487 - 09/25/79	US 4378343 - 03/29/83 JP 1543126 -	US case assigned to HI JP case jointly owned with Sumitomo

<sup>1</sup> Japanese patents owned by Sumitomo that Sumitomo will not assert its rights against the sale or precursor of carbon fiber manufactured by Hercules

**1.1.18 CPD Intellectual Property  
 O. Hercules Incorporated Patents, Patent Applications and Patent Rights Obtained Pursuant to  
 Dissolution of Sumika-Hercules  
 Page 3 of 3**

Inventor(s)	Subject (Title)	Patent Application & Filing Date (or Priority Number & Date)	Patent Number & Grant Date	Remarks
S Nakajima & T Marui	Spinning Apparatus Having a Tubular Elastomeric Flow Control Valve Body	US 07/965784 - 10/23/92 JP 91306994 <sup>1</sup> - 10/24/91 KR 9219594 -	US 5299926 - 04/05/94	JP 5117908 A (laid open number) assigned to Sumitomo Chemical ; request for examination for KR due 10/23/97
-	Sizing for Fiber Reinforcing Composition Materials	JP 92350669 - 12/04/92		JP 6173170 A (laid open number)
-	Oiling Agent Composition for Carbon Fiber Precursor	JP 9329748 - 01/25/93		JP 6220723 A (laid open number)
K Maruyama & R Koide	Oil Composition and Precursor for High Performance Carbon Fiber	US 08/477627 - 06/07/95 JP 9329722 - 01/25/93		JP 6220722 A (laid open number) also listed in Schedule C

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